

SYMBOLS & CODES EXPLAINED

6. "P" Channel

7. "N" Channel — SILICON FIELD EFFECT TRANSISTORS

LINE No.	TYPE No.	1 MAX. DEVICE DISS @ 25°C (W)	2 MAX. Id=0 (V)	3 MAX. Vds (V)	4 ABS. MAX. BVdss (V)	5 ABS. MAX. BVgss (V)	6 Id (A)	7 Ig (A)	8 Max. Idss @ Vgs=0 & Vds>Vp (A)	9 Max. Igss @ Vgs>Vp & Vds=0 (A)	TEST COND.		PARAMETERS @ 25°C COMMON SOURCE		12 Rds (Ω)	13 MAX. Cis (F)	14 IN FREE AIR W/°C	15 MAX. TEMP (°C)	16 STRUCTURE	17 DWG # Y200 s/s TO200 Ser.	18 # C A D E
											Vgs (V)	Vds (V)	gfs (mhos)	Yos (mhos)							

▼ - Matched Type, also listed in Section 13, Category 6  
 ◆ - Phototransistor, also listed in Section 13, Category 7 (See Above Also)

△ - With infinite heat sink  
 † - Above 25°C; For additional information, consult manufacturer.

† - V<sub>GS</sub> (Cut Off)  
 △ - V<sub>GST</sub> (Threshold)  
 % - Typical  
 # - Minimum

△ - Depletion Mode, Type A  
 § - Depletion-Enhancement Mode, Type B  
 \* - Enhancement Mode, Type C

△ - BV<sub>DSS</sub>  
 † - BV<sub>DSSX</sub>  
 △ - BV<sub>DGO</sub>

△ - Typical § - gfg  
 † - Pulsed  
 % - High Frequency (V<sub>fs</sub>)  
 □ - YFS

△ - Y<sub>is</sub> § - Y<sub>og</sub>  
 † - Not at given test conditions  
 % - Maximum  
 \* - Pulsed

△ - V<sub>GD</sub>  
 † - V<sub>DG</sub>  
 ∅ - I<sub>D</sub> in mA

% - Maximum  
 △ - Not given at test conditions  
 † - R<sub>DS(on)</sub> at V<sub>DS</sub> = 0

△ - I<sub>GDO</sub>

△ - I<sub>DSS</sub> @ V<sub>GS</sub> = 0 and V<sub>DS</sub> ≈ V<sub>p</sub>  
 ∅ - V<sub>GS</sub> > 0  
 # - Minimum  
 \* - Typical  
 % - Pulsed

# - C<sub>iss</sub> (Output Shorted)  
 △ - C<sub>dgs</sub>  
 † - C<sub>gss</sub>  
 % - Not given at test conditions  
 \* - Typical  
 □ - C<sub>dss</sub>  
 ∅ - C<sub>dgo</sub> § - C<sub>igs</sub>

STRUCTURE  
 D - Diffused  
 E - Epitaxial  
 Ge - GermaniumPE  
 PE - Planar Epitaxial  
 PL - Planar  
 # - Junction Type  
 \* - Insulated Gate (MOS Type)  
 § - Matched pair or dual  
 △ - Switching, other uses  
 % - Chopper, Other uses  
 † - Noise figure 8db or below  
 H - Plastic Package  
 § - Hometaxial  
 % - Tetrode  
 % - Insulated Gate (MNOS Type)

A - Ambient J - Junction  
 C - Case S - Storage

□ - Phototransistor Device  
 △ - Tetrode Device  
 % - Composite Type

8. GERMANIUM PNP

9. GERMANIUM NPN

10. SILICON PNP

11. SILICON NPN — High Power Transistors

LINE No.	TYPE No.	1 MIN. DERATE J to C W/°C	2 MAX. FREE AIR @ 25°C (W)	3 P <sub>CM</sub> (W)	4 I <sub>c</sub> (A)	5 I <sub>b</sub> (A)	ABSOLUTE MAX. RATINGS @ 25°C			9 MAX. Icbo @ 25°C (A)	10 MAX. Vcb (V)	11 BIAS Ic (A)	12 MIN. f <sub>ae</sub> (Hz)	13 MAX. f <sub>ae</sub> (Hz)	14 MAX. SAT. RES. (Ω)	15 tr (ns)	16 STRUCTURE	17 DWG # Y200 s/s TO200 Ser.	18 # C A D E
							BVcbo (V)	BVceo (V)	BVceo (V)										

† - 40°C    ◆ - 80°C  
 \* - 45°C    § - 100°C  
 # - 50°C    ∅ - Free Air  
 □ - 60°C    ∇ - Typical Value  
 § - 75°C    △ - > 100°C  
 Symbols indicate temperature at which derating starts.

