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Support tools

Check the NXP Standard Products Portal www.standardproducts.nxp.com

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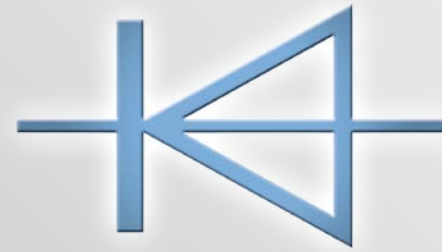
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Diodes

Schottky barrier diodes and rectifiers

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











Power diodes

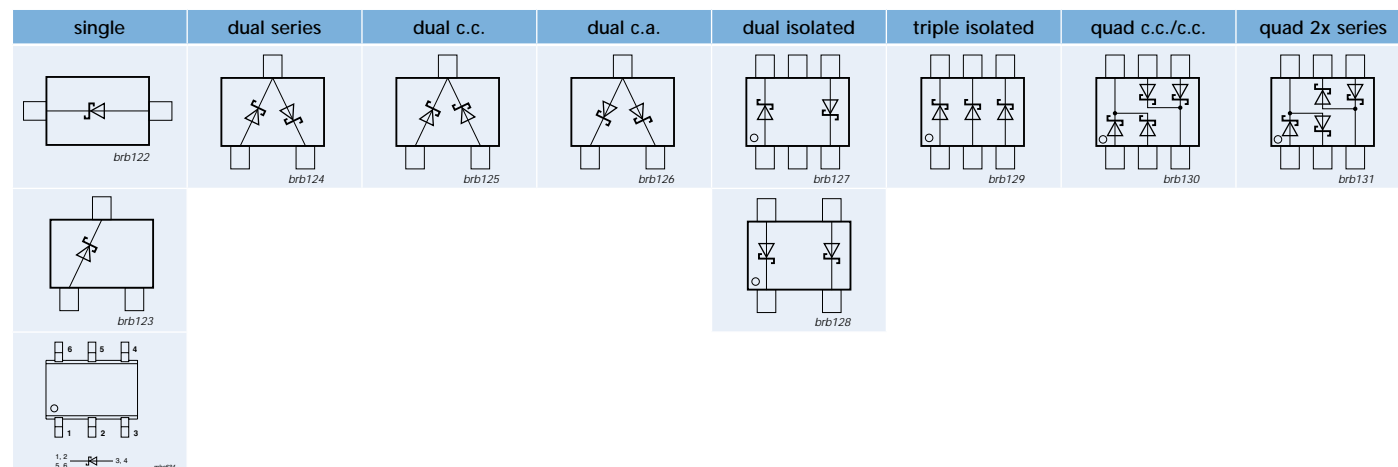
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- Ultrafast recovery power diodes 20
- Hyperfast power diodes 20








General purpose Schottky diodes ≤ 250 mA

types in **bold** represent new products

| I _f max (mA) | V _R max (V) | V _F max (mV) | @ I _f (mA) | I _R max (μA) | @ V _R (V) | Package | SOD80C (MiniMelf) | SOD68 (DO-34) | SOT23 | SOT143B | | SOD123F | SOT323 (SC-70) | SOT363 (SC-88) | SOD323F (SC-90) | SOD323 (SC-76) | SOT666 | SOT416 (SC-75) | SOD523 (SC-79) | SOD882/ SOT883 (SC-101) | | | | | | |
|-------------------------|------------------------|-------------------------|-----------------------|-------------------------|----------------------|-----------------------|---|---|---|---|--|---|---|---|---|---|---|---|---|---|------------|----------|------------|--|--|--|
| | | | | | | |  |  |  |  | |  |  |  |  |  |  |  |  |  | | | | | | |
| | | | | | | | 3.5 x 1.5 x 1.5 | 3.04 x 1.6 x 0.55 | 2.9 x 1.3 x 1.0 | 2.9 x 1.3 x 1.0 | | 2.6 x 1.6 x 1.1 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.7 x 1.25 x 0.7 | 1.7 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | 1.6 x 0.8 x 0.77 | 1.2 x 0.8 x 0.6 | 1.0 x 0.6 x 0.5 | | | | | | |
| | | | | | | P _{tot} (mW) | 300 | 500 | 250 | 250 | | 830 | 250 | 300 | 550 | 400 | 300 | 150 | 500 | 250 | | | | | | |
| 70 | 70 | 750 | 10 | 0.1 | 50 | single | | | BAS70 | | | BAS70H | BAS70W | | | 1PS76SB70 | | | | 1PS79SB70 | BAS70L | | | | | |
| | | | | | | dual series | | | BAS70-04 | | | | BAS70-04W | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | BAS70-05 | | | | BAS70-05W | | | | | | | | | | | | | |
| | | | | | | dual c.a. | | | BAS70-06 | | | | BAS70-06W | | | | | | | | | | | | | |
| | | | | | | dual isolated | | | | | | | | BAS70-07 | | | | | | | | | | | | |
| | | | | | | triple isolated | | | | | | | | | | | | | | | | | | | | |
| | | | | | | quad 2x series | | | | | | | | | | | | | | | | | | | | |
| 120 | 40 | 370 | 1 | 0.5 | 30 | single | | | | | | BAS40H | BAS40W | | | RB751V40 | | | | RB751S40 | RB751CS40 | | | | | |
| | | | | | | dual series | | | BAS40-04 | | | | BAS40-04W | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | BAS40-05 | | | | BAS40-05W | | | | | | | | | | | | | |
| | | | | | | dual c.a. | | | BAS40-06 | | | | BAS40-06W | | | | | | | | | | | | | |
| | | | | | | dual isolated | | | | | | | | BAS40-07 | | | | | | | | | | | | |
| | | | | | | quad c.c./c.c. | | | | | | | | | | | | | | | | | | | | |
| | | | | | | quad 2x series | | | | | | | | | | | | | | | | | | | | |
| 200 | 30 | 300 | 10 | 30 | 10 | single | | | | | | | | | | | | | | | 1PS79SB31 | | | | | |
| | | | | | | dual series | | | BAT754 | | | | | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | BAT754S | | | | | | | | | | | | | | | | | |
| | | 340 | 10 | 2 | 25 | dual c.c. | | | BAT754C | | | | | | | | | | | | | | | | | |
| | | | | | | dual c.a. | | | BAT754A | | | | | | | | | | | | | | | | | |
| | | | | | | triple isolated | | | | | | | | | | | | | | | | | | | | |
| | | 400 | 10 | 2 | 25 | single | BAS85 | BAT85 | BAT54 | | | BAT54H | BAT54W | | | BAT54J | 1PS76SB10 | | | BAT54T | 1PS79SB10 | BAT54L | | | | |
| | | | | | | dual series | | | BAT54S | | | | BAT54SW | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | BAT54C | | | | BAT54CW | | | | | | | | | | | | | |
| | | | | | | dual c.a. | | | BAT54A | | | | BAT54AW | | | | | | | | | | | | | |
| | | | | | | dual isolated | | | | | | | | BAT74 | | | | | | | | | | | | |
| | | | | | | triple isolated | | | | | | | | | | | | | | | | | | | | |
| | | 500 | 200 | 30 | 10 | single | | | | | | | | | | | | | | | | RB521S30 | RB521CS30L | | | |
| | | | | | | dual series | | | | | | | | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | | | | | | | | | | | | | | | | | | |
| 600 | 200 | 1 | 10 | single | | | | | | | | | | | | | | | | RB520S30 | RB520CS30L | | | | | |
| | | | | dual series | | | | | | | | | | | | | | | | | | | | | | |
| | | | | dual c.c. | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 30 | 300 | 10 | 15 | 30 | single | | | BAT721 | | | | | | | | | | | | 1PS76SB21 | | | | | |
| | | | | | | dual series | | | BAT721S | | | | | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | BAT721C | | | | | | | | | | | | | | | | | |
| | | 360 | 10 | 0.5 | 25 | single | | | BAT721A | | | | | | | | | | | | | | | | | |
| | | | | | | dual series | | | | | | | | | | | | | | | | | | | | |
| | | | | | | dual c.c. | | | | | | | | | | | | | | | | | | | | |
| 420 | 30 | 0.5 | 25 | single | | | | | | | | | | | | | | | | | | | | | | |
| | | | | dual series | | | | | | | | | | | | | | | | | | | | | | |
| | | | | dual c.c. | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 10 | 450 | 250 | 5 | 40 | single | BAS86 | BAT86 | | | | | | | | | | | | | | | | | | |
| | | | | | | single | | | | | | | | | | | | | | | | | | | | |
| 250 | 100 | 850 | 250 | 4 | 75 | single | | | | | | | | | | | | | | | | | | | | |
















Low capacitance Schottky diodes

| I _f max (mA) | V _R max (V) | V _F max (mV) | @ I _f (mA) | C _d max (pF) | @ V _R = 0 V | Package | SOT23 | SOT323 (SC-70) | SOT363 (SC-88) | SOD323 (SC-76) | SOT666 | SOD523 (SC-79) | SOD882 | | |
|-------------------------|------------------------|-------------------------|-----------------------|-------------------------|------------------------|----------------------------------|---|---|---|---|---|---|---|--|-----------|
| | | | | | | |  |  |  |  |  |  |  | | |
| | | | | | | | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.7 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | 1.2 x 0.8 x 0.6 | 1.0 x 0.6 x 0.5 | | |
| | | | | | | P _{tot} (mW) | 250 | 250 | 300 | 400 | 300 | 500 | 250 | | |
| 30 | 4 | 450 | 1 | 1 | single | BAT17 | | | | 1PS76SB17 | | | 1PS79SB17 | | |
| | | | | | triple isolated | | | | | | | | 1PS66SB17 | | |
| | | | | | dual series | PMBD353 PMBD354 ¹⁾ | | | | | | | | | |
| | | | | | single | | | 1PS70SB82 | | | | | | | 1PS10SB82 |
| | | | | | triple isolated | | | | 1PS88SB82 | | | 1PS66SB82 | | | |
| | | | | | dual series | | | | 1PS70SB84 | | | | | | |
| 15 | 340 | 1 | 1 | dual c.c. | | | | | 1PS70SB85 | | | | | | |
| | | | | dual c.a. | | | | | 1PS70SB86 | | | | | | |

¹⁾ Diodes have matched capacitance

Medium power low V_F Schottky rectifiers single ≥ 200 mA


types in **bold** represent new products

| I_F max (A) | V_R max (V) | V_F max (mV) @ I_F max | I_R max (mA) @ V_R max | Package | SOD128 | SOT457 (SC-74) | SOT23 | SOD123W | SOD123F | | SOT1061 | SOT323 (SC-70) | SOD323F (SC-90) | SOD323 (SC-76) | SOT666 | SOD523 (SC-79) | SOD882 | SOD882D | | |
|---------------|---------------|----------------------------|----------------------------|------------------------------------|---|---|---|---|---|-------------|---|---|---|---|---|---|---|---|---------------------|--------------------|
| | | | | |  |  |  |  |  | |  |  |  |  |  |  |  |  | | |
| | | | | Size (mm) | 3.8 x 2.5 x 1.0 | 2.9 x 1.5 x 1.0 | 2.9 x 1.3 x 1.0 | 2.6 x 1.7 x 1.0 | 2.6 x 1.6 x 1.1 | | 2.0 x 2.0 x 0.65 | 2.0 x 1.25 x 0.95 | 1.7 x 1.25 x 0.7 | 1.7 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | 1.2 x 0.8 x 0.6 | 1.0 x 0.6 x 0.5 | 1.0 x 0.6 x 0.37 | | |
| | | | | P_{tot} (mW) @ 1 cm ² | 1050 | 540 | 420 | 950 | 830 | | 1000 | 250 | 830 | 570 | 570 | 450 | 250 | 250 | | |
| Optimization | | | | | | | | | | | | | | | | | | | | |
| 0.2 | 30 | 480 | 0.04 | low V_F | | | | | | | | | | PMEG3002EJ | | | PMEG3002AEB | PMEG3002AEL | PMEG3002AELD | |
| | 40 | 600 | 0.01 | low I_R | | | | | | | | | | PMEG4002EJ | | | PMEG4002EB | PMEG4002EL | PMEG4002ELD | |
| | 60 | 600 | 0.1 | low V_F | | | | | | | | | | PMEG6002EJ | | | PMEG6002EB | | | |
| 0.5 | 20 | 390 | 0.2 | low V_F | | | PMEG2005ET | | PMEG2005EH | | | | | PMEG2005EJ | PMEG2005AEA | PMEG2005AEV | | | | |
| | | 440 | 1.5 | low V_F | | | | | | | | | | | | | | PMEG2005AEL | PMEG2005AELD | |
| | | 480 | 0.01 | low I_R | | | | | | | | | | | | | | PMEG2005EB | | |
| | 30 | 500 | 0.03 | low I_R | | | | | | | | | | | | | | | PMEG2005EL | PMEG2005ELD |
| | | 430 | 0.15 | low V_F | | | PMEG3005ET | | PMEG3005EH | | | | | | PMEG3005EJ | PMEG3005AEA | PMEG3005AEV | | | |
| | | 500 | 0.5 | low V_F | | | | | | | | | | | | | | PMEG3005EB | PMEG3005EL | PMEG3005ELD |
| 40 | 470 | 0.1 | low V_F | | | PMEG4005ET | | PMEG4005EH | | | | | | PMEG4005EJ | PMEG4005AEA | PMEG4005AEV | | | | |
| | 550 | 0.1 | low V_F | | | BAT720 | | | | | 1PS70SB20 | | | | | | | | | |
| 1.0 | 20 | 340 | 1 | low V_F | | | | PMEG2010ER | | | | | | | | | | | | |
| | | 375 | 1.9 | low V_F | | | | | | | PMEG2010EPA | | | | | | | | | |
| | | 430 | 0.2 | low V_F | | | PMEG2010AET | | PMEG2010AEH | | | | | | | | | | | |
| | | 450 | 0.05 | low I_R | | | | PMEG2010BER | | | | | | | | | | | | |
| | | 500 | 0.2 | low V_F | | | PMEG2010ET | | PMEG2010EH | | | | | PMEG2010EJ | PMEG2010BEA | PMEG2010BEV | | | | |
| | | 550 | 0.07 | low I_R | | | | | | | | | PMEG2010AEJ | PMEG2010EA BAT760 | PMEG2010EV BAT960 | | | | | |
| | 30 | 620 | 1.5 | low V_F | | | | | | | | | | | | | | PMEG2010AEB | | |
| | | 450 | 1.0 | low V_F | | | 1PS74SB23 | | | | | | | | | | | | | |
| | | 360 | 1.5 | low V_F | | PMEG3010EP | | | PMEG3010ER | | | | | | | | | | | |
| | | 450 | 0.05 | low I_R | | PMEG3010BEP | | | PMEG3010BER | | | | | | | | | | | |
| | | 520 | 0.05 | low I_R | | | | | | PMEG3010CEH | | | | PMEG3010CEJ | | | | | | |
| | | 560 | 0.15 | low V_F | | | | PMEG3010ET | | PMEG3010EH | | | | PMEG3010EJ | PMEG3010BEA | PMEG3010BEV | | | | |
| | | 680 | 0.5 | low V_F | | | | | | | | | | | | | | PMEG3010EB | | |
| | | 40 | 490 | 0.05 | low V_F | | PMEG4010EP | | | PMEG4010ER | | | | | | | | | | |
| | | | 640 | 0.1 | low V_F | | | | PMEG4010ET | | PMEG4010EH | | | | PMEG4010EJ | PMEG4010BEA | PMEG4010BEV | | | |
| 570 | 0.05 | | low I_R | | | | | | PMEG4010CEH | | | | PMEG4010CEJ | | | | | | | |
| 60 | 530 | 0.06 | low V_F | | PMEG6010EP | | | PMEG6010ER | | | | | | | | | | | | |
| | 650 | 0.35 | low V_F | | | PMEG6010AED | | | | | | | | | | | | | | |
| | 660 | 0.05 | low I_R | | | | | | PMEG6010CEH | | | | PMEG6010CEJ | | | | | | | |
| 1.5 | 20 | 660 | 0.07 | low I_R | | | | PMEG2015EH | | | | PMEG2015EJ | PMEG2015EA | PMEG2015EV | | | | | | |
| | 30 | 550 | 1.0 | low V_F | | | | PMEG3015EH | | | | PMEG3015EJ | | PMEG3015EV | | | | | | |
| 2.0 | 10 | 460 | 3.0 | low V_F | | | | PMEG1020EH | | | | PMEG1020EJ | PMEG1020EA | PMEG1020EV | | | | | | |
| | | 420 | 1.9 | low V_F | | | | | | PMEG2020EPA | | | | | | | | | | |
| | 20 | 525 | 0.2 | low V_F | | | | | PMEG2020EH | | | | PMEG2020EJ | PMEG2020AEA | | | | | | |
| | | 360 | 3.0 | low V_F | | PMEG3020EP | | | | | | | | | | | | | | |
| | | 420 | 1.5 | low V_F | | PMEG3020CEP | | | PMEG3020ER | | | | | | | | | | | |
| | | 450 | 0.1 | low I_R | | PMEG3020BEP | | | | | | | | | | | | | | |
| | | 470 | 2.5 | low V_F | | | | | | | | | | PMEG3020EPA | | | | | | |
| | | 520 | 0.05 | low I_R | | PMEG3020DEP | | | PMEG3020BER | | | | | | PMEG3020EJ | | | | | |
| | 30 | 620 | 1.0 | low V_F | | | | | PMEG3020EH | | | | | | | | | | | |
| | | 490 | 0.1 | low V_F | | PMEG4020EP | | | PMEG4020ER | | | | | | | | | | | |
| 535 | | 0.1 | low V_F | | | | | | | | | | PMEG4020EPA | | | | | | | |
| 575 | | 0.25 | low V_F | | PMEG6020EP | | | PMEG6020ER | | | | | | | | | | | | |
| 3.0 | 10 | 530 | 3.0 | low V_F | | | | | PMEG1030EH | | | | | PMEG1030EJ | | | | | | |
| | | 360 | 5.0 | low V_F | | PMEG3030EP | | | | | | | | | | | | | | |
| | 30 | 450 | 0.15 | low I_R | | PMEG3030BEP | | | | | | | | | | | | | | |
| | | 490 | 0.2 | low V_F | | PMEG4030EP | | | | | | | | | | | | | | |
| | | 540 | 0.1 | low I_R | | | | | PMEG4030ER | | | | | | | | | | | |
| 5.0 | 30 | 530 | 0.2 | low V_F | | PMEG6030EP | | | | | | | | | | | | | | |
| | | 360 | 8.0 | low V_F | | PMEG3050EP | | | | | | | | | | | | | | |
| 40 | 450 | 0.25 | low I_R | | PMEG3050BEP | | | | | | | | | | | | | | | |
| | 490 | 0.3 | low V_F | | PMEG4050EP | | | | | | | | | | | | | | | |

In the Spotlight

Low V_F (MEGA) Schottky rectifiers in new leadless SOD882D

- Ultra low package height of only 0.37 mm typ
- Tin-plated solderable side pads
- Ultra small dimensions 1.0 x 0.6 mm
- Portfolio of five low V_F (MEGA) Schottky diodes (I_F up to 0.5 A)
- AEC-Q101 qualified



Medium power low V_F Schottky rectifiers dual ≥ 200 mA


types in **bold** represent new products

| I_F max (A) | V_F max (V) | V_F max (mV) @ I_F max | I_R max (mA) @ V_R max | Optimization | Package | SOT223 (SC-73) | SOT23 | SOT1061 | SOT666 |
|---------------|---------------|----------------------------|----------------------------|--------------|---------------|----------------|------------------|-----------------|------------------|
| | | | | | | | | | |
| | | | | | | Size (mm) | 6.5 x 3.5 x 1.65 | 2.9 x 1.3 x 1.0 | 2.0 x 2.0 x 0.65 |
| | | | | | | P_{tot} (mW) | | | |
| 0.2 | 30 | 480 | 0.03 | low V_F | dual isolated | | | | PMEG3002TV |
| | 60 | 600 | 0.1 | low V_F | | | | | PMEG6002TV |
| 0.5 | 20 | 390 | 0.2 | low V_F | dual c.c. | | | | PMEG2005CT |
| | 30 | 430 | 0.15 | low V_F | | | | | PMEG3005CT |
| | 40 | 470 | 0.1 | low V_F | | | | | PMEG4005CT |
| 1.0 | 25 | 450 | 1.0 | low V_F | dual series | BAT120S | | | |
| | | | | low V_F | dual c.c. | BAT120C | | | |
| | | | | low V_F | dual c.a. | BAT120A | | | |
| | 40 | 500 | 0.05 | low V_F | dual c.c. | | | | PMEG4010CPA |
| | | | | low V_F | dual c.c. | | | | PMEG6010CPA |
| | | | | low V_F | dual series | BAT160S | | | |
| 60 | 650 | 0.35 | low V_F | dual c.c. | BAT160C | | | | |
| | | | low V_F | dual c.a. | BAT160A | | | | |
| | | | low V_F | dual c.c. | | | | PMEG2020CPA | |
| 2.0 | 20 | 420 | 1.0 | low V_F | dual c.c. | | | | PMEG2020CPA |
| | 30 | 440 | 2.0 | low V_F | dual c.c. | | | | PMEG3020CPA |

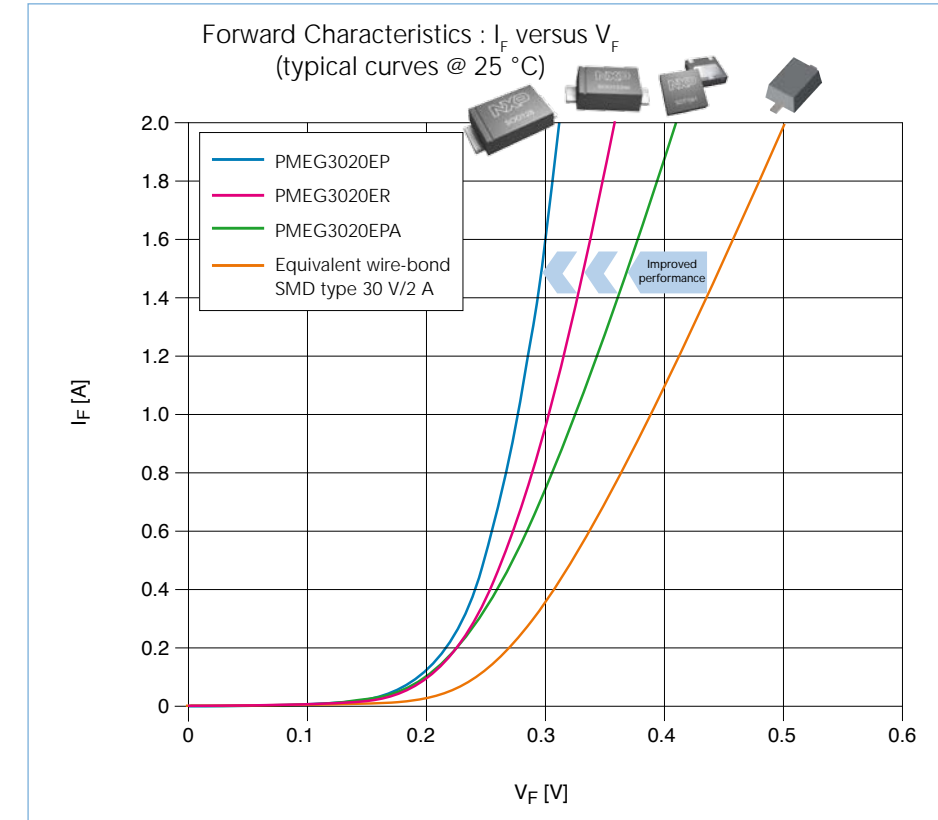
In the Spotlight

Medium power single and dual Schottky rectifiers in SOT1061

- Small (2 x 2 x 0.65 mm) leadless medium power package SOT1061
- Exposed heat sink for excellent thermal and electrical performance ($P_{tot} > 1$ W)
- High forward-current capability (I_F up to 2 A) with low forward voltage drop
- High reverse voltage (V_F up to 60 V)
- AEC-Q101 qualified



Improved forward characteristics of (MEGA)¹ Schottky rectifiers in new packages




¹ Maximum Efficiency General Application

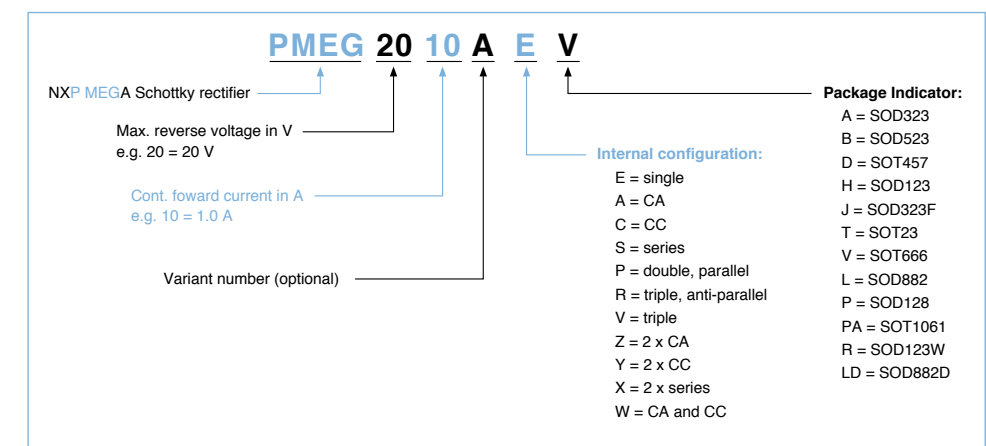
In the Spotlight

3 and 5 A low V_F (MEGA) Schottky rectifiers in SOD123W and SOD128

- Small FlatPower packages SOD123W/128, only 1 mm high
- Very low forward voltage drop V_F down to 340 mV
- Low reverse current I_R down to 0.05 mA
- High power capability due to clip-bonding technology and optimized die design
- AEC-Q101 qualified



Nomenclature of low V_F (MEGA) Schottky rectifiers



General purpose Zener diodes

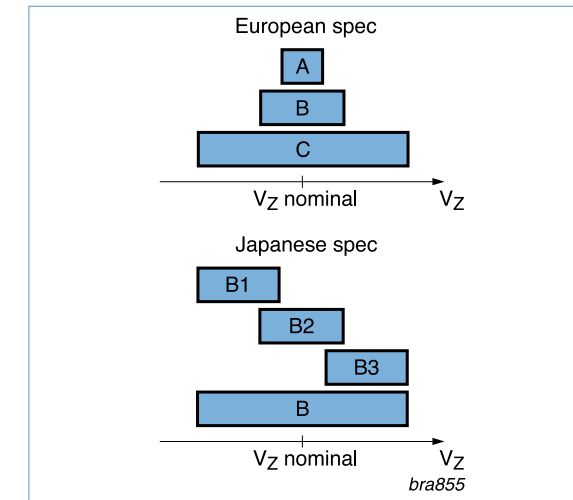
types in **bold** represent new products

| I_f max (mA) | P_{ZSM} (W) | V_Z nom (V) | V_Z tolerance | Note | Configuration | Series | Package | Size (mm) | P_{tot} (mW) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---------------|---------------|-----------------|---------|---------------|------------------|-------------------|--------------------|----------------|---------------|----|--------|----------|---------|--------|--------------|----------------|--------------------|------|-----|--------|--------|-----|--------------|--------|--------------|---------------|-----------------|------|--------|--------------|----------------|------------------|------|--------|--------------|-------------------|-----------------|-----|--------|--------------|---------------|-----------------|------|-----------|--------------|--------|-----------------|-----|---------|--------------|-------------------|-----------------|-----|-------|-------|--------|--------|-----------------|-----------|-----------------|-------|-----------------|-----|-----------|------------------|--------------|-----|--------|------------|---------|--------|------------|-----------------|-----------------|-----------------|-----|--------|------|-----------|------------------|-----|----|--------|------------|---------|---------------|----------------|-----------------|-------------------|-----|-----|--------|--------|-----|---------------|-----------|---------------|----------------|-------------------|-----|---------------|----------------|-----------------|-------------------|-----|--------------|---------|----------------|-------------------|-----|-----------|---------------|----------------|-------------------|-----|--------|------|-----|--------|---------------|----------------|-------------------|----------------|-------------------|-----|--------|---------------|--------------|--------|---------------|----------------|-------------------|-----|--------|---------------|----------------|-------------------|-----|--------------|---------|-----------------|------------------|-----|--------|---------------|----------------|-------------------|-----|--------|--------------|-----------------|------------------|-----|--------------|---------|-----------------|------------------|-----|--------|---------------|-----------------|------------------|-----|--------|--------------|-----------------|------------------|-----|-----------|---------------|--------|------------------|-----|--------|---------------|-----------------|------------------|-----|--------|------|--------|--------|---------------|----------------|-----------------|--------|------------------|-------|------|---------------|---------------|-----|-----|--------|------|--------|---------|---------------|------------------|-----------------|-----|--------|-------|-----|---------------|-----|-----|-----|
| 500 | - | 3.3-24 | C | Eur | single | 1N47xxA series | SOD66 (DO-41) | 4.8 x 2.6 x 0.81 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 60 | 3.6-75 | | | | BZV85 series | | | | 250 | - | 2.4-36 | about 2% | special | single | NZX series | SOD27 (DO-35) | 4.25 x 1.85 x 0.56 | 400 | 40 | 2.4-75 | B, C | Eur | BZX79 series | 400 | 40 | 2.4-75 | C | Eur | single | BZV90 series | SOT223 (SC-73) | 6.5 x 3.5 x 1.65 | 1500 | 250 | 40 | 2.4-75 | C | Eur | single | BZV49 series | SOT89 (SC-62) | 4.5 x 2.5 x 1.5 | 1000 | 250 | 40 | 2.4-75 | B, C | Eur | single | BZV55 series | SOD80C (MiniMelf) | 3.5 x 1.5 x 1.5 | 300 | 200 | 40 | 2.4-75 | B, C | Eur | dual c.a. | BZB84 series | SOT23 | 2.9 x 1.3 x 1.0 | 250 | A, B, C | single | BZX84 series | 250 | 30 | 5-6.8 | 0.2 V | Ave | single | PLVA600A series | SOT23 | 2.9 x 1.3 x 1.0 | 250 | 0.2 V | Ave | dual c.a. | PLVA2600A series | 250 | - | 3.0-30 | about 2.5% | special | single | NZH series | SOD123F | 2.6 x 1.6 x 1.1 | 830 | 40 | 2.4-75 | B, C | Eur | BZT52H series | 200 | 40 | 2.7-24 | B2 | Jap | dual isolated | PZUxDB2 series | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | 300 | 200 | 40 | 2.4-15 | C | Eur | dual c.a. | BZB784 series | SOT323 (SC-70) | 2.0 x 1.25 x 0.95 | 350 | 200 | 30 | 100 | C | Eur | back-to-back | BZB100A | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | B2 | Jap | PDZ-B series | 250 | 40 | 2.4-75 | B, C | Eur | single | BZX384 series | SOT323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | 200 | 40 | 2.4-36 | B, B1, B2, B3 | Jap | single | PZUxBA series | SOT323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | 200 | 60 | 100 | C | Eur | back-to-back | BZB100A | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | 200 | 40 | 2.4-36 | B, B1, B2, B3 | Jap | single | PZUxB series | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | 250 | 40 | 2.4-75 | B, C | Eur | single | BZX84J series | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | 200 | 40 | 2.4-15 | C | Eur | dual c.a. | BZB984 series | SOT663 | 1.6 x 1.2 x 0.55 | 350 | B, C | Jap | BZB984 series | 200 | 40 | 2.4-75 | B, C | Eur | single | BZX585 series | SOD523 (SC-79) | 1.2 x 0.8 x 0.6 | 300 | 2.4-36 | B, B2 | Jap | PZUxBL series | 250 | 180 | 5.6 |
| 250 | - | 2.4-36 | about 2% | special | single | NZX series | SOD27 (DO-35) | 4.25 x 1.85 x 0.56 | 400 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 40 | 2.4-75 | B, C | Eur | | BZX79 series | | | | 400 | 40 | 2.4-75 | C | Eur | single | BZV90 series | SOT223 (SC-73) | 6.5 x 3.5 x 1.65 | 1500 | 250 | 40 | 2.4-75 | C | Eur | single | BZV49 series | SOT89 (SC-62) | 4.5 x 2.5 x 1.5 | 1000 | 250 | 40 | 2.4-75 | B, C | Eur | single | BZV55 series | SOD80C (MiniMelf) | 3.5 x 1.5 x 1.5 | 300 | 200 | 40 | 2.4-75 | B, C | Eur | dual c.a. | BZB84 series | SOT23 | 2.9 x 1.3 x 1.0 | 250 | A, B, C | single | BZX84 series | 250 | 30 | 5-6.8 | 0.2 V | Ave | single | PLVA600A series | SOT23 | 2.9 x 1.3 x 1.0 | 250 | 0.2 V | Ave | dual c.a. | PLVA2600A series | 250 | - | 3.0-30 | about 2.5% | special | single | NZH series | SOD123F | 2.6 x 1.6 x 1.1 | 830 | 40 | 2.4-75 | B, C | Eur | BZT52H series | 200 | 40 | 2.7-24 | B2 | Jap | dual isolated | PZUxDB2 series | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | 300 | 200 | 40 | 2.4-15 | C | Eur | dual c.a. | BZB784 series | SOT323 (SC-70) | 2.0 x 1.25 x 0.95 | 350 | 200 | 30 | 100 | C | Eur | back-to-back | BZB100A | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | B2 | Jap | PDZ-B series | 250 | 40 | 2.4-75 | B, C | Eur | single | BZX384 series | SOT323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | 200 | 40 | 2.4-36 | B, B1, B2, B3 | Jap | single | PZUxBA series | SOT323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | 200 | 60 | 100 | C | Eur | back-to-back | BZB100A | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | 200 | 40 | 2.4-36 | B, B1, B2, B3 | Jap | single | PZUxB series | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | 250 | 40 | 2.4-75 | B, C | Eur | single | BZX84J series | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | 200 | 40 | 2.4-15 | C | Eur | dual c.a. | BZB984 series | SOT663 | 1.6 x 1.2 x 0.55 | 350 | B, C | Jap | BZB984 series | 200 | 40 | 2.4-75 | B, C | Eur | single | BZX585 series | SOD523 (SC-79) | 1.2 x 0.8 x 0.6 | 300 | 2.4-36 | B, B2 | Jap | PZUxBL series | 250 | 180 | 5.6 | C | Eur | single | TDZ5V6J | SOD323F | 1.7 x 1.25 x 0.7 | 500 | | | | | | | | |
| 400 | 40 | 2.4-75 | C | Eur | single | BZV90 series | SOT223 (SC-73) | 6.5 x 3.5 x 1.65 | 1500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 40 | 2.4-75 | C | Eur | single | BZV49 series | SOT89 (SC-62) | 4.5 x 2.5 x 1.5 | 1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 40 | 2.4-75 | B, C | Eur | single | BZV55 series | SOD80C (MiniMelf) | 3.5 x 1.5 x 1.5 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.4-75 | B, C | Eur | dual c.a. | BZB84 series | SOT23 | 2.9 x 1.3 x 1.0 | 250 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | A, B, C | | single | BZX84 series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 30 | 5-6.8 | 0.2 V | Ave | single | PLVA600A series | SOT23 | 2.9 x 1.3 x 1.0 | 250 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 0.2 V | Ave | dual c.a. | PLVA2600A series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | - | 3.0-30 | about 2.5% | special | single | NZH series | SOD123F | 2.6 x 1.6 x 1.1 | 830 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 40 | 2.4-75 | B, C | | Eur | | | | BZT52H series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.7-24 | B2 | Jap | dual isolated | PZUxDB2 series | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.4-15 | C | Eur | dual c.a. | BZB784 series | SOT323 (SC-70) | 2.0 x 1.25 x 0.95 | 350 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 30 | 100 | C | Eur | back-to-back | BZB100A | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | B2 | | Jap | PDZ-B series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 40 | 2.4-75 | B, C | Eur | single | BZX384 series | SOT323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.4-36 | B, B1, B2, B3 | Jap | single | PZUxBA series | SOT323 (SC-76) | 1.7 x 1.25 x 0.95 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 60 | 100 | C | Eur | back-to-back | BZB100A | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.4-36 | B, B1, B2, B3 | Jap | single | PZUxB series | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 40 | 2.4-75 | B, C | Eur | single | BZX84J series | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | 550 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.4-15 | C | Eur | dual c.a. | BZB984 series | SOT663 | 1.6 x 1.2 x 0.55 | 350 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | B, C | | Jap | BZB984 series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 40 | 2.4-75 | B, C | Eur | single | BZX585 series | SOD523 (SC-79) | 1.2 x 0.8 x 0.6 | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 2.4-36 | B, B2 | | | Jap | | | | PZUxBL series | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 180 | 5.6 | C | Eur | single | TDZ5V6J | SOD323F | 1.7 x 1.25 x 0.7 | 500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Notes:
 Jap: B selection: app. 5% V_Z tolerance, B1, B2, B3 selections: app. 2% V_Z tolerance in sequential intervals
 Eur: A selection: app. 1% V_Z tolerance, B selection: app. 2% V_Z tolerance, C selection: app. 5% V_Z tolerance; the selections are in overlapping intervals
 Ave: low voltage avalanche regulator diodes
 dual c.a.: dual common anode

Zener diodes specifications

Differences in Zener specifications



Japanese spec (PZU, PDZ)

| y = | B-series ± 5% | B1-series ± 2% | B2-series ± 2% | B3-series ± 2% |
|---------|------------------|-------------------|-------------------|-------------------|
| | V_Z (V) | V_Z (V) | V_Z (V) | V_Z (V) |
| PZU2.4y | 2.3 - 2.6 | - | - | - |
| PZU2.7y | 2.5 - 2.9 | 2.5 - 2.75 | 2.65 - 2.9 | - |
| PZU3.0y | 2.8 - 3.2 | 2.8 - 3.05 | 2.95 - 3.2 | - |
| PZU3.3y | 3.1 - 3.5 | 3.1 - 3.35 | 3.25 - 3.5 | - |
| PZU3.6y | 3.4 - 3.8 | 3.4 - 3.65 | 3.55 - 3.8 | - |
| PZU3.9y | 3.7 - 4.1 | 3.7 - 3.97 | 3.87 - 4.1 | - |
| PZU4.3y | 4.01 - 4.48 | 4.01 - 4.21 | 4.15 - 4.34 | 4.28 - 4.48 |
| PZU4.7y | 4.42 - 4.9 | 4.42 - 4.61 | 4.55 - 4.75 | 4.69 - 4.9 |
| PZU5.1y | 4.84 - 5.37 | 4.84 - 5.04 | 4.98 - 5.2 | 5.14 - 5.37 |
| PZU5.6y | 5.31 - 5.92 | 5.31 - 5.55 | 5.49 - 5.73 | 5.67 - 5.92 |
| PZU6.2y | 5.86 - 6.53 | 5.86 - 6.12 | 6.06 - 6.33 | 6.26 - 6.53 |
| PZU6.8y | 6.47 - 7.14 | 6.47 - 6.73 | 6.65 - 6.93 | 6.86 - 7.14 |
| PZU7.5y | 7.06 - 7.84 | 7.06 - 7.36 | 7.28 - 7.6 | 7.52 - 7.84 |
| PZU8.2y | 7.76 - 8.64 | 7.76 - 8.1 | 8.02 - 8.36 | 8.28 - 8.64 |
| PZU9.1y | 8.56 - 9.55 | 8.56 - 8.93 | 8.85 - 9.23 | 9.15 - 9.55 |
| PZU10y | 9.45 - 10.55 | 9.45 - 9.87 | 9.77 - 10.21 | 10.11 - 10.55 |
| PZU11y | 10.44 - 11.56 | 10.44 - 10.88 | 10.76 - 11.22 | 11.1 - 11.56 |
| PZU12y | 11.42 - 12.6 | 11.42 - 11.9 | 11.74 - 12.24 | 12.08 - 12.6 |
| PZU13y | 12.47 - 13.96 | 12.47 - 13.03 | 12.91 - 13.49 | 13.37 - 13.96 |
| PZU14y | - | - | 13.7 - 14.3 | - |
| PZU15y | 13.84 - 15.52 | 13.84 - 14.46 | 14.34 - 14.98 | 14.85 - 15.52 |
| PZU16y | 15.37 - 17.09 | 15.37 - 16.01 | 15.85 - 16.51 | 16.35 - 17.09 |
| PZU18y | 16.94 - 19.03 | 16.94 - 17.7 | 17.56 - 18.35 | 18.21 - 19.03 |
| PZU20y | 18.86 - 21.08 | 18.86 - 19.7 | 19.52 - 20.39 | 20.21 - 21.08 |
| PZU22y | 20.88 - 23.17 | 20.88 - 21.77 | 21.54 - 22.47 | 22.23 - 23.17 |
| PZU24y | 22.93 - 25.57 | 22.93 - 23.96 | 23.72 - 24.78 | 24.54 - 25.57 |
| PZU27y | 25.1 - 28.9 | - | - | - |
| PZU30y | 28 - 32 | - | - | - |
| PZU33y | 31 - 35 | - | - | - |
| PZU36y | 34 - 38 | - | - | - |

European spec (BZV, BZX, BZB, 1N47)

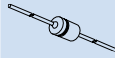
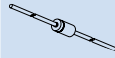



































| y = | C-series ± 5% | B-series ± 2% | A-series ± 1% |
|------------|------------------|------------------|------------------|
| | V_Z (V) | V_Z (V) | V_Z (V) |
| BZX84-y2V4 | 2.2 - 2.6 | 2.35 - 2.45 | 2.37 - 2.43 |
| BZX84-y2V7 | 2.5 - 2.9 | 2.65 - 2.75 | 2.67 - 2.73 |
| BZX84-y3V0 | 2.8 - 3.2 | 2.94 - 3.06 | 2.97 - 3.03 |
| BZX84-y3V3 | 3.1 - 3.5 | 3.23 - 3.37 | 3.26 - 3.34 |
| BZX84-y3V6 | 3.4 - 3.8 | 3.53 - 3.67 | 3.56 - 3.64 |
| BZX84-y3V9 | 3.7 - 4.1 | 3.82 - 3.98 | 3.86 - 3.94 |
| BZX84-y4V3 | 4 - 4.6 | 4.21 - 4.39 | 4.25 - 4.35 |
| BZX84-y4V7 | 4.4 - 5 | 4.61 - 4.79 | 4.65 - 4.75 |
| BZX84-y5V1 | 4.8 - 5.4 | 5 - 5.2 | 5.04 - 5.16 |
| BZX84-y5V6 | 5.2 - 6 | 5.49 - 5.71 | 5.54 - 5.66 |
| BZX84-y6V2 | 5.8 - 6.6 | 6.08 - 6.32 | 6.13 - 6.27 |
| BZX84-y6V8 | 6.4 - 7.2 | 6.66 - 6.94 | 6.73 - 6.87 |
| BZX84-y7V5 | 7 - 7.9 | 7.35 - 7.65 | 7.42 - 7.58 |
| BZX84-y8V2 | 7.7 - 8.7 | 8.04 - 8.36 | 8.11 - 8.29 |
| BZX84-y9V1 | 8.5 - 9.6 | 8.92 - 9.28 | 9 - 9.2 |
| BZX84-y10 | 9.4 - 10.6 | 9.8 - 10.2 | 9.9 - 10.1 |
| BZX84-y11 | 10.4 - 11.6 | 10.8 - 11.2 | 10.8 - 11.11 |
| BZX84-y12 | 11.4 - 12.7 | 11.8 - 12.2 | 11.88 - 12.12 |
| BZX84-y13 | 12.4 - 14.1 | 12.7 - 13.3 | 12.87 - 13.13 |
| BZX84-y15 | 13.8 - 15.6 | 14.7 - 15.3 | 14.85 - 15.15 |
| BZX84-y16 | 15.3 - 17.1 | 15.7 - 16.3 | 15.84 - 16.16 |
| BZX84-y18 | 16.8 - 19.1 | 17.6 - 18.4 | 17.82 - 18.18 |
| BZX84-y20 | 18.8 - 21.2 | 19.6 - 20.4 | 19.8 - 20.2 |
| BZX84-y22 | 20.8 - 23.3 | 21.6 - 22.4 | 21.78 - 22.22 |
| BZX84-y24 | 22.8 - 25.6 | 23.5 - 24.5 | 23.76 - 24.24 |
| BZX84-y27 | 25.1 - 28.9 | 26.5 - 27.5 | 26.73 - 27.27 |
| BZX84-y30 | 28 - 32 | 29.4 - 30.6 | 29.70 - 30.30 |
| BZX84-y33 | 31 - 35 | 32.3 - 33.7 | 32.67 - 33.33 |
| BZX84-y36 | 34 - 38 | 35.3 - 36.7 | 35.64 - 36.36 |
| BZX84-y39 | 37 - 41 | 38.2 - 39.8 | 38.61 - 39.39 |
| BZX84-y43 | 40 - 46 | 42.1 - 43.9 | 42.57 - 43.43 |
| BZX84-y47 | 44 - 50 | 46.1 - 47.9 | - |
| BZX84-y51 | 48 - 54 | 50 - 52 | 50.49 - 51.51 |
| BZX84-y56 | 52 - 60 | 54.9 - 57.1 | - |
| BZX84-y62 | 58 - 66 | 60.8 - 63.2 | - |
| BZX84-y68 | 64 - 72 | 66.6 - 69.4 | - |
| BZX84-y75 | 70 - 79 | 73.5 - 76.5 | 74.25 - 75.75 |

NZX-series in SOD27

| | V_Z (V) | V_Z (V) | V_Z (V) |
|---------|-----------|-----------|---------------|
| NZX2V4A | 2.3 - 2.5 | NZX6V2D | 6.1 - 6.4 |
| NZX2V4B | 2.4 - 2.6 | NZX6V2E | 6.3 - 6.6 |
| NZX2V7A | 2.5 - 2.7 | NZX6V8A | 6.4 - 6.7 |
| NZX2V7B | 2.6 - 2.8 | NZX6V8B | 6.6 - 6.9 |
| NZX2V7C | 2.7 - 2.9 | NZX6V8C | 6.7 - 7 |
| NZX3V0A | 2.8 - 3 | NZX6V8D | 6.9 - 7.2 |
| NZX3V0B | 2.9 - 3.1 | NZX7V5A | 7 - 7.3 |
| NZX3V0C | 3 - 3.2 | NZX7V5B | 7.2 - 7.6 |
| NZX3V3A | 3.1 - 3.3 | NZX7V5C | 7.3 - 7.7 |
| NZX3V3B | 3.2 - 3.4 | NZX7V5D | 7.5 - 7.9 |
| NZX3V3C | 3.3 - 3.5 | NZX7V5X | 7.07 - 7.45 |
| NZX3V6A | 3.4 - 3.6 | NZX8V2A | 7.7 - 8.1 |
| NZX3V6B | 3.5 - 3.7 | NZX8V2B | 7.9 - 8.3 |
| NZX3V6C | 3.6 - 3.8 | NZX8V2C | 8.1 - 8.5 |
| NZX3V9A | 3.7 - 3.9 | NZX8V2D | 8.3 - 8.7 |
| NZX3V9B | 3.8 - 4 | NZX9V1A | 8.5 - 8.9 |
| NZX3V9C | 3.9 - 4.1 | NZX9V1B | 8.7 - 9.1 |
| NZX4V3A | 4 - 4.2 | NZX9V1C | 8.9 - 9.3 |
| NZX4V3B | 4.1 - 4.3 | NZX9V1D | 9.1 - 9.5 |
| NZX4V3C | 4.2 - 4.4 | NZX9V1E | 9.3 - 9.7 |
| NZX4V3D | 4.3 - 4.5 | NZX10A | 9.5 - 9.9 |
| NZX4V7A | 4.4 - 4.6 | NZX10B | 9.7 - 10.1 |
| NZX4V7B | 4.5 - 4.7 | NZX10C | 9.9 - 10.3 |
| NZX4V7C | 4.6 - 4.8 | NZX10D | 10.2 - 10.6 |
| NZX4V7D | 4.7 - 4.9 | NZX11A | 10.4 - 10.8 |
| NZX5V1A | 4.8 - 5 | NZX11B | 10.7 - 11.1 |
| NZX5V1B | 4.9 - 5.1 | NZX11C | 10.9 - 11.3 |
| NZX5V1C | 5 - 5.2 | NZX11D | 11.1 - 11.6 |
| NZX5V1D | 5.1 - 5.3 | NZX12A | 11.4 - 11.9 |
| NZX5V6A | 5.2 - 5.5 | NZX12B | 11.6 - 12.1 |
| NZX5V6B | 5.3 - 5.6 | NZX12C | 11.9 - 12.4 |
| NZX5V6C | 5.4 - 5.7 | NZX12D | 12.2 - 12.7 |
| NZX5V6D | 5.5 - 5.8 | NZX12X | 11.44 - 12.03 |
| NZX5V6E | 5.6 - 5.9 | NZX13A | 12.4 - 12.9 |
| NZX6V2A | 5.7 - 6 | NZX13B | 12.6 - 13.1 |
| NZX6V2B | 5.8 - 6.1 | NZX13C | 12.9 - 13.4 |
| NZX6V2C | 6 - 6.3 | NZX14A | 13.2 - 13.7 |

General purpose switching diodes ≤ 100V

types in **bold** represent new products

| V _R max (V) | V _F max (V) | @ I _F (mA) | I _R max (mA) | @ V _R (V) | t _{rr} max (ns) | Package | SOD27 (DO-35) | SOD68 (DO-34) | SOD80C (MiniMelf) | SOT23 | SOT143B | SOD123F | | SOT323 (SC-70) | SOT363 (SC-88) | SOD323 (SC-76) | SOD323F (SC-90) | SOT666 | SOT416 (SC-75) | SOD523 (SC-79) | SOD882 | SOT883 (SC-101) | SOD882D | | | | |
|------------------------|------------------------|---|-------------------------|----------------------|--------------------------|---|---|---|--|---|---|---|--|---|---|---|---|---|---|---|---|---|---|--|----------------|--|--|
| | | | | | | |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | | | |
| | | | | | | | 4.25 x 1.85 x 0.56 | 3.04 x 1.6 x 0.55 | 3.5 x 1.5 x 1.5 | 2.9 x 1.3 x 1.0 | 2.9 x 1.3 x 1.0 | 2.6 x 1.6 x 1.1 | | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.7 x 1.25 x 0.95 | 1.7 x 1.25 x 0.7 | 1.6 x 1.2 x 0.55 | 1.6 x 0.8 x 0.77 | 1.2 x 0.8 x 0.6 | 1.0 x 0.6 x 0.5 | 1.0 x 0.6 x 0.5 | 1.0 x 0.6 x 0.37 | | | | |
| P _{tot} (mW) | | | | | | | 500 | 500 | 500 | 250 | 250 | 830 | | 200 | 300 | 400 | 550 | 180 | 170 | 500 | 250 | 250 | 250 | | | | |
| 50 | 1 | 50 | 100 | 50 | 4 |  | | | | BAL74 | | | | | | | | | | | | | | | | | |
| | | | | | |  | | | | BAV74 | | | | | | | | | | | | | | | | | |
| 70 | 1 | 50 | 1000 | 70 | 4 |  | | | | BAL99 | | | | | | | | | | | | | | | | | |
| 75 | 1 | 10 | 25 | 20 | 4 |  | | 1N4531 | | | | | | | | | | | | | | | | | | | |
| | | 50 | 1000 | 75 | 4 |  | | | | | BAS28 | | | | | | | | | | | | | | | | |
| | | 100 | 5000 | 75 | 4 |  | | | BAS32L | | | | | | | | | | | | | | | | | | |
| 90 | 1 | 50 | 500 | 80 | 4 |  | | | | BAW56 | | | | BAW56W | | | | | | BAW56T | | | BAW56M | | | | |
| | | | | | |  | | | | | | | | | | | | BAW56S | | | | | | | | | |
| | | | | | |  | | | | | | | | | | | | | BAW756S | | | | | | | | |
| 100 | 1 | 10 | 25 | 20 | 4 |  | 1N4148 | | | | | | | | | | | | | | | | | | | | |
| | | | | | |  | | | | | | BAS16H | | | | | | BAS316 | BAS16J | | | | | | | | |
| | |  | | | | | | | | BAS16 | | | | | BAS16W | | | | | | | BAS16T | | | | | |
| | |  | | | | | | | | | | | | | | | | | | | | BAS516 | BAS16L | | BAS16LD | | |
| | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
| | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
| | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
| | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 50 | 500 | 80 | 4 |  | | | | BAV70 | | | | BAV70W | | | | | | BAV70T | | | BAV70M | | | | |
| | | | | | |  | | | | | | | | | BAV70S | | | | | | | | | | | | |
| | | | | | |  | | | | BAV99 | | | | BAV99W | | | | | | | | | | | | | |
| | | | | | |  | | | | | | | | | BAV99S | | | | | | | | | | | | |

General purpose switching diodes > 100V

| V _R max (V) | V _F max (V) | @ I _F (mA) | I _R max (nA) | @ V _R (V) | t _{rr} max (ns) | Package | SOD27 (DO-35) | SOD80C (MiniMelf) | SOT457 (SC-74) | SOT23 | SOT143B | SOD123F | SOT323 (SC-70) | SOT363 (SC-88) | SOD323 (SC-76) | SOD323F (SC-90) | SOD523 (SC-79) | |
|------------------------|------------------------|-----------------------|-------------------------|----------------------|--------------------------|---------|-----------------------|--------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|-------------------|-------------------|------------------|-----------------|
| | | | | | | | Size (mm) | 4.25 x 1.85 x 0.56 | 3.5 x 1.5 x 1.5 | 2.9 x 1.5 x 1.0 | 2.9 x 1.3 x 1.0 | 2.9 x 1.3 x 1.0 | 2.6 x 1.6 x 1.1 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.7 x 1.25 x 0.95 | 1.7 x 1.25 x 0.7 | 1.2 x 0.8 x 0.6 |
| | | | | | | | P _{tot} (mW) | 500 | 300 | 500 | 250 | 250 | 830 | 350 | 300 | 400 | 550 | 500 |
| 150 | 1 | 100 | 100 | 150 | 50 | | BAV20 | | | | | | | | | | | |
| | | | | | | | BAV21 | BAV103 | | | BAS21H | | BAS321 | | | | | |
| 200 | 1 | 100 | 100 | 200 | 50 | | | | | BAS21 | | | BAS21W | | | | | |
| | | | | | | | | | | | | BAV23 | | | | | | |
| | | | | | | | | | | BAV23A | | BAS21AW | | | | | | |
| | | | | | | | | | | BAV23C | | | | | | | | |
| | | | | | | | | | | BAV23S | | BAS21SW | | | | | | |
| | | | | | | | | | | BAS21VD | | | | | | | | |
| | | | | | | | | | | | | | | | BAS21J | BAS521 | | |
| 300 | 1.1 | 100 | 150 | 250 | 50 | | | | | BAS101 | | | | | | | | |
| | | | | | | | | | | BAS101S | | | | | | | | |
| | | | | | | | | | | | BAW101 | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | BAW101S | |

Controlled avalanche switching diodes









| V _R max (V) | V _F max (V) | @ I _F (mA) | I _R max (nA) @ V _R max | I _{FSM} max (A) | I _{FRM} max (mA) | C _d max (pF) | t _{rr} max (ns) | Package | SOT23 | SOT143B | |
|------------------------|------------------------|-----------------------|--|--------------------------|---------------------------|-------------------------|--------------------------|---------|-----------------------|-----------------|-----------------|
| | | | | | | | | | Size (mm) | 2.9 x 1.3 x 1.0 | 2.9 x 1.3 x 1.0 |
| | | | | | | | | | P _{tot} (mW) | 250 | 250 |
| 60 | 1 | 200 | 100 | 9 | 600 | 2.5 | 6 | | | BAS56 | |
| 90 | 1 | 200 | 100 | 10 | 600 | 35 | 50 | | BAS29 | | |
| | | | | | | | | | BAS31 | | |
| | | | | | | | | | BAS35 | | |
| | | | | | | | | | | | |

Low leakage current switching diodes

| V _R max (V) | V _F max (V) | @ I _F (mA) | I _R max (nA) @ V _R max | t _{rr} max (μs) | Package | SOD80C (MiniMelf) | SOD68 (DO-34) | SOT23 | SOD123F | SOT323 (SC-70) | SOD323 (SC-76) | SOT416 (SC-75) | SOD523 (SC-79) | |
|------------------------|------------------------|-----------------------|--|--------------------------|---------|-----------------------|-----------------|-------------------|-----------------|-----------------|-------------------|-------------------|------------------|-----------------|
| | | | | | | Size (mm) | 3.5 x 1.5 x 1.5 | 3.04 x 1.6 x 0.55 | 2.9 x 1.3 x 1.0 | 2.6 x 1.6 x 1.1 | 2.0 x 1.25 x 0.95 | 1.7 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.2 x 0.8 x 0.6 |
| | | | | | | P _{tot} (mW) | 300 | 500 | 250 | 830 | 250 | 400 | 170 | 500 |
| 75 | 1 | 10 | 5 | 3 | | | | | | BAS116H | BAS416 | | BAS716 | |
| | | | | | | | | | | | BAS116 | | BAS116T | |
| | | | | | | | | | | | BAV199 | | BAV199W | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | BAW156 | | | |
| | | | | | | | | | | | | BAV170 | | |
| 125 | 1 | 100 | 1 | 1.5 typ | | BAS45AL | BAS45A | | | | | | | |





Ultrafast recovery power diodes

types in **bold** represent new products

| V_{RRM} (V) | I_{FAV} (A) | V_F (typ) @ 150C (V) | @ I_F (A) | t_{rr} (typ) @ 25C (ms) | SOD59 (TO220AC) | SOD113 (2-pin SOT186A) | SOT78 (TO220AB) | SOT186A (isolated TO220AB) | SOT223 | SOT226 (I ² PAK) | SOT404 (D ² PAK) | SOT428 (DPAK) |
|---------------|---------------|------------------------|-------------|---------------------------|---|---|---|---|--|---|---|---|
| | | | | |  |  |  |  |  |  |  |  |
| 100 | 8 | 0.8 | 8 | 20 | BYW29E-100 | | | | | | | |
| | 2 x 10 | 0.72 | 8 | 20 | | | BYV32E-100 | | | | | |
| 150 | 2 x 0.75 | 0.5 | 0.5 | 10 | | | | | BYV40E-150 | | | |
| | 8 | 0.8 | 8 | 20 | BYW29E-150 | | | | | | | |
| | 2 x 10 | 0.72 | 8 | 20 | | | BYV32E-150 | | | | | |
| 200 | 2 x 15 | 0.78 | 15 | 20 | | | BYV42E-150 | | | | | |
| | 8 | 0.8 | 8 | 20 | BYW29E-200 | BYW29EX-200 | | | | | | BYW29ED-200 |
| | 2 x 5 | 0.8 | 5 | 15 | | | BYQ28E-200 | BYQ28X-200 | | | | BYQ28ED-200 |
| | 14 | 0.83 | 14 | 20 | BYV79E-200 | | | | | | | |
| | 2 x 8 | 0.84 | 8 | 20 | | | BYQ30E-200 | | | | | |
| | 2 x 10 | 0.72 | 8 | 20 | | | BYV32E-200 | | | BYV32G-200 | BYV32EB-200 | |
| 300 | 2 x 15 | 0.78 | 15 | 20 | | | BYV42E-200 | | | BYV42G-200 | BYV42EB-200 | |
| | 2 x 5 | 0.95 | 5 | 50 | | | BYT28-300 | | | | | |
| | 9 | 0.9 | 8 | 50 | BYV29-400 | | | | | | | |
| 400 | 2 x 10 | 0.87 | 10 | 50 | | | BYV34-400 | | | | | |
| | 9 | 0.9 | 8 | 50 | BYV29-500 | BYV29X-500 | | | | | BYV29B-500 | |
| 500 | 2 x 5 | 0.95 | 5 | 50 | | | BYT28-500 | | | | | |
| | 15 | 0.9 | 15 | 50 | BYT79-500 | | | | | | | |
| | 2 x 10 | 0.87 | 10 | 50 | | | BYV34-500 | | | | | |
| | 2 x 15 | 0.95 | 15 | 50 | | | BYV44-500 | | | | | |
| 600 | 5 | 0.97 | 5 | 50 | | BYV25X-600 | | | | BYV25G-600 | | BYV25D-600 |
| | 8 | 1.07 | 8 | 60 | BYR29-600 | BYR29X-600 | | | | | | |
| | 9 | 0.97 | 8 | 50 | BYV29-600 | BYV29X-600 | | | | BYV29G-600 | BYV29B-600 | |
| | 15 | 1 | 15 | 50 | BYT79-600 | BYT79X-600 | | | | | | |
| | 2 x 10 | 0.92 | 10 | 50 | | | BYV34-600 | BYV34X-600 | | BYV34G-600 | | |
| | 5 | 1.1 | 5 | 17.5 | | BYV25FX-600 | BYV25F-600 | | | | BYV25FB-600 | BYV25FD-600 |
| | 9 | 1.25 | 8 | 17.5 | | BYV29FX-600 | BYV29F-600 | | | | BYV29FB-600 | BYV29FD-600 |
| | 2 x 10 | 1.3 | 10 | 20 | | | BYV410-600 | BYV410X-600 | | | | |
| 800 | 8 | 1.07 | 8 | 60 | BYR29-800 | BYR29X-800 | | | | | | |

Hyperfast power diodes

types in **bold** represent new products

| V_{RRM} (V) | I_{FAV} (A) | V_F (typ) @ 150C (V) | @ I_F (A) | t_{rr} (typ) @ 25C (ms) | SOD59 (TO220AC) | SOD113 (2-pin SOT186A) | SOT78 (TO220AB) | SOT404 (D ² PAK) |
|---------------|---------------|------------------------|-------------|---------------------------|---|---|--|---|
| | | | | |  |  |  |  |
| 600 | 5 | 1.4 | 5 | 19 | BYC5-600 | BYC5X-600 | | BYC5B-600 |
| | 8 | 1.4 | 8 | 19 | BYC8-600 | BYC8X-600 | | BYC8B-600 |
| | 8 | 1.4 | 8 | 19 | BYC8D-600 | BYC8DX-600 | | |
| | 8 | 2 | 8 | 12.5 | | BYC58X-600 | | |
| | 10 | 1.4 | 10 | 19 | BYC10-600 | BYC10X-600 | | BYC10B-600 |
| | 2 x 5 | 1.4 | 5 | 19 | | | BYC10-600CT | |
| | 15 | 1.4 | 15 | 19 | BYC15-600 | BYC15X-600 | | |
| | 20 | 1.4 | 20 | 19 | BYC20-600 | BYC20X-600 | | |












Protection and signal conditioning

| | |
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| Standard ESD protection devices | 22 |
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Standard ESD protection devices

types in **bold** represent new products








| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | P _{pp} ^[1] max (W) | ESD rating ^[2] max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) | | | |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|--|------------------------------------|--|---|---------------------|---|---|---|-----------------|-----------------|
| Unidirectional | Bidirectional | | | | | | | | | | | | | |
| 1 | 0 | 3.3 | 207 | 300 | 150 | 30 | 2 |  | PESD3V3S1UL | SOD882 | 1.0 x 0.6 x 0.5 | | | |
| | | 5 | 152 | 200 | 150 | 30 | 1 | | PESD5V0S1UL |  | | | | |
| | | 12 | 38 | 75 | 150 | 30 | 0.05 | | PESD12VS1UL | | | | | |
| | | 15 | 32 | 70 | 150 | 30 | 0.05 | | PESD15VS1UL | | | | | |
| | | 24 | 23 | 50 | 150 | 23 | 0.05 | | PESD24VS1UL | | | | | |
| | | 5 | 152 | 200 | 150 | 30 | 1 | | PESD5V0S1ULD | | SOD882D | 1.0 x 0.6 x 0.37 | | |
| | | 12 | 38 | 75 | 150 | 30 | 0.05 | | PESD12VS1ULD |  | | | | |
| | | 15 | 32 | 70 | 150 | 30 | 0.05 | | PESD15VS1ULD | | | | | |
| | | 24 | 23 | 50 | 150 | 23 | 0.05 | | PESD24VS1ULD | | | | | |
| | | 3.3 | 207 | 300 | 330 | 30 | 2 | | PESD3V3S1UB | | SOD523 (SC-79) | | 1.2 x 0.8 x 0.6 | |
| | | 5 | 152 | 200 | 260 | 30 | 1 | | PESD5V0S1UB | |  | | | |
| | | 12 | 38 | 75 | 180 | 30 | 0.05 | | PESD12VS1UB | | | | | |
| | | 15 | 32 | 70 | 160 | 30 | 0.05 | | PESD15VS1UB | | | | | |
| | | 24 | 23 | 50 | 160 | 23 | 0.05 | | PESD24VS1UB | | | | | |
| | | 5 | 480 | 530 | 890 | 30 | 4 | | PESD5V0S1UA | SOD323 (SC-76) | | 1.7 x 1.25 x 0.95 | | |
| | | 12 | 160 | 180 | 600 | 30 | 0.1 | | PESD12VS1UA |  | | | | |
| | | 24 | 23 | 50 | 160 | 23 | 0.05 | | PESD24VS1UA | | | | | |
| | | 5 | 480 | 530 | 890 | 30 | 4 | | PESD5V0S1UJ | | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 | | |
| | | 12 | 160 | 180 | 600 | 30 | 0.1 | | PESD12VS1UJ |  | | | | |
| | | 2.5 | 229 | 300 | 260 | 30 | 6 | | PESD5Z2.5 | | SOD523 (SC-79) | 1.2 x 0.8 x 0.6 | | |
| | | 3.3 | 172 | 200 | 260 | 30 | 0.05 | | PESD5Z3.3 |  | | | | |
| | | 5 | 89 | 150 | 180 | 30 | 0.05 | | PESD5Z5.0 | | | | | |
| | | 6 | 78 | 150 | 180 | 30 | 0.01 | | PESD5Z6.0 | | | | | |
| | | 7 | 69 | 150 | 180 | 30 | 0.01 | | PESD5Z7.0 | | | | | |
| | | 12 | 35 | 75 | 200 | 30 | 0.01 | | PESD5Z12 | | | | | |
| | | 5 | 68 | 75 | 150 | 30 | 1 | | PESD9X5.0L | | SOD882 | | 1.0 x 0.6 x 0.5 | |
| | | 7 | 62 | 70 | 150 | 30 | 1 | | PESD9X7.0L | |  | | | |
| | | 0 | 1 | 5 | 35 | 45 | 130 | | 30 | 0.1 | |  | PESD5V0S1BL | SOD882D |
| | | | | 5 | 35 | 45 | 130 | | 30 | 0.1 | PESD5V0S1BLD | | | |
| | | | | 5 | 35 | 45 | 130 | | 30 | 0.1 | PESD5V0S1BB | | SOD523 (SC-79) | 1.2 x 0.8 x 0.6 |
| 5 | 35 | | | 45 | 130 | 30 | 0.1 | PESD5V0S1BA | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 | | | | |
| 5.5 | 35 | | | 45 | 100 | 30 | 0.1 | PESD5V0S1BSF | SOD962 | 0.6 x 0.3 x 0.3 | | | | |

^[1] 8/20 μs surge pulse acc. to IEC 61000-4-5

^[2] acc. to IEC 61000-4-2 (contact discharge)

Standard ESD protection devices

types in **bold** represent new products





















| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | P _{pp} ^[1] max (W) | ESD rating ^[2] max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) | |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|--|------------------------------------|--|---|---|---|--------------------|-------------------|
| Unidirectional | Bidirectional | | | | | | | | | | | |
| 2 | 1 | 3.3 | 200 | 275 | 150 | 23 | 3 |  | PESD3V3S2UQ | SOT663 | 1.6 x 1.2 x 0.55 | |
| | | 5 | 150 | 215 | 150 | 30 | 0.3 | | PESD5V0S2UQ | | | |
| | | 12 | 38 | 100 | 150 | 30 | 0.03 | | PESD12VS2UQ | | | |
| | | 15 | 32 | 70 | 150 | 30 | 0.05 | | PESD15VS2UQ | | | |
| | | 24 | 23 | 50 | 150 | 23 | 0.05 | | PESD24VS2UQ | | | |
| | | 3.3 | 207 | 300 | 330 | 30 | 2 | |  | PESD3V3S2UT | SOT23 | 2.9 x 1.3 x 1.0 |
| | | 5.2 | 152 | 200 | 260 | 30 | 1 | | | PESD5V2S2UT | | |
| | | 12 | 38 | 75 | 180 | 30 | 1 | | | PESD12VS2UT | | |
| | | 15 | 32 | 70 | 160 | 30 | 1 | | | PESD15VS2UT | | |
| | | 24 | 23 | 50 | 160 | 23 | 1 | | | PESD24VS2UT | | |
| | | 36 | 17 | 35 | 160 | 30 | 1 (@ 30 V) | | | PESD36VS2UT | | |
| | | 3.3 | 207 | 300 | 330 | 30 | 2 | | | PESD3V3S2UAT | | |
| | | 5 | 152 | 200 | 260 | 30 | 1 | | | PESD5V0S2UAT | | |
| | | 12 | 38 | 75 | 180 | 30 | 0.05 | | | PESD12VS2UAT | | |
| | | 15 | 32 | 70 | 160 | 30 | 0.05 | | | PESD15VS2UAT | | |
| 24 | 23 | 50 | 160 | 23 | 0.05 | PESD24VS2UAT | | | | | | |
| 4 | 3 | 5.5 | 45 | 60 | - | 15 | 0.1 |  | IP4342CX5/LF | CSP5, staggered compressed | 1.06 x 0.76 x 0.61 | |
| | | 5.5 | 30 | 40 | - | 15 | 0.1 | | IP4042CX5/LF | CSP5, staggered compressed | 1.28 x 0.91 x 0.65 | |
| | | 3.3 | 110 | 300 | 110 | 30 | 1 (@ 3 V) | | PESD3V3S4UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | |
| | | 5 | 85 | 220 | 110 | 30 | 0.1 (@ 4.3 V) | | PESD5V0S4UF |  | | |
| | | 3 | 107 | 125 | - | 8 | 1 | | BZA956A | | SOT665 | 1.6 x 1.2 x 0.55 |
| | | 4 | 90 | 105 | - | 8 | 0.5 | | BZA962A |  | | |
| | | 4.3 | 78 | 90 | - | 8 | 0.1 | | BZA968A | | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 |
| | | 3 | 200 | 240 | - | 8 | 2 | | BZA856A | | | |
| | | 3 | 107 | 125 | - | 8 | 1 | | BZA856AL | | | |
| | | 4 | 165 | 200 | - | 8 | 0.7 | | BZA862A | | | |
| | | 4 | 90 | 105 | - | 8 | 0.5 | | BZA862AL | | | |
| | | 4.3 | 145 | 180 | - | 8 | 0.2 | | BZA868A | | | |
| | | 4.3 | 78 | 90 | - | 8 | 0.1 | | BZA868AL | | | |
| | | 15 | 37 | 50 | - | 8 | 0.1 | | BZA820A | | | |
| | | 3 | 200 | 240 | - | 8 | 2 | | BZA456A | | | |
| 4 | 165 | 200 | - | 15 | 0.7 | BZA462A | | | | | | |
| 14 | 37 | 48 | - | 8 | 0.075 | BZA418A | | | | | | |
| 15 | 37 | 48 | - | 8 | 0.1 | BZA420A | | | | | | |
| 3.3 | 215 | 300 | 200 | 30 | 0.8 | PESD3V3S4UD | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 | | | | |
| 5 | 165 | 220 | 200 | 30 | 0.2 | PESD5V0S4UD | | | | | | |
| 12 | 73 | 100 | 200 | 30 | 0.015 | PESD12VS4UD | | | | | | |
| 15 | 60 | 90 | 200 | 30 | 0.015 | PESD15VS4UD | | | | | | |
| 24 | 40 | 70 | 200 | 23 | 0.015 | PESD24VS4UD | | | | | | |
| 3.3 | 215 | 300 | 200 | 30 | 0.8 | PESD3V3S5UD | | | | | | |
| 5 | 165 | 220 | 200 | 30 | 0.2 | PESD5V0S5UD | | | | | | |
| 12 | 73 | 100 | 200 | 30 | 0.015 | PESD12VS5UD | | | | | | |
| 15 | 60 | 90 | 200 | 30 | 0.015 | PESD15VS5UD | | | | | | |
| 24 | 45 | 70 | 200 | 23 | 0.015 | PESD24VS5UD | | | | | | |
| 0 | 4 | 5 | 45 | 75 | - | 15 | 0.1 |  | BZA408B | | | |
| 18 | 17 | 5.2 | 100 | 120 | - | 8 | 2 |  | BZA100 | SOT163 (SO20) | 12.8 x 7.5 x 2.65 | |

^[1] 8/20 μs surge pulse acc. to IEC 61000-4-5

^[2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

types in **bold** represent new products











| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | P _{pp} ^[1] max (W) | ESD rating ^[2] max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) | | | |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|--|------------------------------------|--|---|---------------------|---|---|---|----------------|-------------------|
| Unidirectional | Bidirectional | | | | | | | | | | | | | |
| 1 | 0 | 3.3 | 34 | 40 | 45 | 30 | 0.3 |  | PESD3V3L1UL | SOD882 | 1.0 x 0.6 x 0.5 | | | |
| | | 5 | 25 | 30 | 42 | 26 | 0.1 | | PESD5V0L1UL |  | | | | |
| | | 5 | 25 | 30 | 42 | 26 | 0.1 | | PESD5V0L1ULD | SOD882D |  | 1.0 x 0.6 x 0.37 | | |
| | | 3.3 | 34 | 40 | 45 | 30 | 0.3 | | PESD3V3L1UB | SOD523 (SC-79) |  | 1.2 x 0.8 x 0.6 | | |
| | | 5 | 25 | 30 | 42 | 26 | 0.1 | | PESD5V0L1UB |  | 1.7 x 1.25 x 0.95 | | | |
| | | 3.3 | 34 | 40 | 45 | 30 | 0.3 | | PESD3V3L1UA | SOD323 (SC-76) | |  | | |
| | | 5 | 25 | 30 | 42 | 26 | 0.1 | | PESD5V0L1UA |  | | | | |
| | | 3.3 | 2.6 | 3.1 | - | 9 | 0.1 (@ 3 V) | | PESD3V3U1UL | SOD882 |  | 1.0 x 0.6 x 0.5 | | |
| | | 5 | 2 | 2.6 | - | 9 | 0.1 | | PESD5V0U1UL |  | 1.2 x 0.8 x 0.6 | | | |
| | | 3.3 | 2.6 | 3.1 | - | 9 | 0.1 (@ 3 V) | | PESD3V3U1UB | SOD523 (SC-79) | |  | | |
| | | 5 | 2 | 2.6 | - | 9 | 0.1 | | PESD5V0U1UB |  | | | | |
| | | 3.3 | 2.6 | 3.1 | - | 9 | 0.1 (@ 3 V) | | PESD3V3U1UA | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 | | | |
| | | 5 | 2 | 2.6 | - | 9 | 0.1 | | PESD5V0U1UA | | |  | | |
| | | 0 | 1 | 3.3 | 101 | - | 500 | | 30 | 2 |  | PESD3V3L1BA | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 |
| | | | | 5 | 75 | - | 500 | | 30 | 1 | | PESD5V0L1BA | | |
| | | | | 12 | 19 | - | 200 | | 30 | 0.05 | | PESD12VL1BA | | |
| 15 | 16 | | | - | 200 | 30 | 0.05 | PESD15VL1BA | | | | | | |
| 24 | 11 | | | - | 200 | 23 | 0.05 | PESD24VL1BA | | | | | | |
| 5.5 | 12 | | | 15.4 | 35 | 30 | 0.1 | PESD5V0L1BSF | SOD962 |  | | 0.6 x 0.3 x 0.3 | | |
| 5 | 11 | | | 13 | 45 | 30 | 0.01 | PESD5V0V1BL | SOD882 |  | | 1.0 x 0.6 x 0.5 | | |
| 5 | 11 | | | 13 | 45 | 30 | 0.01 | PESD5V0V1BLD | SOD882D |  | | 1.0 x 0.6 x 0.37 | | |
| 5 | 11 | | | 13 | 45 | 30 | 0.01 | PESD5V0V1BB | SOD523 (SC-79) |  | | 1.2 x 0.8 x 0.6 | | |
| 5 | 11 | | | 13 | 45 | 30 | 0.01 | PESD5V0V1BA | SOD323 (SC-76) |  | | 1.7 x 1.25 x 0.95 | | |
| 5.5 | 3.5 | | | 4.5 | 8 | 15 | 0.1 | PESD5V0V1BSF | SOD962 |  | | 0.6 x 0.3 x 0.3 | | |
| 15 | 8 | | | 10 | - | 15 | 0.1 | IP4302CX2/A | CSP2 |  | | 0.7 x 0.52 x 0.40 | | |

^[1] 8/20 μs surge pulse acc. to IEC 61000-4-5

^[2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

types in **bold** represent new products

| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | P _{pp} ^[1] max (W) | ESD rating ^[2] max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) | | | |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|--|------------------------------------|--|---|---------------------|--|---|---|---|--------------------|
| Unidirectional | Bidirectional | | | | | | | | | | | | | |
| 0 | 1 | 5 | 2.9 | 3.5 | - | 10 | 0.1 |  | PESD5V0U1BL | SOD882 | 1.0 x 0.6 x 0.5 | | | |
| | | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U1BLD | SOD882D |  | 1.0 x 0.6 x 0.37 | | |
| | | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U1BB | SOD523 (SC-79) |  | 1.2 x 0.8 x 0.6 | | |
| | | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U1BA | SOD323 (SC-76) |  | 1.7 x 1.25 x 0.95 | | |
| 2 | 1 | 3.3 | 22 | 28 | 30 | 15 | 0.3 |  | PESD3V3L2UM | SOT883 (SC-101) | 1.0 x 0.6 x 0.5 | | | |
| | | 5 | 16 | 19 | 30 | 15 | 0.025 | | PESD5V0L2UM | | |  | | |
| | | 5 | 38 | 46 | 70 | 30 | 0.09 (@ 4 V) | | PESD5V0L2UU | SOT323 (SC-70) | 2.0 x 1.25 x 0.95 | | | |
| | | 6 | 34 | 40 | 60 | 30 | 0.018 (@ 4.3 V) | | PESD6V0L2UU |  | | | | |
| 0 | 2 | 3.3 | 101 | - | 350 | 30 | 2 |  | PESD3V3L2BT | SOT23 | 2.9 x 1.3 x 1.0 | | | |
| | | 5 | 75 | - | 350 | 30 | 1 | | PESD5V0L2BT | | | | | |
| | | 12 | 19 | - | 200 | 30 | 0.05 | | PESD12VL2BT | | | | | |
| | | 15 | 16 | - | 200 | 30 | 0.05 | | PESD15VL2BT | | | | | |
| | | 24 | 11 | - | 200 | 23 | 0.05 | | PESD24VL2BT | | | | | |
| | | 5 | 35 | 45 | 130 | 30 | 0.1 | | PESD5V0S2BT | | | | | |
| | | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U2BT | SOT883 (SC-101) | 1.0 x 0.6 x 0.5 | | | |
| | | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U2BM | | |  | | |
| | | 15 | 13 | 15 | - | 15 | 0.1 | | IP4303CX4/P | | | CSP4 |  | 0.76 x 0.76 x 0.40 |


^[1] 8/20 μs surge pulse acc. to IEC 61000-4-5

^[2] acc. to IEC 61000-4-2 (contact discharge)

In the Spotlight

New innovative ultra-small package SOD882D

- Ultra-low package height of only 0.37 mm typ.
- Tin plated solderable side pads
- Fully compatible with standard 0402 inch / 1006 mm packages
- AEC-Q101 qualified
- Portfolio of 10 ESD diodes covering all applications and segments



Low capacitance ESD protection devices

types in **bold** represent new products

| Number of protected lines | | V _{RWM} (V) | C _{line typ} (pF) | C _{line max} (pF) | P _{pp} ^[1] max (W) | ESD rating ^[2] max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) | | |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|--|------------------------------------|--|---------------|---------------------|----------------------------|----------------------------------|--------------------|--------------------|
| Unidirectional | Bidirectional | | | | | | | | | | | | |
| 3 | 0 | 5.5 | 3 | 4 | - | 15 | 0.1 | - | IP4059CX5/LF | CSP5, staggered compressed | 1.34 x 0.96 x 0.65 | | |
| 4 | 3 | 3.3 | 22 | 28 | 30 | 20 | 0.3 | | PESD3V3L4UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | | |
| | | 5 | 16 | 19 | 30 | 20 | 0.025 | | PESD5V0L4UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | | |
| | | 3.3 | 22 | 28 | 30 | 20 | 0.3 | | PESD3V3L4UW | SOT665 | 1.6 x 1.2 x 0.55 | | |
| | | 5 | 16 | 19 | 30 | 20 | 0.025 | | PESD5V0L4UW | SOT665 | 1.6 x 1.2 x 0.55 | | |
| | | 3.3 | 22 | 28 | 30 | 20 | 0.3 | | PESD3V3L4UG | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | | |
| | | 5 | 16 | 19 | 30 | 20 | 0.025 | PESD5V0L4UG | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | | | |
| | | 3.3 | 13 | 17 | 25 | 10 | 1 | | PESD3V3V4UW | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 | | |
| | | 5 | 12 | 15 | 25 | 15 | 0.3 | | PESD5V0V4UW | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 | | |
| | | 9 | 6.5 | 10 | 28 | 8 | 0.1 | | PESD9V0V4UW | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 | | |
| | | 3.3 | 15 | 18 | 16 | 12 | 0.3 | | PESD3V3V4UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | | |
| | | 5 | 12 | 15 | 16 | 12 | 0.025 | | PESD5V0V4UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | | |
| | | 3.3 | 15 | 18 | 16 | 12 | 0.3 | | PESD3V3V4UW | SOT665 | 1.6 x 1.2 x 0.55 | | |
| | | 5 | 12 | 15 | 16 | 12 | 0.025 | PESD5V0V4UW | SOT665 | 1.6 x 1.2 x 0.55 | | | |
| | | 3.3 | 15 | 18 | 16 | 12 | 0.3 | | PESD3V3V4UG | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | | |
| | | 5 | 12 | 15 | 16 | 12 | 0.025 | | PESD5V0V4UG | SOT353 (SC-88A) | 2.0 x 1.25 x 0.95 | | |
| | | 5.5 | 18 | 20 | - | 15 | 0.1 | | - | IP4142CX5/LF | 5 ball CSP, staggered compressed | 1.28 x 0.91 x 0.65 | |
| | | 0 | 4 | 5.5 | 18 | 20 | - | 15 | 0.1 | | IP4343CX5/LF | 5 ball CSP | 1.06 x 0.76 x 0.61 |
| | | | | 5.5 | 18 | 20 | - | 15 | 0.1 | | IP4043CX5/LF | 5 ball CSP | 1.12 x 1.12 x 0.65 |

^[1] 8/20 μs surge pulse acc. to IEC 61000-4-5

^[2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

| Number of protected lines | | V _{RWM} (V) | C _{line typ} (pF) | C _{line max} (pF) | P _{pp} ^[1] max (W) | ESD rating ^[2] max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|--|------------------------------------|--|---------------|----------------|-------------------|-------------------|
| Unidirectional | Bidirectional | | | | | | | | | | |
| 0 | 4 | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U4BF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |
| 5 | 4 | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U4BW | SOT665 | 1.6 x 1.2 x 0.55 |
| | | 3.3 | 20 | 24 | 28 | 15 | 2 | | PESD3V3L5UW | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 |
| | | 5 | 18.5 | 22 | 30 | 20 | 0.5 | | PESD5V0L5UW | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 |
| | | 3.3 | 22 | 28 | 25 | 20 | 0.3 | | PESD3V3L5UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |
| | | 5 | 16 | 19 | 25 | 20 | 0.025 | PESD5V0L5UF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | |
| | | 3.3 | 22 | 28 | 25 | 20 | 0.3 | | PESD3V3L5UV | SOT666 | 1.6 x 1.2 x 0.55 |
| | | 5 | 16 | 19 | 25 | 20 | 0.025 | | PESD5V0L5UV | SOT666 | 1.6 x 1.2 x 0.55 |
| | | 3.3 | 22 | 28 | 25 | 20 | 0.3 | | PESD3V3L5UY | SOT363 (SC-88) | 2.0 x 1.25 x 0.95 |
| | | 5 | 16 | 19 | 25 | 20 | 0.025 | PESD5V0L5UY | SOT363 (SC-88) | 2.0 x 1.25 x 0.95 | |
| | | 0 | 5 | 5 | 2.9 | 3.5 | - | 10 | 0.1 | | PESD5V0U5BF |
| 5 | 2.9 | | | 3.5 | - | 10 | 0.1 | PESD5V0U5BV | SOT666 | | 1.6 x 1.2 x 0.55 |
| 6 | 5 | 5 | 16 | 19 | 35 | 20 | 0.025 | | PESD5V0L6US | SOT96 (SO8) | 4.9 x 3.9 x 1.75 |
| 0 | 7 | 5 | 8 | 10 | 35 | 10 | 0.025 | | PESD5V0L7BS | SOT96 (SO8) | 4.9 x 3.9 x 1.75 |

^[1] 8/20 μs surge pulse acc. to IEC 61000-4-5

^[2] acc. to IEC 61000-4-2 (contact discharge)

Protection and signal conditioning

ESD protection for very high-speed interfaces (< 2 pF)

types in **bold** represent new products

| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | ESD rating ⁽¹⁾ max (kV) | Configuration | Type | Package | Size (mm) | |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|------------------------------------|---------------|----------------|------------------|-------------------|------------------|
| Unidirectional | Bidirectional | | | | | | | | | |
| 1 | 0 | 5 | 1.55 | 1.75 | 15 | | PESD5V0X1ULD | SOD882D | 1.0 x 0.6 x 0.37 | |
| | | 5 | 0.95 | 1.15 | 8 | | PESD5V0X1UALD | | | |
| | | 5 | 0.95 | 1.15 | 8 | | PESD5V0X1UB | | | |
| | | 5 | 1.55 | 1.75 | 15 | | PESD5V0X1UAB | | | |
| | | 16 | 0.83 | 0.98 | 8 | PESD16VX1UL | SOD882 | 1.0 x 0.6 x 0.5 | | |
| | | 5.5 | 1 | 1.5 | 8 | PRTR5V0U1T | SOT23 | 2.9 x 1.3 x 1.0 | | |
| | | 80 | 0.6 | 0.75 | 30 | NUP1301 | | SOT323 | 2.0 x 1.25 x 0.95 | |
| | | 80 | 0.6 | 0.75 | 30 | NUP1301U | | | | |
| 0 | 1 | 5.5 | 0.4 | 0.55 | 10 | | PESD5V0F1BL | SOD882 | 1.0 x 0.6 x 0.5 | |
| | | 16 | 0.5 | 0.65 | 8 | | PESD16VF1BL | | | |
| | | 3.3 | 1.3 | 1.6 | 9 | | PESD3V3X1BL | | | |
| | | 5 | 0.9 | 1.3 | 9 | | PESD5V0X1BL | | | |
| | | 5.5 | 0.25 | 0.3 | 28 | | PESD5V0F1BSF | SOD962 | | 0.6 x 0.3 x 0.3 |
| 2 | 1 | 5 | 0.9 | 1.3 | 9 | | PESD5V0X1BQ | SOT663 | 1.6 x 1.2 x 0.55 | |
| | | 5 | 0.9 | 1.3 | 9 | | PESD5V0X1BT | SOT23 | 2.9 x 1.3 x 1.0 | |
| | 0 | 5.5 | 1 | 1.5 | 8 | | PRTR5V0U2X | SOT143B | 2.9 x 1.3 x 1.0 | |
| | | | 5.5 | 1.8 | - | | 12 | PRTR5V0U2AX | | |
| | | 5.5 | 1 | 1.5 | 8 | PRTR5V0U2K | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 | | |
| | | 5.5 | 1 | 1.5 | 8 | PRTR5V0U2D | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 | | |
| | | 5.5 | 1 | 1.5 | 8 | PRTR5V0U2F | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | | |
| | | 5.5 | 1 | 1.5 | 8 | | | PRTR5V0U2D | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 |
| | | | | | | | | | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |


⁽¹⁾ acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

In the Spotlight

Ultra low clamping ESD protection diodes in SOD523

- Ultra-low clamping voltage of V_{CL} = 10 V
- Ultra-low capacitance of C_d = 0.95 / 1.8 pF (high robustness version)
- Ultra-low dynamical resistance r_{dyn} = 0.25 / 0.15
- IEC 61000-4-2; level 4 (ESD)
- AEC-Q101 qualified



Protection and signal conditioning

types in **bold** represent new products

| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | ESD rating ⁽¹⁾ max (kV) | Configuration | Type | Package | Size (mm) |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|------------------------------------|---------------|--------------|-----------------------------|--------------------|
| Unidirectional | Bidirectional | | | | | | | | |
| 2 | 0 | 5.5 | 2 | - | 15 | | IP4234CZ6 | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 |
| | | 5.5 | 0.7 | - | 8 | | IP4282CZ6 | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |
| | | 5.5 | 1.3 | - | 15 | | IP4359CX4/LF | CSP4 | 0.76 x 0.76 x 0.61 |
| 3 | 2 | 5.5 | 1.4 | 1.5 | 15 | - | IP4356CX4 | | |
| 4 | 0 | 5.5 | 1.4 | 1.5 | 15 | - | IP4319CX10 | CSP10, staggered compressed | 1.56 x 1.05 x 0.61 |
| | | 5.5 | 1 | - | 8 | | IP4220CZ6 | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 |
| | | 5.5 | 1 | - | 8 | | IP4221CZ6-S | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |
| | | 5.5 | 1 | - | 8 | | IP4221CZ6-XS | SOT891 (XSON6) | 1.0 x 1.0 x 0.5 |
| | | 5.5 | 1 | - | 8 | | IP4233CZ6 | SOT363 (SC-88) | 2.0 x 1.25 x 0.95 |

⁽¹⁾ acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

types in **bold** represent new products

| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | ESD rating ⁽¹⁾ max (kV) | Configuration | Type | Package | Size (mm) |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|------------------------------------|---------------|-----------------------|----------------------|-------------------|
| Unidirectional | Bidirectional | | | | | | | | |
| 4 | 0 | 5.5 | 1 | - | 8 | | PRTR5V0U4D | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 |
| | | 5.5 | 1 | - | 8 | | PRTR5V0U4Y | SOT363 (SC-88) | 2.0 x 1.25 x 0.95 |
| | | 5.5 | 0.8 | - | 12 | | IP4285CZ9-TBB | SOT1178 (XSON9) | 1.0 x 2.1 x 0.5 |
| | | 5.5 | 0.7 | - | 8 | | IP4280CZ10 | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 |
| | | 5.5 | 0.6 | - | 8 | | IP4283CZ10-TBA | SOT1165 (XSON10) | 1.0 x 2.5 x 0.5 |
| | | 5.5 | 0.6 | - | 8 | | IP4283CZ10-TBR | SOT1176 (XSON10) | 1.0 x 2.5 x 0.5 |
| | | 5.5 | 0.6 | - | 8 | | IP4283CZ10-TT | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 |
| | | 5.5 | 0.5 | - | 8 | | IP4284CZ10-TBR | SOT1176 (XSON10) | 1.0 x 2.5 x 0.5 |
| | | 5.5 | 0.5 | - | 8 | | IP4284CZ10-TT | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 |
| | | 5.5 | 0.6 | - | 8 | | IP4286CZ6-TBF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |
| | | 5.5 | 0.6 | - | 8 | | IP4286CZ6-TTY | SOT363 (SC-88) | 2.0 x 1.25 x 0.95 |

⁽¹⁾ acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

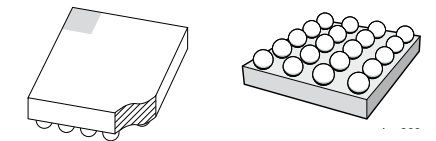
types in **bold** represent new products

| Number of protected lines | | V _{RWM} (V) | C _{line} typ (pF) | C _{line} max (pF) | ESD rating ⁽¹⁾ max (kV) | I _r max (μA) @ V _{RWM} | Configuration | Type | Package | Size (mm) |
|---------------------------|---------------|----------------------|----------------------------|----------------------------|------------------------------------|--|---------------|------------------|----------------------|--------------------|
| Unidirectional | Bidirectional | | | | | | | | | |
| 4 | 0 | 5.5 | 0.5 | - | 8 | - | | IP4292CZ10-TBR | SOT1176 (XSON10) | 1.0 x 2.5 x 0.5 |
| 5 | 0 | 5.5 | 1.3 | - | 15 | - | | IP4358CX6 | CSP | 0.76 x 1.16 x 0.61 |
| 8 | 0 | 5.5 | 1.3 | - | 15 | - | | IP4309CX9 | CSP | 1.16 x 1.16 x 0.61 |
| | | 5.5 | 1 | - | 8 | - | | PRTR5V0U8S | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 |
| 11 | 0 | 5.5 | 0.7 | - | 8 | - | | IP4790CZ38 | SOT510 (TSSOP38) | 9.7 x 4.4 x 1.1 |

⁽¹⁾ acc. to IEC 61000-4-2 (contact discharge)

NXP Wafer-Level Chip Scale Package (WL-CSP)

- ▶ Smallest possible solution for ESD and EMI circuits, saving maximum of space
- ▶ Lowest parasitic inductance to GND contact, ensures best performance
- ▶ High mechanical robustness



Audio interfaces

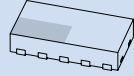

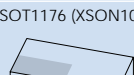
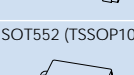





types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | Digital interface clock speed (MHz) | Remark | Type | Package | Size (mm) |
|--------------------|---------------------------|-------------------------------|------------------------|---|---|------------------|--------------------|--------------------|
| | | R _{line} | C _{line} (pF) | | | | | |
| Audio | 2 | 0.9 | 290 | - | Low-ohmic speaker (< -8 Ω) | IP4047CX6/LF | 6 ball CSP | 1.56 x 1.01 x 0.65 |
| | | 10 | 200 | - | Low-ohmic speaker (> -8 Ω) | IP4048CX5/LF | 5 ball CSP | 0.91 x 1.28 x 0.65 |
| | | 68 | 110 | - | Single-ended or differential microphone | IP4049CX5/LF | 6 ball CSP | 1.56 x 1.03 x 0.65 |
| | | 470 | 35 | - | Single-ended or differential microphone | IP4055CX6/LF | | |
| | | 470 | 20 | - | Single-ended or differential microphone | IP4355CX6/LF | 8 ball CSP | 1.16 x 0.76 x 0.65 |
| | | 50 / 2.2 k | 2000 | - | Single-ended to quasi-differential microphone channel with integrated biasing network | IP5002CX8/LF | 6 ball CSP | 1.67 x 1.67 x 0.65 |
| | | 0.25 Ω, 3 nH | - | - | Inductive, low-ohmic differential channel LC filter | IP3047CX6 | 6 ball CSP | 1.60 x 1.15 x 0.65 |
| | 0.25 Ω, 3 nH | - | - | Inductive, low-ohmic differential channel LC filter | IP3048CX5 | 5 ball CSP | 1.51 x 1.15 x 0.65 | |
| 6 | 40 / 1450 / 10 | 50 / 20 / 200 | - | Fully integrated audio interface protection for differential microphone and differential speaker, including EMI filtering and pull up resistors | IP4027CX20/LF | 20 ball CSP | 1.91 x 2.52 x 0.65 | |

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

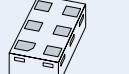
types in **bold** represent new products

| Baseband interface | Number of protected lines | C _{line} (pF) | Remark | Type | Package | Size (mm) |
|--------------------|---------------------------|------------------------|--|-----------------------|---|-------------------|
| Display port | 4 | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TBR |  | 1.0 x 2.5 x 0.5 |
| | | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TT |  | 3.0 x 3.0 x 1.1 |
| | | 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TBR |  | 1.0 x 2.5 x 0.5 |
| | | 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TT |  | 3.0 x 3.0 x 1.1 |
| | | 0.5 | ESD protection for ultra high-speed interfaces | IP4292CZ10-TBR |  | 1.0 x 2.5 x 0.5 |
| | | 0.8 | ESD protection for ultra high-speed interfaces | IP4285CZ9-TBB |  | 1.0 x 2.1 x 0.5 |
| | | 0.6 | ESD protection for ultra high-speed interfaces | IP4286CZ6-TBF |  | 1.45 x 1.0 x 0.5 |
| | | | ESD protection for ultra high-speed interfaces | IP4286CZ6-TTY |  | 2.0 x 1.25 x 0.95 |
| | 11 | 0.7 | ESD protection for display port | IP4790CZ38 |  | 9.7 x 4.4 x 1.1 |

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

types in **bold** represent new products

| Baseband interface | Number of protected lines | C _{line} (pF) | Remark | Type | Package | Size (mm) | | | |
|--------------------|--|------------------------|---|-------------------|---|--|-----------------------|---|------------------|
| HDMI | 2 | 0.7 | ESD protection for ultra high-speed interfaces | IP4282CZ6 | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 | | | |
| | | | | |  | | | | |
| | 4 | 0.7 | ESD protection for ultra high-speed interfaces | IP4280CZ10 | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 | | | |
| | | | | |  | | | | |
| | | | | | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TBA | SOT1165 (XSON10) | 1.0 x 2.5 x 0.5 |
| | | | | | | | |  | |
| | | | | | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TBR | SOT1176 (XSON10) | 1.0 x 2.5 x 0.5 |
| | | | | | | | |  | |
| | | | | | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TT | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 |
| | | | | | | | |  | |
| | | | | | 0.6 | ESD protection for ultra high-speed interfaces | IP4286CZ6-TBF | SOT886 (XSON6) | 1.45 x 1.0 x 0.5 |
| | | | | | | | |  | |
| 0.6 | ESD protection for ultra high-speed interfaces | IP4286CZ6-TTY | SOT363 (SC-88) | 2.0 x 1.25 x 0.95 | | | | | |
| | | |  | | | | | | |
| 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TBR | SOT1176 (XSON10) | 1.0 x 2.5 x 0.5 | | | | | |
| | | |  | | | | | | |
| 0.8 | ESD protection for ultra high-speed interfaces | IP4285CZ9-TBB | SOT1178 (XSON10) | 1.0 x 2.1 x 0.5 | | | | | |
| | | |  | | | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

In the Spotlight

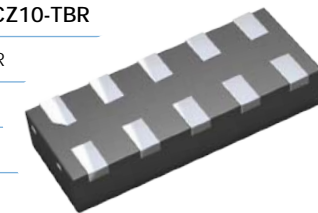
HDMI: High-speed 4 channel ESD protection – IP4283CZ10-TBR

Low capacitance 4 channel ESD protection array: IP4283CZ10-TBR

Optimized for high level ESD protection of HDMI ports

Straight through routing → best signal integrity

10 pin QFN package with exposed leads (SOT1176)



Video interfaces

types in **bold** represent new products

| Baseband interface | Number of protected lines | Buffer | Level shifter | C _{line} (pF) | Resistor () | Remark | Type | Package | Size (mm) |
|--------------------|---------------------------|--------|---------------|----------------------------|---------------|---|---|-----------------------------|----------------------------|
| HDMI | 4 | - | - | 0.5 | - | ESD protection for ultra high-speed interfaces | IP4284CZ10-TT | SOT552 (TSSOP10) | 3.0 x 3.0 x 1.1 |
| | | - | - | 0.5 | - | ESD protection for ultra high-speed interfaces | IP4292CZ10-TBR | SOT1176 (XSON10) | 1.0 x 2.5 x 0.5 |
| | 5 | - | - | 10 | 1.75 k, 100 k | HDMI, DDC, CEC, hot plug ESD protection and biasing | IP4310CX8/P | 8 ball CSP | 1.16 x 1.16 x 0.61 |
| | | yes | yes | - | internal | Fully integrated solution for HDMI low-speed signals, buffer and level shifter for DDC, CEC, HP | IP4791CZ12 | SOT1156 | 2.5 x 2.1 x 0.5 |
| | 8 | - | - | 1.3 | - | HDMI, TMDS line ESD protection | IP4309CX9 | 9 ball CSP | 1.16 x 1.16 x 0.61 |
| | 12 | - | yes | 0.7 | - | ESD protection and level shifting for a complete HDMI port | IP4776CZ38 | SOT510 (TSSOP38) | 9.7 x 4.4 x 1.1 |
| | | yes | yes | 0.7 | - | ESD protection, DDC buffering, noise reduction and hot plug application for a complete HDMI source port | IP4777CZ38 | | |
| | | yes | yes | 0.7 | - | ESD protection, DDC buffering, noise reduction and hot plug application for a complete HDMI sink port | IP4778CZ38 | | |
| | 13 | yes | yes | 100 differential impedance | internal | Fully integrated HDMI solution with current limiter, buffer and level shifter for DDC, CEC, HP | IP4786CZ32 | SOT617 | 5.0 x 5.0 x 1.0 |
| | LVDS | 2 | - | - | 30 | 10 | EMI filter with ESD protection for MIPI or MDDI | IP3348CX5 | CSP5, staggered compressed |
| 4 | | - | - | 30 | 10 | EMI filter with ESD protection for MIPI or MDDI | IP3348CX10 | CSP10, staggered compressed | 1.56 x 1.06 x 0.61 |
| 6 | | - | - | 30 | 10 | EMI filter with ESD protection for MIPI or MDDI | IP3348CX15 | CSP15, staggered compressed | 2.36 x 1.06 x 0.61 |
| 8 | | - | - | 30 | 10 | EMI filter with ESD protection for MIPI or MDDI | IP3348CX20 | CSP20, staggered compressed | 3.16 x 1.06 x 0.61 |

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

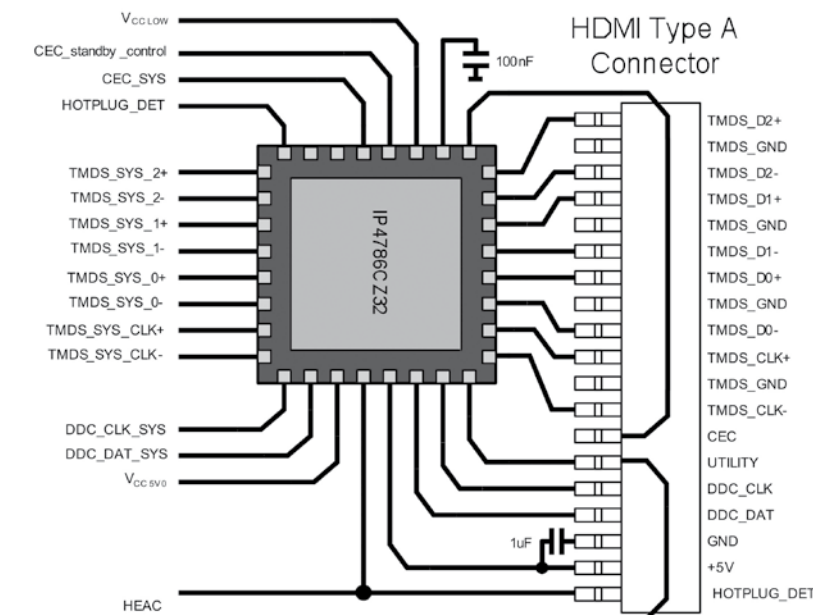
types in **bold** represent new products

| Baseband interface | Number of protected lines | Buffer | Level shifter | C _{line} (pF) | Resistor () | Remark | Type | Package | Size (mm) |
|--------------------|---------------------------|--------|---------------|------------------------|--------------|---|-------------------|--------------------|------------------|
| VGA | 7 | yes | yes | 5 | 55 | H&V sync buffer, DDC level shifter | IP4770CZ16 | SOT519 (SSOP16) | 4.9 x 3.9 x 1.73 |
| | | yes | yes | 5 | 65 | H&V sync buffer, DDC level shifter | IP4771CZ16 | | |
| | | yes | yes | 5 | 10 | H&V sync buffer, DDC level shifter | IP4772CZ16 | | |
| | | yes | no | 4 | 10 | VGA receivers and transmitters, H&V sync buffer | IP4773CZ14 | SOT337 (SSOP14) | 6.2 x 5.3 x 2.0 |
| | | yes | no | 4 | 10 | VGA receivers and transmitters, H sync buffer | IP4774CZ14 | | |
| | | no | yes | 4 | 1.3 - 2.4 | VGA receivers and transmitters, DDC level shifter | IP4769CZ14 | SOT402-1 (TSSOP14) | 5.0 x 4.4 x 1.1 |

ESD protection acc. to IEC 61000-4-2 (level 4)

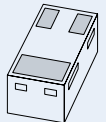
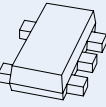
Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Transmitter HDMI companion chip IP4786CZ32



Multichannel EMI filters, ESD protection for LCD and camera

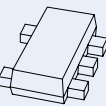
types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | | Digital interface clock speed (MHz) | Insertion Loss S21 ~ -3 dB (MHz) | Type | Package | Size (mm) |
|-----------------------------|---------------------------|-------------------------------|------------------------|------------------------|-------------------------------------|----------------------------------|--------------|---|--------------------|
| | | R _{line} (Ω) | C _{line} (pF) | L _{line} (nH) | | | | | |
| LCD display, camera, keypad | 1 | 75 | 36 | - | -50 | 155 | IP4307CX4/LF | 4 ball CSP | 0.76 x 0.76 x 0.61 |
| | | 20 | 40 | - | -50 | 153 | PEMI1QFN/CT |  | 1.0 x 0.6 x 0.5 |
| | | 20 | 36 | - | -55 | 170 | PEMI1QFN/CR | | |
| | | 20 | 32 | - | -60 | 185 | PEMI1QFN/CP | | |
| | | 20 | 28 | - | -70 | 218 | PEMI1QFN/CM | | |
| | | 20 | 23 | - | -90 | 264 | PEMI1QFN/CK | | |
| | | 20 | 19 | - | -105 | 317 | PEMI1QFN/CG | | |
| | | 20 | 15 | - | -130 | 397 | PEMI1QFN/CE | | |
| | | 45 | 40 | - | -50 | 145 | PEMI1QFN/HT | | |
| | | 45 | 36 | - | -55 | 161 | PEMI1QFN/HR | | |
| | | 45 | 32 | - | -60 | 175 | PEMI1QFN/HP | | |
| | | 45 | 28 | - | -70 | 206 | PEMI1QFN/HM | | |
| | | 45 | 23 | - | -80 | 249 | PEMI1QFN/HK | | |
| | | 45 | 19 | - | -100 | 300 | PEMI1QFN/HG | | |
| | | 45 | 15 | - | -125 | 376 | PEMI1QFN/HE | | |
| | | 65 | 40 | - | -45 | 139 | PEMI1QFN/LT | | |
| | | 65 | 36 | - | -50 | 155 | PEMI1QFN/LR | | |
| | | 65 | 32 | - | -55 | 168 | PEMI1QFN/LP | | |
| | | 65 | 28 | - | -65 | 197 | PEMI1QFN/LM | | |
| | | 65 | 23 | - | -80 | 239 | PEMI1QFN/LK | | |
| | | 65 | 19 | - | -95 | 288 | PEMI1QFN/LG | | |
| | | 65 | 15 | - | -120 | 361 | PEMI1QFN/LE | | |
| | | 100 | 40 | - | -45 | 131 | PEMI1QFN/RT | | |
| | | 100 | 36 | - | -50 | 145 | PEMI1QFN/RR | | |
| | | 100 | 32 | - | -55 | 159 | PEMI1QFN/RP | | |
| | | 100 | 28 | - | -60 | 187 | PEMI1QFN/RM | | |
| | | 100 | 30 | - | -65 | 200 | IP4256CZ3-M | | |
| | | 100 | 23 | - | -75 | 227 | PEMI1QFN/RK | | |
| | | 100 | 19 | - | -90 | 272 | PEMI1QFN/RG | | |
| | | 100 | 15 | - | -115 | 343 | PEMI1QFN/RE | | |
| | | 200 | 40 | - | -40 | 119 | PEMI1QFN/WT | | |
| | | 200 | 36 | - | -45 | 132 | PEMI1QFN/WR | | |
| | | 200 | 32 | - | -50 | 143 | PEMI1QFN/WP | | |
| | 200 | 28 | - | -55 | 169 | PEMI1QFN/WM | | | |
| | 200 | 23 | - | -70 | 205 | PEMI1QFN/WK | | | |
| | 200 | 19 | - | -80 | 247 | PEMI1QFN/WG | | | |
| | 200 | 15 | - | -105 | 311 | PEMI1QFN/WE | | | |
| | 2 | 10 | 35 | 15 | -115 | 350 | IP3348CX5 | 5 ball CSP | 0.76 x 1.06 x 0.61 |
| | | 18 | 65 | 40 | -60 | 175 | IP3088CX5 |  | 0.96 x 1.28 x 0.65 |
| | | 100 | 45 | 35 | -50 | 150 | IP3053CX5 | | |
| | | 20 | 40 | - | -50 | 153 | PEMI2STD/CT | | 1.6 x 1.2 x 0.5 |
| | | 20 | 36 | - | -55 | 170 | PEMI2STD/CR | | |
| 20 | | 32 | - | -60 | 185 | PEMI2STD/CP | | | |
| 20 | 28 | - | -70 | 218 | PEMI2STD/CM | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

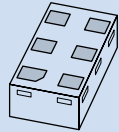
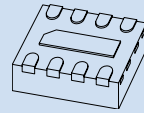
types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | | Digital interface clock speed (MHz) | Insertion Loss S21 ~ -3 dB (MHz) | Type | Package | Size (mm) |
|-----------------------------|---------------------------|-------------------------------|------------------------|------------------------|-------------------------------------|----------------------------------|-------------|--|-----------------|
| | | R _{line} (Ω) | C _{line} (pF) | L _{line} (nH) | | | | | |
| LCD display, camera, keypad | 2 | 20 | 23 | - | -90 | 264 | PEMI2STD/CK |  | 1.6 x 1.2 x 0.5 |
| | | 20 | 19 | - | -105 | 317 | PEMI2STD/CG | | |
| | | 20 | 15 | - | -130 | 397 | PEMI2STD/CE | | |
| | | 45 | 40 | - | -50 | 145 | PEMI2STD/HT | | |
| | | 45 | 36 | - | -55 | 161 | PEMI2STD/HR | | |
| | | 45 | 32 | - | -60 | 175 | PEMI2STD/HP | | |
| | | 45 | 28 | - | -70 | 206 | PEMI2STD/HM | | |
| | | 45 | 23 | - | -80 | 249 | PEMI2STD/HK | | |
| | | 45 | 19 | - | -100 | 300 | PEMI2STD/HG | | |
| | | 45 | 15 | - | -125 | 376 | PEMI2STD/HE | | |
| | | 65 | 40 | - | -45 | 139 | PEMI2STD/LT | | |
| | | 65 | 36 | - | -50 | 155 | PEMI2STD/LR | | |
| | | 65 | 32 | - | -55 | 168 | PEMI2STD/LP | | |
| | | 65 | 28 | - | -65 | 197 | PEMI2STD/LM | | |
| | | 65 | 23 | - | -80 | 239 | PEMI2STD/LK | | |
| | | 65 | 19 | - | -95 | 288 | PEMI2STD/LG | | |
| | | 65 | 15 | - | -120 | 361 | PEMI2STD/LE | | |
| | | 100 | 40 | - | -45 | 131 | PEMI2STD/RT | | |
| | | 100 | 36 | - | -50 | 145 | PEMI2STD/RR | | |
| | | 100 | 32 | - | -55 | 159 | PEMI2STD/RP | | |
| | | 100 | 30 | - | -65 | 200 | IP4256CZ5-W | | |
| | | 100 | 28 | - | -60 | 187 | PEMI2STD/RM | | |
| | | 100 | 23 | - | -75 | 227 | PEMI2STD/RK | | |
| | | 100 | 19 | - | -90 | 272 | PEMI2STD/RG | | |
| | | 100 | 15 | - | -115 | 343 | PEMI2STD/RE | | |
| | | 200 | 40 | - | -40 | 119 | PEMI2STD/WT | | |
| | | 200 | 36 | - | -45 | 132 | PEMI2STD/WR | | |
| | | 200 | 32 | - | -50 | 143 | PEMI2STD/WP | | |
| | | 200 | 28 | - | -55 | 169 | PEMI2STD/WM | | |
| | | 200 | 23 | - | -70 | 205 | PEMI2STD/WK | | |
| | | 200 | 19 | - | -80 | 247 | PEMI2STD/WG | | |
| | | 200 | 15 | - | -105 | 311 | PEMI2STD/WE | | |
| | | 2 | 20 | 40 | - | -50 | 153 | | |
| | 20 | | 36 | - | -55 | 170 | PEMI2QFN/CR | | |
| | 20 | | 32 | - | -60 | 185 | PEMI2QFN/CP | | |
| | 20 | | 28 | - | -70 | 218 | PEMI2QFN/CM | | |
| | 20 | | 23 | - | -90 | 264 | PEMI2QFN/CK | | |
| | 20 | | 19 | - | -105 | 317 | PEMI2QFN/CG | | |
| | 20 | 15 | - | -130 | 397 | PEMI2QFN/CE | | | |
| | 45 | 40 | - | -50 | 145 | PEMI2QFN/HT | | | |
| | 45 | 36 | - | -55 | 161 | PEMI2QFN/HR | | | |
| | 45 | 32 | - | -60 | 175 | PEMI2QFN/HP | | | |
| 45 | 28 | - | -70 | 206 | PEMI2QFN/HM | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