∅ - With infinite heat sink  
 Following symbols indicate temp at which derating starts:  
 † - 40°C    □ - 60°C    ◆ - 80°C  
 \* - 45°C    § - 70°C    △ - Pulsed  
 # - 50°C    § - 100°C    % - Min.

\* - 50-65°C    A - Ambient  
 ∅ - 70-80°C    C - Case  
 # - 85-100°C    J - Junction  
 ◆ - 110-125°C    S - Storage  
 † - 130-135°C  
 § - 140-165°C  
 § - 170-200°C  
 ▼ - Over 200°C

∅ - I<sub>E</sub>    § - Minimum  
 # - Pulsed or Peak  
 † - At temperature 25°C Case

∅ - At V<sub>CB</sub> < Max. V<sub>CB</sub> (see mfr. spec.)  
 # - I<sub>CEX</sub>    \* - I<sub>cer</sub>    △ - I<sub>CEO</sub>  
 § - I<sub>CES</sub>    ◆ - At Temp. 25°C Case  
 § - Typical    † - At Temp. > 25°C

# - BV<sub>CEx</sub> or punch-through  
 ∅ - BV<sub>CES</sub>    \* - Pulsed  
 § - BV<sub>CER</sub>    □ - BV<sub>ceo(SUS)</sub>  
 § - Minimum

† - At Temp. 25°C Case  
 § - Minimum  
 ∅ - I<sub>E</sub>  
 # - Pulsed  
 § - Minimum

† - h<sub>fe</sub>    \* - Available to selected range narrower than indicated  
 # - Pulsed  
 ∅ - Typical

□ - Maximum  
 ∅ - t<sub>d</sub> + t<sub>r</sub> = T<sub>on</sub>  
 § - t<sub>s</sub>  
 # - t<sub>f</sub>  
 † - t<sub>s</sub> + t<sub>f</sub> = T<sub>off</sub>  
 \* - T<sub>on</sub> + T<sub>off</sub>

▼ - Typical Value    # - Pulsed  
 # - Rated max. operating frequency  
 † - f<sub>αb</sub>  
 § - Gain bandwidth product (f<sub>T</sub>)  
 \* - Maximum frequency of oscillation  
 ∅ - Figure of merit (frequency for unity power gain)  
 △ - Minimum    □ - Maximum

§ - Tetrode  
 # - Radiation Resistant Device (Also see top of reverse side of card.)

# 11. SILICON NPN - HIGH POWER TRANSISTORS

IN ORDER OF (1) MIN. DERATING FACTOR & (2) TYPE No.

LINE No.	TYPE No.	MIN. DERATE J to C (W/C)	MAX FREE AIR @ 25°C (W)	M T A E M P	ABSOLUTE MAX. RATINGS @25°C					MAX. hFE				MAX. SAT. RES. (Ω)	tr (s)	STRUCTURE	DWG # s/a TO200 Ser.	C O D E		
					Ic (A)	Ib (A)	BVcbo (V)	BVebo (V)	BVceo (V)	Icbo @ 25°C (A)	Vcb (V)	Ic (A)	MIN						MAX	fae (Hz)
1	MHT6310	333m	30	§	5.0	500m	100	8.0	80	1.0	2.0	1.0	20	60 #	30M	500m	PLD	MT42		
2	MHT6311	333m	30	§	5.0	500m	60	8.0	40	1.0	2.0	1.0	40	120 #	30M	500m	PLD	MT42		
3	MHT6312	333m	30	§	5.0	500m	80	8.0	60	1.0	2.0	1.0	40	120 #	30M	500m	PLD	MT42		
4	MHT6313	333m	30	§	5.0	500m	100	8.0	80	1.0	2.0	1.0	40	120 #	30M	500m	PLD	MT42		
5	MHT6314	333m	30	§	5.0	500m	60	8.0	40	1.0	2.0	1.0	100 #	30M	500m	PLD	MT42			
6	MHT6315	333m	30	§	5.0	500m	80	8.0	60	1.0	2.0	1.0	100 #	30M	500m	PLD	MT42			
7	MHT6316	333m	30	§	5.0	500m	100	8.0	80	1.0	2.0	1.0	100 #	30M	500m	PLD	MT42			
8	MHT6408	333m	30	§	5.0	500m	60	8.0	40	1.0	2.0	1.0	20	60 #	30M	500m	PLD	MT53	GN	
9	MHT6409	333m	30	§	5.0	500m	80	8.0	60	1.0	2.0	1.0	20	60 #	30M	500m	PLD	MT53	GN	
10	MHT6410	333m	30	§	5.0	500m	100	8.0	80	1.0	2.0	1.0	20	60 #	30M	500m	PLD	MT53	GN	
11	MHT6411	333m	30	§	5.0	500m	60	8.0	40	1.0	2.0	1.0	40	120 #	30M	500m	PLD	MT53	GN	
12	MHT6412	333m	30	§	5.0	500m	80	8.0	60	1.0	2.0	1.0	40	120 #	30M	500m	PLD	MT53	GN	
13	MHT6413	333m	30	§	5.0	500m	100	8.0	80	1.0	2.0	1.0	40	120 #	30M	500m	PLD	MT53	GN	
14	MHT6414	333m	30	§	5.0	500m	60	8.0	40	1.0	2.0	1.0	100 #	30M	500m	PLD	MT53	GN		
15	MHT6415	333m	30	§	5.0	500m	80	8.0	60	1.0	2.0	1.0	100 #	30M	500m	PLD	MT53	GN		
16	MHT6416	333m	30	§	5.0	500m	100	8.0	80	1.0	2.0	1.0	100 #	30M	500m	PLD	MT53	GN		
17	NS9002†	333m	30	§	5.0	500m	100	8.0	80	200m	5.0	1.0	30	30	250mΔ	250u†	PL	MT42		
18	NS9210†	333m	50	§	5.0	.50	200	5.0	200	.01m	15	2.0	20	20 #	100M	1.5	PE	TO61	AO	
19	NS9211†	333m	50	§	5.0	.50	250	5.0	250	.01m	15	2.0	20	20 #	100M	1.5	PE	TO61		
20	STC1001	333m	30	§	5.0	100	100	8.0	40	1.0	4.0	1.5	20	60 #	1.0M†		D			
21	STT6309	333m	30	§	5.0	500m	80	8.0	60	1.0	5.0	1.0	20	60 #	30M	500m	PL	TO111		
22	STT6310	333m	30	§	5.0	500m	100	8.0	80	1.0	5.0	1.0	20	60 #	30M	500m	PL	TO111		
23	STT6312	333m	30	§	5.0	500m	80	8.0	60	1.0	5.0	1.0	40	120 #	30M	500m	PL	TO111		
24	STT6313	333m	30	§	5.0	500m	100	8.0	80	1.0	5.0	1.0	40	120 #	30M	500m	PL	TO111		
25	STT6314	333m	30	§	5.0	500m	80	8.0	60	1.0	5.0	1.0	100 #	30M	500m	PL	TO111			
26	STT6315	333m	30	§	5.0	500m	100	8.0	80	1.0	5.0	1.0	100 #	30M	500m	PL	TO111			
27	STT6309	333m	30	§	5.0	500m	80	8.0	60	1.0	5.0	1.0	20	60 #	30M	500m	PL	TO111		