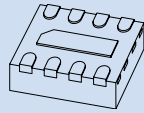
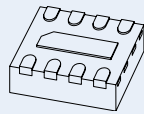
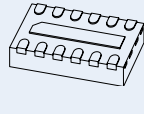
types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | | Digital interface clock speed (MHz) | Insertion Loss S21 ~ -3 dB (MHz) | Type | Package | Size (mm) |
|-----------------------------|---------------------------|-------------------------------|------------------------|------------------------|-------------------------------------|----------------------------------|-------------|--|--------------------|
| | | R _{line} (Ω) | C _{line} (pF) | L _{line} (nH) | | | | | |
| LCD display, camera, keypad | 2 | 45 | 23 | - | -80 | 249 | PEMI2QFN/HK | SOT886 (XSON6)  | 1.45 x 1.0 x 0.5 |
| | | 45 | 19 | - | -100 | 300 | PEMI2QFN/HG | | |
| | | 45 | 15 | - | -125 | 376 | PEMI2QFN/HE | | |
| | | 65 | 40 | - | -45 | 139 | PEMI2QFN/LT | | |
| | | 65 | 36 | - | -50 | 155 | PEMI2QFN/LR | | |
| | | 65 | 32 | - | -55 | 168 | PEMI2QFN/LP | | |
| | | 65 | 28 | - | -65 | 197 | PEMI2QFN/LM | | |
| | | 65 | 23 | - | -80 | 239 | PEMI2QFN/LK | | |
| | | 65 | 19 | - | -95 | 288 | PEMI2QFN/LG | | |
| | | 65 | 15 | - | -120 | 361 | PEMI2QFN/LE | | |
| | | 100 | 40 | - | -45 | 131 | PEMI2QFN/RT | | |
| | | 100 | 36 | - | -50 | 145 | PEMI2QFN/RR | | |
| | | 100 | 32 | - | -55 | 159 | PEMI2QFN/RP | | |
| | | 100 | 30 | - | -65 | 200 | IP4256CZ6-F | | |
| | | 100 | 28 | - | -60 | 187 | PEMI2QFN/RM | | |
| | | 100 | 23 | - | -75 | 227 | PEMI2QFN/RK | | |
| | | 100 | 19 | - | -90 | 272 | PEMI2QFN/RG | | |
| | | 100 | 15 | - | -115 | 343 | PEMI2QFN/RE | | |
| | | 200 | 40 | - | -40 | 119 | PEMI2QFN/WT | | |
| | | 200 | 36 | - | -45 | 132 | PEMI2QFN/WR | | |
| | 200 | 32 | - | -50 | 143 | PEMI2QFN/WP | | | |
| | 200 | 28 | - | -55 | 169 | PEMI2QFN/WM | | | |
| | 200 | 23 | - | -70 | 205 | PEMI2QFN/WK | | | |
| | 200 | 19 | - | -80 | 247 | PEMI2QFN/WG | | | |
| | 200 | 15 | - | -105 | 311 | PEMI2QFN/WE | | | |
| | 4 | 10 | 35 | 15 | -115 | 350 | IP3348CX10 | 10 ball CSP | 1.56 x 1.06 x 0.61 |
| | | 18 | 65 | 40 | -60 | 175 | IP3088CX10 | | 1.96 x 1.28 x 0.65 |
| | | 100 | 54 | - | -30 | 98 | PEMI4CSP/RW | | 1.56 x 1.06 x 0.61 |
| | | 100 | 45 | 35 | -20 | 150 | IP3053CX10 | | 1.96 x 1.28 x 0.65 |
| | | 100 | 41 | - | -40 | 125 | PEMI4CSP/RT | | 1.56 x 1.06 x 0.61 |
| | | 20 | 40 | - | -50 | 153 | PEMI4QFN/CT | SOT1157 (8 pin QFN)  | 1.7 x 1.2 x 0.5 |
| 20 | | 36 | - | -55 | 170 | PEMI4QFN/CR | | | |
| 20 | | 32 | - | -60 | 185 | PEMI4QFN/CP | | | |
| 20 | | 28 | - | -70 | 218 | PEMI4QFN/CM | | | |
| 20 | | 23 | - | -90 | 264 | PEMI4QFN/CK | | | |
| 20 | | 19 | - | -105 | 317 | PEMI4QFN/CG | | | |
| 20 | 15 | - | -130 | 397 | PEMI4QFN/CE | | | | |
| 45 | 40 | - | -50 | 145 | PEMI4QFN/HT | | | | |
| 45 | 36 | - | -55 | 161 | PEMI4QFN/HR | | | | |
| 45 | 32 | - | -60 | 175 | PEMI4QFN/HP | | | | |
| 45 | 28 | - | -70 | 206 | PEMI4QFN/HM | | | | |
| 45 | 23 | - | -80 | 249 | PEMI4QFN/HK | | | | |
| 45 | 19 | - | -100 | 300 | PEMI4QFN/HG | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | | Digital interface clock speed (MHz) | Insertion Loss S21 ~ -3 dB (MHz) | Type | Package | Size (mm) |
|-----------------------------|---------------------------|-------------------------------|------------------------|------------------------|-------------------------------------|---|--------------------|--|--------------------|
| | | R _{line} (Ω) | C _{line} (pF) | L _{line} (nH) | | | | | |
| LCD display, camera, keypad | 4 | 45 | 15 | - | -125 | 376 | PEMI4QFN/HE | SOT1157 (8 pin QFN)  | 1.7 x 1.2 x 0.5 |
| | | 65 | 40 | - | -45 | 139 | PEMI4QFN/LT | | |
| | | 65 | 36 | - | -50 | 155 | PEMI4QFN/LR | | |
| | | 65 | 32 | - | -55 | 168 | PEMI4QFN/LP | | |
| | | 65 | 28 | - | -65 | 197 | PEMI4QFN/LM | | |
| | | 65 | 23 | - | -80 | 239 | PEMI4QFN/LK | | |
| | | 65 | 19 | - | -95 | 288 | PEMI4QFN/LG | | |
| | | 65 | 15 | - | -120 | 361 | PEMI4QFN/LE | | |
| | | 100 | 40 | - | -45 | 131 | PEMI4QFN/RT | | |
| | | 100 | 36 | - | -50 | 145 | PEMI4QFN/RR | | |
| | | 100 | 32 | - | -55 | 159 | PEMI4QFN/RP | | |
| | | 100 | 28 | - | -60 | 187 | PEMI4QFN/RM | | |
| | | 100 | 23 | - | -75 | 227 | PEMI4QFN/RK | | |
| | | 100 | 19 | - | -90 | 272 | PEMI4QFN/RG | | |
| | | 100 | 15 | - | -115 | 343 | PEMI4QFN/RE | | |
| | | 200 | 40 | - | -40 | 119 | PEMI4QFN/WT | | |
| | | 200 | 36 | - | -45 | 132 | PEMI4QFN/WR | | |
| | | 200 | 32 | - | -50 | 143 | PEMI4QFN/WP | | |
| | | 200 | 28 | - | -55 | 169 | PEMI4QFN/WM | | |
| | | 200 | 23 | - | -70 | 205 | PEMI4QFN/WK | | |
| | 200 | 19 | - | -80 | 247 | PEMI4QFN/WG | | | |
| | 200 | 15 | - | -105 | 311 | PEMI4QFN/WE | | | |
| | 6 | 15 | 43 | 12 | -60 | 175 | IP3253CZ8-4-TTL | SOT1166 (8 pin QFN)  | 1.7 x 1.35 x 0.5 |
| | | 15 | 50 | 18 | -50 | 145 | IP3254CZ8-4-TTL | | |
| | | 40 | 18 | - | -100 | 300 | IP4252CZ8-4-TTL | | |
| | | 100 | 45 | - | -40 | 130 | IP4254CZ8-4-TTL | | |
| | | 100 | 15 | - | -110 | 330 | IP4251CZ8-4-TTL | | |
| | | 200 | 45 | - | -35 | 110 | IP4253CZ8-4-TTL | | |
| | | 10 | 35 | 15 | -115 | 350 | IP3348CX15 | 15 ball CSP | 2.36 x 1.06 x 0.61 |
| | | 18 | 65 | 40 | -60 | 175 | IP3088CX15 | | 2.96 x 1.28 x 0.65 |
| | | 100 | 60 | - | -40 | 120 | IP4053CX15/LF | | 2.96 x 1.32 x 0.65 |
| 100 | | 60 | - | -40 | 120 | IP4353CX15/LF | 2.38 x 1.05 x 0.61 | | |
| 100 | | 54 | - | -30 | 98 | PEMI6CSP/RW | 2.36 x 1.06 x 0.61 | | |
| 100 | 45 | 35 | -20 | 150 | IP3053CX15 | 2.96 x 1.28 x 0.65 | | | |
| 100 | 41 | - | -40 | 125 | PEMI6CSP/RT | 2.36 x 1.06 x 0.61 | | | |
| 100 | 30 | - | -70 | 210 | IP4153CX15/LF | 2.91 x 1.28 x 0.65 | | | |
| 20 | 40 | - | -50 | 153 | PEMI6QFN/CT | SOT1158 (12 pin QFN)  | 2.5 x 1.2 x 0.5 | | |
| 20 | 36 | - | -55 | 170 | PEMI6QFN/CR | | | | |
| 20 | 32 | - | -60 | 185 | PEMI6QFN/CP | | | | |
| 20 | 28 | - | -70 | 218 | PEMI6QFN/CM | | | | |
| 20 | 23 | - | -90 | 264 | PEMI6QFN/CK | | | | |
| 20 | 19 | - | -105 | 317 | PEMI6QFN/CG | | | | |
| 20 | 15 | - | -130 | 397 | PEMI6QFN/CE | | | | |
| 45 | 40 | - | -50 | 145 | PEMI6QFN/HT | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | | Digital interface clock speed (MHz) | Insertion Loss S21~ -3 dB (MHz) | Type | Package | Size (mm) |
|-----------------------------|---------------------------|-------------------------------|------------------------|------------------------|-------------------------------------|---------------------------------|-------------------------|----------------------|--------------------|
| | | R _{line} (Ω) | C _{line} (pF) | L _{line} (nH) | | | | | |
| LCD display, camera, keypad | 6 | 45 | 36 | - | -55 | 161 | PEMI6QFN/HR | SOT1158 (12 pin QFN) | 2.5 x 1.2 x 0.5 |
| | | 45 | 32 | - | -60 | 175 | PEMI6QFN/HP | | |
| | | 45 | 28 | - | -70 | 206 | PEMI6QFN/HM | | |
| | | 45 | 23 | - | -80 | 249 | PEMI6QFN/HK | | |
| | | 45 | 19 | - | -100 | 300 | PEMI6QFN/HG | | |
| | | 45 | 15 | - | -125 | 376 | PEMI6QFN/HE | | |
| | | 65 | 40 | - | -45 | 139 | PEMI6QFN/LT | | |
| | | 65 | 36 | - | -50 | 155 | PEMI6QFN/LR | | |
| | | 65 | 32 | - | -55 | 168 | PEMI6QFN/LP | | |
| | | 65 | 28 | - | -65 | 197 | PEMI6QFN/LM | | |
| | | 65 | 23 | - | -80 | 239 | PEMI6QFN/LK | | |
| | | 65 | 19 | - | -95 | 288 | PEMI6QFN/LG | | |
| | | 65 | 15 | - | -120 | 361 | PEMI6QFN/LE | | |
| | | 100 | 40 | - | -45 | 131 | PEMI6QFN/RT | | |
| | | 100 | 36 | - | -50 | 145 | PEMI6QFN/RR | | |
| | | 100 | 32 | - | -55 | 159 | PEMI6QFN/RP | | |
| | | 100 | 28 | - | -60 | 187 | PEMI6QFN/RM | | |
| | | 100 | 23 | - | -75 | 227 | PEMI6QFN/RK | | |
| | | 100 | 19 | - | -90 | 272 | PEMI6QFN/RG | | |
| | | 100 | 15 | - | -115 | 343 | PEMI6QFN/RE | | |
| | | 200 | 40 | - | -40 | 119 | PEMI6QFN/WT | | |
| | | 200 | 36 | - | -45 | 132 | PEMI6QFN/WR | | |
| | | 200 | 32 | - | -50 | 143 | PEMI6QFN/WP | | |
| | | 200 | 28 | - | -55 | 169 | PEMI6QFN/WM | | |
| | | 200 | 23 | - | -70 | 205 | PEMI6QFN/WK | | |
| | | 200 | 19 | - | -80 | 247 | PEMI6QFN/WG | | |
| | | 200 | 15 | - | -105 | 311 | PEMI6QFN/WE | | |
| | | 15 | 50 | 18 | -50 | 145 | IP3254CZ12-6-TTL | | |
| | 15 | 43 | 12 | -60 | 175 | IP3253CZ12-6-TTL | | | |
| | 40 | 18 | - | -100 | 300 | IP4252CZ12-6-TTL | | | |
| | 100 | 45 | - | -40 | 130 | IP4254CZ12-6-TTL | | | |
| | 100 | 15 | - | -110 | 330 | IP4251CZ12-6-TTL | | | |
| | 200 | 45 | - | -35 | 110 | IP4253CZ12-6-TTL | | | |
| | 7 | 70 | 25 | - | -75 | 220 | IP4337CX18/LF | 18 ball CSP | 1.96 x 1.61 x 0.61 |
| | 125 | 25 | 60 | -60 | 180 | IP3337CX18/LF | 2.06 x 1.66 x 0.61 | | |
| | 8 | 10 | 35 | 15 | -115 | 350 | IP3348CX20 | 20 ball CSP | 3.16 x 1.06 x 0.61 |
| | | 18 | 65 | 40 | -60 | 175 | IP3088CX20 | | 3.96 x 1.28 x 0.65 |
| | | 100 | 54 | - | -30 | 98 | PEMI8CSP/RW | | 3.16 x 1.06 x 0.61 |
| | | 100 | 50 | - | -40 | 120 | IP4088CX20/LF | | 3.91 x 1.28 x 0.65 |
| | | 100 | 45 | 35 | -20 | 150 | IP3053CX20 | | 3.96 x 1.28 x 0.65 |
| | | 100 | 41 | - | -40 | 125 | PEMI8CSP/RT | | 3.16 x 1.06 x 0.61 |
| | | 20 | 40 | - | -50 | 153 | PEMI8QFN/CT | SOT1159 (16 pin QFN) | 3.3 x 1.2 x 0.5 |
| | | 20 | 36 | - | -55 | 170 | PEMI8QFN/CR | | |
| | | 20 | 32 | - | -60 | 185 | PEMI8QFN/CP | | |
| | | 20 | 28 | - | -70 | 218 | PEMI8QFN/CM | | |
| 20 | | 23 | - | -90 | 264 | PEMI8QFN/CK | | | |
| 20 | | 19 | - | -105 | 317 | PEMI8QFN/CG | | | |
| 20 | 15 | - | -130 | 397 | PEMI8QFN/CE | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

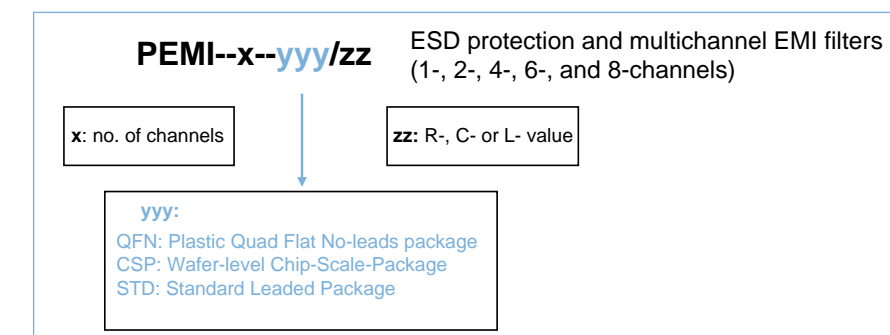
Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

| Baseband interface | Number of protected lines | Line small-signal equivalents | | | Digital interface clock speed (MHz) | Insertion Loss S21~ -3 dB (MHz) | Type | Package | Size (mm) | | |
|-----------------------------|---------------------------|-------------------------------|------------------------|------------------------|-------------------------------------|---------------------------------|-------------------------|----------------------|--------------------|----------------------|------------------|
| | | R _{line} (Ω) | C _{line} (pF) | L _{line} (nH) | | | | | | | |
| LCD display, camera, keypad | 8 | 45 | 40 | - | -50 | 145 | PEMI8QFN/HT | SOT1159 (16 pin QFN) | 3.3 x 1.2 x 0.5 | | |
| | | 45 | 36 | - | -55 | 161 | PEMI8QFN/HR | | | | |
| | | 45 | 32 | - | -60 | 175 | PEMI8QFN/HP | | | | |
| | | 45 | 28 | - | -70 | 206 | PEMI8QFN/HM | | | | |
| | | 45 | 23 | - | -80 | 249 | PEMI8QFN/HK | | | | |
| | | 45 | 19 | - | -100 | 300 | PEMI8QFN/HG | | | | |
| | | 45 | 15 | - | -125 | 376 | PEMI8QFN/HE | | | | |
| | | 65 | 40 | - | -45 | 139 | PEMI8QFN/LT | | | | |
| | | 65 | 36 | - | -50 | 155 | PEMI8QFN/LR | | | | |
| | | 65 | 32 | - | -55 | 168 | PEMI8QFN/LP | | | | |
| | | 65 | 28 | - | -65 | 197 | PEMI8QFN/LM | | | | |
| | | 65 | 23 | - | -80 | 239 | PEMI8QFN/LK | | | | |
| | | 65 | 19 | - | -95 | 288 | PEMI8QFN/LG | | | | |
| | | 65 | 15 | - | -120 | 361 | PEMI8QFN/LE | | | | |
| | | 100 | 40 | - | -45 | 131 | PEMI8QFN/RT | | | | |
| | | 100 | 36 | - | -50 | 145 | PEMI8QFN/RR | | | | |
| | | 100 | 32 | - | -55 | 159 | PEMI8QFN/RP | | | | |
| | | 100 | 28 | - | -60 | 187 | PEMI8QFN/RM | | | | |
| | | 100 | 23 | - | -75 | 227 | PEMI8QFN/RK | | | | |
| | | 100 | 19 | - | -90 | 272 | PEMI8QFN/RG | | | | |
| | | 100 | 15 | - | -115 | 343 | PEMI8QFN/RE | | | | |
| | | 200 | 40 | - | -40 | 119 | PEMI8QFN/WT | | | | |
| | | 200 | 36 | - | -45 | 132 | PEMI8QFN/WR | | | | |
| | | 200 | 32 | - | -50 | 143 | PEMI8QFN/WP | | | | |
| | | 200 | 28 | - | -55 | 169 | PEMI8QFN/WM | | | | |
| | | 200 | 23 | - | -70 | 205 | PEMI8QFN/WK | | | | |
| | | 200 | 19 | - | -80 | 247 | PEMI8QFN/WG | | | | |
| | | 200 | 15 | - | -105 | 311 | PEMI8QFN/WE | | | | |
| | | 15 | 43 | 12 | -60 | 175 | IP3254CZ16-8-TTL | | | SOT1168 (16 pin QFN) | 3.3 x 1.35 x 0.5 |
| | | 15 | 50 | 18 | -50 | 145 | IP3253CZ16-8-TTL | | | | |
| | | 40 | 18 | - | -100 | 300 | IP4252CZ16-8-TTL | | | | |
| | | 100 | 45 | - | -40 | 130 | IP4254CZ16-8-TTL | | | | |
| | 100 | 15 | - | -110 | 330 | IP4251CZ16-8-TTL | | | | | |
| | 200 | 45 | - | -35 | 110 | IP4253CZ16-8-TTL | | | | | |
| | 10 | 70 | 25 | - | -75 | 220 | IP4338CX24/LF | 24 ball CSP | 1.96 x 2.01 x 0.61 | | |
| | | 125 | 25 | 60 | -60 | 180 | IP3338CX24/LF | | 2.11 x 2.11 x 0.61 | | |
| | | 1000 | 50 | - | -7 | 22 | IP4035CX24/LF | | 2.41 x 2.41 x 0.65 | | |
| | | 80 | 40 | - | -30 | 100 | IP4032CX25/LF | 25 ball CSP | 2.41 x 2.41 x 0.65 | | |
| | | 200 | 50 | - | -35 | 105 | IP4041CX25/LF | | | | |





ESD protection acc. to IEC 61000-4-2 (level 4)

PEMI-series nomenclature



SD-, SIM-card and MMC

types in **bold** represent new products


| Baseband interface | Number of protected lines | Line small-signal equivalents | | Digital interface clock speed (MHz) | Remark | Type | Package | Size (mm) | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------|---------------------------|-------------------------------|------------------------|---|---|---|----------------------|---|------------------|---|-------------|---|---|-------------------------|----------------------|--------------------|--|--|----------------|--------------------|--------------------|------------------|-----|---|---|--------------------|-------------|--------------------|-----|---|------------------|---------------------|------------------|
| | | R _{line} | C _{line} (pF) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SIM card | 3 + 2 | 47 / 100 | 10 | -20 | Integrated low capacitance SIM-card passive filter array & USB ESD protection | IP4365CX11 | 11 ball CSP | 1.16 x 1.56 x 0.61 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 3 | 47 / 100 | 40 | -12 | Integrated SIM-card EMI filter and ESD protection | IP4044CX8/LF | 8 ball CSP | 1.46 x 1.49 x 0.65 | | | | | | | | | | | | | | | | | |
| | 47 / 100 | 20 | -20 | Integrated SIM-card EMI filter and ESD protection | IP4064CX8/LF/P | 1.41 x 1.41 x 0.65 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | 47 / 100 | 20 | | | | | | | | | -20 | Smaller size, integrated SIM-card EMI filter and ESD protection | IP4364CX8/LF/P | 1.16 x 1.16 x 0.61 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | 47 / 100 | 10 | -20 | Smaller size, low capacitance integrated SIM-card EMI filter and ESD protection | IP4366CX8/P | 1.16 x 1.16 x 0.61 | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | 47 / 100 | 40 | -12 | Integrated SIM-card EMI filter and ESD protection | IP4264CZ8-40-TTL | SOT1166 (8 pin QFN) | 1.7 x 1.35 x 0.5 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 47 / 100 | 10 | -20 | Integrated SIM-card EMI filter and ESD protection | IP4264CZ8-10-TTL |  | 1.7 x 1.35 x 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - | | | | | | | | 1 | -240 | Quad channel low capacitance ESD protection | IP4221CZ6-S |  | 1.45 x 1.0 x 0.5 | | | | | | | | | | | | | | | | | | | | |
| SD-card / MMC | 4 | 47 / 13 k / 56 k | 25 | -30 | MMC ESD protection, pull-up resistors | IP4051CX11/LF | 11 ball CSP | 1.44 x 1.96 x 0.65 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 50 / 75 k / 7 k | 18 | -50 | High-speed MMC ESD protection, pull-up resistors | IP4060CX16/LF | 16 ball CSP | 1.96 x 1.97 x 0.65 | | | | | | | | | | | | | | | | | | |
| | 6 | 40 | 12 | >52 | (Mini) SD card/trans flash ESD protection, EMI filter | IP4252CZ12-6-TTL | SOT1167 (12 pin QFN) |  | | | | | | | | 2.5 x 1.35 x 0.5 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 6 + 2 | 40 | 12 | >52 | (Mini) SD card/trans flash ESD protection, EMI filter | IP4252CZ16-8-TTL | SOT1168 (16 pin QFN) | |  | 3.3 x 1.35 x 0.5 | | | | | | | | | | | | | | | |
| | 7 | 40 / 50 k / 25 k | 18 | -20 | (Mini) SD/trans flash card ESD protection, EMI filter, pull-up resistors | IP4052CX20/LF | 20 ball CSP | 2.54 x 1.96 x 0.65 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | - | 5 | -24 | Memory stick PRO ESD protection | IP4067CX9/LF | 9 ball CSP | 1.46 x 1.52 x 0.65 | | | | | | | | | | | | | | | | | | |
| | 6 (+3) | 15 / 50 k / 15 k | 8 | >52 | Very low capacitance, low channel resistance (mini) SD card/trans flash ESD protection EMI filter, pull-up resistor | IP4350CX24/LF | 24 ball CSP | 1.95 x 2.11 x 0.61 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 40 / 50 k / 15 k | 20 | >52 | (Mini) SD card/trans flash ESD protection, EMI filter, pull-up resistor | IP4352CX24/LF | 2.02 x 2.01 x 0.61 | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | - | - | >52 | (Mini) SD/SDIO memory card level shifter, can be combined with IP4352CX24/LF | IP4852CX25/LF | 25 ball CSP | 2.01 x 2.01 x 0.61 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | 40 / 50 k / 15 k | - | >52 | (Mini) SD/SDIO memory card level shifter, and voltage regular, incl. ESD and EMI filter | IP4853CX24/P | 24 ball CSP | 2.01 x 2.01 x 0.61 | | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Battery and charger protection




types in **bold** represent new products

| Baseband interface | Number of protected lines | C _{line} (pF) | Diode voltage | Remark | Type | Package | Size (mm) | | |
|------------------------------|---------------------------|------------------------|-------------------------|--------------------------------------|-------------------|---|--------------------|-----------------|-------------------|
| Battery & charger protection | 1 | 180 | Breakdown 16 V | Power diode | IP4085CX4 | 4 ball CSP | 0.91 x 0.91 x 0.65 | | |
| | | 450 | Breakdown 7 V | Power diode | IP4385CX4 | | | | |
| | | 160 | Breakdown 16 V | Power diode | IP4386CX4 | | | | |
| | | 290 | Breakdown 10 V | Power diode | IP4387CX4 | | | | |
| | | 160 | V _{RWM} = 12 V | Power diode with 2 A integrated fuse | IP4389CX4 |  | 0.76 x 0.76 x 0.61 | | |
| | | 160 | V _{RWM} = 12 V | Power diode | PESD12VS1UJ | | | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 |
| | | 160 | V _{RWM} = 12 V | Power diode | PESD12VS1UA | | | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 |
| | | 480 | V _{RWM} = 5 V | Power diode | PESD5V0S1UJ | | | SOD323F (SC-90) | 1.7 x 1.25 x 0.7 |
| 480 | V _{RWM} = 5 V | Power diode | PESD5V0S1UA | SOD323 (SC-76) | 1.7 x 1.25 x 0.95 | | | | |

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN


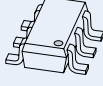
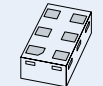
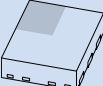
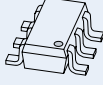
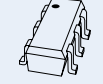
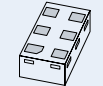
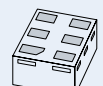
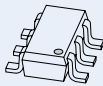
types in **bold** represent new products

| Baseband interface | Number of protected lines | R _{line} | C _{line} (pF) | Digital interface clock speed (MHz) | Remark | Type | Package | Size (mm) | | | | | | | | | | | | | | |
|--------------------|---------------------------|-------------------|------------------------|--|--|---|--------------------|--------------------|-------------------|------|---|--|---|--------------------|--------------------|--------------------------|-----|--------|--|------------------|---|--------------------|
| USB (CSP package) | 2 | 33 / 1.3 k | 30 | >6 | Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching | IP4056CX8/LF | 8 ball CSP | 1.27 x 1.83 x 0.65 | | | | | | | | | | | | | | |
| | | | | | | | | | 33 / 1.3 k / 10 k | 30 | >6 | Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching | IP4057CX10/LF | 10 ball CSP | 1.56 x 1.91 x 0.65 | | | | | | | |
| | | | | | | | | | | | | | | | | 33 / 1.3 k / 17 k / 15 k | 27 | >6 | Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching | IP4065CX11/LF | 11 ball CSP | 1.47 x 1.97 x 0.65 |
| | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | 17 / 1.5 k | 35 | >6 | Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching | IP4158CX8/LF | 6 ball CSP | 0.91 x 1.41 x 0.65 | | | | | | | |
| | | | | | | | | | | | | | | | | 33 | 35 | >6 | Fully integrated USB low / fullspeed interface with EMI filter, ESD protection and impedance matching | IP4078CX6/LF | 4 ball CSP | 0.76 x 0.76 x 0.61 |
| | | | | | | | | | - | 1.3 | -1 GHz | USB2.0 high-speed ESD protection | IP4359CX4/LF | 4 ball CSP | 0.76 x 0.76 x 0.61 | | | | | | | |
| | - | 1.3 | -1 GHz | USB2.0 high-speed ESD protection | IP4356CX4 | 4 ball CSP | 0.76 x 0.76 x 0.61 | | | | | | | | | | | | | | | |
| | | | | | | | | 3+2 | 47 / 100 | 10 | -20/6 | Integrated low capacitance SIM-Card & USB passive filter array with ESD protection | IP4365CX11/P | 11 ball CSP | 1.16 x 1.56 x 0.61 | | | | | | | |
| | 4 | 33 / 1.5 k / 20 k | 17 | >6 | Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching | IP4368CX9/P | 5 ball CSP | | | | | | | | | 1.16 x 1.16 x 0.61 | | | | | | |
| | | | | | | | | - | 3 | >240 | USB2.0 high-speed ESD protection | IP4059CX5/LF | 5 ball CSP | 0.96 x 1.34 x 0.65 | | | | | | | | |
| | | | | | | | | | | | | | | | - | | 1.3 | -1 GHz | USB2.0 high-speed ESD protection | IP4358CX6 | 6 ball CSP | 0.76 x 1.16 x 0.41 |
| | | | | | | | | | | | | | | | | | | | | | | |
| | 0.5 | 2 | - | >15 kV IEC contact ESD protection with pi-filter | IP4234CZ6 |  | SOT457 (SC-74) | 2.9 x 1.5 x 1.0 | | | | | | | | | | | | | | |
| - | | | | | | | | | 1.0 | - | ESD protection for up to 2 ultra high-speed datalines | PRTR5V0U2X |  | SOT143B | 2.9 x 1.3 x 1.0 | | | | | | | |
| | | | | | | | | | | | | | | | | - | 1.8 | - | ESD protection for up to 2 ultra high-speed datalines with 12 kV ESD robustness | PRTR5V0U2AX |  | SOT886 (XSON6) |

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

| Baseband interface | Number of protected lines | R_{line} | C_{line} (pF) | Remark | Type | Package | Size (mm) |
|-----------------------------|---------------------------|------------|-----------------|--|----------------------|---|-------------------|
| USB2.0 (Plastic package) | 2 | - | 1 | ESD protection for up to 2 ultra high-speed datalines | PRTR5V0U2K |  | 1.0 x 1.0 x 0.5 |
| | | - | 1 | ESD protection for up to 2 ultra high-speed datalines | PRTR5V0U2D |  | 2.9 x 1.5 x 1.0 |
| | | - | 1 | ESD protection for up to 2 ultra high-speed datalines | PRTR5V0U2F |  | 1.45 x 1.0 x 0.5 |
| | 3 + 1 | - | 0.8 | USB protection for USB OTG with 5.5 V Vbat protection | PUSBM5V5X4-TL |  | 1.6 x 1.6 x 0.5 |
| | | - | 0.8 | USB protection for USB OTG with 12 V Vbat protection | PUSBM12VX4-TL | | |
| | | - | 0.8 | USB protection for USB OTG with 15 V Vbat protection | PUSBM15VX4-TL | | |
| | | - | 0.8 | USB protection for USB OTG with 27 V Vbat protection | PUSBM27VX4-TL | | |
| | 4 | - | 1 | Dual ESD protection for USB2.0 high-speed, SD-card, SIM card | IP4220CZ6 |  | 2.9 x 1.5 x 1.0 |
| | | - | 1 | Dual ESD protection for USB2.0 high-speed, SD-card, SIM card | PRTR5V0U4D | | |
| | | - | 1 | Dual ESP protection for USB2.0 high-speed, SD-card, SIM card | PRTR5V0U4Y |  | 2.0 x 1.25 x 0.95 |
| | | - | 1 | ESD protection for USB2.0 high-speed, SD-card, SIM card | IP4221CZ6-S |  | 1.45 x 1.0 x 0.5 |
| | | - | 1 | ESD protection for USB2.0 high-speed, SD-card, SIM card | IP4221CZ6-XS |  | 1.0 x 1.0 x 0.5 |
| | | 1 | 3 | >15 kV IEC contact ESD protection with pi-filter | IP4225CZ10 |  | 2.9 x 1.5 x 1.0 |

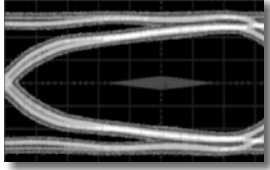
ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

In the Spotlight

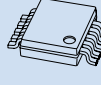
USB3.0: Ultra high-speed 4 channel ESD protection – IP4292CZ10-TBR

- Low clamping voltage ensures best protection of the System Chip
- Low Cline and high ESD protection level
- Straight through routing → best signal integrity
- Clean eye diagrams
- 10 pin QFN package with exposed leads (SOT1176)



Protection and signal conditioning

types in **bold** represent new products

| Baseband interface | Number of protected lines | R_{line} | C_{line} (pF) | Remark | Type | Package | Size (mm) |
|-----------------------|---------------------------|------------|-----------------|--|-----------------------|---|-----------------|
| USB3.0 SuperSpeed USB | 4 | - | 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TBR |  | 1.0 x 2.5 x 0.5 |
| | | - | 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TT |  | 3.0 x 3.0 x 1.1 |
| | | - | 0.5 | ESD protection for ultra high-speed interfaces | IP4292CZ10-TBR |  | 1.0 x 2.5 x 0.5 |

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN




types in **bold** represent new products

| Baseband interface | Number of protected lines | R_{line} | C_{line} (pF) | Remark | Type | Package | Size (mm) |
|--------------------|---------------------------|------------|-----------------|--|--|---|---|
| Display port | 4 | - | 0.6 | ESD protection for ultra high-speed interfaces | IP4286CZ6-TTY | SOT363 (SC-88)  | 2.0 x 1.25 x 0.95 |
| | 11 | - | 0.7 | ESD protection | IP4790CZ38 | SOT510 (TSSOP38)  | 9.7 x 4.4 x 1.1 |
| SATA | 2 | - | 0.7 | ESD protection for ultra high-speed interfaces | IP4282CZ6 | SOT886 (XSON6)  | 1.45 x 1.0 x 0.5 |
| | | | 0.6 | ESD protection for ultra high-speed interfaces | IP4286CZ6-TBF | SOT363 (SC-88)  | 2.0 x 1.25 x 0.95 |
| | | - | 0.6 | ESD protection for ultra high-speed interfaces | IP4286CZ6-TTY | SOT363 (SC-88)  | 2.0 x 1.25 x 0.95 |
| | 4 | - | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TBR | SOT1176 (XSON10)  | 1.0 x 2.5 x 0.5 |
| | | | 0.6 | ESD protection for ultra high-speed interfaces | IP4283CZ10-TT | SOT552 (TSSOP10)  | 3.0 x 3.0 x 1.1 |
| | | | 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TBR | SOT1176 (XSON10)  | 1.0 x 2.5 x 0.5 |
| | | | 0.5 | ESD protection for ultra high-speed interfaces | IP4284CZ10-TT | SOT552 (TSSOP10)  | 3.0 x 3.0 x 1.1 |
| | | | 0.8 | ESD protection for ultra high-speed interfaces | IP4285CZ9-TBB | SOT1178 (XSON9)  | 1.0 x 2.5 x 0.1 |
| | | | 0.5 | ESD protection for ultra high-speed interfaces | IP4292CZ10-TBR | SOT1176 (XSON10)  | 1.0 x 2.5 x 0.5 |
| | | | - | 0.5 | ESD protection for ultra high-speed interfaces | IP4292CZ10-TTY | SOT363 (SC-88)  |

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

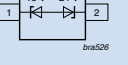

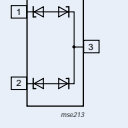

types in **bold** represent new products

| Baseband interface | Number of protected lines | R_{line} | C_{line} (pF) | Remark | Type | Package | Size (mm) |
|--------------------|---------------------------|------------|-----------------|---|------------------|---|-------------------|
| LAN | 1 | - | 0.6 | Ethernet ESD protection $V_{RWM} = 3.3$ V | PESD3V3U1UT |  | 2.9 x 1.3 x 1.0 |
| | | | 0.6 | Ethernet ESD protection $V_{RWM} = 5.0$ V | PESD5V0U1UT | | |
| | | | 0.6 | Ethernet ESD protection $V_{RWM} = 12$ V | PESD12VU1UT | | |
| | | | 0.6 | Ethernet ESD protection $V_{RWM} = 15$ V | PESD15VU1UT | | |
| | | | 0.6 | Ethernet ESD protection $V_{RWM} = 24$ V | PESD24VU1UT | | |
| | 4 | - | 1 | Ethernet ESD protection | IP4220CZ6 | SOT457 (SC-74)  | 2.9 x 1.5 x 1.0 |
| | | | 1 | Ethernet line surge ESD protection | IP4233CZ6 | SOT363 (SC-88)  | 2.0 x 1.25 x 0.95 |
| | | | - | - | - | - | - |

ESD protection acc. to IEC 61000-4-2 (level 4)

Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Automotive LIN/CAN/FlexRay

| Number of protected lines bidirectional | V_{RWM} (V) | C_{line} typ (pF) | C_{line} max (pF) | $P_{PP}^{(1)}$ max (W) | ESD rating ⁽²⁾ max (kV) | I_r max [μA] @ V_{RWM} | Configuration | Type | Package | Size (mm) |
|---|------------------------------|---------------------|---------------------|------------------------|------------------------------------|----------------------------|---|-----------|---|-------------------|
| 1 | 15 (diode 1) 24 (diode 2) | 13 | 17 | 160 | 23 | 0.05 |  | PESD1LIN | SOD323 (SC-76)  | 1.7 x 1.25 x 0.95 |
| 2 | 24 | 11 | 17 | 200 | 23 | 0.05 |  | PESD1CAN |  | 2.9 x 1.3 x 1.0 |
| | | 25 | 30 | 230 | 30 | 0.01 | | PESD2CAN | | |
| | | 11 | 17 | 200 | 23 | 0.05 | | PESD1FLEX | | |

⁽¹⁾ 8/20 μs surge pulse acc. to IEC 61000-4-5

⁽²⁾ acc. to IEC 61000-4-2 (contact discharge)

TVS diodes, 24 W / 40 W

| Power (W) (10/1000 µs waveform) ^[1] | V _{RWM} (V) | V _{BR min} (V) @ I _r | V _{BR typ} (V) @ I _r | V _{BR max} (V) @ I _r | I _r (mA) | ESD rating ^[2] max (kV) | C _{line} typ (pF) | V _{CL max} (V) @ I _{pp} | I _{pp} (A) | I _{RM max} (µA) @ V _{RWM} | Configuration | Type | Package | Size (mm) | | |
|--|----------------------|--|--|--|---------------------|------------------------------------|----------------------------|---|---------------------|---|---------------|-----------|---------|-----------------|-------|-----------------|
| 24 | 3 | 5.32 | 5.6 | 5.88 | 20 | 30 | 210 | 8 | 3 | 5 | | MMBZ5V6AL | SOT23 | 2.9 x 1.3 x 1.0 | | |
| | 3 | 5.89 | 6.2 | 6.51 | 1 | 30 | 175 | 8.7 | 2.76 | 0.2 | | MMBZ6V2AL | | | | |
| | 4.5 | 6.48 | 6.8 | 7.14 | 1 | 30 | 150 | 9.6 | 2.5 | 0.3 | | MMBZ6V8AL | | | | |
| | 6 | 8.65 | 9.1 | 9.56 | 1 | 30 | 155 | 14 | 1.7 | 0.1 | | MMBZ9V1AL | | | | |
| | 6.5 | 9.5 | 10 | 10.5 | 1 | 30 | 130 | 14.2 | 1.7 | 0.02 | | MMBZ10VAL | | | | |
| | 8.5 | 11.4 | 12 | 12.6 | 1 | 30 | 110 | 17 | 2.35 | 0.005 | | MMBZ12VAL | | | | |
| 40 | 12 | 14.25 | 15 | 15.75 | 1 | 30 | 85 | 21 | 1.9 | 0.005 | MMBZ15VAL | | | | SOT23 | 2.9 x 1.3 x 1.0 |
| | 14.5 | 17.1 | 18 | 18.9 | 1 | 30 | 70 | 25 | 1.6 | 0.005 | MMBZ18VAL | | | | | |
| | 17 | 19 | 20 | 21 | 1 | 30 | 65 | 28 | 1.4 | 0.005 | MMBZ20VAL | | | | | |
| | 22 | 25.65 | 27 | 28.35 | 1 | 30 | 48 | 40 | 1 | 0.005 | MMBZ27VAL | | | | | |
| | 26 | 31.35 | 33 | 34.65 | 1 | 30 | 45 | 46 | 0.87 | 0.005 | MMBZ33VAL | | | | | |
| | 8.5 | 11.4 | 12 | 12.6 | 1 | 30 | 110 | 17 | 2.35 | 0.005 | MMBZ12VDL | | | | | |
| | 12.8 | 14.3 | 15 | 15.8 | 1 | 30 | 85 | 21.2 | 1.9 | 0.005 | MMBZ15VDL | | | | | |
| | 14.5 | 17.1 | 18 | 18.9 | 1 | 30 | 70 | 25 | 1.6 | 0.005 | MMBZ18VCL | | | | | |
| | 17 | 19 | 20 | 21 | 1 | 30 | 65 | 28 | 1.4 | 0.005 | MMBZ20VCL | | | | | |
| | 22 | 25.65 | 27 | 28.35 | 1 | 30 | 48 | 38 | 1 | 0.005 | MMBZ27VCL | | | | | |
| | 26 | 31.35 | 33 | 34.65 | 1 | 30 | 45 | 46 | 0.87 | 0.005 | MMBZ33VCL | | | | | |

^[1] acc. to IEC 61643-321 ^[2] acc. to IEC 61000-4-2 (contact discharge)

TVS diodes, 400 W

| Power (W) (10/1000 µs waveform) ^[1] | V _{RWM} (V) | V _{BR min} (V) @ I _r | V _{BR typ} (V) @ I _r | V _{BR max} (V) @ I _r | I _r (mA) | V _{CL max} (V) @ I _{pp} | I _{pp} (A) | I _{RM typ} (µA) @ V _{RWM} | I _{RM max} (µA) @ V _{RWM} | Type | Package | Size (mm) |
|--|----------------------|--|--|--|---------------------|---|---------------------|---|---|-------------|---------|-----------------|
| 350 | 3.5 | 5.20 | 5.60 | 6.00 | 10 | 8.0 | 43.8 | 5 | 600 | PTVS3V3S1UR | SOD123W | 2.6 x 1.7 x 1.0 |
| 400 | 5.0 | 6.40 | 6.70 | 7.00 | 10 | 9.2 | 43.5 | 5 | 400 | PTVS5V0S1UR | | |
| | 6.0 | 6.67 | 7.02 | 7.37 | 10 | 10.3 | 38.8 | 5 | 400 | PTVS6V0S1UR | | |
| | 6.5 | 7.22 | 7.60 | 7.98 | 10 | 11.2 | 35.7 | 5 | 250 | PTVS6V5S1UR | | |
| | 7.0 | 7.78 | 8.20 | 8.60 | 10 | 12.0 | 33.3 | 3 | 100 | PTVS7V0S1UR | | |
| | 7.5 | 8.33 | 8.77 | 9.21 | 1 | 12.9 | 31.0 | 0.2 | 50 | PTVS7V5S1UR | | |
| | 8.0 | 8.89 | 9.36 | 9.83 | 1 | 13.6 | 29.4 | 0.03 | 25 | PTVS8V0S1UR | | |
| | 8.5 | 9.44 | 9.92 | 10.40 | 1 | 14.4 | 27.8 | 0.01 | 10 | PTVS8V5S1UR | | |
| | 9.0 | 10.00 | 10.55 | 11.10 | 1 | 15.4 | 26.0 | 0.005 | 5 | PTVS9V0S1UR | | |
| | 10 | 11.10 | 11.70 | 12.30 | 1 | 17.0 | 23.5 | 0.005 | 2.5 | PTVS10VS1UR | | |
| | 11 | 12.20 | 12.85 | 13.50 | 1 | 18.2 | 22.0 | 0.005 | 2.5 | PTVS11VS1UR | | |
| | 12 | 13.30 | 14.00 | 14.70 | 1 | 19.9 | 20.1 | 0.005 | 2.5 | PTVS12VS1UR | | |
| | 13 | 14.40 | 15.15 | 15.90 | 1 | 21.5 | 18.6 | 0.001 | 0.1 | PTVS13VS1UR | | |
| | 14 | 15.60 | 16.40 | 17.20 | 1 | 23.2 | 17.2 | 0.001 | 0.1 | PTVS14VS1UR | | |
| | 15 | 16.70 | 17.60 | 18.50 | 1 | 24.4 | 16.4 | 0.001 | 0.1 | PTVS15VS1UR | | |
| | 16 | 17.80 | 18.75 | 19.70 | 1 | 26.0 | 15.4 | 0.001 | 0.1 | PTVS16VS1UR | | |
| | 17 | 18.90 | 19.90 | 20.90 | 1 | 27.6 | 14.5 | 0.001 | 0.1 | PTVS17VS1UR | | |
| | 18 | 20.00 | 21.00 | 22.10 | 1 | 29.2 | 13.7 | 0.001 | 0.1 | PTVS18VS1UR | | |
| | 20 | 22.20 | 23.35 | 24.50 | 1 | 32.4 | 12.3 | 0.001 | 0.1 | PTVS20VS1UR | | |
| | 22 | 24.40 | 25.60 | 26.90 | 1 | 35.5 | 11.3 | 0.001 | 0.1 | PTVS22VS1UR | | |
| | 24 | 26.70 | 28.10 | 29.50 | 1 | 38.9 | 10.3 | 0.001 | 0.1 | PTVS24VS1UR | | |
| | 26 | 28.90 | 30.40 | 31.90 | 1 | 42.1 | 9.5 | 0.001 | 0.1 | PTVS26VS1UR | | |
| | 28 | 31.10 | 32.80 | 34.40 | 1 | 45.4 | 8.8 | 0.001 | 0.1 | PTVS28VS1UR | | |
| | 30 | 33.30 | 35.10 | 36.80 | 1 | 48.4 | 8.3 | 0.001 | 0.1 | PTVS30VS1UR | | |
| | 33 | 36.70 | 38.70 | 40.60 | 1 | 53.3 | 7.5 | 0.001 | 0.1 | PTVS33VS1UR | | |
| 36 | 40.00 | 42.10 | 44.20 | 1 | 58.1 | 6.9 | 0.001 | 0.1 | PTVS36VS1UR | | | |
| 40 | 44.40 | 46.80 | 49.10 | 1 | 64.5 | 6.2 | 0.001 | 0.1 | PTVS40VS1UR | | | |
| 43 | 47.80 | 50.30 | 52.80 | 1 | 69.4 | 5.8 | 0.001 | 0.1 | PTVS43VS1UR | | | |
| 45 | 50.00 | 52.65 | 55.30 | 1 | 72.7 | 5.5 | 0.001 | 0.1 | PTVS45VS1UR | | | |
| 48 | 53.30 | 56.10 | 58.90 | 1 | 77.4 | 5.2 | 0.001 | 0.1 | PTVS48VS1UR | | | |
| 51 | 56.70 | 59.70 | 62.70 | 1 | 82.4 | 4.9 | 0.001 | 0.1 | PTVS51VS1UR | | | |
| 54 | 60.00 | 63.15 | 66.30 | 1 | 87.1 | 4.6 | 0.001 | 0.1 | PTVS54VS1UR | | | |
| 58 | 64.40 | 67.80 | 71.20 | 1 | 93.6 | 4.3 | 0.001 | 0.1 | PTVS58VS1UR | | | |
| 60 | 66.70 | 70.20 | 73.70 | 1 | 96.8 | 4.1 | 0.001 | 0.1 | PTVS60VS1UR | | | |
| 64 | 71.10 | 74.85 | 78.60 | 1 | 103.0 | 3.9 | 0.001 | 0.1 | PTVS64VS1UR | | | |

^[1] 10/1000 µs acc. to IEC 61643-321

TVS diodes, 600 W

| Power (W) (10/1000 µs waveform) ^[1] | V _{RWM} (V) | V _{BR min} (V) @ I _r | V _{BR typ} (V) @ I _r | V _{BR max} (V) @ I _r | I _r (mA) | V _{CL max} (V) @ I _{pp} | I _{pp} (A) | I _{RM typ} (µA) @ V _{RWM} | I _{RM max} (µA) @ V _{RWM} | Type | Package | Size (mm) |
|--|----------------------|--|--|--|---------------------|---|---------------------|---|---|-------------|---------|-----------------|
| 600 | 3.5 | 5.20 | 5.60 | 6.00 | 10 | 8 | 75 | 5 | 600 | PTVS3V3P1UP | SOD128 | 3.8 x 2.6 x 1.0 |
| | 5 | 6.40 | 6.70 | 7.00 | 10 | 9.2 | 65.2 | 5 | 400 | PTVS5V0P1UP | | |
| | 6 | 6.67 | 7.02 | 7.37 | 10 | 10.3 | 58.3 | 5 | 400 | PTVS6V0P1UP | | |
| | 6.5 | 7.22 | 7.60 | 7.98 | 10 | 11.2 | 53.6 | 5 | 250 | PTVS6V5P1UP | | |
| | 7 | 7.78 | 8.20 | 8.60 | 10 | 12 | 50 | 3 | 100 | PTVS7V0P1UP | | |
| | 7.5 | 8.33 | 8.77 | 9.21 | 1 | 12.9 | 46.5 | 0.2 | 50 | PTVS7V5P1UP | | |
| | 8 | 8.89 | 9.36 | 9.83 | 1 | 13.6 | 44.1 | 0.03 | 25 | PTVS8V0P1UP | | |
| | 8.5 | 9.44 | 9.92 | 10.40 | 1 | 14.4 | 41.7 | 0.01 | 10 | PTVS8V5P1UP | | |
| | 9 | 10.00 | 10.55 | 11.10 | 1 | 15.4 | 39 | 0.005 | 5 | PTVS9V0P1UP | | |
| | 10 | 11.10 | 11.70 | 12.30 | 1 | 17 | 35.3 | 0.005 | 2.5 | PTVS10VP1UP | | |
| | 11 | 12.20 | 12.85 | 13.50 | 1 | 18.2 | 33 | 0.005 | 2.5 | PTVS11VP1UP | | |
| | 12 | 13.30 | 14.00 | 14.70 | 1 | 19.9 | 30.2 | 0.005 | 2.5 | PTVS12VP1UP | | |
| | 13 | 14.40 | 15.15 | 15.90 | 1 | 21.5 | 27.9 | 0.001 | 0.1 | PTVS13VP1UP | | |
| | 14 | 15.60 | 16.40 | 17.20 | 1 | 23.2 | 25.9 | 0.001 | 0.1 | PTVS14VP1UP | | |
| | 15 | 16.70 | 17.60 | 18.50 | 1 | 24.4 | 24.6 | 0.001 | 0.1 | PTVS15VP1UP | | |
| | 16 | 17.80 | 18.75 | 19.70 | 1 | 26 | 23.1 | 0.001 | 0.1 | PTVS16VP1UP | | |
| | 17 | 18.90 | 19.90 | 20.90 | 1 | 27.6 | 21.7 | 0.001 | 0.1 | PTVS17VP1UP | | |
| | 18 | 20.00 | 21.00 | 22.10 | 1 | 29.2 | 20.5 | 0.001 | 0.1 | PTVS18VP1UP | | |
| | 20 | 22.20 | 23.35 | 24.50 | 1 | 32.4 | 18.5 | 0.001 | 0.1 | PTVS20VP1UP | | |
| | 22 | 24.40 | 25.60 | 26.90 | 1 | 35.5 | 16.9 | 0.001 | 0.1 | PTVS22VP1UP | | |
| | 24 | 26.70 | 28.10 | 29.50 | 1 | 38.9 | 15.4 | 0.001 | 0.1 | PTVS24VP1UP | | |
| | 26 | 28.90 | 30.40 | 31.90 | 1 | 42.1 | 14.2 | 0.001 | 0.1 | PTVS26VP1UP | | |
| | 28 | 31.10 | 32.80 | 34.40 | 1 | 45.4 | 13.2 | 0.001 | 0.1 | PTVS28VP1UP | | |
| | 30 | 33.30 | 35.10 | 36.80 | 1 | 48.4 | 12.4 | 0.001 | 0.1 | PTVS30VP1UP | | |
| | 33 | 36.70 | 38.70 | 40.60 | 1 | 53.3 | 11.3 | 0.001 | 0.1 | PTVS33VP1UP | | |
| | 36 | 40.00 | 42.10 | 44.20 | 1 | 58.1 | 10.3 | 0.001 | 0.1 | PTVS36VP1UP | | |
| | 40 | 44.40 | 46.80 | 49.10 | 1 | 64.5 | 9.3 | 0.001 | 0.1 | PTVS40VP1UP | | |
| | 43 | 47.80 | 50.30 | 52.80 | 1 | 69.4 | 8.6 | 0.001 | 0.1 | PTVS43VP1UP | | |
| | 45 | 50.00 | 52.65 | 55.30 | 1 | 72.7 | 8.3 | 0.001 | 0.1 | PTVS45VP1UP | | |
| | 48 | 53.30 | 56.10 | 58.90 | 1 | 77.4 | 7.8 | 0.001 | 0.1 | PTVS48VP1UP | | |
| | 51 | 56.70 | 59.70 | 62.70 | 1 | 82.4 | 7.3 | 0.001 | 0.1 | PTVS51VP1UP | | |
| | 54 | 60.00 | 63.15 | 66.30 | 1 | 87.1 | 6.9 | 0.001 | 0.1 | PTVS54VP1UP | | |
| | 58 | 64.40 | 67.80 | 71.20 | 1 | 93.6 | 6.4 | 0.001 | 0.1 | PTVS58VP1UP | | |
| | 60 | 66.70 | 70.20 | 73.70 | 1 | 96.8 | 6.2 | 0.001 | 0.1 | PTVS60VP1UP | | |
| | 64 | 71.10 | 74.85 | 78.60 | 1 | 103 | 5.8 | 0.001 | 0.1 | PTVS64VP1UP | | |

^[1] 10/1000 µs acc. to IEC 61643-321

In the Spotlight

600 / 400 W TVS series – PTVSxP1UP & PTVSxS1UR

Industry's smallest packages in the 600 / 400 W surge protection class

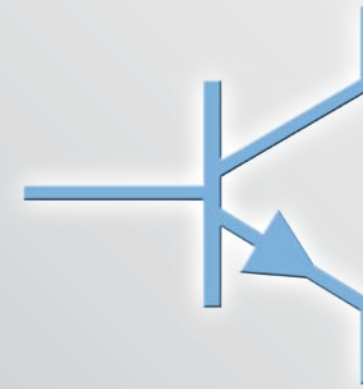
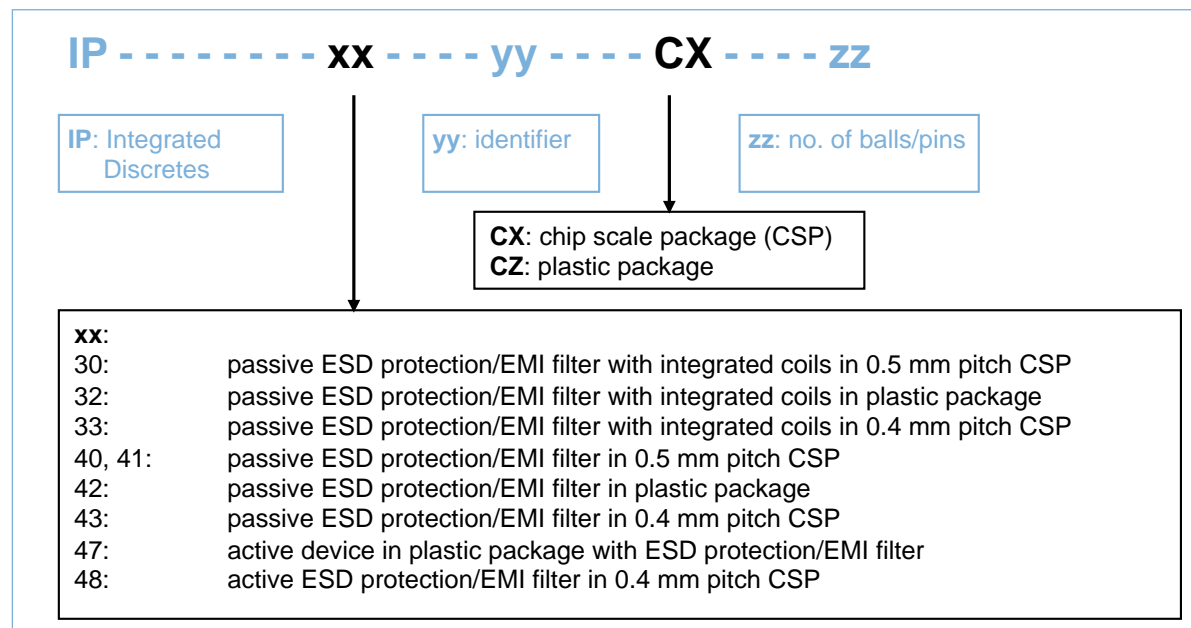
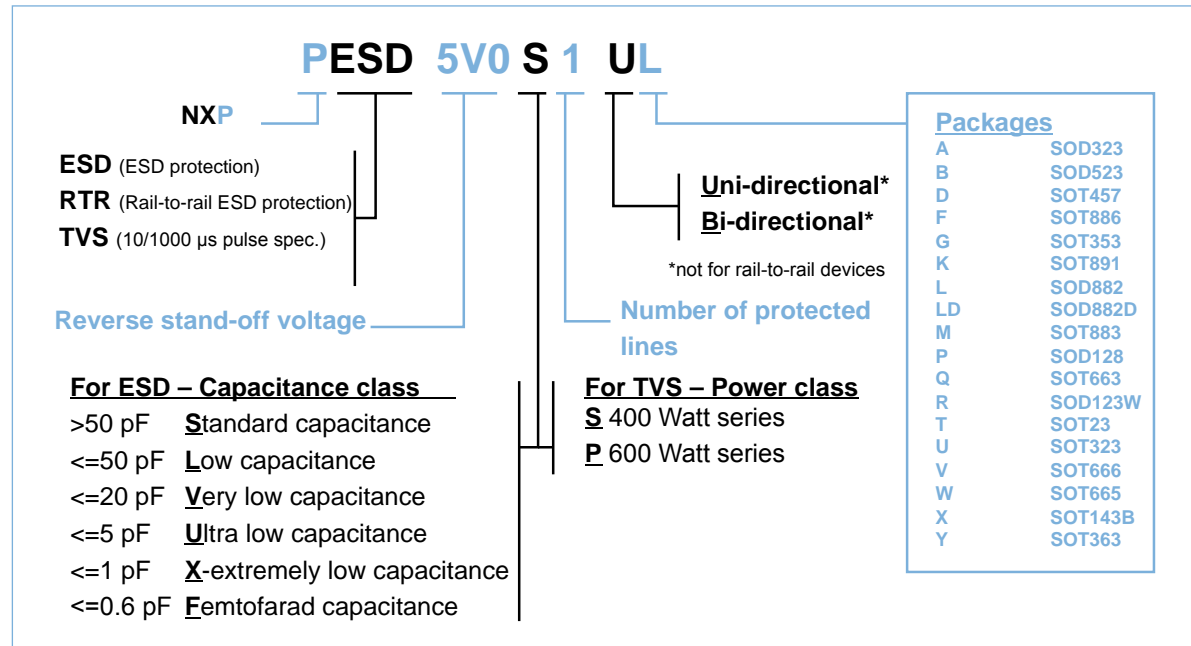
Small FlatPower packages SOD123W/128, only 1 mm high

AEC-Q101 qualified

Low reverse leakage current (down to 1 nA typical)



Protection and signal conditioning nomenclature



Bipolar transistors

General purpose bipolar transistors

52

| | |
|--|----|
| Single transistors NPN | 52 |
| Single transistors PNP | 52 |
| Double transistors | 53 |
| Single and double switching transistors | 53 |
| Medium power general purpose transistors | 54 |
| High voltage transistors | 54 |
| Low noise transistors | 54 |
| Matched pair transistors | 55 |
| Darlington transistors | 56 |
| Schmitt trigger | 56 |
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Resistor-equipped transistors (RETs)

58

| | |
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| RETs 100 mA single | 58 |
| RETs 100 mA double | 59 |
| RETs 500 mA | 59 |
| Low V_{CEsat} (BISS) RETs | 59 |

Low V_{CEsat} (BISS) transistors

60

| | |
|--|----|
| Low V_{CEsat} (BISS) transistors single NPN | 60 |
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| Low V_{CEsat} (BISS) RETs | 66 |
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| Advantages of low V_{CEsat} (BISS) technology | 67 |

High voltage power bipolar transistors

68

| | |
|---|----|
| High voltage bipolar transistors for lighting, SMPS and industrial applications | 68 |
|---|----|

Single transistors NPN

types in **bold** represent new products

| Package | | | | | | SOT23 | SOT323 (SC-70) | SOT416 (SC-75) | SOT883 (SC-101) |
|-----------------------|---------------------|---------------------|---------------------|--------------------------|--|-------------------------------------|-----------------------------|-----------------------|-------------------|
| Size (mm) | | | | | | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.0 x 0.6 x 0.5 |
| P _{tot} (mW) | | | | | | 250 | 200 | 150 | 250 |
| V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T min (MHz) | | | | | |
| 25 | 100 | 450 | 1200 | 100 | | | PMST5089 | | |
| 30 | 100 | 110 - 200 | 450 - 800 | 100 | | BC848B | BC848W | | |
| | | 350 | 900 | 100 | | | PMST5088 | | |
| 32 | 100 | 110 - 420 | 220 - 800 | 100 | | BCW31 / 32 / 33 | | | |
| | | 180 - 380 | 310 - 630 | 250 | | BCW60B / C / D | | | |
| 40 | 100 | 120 - 270 | 270 - 560 | 100 | | | | 2PC4617QM / RM | |
| 45 | 100 | 110 - 420 | 220 - 800 | 100 | | BC847 / A / B / C | BC847W / AW / BW / CW | BC847T / AT / BT / CT | BC847AM / BM / CM |
| | | 120 - 380 | 220 - 630 | 100 | | BCX70G / H / J / K | | | |
| | | 110 - 200 | 220 - 450 | 100 | | BCW71 / 72 | | | |
| 50 | 100 | 210 - 290 | 340 - 460 | 100 - 150 | | PMBT6429 | PMST6429 | | |
| | | 250 | 650 | 100 | | 2PD601ART 2PD601ARL 2PD601ASL | 2PD601ARW / SW | | |
| 60 | 100 | 110 - 200 | 220 - 450 | 100 | | PMBT6428 | PMST6428 | | |
| 65 | 100 | 110 - 200 | 220 - 450 | 100 | | BCV71 / 72 | | | |
| 80 | 100 | 20 | 80 | 60 | | BC846 / A / B | BC846W / AW / BW | BC846T / AT / BT | |
| 50 | 150 | 120 - 270 | 270 - 560 | 100 | | BSS64 | 2PC4081Q / R / S | 2PC4617Q / R | |
| | | 210 | 340 | 100 | | | 2PD601BRL | | |
| 45 | 200 | 290 | 460 | 100 | | | 2PD601BSL | | |
| | | 100 - 250 | 250 - 600 | 100 | | BC817 / -16 / -25 / -40 | BC817W / -16W / -25W / -40W | | |
| 50 | 500 | 100 | 600 | 100 | | BCX19 | | | |
| | | 85 - 170 | 170 - 340 | 140 - 180 | | 2PD602AQL 2PD602ARL 2PD602ASL | 2PD1820AR / S | | |
| 60 | 500 | 50 | - | 100 | | | PMSTA05 | | |

Single transistors PNP

types in **bold** represent new products

| Package | | | | | | SOT23 | SOT323 (SC-70) | SOT416 (SC-75) | SOT883 (SC-101) |
|-----------------------|---------------------|---------------------|---------------------|--------------------------|--|-------------------------------------|-----------------------------|-----------------------|-------------------|
| Size (mm) | | | | | | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.0 x 0.6 x 0.5 |
| P _{tot} (mW) | | | | | | 250 | 200 | 150 | 250 |
| V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T min (MHz) | | | | | |
| 80 | 500 | 100 | - | 100 | | PMBTA06 | PMSTA06 | | |
| 30 | 100 | 125 - 220 | 500 - 800 | 100 | | BC858B | BC858W | | |
| 32 | 100 | 120 - 215 | 260 - 500 | 100 | | BCW29 / 30 | | | |
| | | 180 - 380 | 310 - 630 | 100 | | BCW61B / C / D | | | |
| 40 | 100 | 120 - 270 | 270 - 560 | 100 | | | | 2PA1774QM / RM / SM | |
| 45 | 100 | 210 - 290 | 340 - 460 | 70 - 80 | | 2PB709ART 2PB709ARL 2PB709ASL | 2PB709ARW / SW | | |
| | | 180 - 380 | 310 - 630 | 100 | | BCX71H / J / K | | | |
| | | 120 - 215 | 260 - 500 | 100 | | BCW69 / 70 | | | |
| 60 | 100 | 125 - 420 | 250 - 800 | 100 | | BC857 / A / B / C | BC857W / AW / BW / CW | BC857T / AT / BT / CT | BC857AM / BM / CM |
| | | 120 | 260 | 150 | | BCW89 | | | |
| 65 | 100 | 125 - 200 | 250 - 475 | 100 | | BC856 / A / B | BC856W / AW / BW | BC856T / AT / BT | |
| 100 | 100 | 30 | - | 50 | | BSS63 | | | |
| 50 | 150 | 120 - 270 | 270 - 560 | 100 | | | 2PA1576Q / R / S | 2PA1774Q / R / S | |
| | | 210 | 340 | 100 | | | 2PD601BRL | | |
| 25 | 200 | 290 | 460 | 100 | | | 2PD601BSL | | |
| | | 100 | 600 | 80 | | BCX18 | | | |
| 45 | 500 | 100 - 250 | 250 - 600 | 80 | | BC807 / -16 / -25 / -40 | BC807W / -16W / -25W / -40W | | |
| | | 100 | 600 | 80 | | BCX17 | | | |
| 50 | 500 | 85 - 170 | 170 - 340 | 100 - 140 | | 2PB710ARL 2PB710ASL | 2PB1219AQ / R / S | | |
| 60 | 500 | 100 | - | 50 | | | PMSTA55 | | |
| 80 | 500 | 100 | - | 50 | | | PMBTA56 | | |

Double transistors

| Package | | | | | | SOT457 (SC-74) | SOT363 (SC-88) | SOT666 | |
|-----------------------|----------------------|---------------------|---------------------|---------------------|--------------------------|-----------------|-------------------|------------------|----------|
| Size (mm) | | | | | | 2.9 x 1.5 x 1.0 | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | |
| P _{tot} (mW) | | | | | | 600 | 300 | 300 | |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T min (MHz) | | | | |
| NPN | 40 | 100 | 120 | 450 | 100 | | PUMX1 | PEMX1 | |
| | 45 | 100 | 200 | 450 | 100 | | BC847DS | BC847BS | BC847BV |
| | 65 | 100 | 110 | - | 100 | | | BC846S | |
| | | | 200 | 450 | 100 | | BC846DS | BC846BS | |
| 50 | 150 | 120 | 560 | 100 | | | PUMX2 | | |
| PNP | 45 | 500 | 160 | 400 | 80 | | BC817DS | | |
| | 40 | 100 | 120 | 450 | 100 | | PIMT1 | PUMT1 | PEMT1 |
| | 45 | 100 | 200 | 450 | 100 | | | BC857BS | BC857BV |
| | 65 | 100 | 110 | - | 100 | | | BC856S | |
| NPN/PNP | 45 | 500 | 160 | 400 | 80 | | | BC856BS | |
| | | | 200 | 450 | 100 | | BC807DS | | |
| | 40 | 100 | 120 | 450 | 100 | | | PUMZ1 | PEMZ1 |
| | 45 | 100 | 200 | 450 | 100 | | | BC847BPN | BC847BPN |
| 50 | 100 | 120 | 560 | 100 | | | PIMZ2 | PUMZ2 | |
| 65 | 100 | 200 | 450 | 100 | | | BC846BPN | | |
| 12 | 500 | 200 | - | 250/100 | | | | PEMZ7 | |
| 45 | 500 | 160 | 400 | 100/80 | | | BC817DPN | | |

Single and double switching transistors

| Package | | | | | | | SOT223 (SC-73) | SOT89 (SC-62) | SOT23 | SOT323 (SC-70) | SOT363 (SC-88) | SOT666 | SOT883 (SC-101) |
|-----------------------|----------------------|---------------------|---------------------|---------------------|--------------------------|-----------------------|------------------|-----------------|-----------------|-------------------|-------------------|------------------|-----------------|
| Size (mm) | | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | 1.0 x 0.6 x 0.5 |
| P _{tot} (mW) | | | | | | | 1700 | 1300 | 250 | 200 | 300 | 300 | 250 |
| Configuration | | | | | | | single | single | single | single | double | double | single |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T min (MHz) | t _{off} (ns) | | | | | | | |
| NPN | 12 | 100 | 40 | 120 | 400 | 20 | | | BSV52 | | | | |
| | 40 | 100 | 100 | 300 | 180 | 1200 | | | PMBS3904 | PMSS3904 | | | |
| | | | | | 300 | 250 | | PXT2222A | | | | | |
| | 15 | 200 | 40 | 120 | 500 | 20 | | | PMBT2369 | PMST2369 | | | |
| | 40 | 200 | 100 | 300 | 300 | 250 | | | MMBT3904 | | | | |
| | | | | | | | | | PMBT3904 | PMST3904 | PMBT3904YS | PMBT3904VS | PMBT3904M |
| | 30 | 600 | 100 | 300 | 250 | 250 | | | PMBT2222 | PMST2222 | | | |
| 40 | 600 | 100 | 300 | 300 | 250 | | | PZT4401 | PXT4401 | PMBT4401 | PMST4401 | | |
| | | | | | | | | MMBT2222A | | | | | |
| | | | | | | PZT2222A | | PMBT2222A | PMST2222A | | | | |
| PNP | 40 | 800 | 100 | 300 | 300 | 250 | | | BSR14 | | | | |
| | 40 | 100 | 100 | 300 | 150 | 700 | | | PMBS3906 | PMSS3906 | | | |
| | | | | | | | | | MMBT3906 | | | | |
| | 40 | 200 | 100 | 300 | 250 | 300 | | | PMBT3906 | PMST3906 | PMBT3906YS | PMBT3906VS | PMBT3906M |
| 40 | 600 | 100 | 300 | 200 | 350 | 300 | | | PZT4403 | PXT4403 | PMBT4403 | PMST4403 | |
| | | | | | 365 | | | | PMBT2907 | | | | |
| | | | | | | 300 | | | | | PMST2907A | | |
| 60 | 600 | 100 | 300 | 200 | 200 | | | | BSR16 | | | | |
| | | | | | | | | PZT2907A | PXT2907A | PMBT2907A | | | |
| NPN/PNP | 40 | 200 | 100 | 300 | 300/250 | 250/300 | | | | | PMBT3946YPN | PMBT3946VPN | |

Medium power general purpose transistors

| Package | | | | | | SOT223 (SC-73) | SOT89 (SC-62) |
|-----------------------|----------------------|---------------------|---------------------|---------------------------------------|---------------------------------------|-------------------|-------------------|
| Size (mm) | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 |
| P _{tot} (mW) | | | | | | 1700 | 1300 |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T min (MHz) | | |
| NPN | 20 | 1000 | 85 - 160 | 375 | 40 | BCP68 / -25 | BC868 / -25 |
| | 45 | 1000 | 63 - 100 | 160 - 250 | 100 | BCP54 / -10 / -16 | BCX54 / -10 / -16 |
| | 60 | 1000 | 63 - 100 | 160 - 250 | 100 | BCP55 / -10 / -16 | BCX55 / -10 / -16 |
| | | | 100 | 300 | 100 | BSP41 | BSR41 |
| 80 | 1000 | 63 - 100 | 160 - 250 | 100 | BCP56 / -10 / -16 | BCX56 / -10 / -16 | |
| | | 40 - 100 | 120 - 300 | 100 | BSP43 | BSR42 / 43 | |
| PNP | 20 | 1000 | 85 - 160 | 250 - 375 | 40 | BCP69 / -16 / -25 | BC869 / -16 / -25 |
| | 45 | 1000 | 63 - 100 | 160 - 250 | 115 ¹⁾ - 145 ¹⁾ | BCP51 / -10 / -16 | BCX51 / -10 / -16 |
| | 60 | 1000 | 63 - 100 | 160 - 250 | 100 | BCP52 / -10 / -16 | BCX52 / -10 / -16 |
| | | | 40 - 100 | 120 - 300 | 100 | BSP31 | BSR30 / 31 |
| 80 | 1000 | 63 - 100 | 160 - 250 | 115 ¹⁾ - 145 ¹⁾ | BCP53 / -10 / -16 | BCX53 / -10 / -16 | |
| | | 40 - 100 | 120 - 300 | 100 | BSP32 / 33 | BSR33 | |

¹⁾ typical value

High voltage transistors

| Package | | | | | | SOT223 (SC-73) | SOT89 (SC-62) | SOT457 (SC-74) | SOT23 | SOT323 (SC-70) | |
|-----------------------|----------------------|---------------------|---------------------|---------------------|--------------------------|------------------|-----------------|-----------------|-----------------|-------------------|--|
| Size (mm) | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.5 x 1.0 | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | |
| P _{tot} (mW) | | | | | | 1700 | 1300 | 600 | 250 | 200 | |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T min (MHz) | | | | | | |
| NPN | 80 | 100 | 20 | - | 60 | | | | BSS64 | | |
| | 140 | 100 | 60 | 250 | 100 | | | | PMBT5550 | PMST5550 | |
| | 160 | 300 | 80 | 250 | 100 | | | | PMBT5551/BSR19A | PMST5551 | |
| | 250 | 100 | 50 | - | 60 | BF722 | BF622 | | BF822 | | |
| | | | 50 | - | 60 | BF720 | BF620 | | BF820 | BF820W | |
| | 300 | 100 | 40 | - | 50 | PZTA42 | PXTA42 | | PMBTA42 | PMSTA42 | |
| 350 | 100 | 40 | - | 70 | BSP19 | BST39 | | | | | |
| PNP | 400 | 300 | 50 | 200 | 20 | PZTA44 | | | PMBTA44 | | |
| | 100 | 100 | 30 | - | 50 | | | | BSS63 | | |
| | 250 | 100 | 50 | - | 60 | BF723 | | | BF823 | | |
| | | | 50 | - | 60 | | BF623 | | BF823 | BF821 | |
| 300 | 100 | 50 | - | 60 | | BF621 | | BF821 | | | |
| 2 x NPN | 300 | 100 | 40 | - | 50 | PZTA92 | PXTA92 | | PMBTA92 | PMSTA92 | |
| | | | 40 | - | 50 | | | | PMBTA42DS | | |

For high voltage transistors with increased performance please refer to our high voltage low V_{CEsat} (BISS) transistor portfolio on page 66.

Low noise transistors

| Package | | | | | | SOT23 | SOT323 (SC-70) | |
|-----------------------|----------------------|---------------------|-------------|---------------------|---------------------|--------------------------|-------------------|---------|
| Size (mm) | | | | | | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | |
| P _{tot} (mW) | | | | | | 250 | 200 | |
| Polarity | V _{CEO} (V) | I _C (mA) | NF max (dB) | h _{FE} min | h _{FE} max | f _T min (MHz) | | |
| NPN | 30 | 100 | 4 | 200 | 450 | 100 | BC849B | BC849BW |
| | | | | 420 | 800 | 100 | BC849C | BC849CW |
| | 45 | 100 | 4 | 200 | 450 | 100 | BC850B | BC850BW |
| | | | | 420 | 800 | 100 | BC850C | BC850CW |
| PNP | 30 | 100 | 4 | 220 | 475 | 100 | BC859B | BC859BW |
| | | | | 420 | 800 | 100 | BC859C | BC859CW |
| | 45 | 100 | 4 | 220 | 475 | 100 | BC860B | BC860BW |
| | | | | 420 | 800 | 100 | BC860C | BC860CW |

Matched pair transistors

| Package | | | | | | | SOT143B | SOT457 (SC-74) | SOT353 (SC-88A) | SOT363 (SC-88) | SOT666 | |
|-----------------------|----------------------|---------------------|---------------------|---------------------|------------------------------------|--|---------------------------|-----------------|-------------------|-------------------|------------------|----------|
| Size (mm) | | | | | | | 2.9 x 1.3 x 1.0 | 2.9 x 1.5 x 1.0 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | |
| P _{tot} (mW) | | | | | | | 250 | 380 | 300 | 300 | 300 | |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | h _{FE1} /h _{FE2} | V _{BE1} - V _{BE2} (mV) | | | | | | |
| NPN | 30 | 100 | 110 | 800 | 0.7 ¹⁾ | n.a. | BCV61/A/B/C ¹⁾ | | | | | |
| | 45 | 100 | 200 | 450 | 0.9 ¹⁾ | n.a. | BCM61B ¹⁾ | | | | | |
| | | | | | | 2 | | BCM847DS | | BCM847BS | | BCM847BV |
| | | | | | | 0.95 | 2 | | PMP4501G | | PMP4501Y | |
| 0.98 | 2 | | PMP4201G | | PMP4201Y | | PMP4201V | | | | | |
| Configuration | | | | | | | | | | | | |
| PNP | 30 | 100 | 100 | 800 | 0.7 ¹⁾ | n.a. | BCV62/A/B/C ¹⁾ | | | | | |
| | 45 | 100 | 200 | 450 | 0.9 ¹⁾ | n.a. | BCM62B ¹⁾ | | | | | |
| | | | | | | 2 | | BCM857DS | | BCM857BS | | BCM857BV |
| | | | | | | 0.95 | 2 | | PMP5501G | | PMP5501Y | |
| 0.98 | 2 | | PMP5201G | | PMP5201Y | | PMP5201V | | | | | |
| 65 | 100 | 200 | 450 | 0.9 | 2 | | BCM856DS | | BCM856BS | | | |
| Configuration | | | | | | | | | | | | |

¹⁾ I_{C1}/I_{E2}

Key features

- ▶ Current gain matching to 10%, 5% or 2%
- ▶ Base-emitter voltage matching to 2 mV
- ▶ Choice of standard double transistor pinout or application-optimized pinout
- ▶ Common-emitter configuration for 5-pin type
- ▶ Range of small, very small and ultra small packages

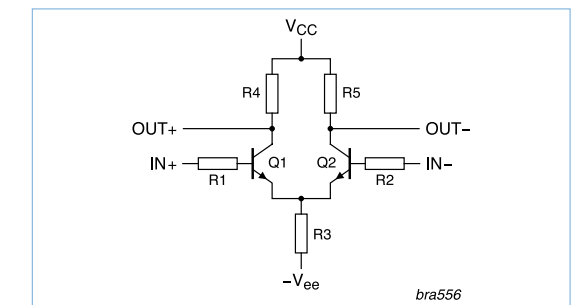
Key benefits

- ▶ Improved performance of current mirror and differential amplifier circuits
- ▶ Drop-in replacement for standard double transistors (BCM series)
- ▶ Simplified board layout (PMP series)
- ▶ Eliminates the need for costly additional trimming

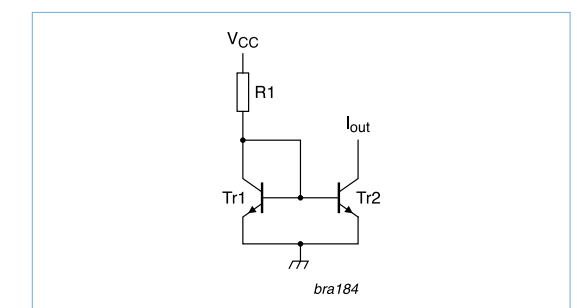
Key applications

- ▶ Current mirrors
- ▶ Differential and instrumentation amplifiers
- ▶ Logarithmic amplifiers
- ▶ Comparators

Differential amplifier



Current mirror



Darlington transistors

| Package | | | | | | SOT223 (SC-73) | SOT89 (SC-62) | SOT23 |
|-----------------------|----------------------|---------------------|---------------------|--------------------------|--------|------------------|-----------------|-----------------|
| Size (mm) | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.3 x 1.0 |
| P _{tot} (mW) | | | | | | 1700 | 1300 | 250 |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | f _T min (MHz) | | | | |
| NPN | 30 | 500 | 10000 | 125 | | | | |
| | | | 20000 | 125 | PZTA14 | PXTA14 | PMBTA13 | |
| | 45 | 1000 | 2000 | 200 | | | | |
| | | | 10000 | 200 | BSP50 | BCV29 | PMBTA14 | |
| | | | 2000 | 200 | BSP51 | BST51 | BCV27 | |
| 80 | 1000 | 2000 | 200 | | | | | |
| | | 2000 | 200 | BSP52 | BST52 | BCV47 | | |
| PNP | 30 | 500 | 20000 | 125 | | | PMBTA64 | |
| | | | 20000 | 220 | | | PMBTA14 | |
| | 45 | 1000 | 2000 | 200 | | | | |
| | | | 10000 | 200 | BSP60 | BST60 | BCV26 | |
| | | | 2000 | 200 | | | BCV28 | |
| 80 | 1000 | 2000 | 200 | | | | | |
| | | 2000 | 200 | BSP61 | BST61 | BCV46 | | |
| | | | 2000 | 200 | BSP62 | BST62 | | |

Schmitt trigger

| Package | | | | | | | SOT143B |
|-----------------------|--------------------------|--------------------------|---------------------|---------------------|---------------------|-----------------------------|-----------------|
| Size (mm) | | | | | | | 2.9 x 1.3 x 1.0 |
| P _{tot} (mW) | | | | | | | 250 |
| Polarity | V _{CEO} (V) TR1 | V _{CEO} (V) TR2 | I _C (mA) | h _{FE} min | h _{FE} max | V _{CEsat} typ (mV) | |
| NPN | 30 | 6 | 100 | 110 | 800 | 250 | BCV63 / B |
| PNP | 30 | 6 | 100 | 220 | 475 | 250 | BCV64B |

Key features

- ▶ Low current (max. 100 mA)
- ▶ Low voltage (max. 30 and 6 V)

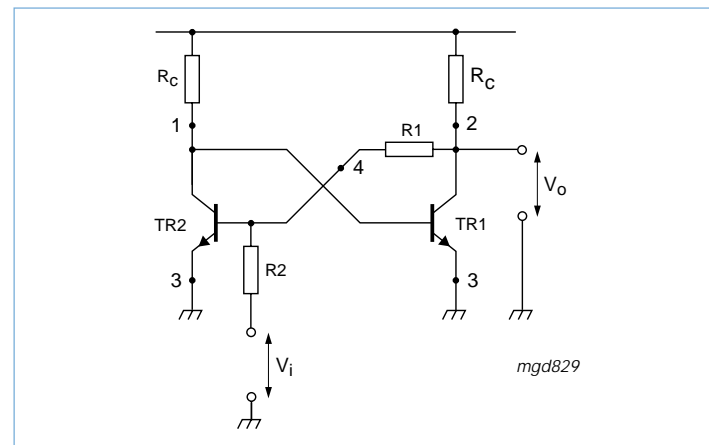
Key benefits

- ▶ Reduced component count and pick-and-place costs
- ▶ Smaller designs

Key applications

- ▶ General purpose switching and amplification
- ▶ Schmitt trigger applications

Schmitt trigger



MOSFET driver

| Package | | | | SOT457 (SC-74) | |
|--|--|--|--|--------------------|---------------------|
| Size (mm) | | | | 2.9 x 1.5 x 1.0 | |
| P _{tot} (mW) | | | | 400 | 580 |
| Configuration | | | | | |
| Contains | | | | I _C (A) | I _{CM} (A) |
| General purpose transistors | | | | 0.1 | 0.2 |
| Switching transistors - reduced storage time | | | | 0.6 | 1.0 |
| Low V _{CEsat} (BISS) transistors - Low V _{CEsat} , high h _{FE} and I _C | | | | 1.0 | 2.0 |
| | | | | R1 = R2 (k) | |
| | | | | PMD9050D | PMD9010D |
| | | | | 2.2 | PMD9001D |
| | | | | 4.7 | PMD9002D |
| | | | | 10 | PMD9003D |
| | | | | | PMD2001D |
| | | | | | PMD3001D |

Key features

- ▶ Three different configurations
- ▶ Types available with standard, switching and low V_{CEsat} (BISS) transistors
- ▶ Small footprint packages

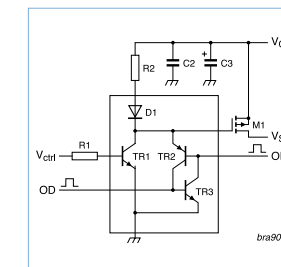
Key benefits

- ▶ Reduced component count
- ▶ Smaller end products

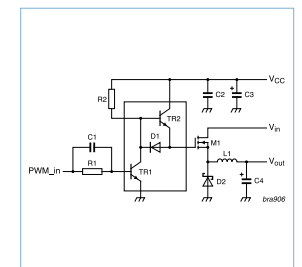
Key applications

- ▶ MOSFET driver
- ▶ Bipolar power transistor driver
- ▶ Push-pull driver

MOSFET driver with hardware output disable function



High-side MOSFET driver with level shifter function



Medium frequency transistors

| Package | | | | | | SOT23 | SOT323 (SC-70) |
|-----------------------|----------------------|---------------------|---------------------|---------------------|--------------------------|-----------------|-------------------|
| Size (mm) | | | | | | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 |
| P _{tot} (mW) | | | | | | 250 | 200 |
| Polarity | V _{CEO} (V) | I _C (mA) | h _{FE} min | h _{FE} max | f _T typ (MHz) | | |
| NPN | 15 | 100 | 40 | - | 500 | BF570 | |
| | 20 | 25 | 40 | 85 | >275 | BFS20 | BFS20W |
| | | 30 | 65 | 225 | 260 | BFS19 | |
| PNP | 40 | 25 | 67 | 220 | 380 | BF840 | |
| | 30 | 25 | 25 | 50 | 250 | BF824 | BF824W |
| | | 40 | 25 | 50 | - | >325 | BF550 |

RETs 100 mA single

| Package | | | | | SOT23 | | SOT323 (SC-70) | | | |
|-----------------------|---------------------|---------------|---------|-----------|-----------------|-----------|-------------------|-----------|--|--|
| Size (mm) | | | | | 2.9 x 1.3 x 1.0 | | 2.0 x 1.25 x 0.95 | | | |
| P _{tot} (mW) | | | | | 250 | | 200 | | | |
| V _{CE0} (V) | I _c (mA) | Configuration | R1 (k) | R2 (k) | NPN | PNP | NPN | PNP | | |
| 50 | 100 | | 1 | 1 | | PDTA113ET | | PDTA113EU | | |
| | | | 2.2 | 2.2 | PDTC123ET | PDTA123ET | PDTC123EU | PDTA123EU | | |
| | | | 4.7 | 4.7 | PDTC143ET | PDTA143ET | PDTC143EU | PDTA143EU | | |
| | | | 10 | 10 | PDTC114ET | PDTA114ET | PDTC114EU | PDTA114EU | | |
| | | | 22 | 22 | PDTC124ET | PDTA124ET | PDTC124EU | PDTA124EU | | |
| | | | 47 | 47 | PDTC144ET | PDTA144ET | PDTC144EU | PDTA144EU | | |
| | | | 100 | 100 | PDTC115ET | PDTA115ET | PDTC115EU | PDTA115EU | | |
| | | | 1 | 10 | | PDTA113ZT | | PDTA113ZU | | |
| | | | 2.2 | 10 | PDTC123YT | PDTA123YT | PDTC123YU | PDTA123YU | | |
| | | | 2.2 | 47 | PDTC123JT | PDTA123JT | PDTC123JU | PDTA123JU | | |
| | | | 4.7 | 10 | PDTC143XT | PDTA143XT | PDTC143XU | PDTA143XU | | |
| | | | 4.7 | 47 | PDTC143ZT | PDTA143ZT | PDTC143ZU | PDTA143ZU | | |
| | | | 10 | 47 | PDTC114YT | PDTA114YT | PDTC114YU | PDTA114YU | | |
| | | | 22 | 47 | PDTC124XT | PDTA124XT | PDTC124XU | PDTA124XU | | |
| | | 47 | 10 | PDTC144VT | PDTA144VT | PDTC144VU | PDTA144VU | | | |
| | | 47 | 22 | PDTC144WT | PDTA144WT | PDTC144WU | PDTA144WU | | | |
| | | 2.2 | - | PDTC123TT | PDTA123TT | PDTC123TU | PDTA123TU | | | |
| | | 4.7 | - | PDTC143TT | PDTA143TT | PDTC143TU | PDTA143TU | | | |
| | | 10 | - | PDTC114TT | PDTA114TT | PDTC114TU | PDTA114TU | | | |
| | | 22 | - | PDTC124TT | PDTA124TT | PDTC124TU | PDTA124TU | | | |
| | | 47 | - | PDTC144TT | PDTA144TT | PDTC144TU | PDTA144TU | | | |
| | | 100 | - | PDTC115TT | PDTA115TT | PDTC115TU | PDTA115TU | | | |
| | | | | | | | | | | |

RETs 100 mA double

| Package | | | | | SOT457 (SC-74) | | SOT363 (SC-88) | | | SOT666 | | | | |
|-----------------------|---------------------|---------------|---------|---------|-----------------|---------|-------------------|---------|---------|------------------|---------|---------|--------|--------|
| Size (mm) | | | | | 2.9 x 1.5 x 1.0 | | 2.0 x 1.25 x 0.95 | | | 1.6 x 1.2 x 0.55 | | | | |
| P _{tot} (mW) | | | | | 600 | | 300 | | | 300 | | | | |
| V _{CE0} (V) | I _c (mA) | Configuration | R1 (k) | R2 (k) | NPN/NPN | NPN/PNP | NPN/NPN | NPN/PNP | PNP/PNP | NPN/NPN | NPN/PNP | PNP/PNP | | |
| 50 | 100 | | 2.2 | 2.2 | | | | PUMH20 | PUMD20 | PUMB20 | PEMH20 | PEMD20 | PEMB20 | |
| | | | 4.7 | 4.7 | | | | PUMH15 | PUMD15 | PUMB15 | PEMH15 | PEMD15 | PEMB15 | |
| | | | 10 | 10 | | | | PIMD3 | PUMH11 | PUMD3 | PUMB11 | PEMH11 | PEMD3 | PEMB11 |
| | | | 22 | 22 | | | | PIMD2 | PUMH11 | PUMD2 | PUMB1 | PEMH1 | PEMD2 | PEMB1 |
| | | | 47 | 47 | | | | | PUMH2 | PUMD12 | PUMB2 | PEMH2 | PEMD12 | PEMB2 |
| | | | 100 | 100 | | | | | PUMH24 | PUMD24 | PUMB24 | PEMH24 | PEMD24 | PEMB24 |
| | | | 2.2 | 47 | | | | | PUMH10 | PUMD10 | PUMB10 | PEMH10 | PEMD10 | PEMB10 |
| | | | 4.7 | 10 | | | | | PUMH18 | PUMD18 | PUMB18 | PEMH18 | PEMD18 | PEMB18 |
| | | | 4.7 | 47 | | | | | PUMH13 | PUMD13 | PUMB13 | PEMH13 | PEMD13 | PEMB13 |
| | | | 10 | 47 | | | PIMH9 | | PUMH9 | PUMD9 | PUMB9 | PEMH9 | PEMD9 | PEMB9 |
| | | | 22 | 47 | | | | | PUMH16 | PUMD16 | PUMB16 | PEMH16 | PEMD16 | PEMB16 |
| | | | 47 | 22 | | | | | PUMH17 | PUMD17 | PUMB17 | PEMH17 | PEMD17 | PEMB17 |
| | | | 47/2.2 | 47/47 | | | | | | PUMD48 | | | PEMD48 | |
| | | | 2.2 | - | | | | | | PUMH30 | PUMD30 | PUMB30 | PEMH30 | PEMD30 |
| | | 4.7 | - | | | | | | PUMH7 | PUMD6 | PUMB3 | PEMH7 | PEMD6 | PEMB3 |
| | | 10 | - | | | | | | PUMH4 | PUMD4 | PUMB4 | PEMH4 | PEMD4 | PEMB4 |
| | | 22 | - | | | | | | PUMH19 | PUMD19 | PUMB19 | PEMH19 | PEMD19 | PEMB19 |
| | | 47 | - | | | | | | PUMH14 | PUMD14 | PUMB14 | PEMH14 | PEMD14 | PEMB14 |
| | | | | | | | | | | | | | | |

Bipolar transistors

| Package | | | | | SOT416 (SC-75) | | SOT883 (SC-101) | | | |
|-----------------------|---------------------|---------------|---------|-----------|------------------|-----------|-----------------|-----------|--|--|
| Size (mm) | | | | | 1.6 x 0.8 x 0.77 | | 1.0 x 0.6 x 0.5 | | | |
| P _{tot} (mW) | | | | | 150 | | 250 | | | |
| V _{CE0} (V) | I _c (mA) | Configuration | R1 (k) | R2 (k) | NPN | PNP | NPN | PNP | | |
| 50 | 100 | | 1 | 1 | | PDTA113EE | | PDTA113EM | | |
| | | | 2.2 | 2.2 | PDTC123EE | PDTA123EE | PDTC123EM | PDTA123EM | | |
| | | | 4.7 | 4.7 | PDTC143EE | PDTA143EE | PDTC143EM | PDTA143EM | | |
| | | | 10 | 10 | PDTC114EE | PDTA114EE | PDTC114EM | PDTA114EM | | |
| | | | 22 | 22 | PDTC124EE | PDTA124EE | PDTC124EM | PDTA124EM | | |
| | | | 47 | 47 | PDTC144EE | PDTA144EE | PDTC144EM | PDTA144EM | | |
| | | | 100 | 100 | PDTC115EE | PDTA115EE | PDTC115EM | PDTA115EM | | |
| | | | 1 | 10 | | PDTA113ZE | | PDTA113ZM | | |
| | | | 2.2 | 10 | PDTC123YE | PDTA123YE | PDTC123YM | PDTA123YM | | |
| | | | 2.2 | 47 | PDTC123JE | PDTA123JE | PDTC123JM | PDTA123JM | | |
| | | | 4.7 | 10 | PDTC143XE | PDTA143XE | PDTC143XM | PDTA143XM | | |
| | | | 4.7 | 47 | PDTC143ZE | PDTA143ZE | PDTC143ZM | PDTA143ZM | | |
| | | | 10 | 47 | PDTC114YE | PDTA114YE | PDTC114YM | PDTA114YM | | |
| | | | 22 | 47 | PDTC124XE | PDTA124XE | PDTC124XM | PDTA124XM | | |
| | | 47 | 10 | PDTC144VE | PDTA144VE | PDTC144VM | PDTA144VM | | | |
| | | 47 | 22 | PDTC144WE | PDTA144WE | PDTC144WM | PDTA144WM | | | |
| | | 2.2 | - | PDTC123TE | PDTA123TE | PDTC123TM | PDTA123TM | | | |
| | | 4.7 | - | PDTC143TE | PDTA143TE | PDTC143TM | PDTA143TM | | | |
| | | 10 | - | PDTC114TE | PDTA114TE | PDTC114TM | PDTA114TM | | | |
| | | 22 | - | PDTC124TE | PDTA124TE | PDTC124TM | PDTA124TM | | | |
| | | 47 | - | PDTC144TE | PDTA144TE | PDTC144TM | PDTA144TM | | | |
| | | 100 | - | PDTC115TE | PDTA115TE | PDTC115TM | PDTA115TM | | | |
| | | | | | | | | | | |

RETs 500 mA

| Package | | | | | SOT457 (SC-74) | | SOT23 | |
|-----------------------|---------------------|---------------|---------|---------|-----------------|-----------|-----------------|-----------|
| Size (mm) | | | | | 2.9 x 1.5 x 1.0 | | 2.9 x 1.3 x 1.0 | |
| P _{tot} (mW) | | | | | 600 | | 250 | |
| V _{CE0} (V) | I _c (mA) | Configuration | R1 (k) | R2 (k) | NPN/NPN | NPN/PNP | NPN | PNP |
| 50 | 500 | R1 = R2 | 1.0 | 1.0 | | | PDTD113ET | PDTB113ET |
| | | | 2.2 | 2.2 | | | PDTD123ET | PDTB123ET |
| | | | 1.0 | 10 | PIMN31 | PIMC31 | PDTD113ZT | PDTB113ZT |
| | | 2.2 | 10 | | | PDTD123YT | PDTB123YT | |
| | | 2.2 | - | | | | | PDTD123TT |

Low V_{CEsat} (BISS) RETs

| Package | | | | | | SOT23 |
|-----------------------|----------------------|---------------------|---------------|---------|---------|-----------------|
| Size (mm) | | | | | | 2.9 x 1.3 x 1.0 |
| P _{tot} (mW) | | | | | | 250 |
| Polarity | V _{CE0} (V) | I _c (mA) | Configuration | R1 (k) | R2 (k) | |
| NPN | 40 | 600 | R1 = R2 | 1 | 1 | PBRN113ET |
| | | | | 2.2 | 2.2 | PBRN123ET |
| | | | R1 R2 | 1 | 10 | PBRN113ZT |
| | | | | 2.2 | 10 | PBRN123YT |
| PNP | 40 | 600 | R1 = R2 | 1 | 1 | PBRP113ET |
| | | | | 2.2 | 2.2 | PBRP123ET |
| | | | R1 R2 | 1 | 10 | PBRP113ZT |
| | | | | 2.2 | 10 | PBRP123YT |

Low V_{CEsat} (BISS) transistors single NPN

| Package | | | | | | | | | | | | SOT223 (SC-73) | SOT89 (SC-62) | SOT457 (SC-74) | | SOT23 | SOT1061 | SOT323 (SC-70) | SOT363 (SC-88) | SOT416 (SC-75) | SOT666 | SOT883 (SC-101) |
|----------------|-----------|--------------|------------------|-------------|------------------|--|---|----------------------|-------------|-------------|-----------|------------------|-----------------|-----------------|--|-----------------|------------------|-------------------|-------------------|------------------|------------------|-----------------|
| Size (mm) | | | | | | | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.5 x 1.0 | | 2.9 x 1.3 x 1.0 | 2.0 x 2.0 x 0.65 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.6 x 1.2 x 0.55 | 1.0 x 0.6 x 0.5 |
| P_{tot} (mW) | | | | | | | | | | | | 1700 | 1650 | 750 | | 480 | 1400 | 350 | 430 | 250 | 500 | 250 |
| V_{CEO} (V) | I_C (A) | I_{CM} (A) | h_{FE} min/typ | @ I_C (A) | @ V_{CE} (V) | R_{CEsat} typ (m Ω); $I_C/I_B = 10$ | V_{CEsat} typ (mV); $I_C = 0.5$ A; $I_B = 0.05$ A | V_{CEsat} max (mV) | @ I_C (A) | @ I_B (A) | | | | | | | | | | | | |
| 12 | 5.3 | 10.6 | 300/530 | 0.5 | 2 | 27 ¹⁾ | 18 | 200 | 5.3 | 0.265 | | | | | | | | | | | | |
| | 5.8 | 11.6 | 300/530 | 0.5 | 2 | 29 ¹⁾ | 18 | 235 | 5.8 | 0.29 | PBSS301NZ | | | | | | | | | | | |
| | 6.0 | 7.0 | 280/440 | 0.5 | 2 | 33 ¹⁾ | 20 | 275 | 6 | 0.3 | | | | | | | | | | | | |
| 15 | 0.5 | 1.0 | 200/325 | 0.01 | 2 | 360 | - | 250 | 0.5 | 0.05 | | | | | | | | | | | | |
| | | | 200/425 | 0.01 | 2 | 300 | 200 | 250 | 0.5 | 0.05 | | | | | | | | | | | | |
| 20 | 1.0 | 3.0 | 350/470 | 0.1 | 2 | 220 | 110 ²⁾ | 250 | 1 | 0.05 | | | | | | | | | | | | |
| | 2.0 | 4.0 | 220/410 | 0.5 | 2 | 140 | 70 | 350 | 2 | 0.2 | | | | | | | | | | | | |
| | | 5.0 | 220/330 | 0.1 | 2 | 80 | 45 | 310 | 3 | 0.3 | | | | | | | | | | | | |
| | 3.0 | 5.0 | 220/390 | 0.5 | 2 | 85 | 40 | 310 | 3 | 0.3 | | | | | | | | | | | | |
| | 4.0 | 15.0 | 300/450 | 0.5 | 2 | 50 | 30 | 280 | 4 | 0.4 | | | | | | | | | | | | |
| | 4.3 | 8.0 | 300/550 | 0.5 | 2 | 36 | 21 | 220 | 4 | 0.2 | | | | | | | | | | | | |
| | 5.0 | 10.0 | 300/450 | 0.5 | 2 | 32 | 35 | 220 | 5 | 0.5 | | | | | | | | | | | | |
| | 5.3 | 10.6 | 300/570 | 0.5 | 2 | 27 ¹⁾ | 20 | 200 | 5.3 | 0.265 | | | | | | | | | | | | |
| | 5.8 | 10.2 | 300/570 | 0.5 | 2 | 30 ¹⁾ | 20 | 250 | 5.8 | 0.29 | | | | | | | | | | | | |
| | 6.0 | 7.0 | 280/440 | 0.5 | 2 | 33 ¹⁾ | 20 | 275 | 6 | 0.3 | | | | | | | | | | | | |
| 30 | 1.0 | 3.0 | 300/450 | 0.5 | 2 | 240 | 120 ²⁾ | 270 | 1 | 0.05 | | | | | | | | | | | | |
| | 2.0 | 3.0 | 300/450 | 0.5 | 2 | 120 | 70 | 320 | 2 | 0.2 | | | | | | | | | | | | |
| | 2.6 | 5.0 | 300/500 | 0.5 | 2 | 76 | 80 | 320 | 3 | 0.3 | | | | | | | | | | | | |
| | 3.0 | 5.0 | 300/490 | 0.5 | 2 | 80 | 45 | 300 | 3 | 0.3 | | | | | | | | | | | | |
| | 3.0 | 5.0 | 300/465 | 0.5 | 2 | 75 | 40 | 300 | 3 | 0.3 | | | | | | | | | | | | |
| | 3.5 | 6.0 | 300/500 | 0.5 | 2 | 50 | 70 | 300 | 4 | 0.4 | | | | | | | | | | | | |
| | 4.7 | 10.0 | 300/500 | 0.5 | 2 | 45 | 57 | 250 | 4 | 0.4 | | | | | | | | | | | | |
| | 5.1 | 10.2 | 300/480 | 0.5 | 2 | 30 ¹⁾ | 20 | 220 | 5.1 | 0.255 | | | | | | | | | | | | |
| | 5.4 | 10.0 | 300/500 | 0.5 | 2 | 45 | 57 | 340 | 4.9 | 0.27 | | | | | | | | | | | | |
| | 5.5 | 11.0 | 300/480 | 0.5 | 2 | 31 ¹⁾ | 20 | 240 | 5.5 | 0.275 | | | | | | | | | | | | |
| 40 | 0.5 | 1.0 | 200/550 | 0.01 | 2 | 380 | 200 ²⁾ | 250 | 0.5 | 0.05 | | | | | | | | | | | | |
| | | 3.0 | 300/- | 0.5 | 5 | 150 | 70 | 440 | 2 | 0.2 | | | | | | | | | | | | |
| | 1.0 | 2.0 | 300/440 | 0.5 | 5 | 240 | 130 | 500 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 300/510 | 0.5 | 5 | 230 | 120 | 500 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 300/420 | 0.5 | 5 | 150 | 130 | 500 | 1 | 0.1 | | | | | | | | | | | | |
| | 2.0 | 3.0 | 300/400 | 0.5 | 5 | 150 | 70 | 400 | 2 | 0.2 | | | | | | | | | | | | |
| | | | 350/470 | 0.1 | 2 | 120 | 70 | 320 | 2 | 0.2 | | | | | | | | | | | | |
| | | | 300/450 | 0.5 | 2 | 120 | 70 | 320 | 2 | 0.2 | | | | | | | | | | | | |
| | 4.0 | 15.0 | 300/520 | 0.5 | 2 | 55 | 35 | 300 | 4 | 0.4 | | | | | | | | | | | | |
| | 5.0 | 10.0 | 300/500 | 0.5 | 2 | 40 | 21 | 355 | 5 | 0.5 | | | | | | | | | | | | |
| 50 | 2.0 | 5.0 | 300/495 | 0.5 | 2 | 100 | 60 | 260 | 2 | 0.2 | | | | | | | | | | | | |
| | | | 300/- | 0.5 | 2 | 160 | 90 ²⁾ | 320 | 2 | 0.2 | | | | | | | | | | | | |
| | 3.0 | 5.0 | 200/280 | 0.5 | 2 | 110 | 65 | 290 | 2 | 0.2 | | | | | | | | | | | | |
| | | | 300/460 | 0.5 | 2 | 75 | 50 | 370 | 3 | 0.3 | | | | | | | | | | | | |
| | | | 200/280 | 0.5 | 2 | 110 | 60 ¹⁾ | 290 | 2 | 0.2 | | | | | | | | | | | | |
| 60 | 1.0 | 2.0 | 200/400 | 0.5 | 5 | 200 | 110 | 250 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 200/420 | 0.5 | 5 | 230 | 120 | 280 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 200/350 | 0.5 | 5 | 200 | 110 | 250 | 1 | 0.1 | | | | | | | | | | | | |
| | 3.0 | 6.0 | 345/570 | 0.5 | 2 | 65 | 40 | 260 | 3 | 0.3 | | | | | | | | | | | | |
| | 3.8 | 8.0 | 300/500 | 0.5 | 2 | 46 | 29 | 200 | 3 | 0.3 | | | | | | | | | | | | |
| | 4.7 | 9.4 | 300/520 | 0.5 | 2 | 37 ¹⁾ | 25 | 245 | 4.7 | 0.235 | | | | | | | | | | | | |
| | 5.2 | 10.4 | 300/520 | 0.5 | 2 | 39 ¹⁾ | 25 | 280 | 5.2 | 0.26 | | | | | | | | | | | | |
| | 6.0 | 7.0 | 280/440 | 0.5 | 2 | 34 ¹⁾ | 22 | 290 | 6 | 0.3 | | | | | | | | | | | | |
| 80 | 6.2 | 15.0 | 300/500 | 0.5 | 2 | 25 | 17 | 230 | 6 | 0.3 | | | | | | | | | | | | |
| | 7.0 | 15.0 | 300/500 | 0.5 | 2 | 17.5 | 13 | 195 | 7 | 0.35 | | | | | | | | | | | | |
| | 3.0 | 6.0 | 240/360 | 0.5 | 2 | 67 | 40 | 255 | 3 | 0.3 | | | | | | | | | | | | |
| | 4.0 | 10.0 | 250/400 | 0.5 | 2 | 43 ¹⁾ | 25 | 230 | 4 | 0.2 | | | | | | | | | | | | |
| | 4.6 | 9.2 | 300/470 | 0.5 | 2 | 37 ¹⁾ | 25 | 240 | 4.6 | 0.23 | | | | | | | | | | | | |
| | 5.1 | 10.2 | 300/470 | 0.5 | 2 | 38 ¹⁾ | 25 | 270 | 5.1 | 0.255 | | | | | | | | | | | | |
| | 5.6 | 7.0 | 270/425 | 0.5 | 2 | 40 ¹⁾ | 25 | 320 | 5.6 | 0.28 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 1.0 | 3.0 | 150/400 | 0.25 | 10 | 160 | 80 | 200 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 150/300 | 0.25 | 10 | 165 | 70 | 200 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 150/290 | 0.25 | 10 | 160 | 75 | 200 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 150/290 | 0.25 | 10 | 165 | 73 | 200 | 1 | 0.1 | | | | | | | | | | | | |
| | | | 150/290 | 0.25 | 10 | 160 | 73 | 200 | 1 | 0.1 | | | | | | | | | | | | |
| | 3.0 | 4.0 | 170/275 | 0.5 | 2 | 72 | 45 | 360 | 4 | 0.4 | | | | | | | | | | | | |
| | 4.5 | 9.0 | 200/330 | 0.5 | 2 | 38 ¹⁾ | 27 | 245 | 4.5 | 0.225 | | | | | | | | | | | | |
| 5.1 | 10.2 | 200/330 | 0.5 | 2 | 43 ¹⁾ | 27 | 300 | 5.1 | 0.255 | | | | | | | | | | | | | |
| 5.2 | 6.0 | 180/285 | 0.5 | 2 | 48 ¹⁾ | 30 | 340 | 5.2 | 0.26 | | | | | | | | | | | | | |

¹⁾ $I_C/I_B = 20$
²⁾ V_{CEsat} (max)
³⁾ optimized for high speed switching

Low V_{CEsat} (BISS) transistors single PNP

| Package | | | | | | | | | | | SOT223 (SC-73) | SOT89 (SC-62) | SOT457 (SC-74) | | SOT23 | SOT1061 | SOT323 (SC-70) | SOT363 (SC-88) | SOT416 (SC-75) | SOT666 | SOT883 (SC-101) |
|-----------------------|--------------------|---------------------|-------------------------|----------------------|-----------------------|--|--|-----------------------------|----------------------|----------------------|--------------------------|-----------------|-----------------|------------|-----------------|------------------|-------------------|-------------------|------------------|------------------|-----------------|
| Size (mm) | | | | | | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.5 x 1.0 | | 2.9 x 1.3 x 1.0 | 2.0 x 2.0 x 0.65 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.6 x 1.2 x 0.55 | 1.0 x 0.6 x 0.5 |
| P _{tot} (mW) | | | | | | | | | | | 1700 | 1650 | 750 | | 480 | 1400 | 350 | 430 | 250 | 500 | 250 |
| V _{CEO} (V) | I _C (A) | I _{CM} (A) | h _{FE} min/typ | @ I _C (V) | @ V _{CE} (V) | R _{CEsat} typ (mΩ); I _C /I _B = 10 | V _{CEsat} typ (mV); I _C = 0.5 A; I _B = 0.05 A | V _{CEsat} max (mV) | @ I _C (A) | @ I _B (A) | | | | | | | | | | | |
| 12 | 5.3 | 10.6 | 250/400 | 0.5 | 2 | 28 ¹⁾ | 20 | 210 | 5.3 | 0.265 | | | | | | | | | | | |
| | 5.7 | 11.4 | 250/400 | 0.5 | 2 | 30 ¹⁾ | 20 | 245 | 5.7 | 0.285 | PBSS301PZ | | | | | | | | | | |
| | 6.0 | 7.0 | 220/335 | 0.5 | 2 | 33 ¹⁾ | 20 | 300 | 6 | 0.3 | | | | PBSS5612PA | | | | | | | |
| 15 | 0.5 | 1.0 | 200/260 | 0.01 | 2 | 300 | 150 | 250 | 0.5 | 0.05 | | | | | | | | PBSS3515M | | | |
| | | | 200/325 | 0.01 | 2 | 300 | 150 | 250 | 0.5 | 0.05 | | | | | | | | PBSS3515E | | | |
| 20 | 1.0 | 2.0 | 300/450 | 0.1 | 2 | 250 | 125 ²⁾ | 250 | 1 | 0.05 | | | | | | | | | | | |
| | 2.0 | 4.0 | 220/440 | 0.1 | 2 | 140 | 75 | 390 | 2 | 0.2 | | | | | | | | | | | |
| | | 3.0 | 225/- | 0.5 | 2 | 115 | 80 ²⁾ | 225 | 2 | 0.2 | | | | | | | | | | | |
| | | 5.0 | 220/420 | 0.5 | 2 | 75 | 50 | 210 | 2 | 0.2 | | | | | | | | | | | |
| | 3.0 | 5.0 | 200/- | 0.5 | 2 | 85 | 80 ²⁾ | 400 | 3 | 0.3 | | | | | | | | | | | |
| | | | | 220/450 | 0.5 | 2 | 90 | 50 | 300 | 3 | 0.3 | | | | | | | | | | |
| | 3.5 | 8.0 | 250/400 | 0.5 | 2 | 55 | 35 | 375 | 4 | 0.2 | | | | | | | | | | | |
| | 4.0 | 15.0 | 250/400 | 0.5 | 2 | 50 | 35 | 280 | 4 | 0.4 | | | | | | | | | | | |
| | 5.0 | 10.0 | 300/430 | 0.5 | 2 | 34 | 45 | 270 | 5 | 0.5 | | | | | | | | PBSS5220V | | | |
| | 5.1 | 10.2 | 250/370 | 0.5 | 2 | 32 ¹⁾ | 25 | 230 | 5.1 | 0.255 | | | | | | | | | | | |
| 30 | 5.5 | 11.0 | 250/370 | 0.5 | 2 | 34 ¹⁾ | 25 | 265 | 5.5 | 0.275 | PBSS302PZ | | | | | | | | | | |
| | 6.0 | 7.0 | 230/345 | 0.5 | 2 | 39 ¹⁾ | 25 | 350 | 6 | 0.3 | | | | | | | | | | | |
| | 6.2 | 15.0 | 250/400 | 0.5 | 2 | 23 | 18 | 240 | 6 | 0.3 | | | | | | | | | | | |
| | 6.6 | 20.0 | 250/400 | 0.5 | 2 | 22 | 16 | 240 | 7 | 0.35 | PBSS4021PZ | | | | | | | | | | |
| | 1.0 | 3.0 | 260/350 | 0.5 | 2 | 220 | 110 | 225 | 1 | 0.05 | | | | | | | | | | | |
| | 2.0 | 3.0 | 300/450 | 0.1 | 2 | 160 | 70 | 350 | 2 | 0.2 | | | | | | | | | | | |
| | 2.4 | 5.0 | 200/320 | 0.5 | 2 | 110 | 95 | 330 | 2 | 0.2 | | | | | | | | | | | |
| | 2.7 | 5.0 | 200/350 | 0.5 | 2 | 88 | 87 | 395 | 3 | 0.3 | | | | | | | | | | | |
| | 3.0 | 5.0 | 200/380 | 0.5 | 2 | 80 | 50 | 320 | 3 | 0.3 | | | | | | | | | | | |
| | 3.0 | 5.0 | 200/320 | 0.5 | 2 | 75 | 45 | 320 | 3 | 0.3 | | | | | | | | | | | |
| 40 | 4.2 | 10.0 | 200/350 | 0.5 | 2 | 58 | 70 | 345 | 4 | 0.4 | | | | | | | | | | | |
| | 4.4 | 10.0 | 200/350 | 0.5 | 2 | 58 | 70 | 400 | 4 | 0.2 | | | | | | | | | | | |
| | 5.1 | 10.2 | 250/400 | 0.5 | 2 | 32 ¹⁾ | 25 | 230 | 5.1 | 0.255 | PBSS4032PZ ³⁾ | | | | | | | | | | |
| | 5.3 | 10.6 | 250/400 | 0.5 | 2 | 35 ¹⁾ | 25 | 265 | 5.3 | 0.265 | PBSS303PZ | | | | | | | | | | |
| | 6.0 | 7.0 | 200/335 | 0.5 | 2 | 39 ¹⁾ | 25 | 350 | 6 | 0.3 | | | | | | | | | | | |
| | 0.5 | 1.0 | 200/380 | 0.01 | 2 | 440 | 220 | 350 | 0.5 | 0.05 | | | | | | | | | | | |
| | | | 200/380 | 0.01 | 2 | 440 | 230 | 350 | 0.5 | 0.05 | | | | | | | | | | | |
| | 1.0 | 2.0 | 300/- | 0.1 | 5 | 200 | 120 | 310 | 1 | 0.1 | | | | | | | | | | | |
| | | | 300/520 | 0.1 | 5 | 230 | 130 | 500 | 1 | 0.1 | | | | | | | | | | | |
| | | | 300/800 | 0.1 | 5 | 250 | 130 | 500 | 1 | 0.1 | | | | | | | | | | | |
| 300/510 | | | 0.1 | 5 | 230 | 130 | 500 | 1 | 0.1 | | | | | | | | | | | | |
| 1.8 | 3.0 | 300/450 | 0.1 | 5 | 185 | 100 | 530 | 2 | 0.2 | | | | | | | | | | | | |
| 2.0 | 3.0 | 300/- | 0.1 | 2 | 200 | 110 ²⁾ | 350 | 2 | 0.2 | | | | | | | | | | | | |
| | | 300/450 | 0.1 | 2 | 150 | 70 | 350 | 2 | 0.2 | | | | | | | | | | | | |
| 4.0 | 15.0 | 200/310 | 0.5 | 2 | 55 | 46 | 300 | 4 | 0.4 | | | | | | | | | | | | |
| | | 250/370 | 0.5 | 2 | 45 | 33 | 375 | 5 | 0.5 | | | | | | | | | | | | |
| 5.0 | 10.0 | 250/350 | 0.5 | 2 | 55 | 40 ¹⁾ | 160 | 2 | 0.2 | | | | | | | | | | | | |
| | | 200/310 | 0.5 | 2 | 55 | 40 ¹⁾ | 300 | 2 | 0.1 | | | | | | | | | | | | |
| 50 | 2.0 | 200/360 | 0.5 | 2 | 90 | 55 | 270 | 2 | 0.2 | | | | | | | | | | | | |
| | | 200/- | 0.5 | 2 | 160 | 90 ²⁾ | 320 | 2 | 0.2 | | | | | | | | | | | | |
| | 3.0 | 5.0 | 200/300 | 0.5 | 2 | 120 | 70 | 300 | 2 | 0.2 | | | | | | | | | | | |
| | | | 200/375 | 0.5 | 2 | 120 | 70 | 390 | 3 | 0.3 | | | | | | | | | | | |
| | 2.0 | 5.0 | 200/300 | 0.5 | 2 | 120 | 70 | 300 | 2 | 0.2 | | | | | | | | | | | |
| | | | 200/300 | 0.5 | 2 | 120 | 70 | 300 | 2 | 0.2 | | | | | | | | | | | |
| 60 | 1.0 | 2.0 | 150/250 | 0.5 | 5 | 220 | 120 | 330 | 1 | 0.1 | | | | | | | | | | | |
| | | | 150/250 | 0.5 | 5 | 255 | 135 | 340 | 1 | 0.1 | | | | | | | | | | | |
| | | | 150/250 | 0.5 | 5 | 220 | 120 | 330 | 1 | 0.1 | | | | | | | | | | | |
| | 2.7 | 8.0 | 200/300 | 0.5 | 2 | 80 | 49 | 360 | 3 | 0.3 | | | | | | | | | | | |
| | 3.0 | 6.0 | 180/265 | 0.5 | 2 | 70 | 55 | 290 | 3 | 0.3 | | | | | | | | | | | |
| | 4.2 | 8.4 | 200/295 | 0.5 | 2 | 53 ¹⁾ | 35 | 310 | 4.2 | 0.21 | | | | | | | | | | | |
| | 4.5 | 9.0 | 200/295 | 0.5 | 2 | 59 ¹⁾ | 35 | 375 | 4.5 | 0.225 | PBSS304PZ | | | | | | | | | | |
| | 5.0 | 15.0 | 170/260 | 0.5 | 2 | 35 ¹⁾ | 35 | 450 | 5 | 0.25 | | | | | | | | | | | |
| 200/300 | | | 0.5 | 2 | 40 | 30 | 300 | 5 | 0.5 | | | | | | | | | | | | |
| 80 | 3.0 | 5.0 | 200/300 | 0.5 | 2 | 29 | 22 | 285 | 6 | 0.3 | PBSS4041PZ | | | | | | | | | | |
| | | | 155/225 | 0.5 | 2 | 71 | 55 | 290 | 3 | 0.3 | | | | | | | | | | | |
| | | | 180/265 | 0.5 | 2 | 65 ¹⁾ | 40 | 420 | 4 | 0.2 | | | | | | | | | | | |
| | 4.0 | 10.0 | 200/300 | 0.5 | 2 | 50 | 35 | 380 | 5 | 0.5 | | | | | | | | | | | |
| | | | 200/280 | 0.5 | 2 | 43 | 36 | 240 | 4 | 0.4 | | | | | | | | | | | |
| | 4.5 | 9.0 | 200/280 | 0.5 | 2 | 69 ¹⁾ | 36 | 450 | 4.5 | 0.225 | PBSS305PZ | | | | | | | | | | |
| 100 | 1.0 | 3.0 | 150/- | 0.25 | 5 | 170 | 93 | 320 | 1 | 0.1 | | | | | | | | | | | |
| | | | 150/350 | 0.5 | 5 | 170 | 95 | 320 | 1 | 0.1 | | | | | | | | | | | |
| | | | 150/350 | 0.5 | 5 | 170 | 100 | 320 | 1 | 0.1 | | | | | | | | | | | |
| | | | 150/350 | 0.5 | 5 | 170 | 90 | 320 | 1 | 0.1 | | | | | | | | | | | |
| | | | 150/- | 0.5 | 5 | 170 | 90 | 320 | 1 | 0.1 | | | | | | | | | | | |
| 2.0 | 3.0 | 175/275 | 0.5 | 2 | 88 | 65 | 250 | 2 | 0.2 | | | | | | | | | | | | |
| 2.7 | 4.0 | 180/295 | 0.5 | 2 | 110 ¹⁾ | 45 | 450 | 2.7 | 0.135 | | | | | | | | | | | | |
| 3.7 | 7.4 | 200/300 | 0.5 | 2 | 52 | 45 | 300 | 4 | 0.4 | | | | | | | | | | | | |
| 4.1 | 8.2 | 200/300 | 0.5 | 5 | 57 | 45 | 325 | 4.1 | 0.41 | PBSS306PZ | | | | | | | | | | | |

¹⁾ I_C/I_B = 20
²⁾ V_{CEsat} (max)
³⁾ optimized for high speed switching

In the Spotlight

New low V_{CEsat} (BISS) transistors

Industry's first combination of reduced switching times (down to 125 ns) with minimized saturation voltage (below 50 mV)

Voltage range from 12 V to 100 V

Flexible package options, from standard SMD to brand new medium power leadless package SOT1061 (2 x 2 x 0.65 mm)

Benchmark for reduced on-state-resistance

Low V_{CEsat} (BISS) double transistors

| Package | | SOT96 (SO8) | SOT457 (SC-74) | SOT363 (SC-88) | SOT666 | | | | | | |
|-----------------------|--------------------|--------------------|---------------------|----------------------|-----------------------|--|-----------------------------|----------------------|----------------------|-------------|---------------------------|
| Size (mm) | | 4.9 x 3.9 x 1.75 | 2.9 x 1.5 x 1.0 | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | | | | | | |
| P _{tot} (mW) | | 2000 ²⁾ | 750 | 430 | 500 | | | | | | |
| V _{CEO} (V) | I _C (A) | Polarity | h _{FE} min | @ I _C (A) | @ V _{CE} (V) | V _{CEsat} typ (mV); I _C = 0.5 A; I _B = 0.05 A | V _{CEsat} max (mV) | @ I _C (A) | @ I _B (A) | | |
| 15 | 0.5 | 2 x NPN | 200 | 0.01 | 2 | 170 ¹⁾ | 250 | 0.5 | 0.05 | | PBSS2515VS |
| | | 2 x PNP | 200 | 0.01 | 2 | 170 ¹⁾ | 250 | 0.5 | 0.05 | | PBSS3515VS |
| | | NPN/PNP | 200 | 0.01 | 2 | 170 ¹⁾ | 250 | 0.5 | 0.05 | | PBSS2515VPN |
| | | NPN/PNP | 200 | 0.01 | 2 | 170 ¹⁾ | 250 | 0.5 | 0.05 | | PBSS2515YPN |
| 20 | 7.5 | NPN/NPN | 300 | 0.5 | 2 | 15 | 150 | 4 | 0.2 | | PBSS4021SN |
| | 6.3 | PNP/PNP | 250 | 0.5 | 2 | 24 | 225 | 4 | 0.2 | | PBSS4021SP |
| | 7.5 / 6.3 | NPN/PNP | 300/250 | 0.5 | 2 | 15/24 | 150/225 | 4 | 0.2 | | PBSS4021SPN |
| 30 | 5.7 | NPN/NPN | 300 | 0.5 | 2 | 57 | 250 | 4 | 0.4 | | PBSS4032SN ³⁾ |
| | 4.8 | PNP/PNP | 200 | 0.5 | 2 | 70 | 390 | 4 | 0.4 | | PBSS4032SP ³⁾ |
| | 5.7 / 4.8 | NPN/PNP | 300/200 | 0.5 | 2 | 57/70 | 250/390 | 4 | 0.4 | | PBSS4032SPN ³⁾ |
| 40 | 1.0 | NPN/PNP | 300/250 | 0.5 | 5 | 130/150 | 500 | 1 | 0.1 | | PBSS4140DPN |
| | 2.0 | NPN/PNP | 300/250 | 0.5 | 5 | 80/100 | 400/530 | 2 | 0.2 | | PBSS4240DPN |
| 50 | 2.7 | 2 x NPN | 300 | 0.5 | 2 | 50 | 340 | 2.7 | 0.27 | | PBSS4350SS |
| | | 2 x PNP | 200 | 0.5 | 2 | 60 | 370 | 2.7 | 0.27 | | PBSS5350SS |
| | | NPN/PNP | 300/200 | 0.5 | 2 | 50/60 | 340/370 | 2.7 | 0.27 | | PBSS4350SPN |
| 60 | 1.0 | 2 x NPN | 200 | 0.5 | 5 | 115 | 250 | 1 | 0.1 | | PBSS4160DS |
| | | 2 x PNP | 150 | 0.5 | 5 | 120 | 330 | 1 | 0.1 | | PBSS5160DS |
| | | NPN/PNP | 200/150 | 0.5 | 5 | 115/120 | 250/330 | 1 | 0.1 | | PBSS4160DPN |
| | 6.7 | NPN/NPN | 300 | 0.5 | 2 | 20 | 190 | 4 | 0.2 | | PBSS4041SN |
| | 5.9 | PNP/PNP | 200 | 0.5 | 2 | 35 | 330 | 4 | 0.2 | | PBSS4041SP |
| 6.7 / 5.9 | NPN/PNP | 300/200 | 0.5 | 2 | 20/35 | 190/330 | 4 | 0.2 | | PBSS4041SPN | |

¹⁾ I_C/I_B=20
²⁾ Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
³⁾ Optimized for high speed switching

Low V_{CEsat} (BISS) load switches

| Package | | | | SOT96 (SO8) | SOT457 (SC-74) | SOT363 (SC-88) | SOT666 | | |
|-----------------------|--------------------|--|-------------|--------------------|-------------------|-------------------|-------------------|-----------|-----------|
| Size (mm) | | | | 4.9 x 3.9 x 1.75 | 2.9 x 1.5 x 1.0 | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | | |
| P _{tot} (mW) | | | | 1500 ¹⁾ | 750 ¹⁾ | 600 ¹⁾ | 300 ²⁾ | | |
| V _{CEO} (V) | I _C (A) | V _{CEsat} max (mV); I _C = 0.5 A; I _B = 0.05 A | R1, R2 (k) | | | | | | |
| 15 | 0.5 | 250 | 2.2 | | | | PBLS1501Y | PBLS1501V | |
| | | | 4.7 | | | | PBLS1502Y | PBLS1502V | |
| | | | 10 | | | | PBLS1503Y | PBLS1503V | |
| | | | 22 | | | | PBLS1504Y | PBLS1504V | |
| 20 | 1 | 150 | 2.2 | | | | PBLS2001D | | |
| | | | 4.7 | | | | PBLS2002D | | |
| | | | 10 | | | | PBLS2003D | | |
| | | | 22 | | | | PBLS2004D | | |
| | 1.8 | 70 | 70 | 2.2 | | | | PBLS2021D | |
| | | | | 4.7 | | | | PBLS2022D | |
| | | | | 10 | | | | PBLS2023D | |
| | | | | 22 | | | | PBLS2024D | |
| 3 | 75 | 75 | 2.2 | | | | PBLS2001S | | |
| | | | 4.7 | | | | PBLS2002S | | |
| | | | 10 | | | | PBLS2003S | | |
| 40 | 0.5 | 350 | 2.2 | | | | PBLS4001Y | PBLS4001V | |
| | | | 4.7 | | | | PBLS4002Y | PBLS4002V | |
| | | | 10 | | | | PBLS4003Y | PBLS4003V | |
| | | | 22 | | | | PBLS4004Y | PBLS4004V | |
| | 1 | 170 | 170 | 4.7 | | | | PBLS4005Y | PBLS4005V |
| | | | | 10 | | | | PBLS4001D | |
| | | | | 22 | | | | PBLS4002D | |
| | | | | 47 | | | | PBLS4003D | |
| 60 | 1 | 180 | 2.2 | | | | PBLS4004D | | |
| | | | 4.7 | | | | PBLS4005D | | |
| | | | 10 | | | | PBLS6001D | | |
| | | | 22 | | | | PBLS6002D | | |
| | 1.5 | 100 | 100 | 4.7 | | | | PBLS6003D | |
| | | | | 10 | | | | PBLS6004D | |
| | | | | 22 | | | | PBLS6005D | |
| | | | | 47 | | | | PBLS6021D | |
| | | | 4.7 | | | | PBLS6022D | | |
| | | | 10 | | | | PBLS6023D | | |
| | | | 22 | | | | PBLS6024D | | |

¹⁾ Device mounted on a ceramic PCB, Al₂O₃, standard footprint
²⁾ Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint

Key features

- ▶ Low V_{CEsat} (BISS) transistor and resistor-equipped transistor (RET) in one package
- ▶ Low saturation voltage
- ▶ Low 'threshold' voltage (<1 V) compared to MOSFET
- ▶ Low drive power required
- ▶ Range of small, very small and ultra small packages

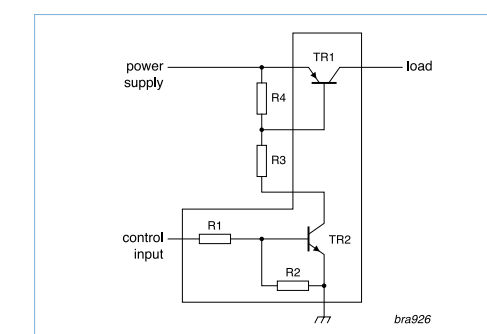
Key benefits

- ▶ Smaller end products
- ▶ Reduced component count
- ▶ Less sourcing effort
- ▶ Fewer solder points increase reliability
- ▶ Cost reduction
- ▶ More efficient, cooler running systems

Key applications

- ▶ Supply line switch
- ▶ Battery charger
- ▶ High-side switch for LEDs, drivers and backlights
- ▶ Portable equipment

BISS load switch



High voltage low V_{CEsat} (BISS) transistors

types in bold represent new products

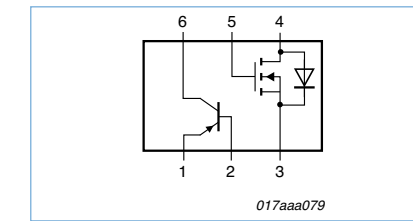
| | | | | SOT223 (SC-73) | SOT89 (SC-62) | SOT23 |
|-----------------------|---------------------------------|----------------------|--------------------|------------------|-----------------|------------------|
| Package | | | | | | |
| Size (mm) | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.3 x 1.0 |
| P _{tot} (mW) | | | | 1700 | 1300 | 250 |
| Polarity | V _{CESM} ¹⁾ | V _{CEO} (V) | I _C (A) | | | |
| NPN | - | 150 | 1 | PBHV8115Z | | PBHV8115T |
| | | | 2 | PBHV8215Z | | |
| | | 180 | 1 | | | PBHV8118T |
| | 500 | 400 | 0.5 | PBHV8540Z | | PBHV8540T |
| | | | 1 | PBHV8140Z | | |
| | | 500 | 0.15 | | | PMBTA45 |
| PNP | - | 150 | 1 | PBHV9115Z | PBHV9115X | PBHV9115T |
| | | | 2 | PBHV9215Z | | |
| | | 0.25 | PBHV9040Z | | PBHV9040T | |
| | 500 | 400 | 0.5 | PBHV9540Z | | |
| | | | 0.15 | | | |
| | | 500 | 0.25 | PBHV9050Z | | PBHV9050T |

¹⁾ Collector-emitter peak voltage

Low V_{CEsat} (BISS) transistor PNP – N-channel MOSFET combination

types in bold represent new products

| | | | | | | | | | | | | SOT1118 |
|-----------------------|--------------------|---------------------|---------------------|-----------------------|-----------------------|-----------------------------|---------------------|---------------------|--------------------|----------------------------|-------------------|------------------|
| Package | | | | | | | | | | | | |
| Size (mm) | | | | | | | | | | | | 2.0 x 2.0 x 0.65 |
| P _{tot} (mW) | | | | | | | | | | | | 1300 |
| V _{CEO} (V) | I _C (A) | h _{FE min} | h _{FE max} | @ I _C (mA) | @ V _{CE} (V) | R _{CEsat} typ (mΩ) | V _{DS} (V) | V _{GS} (V) | I _D (A) | R _{Dson} typ (mΩ) | | |
| 40 | 2 | 300 | 800 | 100 | 5 | 240 | 30 | 0.7 | 0.66 | 390 | PBSM5240PF | |



Combination of Low V_{CEsat} transistor with N-channel MOSFET in the very small and ultra thin leadless package SOT1118

In the Spotlight

High voltage low V_{CEsat} (BISS) transistors in SOT223 & SOT23

- Voltage V_{CEO} up to 500 V
- Current I_C up to 1 A (continuous), 2 A (peak)
- V_{CEsat} down to 33 mV at $I_B = 20$ mA
- AEC-Q101 qualified

Low V_{CEsat} (BISS) RETs

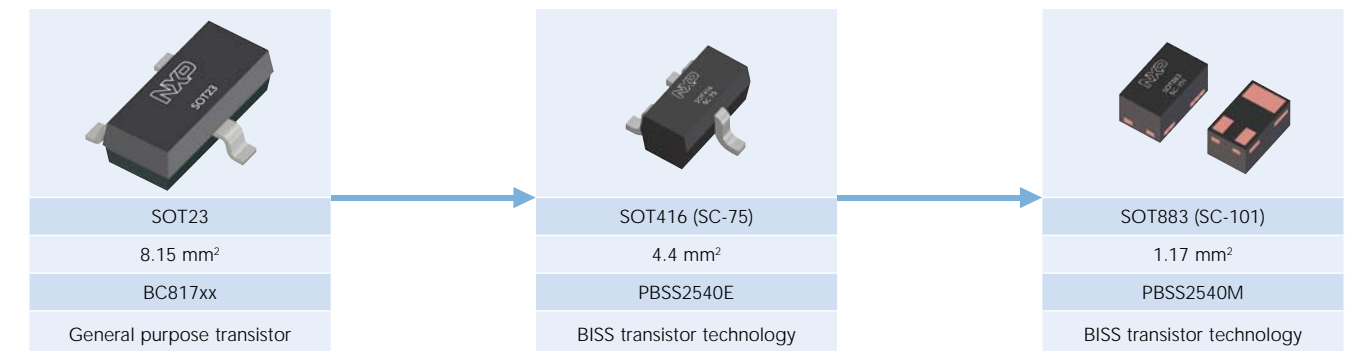
| | | | | | | SOT23 | |
|-----------------------|---------------------|---------|---------|---------|-----------|-----------------|--|
| Package | | | | | | | |
| Size (mm) | | | | | | 2.9 x 1.3 x 1.0 | |
| P _{tot} (mW) | | | | | | 250 | |
| V _{CEO} (V) | I _C (mA) | | R1 (kΩ) | R2 (kΩ) | NPN | PNP | |
| 40 | 600 | R1 = R2 | 1 | 1 | PBRN113ET | PBRP113ET | |
| | | | 2.2 | 2.2 | PBRN123ET | PBRP123ET | |
| | | R1 R2 | 1 | 10 | PBRN113ZT | PBRP113ZT | |
| | | | 2.2 | 10 | PBRN123YT | PBRP123YT | |

Advantages of low V_{CEsat} (BISS) technology

Our BISS (Breakthrough In Small-Signal) transistors show lowest V_{CEsat} values due to an innovative mesh-emitter technology and further technology improvement. Benefit from:

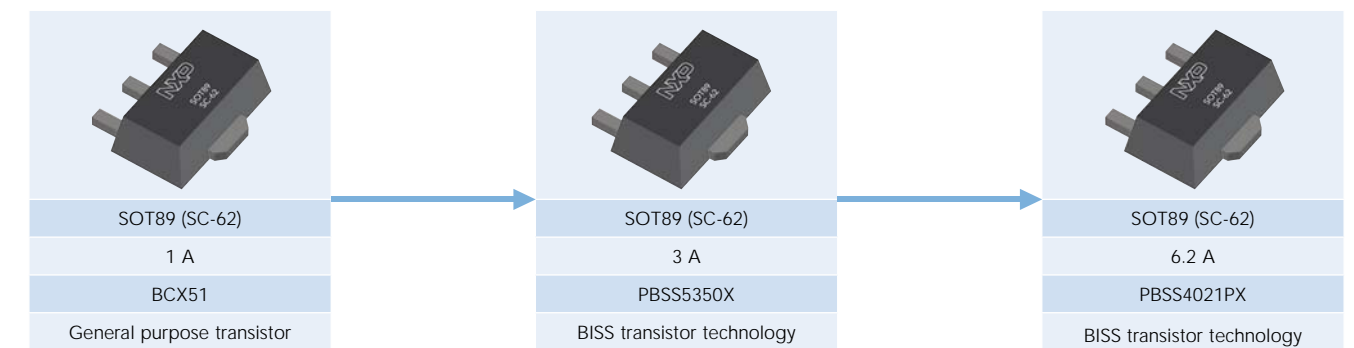
Reduction in board space

- Stable performance at smaller footprint
- $I_C = 0.5$ A; $V_{CEO} = 40 - 45$ V



Improved collector current capabilities

- 17.87 mm² footprint

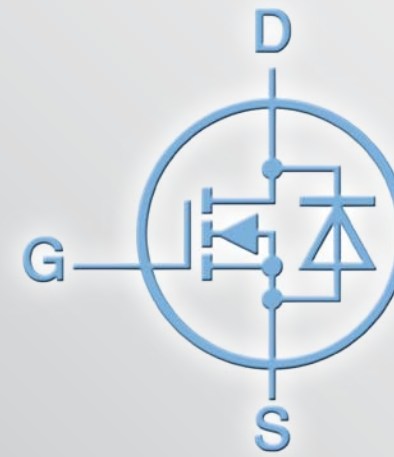


High voltage bipolar transistors for lighting, SMPS and industrial applications

types in **bold** represent new products

| V_{CESM} (V) | $I_{C(DC)}$ (max) (A) | 25 °C ind. t_f (typ) (ns) | @ I_c (A) | h_{FE} (typ) | @ I_c (A) | SOT54 (TO92) | SOT78 (TO220AB) | SOT186A (isolated TO220AB) | SOT404 (D ² PAK) | SOT428 (DPAK) |
|----------------|-----------------------|-----------------------------|----------------|----------------|-------------|---|---|---|---|---|
| | | | | | |  |  |  |  |  |
| 700 | 1 | 80 | 1 | 7.5 | 0.8 | BUJ100LR | | | | |
| | 1 | 80 | 1 | 7.5 | 0.8 | PHE13003A | | | | |
| | 1 | 50 | 1 | 14 | 0.75 | BUJ100 | | | | |
| | 1.5 | 100 | 0.5 | 9 | 1 | PHE13003C | | | | |
| | 1.5 | 100 | 0.5 | 9 | 1 | PHD13003C ¹⁾ | | | | |
| | 4 | 30 | 2 | 12.5 | 3 | | BUJ103A | BUJ103AX | | BUJ103AD |
| | 4 | 30 | 2 | 12.5 | 3 | | | | | BUJD103AD ¹⁾ |
| | 4 | 100 | 2 | 17 | 2 | | PHE13005 | PHE13005X | | |
| | 4 | 100 | 2 | 17 | 2 | | PHD13005 ¹⁾ | | | |
| | 8 | 20 | 5 | 11 | 4 | | BUJ105A | | BUJ105AB | BUJ105AD |
| | 8 | 20 | 5 | 11 | 4 | | | | | BUJD105AD ¹⁾ |
| | 8 | 40 | 5 | 9 | 5 | | PHE13007 | | | |
| | 10 | 20 | 5 | 11 | 6 | | BUJ106A | | | |
| 12 | 100 | 5 | 6 min - 30 max | 8 | | PHE13009 | | | | |
| 850 | 4 | 30 | 2 | 12.5 | 3 | | BUJD203A ¹⁾ | BUJD203AX ¹⁾ | | BUJD203AD ¹⁾ |
| 1000 | 5 | 145 | 2.5 | 12 | 3 | | BUJ303A | BUJ303AX | | BUJ303AD |
| 1050 | 4 | 520 | 2 | 41 | 0.8 | | BUJ302A | BUJ302AX | | BUJ302AD |
| | 5 | 200 | 2.5 | 10.5 | 3 | | BUJ303B | | | |
| 1200 | 6 | 170 | 2.5 | 15.5 | 3 | | BUJ403A | | | |

¹⁾ Integrated freewheeling diode



MOSFETs

Small-signal MOSFETs

70

- Small-signal MOSFETs single (N-channel) < 50 V
- Small-signal MOSFETs single (N-channel) 50 V
- Small-signal MOSFETs dual (N-channel)
- Small-signal MOSFETs single (P-Channel)
- Small-signal MOSFET – Schottky combination
- Small-signal MOSFETs dual (P-channel)

70
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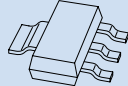
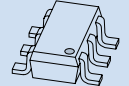
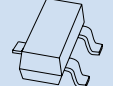




Power MOSFETs

77

- 12 V - 25 V N-channel MOSFETs
- 30 V N-channel MOSFETs
- 40 V - 55 V N-channel MOSFETs
- 60 V - 80 V N-channel MOSFETs
- 100 V - 110 V N-channel MOSFETs
- 150 V - 300 V N-channel MOSFETs
- P-channel MOSFETs
- Multi-chip MOSFETs

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Small-signal MOSFETs single (N-channel) < 50V

| | | | | | | | | | | | | | SOT223 (SC-73) | | TSOP6 SOT457 (SC-74) | SOT23 | SOT363 (SC-88) | SOT323 (SC-70) | SOT416 (SC-75) | SOT883 (SC-101) | | | | | |
|-----------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|---------------------|--|-------------------|-------|-------------------|---|--|---|---|---|---|---|---|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|
| Package | | | | | | | | | | | | |  | |  |  |  |  |  |  | | | | | |
| Size (mm) | | | | | | | | | | | | | 6.5 x 3.5 x 1.65 | | 2.9 x 1.5 x 1.0 | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.0 x 0.6 x 0.5 | | | | | |
| P _{tot} (mW) | | | | | | | | | | | | | 1700 | | 600 | 250 | 300 | 200 | 150 | 250 | | | | | |
| V _{DS} (V) | V _{GS} (V) | I _D (A) | V _{GS(th)} min (V) | V _{GS(th)} max (V) | t _{on} typ (ns) | t _{off} typ (ns) | Q _G typ (nC) | ESD protection (kV) | R _{Dson} typ (mΩ) @ V _{GS} = | | | | | | | | | | | | | | | | |
| | | | | | | | | | 10 V | 4.5 V | 2.5 V | 1.8 V | | | | | | | | | | | | | |
| 12 | 8 | 5.7 | 0.4 | - | 23 | 67 | 10.1 | - | - | 28 | - | 39 | | | | | | PMN28UN | | | | | | | |
| 20 | 8 | tbd | tbd | tbd | tbd | tbd | tbd | - | - | 16 | tbd | tbd | | | | | | | PMN23UN | | | | | | |
| | | 5.7 | 0.4 | - | 23 | 71 | 10.6 | - | - | 27 | - | 39 | | | | | | | PMN27UN | | | | | | |
| | | tbd | tbd | tbd | tbd | tbd | tbd | tbd | - | - | 28 | tbd | tbd | | | | | | | PMV28UN ¹⁾ | | | | | |
| | | 5.7 | 0.45 | - | 20 | 66 | 7.4 | - | - | 30 | - | 44 | | | | | | | | PMV30UN ¹⁾ | | | | | |
| | | 3.76 | 0.65 | - | 35 | 84 | 5.4 | - | - | 56 | 77 | - | | | | | | | | PMV56XN ¹⁾ | | | | | |
| | | 2.5 | 0.65 | - | 35 | 84 | 5.4 | - | - | 56 | 77 | - | | | | | | | | SI2302DS | | | | | |
| | | 1.05 | 0.4 | - | 6.5 | 65 | - | - | - | 140 | - | 240 | | | | | | | | BSH105 | | | | | |
| | | 2.28 | 0.45 | 0.95 | 14.5 | 23.5 | 0.89 | - | - | 250 | - | 420 | | | | | | | | | | | PMZ250UN | | |
| | 1 | 0.45 | 1 | 14.5 | 23.5 | 0.89 | - | - | 280 | - | 460 | | | | | | | | | PMF280UN | PMR280UN | | | | |
| | 12 | tbd | tbd | tbd | tbd | tbd | tbd | tbd | - | - | 30 | tbd | - | | | | | | | | PMV30XN ¹⁾ | | | | |
| | | 5.9 | 0.5 | 1.5 | 25 | 37 | 5.8 | - | - | 31 | 44 | - | | | | | | | | | PMV31XN ¹⁾ | | | | |
| | | 2.15 | 0.5 | 1.5 | 16 | 17 | 0.72 | - | - | 270 | 440 | - | | | | | | | | | | | PMZ270XN | | |
| | | 1 | 0.5 | 1.5 | 16 | 17 | 0.72 | - | - | 290 | 460 | - | | | | | | | | | | | | | |
| | 15 | 5.7 | 1 | 2 | 24 | 35 | 13.1 | - | 28 | 34 | - | - | | | | | | | | | PMN34LN | | | | |
| 4.1 | | 1 | 2 | 24 | 35 | 13.1 | - | 55 | 70 | - | - | | | | | | | | | PMN55LN | | | | | |
| 30 | 8 | 4.9 | 0.45 | - | 22 | 60 | 9.9 | - | - | 38 | - | 54 | | | | | | | | PMN34UN | | | | | |
| | | 4.9 | 0.45 | - | 18 | 50 | 9.3 | - | - | 40 | - | 55 | | | | | | | | | | | PMV40UN ¹⁾ | | |
| | | 1.78 | 0.45 | 0.95 | 11.5 | 22.5 | 0.89 | - | - | 390 | - | 550 | | | | | | | | | | | PMZ390UN | | |
| | | 0.85 | 0.4 | - | 6 | 27 | - | - | - | 400 ²⁾ | - | 600 ²⁾ | | | | | | | | | | | BSH103 | | |
| | 12 | 0.8 | 0.45 | 1 | 11.5 | 22.5 | 0.89 | - | - | 400 | - | 580 | | | | | | | | | | | | PMF400UN | PMR400UN |
| | | tbd | tbd | tbd | tbd | tbd | tbd | tbd | - | - | 20 | tbd | - | | | | | | | | | PMV20XN ¹⁾ | | | |
| | | tbd | tbd | tbd | tbd | tbd | tbd | tbd | - | - | 250 | tbd | - | | | | | | | | | | | PMF250XN ¹⁾ | |
| | | 1.87 | 0.5 | 1.5 | 16 | 19.5 | 0.65 | - | - | 350 | 520 | - | | | | | | | | | | | | PMZ350XN | |
| | 15 | 0.87 | 0.35 | - | 16 | 19.5 | - | - | - | 370 | 550 | - | | | | | | | | | | | | | PMF370XN |
| | | 0.9 | 0.5 | - | 16 | 19.5 | 0.65 | - | - | 370 | 550 | - | | | | | | | | | | | | | PMG370XN |
| 5.4 | | 1 | 2 | 12 | 27 | 13.8 | - | 32 | 40 | - | - | | | | | | | | | | PMN40LN | | | | |
| tbd | | tbd | tbd | tbd | tbd | tbd | tbd | - | tbd | 15 | tbd | - | | | | | | | | | | PMN15EN ¹⁾ | | | |
| tbd | | tbd | tbd | tbd | tbd | tbd | tbd | - | tbd | 18 | tbd | - | | | | | | | | | | | PMV18EN ¹⁾ | | |
| 10 | | 1 | 2.8 | 18 | 44 | 24 | - | 20 | 30 | - | - | | | | | | | | | | BSP030 | | | | |
| 20 | tbd | tbd | tbd | tbd | tbd | tbd | tbd | - | tbd | 31 | tbd | - | | | | | | | | | | | | PMV31EN ¹⁾ | |
| | tbd | tbd | tbd | tbd | tbd | tbd | tbd | - | tbd | 35 | tbd | - | | | | | | | | | | | | | PMN35EN ¹⁾ |
| | 5.4 | 1 | 2 | 33 | 44 | 6.1 | - | 31 | 38 | - | - | | | | | | | | | | | | | PMN38EN | |
| | 5.2 | 1 | 2 | 33 | 44 | 6.1 | - | 32 | 42 | - | - | | | | | | | | | | | | | PMN45EN | |
| | 5.4 | 1 | 2 | 12 | 21.5 | 9.4 | - | 35 | 45 | - | - | | | | | | | | | | | | | PMV45EN ¹⁾ | |
| | 4.6 | 1 | 2 | 8.4 | 17.8 | 8.8 | - | 40 | 49 | - | - | | | | | | | | | | | | | PMN49EN | |
| | 4.7 | 1 | 2 | 12 | 23.5 | 9.4 | - | 47 | 60 | - | - | | | | | | | | | | | | | | PMV60EN ¹⁾ |
| | 1.9 | 1 | 2 | 11 | 41 | 6.4 | - | 77 | 102 | - | - | | | | | | | | | | | | | | BSH108 |
| | 2.5 | 1.5 | - | 12 | 23.5 | 4.6 | - | 74 | 117 | - | - | | | | | | | | | | | | | | PMV117EN |
| | 6 | 1 | 2.8 | 14 | 36 | - | - | 80 | 120 | - | - | | | | | | | | | | | | | | BSP100 |
| 1.7 | 1.5 | - | 11.5 | 31 | 4.6 | - | 117 ²⁾ | 190 ²⁾ | - | - | | | | | | | | | | | | | | | SI2304DS |

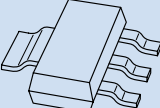
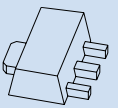




¹⁾ Enhanced thermal capability

²⁾ Max values

* Products to be released in 2011. For new product information, please check <http://standardproducts.nxp.com/mosfets>

Small-signal MOSFETs single (N-channel) ≥ 50V

types in **bold** represent new products


| | | | | | | | | | | | | | SOT223 (SC-73) | | SOT89 (SC-62) | SOT23 | SOT323 (SC-70) | SOT416 (SC-75) | SOT883 (SC-101) |
|-----------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|---------------------|--|--------------------|-------|-------|---|--|---|---|---|---|---|
| Package | | | | | | | | | | | | |  | |  |  |  |  |  |
| Size (mm) | | | | | | | | | | | | | 6.5 x 3.5 x 1.65 | | 4.5 x 2.5 x 1.5 | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.0 x 0.6 x 0.5 |
| P _{tot} (mW) | | | | | | | | | | | | | 1700 | | 1300 | 250 | 200 | 150 | 250 |
| V _{DS} (V) | V _{GS} (V) | I _D (A) | V _{GS(th)} min (V) | V _{GS(th)} max (V) | t _{on} typ (ns) | t _{off} typ (ns) | Q _G typ (nC) | ESD protection (kV) | R _{Dson} typ (mΩ) @ V _{GS} = | | | | | | | | | | |
| | | | | | | | | | 10 V | 4.5 V | 2.5 V | 1.8 V | | | | | | | |
| 50 | 20 | 0.1 | 0.4 | 1.8 | 2 | 5 | - | - | 2800 | 3800 ³⁾ | - | - | | | | | BSN20 | | |
| 55 | 8 | 0.3 | 0.4 | 1.3 | 4 | 11 | 1 | - | - | 2300 | 2400 | 3100 | | | | | BSH121 | | |
| | 10 | 0.335 | 0.4 | 1.3 | 4 | 11 | 1 | - | - | 2300 | 2400 | 3100 | | | | | BSH111 | | |
| | 13 | 2.5 | 2 | 4 | - | - | - | 2 | 120 | - | - | - | | | | | | | |
| 3.5 | | 1 | 2 | - | - | - | 2 | - | 65 | - | - | | | | | | | | |
| 60 | 15 | 2.5 | 1 | 2 | - | - | - | 2 | - | 120 | - | - | | | | | | | |
| | | 2.5 | 1 | 2 | - | - | - | 2 | - | 120 | - | - | | | | | | | |
| | 20 | 0.26 | 1 | 3.3 | 3 | 9 | - | 1 | 2800 | 3800 | - | - | | | | | | PMF3800SN | |
| | | 0.25 | 0.8 | 3 | - | - | - | - | 2500 | - | - | - | | | | | | PMBF170 | |
| | | 0.36 | 0.9 | 1.5 | 5 | 13 | 0.72 | - | 900 | 1000 | - | - | | | | | BSS138P | BSS138PW | |
| | | 1.22 | 1 | 3 | 6 | 7.2 | 1.05 | - | 760 | 1100 | - | - | | | | | | | PMZ760SN |
| | | 0.57 | 1 | - | 6 | 7.2 | - | - | 780 | 1100 | - | - | | | | | | PMF780SN | |
| | | 0.55 | 1 | 3 | 6 | 7.2 | 1.05 | - | 780 | 1100 | - | - | | | | | | | PMR780SN |
| | 30 | 0.3 | 1 | 2.5 | 7 | 15 | 0.6 | - | 1000 | 1300 | - | - | | | | | 2N7002P | 2N7002PW | 2N7002PT |
| | | 0.3 | 1 | 2.5 | 11 | 19 | 0.5 | 2 | 1000 | 1300 | - | - | | | | | 2N7002BK | 2N7002BKW | 2N7002BKT |
| 0.3 | | 1 | 2.5 | 16 | 60 | 1.09 | 3 | 1100 | 1300 | - | - | | | | | 2N7002CK | | | |
| 0.34 | | 1 | - | 3 | 9 | - | 1 | 2800 | 3800 | - | - | | | | | 2N7002K | | | |
| 100 | 16 | 0.385 | 1 | 2.5 | 2.5 | 11 | 0.69 | - | 780 | 1200 | - | - | | | | | 2N7002E | | |
| | | 0.475 | 1 | 2.5 | 2.5 | 11 | 0.69 | - | 780 | 1200 | - | - | | | | | 2N7002F | | |
| | 20 | 0.3 | 1 | 2.5 | 2.5 | 11 | - | - | 2800 | 3800 | - | - | | | | | 2N7002 | | |
| | | 3.5 | 1 | 2 | 14 | 73 | - | - | - | 200 | - | - | | | | | PHT4NQ10LT | | |
| | | 3 | 2 | 4 | - | - | - | - | 57 | - | - | - | | | | | PHT6NQ10T | | |
| | | 3.5 | 2 | 4 | 21 | 31 | 7.4 | - | 200 | - | - | - | | | | | PHT4NQ10T | | |
| 30 | 0.85 | 2 | 4 | 19 | 13 | 4.6 | - | 400 | - | - | - | | | | | BSH114 | | | |
| | 0.15 | 1 | 2.8 | 3 | 12 | - | - | 3500 | - | - | - | | | | | BSS123 | | | |
| | 0.19 | 1 | - | 3 | 12 | - | - | - | 5000 | - | - | | | | | BST82 | | | |
| 200 | 20 | 0.52 | 1 | - | 3 | 12 | - | - | - | 5000 | - | - | | | | | BSP110 | | |
| | | 1.9 | 2 | 4 | 10.5 | 12.5 | 7 | - | 213 | - | - | - | | | | | PMV213SN ¹⁾ | | |
| 240 | 20 | 0.4 | 0.8 | 2.8 | 6 | 49 | - | - | 1600 | - | - | - | | | | | BSS87 | | |
| | | 0.55 | 0.4 | 2 | 10 | 45 | - | - | 1700 | - | 3000 | - | | | | | BSP122 | | |
| 240 | 20 | 0.375 | 0.8 | 2 | 6 | 47 | - | - | 2800 | 7500 ²⁾ | - | - | | | | | BSP89 | | |
| 250 | 20 | 0.35 | 0.8 | 2 | 6 | 47 | - | - | 2800 | - | - | - | | | | | BSP126 | | |
| 300 | 20 | 0.35 | 0.8 | 2 | 6 | 46 | - | - | 3700 | - | 4800 | - | | | | | BSP130 | | |

¹⁾ Enhanced thermal capability
²⁾ Max values
³⁾ @ V_{GS} = 5 V



In the Spotlight

2N7002BKx - 2N7002 ESD-protected 60 V N-channel MOSFET-series in several SMD packages

- ESD protection up to 2 kV in several SMD packages
- Available in single and dual configuration
- Very fast switching
- TrenchMOS technology
- AEC-Q101 qualified



Small-signal MOSFETs dual (N-channel)

| | | | | | | | | | | | | | | SOT363 (SC-88) | SOT666 (SC-88) |
|-----------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|---------------------|--|-------|-------|-------|---|---|---|
| | | | | | | | | | | | | | |  |  |
| Package | | | | | | | | | | | | | | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 |
| Size (mm) | | | | | | | | | | | | | | 300 | 300 |
| P _{tot} (mW) | | | | | | | | | | | | | | | |
| V _{DS} (V) | V _{GS} (V) | I _b (A) | V _{GS(th) min} (V) | V _{GS(th) max} (V) | t _{on} typ (ns) | t _{off} typ (ns) | Q _G typ (nC) | ESD protection (kV) | R _{DSon} typ (mΩ) @ V _{GS} = | | | | | | |
| | | | | | | | | | 10 V | 4.5 V | 2.5 V | 1.8 V | | | |
| 20 | 8 | 0.87 | 0.45 | 1 | 14.5 | 23.5 | - | - | - | 280 | - | 460 | | PMGD280UN | |
| | 12 | 0.86 | 0.5 | 1.5 | 16 | 17 | 0.72 | - | - | 290 | 460 | - | | PMGD290XN | |
| 30 | 8 | 0.71 | 0.45 | 1 | 11.5 | 22.5 | 0.89 | - | - | 400 | - | 580 | | PMGD400UN | |
| | 12 | 0.74 | 0.5 | 1.5 | 17 | 19.5 | 0.65 | - | - | 370 | 550 | - | | PMGD370XN | |
| | 15 | 0.125 | 0.8 | 1.5 | 17 | 22 | 0.35 | - | - | 1800 | 2900 | - | | PMGD8000LN | |
| 60 | 20 | 0.49 | 1 | - | 6 | 7.2 | 1.05 | - | - | 780 | 1100 | - | - | PMGD780SN | |
| | | 0.36 | 0.9 | 1.5 | 5 | 13 | 0.72 | - | - | 900 | 1000 | - | - | BSS138PS | |
| | | 0.3 | 1 | 2.5 | 7 | 15 | 0.6 | - | - | 1000 | 1300 | - | - | 2N7002PS | 2N7002PV |
| | | 0.3 | 1 | 2.5 | 11 | 19 | 0.5 | 2 | - | 1000 | 1300 | - | - | 2N7002BKS | 2N7002BKV |

types in bold represent new products

In the Spotlight

20 V, 100 m P-channel enhancement mode Field-Effect Transistor (FET) – NX2301P


Housed in a small SMD plastic package SOT23

Very fast switching

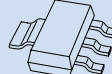







TrenchMOS technology

AEC-Q101 qualified

1.8 V R_{DSon} rated for Low Voltage Gate Drive



Small-signal MOSFETs single (P-channel)

| | | | | | | | | | | | | | | SOT223 (SC-73) | SOT89 (SC-62) | TSOP6 SOT457 (SC-74) | SOT23 | SOT363 (SC-88) | SOT323 (SC-70) | SOT416 (SC-75) | SOT883 (SC-101) |
|-----------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|---------------------|--|-------|-------|-------|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | |  |  |  |  |  |  |  |  |
| Package | | | | | | | | | | | | | | 6.5 x 3.5 x 1.65 | 4.5 x 2.5 x 1.5 | 2.9 x 1.5 x 1.0 | 2.9 x 1.3 x 1.0 | 2.0 x 1.25 x 0.95 | 2.0 x 1.25 x 0.95 | 1.6 x 0.8 x 0.77 | 1.0 x 0.6 x 0.5 |
| Size (mm) | | | | | | | | | | | | | | 1700 | 1300 | 600 | 250 | 300 | 200 | 150 | 250 |
| P _{tot} (mW) | | | | | | | | | | | | | | | | | | | | | |
| V _{DS} (V) | V _{GS} (V) | I _b (A) | V _{GS(th) min} (V) | V _{GS(th) max} (V) | t _{on} typ (ns) | t _{off} typ (ns) | Q _G typ (nC) | ESD protection (kV) | R _{DSon} typ (mΩ) @ V _{GS} = | | | | | | | | | | | | |
| | | | | | | | | | 10 V | 4.5 V | 2.5 V | 1.8 V | | | | | | | | | |
| 12 | 8 | 1.52 | 0.4 | - | 6.5 | 65 | - | - | - | 80 | - | 140 | | | BSH207 | | | | | | |
| | | 0.75 | 0.4 | - | 6.5 | 65 | - | - | - | 180 | - | 420 | | | BSH205 ¹⁾ | | | | | | |
| 20 | 8 | tbid | tbid | tbid | tbid | tbid | tbid | - | - | 21 | tbid | tbid | | | PMN21UP* | | | | | | |
| | | tbid | tbid | tbid | tbid | tbid | tbid | - | - | 27 | tbid | tbid | | | PMN27UP* | | | | | | |
| | | 2 | 0.5 | 1.1 | 7 | 50 | 6 | - | - | 100 | - | - | | | NX2301P | | | | | | |
| | 12 | 4.8 | 0.55 | 0.95 | 16 | 117 | 10 | - | - | 48 | 65 | - | | | PMN50XP | | | | | | |
| | | 3.5 | 0.75 | 1.25 | 24 | 84 | 8.5 | - | - | 48 | 71 | - | | | PMN48XP* | PMV48XP | | | | | |
| | | 3.9 | 0.55 | 0.95 | 28 | 101 | 7.6 | - | - | 65 | 90 | - | | | PMV65XP ¹⁾ | | | | | | |
| | | 3.5 | 0.75 | 1.25 | tbid | tbid | tbid | - | - | 85 | tbid | tbid | | | PMG85XP* | | | | | | |
| 3.5 | 0.75 | 1.25 | tbid | tbid | tbid | - | - | 170 | tbid | tbid | | | | PMF170XP* | | | | | | | |
| 30 | 8 | 0.47 | 0.4 | - | 6.5 | 65 | - | - | - | 660 | - | 1100 | | | BSH203 | | | | | | |
| | | 3 | 1 | 2.8 | 20 | 50 | - | - | 220 | 330 | - | - | | | BSP250 | | | | | | |
| | 20 | 0.52 | 1 | - | 6.5 | 65 | - | - | 630 | 890 | - | - | | | BSH202 | | | | | | |
| 50 | 20 | 0.2 | tbid | tbid | tbid | tbid | tbid | 1 | 5300 | 6000 | - | - | | | BSS84AK* | BSS84AKW* | | | | | |
| | | 0.13 | 0.8 | 2 | 3 | 7 | - | - | 6000 | - | - | - | | | BSS84 | BSS84AKM* | | | | | |
| 60 | 20 | 0.3 | 1 | - | 6.5 | 65 | - | - | 2100 | 2700 | - | - | | | BSH201 | | | | | | |
| 200 | 20 | 0.225 | 0.8 | 2.8 | 5 | 20 | - | - | 10000 | - | - | - | | | BSP220 | | | | | | |
| 240 | 20 | 0.2 | 0.8 | 2.8 | 5 | 20 | - | - | 10000 | - | - | - | | | | BSS192 | | | | | |
| 250 | 20 | 0.225 | 0.8 | 2.8 | 5 | 10 | - | - | 10000 | - | - | - | | | BSP225 | | | | | | |
| 300 | 20 | 0.21 | 1.95 | 2.8 | 5 | 15 | - | - | 17000 ²⁾ | - | - | - | | | BSP230 | | | | | | |

types in bold represent new products


¹⁾ Enhanced thermal capability

²⁾ Max values

* Products to be released in 2011. For new product information, please check <http://standardproducts.nxp.com/mosfets>




Small-signal MOSFET – Schottky combination

types in **bold** represent new products

| | | | | | | | | | | | | | | SOT1118 | | |
|-----------------------|---------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|---------------------|--------------------|--------------------|--------------------------|--|---|-------|--------------------|
| Package | | | | | | | | | | | | | |  | | |
| Size (mm) | | | | | | | | | | | | | | 2.0 x 2.0 x 0.65 | | |
| P _{tot} (mW) | | | | | | | | | | | | | | 1250 | | |
| Configuration | V _{DS} (V) | V _{GS} (V) | I _D (A) | V _{GS(th) min} (V) | V _{GS(th) max} (V) | t _{on typ} (ns) | t _{off typ} (ns) | Q _{G typ} (nC) | ESD protection (kV) | I _F (A) | V _R (V) | V _{F typ.} (mA) | R _{DSon typ} (mΩ) @ V _{GS} = | | | |
| | | | | | | | | | | | | | 4.5 V | 2.5 V | 1.8 V | |
| single + schottky | 20 | 8 | 3.3 | 0.5 | 1.5 | 15 | 92 | 4.5 | 1 | 2 | 30 | 455 | 58 | 72 | 100 | PMFPB6545UP |
| | | | 3.3 | 0.5 | 1.5 | 15 | 92 | 4.5 | 1 | 2.2 | 30 | 325 | 58 | 72 | 100 | PMFPB6532UP |

Small-signal MOSFETs dual (P-channel)

types in **bold** represent new products


| | | | | | | | | | | SOT363 (SC-88) | SOT666 (SC-88) | SOT1118 | | | |
|-----------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|---------------------|--|---|---|---|-----------|-----------|------------------|
| Package | | | | | | | | | |  |  |  | | | |
| Size (mm) | | | | | | | | | | 2.0 x 1.25 x 0.95 | 1.6 x 1.2 x 0.55 | 2.0 x 2.0 x 0.65 | | | |
| P _{tot} (mW) | | | | | | | | | | 300 | 300 | 1250 | | | |
| V _{DS} (V) | V _{GS} (V) | I _D (A) | V _{GS(th) min} (V) | V _{GS(th) max} (V) | t _{on typ} (ns) | t _{off typ} (ns) | Q _{G typ} (nC) | ESD protection (kV) | R _{DSon typ} (mΩ) @ V _{GS} = | | | | | | |
| | | | | | | | | | | 10 V | 4.5 V | 2.5 V | 1.8 V | | |
| 20 | 8 | 3.3 | 0.5 | 1.5 | 15 | 92 | 4.5 | 1 | - | 58 | 72 | 100 | | | PMDPB65UP |
| 50 | 20 | 0.2 | tbd | tbd | tbd | tbd | tbd | 1 | 5300 | 6000 | - | - | BSS84AKS* | BSS84AKV* | |

* Products to be released in 2011. For new product information, please check <http://standardproducts.nxp.com/mosfets>

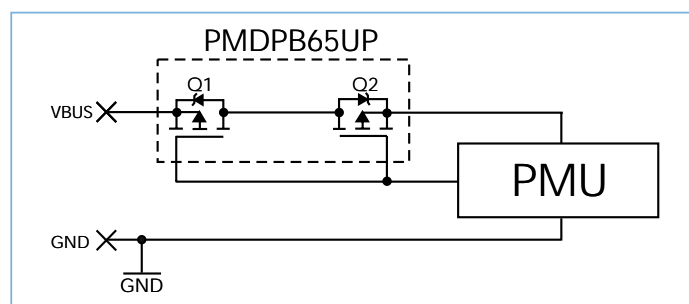
In the Spotlight

Dual P-channel ESD protected MOSFET in small 0.65 mm flat, 2 x 2 mm leadless package (PMDPB65UP)

- ESD protected MOSFET of >1 kV HBM
- Very low R_{DSon} of <70 mΩ at V_{GS} = 4.5 V
- 1.8 V R_{DSon} rating for operation at low voltage gate drive levels
- Best-in-class thermal performance due to extra heatsink
- Smallest 2 x 2 mm leadless package dual P-channel; 0.65 mm package height



USB OTG Vbus protection



12 V - 25 V N-channel MOSFETs

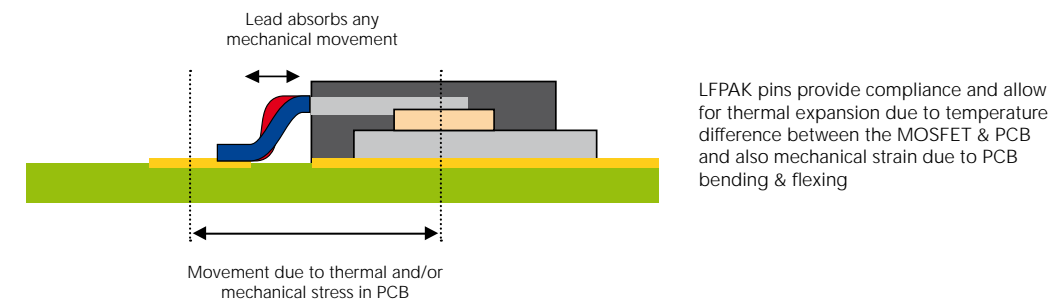
types in **bold** represent new products

| Package | Typenumber | V _{DS} [max] (V) | R _{DSon} [max] @ V _{GS} = 10 V (mΩ) | R _{DSon} [max] @ V _{GS} = 4.5 V (mΩ) | I _D [max] (A) | Q _{g(tot)} [typ] (nC) |
|-----------------------------|--------------|---------------------------|---|--|--------------------------|--------------------------------|
| D ² PAK (SOT404) | PHB66NQ03LT | 25 | 10.5 | - | 66 | 12 |
| DPAK (SOT428) | PHD38N02LT | 20 | - | - | 44.7 | 15.1 |
| | PHD97NQ03LT | 25 | 6.3 | 10.6 | 75 | 11.7 |
| IPAK (SOT533) | PHU97NQ03LT | 25 | 6.6 | - | 75 | - |
| | PH2520U | 20 | - | 2.7 | 100 | 78 |
| Power-SO8 (LFPAK) | PH3120L | 20 | 2.65 | 3.7 | 100 | 48.5 |
| | PH2925U | 25 | - | 3 | 100 | 92 |
| | PSMN1R2-25YL | 25 | 1.2 | 1.85 | 100 | 50.6 |
| | PSMN1R5-25YL | 25 | 1.5 | 2.2 | 100 | 36 |
| SO8 (SOT96-1) | PHKD6N02LT | 20 | - | - | 10.9 | 15.3 |
| | PSMN006-20K | 20 | - | 5 | 32 | 32 |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

LFPAK for mechanical & thermal ruggedness

NXP LFPAK



30V N-channel MOSFETs

types in **bold** represent new products

| Package | Typenumber | V _{DS} [max] (V) | R _{DSon} [max] @ V _{GS} = 10 V (mΩ) | R _{DSon} [max] @ V _{GS} = 4.5 V (mΩ) | I _D [max] (A) | Q _{g(tot)} [typ] (nC) |
|--------------------|---------------|---------------------------|---|--|--------------------------|--------------------------------|
| DPAK (SOT428) | PHD71NQ03LT | 30 | 10 | - | 75 | 13.2 |
| | PHD36N03LT | 30 | 17 | 22 | 43.4 | 18.5 |
| Power-SO8 (LFPACK) | PSMN1R0-30YLC | 30 | 1.15 | 1.4 | 100 | 50 |
| | PSMN1R3-30YL | 30 | 1.3 | 1.95 | 100 | 46.6 |
| | PSMN1R5-30YL | 30 | 1.5 | 1.9 | 100 | 36.2 |
| | PSMN1R7-30YL | 30 | 1.7 | 2.1 | 100 | 36.2 |
| | PSMN2R0-30YL | 30 | 2 | 2.63 | 100 | 30 |
| | PSMN2R5-30YL | 30 | 2.4 | 3.16 | 100 | 27 |
| | PSMN3R0-30YL | 30 | 3 | 4.04 | 100 | 21 |
| | PSMN3R5-30YL | 30 | 3.5 | 4.61 | 100 | 19 |
| | PSMN4R0-30YL | 30 | 4 | 5.25 | 100 | 17.6 |
| | PSMN4R5-30YLC | 30 | 4.8 | 6.1 | 84 | 9.6 |
| | PSMN5R0-30YL | 30 | 5 | 6.7 | 91 | 14.1 |
| | PSMN6R0-30YL | 30 | 6 | 7.87 | 79 | 11 |
| | PSMN7R0-30YL | 30 | 7 | 9.1 | 76 | 10 |
| PSMN9R0-30YL | 30 | 8 | 11.03 | 61 | 8.7 | |
| QFN3333 (SOT873-1) | PSMN3R5-30LL | 30 | 3.6 | 5.6 | 40 | 18 |
| | PSMN3R8-30LL | 30 | 3.7 | 5.8 | 40 | 38 |
| | PSMN5R8-30LL | 30 | 5.8 | 8 | 40 | 24 |
| | PSMN9R0-30LL | 30 | 9 | 13 | 21 | 20.6 |
| | PSMN013-30LL | 30 | 13 | 19 | 21 | 12.2 |
| SO8 (SOT96-1) | PHK12NQ03LT | 30 | - | 14 | 11.8 | - |
| | PSMN3R2-30KL | 30 | 3.5 | 3.8 | 30 | 70.3 |
| | PHK31NQ03LT | 30 | 4.4 | - | 30.4 | - |
| | PSMN005-30K | 30 | 5.5 | 8 | - | 34 |
| | PHK28NQ03LT | 30 | 6.5 | 7.7 | 23.7 | 30.3 |
| | PHK18NQ03LT | 30 | 8.9 | - | 20.3 | - |
| | SI4410DY | 30 | 13.5 | 20 | 10 | 21.5 |
| | PHK13N03LT | 30 | 20 | 26 | 13.8 | 10.7 |
| | PHKD13N03LT | 30 | 20 | 26 | 10.4 | 10.7 |
| | PHN203 | 30 | 30 | 55 | 6.3 | 14.6 |
| TO-220AB (SOT78) | PHN210T | 30 | 100 | 200 | 3.4 | - |
| | PSMN1R6-30PL | 30 | 1.7 | 2.1 | 100 | 101 |
| | PSMN1R8-30PL | 30 | 1.8 | 2.3 | 100 | 83 |
| | PSMN2R0-30PL | 30 | 2.1 | 2.8 | 100 | 55 |
| | PSMN2R7-30PL | 30 | 2.7 | 3.6 | 100 | 32 |
| | PSMN3R4-30PL | 30 | 3.4 | 4.1 | 100 | 31 |
| | PSMN4R3-30PL | 30 | 4.3 | 6.2 | 100 | 19 |
| PHP36N03LT | 30 | 17 | 22 | 43.4 | 18.5 | |
| PSMN022-30PL | 30 | 22 | 34 | 30 | 4.4 | |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

40V - 55V N-channel MOSFETs

types in **bold** represent new products

| Package | Typenumber | V _{DS} [max] (V) | R _{DSon} [max] @ V _{GS} = 10 V (mΩ) | R _{DSon} [max] @ V _{GS} = 4.5 V (mΩ) | I _D [max] (A) | Q _{g(tot)} [typ] (nC) |
|-----------------------------|--------------|---------------------------|---|--|--------------------------|--------------------------------|
| D ² PAK (SOT404) | PHB191NQ06LT | 55 | 3.7 | 4.4 | 75 | 95.6 |
| | PHB21N06LT | 55 | 70 | - | 19 | - |
| | PHB20N06T | 55 | 75 | - | 20.3 | 11 |
| DPAK (SOT428) | PHD20N06T | 55 | 77 | - | 18 | 11 |
| Power-SO8 (LFPACK) | PSMN2R6-40YS | 40 | 2.8 | - | 100 | 63 |
| | PSMN3R3-40YS | 40 | 3.3 | - | 100 | 49 |
| | PSMN4R0-40YS | 40 | 4.2 | - | 100 | 38 |
| | PSMN5R8-40YS | 40 | 5.7 | - | 90 | 28.8 |
| | PSMN8R3-40YS | 40 | 8.6 | - | 70 | 20 |
| | PSMN014-40YS | 40 | 14 | - | 46 | 12 |
| QFN3333 (SOT873-1) | PSMN7R0-40LS | 40 | 7 | - | 40 | 21.4 |
| TO-220AB (SOT78) | PSMN2R2-40PS | 40 | 2.1 | - | 100 | 110 |
| | PSMN2R8-40PS | 40 | 2.8 | - | 100 | 71 |
| | PSMN4R5-40PS | 40 | 4.6 | - | 100 | 35 |
| | PSMN8R0-40PS | 40 | 7.6 | - | 77 | 17 |
| | PHP191NQ06LT | 55 | 3.7 | 4.4 | 75 | 95.6 |
| | PHP20N06T | 55 | 75 | - | 20.3 | 11 |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

Part numbering for PSMN types

| P | S | M | N | 1 | R | 7 | - | 3 | 0 | Y | S |
|-------------------|---|----------------------------|---|--|---|---|---|----------------------------------|---|-------------------------------|------------------------|
| MOSFET Brand name | | MOSFET type N -ch or P -ch | | MOSFET on - resistance R _{DSon} | | | - | MOSFET voltage BV _{DSS} | | Package type | Gate threshold voltage |
| Power Silicon Max | | N = N -ch | | R95 = 0.95 m | | | - | 25 = 25 V | | B = D ² PAK SOT404 | X = Extremely low |
| | | P = P -ch | | 1R7 = 1.7 m | | | - | 30 = 30 V | | D = DPAK SOT428 | L = logic level |
| | | X = Dual N -ch | | 014 = 14 m | | | - | 40 = 40 V | | E = I ² PAK SOT226 | S = standard level |
| | | X = Dual P -ch | | 125 = 125 m | | | - | 60 = 60 V | | K = SO8 SOT96 | |
| | | Z = N -ch + P -ch | | | | | - | 80 = 80 V | | L = QFN3333 SOT873 | |
| | | | | | | | - | 100 = 100 V | | P = TO220 SOT78 | |
| | | | | | | | - | 110 = 110 V | | Y = LFPACK SOT669 & SOT1023 | |

60V - 80V N-channel MOSFETs

types in **bold** represent new products

| Package | Typenumber | V _{DS} [max] (V) | R _{DS(on)} [max] @ V _{GS} = 10 V (mΩ) | I _D [max] (A) | C _{g(tot)} [typ] (nC) |
|-----------------------------|--------------|---------------------------|---|--------------------------|--------------------------------|
| D ² PAK (SOT404) | PSMN004-60B | 60 | 3.6 | 75 | 168 |
| | PHB32N06LT | 60 | 37 | 34 | 17 |
| | PHB29N08T | 75 | - | 27 | 19 |
| | PSMN005-75B | 75 | 5 | 75 | 165 |
| | PSMN008-75B | 75 | 8.5 | 75 | 122.8 |
| | PHB110NQ08T | 75 | 9 | 75 | 113.1 |
| Power-SO8 (LFAK) | PSMN5R5-60YS | 60 | 5.2 | 100 | 56 |
| | PSMN7R0-60YS | 60 | 6.4 | 89 | 45 |
| | PSMN8R5-60YS | 60 | 8 | 76 | 39 |
| | PSMN012-60YS | 60 | 11.1 | 59 | 28.4 |
| | PSMN017-60YS | 60 | 15.7 | 44 | 20 |
| | PSMN030-60YS | 60 | 24.7 | 29 | 13 |
| | PSMN8R2-80YS | 80 | 8.5 | 82 | 55 |
| | PSMN011-80YS | 80 | 11 | 67 | 45 |
| | PSMN013-80YS | 80 | 12.9 | 60 | 37 |
| | PSMN018-80YS | 80 | 18 | 45 | 26 |
| QFN3333 (SOT873-1) | PSMN014-60LS | 60 | 14 | 40 | 19.6 |
| | PSMN023-80LS | 80 | 23 | 34 | 21 |
| TO-220AB (SOT78) | PSMN3R0-60PS | 60 | 3 | 100 | 130 |
| | PSMN4R6-60PS | 60 | 4.6 | 100 | 70.8 |
| | PSMN7R6-60PS | 60 | 7.8 | 92 | 38.7 |
| | PSMN015-60PS | 60 | 14.8 | 50 | 20.9 |
| | PHP29N08T | 75 | - | 27 | 19 |
| | PSMN008-75P | 75 | 8.5 | 75 | 122.8 |
| | PHP79NQ08LT | 75 | 16 | 73 | 30 |
| | PSMN4R4-80PS | 80 | 4.1 | 100 | 112 |
| | PSMN5R0-80PS | 80 | 4.7 | 100 | 87 |
| | PSMN6R5-80PS | 80 | 6.9 | 100 | 71 |
| | PSMN8R7-80PS | 80 | 8.7 | 90 | 52 |
| | PSMN012-80PS | 80 | 11 | 74 | 36 |
| | PSMN017-80PS | 80 | 17 | 50 | 26 |
| | PSMN050-80PS | 80 | 46 | 22 | 9 |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

100V - 110V N-channel MOSFETs

types in **bold** represent new products

| Package | Typenumber | V _{DS} [max] (V) | R _{DS(on)} [max] @ V _{GS} = 10 V (mΩ) | I _D [max] (A) | C _{g(tot)} [typ] (nC) |
|-----------------------------|---------------|---------------------------|---|--------------------------|--------------------------------|
| D ² PAK (SOT404) | PSMN009-100B | 100 | 8.8 | 75 | 156 |
| | PSMN015-100B | 100 | 15 | 75 | 90 |
| | PHB45NQ10T | 100 | 25 | 47 | 61 |
| | PHB47NQ10T | 100 | 28 | 47 | 66 |
| | PHB27NQ10T | 100 | 50 | 28 | - |
| | PHB18NQ10T | 100 | 90 | 18 | - |
| DPAK (SOT428) | PSMN025-100D | 100 | 25 | 47 | 61 |
| I ² PAK (SOT226) | PSMN7R0-100ES | 100 | 6.8 | 100 | 125 |
| | PSMN013-100ES | 100 | 13.9 | 68 | 59 |
| Power-SO8 (LFAK) | PSMN012-100YS | 100 | 12 | 60 | 64 |
| | PSMN016-100YS | 100 | 16.3 | 51 | 54 |
| | PSMN020-100YS | 100 | 20.5 | 43 | 41 |
| | PSMN028-100YS | 100 | 27.5 | 42 | 33 |
| | PSMN039-100YS | 100 | 39.5 | 28.1 | 23 |
| | PSMN069-100YS | 100 | 72.4 | 17 | 14 |
| QFN3333 (SOT873-1) | PSMN035-100LS | 100 | 32 | 27 | 23 |
| SO8 (SOT96-1) | PHK12NQ10T | 100 | 28 | 11.6 | 35 |
| | PSMN038-100K | 100 | 38 | - | 43 |
| | PHKD3NQ10T | 100 | 90 | 3 | - |
| TO-220AB (SOT78) | PSMN5R6-100PS | 100 | 5.6 | 100 | 141 |
| | PSMN7R0-100PS | 100 | 6.8 | 100 | 125 |
| | PSMN009-100P | 100 | 8.8 | 75 | 156 |
| | PSMN9R5-100PS | 100 | 9.6 | 89 | 82 |
| | PSMN013-100PS | 100 | 13.9 | 68 | 59 |
| | PSMN015-100P | 100 | 15 | 75 | 90 |
| | PSMN015-110P | 110 | 15 | 75 | 90 |
| | PSMN016-100PS | 100 | 16 | 96 | 49 |
| | PHP45NQ10T | 100 | 25 | 47 | 61 |
| | PHP45NQ11T | 105 | 25 | 47 | 60 |
| | PSMN027-100PS | 100 | 26.8 | 37 | 30 |
| | PSMN034-100PS | 100 | 34.5 | 32 | 23.8 |
| | PHP27NQ11T | 110 | 50 | 27.6 | 30 |
| | PHP23NQ11T | 110 | 70 | 23 | 22 |
| | PHP18NQ10T | 100 | 90 | 18 | - |
| | PHP18NQ11T | 110 | 90 | 18 | 21 |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

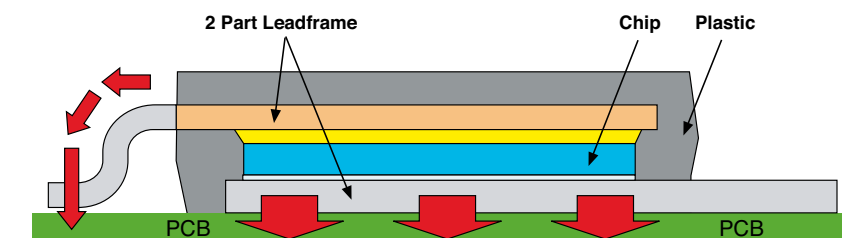
150V - 300V N-channel MOSFETs

| Package | Typenumber | V _{DS} [max] (V) | R _{DSon} [max] @ V _{GS} = 10 V (m Ω) | I _D [max] (A) | Q _{g(tot)} [typ] (nC) |
|-----------------------------|--------------|---------------------------|--|--------------------------|--------------------------------|
| D ² PAK (SOT404) | PSMN030-150B | 150 | 30 | 55.5 | - |
| | PSMN035-150B | 150 | 35 | 50 | 79 |
| | PHB45NQ15T | 150 | 42 | 45.1 | 32 |
| | PSMN057-200B | 200 | 57 | 39 | - |
| | PSMN070-200B | 200 | 70 | 35 | - |
| | PHB33NQ20T | 200 | 77 | 32.7 | 32.2 |
| | PHB20NQ20T | 200 | 130 | 20 | - |
| DPAK (SOT428) | PSMN063-150D | 150 | 63 | 29 | 55 |
| | PSMN130-200D | 200 | 130 | 20 | - |
| | PHD9NQ20T | 200 | 400 | 8.7 | - |
| Power-SO8 (LFAK) | PSMN059-150Y | 150 | 59 | 43 | - |
| | PSMN102-200Y | 200 | 102 | 21.5 | - |
| QFN3333 (SOT873-1) | PML260SN | 200 | 294 | 8.8 | 13.3 |
| | PML340SN | 220 | 386 | 7.3 | 13.2 |
| SO8 (SOT96-1) | PHK5NQ15T | 150 | 75 | 5 | 29 |
| | PSMN085-150K | 150 | 85 | - | 40 |
| | PSMN165-200K | 200 | 165 | - | 40 |
| TO-220AB (SOT78) | PSMN030-150P | 150 | 30 | 55.5 | - |
| | PSMN035-150P | 150 | 35 | 50 | 79 |
| | PHP30NQ15T | 150 | 63 | 29 | 55 |
| | PHP28NQ15T | 150 | 65 | 28.5 | 24 |
| | PSMN057-200P | 200 | 57 | 39 | - |
| | PSMN070-200P | 200 | 70 | 35 | - |
| | PHP33NQ20T | 200 | 77 | 32.7 | 32.2 |
| | PHP20NQ20T | 200 | 130 | 20 | - |
| | PHP9NQ20T | 200 | 400 | 8.7 | - |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

Power-SO8 (LFAK) Design

- ▶ Low Thermal resistance
- ▶ Low Electrical resistance
- ▶ Low Inductance



P-channel MOSFETs

| Package | Typenumber | V _{DS} [max] (V) | R _{DSon} [max] @ V _{GS} = 10 V (m Ω) | R _{DSon} [max] @ V _{GS} = 4.5 V (m Ω) | I _D [max] (A) | Q _{g(tot)} [typ] (nC) |
|---------------|------------|---------------------------|--|---|--------------------------|--------------------------------|
| SO8 (SOT96-1) | PHK04P02T | -16 | - | 120 | -4.66 | - |
| | PMK50XP | -20 | - | 50 | -7.9 | 10 |
| | PMK30EP | -30 | 19 | 30 | -14.9 | 50 |
| | PMK35EP | -30 | 19 | 35 | -14.9 | 42 |
| | PHP225 | -30 | 250 | - | - | - |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

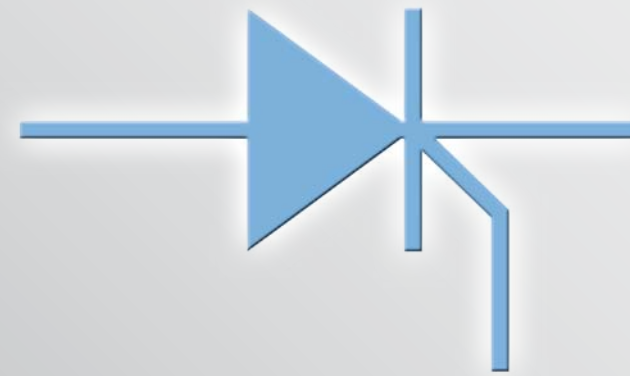
Multi-chip MOSFETs

| Package | Typenumber | V _{DS} [max] (V) | R _{DSon} [max] @ V _{GS} = 10 V (m Ω) | R _{DSon} [max] @ V _{GS} = 4.5 V (m Ω) | I _D [max] (A) | Q _{g(tot)} [typ] (nC) |
|---------------|-------------|---------------------------|--|---|--------------------------|--------------------------------|
| SO8 (SOT96-1) | PHKD6N02LT | 20 | - | 20 @ 5 V | 10.9 | dual N-channel |
| | PHKD13N03LT | 30 | 20 | 26 | 10.4 | dual N-channel |
| | PHN203 | 30 | 30 | - | 6.3 | dual N-channel |
| | PHC21025 | 30, -30 | 100, 250 | - | 3.5, -2.3 @ 80 °C | complementary pair |
| | PHP225 | -30 | 250 | - | -2.3 @ 80 °C | dual P-channel |
| | PHKD3NQ10T | 100 | 90 | - | 3 | dual N-channel |

For the most up to date product information, please visit <http://standardproducts.nxp.com/mosfets>

Part numbering for PH types

| P | H | P | 4 | 4 | N | Q | 0 | 3 | L | T |
|-------------------|--------------------------------|-----------------------------------|--------------------------|-------------------------------------|---------------------------------|--------------------------|------------|---|---|---|
| MOSFET Brand name | Package type | Current rating I _D (A) | MOSFET type N-ch or P-ch | Q-Trench | MOSFET voltage V _{DSS} | Gate threshold voltage | Trench MOS | | | |
| PH | B = D ² PAK | 44 = 44 A | N = N-ch | Q = low gate charge Q _{GD} | 02 = 20 V | 'Blank' = Standard level | T = Trench | | | |
| PH | D = DPAK | 33 = 33 A | P = P-ch | | 03 = 25 - 30 V | L = logic level | | | | |
| PH | P = TO220AB | 20 = 20 A | | | 06 = 55 - 60 V | | | | | |
| PH | T = SOT223 | 12 = 12 A | | | 08 = 75 - 80 V | | | | | |
| PH | X = SOT186A (isolated TO220AB) | | | | 10 = 100 V | | | | | |
| PH | K = SO8 | | | | 11 = 110 V | | | | | |
| PH | KD = Dual SO8 | | | | 15 = 150 V | | | | | |











Thyristors

| | |
|-------------------------------|----|
| 4-Quadrant Triacs | 86 |
| 3-Quadrant Triacs | 88 |
| AC Thyristors | 89 |
| Silicon Controlled Rectifiers | 89 |




4-Quadrant Triacs

types in **bold** represent new products

| $I_{T(RMS)}$ (A) | V_{DRM} (V) | I_{GT} (max) (mA) | SOT54 (TO92) | SOT78 (TO220AB) | SOT78D (internally insulated TO220AB) | SOT82 | SOT186A (isolated TO220AB) | SOT223 | SOT404 (D ² PAK) | SOT428 (DPAK) |
|------------------|---------------|---------------------|---|---|---|---|---|--|---|---|
| | | |  |  |  |  |  |  |  |  |
| 0.6 | 400 | 5/5/5/7 | MAC97A6 | | | | | | | |
| | 600 | 5/5/5/7 | MAC97A8 | | | | | | | |
| | 400 / 600 | 5/5/5/7 | BT1306-D | | | | | | | |
| 0.8 | 400 / 600 | 5/5/5/7 | BT1308-D | | | | | BT1308W-D | | |
| | 600 | 5/5/5/7 | Z00607MA | | | | | | | |
| 1 | 600 | 3/3/3/7 | | | | | | BT131W | | |
| | 600 / 800 | 3/3/3/7 | BT131 | | | | | | | |
| | 600 / 800 | 5/5/5/7 | BT131-D | | | | | | | |
| | 600 / 800 | 10/10/10/10 | BT131-E | | | | | | | |
| | 600 / 800 | 3/3/3/5 | Z0103MA/NA | | | | | Z0103MN/NN | | |
| | 600 / 800 | 5/5/5/7 | Z0107MA/NA | | | | | Z0107MN/NN | | |
| | 600 / 800 | 10/10/10/10 | Z0109MA/NA | | | | | Z0109MN/NN | | |
| | 600 / 800 | 3/3/3/5 | Z0103MA0/NA0** | | | | | Z0103MN0/NN0** | | |
| | 600 / 800 | 5/5/5/7 | Z0107MA0/NA0** | | | | | Z0107MN0/NN0** | | |
| | 600 / 800 | 10/10/10/10 | Z0109MA0/NA0** | | | | | Z0109MN0/NN0** | | |
| 4 | 600 | D/E/-/G | | | | | | | | |
| | 800 | E/- | | | | | | BT134 | | |
| | 600 | D/- | | BT136 | | | | BT136X | | BT136S |
| | 600 | F | | | | | | BT136X | | BT136S |
| | 600 / 800 | E | | BT136 | | | | BT136X | BT136B | BT136S |
| | 800 | F | | | | | | BT136X | | BT136S |
| | 800 | - | | | | | | BT136X | | BT136S |
| 6 | 600 | F/-/G | | | | | | BT236X | | |
| | 800 | -/G | | | | | | BT236X | | |
| 8 | 600 | D/-/G | | BT137 | | | | BT137X | | BT137S |
| | 600 | E | | BT137 | | | | BT137X | BT137B | BT137S |
| | 600 | F | | | | | | BT137X | BT137B | BT137S |
| | 800 | E | | BT137 | | | | BT137X | | BT137S |
| | 800 | F | | | | | | BT137X | BT137B | BT137S |
| | 800 | - | | BT137 | | | | BT137X | BT137B | BT137S |
| 12 | 600 | D | | BT138 | | | | BT138X | | |
| | 600 | -/G | | BT138 | | | | BT138X | | BT138B |
| | 600 | F | | | | | | BT138X | | BT138B |
| | 600 / 800 | E | | BT138 | BT138Y | | | BT138X | | BT138B |
| | 800 | F | | | | | | BT138X | | |
| | 800 | - | | BT138 | | | | BT138X | | |

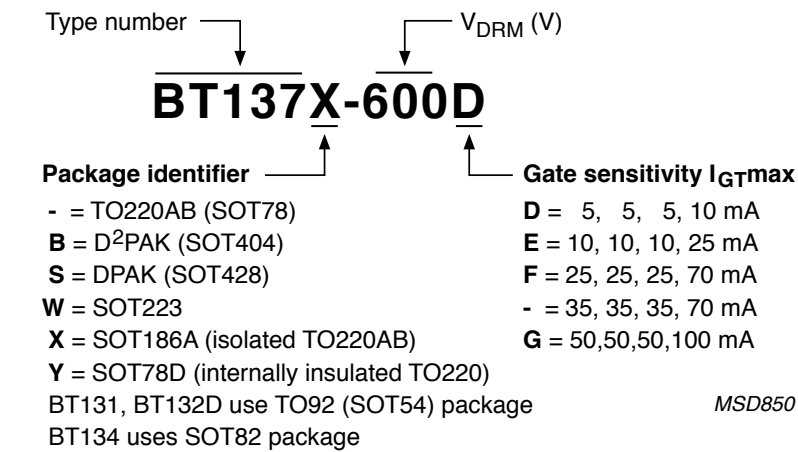
* Large chip / high I_{TSM}
 ** Enhanced immunity to false triggering

4-Quadrant Triacs

| $I_{T(RMS)}$ (A) | V_{DRM} (V) | I_{GT} (max) (mA) | SOT78 (TO220AB) | SOT186A (isolated TO220AB) | SOT404 (D ² PAK) |
|------------------|---------------|---------------------|---|---|---|
| | | |  |  |  |
| 16 | 600 | E/- | BT139 | BT139X | BT139B |
| | 600 | F | | BT139X | BT139B |
| | 600 | G | | BT139X | BT139B |
| | 800 | E | BT139 | | BT139B |
| | 800 | F | | | BT139B |
| | 800 | - | BT139 | BT139X | BT139B |
| 20 | 600 | 50/50/50/75 | | MAC223A8X | |
| | 600 / 800 | - | BTA140 | | |








* Large chip / high I_{TSM}
 ** Enhanced immunity to false triggering

4-Quadrant Triacs part numbering



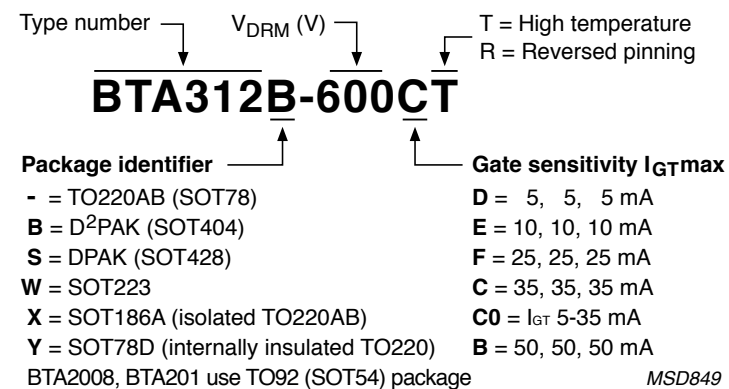
3-Quadrant Triacs

types in **bold** represent new products

| $I_{T(RMS)}$ (A) | V_{DRM} (V) | I_{GT} (max) (mA) | SOT54 (TO92) | SOT78 (TO220AB) | SOT78D (internally insulated TO220AB) | SOT186A (isolated TO220AB) | SOT223 | SOT404 (D ² PAK) | SOT428 (DPAK) |
|------------------|---------------|---------------------|---|---|---|---|---|---|---|
| | | |  |  |  |  |  |  |  |
| 0.8 | 600 / 800 | D/E | BTA2008 | | | | | | |
| 1 | 600 / 800 | B/E/ER | BTA201 | | | | | | |
| | 600 / 800 | E | | | | | BTA201W | | |
| 2 | 600 / 800 | D/E | | | | BTA202X | | | |
| 4 | 600 | B/C/D/E/F | | BTA204 | | BTA204X | | | BTA204S |
| | 800 | B/C/E | | BTA204 | | BTA204X | | | BTA204S |
| | 1000 | C | | | | BTA204X | | | BTA204S |
| 8 | 600 | B/D/E/F | | BTA208 | | BTA208X | | | BTA208S |
| | 800 | B/E | | BTA208 | | BTA208X | | | BTA208S |
| | 800 | F | | BTA208 | | BTA208X | | | BTA208S |
| | 1000 | B | | | | BTA208X | | | |
| | 1000 | C | | | | BTA208X | | BTA208B | |
| | 1000 | 5 min - 35 max | | | | BTA208X-1000C0 | | | |
| 12 | 600 | D | | BTA312 | | BTA312X | | BTA312B | |
| | 600 | CT | | BTA312 | | | | BTA312B | |
| | 600 / 800 | B/C/E | | BTA312 | | BTA312X | | BTA312B | |
| | 600 / 800 | C | | | BTA312Y | | | | |
| | 800 | ET | | BTA312 | | | | BTA312B | |
| 16 | 600 / 800 | B/C | | | BTA412Y | | | | |
| | 600 | BT/D | | BTA316 | | | | | |
| | 600 / 800 | B/C/E | | BTA316 | | BTA316X | | BTA316B | |
| | 600 / 800 | ET | | BTA316 | | | | | |
| 25 | 800 | 10 min - 50 max | | | | BTA316X-800B0 | | | |
| | 600 / 800 | B/C | | | BTA416Y | | | | |
| | 600 | BT | | BTA225 | | | | | |
| 600 / 800 | B | | BTA225 | | | | BTA225B | | |




* Large chip / high I_{TSM}
T: high T_{max} 150 °C

3-Quadrant Triacs part numbering

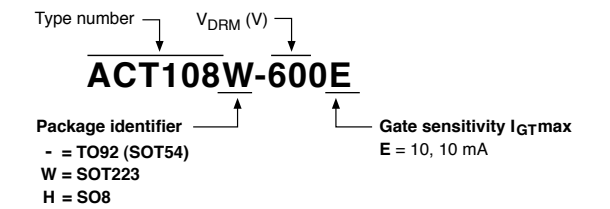


AC Thyristors

types in **bold** represent new products









| $I_{T(RMS)}$ (A) | V_{DRM} (V) | I_{GT} (max) (mA) | SOT54 (TO92) | SOT223 | SO8 |
|------------------|---------------|---------------------|---|---|---|
| | | |  |  |  |
| 0.2 | 600 | D | | | ACT102H |
| 0.8 | 600 | D | ACT108 | ACT108W | |
| | 600 | E | ACT108 | ACT108W | |

AC Thyristors part numbering



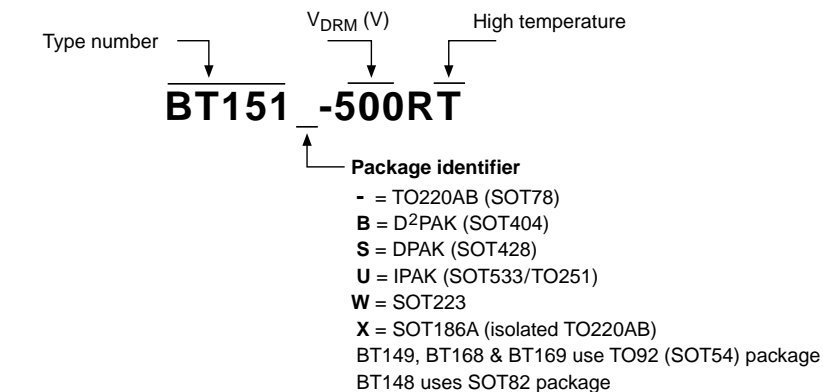
Silicon Controlled Rectifiers

types in **bold** represent new products

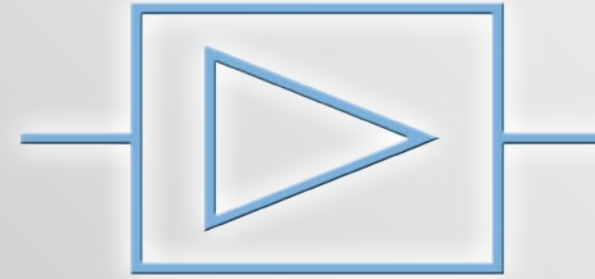
| $I_{T(RMS)}$ (A) | V_{DRM} & V_{RRM} (V) | I_{GT} (max) (mA) | SOT54 (TO92) | SOT78 (TO220AB) | SOT82 | SOT186A (isolated TO220AB) | SOT223 | SOT404 (D ² PAK) | SOT428 (DPAK) | SOT533 (IPAK) |
|------------------|---------------------------|---------------------|---|---|---|---|---|---|---|---|
| | | |  |  |  |  |  |  |  |  |
| 0.8 | 400 | 0.012 | EC103D1 | | | | | | | |
| | 400 (V_{DRM} only) | 0.2 | NXL0840 | | | | | | | |
| | 200 / 400 / 600 | 0.2 | BT149B/D/G | | | | | | | |
| | 200 / 400 / 600 | 0.2 | BT169B/D/G | | | | | | | |
| | 400 | 0.05 | BT169D-L | | | | | | | |
| | 800 | 0.1 | BT169H | | | | | | | |
| | 500 / 600 | 0.02 min - 0.2 max | BT168E/G | | | | | | | |
| | 200 | 0.2 | | | | | | MCR08BT1 | | |
| | 600 | 0.02 min - 0.2 max | | | | | | BT168GW | | |
| | 600 | 0.07 min - 0.45 max | | | | | | BT168GWF** | | |
| 4 | 400 / 500 / 600 | 0.2 | | | BT148-R | | | | | |
| | 600 | 0.2 | | | | | | | BT150S-R | |
| | 500 | 0.2 | | | BT150-R | | | | | |
| 8 | 800 | 0.05 | | | | | | | BT258S-LT | |
| | 500 / 600 / 800 | 0.2 | | | BT258-R | | BT258X-R | | | |
| | 600 | 0.2 | | | | | | | BT258U-R | |
| | 800 | 0.2 | | | | | | | BT258S-R | |
| 12 | 600 | 5 | | | | | | | BT300S-R | |
| | 500 / 650 | 5 | | | BT151-L | | | | BT151S-L | |
| | 500 / 650 / 800 | 15 | | | BT151-R | | BT151X-R | | BT151S-R | |
| | 650 | 15 | | | | | | | BTH151S-R | |
| | 500 / 650 / 800 | 15 | | | BT151-C | | BT151X-C | | | BT151U-C |
| 20 | 400 / 600 / 800 | 32 | | | BT152-R | | BT152X-R | | BT152B-R | |
| | 500 | 32 | | | BT152-RT | | | | | |
| | 800 | 35 | | | BT145-R | | | | | |

* Large chip / high I_{TSM} ** Hi-Com / fast turn-off T: high T_{max} 150 °C

SCRs part numbering



MSD848



Standard & advanced linear products

Adjustable shunt voltage regulator TL431 92

Adjustable shunt voltage regulator TLVH431 93


Discrete voltage regulator / Constant current source 94

Low-dropout regulator 95

Advanced linear ultra low-dropout voltage regulators 96

Adjustable shunt voltage regulator TL431

types in **bold** represent new products

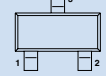
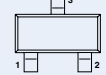
| Package | | | | SOT23 | |
|-----------------------|---------------------|--------------------------------|--------------------------|---|---------------------------------|
| | | | |  | |
| Size (mm) | | | | 2.9 x 1.3 x 1.0 | |
| P _{tot} (mW) | | | | 580 | |
| Pinning configuration | | | | Normal pinning* | Mirrored pinning* |
| V _{KA} (V) | I _k (mA) | V _{ref} | T _{amb} (°C) | | |
| 36 | 100 | 2% | 0 to 70 | TL431CDBZR ¹⁾ | |
| | | | -40 to 85 | TL431IDBZR ¹⁾ | |
| | | | -40 to 125 | TL431QDBZR ¹⁾ | |
| | | | | TL431FDT ²⁾ | TL431MFDT ²⁾ |
| | | | | TL431SDT ³⁾ | TL431MSDT ³⁾ |
| | | | 1% | 0 to 70 | TL431ACDBZR ¹⁾ |
| | | -40 to 85 | | TL431AIDBZR ¹⁾ | |
| | | -40 to 125 | | TL431AQDBZR ¹⁾ | |
| | | | | TL431AFDT ²⁾ | TL431AMFDT ²⁾ |
| | | | | TL431ASDT ³⁾ | TL431AMSDT ³⁾ |
| | | 0.5% | | 0 to 70 | TL431BCDBZR ¹⁾ |
| | | | -40 to 85 | TL431BIDBZR ¹⁾ | |
| | | | -40 to 125 | TL431BQDBZR ¹⁾ | |
| | | TL431BFDT ²⁾ | | TL431BMFDT ²⁾ | |
| | | TL431BSDT ³⁾ | TL431BMSDT ³⁾ | | |

¹⁾ Offers enhanced stability area and very low load capacity requirement

²⁾ Offers higher ElectroMagnetic Interference (EMI) ruggedness, e.g. for Switch Mode Power Supply


³⁾ Is designed for standard requirements and linear applications

* Normal pinning vs. mirrored pinning for TL431

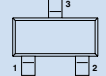
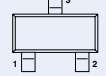
| | Pin | Symbol | Description | Simplified outline | Grafic symbol |
|------------------|-----|--------|-------------|--|-----------------|
| Normal pinning | 1 | k | cathode |  | REF a — >— k |
| | 2 | REF | reference | | |
| | 3 | a | anode | | |
| Mirrored pinning | 1 | REF | reference |  | REF a — >— k |
| | 2 | k | cathode | | |
| | 3 | a | anode | | |

Adjustable shunt voltage regulator TLVH431

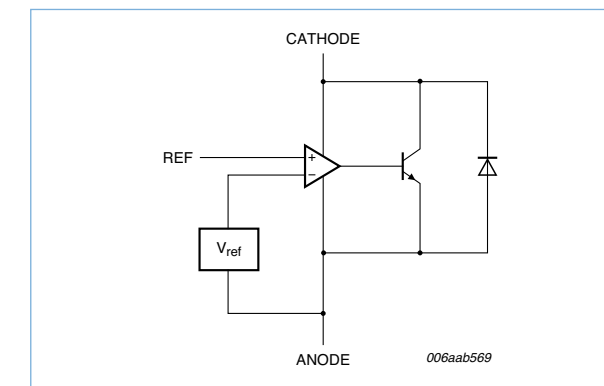
types in **bold** represent new products

| Package | | | | SOT23 | | |
|-----------------------|---------------------|------------------|-----------------------|---|-----------------------|-----------------------|
| | | | |  | | |
| Size (mm) | | | | 2.9 x 1.3 x 1.0 | | |
| P _{tot} (mW) | | | | 580 | | |
| Pinning configuration | | | | Normal pinning* | Mirrored pinning* | |
| V _{KA} (V) | I _k (mA) | V _{ref} | T _{amb} (°C) | | | |
| 20 | 80 | 1.5% | 0 to 70 | TLVH431CDBZR | | |
| | | | -40 to 85 | TLVH431IDBZR | | |
| | | | -40 to 125 | TLVH431QDBZR | TLVH431MQDBZR | |
| | | | 0 to 70 | TLVH431ACDBZR | | |
| | | | | -40 to 85 | TLVH431AIDBZR | |
| | | | | -40 to 125 | TLVH431AQDBZR | TLVH431AMQDBZR |
| | | 1% | 0 to 70 | TLVH431BCDBZR | | |
| | | | -40 to 85 | TLVH431BIDBZR | | |
| | | | -40 to 125 | TLVH431BQDBZR | TLVH431BMQDBZR | |

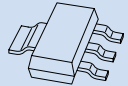
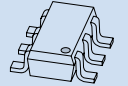
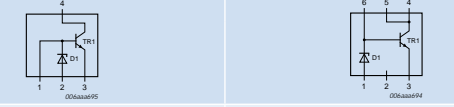
* Normal pinning vs. mirrored pinning for TLVH431

| | Pin | Symbol | Description | Simplified outline | Grafic symbol |
|------------------|-----|--------|-------------|---|-----------------|
| Normal pinning | 1 | REF | reference |  | REF a — >— k |
| | 2 | k | cathode | | |
| | 3 | a | anode | | |
| Mirrored pinning | 1 | k | cathode |  | REF a — >— k |
| | 2 | REF | reference | | |
| | 3 | a | anode | | |

Functional diagram



Discrete voltage regulator

| | | | | | SOT223 (SC-73) | SOT457 (SC-74) |
|-----------------------|---|----------------------|--------------------|---|--|---|
| Package | | | | |  |  |
| Size (mm) | | | | | 6.5 x 3.5 x 1.65 | 2.9 x 1.5 x 1.0 |
| P _{tot} (mW) | | | | | 1300 | 380 |
| Zener diode | | Transistor | | |  | |
| V _{out} (V) | V _z min - V _z max (V) @ I _z = 5 mA | V _{CEO} (V) | I _C (A) | h _{FE} min @ I _C = 100 mA | | |
| 2.5 | 3.23 - 3.37 | 45 | 0.1 | 160 | PVR100AZ-B2V5 | PVR100AD-B2V5 |
| 3.0 | 3.53 - 3.67 | 45 | 0.1 | 160 | PVR100AZ-B3V0 | PVR100AD-B3V0 |
| 3.3 | 3.82 - 3.98 | 45 | 0.1 | 160 | PVR100AZ-B3V3 | PVR100AD-B3V3 |
| 5.0 | 5.49 - 5.71 | 45 | 0.1 | 160 | PVR100AZ-B5V0 | PVR100AD-B5V0 |
| 12.3 | 12.7 - 13.3 | 45 | 0.1 | 160 | PVR100AZ-B12V | PVR100AD-B12V |

Key features

- ▶ A bipolar transistor and an integrated Zener diode, internally connected to build a voltage regulator
- ▶ Output voltage options V_{out}: 2.5 V, 3 V, 3.3 V, 5 V and 12 V

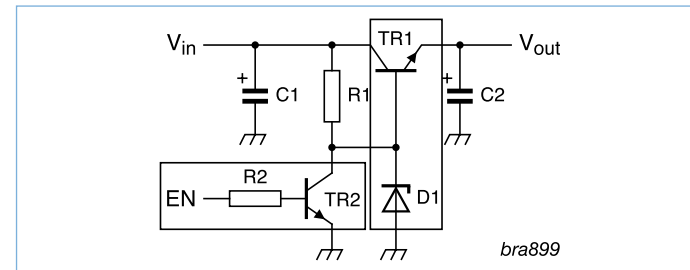
Key benefits

- ▶ Component count reduction
- ▶ Board space reduction
- ▶ Improved reliability


Key applications

- ▶ Linear voltage regulation

Discrete voltage regulator. PVR-series already include TR1 and D1, internally connected. A resistor-equipped transistor (RET) adds an output enable function.



Constant current source

| SOT353 (SC-88A) | | | | | | | |
|---|------------------------|---|--|-----------------------------------|-----------------------------------|--|--|
| Package  | | | | | | | |
| Size (mm) 2.0 x 1.25 x 0.95 | | | | | | | |
| P _{tot} (mW) 335 | | | | | | | |
| Type PSSI2021SAY | | | | | | | |
| Description | maximum supply voltage | maximum supply current | typical stabilized output current | minimum stabilized output current | maximum stabilized output current | typical load stability of stabilized output current | typical output current change over ambient temperature |
| Parameter | V _S max (V) | I _S max (mA) | I _{out} typ (μA) | I _{out} min (mA) | I _{out} max (mA) | I _{out} /I _{out} typ (%) | I _{out} / (I _{out} · T _{amb}) typ (μA/K) |
| Condition | | @ V _S = 12 V; I _{out} = 15 μA; V _{out} = 1 V to 10 V | @ V _S = 12 V; V _{out} = 1 V to 10 V; R _{ext} = open | | | @ V _S = 12 V; V _{out} = 1 V to 10 V | @ V _S = 12 V; V _{out} = 1 V; T _{amb} = -55 °C to 150 °C |
| Value | 75 | 2.2 | 15 | 0.015 | 50 | 0.5 | 0.15 |

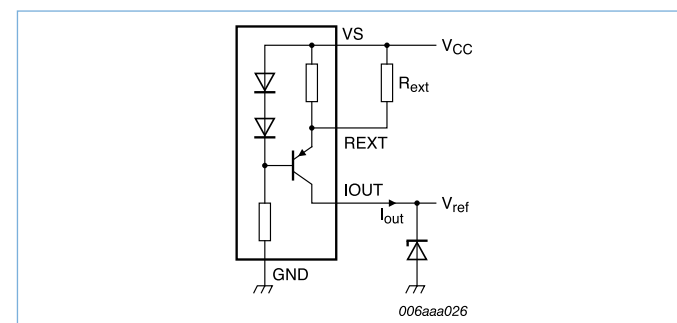
Key features and benefits

- ▶ Single-chip constant current source with reduced component count
- ▶ Output current set by an external resistor
- ▶ Very small footprint package for smaller designs

Key applications

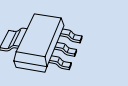
- ▶ Constant current LED driver
- ▶ Generic constant current source
- ▶ Active bias control for audio amplifiers

Voltage reference

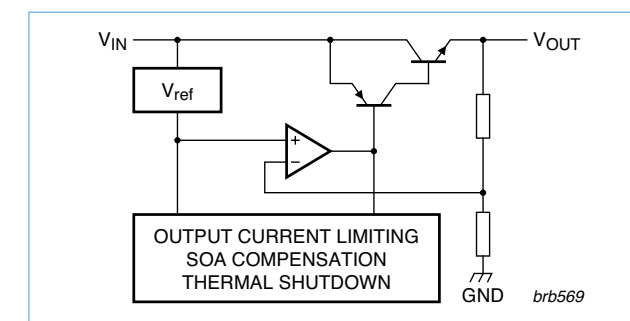


Low-dropout adjustable and fixed linear voltage regulator NX1117

types in bold represent new products

| | | | | | SOT223 (SC-73) |
|-----------------------|----------------------|------------------------------------|----------------------|----------------------------|---|
| Package | | | | |  |
| Size (mm) | | | | | 6.5 x 3.5 x 1.65 |
| P _{tot} (mW) | | | | | 1700 |
| V _{max} (V) | I _{max} (A) | V _{out} drop (V) @ 800 mA | V _{out} (V) | V _{out} tolerance | T _{amb} (°C) |
| 20 | 1 | 1.1 | 1.25 adj | 1% | -40 to 125 |
| | | | 1.2 | | NX1117CADJZ |
| | | | 1.5 | | NX1117C12Z |
| | | | 1.8 | | NX1117C15Z |
| | | | 1.9 | | NX1117C18Z |
| | | | 2.0 | | NX1117C19Z |
| | | | 2.5 | | NX1117C20Z |
| | | | 2.85 | | NX1117C25Z |
| | | | 3.3 | | NX1117C33Z |
| | | | 5.0 | | NX1117C50Z |
| 12.0 | NX1117C120Z | | | | |

Functional diagram: fixed output voltage version



Key applications

- ▶ Post regulator for switching DC/DC converter
- ▶ High efficiency linear regulators
- ▶ Battery charger
- ▶ Battery powered instrumentation
- ▶ Low voltage micro-controller
- ▶ PC motherboard
- ▶ LCD TV, set top box
- ▶ DVD player

In the Spotlight

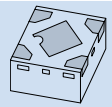
Low-dropout linear voltage regulator NX1117

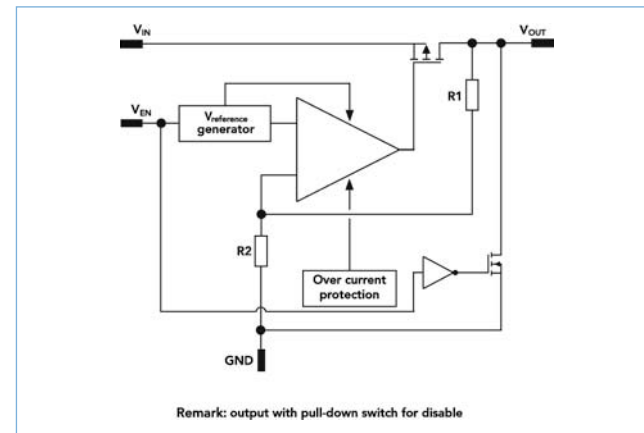
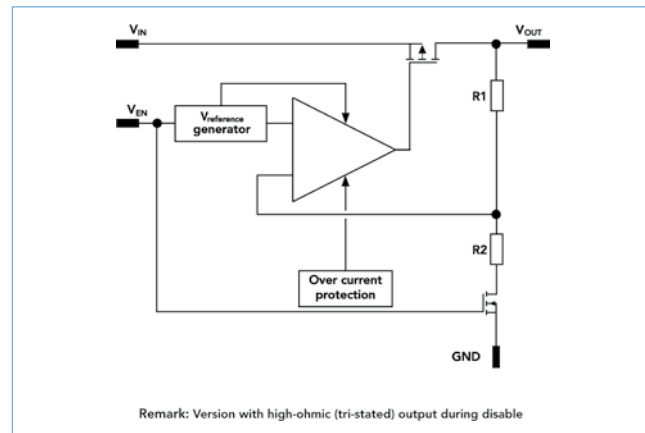
- Adjustable or fixed output voltage version in SOT223 package
- Output voltage accuracy of 1%
- Wide input voltage range up to 20 V
- Maximum output current of 1 A
- Output current limiting and thermal shutdown
- Temperature range -40 °C to 125 °C



LD6805 Ultra low-dropout voltage regulators – 150 mA

types in **bold** represent new products

| Package | | | | | | | SOT1194 | |
|-----------------------|---------------------------|------------------------|-------------------------------------|--------------------------|-----------------|--------------------|---|------------------------------------|
| | | | | | | |  | |
| Size (mm) | | | | | | | 1.0 x 1.0 x 0.55 | |
| P _{tot} @ °C | | | | | | | 400 | |
| V _{in} (V) | I _{out} typ (mA) | Quiescent current (µA) | V _{out} drop @ 150 mA (mV) | output noise µVrms (typ) | PSRR @ 1 kHz dB | Output voltage (V) | V _{OUT, nom} | |
| | | | | | | | LD6805K/vvH High ohmic output stage | LD6805K/vvP Pull down output stage |
| 2.3 - 5.5 | 150 | 35 | 250 | 50 | 75 | 1.2 | LD6805K/12H | LD6805K/12P |
| | | | | | | 1.4 | LD6805K/14H | LD6805K/14P |
| | | | | | | 1.6 | LD6805K/16H | LD6805K/16P |
| | | | | | | 1.7 | LD6805K/17H | LD6805K/17P |
| | | | | | | 1.8 | LD6805K/18H | LD6805K/18P |
| | | | | | | 2.2 | LD6805K/22H | LD6805K/22P |
| | | | | | | 2.3 | LD6805K/23H | LD6805K/23P |
| | | | | | | 2.5 | LD6805K/25H | LD6805K/25P |
| | | | | | | 2.8 | LD6805K/28H | LD6805K/28P |
| | | | | | | 2.9 | LD6805K/29H | LD6805K/29P |
| | | | | | | 3.0 | LD6805K/30H | LD6805K/30P |
| | | | | | | 3.3 | LD6805K/33H | LD6805K/33P |
| | | | | | | 3.6 | LD6805K/36H | LD6805K/36P |



Key features

- ▶ High power supply ripple rejection (PSRR)
- ▶ Ultra low-dropout voltage and low noise
- ▶ Very small package size

Key benefits

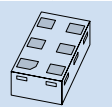

- ▶ No additional noise bypass capacitor needed
- ▶ Very low-dropout voltage for extended battery usage
- ▶ Lower power dissipation

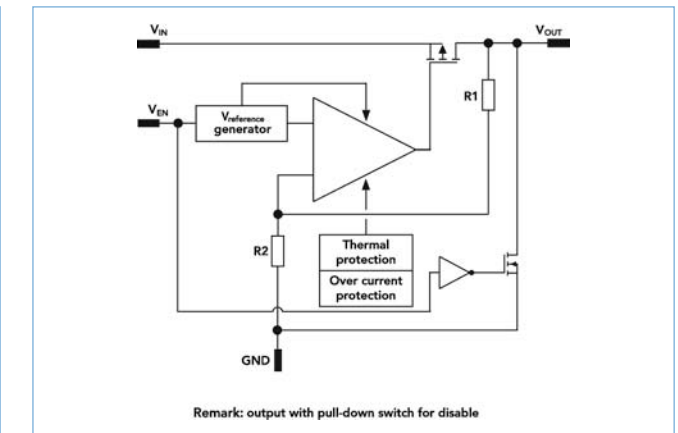
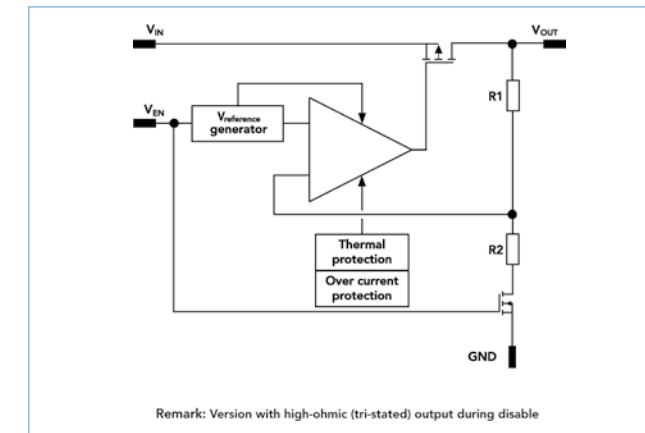
Key applications

- ▶ Mobile phone handsets, cordless telephones, personal digital devices (applications requiring component miniaturization)

LD6806 Ultra low-dropout voltage regulators – 200 mA

types in **bold** represent new products

| Package | | | | | | | SOT886 | | CSP 4 | |
|-----------------------|---------------------------|------------------------|-------------------------------------|--------------------------|-----------------|--------------------|---|-------------|---|---------------|
| | | | | | | |  | |  | |
| Size (mm) | | | | | | | 1.45 x 1.0 x 0.5 | | 0.76 x 0.76 x 0.47 | |
| P _{tot} @ °C | | | | | | | 450 | | 600 | |
| V _{in} (V) | I _{out} typ (mA) | Quiescent current (µA) | V _{out} drop @ 200 mA (mV) | output noise µVrms (typ) | PSRR @ 1 kHz dB | Output voltage (V) | LD6806F/vvH | LD6806F/vvP | LD6806CX4/vvH | LD6806CX4/vvP |
| 2.3 - 5.5 | 200 | 70 | 60 | 30 | 55 | 1.2 | LD6806F/12H | LD6806F/12P | LD6806CX4/12H | LD6806CX4/12P |
| | | | | | | 1.4 | LD6806F/14H | LD6806F/14P | LD6806CX4/14H | LD6806CX4/14P |
| | | | | | | 1.6 | LD6806F/16H | LD6806F/16P | LD6806CX4/16H | LD6806CX4/16P |
| | | | | | | 1.7 | LD6806F/17H | LD6806F/17P | LD6806CX4/17H | LD6806CX4/17P |
| | | | | | | 1.8 | LD6806F/18H | LD6806F/18P | LD6806CX4/18H | LD6806CX4/18P |
| | | | | | | 2.2 | LD6806F/22H | LD6806F/22P | LD6806CX4/22H | LD6806CX4/22P |
| | | | | | | 2.3 | LD6806F/23H | LD6806F/23P | LD6806CX4/23H | LD6806CX4/23P |
| | | | | | | 2.5 | LD6806F/25H | LD6806F/25P | LD6806CX4/25H | LD6806CX4/25P |
| | | | | | | 2.8 | LD6806F/28H | LD6806F/28P | LD6806CX4/28H | LD6806CX4/28P |
| | | | | | | 2.9 | LD6806F/29H | LD6806F/29P | LD6806CX4/29H | LD6806CX4/29P |
| | | | | | | 3.0 | LD6806F/30H | LD6806F/30P | LD6806CX4/30H | LD6806CX4/30P |
| | | | | | | 3.3 | LD6806F/33H | LD6806F/33P | LD6806CX4/33H | LD6806CX4/33P |
| | | | | | | 3.6 | LD6806F/36H | LD6806F/36P | LD6806CX4/36H | LD6806CX4/36P |



Key benefits

- ▶ Ultra low-dropout voltage (60mV@200mA) for extended battery usage
- ▶ No additional noise bypass capacitor needed
- ▶ Smallest CSP package
- ▶ Lower power dissipation

Key applications

- ▶ Mobile phone handsets, cordless telephones, personal digital devices (applications requiring component miniaturization)

In the Spotlight

Ultra low-dropout voltage regulators – LD680x

Typical output current 150 mA (LD6805) and 200 mA LDOs (LD6806)

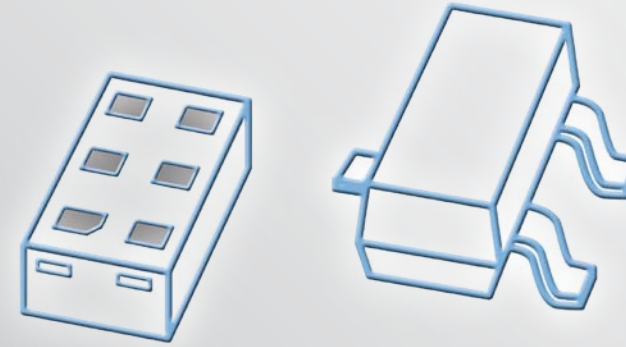
Ultra low-dropout voltage → 60 mV @ 200 mA (LD6806)

Ultra high power supply ripple rejection (PSRR): 75 dB (LD6805)

Low noise → 30 µVrms for LD6806 and 50µVrms for LD6805

Smallest packages (WLCSP and Plastic SMD)

































Packages

Package cross reference 100

Packing methods 102

Minimized outline drawings and reflow soldering footprint 108

Package cross reference

| Pins / leads | NXP | Industry standard names | Size (l x w x h) (mm) | P _{tot} (mW) | Package | Competitor synonyms | | | | | | | | |
|--------------|---------|-------------------------|-----------------------|---|---|---------------------|----------|------------|--------------|-----------|-------------|-----------------|---------------|---------|
| | | | | | | Rohm | Toshiba | ON Semi | Renesas | In neon | Diodes Inc | KEC | Vishay | Semtech |
| 2 | SOD27 | DO-35 | 4.25 x 1.85 x 0.56 | 500 |  | GSD | | | DO-35 | | DO-35 | | DO-204AH | |
| | SOD66 | DO-41 | 4.8 x 2.6 x 0.81 | 1300 |  | GSR | DO-41 | | | | DO-41 | | DO-204AL | |
| | SOD68 | DO-34 | 3.04 x 1.6 x 0.55 | 500 |  | MSD | | | | | | | | |
| | SOD80C | MiniMelf | 3.5 x 1.5 x 1.5 | 300 |  | LLDS | | | LLD | | MiniMELF | | MiniMELF | |
| | SOD123F | - | 2.6 x 1.6 x 1.1 | 830 |  | PMDU | S-Flat | SOD-123-FL | | | PowerDI123 | SMF | | |
| | SOD123W | - | 2.6 x 1.7 x 1.0 | 900 |  | | S-Flat | SOD-123-FL | | | PowerDI123 | | | |
| | SOD128 | - | 3.8 x 2.5 x 1.0 | 1000 |  | PMDT | M-Flat | | | | | | | |
| | SOD323 | SC-76 | 1.7 x 1.25 x 0.95 | 400 |  | | USC | SOD-323 | URP | SOD323 | SOD-323 | USC | SOD323 | |
| | SOD323F | SC-90 | 1.7 x 1.25 x 0.7 | 830 |  | UMD2 | US-Flat | | | | PowerDI323 | | | |
| | SOD523 | SC-79 | 1.2 x 0.8 x 0.6 | 500 |  | EMD2 | ESC/TESE | SOD-523 | UFP | SC79 | | ESC | SOD523 | |
| | SOD882 | - | 1.0 x 0.6 x 0.5 | 250 |  | | CTS2 | | | TSLP-2 | DFN1006-2 | | | |
| | SOD882D | - | 1.0 x 0.6 x 0.37 | 250 |  | | | | | TSLP-2-7 | DFN1006H4-2 | | | |
| 3 | SOT1061 | HUSON3 | 2.0 x 2.0 x 0.65 | 1300 |  | | | WDFN3 | | DFN2020-3 | | PowerPAK SC706L | | |
| | SOT23 | - | 2.9 x 1.3 x 1.0 | 250 |  | SSD3/SST3 | | SOT-23 | SOT23 | SOT-23 | SOT-23 | SOT23 | | |
| | SOT323 | SC-70 | 2.0 x 1.25 x 0.95 | 200 |  | UMD3/UMT3 | USM | SC-70 | CMAK/CM-PAK | SOT323 | SOT-323 | USM | SC-70 3 leads | |
| | SOT416 | SC-75 | 1.6 x 0.8 x 0.77 | 150 |  | EMD3/EMT3 | SSM | SC-75 | SMPAK | SC75 | | | SC-75A | |
| | SOT883 | SC-101 | 1.0 x 0.6 x 0.5 | 250 |  | | SS CSP2 | | | TSLP-3-1 | DFN1006-3 | | | |
| 4 | SOT89 | SC-62 | 4.5 x 2.5 x 1.5 | 1300 |  | MPT3 | PW-Mini | SOT-89 | UPAK (SOT89) | SOT89 | | SOT-89 | | |
| | SOT143B | - | 2.9 x 1.3 x 1.0 | 250 |  | | CP4 | | MPAK-4R | SOT143 | SOT-143 | | | |
| 5 | SOT223 | SC-73 | 6.5 x 3.5 x 1.65 | 1700 |  | | | SOT-223 | | SOT223 | SOT-223 | SOT-223 | SOT223 | |
| | SOT353 | SC-88A | 2.0 x 1.25 x 0.95 | 300 |  | UMD5/UMT5 | USV | SC-88A | CMPAK-5(T) | | USV | SOT353 | | |
| | SOT665 | - | 1.6 x 1.2 x 0.55 | 300 |  | EMD5/EMT5 | ESV | SOT-553 | VSON-5 | | TESV | | | |
| 6 | SOT363 | SC-88 | 2.0 x 1.25 x 0.95 | 300 |  | UMD6/UMT6 | US6 | SC-88 | CMPAK-6 | SOT363 | SOT-363 | US6 | SOT363 | |
| | SOT457 | SC-74 | 2.9 x 1.5 x 1.0 | 750 |  | SMD6/SMT6 | SM6 | SC-74 | TSOP-6 | SC74 | | TSOP6 | TSOP-6 | |
| | SOT666 | - | 1.6 x 1.2 x 0.55 | 300 |  | EMD6/EMT6 | ES6 | SOT-563 | SMFPAK-6 | SOT666 | SOT563 | TES6 | SC89-6lead | |
| | SOT1118 | - | 2.0 x 2.0 x 0.65 | 1300 |  | | | 6 Lead DFN | | | DFN2020B-6 | | | |
| | SOT886 | XSON6 | 1.45 x 1.0 x 0.5 | 250 |  | | | | | | | | SLP1510N6 | |
| SOT891 | XSON6 | 1.0 x 1.0 x 0.5 | - |  | | CS6 | | | | | | | | |

| Pins / leads | NXP | Industry standard names | Size (l x w x h) (mm) | P _{tot} (mW) | Package | Competitor synonyms | | | | | | | | | |
|--------------|---------|-------------------------|-----------------------|-----------------------|---|---------------------|---------|-----------|---------|---------|-----|--------------------------|----------|------------|--|
| | | | | | | Rohm | Toshiba | ON Semi | Renesas | In neon | KEC | Vishay | Semtech | | |
| 8 | SOT505 | TSSOP8 | 3.0 x 3.0 x 1.1 | - |  | | | | | | | TSSOP-8 | | TSSOP8 | |
| | SOT96 | SO8 | 4.9 x 3.9 x 1.75 | 1500 |  | SOP8 | FM8 | SOIC-8 NB | SOP-8 | | | FLP-8 | SO8 | | |
| 8 + 1 | SOT983 | HXSON8 | 1.7 x 1.35 x 0.5 | - |  | | | | | | | UDFN 1.7 x 1.35, 0.4P | | SLP1713P8 | |
| | SOT1157 | HXSON8 | 1.2 x 1.7 x 0.5 | - |  | | | | | | | UDFN8, 1.8 x 1.2, 0.4P | | | |
| | SOT1166 | HUSON8 | 1.35 x 1.7 x 0.55 | - |  | | | | | | | | | SLP1713P8 | |
| 9 | SOT1178 | XSON9 | 1.0 x 2.1 x 0.5 | - |  | | | | | | | | | SLP2010P8T | |
| 10 | SOT1165 | XSON10 | 1.0 x 2.5 x 0.5 | - |  | | | | | | | UDFN10 2.5 x 1, 0.5P | TSLP-9-1 | SLP1610P4 | |
| | SOT1176 | XSON10 | 1.0 x 2.5 x 0.5 | - |  | | | | | | | UDFN10 2.5 x 1, 0.5P | TSLP-9-1 | SLP1610P4 | |
| | SOT552 | TSSOP10 | 3.0 x 3.0 x 1.1 | - |  | | | | | | | Micro10 | TSSOP10 | MSOP-10L | |
| 12+1 | SOT984 | HXSON12 | 2.5 x 1.35 x 0.5 | - |  | | | | | | | | | SLP2513P12 | |
| | SOT1158 | HXSON12 | 1.2 x 2.5 x 0.5 | - |  | | | | | | | UDFN12, 2.5 x 1.2, 0.4P | | | |
| 14 | SOT1167 | HUSON12 | 1.35 x 2.5 x 0.55 | - |  | | | | | | | UDFN12, 2.5 x 1.35, 0.4P | | SLP2513P12 | |
| | SOT108 | SO14 | 8.65 x 3.9 x 1.75 | - |  | SOP14 | | | | | | | DSO14 | | |
| 16 + 1 | SOT985 | HXSON16 | 3.3 x 1.35 x 0.5 | - |  | | | | | | | UDFN16, 3.3 x 1.35, 0.4P | | SLP3313P16 | |
| | SOT1159 | HXSON16 | 1.2 x 3.3 x 0.5 | - |  | | | | | | | UDFN16, 3.5 x 1.2, 0.4P | | | |
| | SOT1168 | HUSON16 | 1.35 x 3.3 x 0.55 | - |  | | | | | | | | | SLP3313P16 | |
| 20 | SOT360 | TSSOP20 | 6.5 x 4.4 x 1.1 | - |  | | | | | | | TSSOP20 | TSSOP20 | | |
| 38 | SOT510 | TSSOP38 | 9.7 x 4.4 x 1.1 | - |  | | | | | | | | TSSOP38 | | |

Packing methods SMD

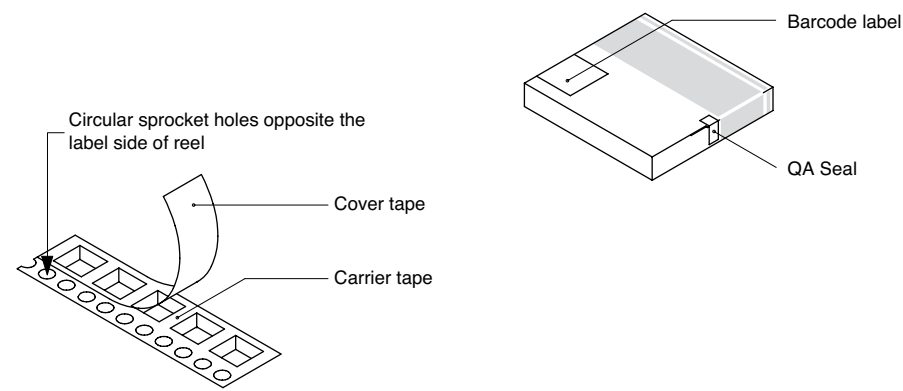
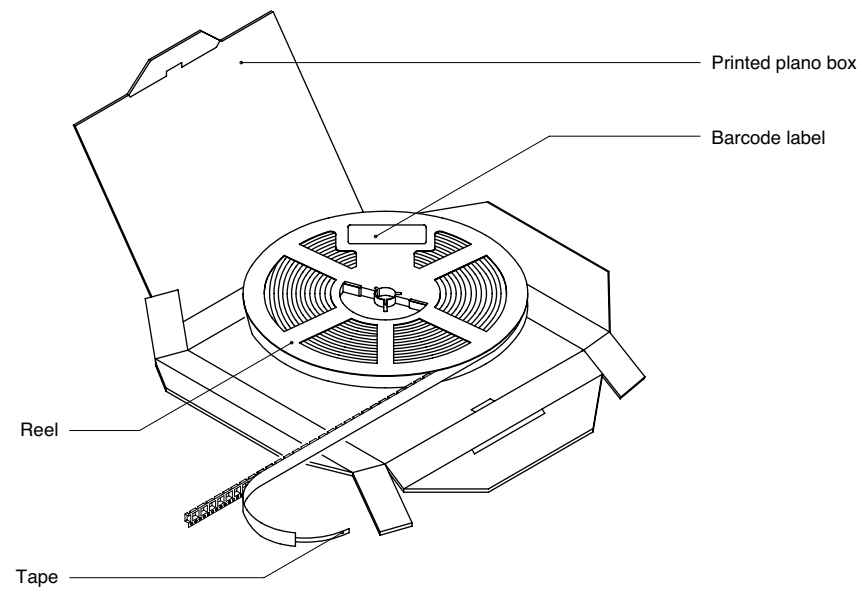
| Pins / leads | Package | Packing method and tape dimension | Reel dimension (d x w) (mm) | Taping | Package | Packing quantity and ordering code (12 NC ending) | | | | | | | |
|--------------|--------------------------------|-----------------------------------|-----------------------------|--------|---------|---|------|------|------|------|------|------|-------|
| | | | | | | 800 | 1000 | 2500 | 3000 | 4000 | 8000 | 9000 | 10000 |
| 2 | SOD80C | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | -115 | - | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 330 x 8 | - | | - | - | - | - | - | - | - | -135 |
| | SOD123F | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | SOD123W | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | SOD128 | 4 mm pitch, 12 mm tape and reel | 180 x 12 | - | | - | - | - | -115 | - | - | - | - |
| | SOD323 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | - | | - | - | - | - | - | - | - | -135 |
| | SOD323F | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | SOD523 | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | -315 | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | - | | - | - | - | - | - | - | - | -135 |
| | SOD882 | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | - | - | -315 |
| | SOD882D | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | - | - | -315 |
| | SOD962 | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | - | - | -315 |
| 3 | SOT23 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -215 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | - | | - | - | - | - | - | - | - | -235 |
| | SOT89 | 8 mm pitch, 12 mm tape and reel | 180 x 12 | T1 | | - | -115 | - | - | - | - | - | - |
| | | 8 mm pitch, 12 mm tape and reel | 330 x 12 | T1 | | - | - | - | - | -135 | - | - | - |
| | | 8 mm pitch, 12 mm tape and reel | 180 x 12 | T3 | | - | -146 | - | - | - | - | - | - |
| | | 8 mm pitch, 12 mm tape and reel | 180 x 12 | T4 | | - | -147 | - | - | - | - | - | - |
| | SOT323 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | - | | - | - | - | - | - | - | - | -135 |
| | SOT404 | 16 mm pitch, 24 mm tape and reel | 330 x 24 | - | | -118 | - | - | - | - | - | - | - |
| | SOT416 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | - | | - | - | - | - | - | - | - | -135 |
| | SOT428 | 8 mm pitch, 16 mm tape and reel | 330 x 16 | - | | - | - | -118 | - | - | - | - | - |
| | SOT663 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | -115 | - | - | - |
| | SOT883 | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | - | - | -315 |
| SOT1061 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - | |
| 4 | SOT143B | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -215 | - | - | - | |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | - | | - | - | - | - | - | - | - | -235 |
| | SOT223 | 8 mm pitch, 12 mm tape and reel | 180 x 12 | - | | - | -115 | - | - | - | - | - | - |
| | | 8 mm pitch, 12 mm tape and reel | 330 x 12 | - | | - | - | - | - | - | -135 | - | - |

| Pins / leads | Package | Packing method and tape dimension | Reel dimension (d x w) (mm) | Taping | Package | Packing quantity and ordering code (12 NC ending) | | | | | | | |
|---------------------------------|--------------------------------|-----------------------------------|-----------------------------|--------|---------|---|------|------|------|------|------|------|-------|
| | | | | | | 1000 | 1400 | 2500 | 3000 | 4000 | 5000 | 8000 | 10000 |
| 5 | SOT353 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T1 | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | T1 | | - | - | - | - | - | - | - | -135 |
| | | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T2 | | - | - | - | -125 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | T2 | | - | - | - | - | - | - | - | -165 |
| | SOT665 | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | - | - | -315 |
| | | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | -115 | - | - | - |
| 6 | SOT363 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T1 | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | T1 | | - | - | - | - | - | - | - | -135 |
| | | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T2 | | - | - | - | -125 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | T2 | | - | - | - | - | - | - | - | -165 |
| | SOT457 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T1 | | - | - | - | -115 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | T1 | | - | - | - | - | - | - | - | -135 |
| | | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T2 | | - | - | - | -125 | - | - | - | - |
| | | 4 mm pitch, 8 mm tape and reel | 286 x 8 | T2 | | - | - | - | - | - | - | - | -165 |
| | SOT666 | 2 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | - | - | - | -315 |
| | | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | - | -115 | - | - | - |
| | SOT1118 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | - | | - | - | - | -115 | - | - | - | - |
| | SOT886 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T1 | | - | - | - | - | - | -115 | - | - |
| 4 mm pitch, 8 mm tape and reel | | 180 x 8 | T4 | | - | - | - | - | - | -132 | - | - | |
| SOT891 | 4 mm pitch, 8 mm tape and reel | 180 x 8 | T4 | | - | - | - | - | - | -132 | - | - | |
| 8 | SOT505 | 8 mm pitch, 12 mm tape and reel | 330 x 12 | - | | - | - | -118 | - | - | - | - | |
| | SOT873 | 8 mm pitch, 12 mm tape and reel | 180 x 12 | - | | - | -118 | - | - | - | - | - | |
| | SOT96 | 8 mm pitch, 12 mm tape and reel | 180 x 12 | - | | -115 | - | - | - | - | - | - | - |
| 8 mm pitch, 12 mm tape and reel | | 330 x 12 | - | | - | - | -118 | - | - | - | - | - | |

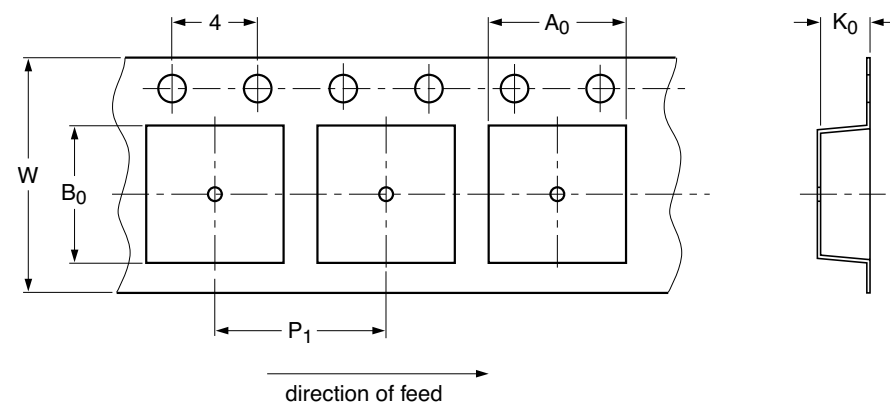
Packing methods glass diodes and through hole packages

| Pins / leads | Package | Packing method and tape/reel/tube dimensions | Package | Ordering code (12 NC ending) | Packing quantity |
|--------------|---|---|---------|------------------------------|-----------------------|
| 2 | SOD27 | 26 mm tape ammo pack, axial | | -143 | 5000 pcs |
| | | 52 mm tape ammo pack, axial | | -133 | 10000 pcs |
| | | 52 mm reel pack, axial | | -113 | 10000 pcs |
| | SOD59 | Rail packing, 50 pcs/tube, tube length = 520 mm | | -127 | 20 tubes x 50 pcs |
| | SOD66 | 52 mm tape ammo pack, axial | | -133 | 10000 pcs |
| | | 52 mm reel pack, axial | | -113 | 10000 pcs |
| | SOD68 | 26 mm tape ammo pack, axial | | -143 | 5000 pcs |
| | | 52 mm reel pack, axial | | -113 | 10000 pcs |
| | | 52 mm tape ammo pack, axial | | -133 | 10000 pcs |
| | SOD113 | Rail packing, 50 pcs/tube, tube length = 520 mm | | -127 | 20 tubes x 50 pcs |
| 3 | SOT54 | Bulk pack, 1000 pcs/carrier | | -112 | 5 carriers x 1000 pcs |
| | | 55 mm reel packing, 2000 pcs/reel, reel dimensions = 380 x 55 mm | | -116 | 5 reels x 2000 pcs |
| | | Ammo packing, 18 mm tape, 2000 pcs/carrier, reel dimensions = 350 x 55 mm | | -126 | 5 carriers x 2000 pcs |
| | | Bulk pack, 1000 pcs/carrier | | -412 | 5 carriers x 1000 pcs |
| | SOT78 | Rail packing, 50 pcs/tube, tube length = 520 mm | | -127 | 20 tubes x 50 pcs |
| SOT78D | Rail packing, 50 pcs/tube, tube length = 520 mm | | -127 | 20 tubes x 50 pcs | |
| SOT82 | Rail packing, 50 pcs/tube, tube length = 390 mm | | -127 | 20 tubes x 50 pcs | |
| SOT186A | Rail packing, 50 pcs/tube, tube length = 520 mm | | -127 | 20 tubes x 50 pcs | |
| SOT226 | Rail packing, 50 pcs/tube, tube length = 520 mm | | -127 | 20 tubes x 50 pcs | |
| SOT533 | Rail packing | | -127 | 75 tubes x 50 pcs | |

Tape and reel pack for SMD packages



Carrier tape - tape and reel

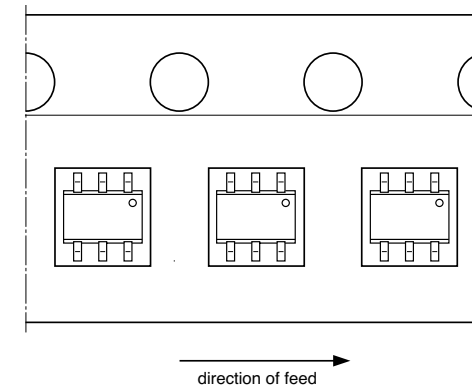


P1 = pitch (see table packing methods)
W = tape width (see table packing methods)

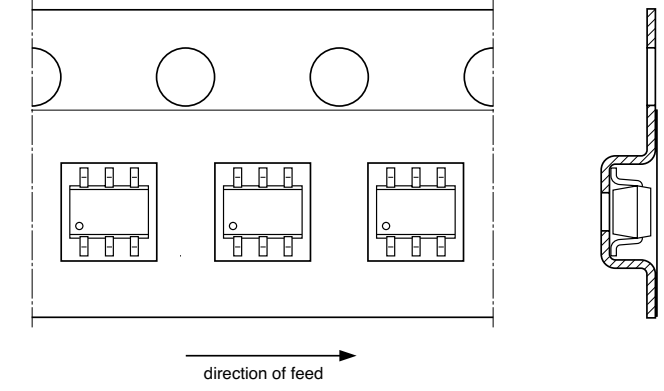
Compartment width (A_0), length (B_0) and depth (K_0) depending on package

Product orientation (tape and reel pack) T1-T4

T1 taping

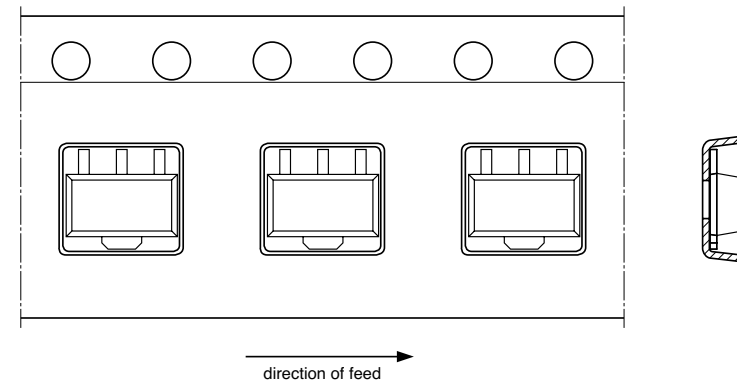


T2 taping

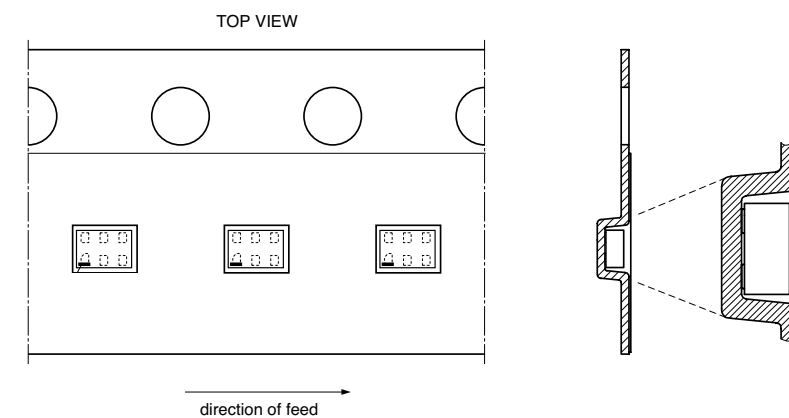


T3 taping

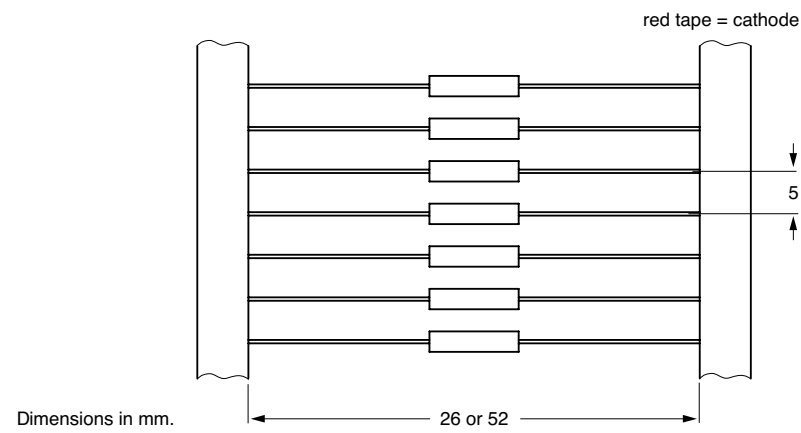
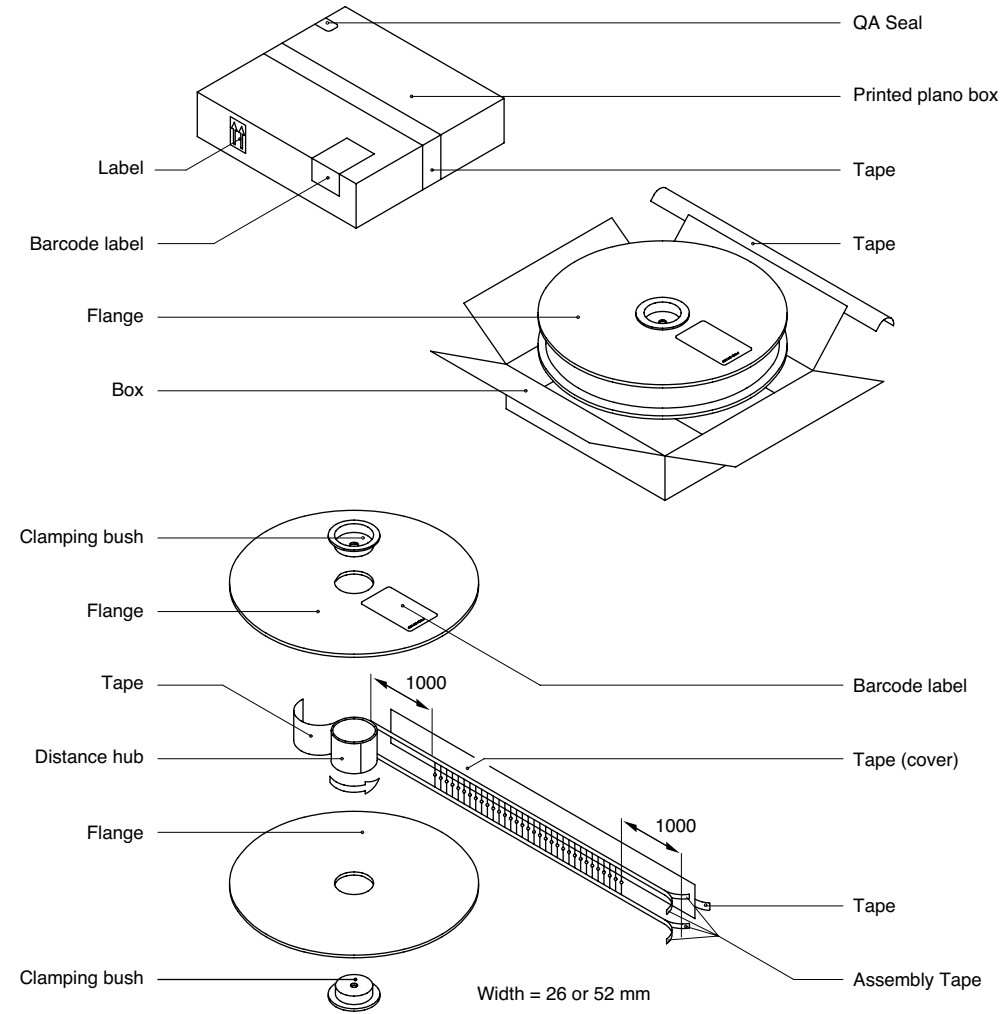
Standard product orientation SOT89 (T3)



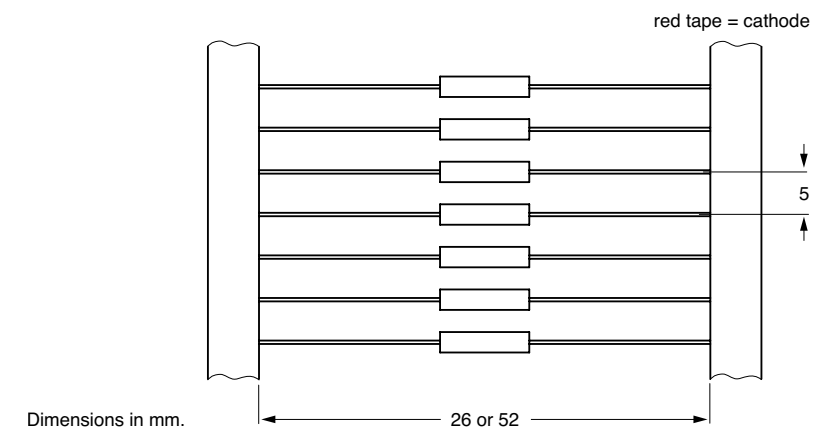
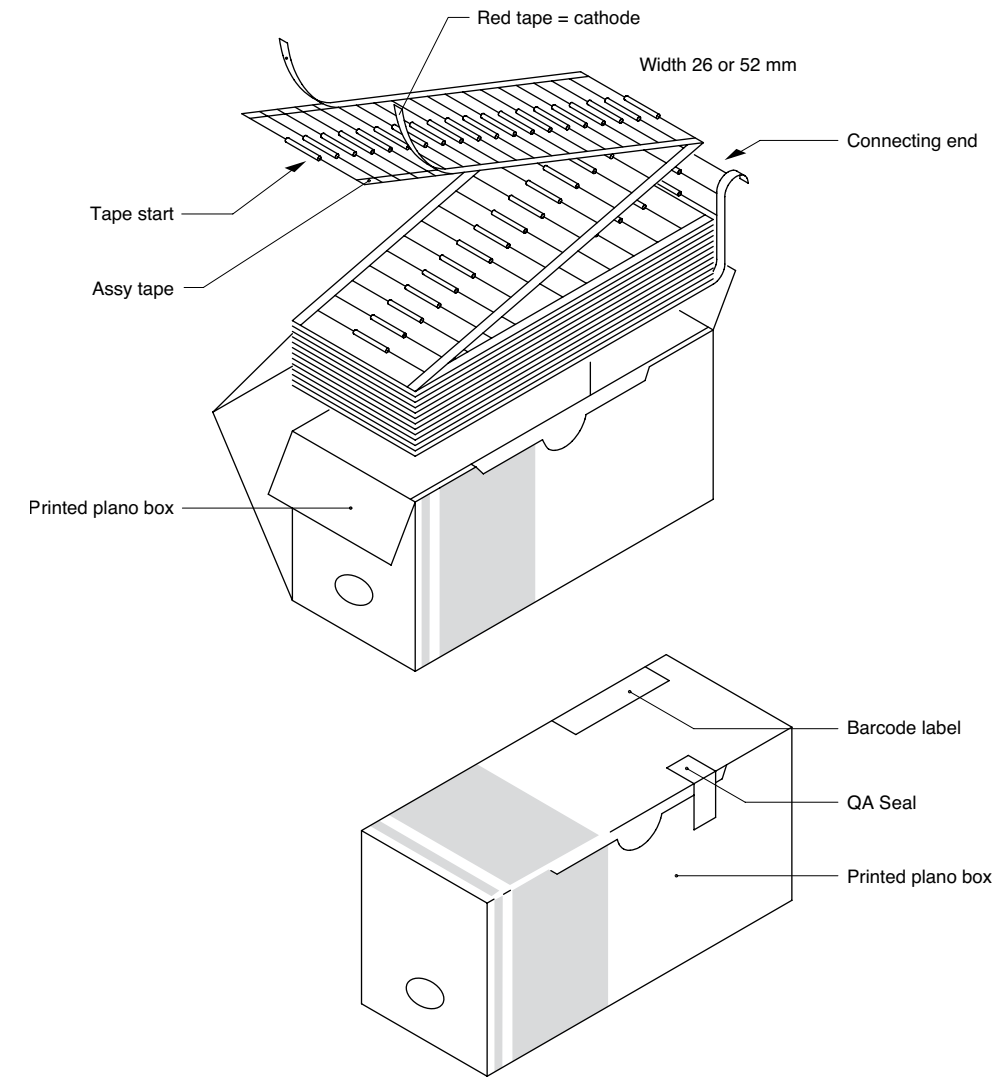
T4 taping



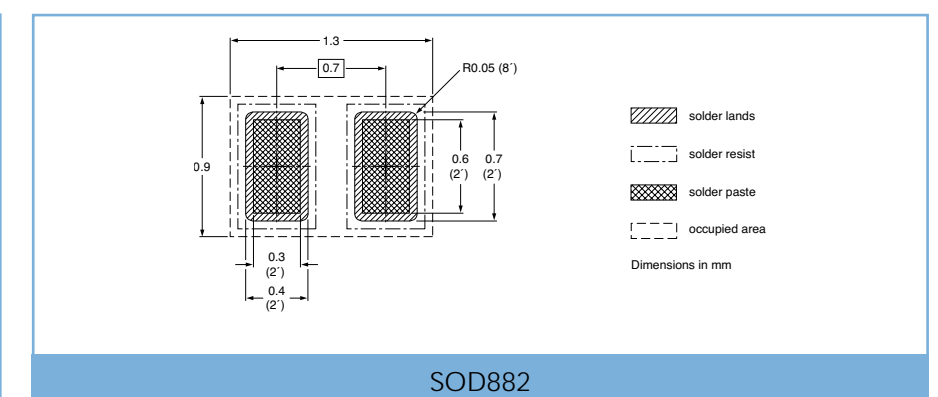
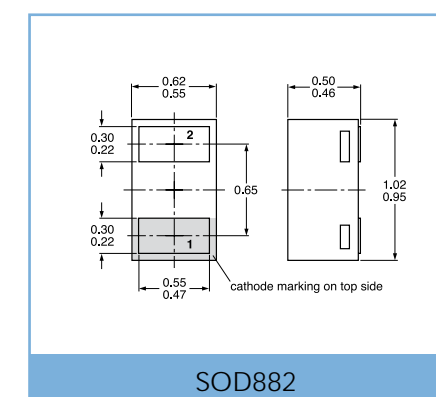
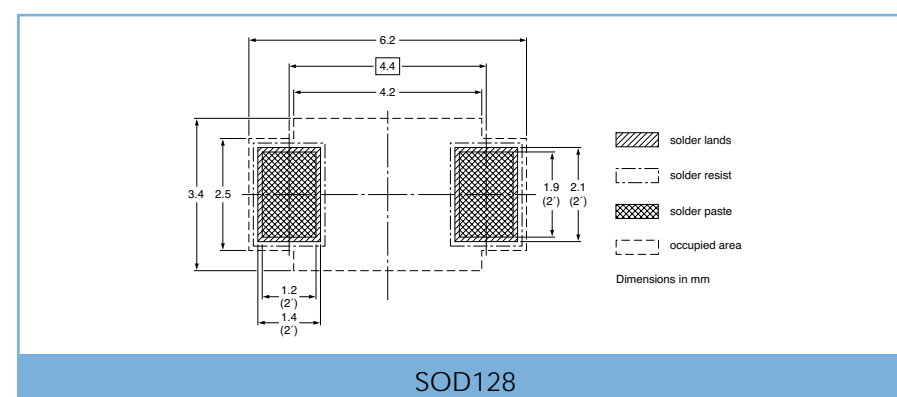
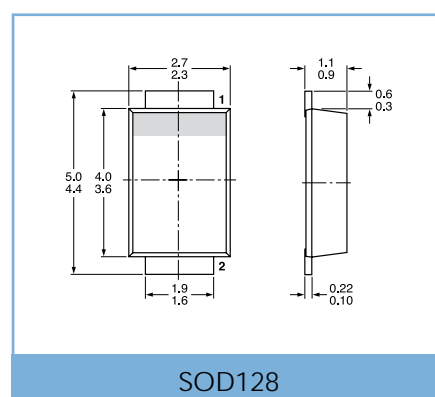
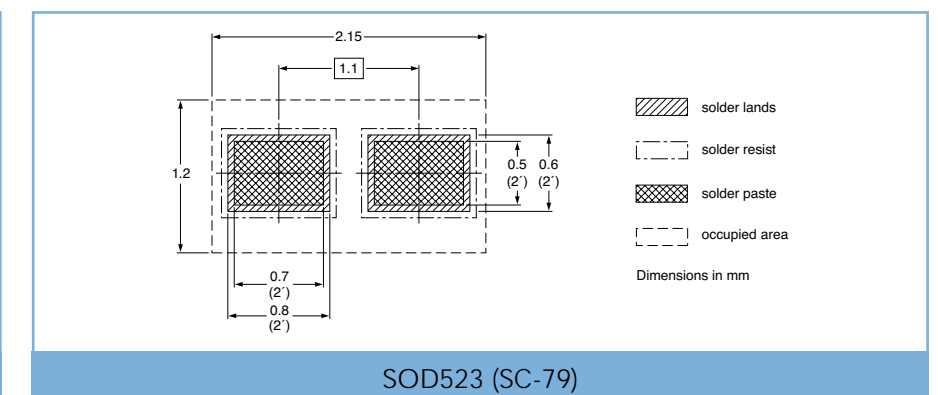
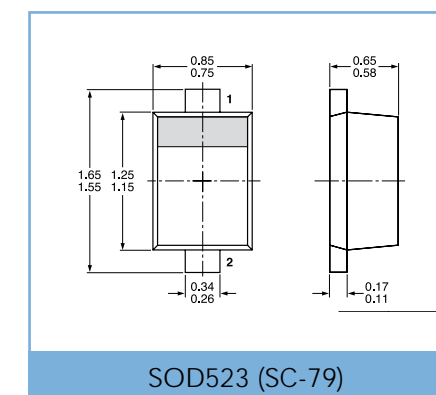
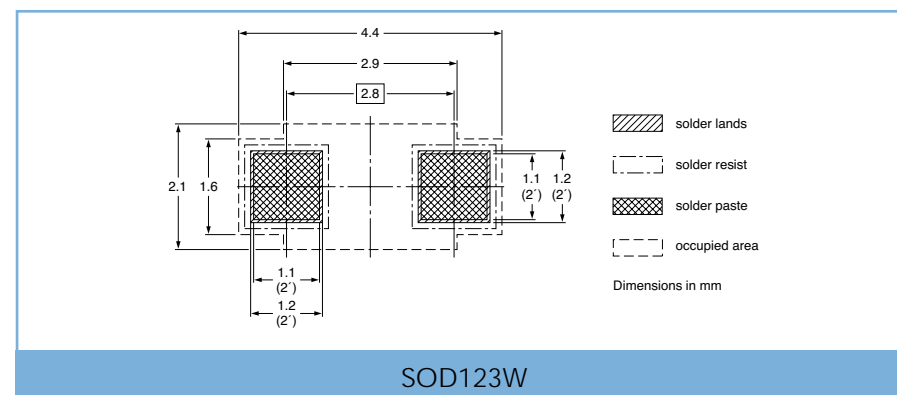
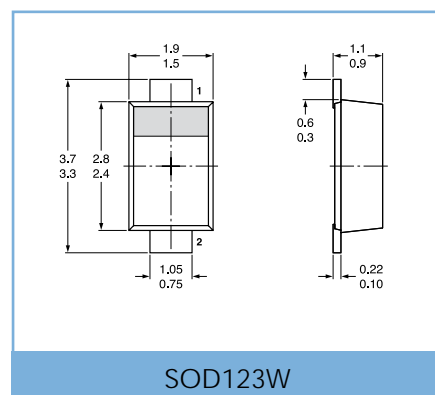
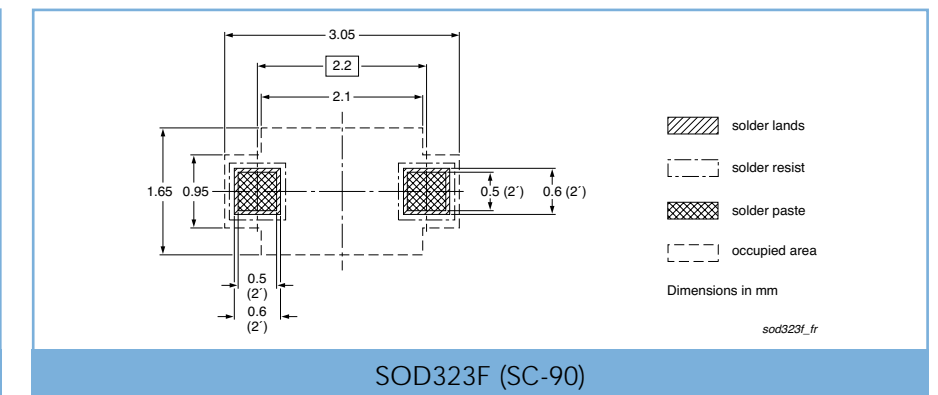
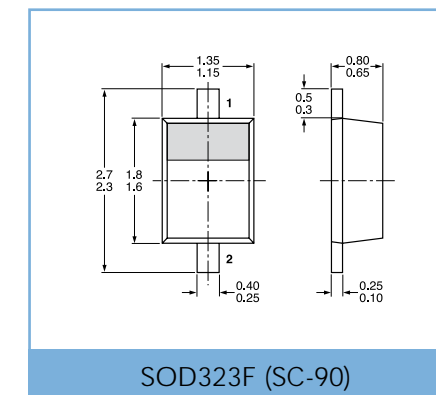
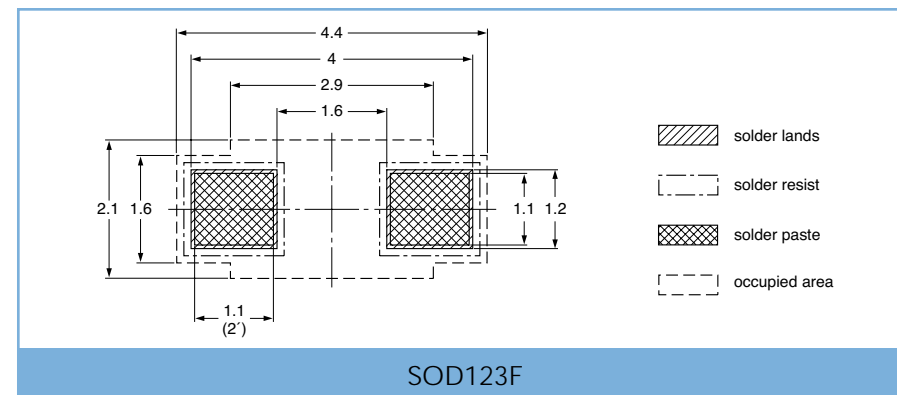
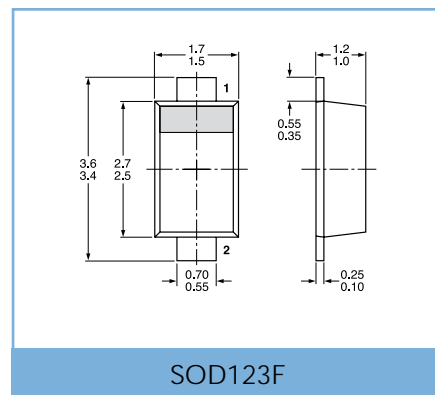
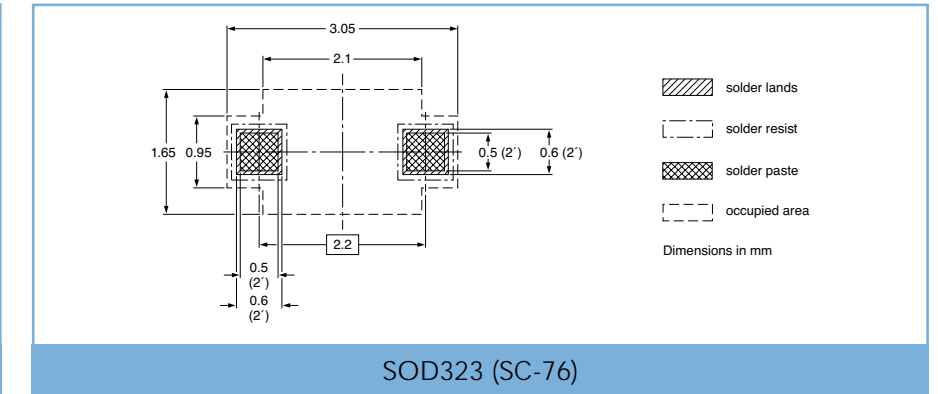
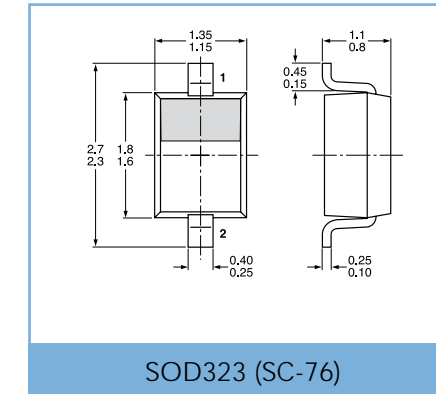
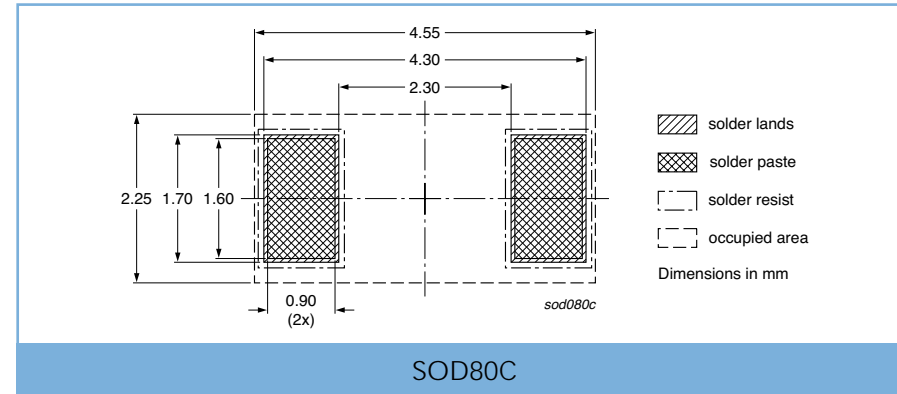
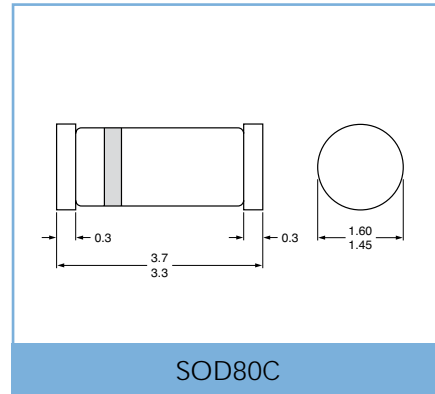
Reel pack axial tape for glass diodes

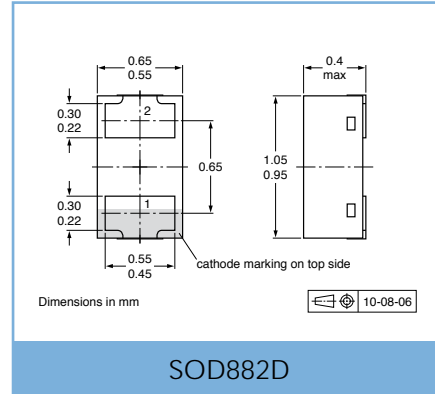


Ammo pack axial tape for glass diodes

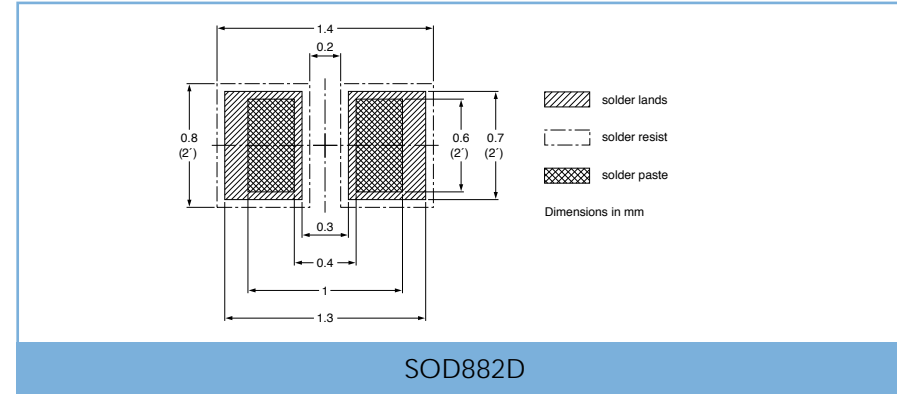


2-Pin SMD Packages

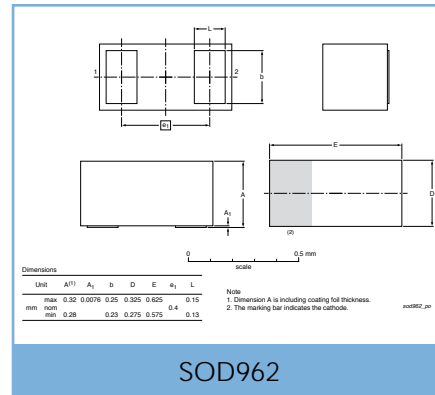




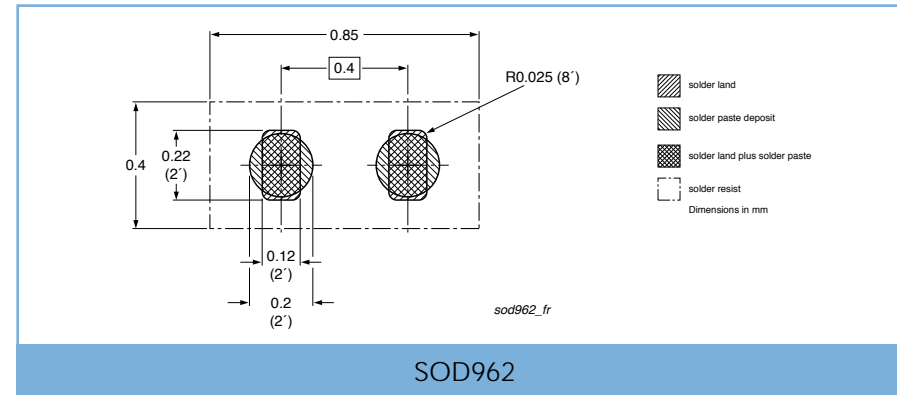
SOD882D



SOD882D

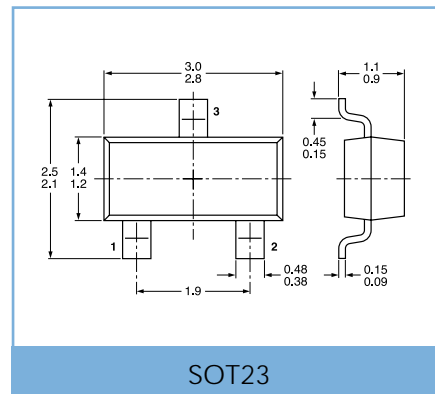


SOD962

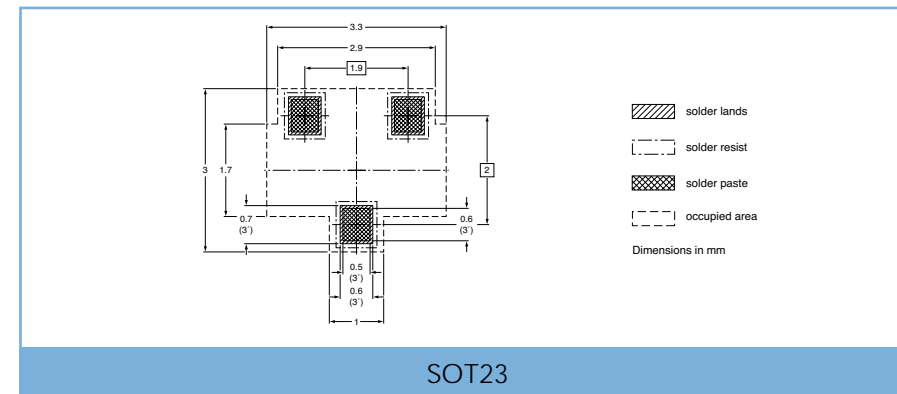


SOD962

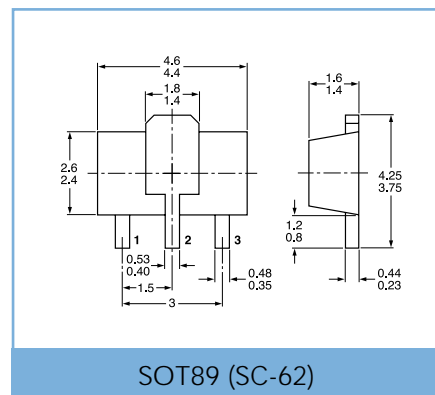
3-Pin SMD Packages



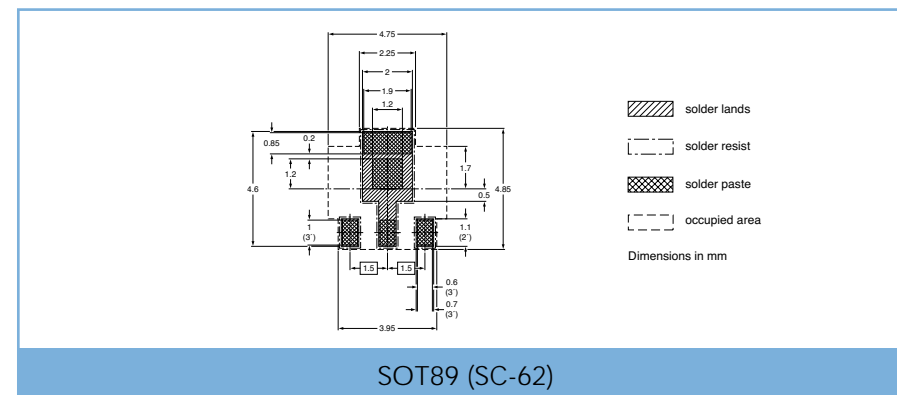
SOT23



SOT23

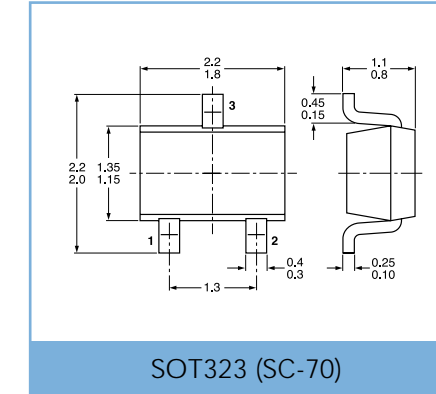


SOT89 (SC-62)

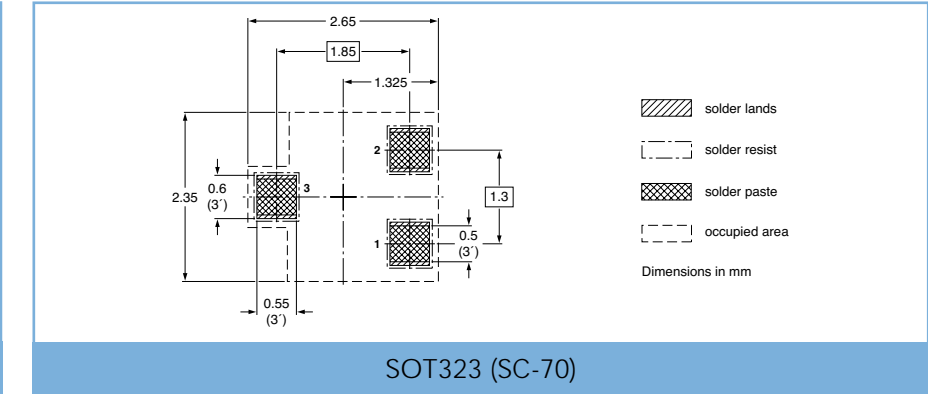


SOT89 (SC-62)

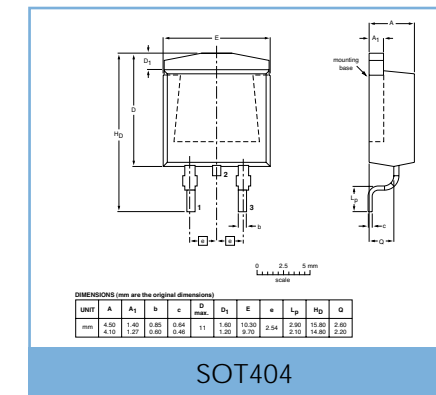
Dimensions in mm



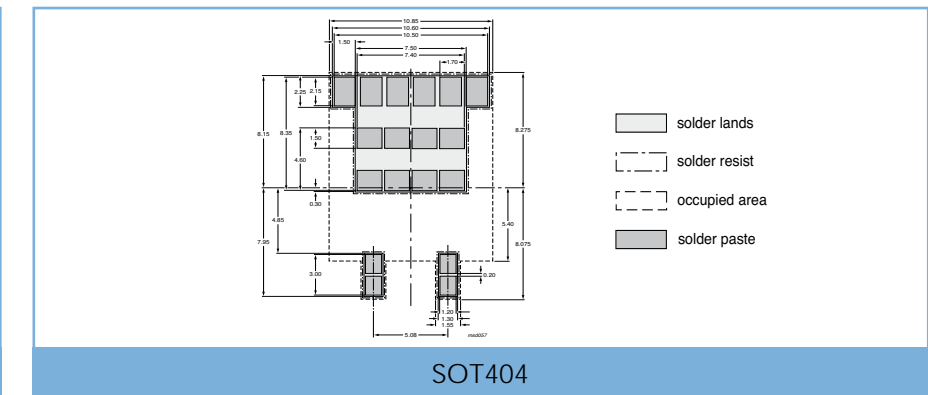
SOT323 (SC-70)



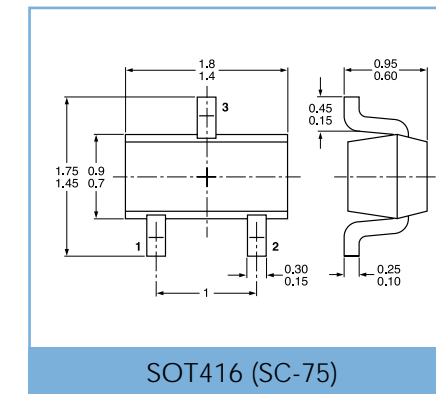
SOT323 (SC-70)



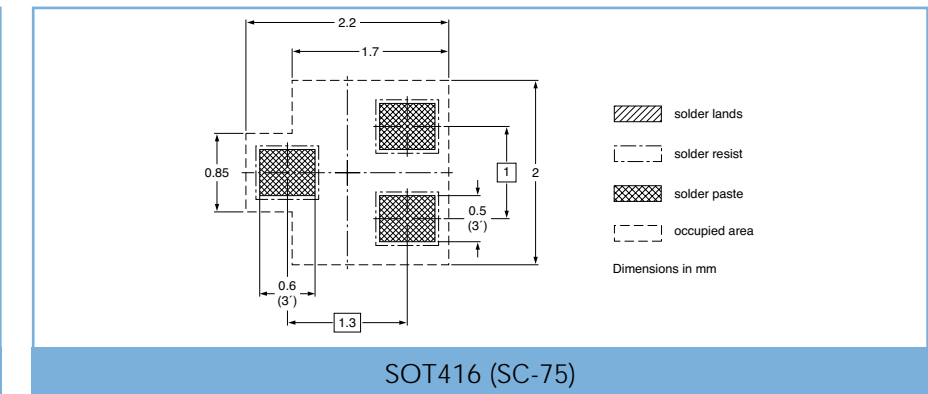
SOT404



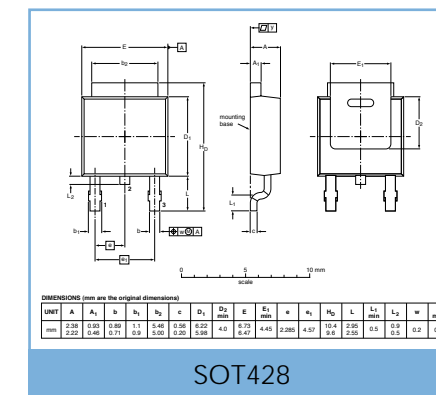
SOT404



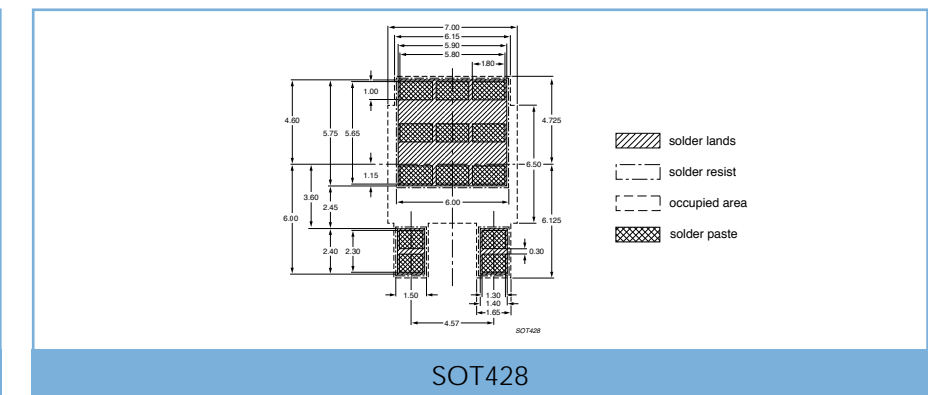
SOT416 (SC-75)



SOT416 (SC-75)

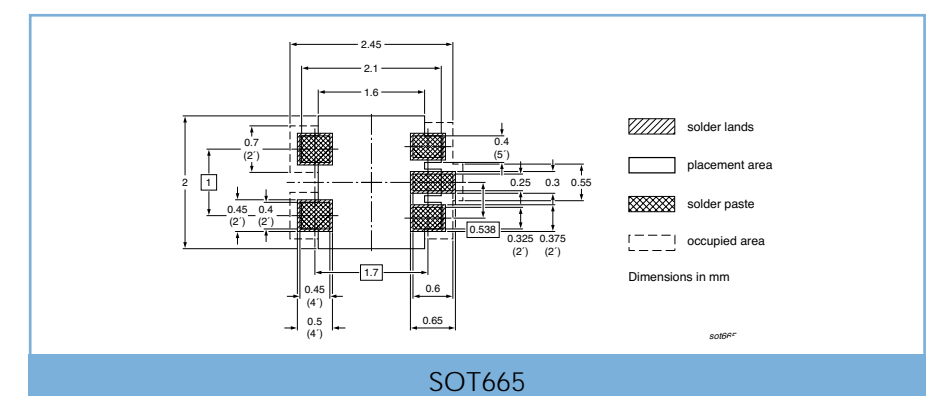
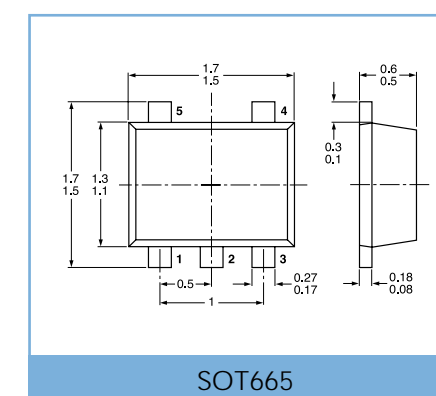
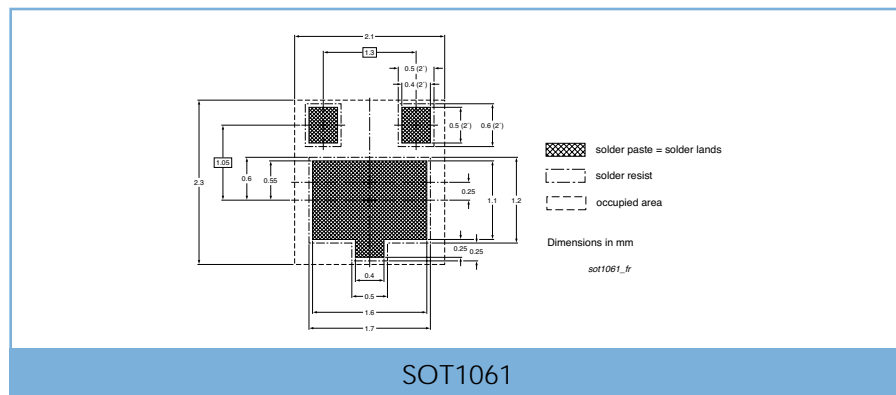
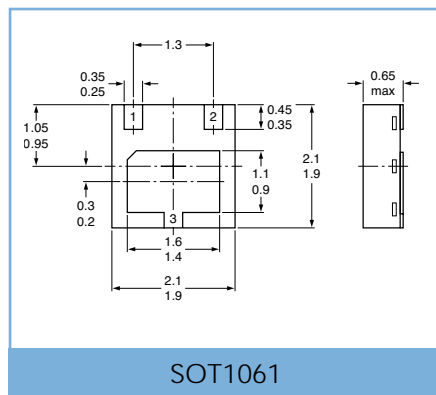
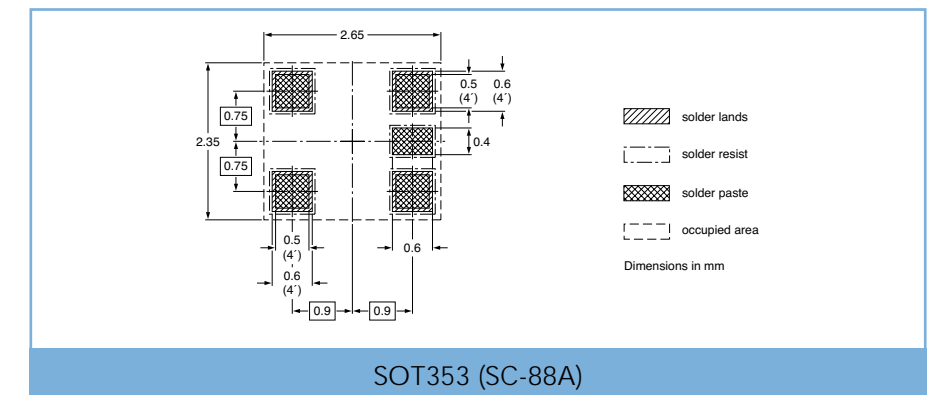
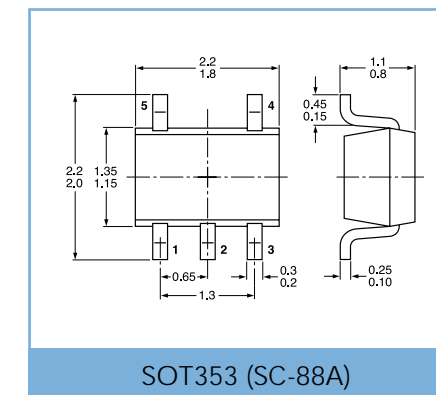
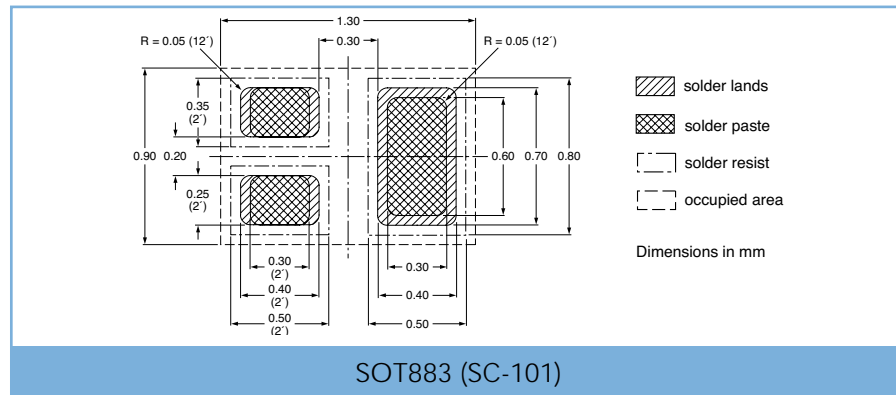
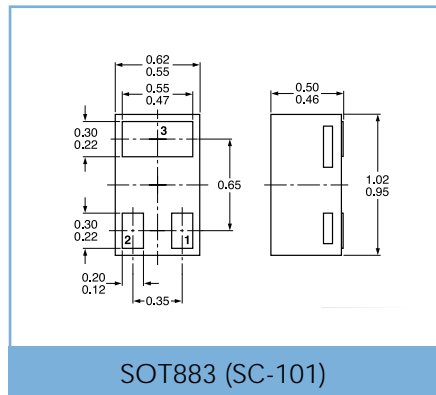
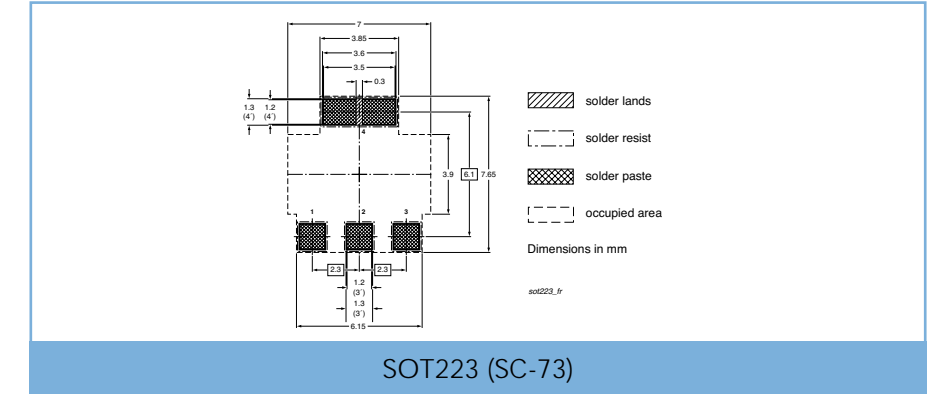
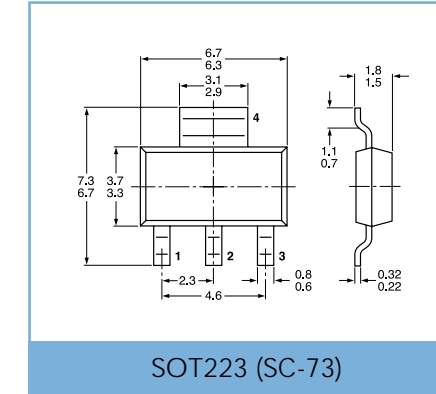
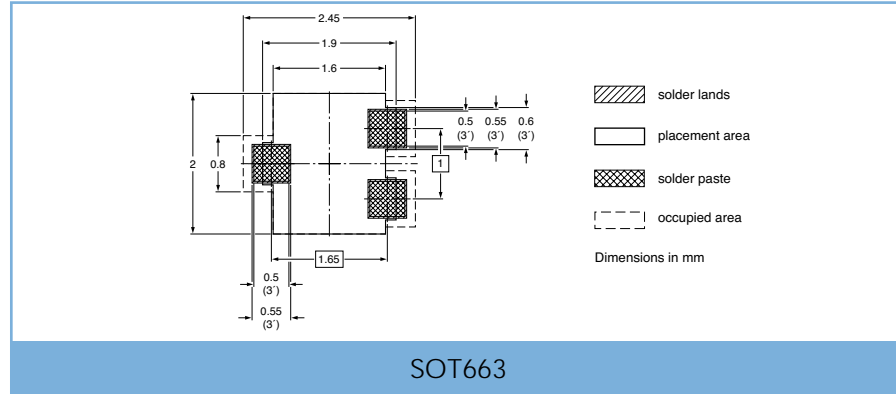
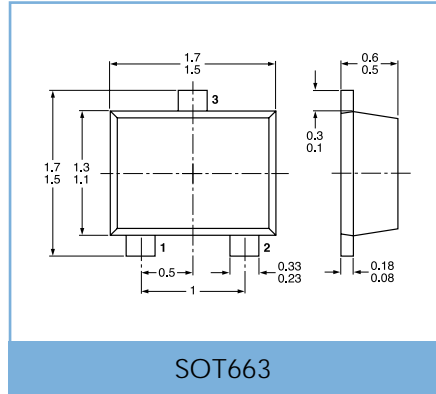


SOT428

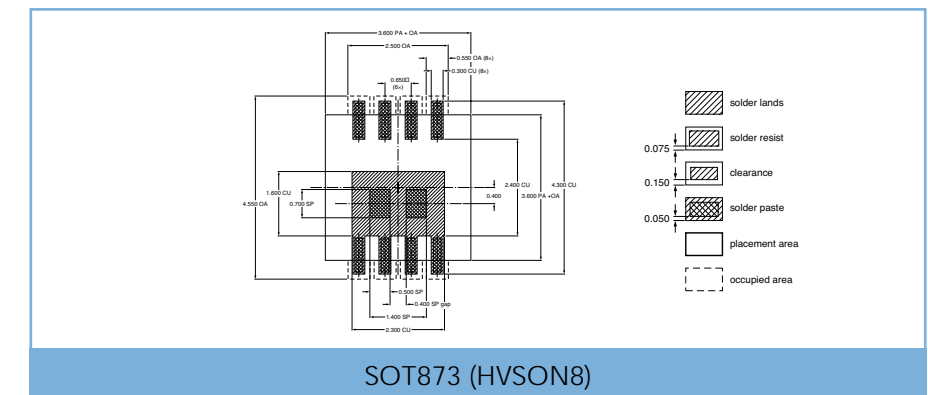
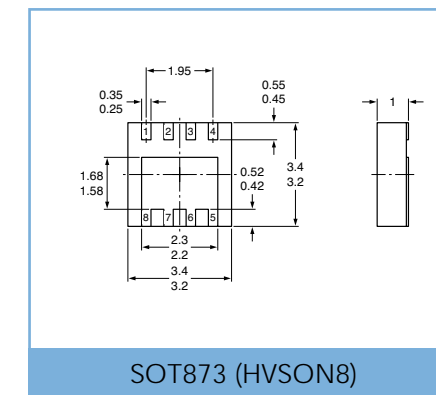
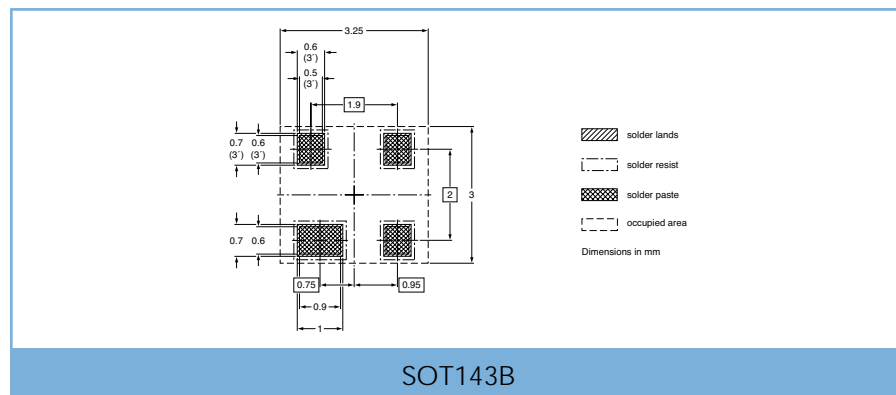
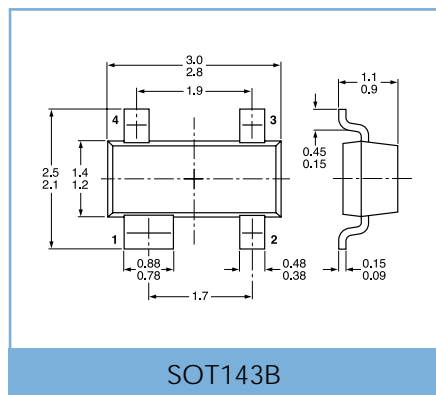


SOT428

Dimensions in mm



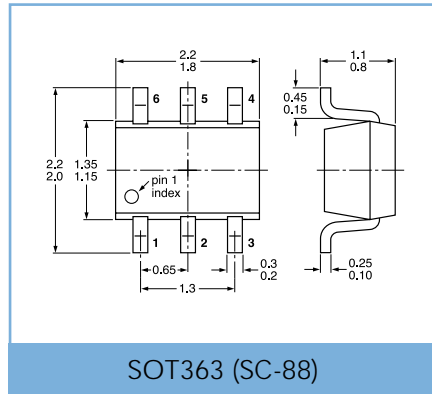
4-/5-Pin SMD Packages



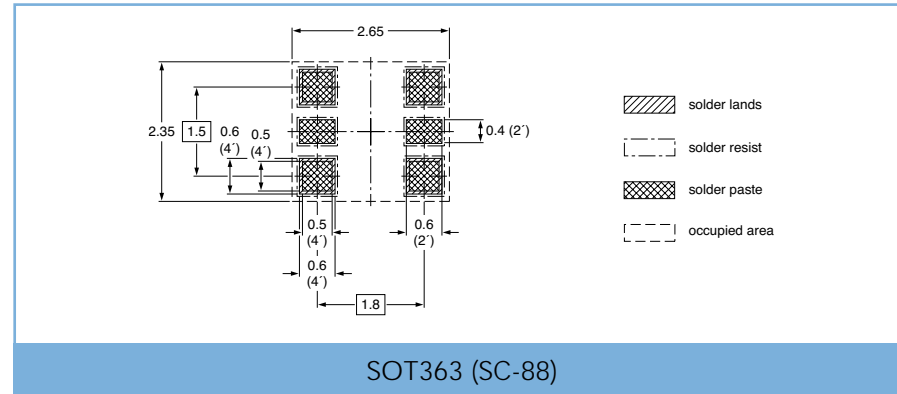
Dimensions in mm

Dimensions in mm

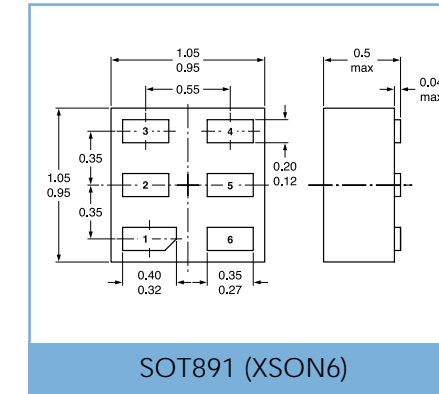
6-Pin SMD Packages



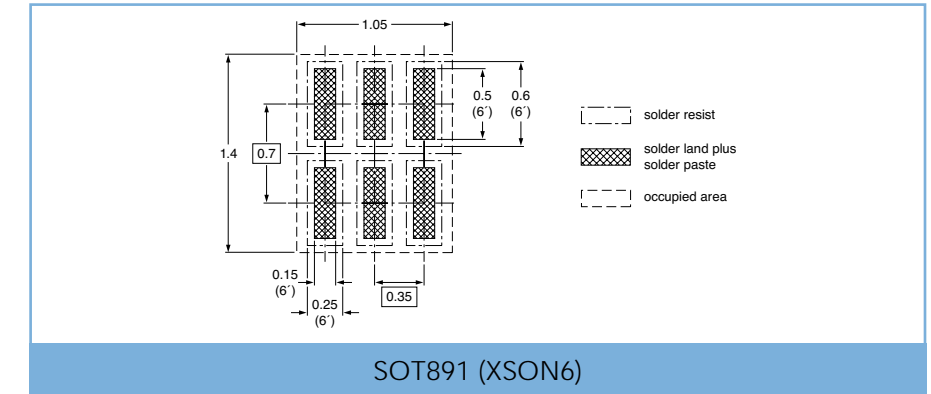
SOT363 (SC-88)



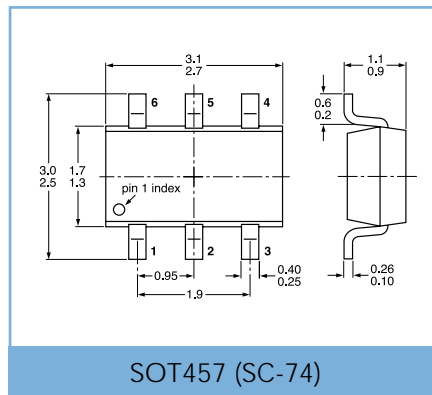
SOT363 (SC-88)



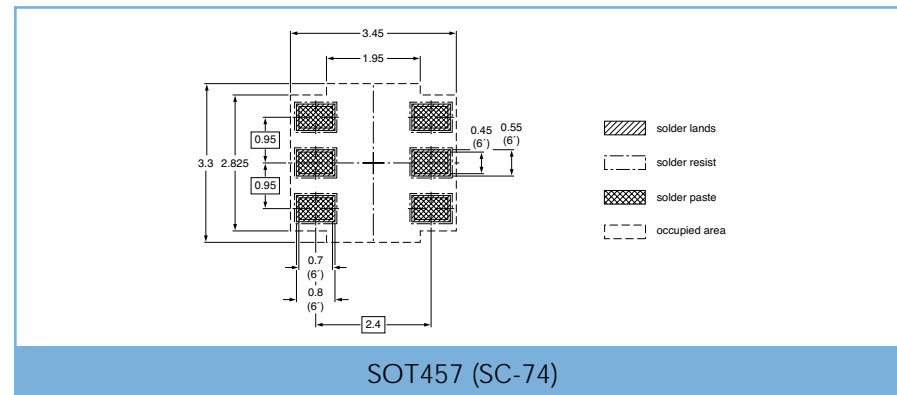
SOT891 (XSON6)



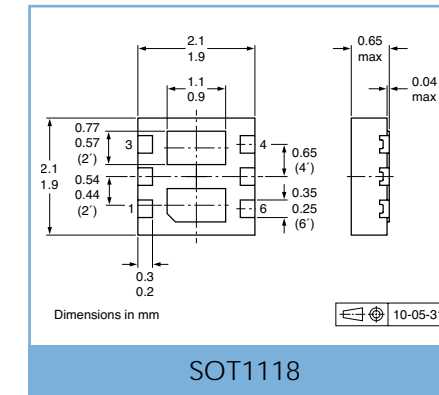
SOT891 (XSON6)



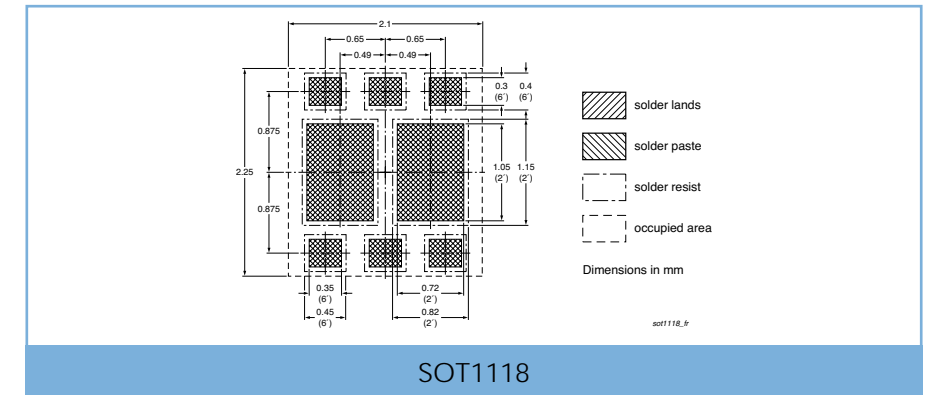
SOT457 (SC-74)



SOT457 (SC-74)

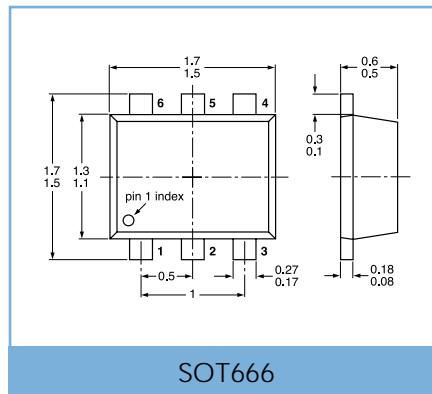


SOT1118

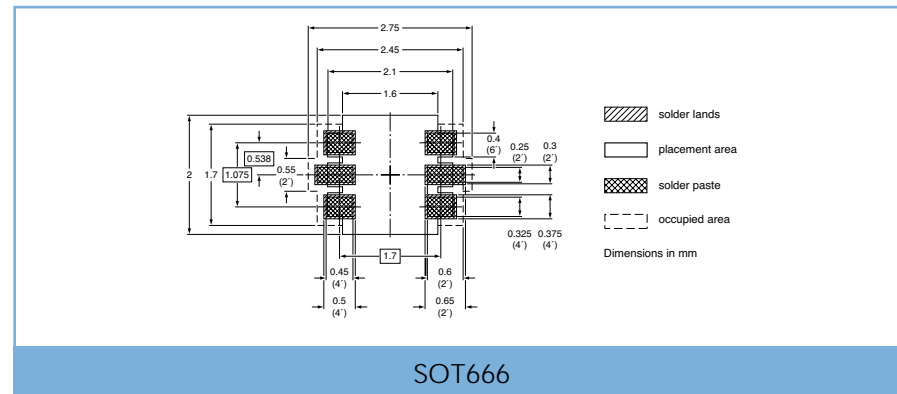


SOT1118

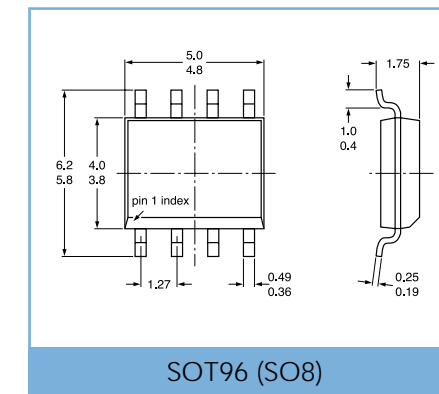
Multi-Pin SMD Packages



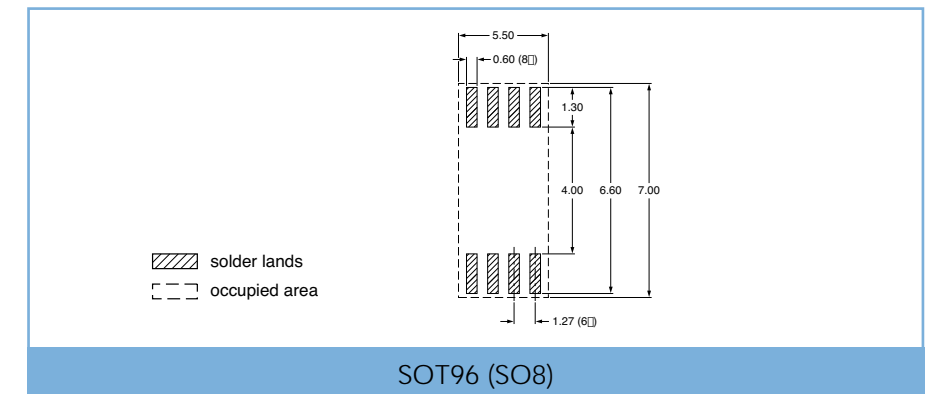
SOT666



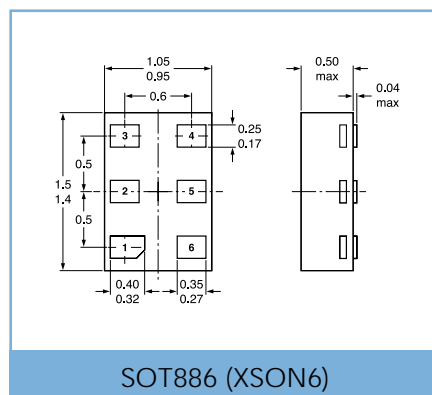
SOT666



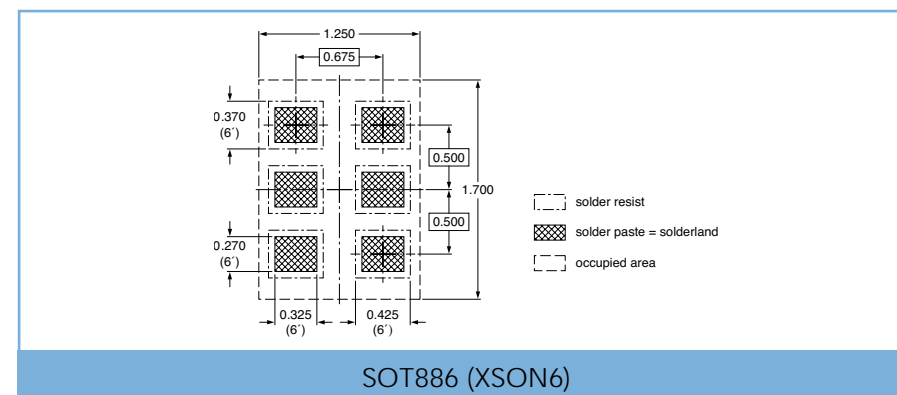
SOT96 (SO8)



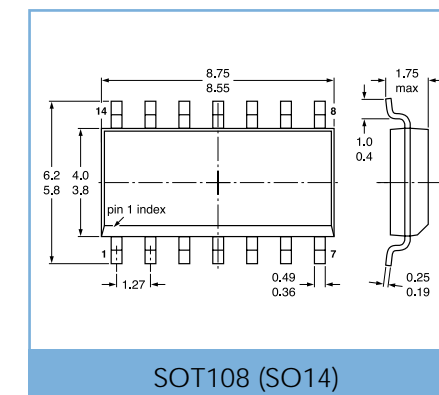
SOT96 (SO8)



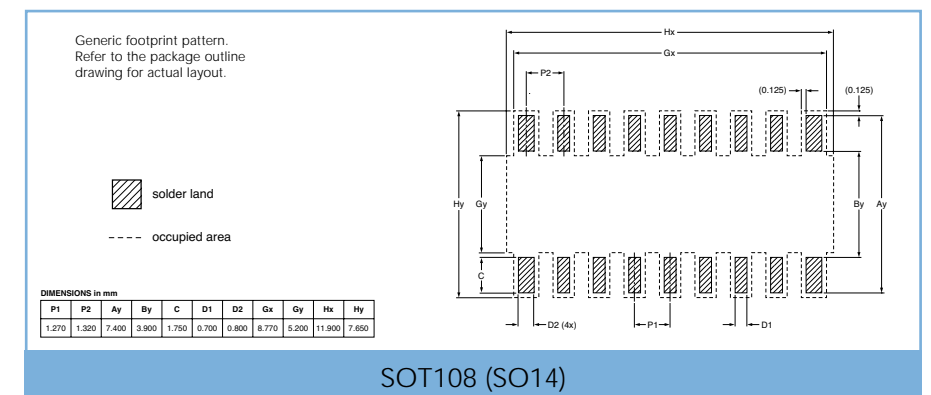
SOT886 (XSON6)



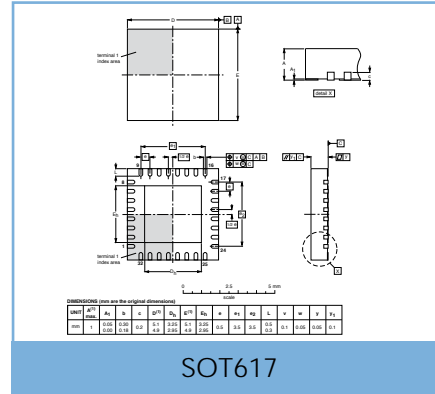
SOT886 (XSON6)



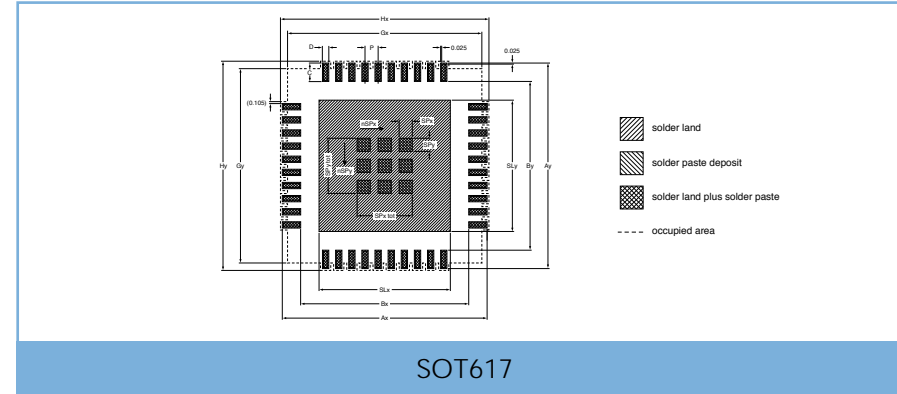
SOT108 (SO14)



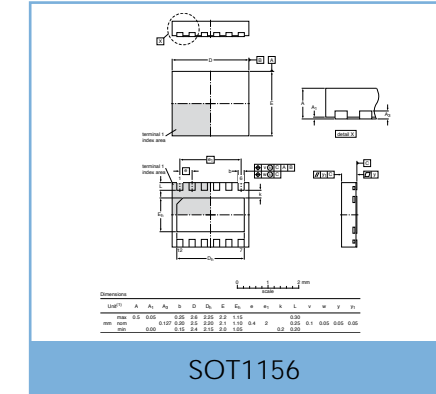
SOT108 (SO14)



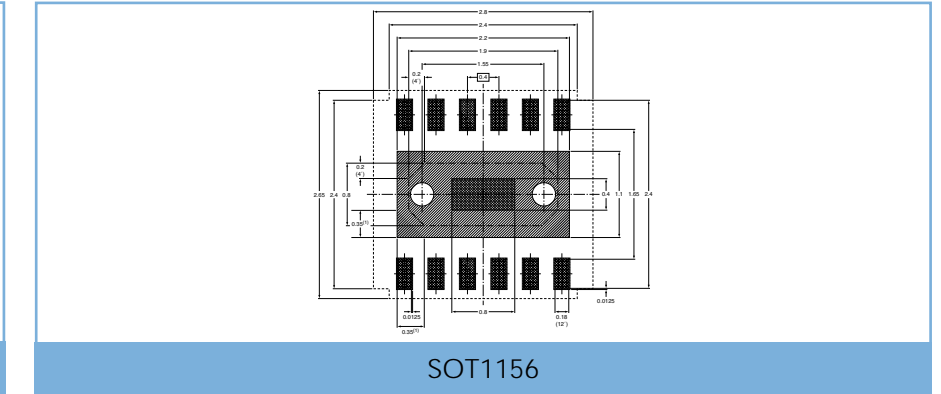
SOT617



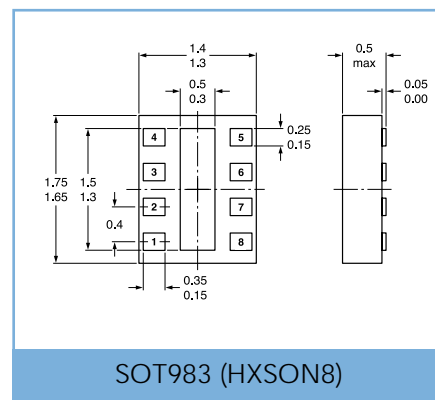
SOT617



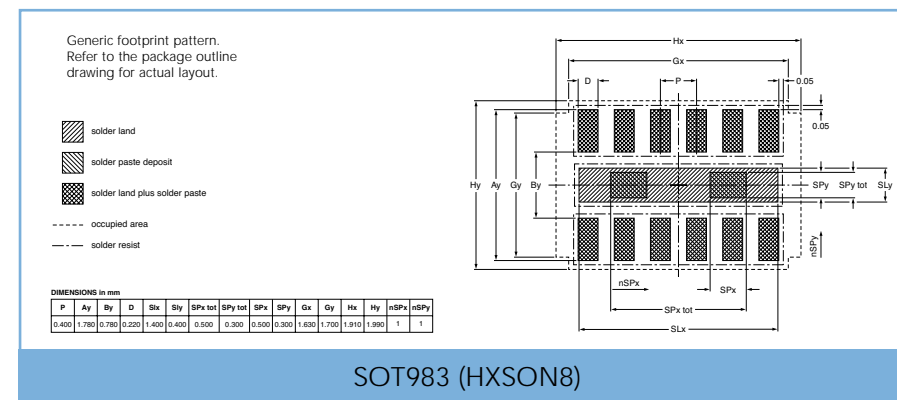
SOT1156



SOT1156

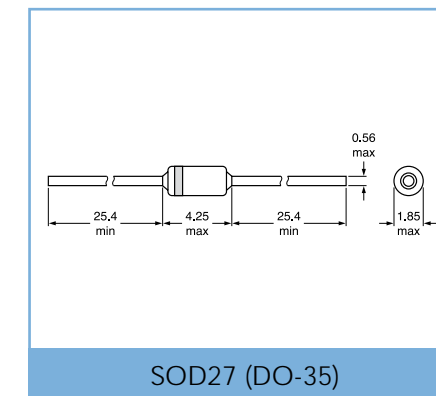


SOT983 (HXSON8)

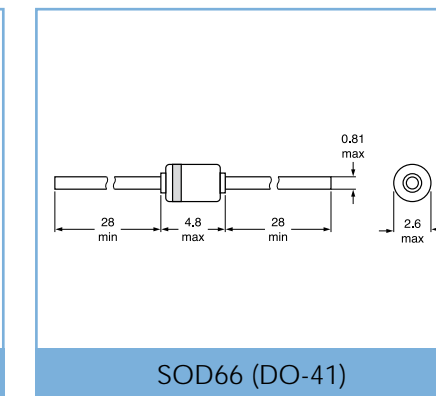


SOT983 (HXSON8)

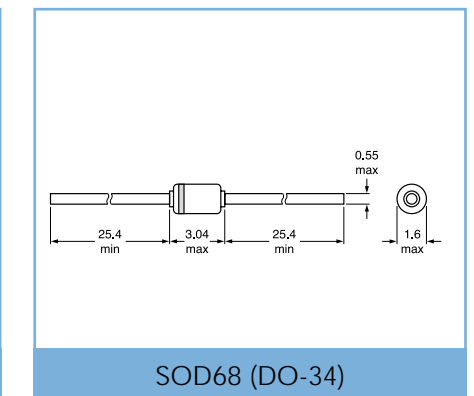
Glass diodes



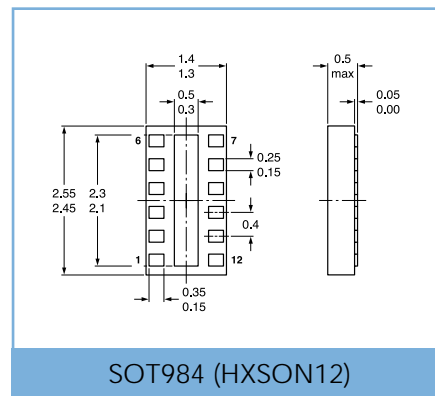
SOD27 (DO-35)



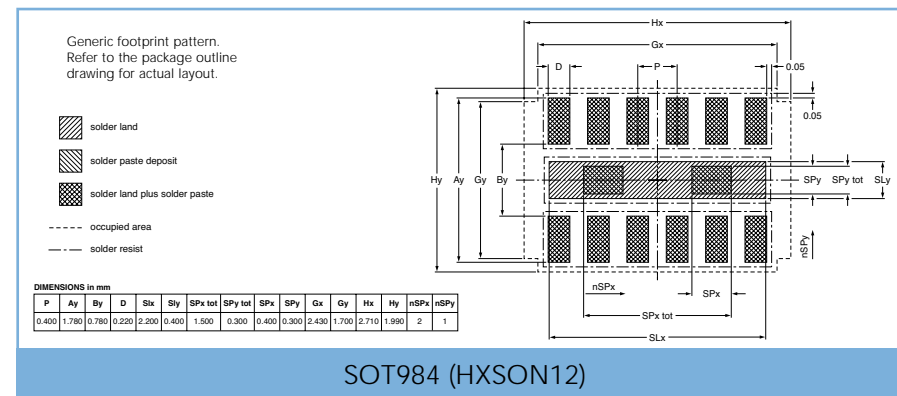
SOD66 (DO-41)



SOD68 (DO-34)

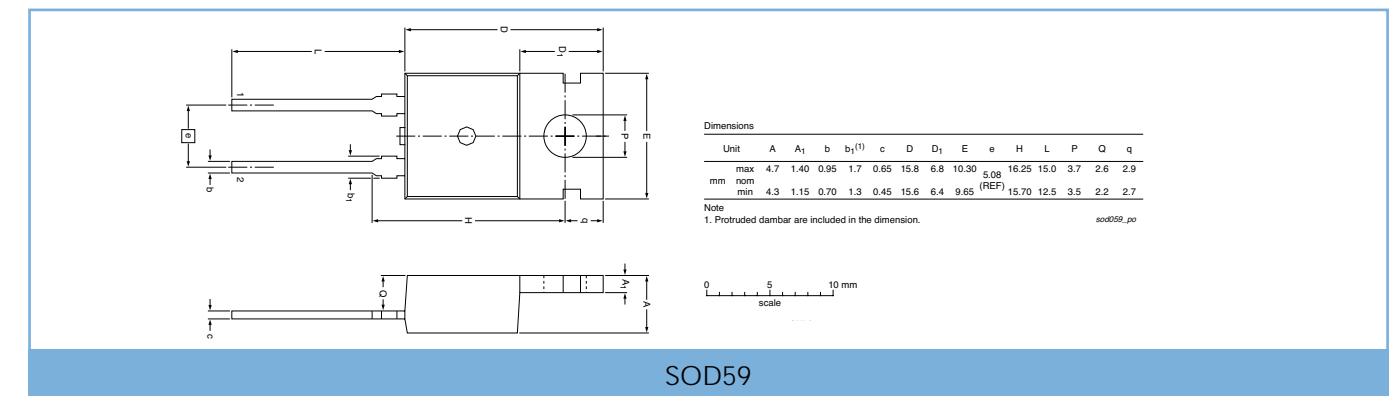


SOT984 (HXSON12)

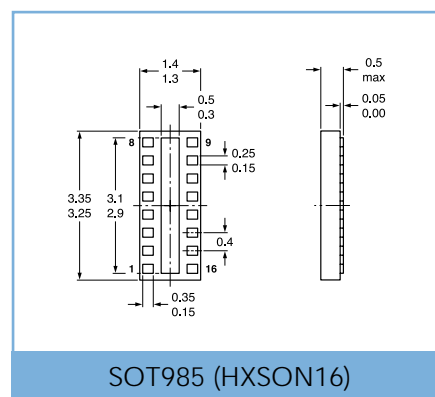


SOT984 (HXSON12)

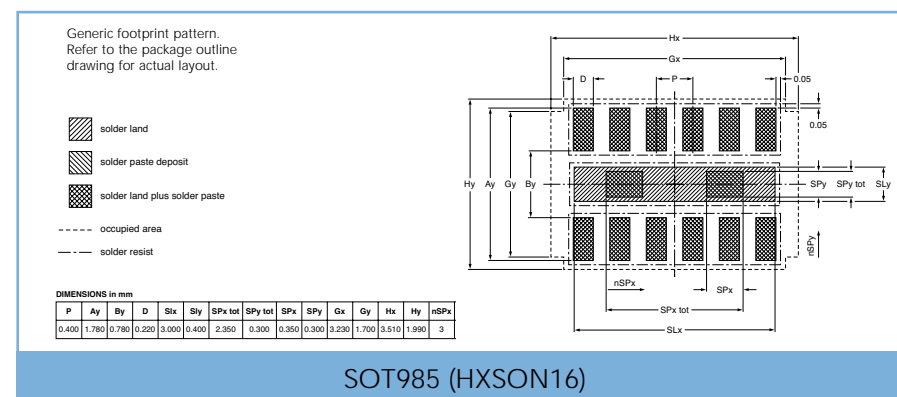
Through Hole Packages



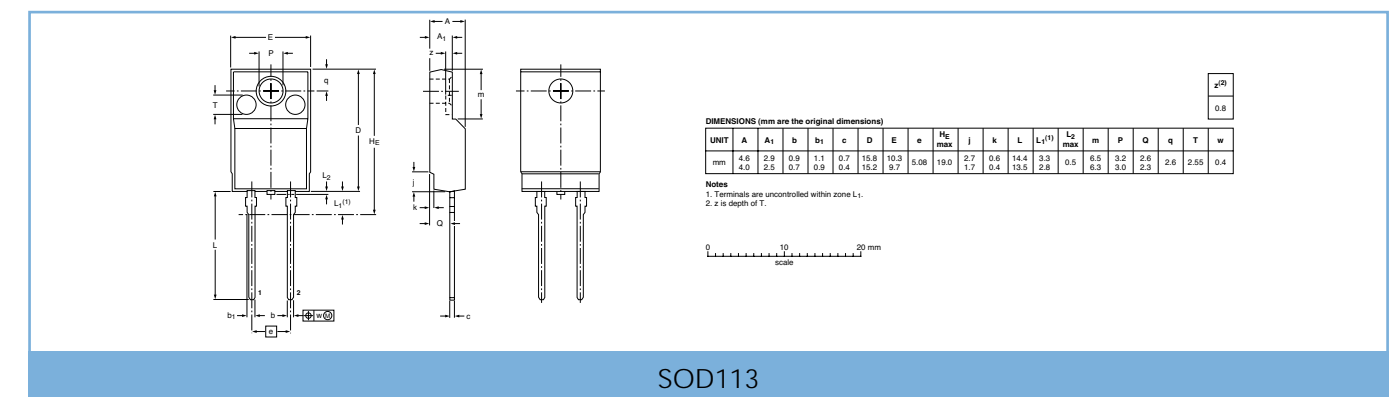
SOD59



SOT985 (HXSON16)



SOT985 (HXSON16)



SOD113

DIMENSIONS (mm are the original dimensions)

| UNIT | A | b | b ₁ | c | D | d | E | e | e ₁ | L | L ₁ ⁽¹⁾ max. |
|------|-----|------|----------------|------|-----|-----|-----|------|----------------|------|---------------------------------------|
| mm | 5.2 | 0.48 | 0.66 | 0.45 | 4.8 | 1.7 | 4.2 | 2.54 | 1.27 | 14.5 | 2.5 |
| | 5.0 | 0.40 | 0.55 | 0.38 | 4.4 | 1.4 | 3.6 | | | 12.7 | |

Note
1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

0 2.5 5 mm
scale

SOT54

DIMENSIONS (mm are the original dimensions)

| UNIT | A ₁ | b | b ₁ | b ₂ | c | D | D ₁ | E | e | e ₁ | j | K | L | L ₁ | L ₂ ⁽¹⁾ max. | P | Q | q | y ⁽²⁾ | w | |
|------|----------------|-----|----------------|----------------|-----|-----|----------------|-----|------|----------------|------|-----|------|----------------|---------------------------------------|-----|-----|-----|------------------|-----|-----|
| mm | 4.6 | 2.9 | 0.9 | 1.1 | 1.4 | 0.7 | 15.8 | 6.5 | 10.3 | 2.54 | 5.08 | 2.7 | 0.6 | 14.4 | 3.30 | 3 | 3.2 | 2.6 | 3.0 | 2.5 | 0.4 |
| | 4.0 | 2.5 | 0.7 | 0.9 | 1.0 | 0.4 | 15.2 | 6.3 | 9.7 | | 1.7 | 0.4 | 13.5 | 2.79 | | 3.0 | 2.3 | 2.6 | 2.5 | | |

Notes
1. Terminal dimensions within this zone are uncontrolled.
2. Both recesses are $\pm 2.5^\circ$ 0.8 max. depth.

0 5 10 mm
scale

SOT186A

DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ | b | b ₁ ⁽²⁾ | b ₂ ⁽²⁾ | c | D | D ₁ | E | e | L | L ₁ ⁽¹⁾ | L ₂ ⁽¹⁾ max. | p | q | Q |
|------|-----|----------------|-----|-------------------------------|-------------------------------|-----|------|----------------|------|------|------|-------------------------------|---------------------------------------|-----|-----|-----|
| mm | 4.7 | 1.40 | 0.9 | 1.6 | 1.3 | 0.7 | 16.0 | 6.6 | 10.3 | 2.54 | 15.0 | 3.30 | 3.0 | 3.8 | 3.0 | 2.6 |
| | 4.1 | 1.25 | 0.6 | 1.0 | 1.0 | 0.4 | 15.2 | 5.9 | 9.7 | | 12.8 | 2.79 | | 3.5 | 2.7 | 2.2 |

Notes
1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

0 5 10 mm
scale

SOT78

DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ | b | b ₁ | c | D max. | D ₁ | E | e | L | L ₁ | Q |
|------|-----|----------------|------|----------------|-----|-----------|----------------|------|------|------|----------------|-----|
| mm | 4.5 | 1.40 | 0.85 | 1.3 | 0.7 | 11 | 1.6 | 10.3 | 2.54 | 15.0 | 3.30 | 2.6 |
| | 4.1 | 1.27 | 0.60 | 1.0 | 0.4 | | 1.2 | 9.7 | | 13.5 | 2.79 | 2.2 |

0 5 10 mm
scale

SOT226

DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ | b | b ₁ | b ₂ | c | D | D ₁ ref. | E | e | L | L ₁ ref. | p | Q | q | w |
|------|-----|----------------|-----|----------------|----------------|-----|------|------------------------|------|------|------|------------------------|-----|-----|-----|-----|
| mm | 4.7 | 1.40 | 0.9 | 1.4 | 1.72 | 0.6 | 16.0 | 6.5 | 10.3 | 2.54 | 14.0 | 3.0 | 3.7 | 2.6 | 3.0 | 0.2 |
| | 4.3 | 1.25 | 0.6 | 1.1 | 1.32 | 0.4 | 15.2 | 5.9 | 9.7 | | 12.8 | 2.79 | 3.5 | 2.2 | 2.7 | |

0 5 10 mm
scale

SOT78D

DIMENSIONS (mm are the original dimensions)

| UNIT | A | A ₁ | b | c | D ₁ | D ₂ | E | E ₁ | e | e ₁ | L | L ₁ ⁽²⁾ max. | Q | w |
|------|------|----------------|------|------|----------------|----------------|------|----------------|--------------------|--------------------|-----|---------------------------------------|-----|-----|
| mm | 2.38 | 0.93 | 0.89 | 0.56 | 1.10 | 6.22 | 6.73 | 5.21 | 4.57 | 2.285 | 9.6 | 2.7 | 1.1 | 0.3 |
| | 2.22 | 0.46 | 0.71 | 0.46 | 0.96 | 5.98 | 6.47 | 5.00 | BSC ⁽¹⁾ | BSC ⁽¹⁾ | 9.2 | | 1.0 | |

Notes
1. Basic spacing between centers.
2. Terminal dimensions are uncontrolled within zone L₁.

0 2.5 5 mm
scale

SOT533

DIMENSIONS (mm are the original dimensions)

| UNIT | A | b | c | D | E | e | e ₁ | L | L ₁ ⁽¹⁾ max. | P | Q | q | w |
|------|-----|------|------|------|-----|------|----------------|------|---------------------------------------|-----|-----|-----|-------|
| mm | 2.8 | 0.88 | 0.58 | 11.1 | 7.8 | 2.29 | 4.58 | 16.5 | 2.54 | 3.1 | 1.5 | 3.9 | 0.254 |
| | 2.3 | 0.65 | 0.47 | 10.5 | 7.2 | | | 15.3 | | 2.5 | 0.9 | 3.5 | |

Note
1. Terminal dimensions within this zone are uncontrolled to allow for body and terminal irregularities.

0 2.5 5 mm
scale

SOT82