28	STT6410	333m	30	§	5.0	500m	100	8.0	80	1.0	5.0	1.0	20	60 #	30M	500m	PL	TO111		
29	STT6412	333m	30	§	5.0	500m	80	8.0	60	1.0	5.0	1.0	40	120 #	30M	500m	PL	TO111		
30	STT6413	333m	30	§	5.0	500m	100	8.0	80	1.0	5.0	1.0	40	120 #	30M	500m	PL	TO111		
31	STT6415	333m	30	§	5.0	500m	80	8.0	60	1.0	5.0	1.0	100 #	30M	500m	PL	TO111			
32	STT6416	333m	30	§	5.0	500m	100	8.0	80	1.0	5.0	1.0	100 #	30M	500m	PL	TO111			
33	FT7207A	361m	30	§	5.0	100	8.0	8.0	80	1.0	5.0	1.0	100 #	30M	300m	DPE	MT43			
34	FT7207B	361m	30	§	5.0	120	8.0	8.0	80	10u	5.0	2.0	40	120 #	70MΔ	300m	DPE	MT43		
35	2N1210/I	400m	50	§	5.0	60	8.0	60	20m	12	2.0	1.0	15	75	2.5M†	1.0		90u	MS3	
36	2N1211/I	400m	50	§	5.0	60	8.0	70	10m	12	2.0	1.0	15	75	2.5M†	1.0		11u	MS3	
37	2N1616/I	400m	50	§	5.0	80	8.0	80	10m	12	2.0	1.0	15	75	2.5M†	1.0		90u	MT10	
38	2N1617/I	400m	50	§	5.0	80	8.0	70	10m	12	2.0	1.0	15	75	2.5M†	1.0		90u	MT10	
39	2N1618/I	400m	50	§	5.0	100	8.0	80	10m	12	2.0	1.0	15	75	2.5M†	1.0		900n	MT10	
40	2N1619	400m	50	§	5.0	100	8.0	80	10m	12	2.0	1.0	35	15	15k	1.0	D	1.2u	90u	
41	2N1620/I	400m	50	§	5.0	150	6.0	80	10m	12	2.0	1.0	12	75	2.5M†	2.0	ME	MS3		
42#	2SC41	400m	50	§	5.0	1.5	150	6.0	75	60m	10	1.0	4.0	185	20M†	2.0	ME	TO3		
43#	2SC42	400m	50	§	5.0	1.5	200	6.0	75	30u	10	1.0	12	128	20M†	400m	ME	TO3		
44#	2SC42A	400m	50	§	5.0	1.5	150	6.0	75	60m	10	1.0	4.0	185	20M†	2.0	ME	TO3		
45#	2SC43	400m	50	§	5.0	1.5	150	6.0	75	60m	10	1.0	4.0	185	20M†	2.0	ME	TO3		
46#	2SC44	400m	50	§	5.0	1.5	150	6.0	75	60m	10	1.0	4.0	185	20M†	2.0	ME	TO3		
47#	2SC270	400m	50	§	5.0	270	6.0	75	1.0m	3.0	2.0	2.0	24	92	20M†	300m	ME	TO3		
48#	2SC518	400m	50	§	5.0	140	5.0	140	10m	5.0	5.0	5.0	20	40	20M†	300m	DM	TO3		
49#	2SC518A	400m	50	§	5.0	180	5.0	180	1.0m	5.0	5.0	5.0	40	70	40M	300m	DM	TO3	CØ	
50#	2SC768	400m	50	§	10	60	5.0	40	1.0m	4.0	1.0	1.0	8.0	70	1.0M	2.0	ME	TO3		
51#	2SC769	400m	50	§	10	120	5.0	80	1.0m	4.0	2.0	2.0	10	110	1.0M	2.0	ME	TO3	CØ	
52#	2SC770	400m	50	§	10	200	5.0	100	1.0m	4.0	2.0	2.0	10	110	1.0M	2.0	ME	TO3	CØ	
53#	2SC771	400m	50	§	10	250	5.0	120	1.0m	4.0	1.0	1.0	8.0	70	1.0M	2.0	ME	TO3	CØ	
54#	2SC1100	400m	50	§	3.0	1.1k	7.0	400	1.0m	15	3.0	3.0	10	10	1.0M	2.0	ME	TO3	CØ	
55#	2SD45	400m	50	§	5.0	1.5	150	6.0	100	15m	1.0	1.0	12	128	20M†	600m	ME	TO3		
56#	2SD46	400m	50	§	5.0	1.5	150	6.0	75	15m	1.0	1.0	12	184	20M†	600m	ME	TO3		
57#	2SD60	400m	50	§	6.0	150	10	75	30u	4.0	1.0	1.0	35	180	3.0M†	200m	D	TO3	CØ	
58	3TE130	400m	60	§	5.0	90	4.0	80	10u	5.0	5.0	5.0	20	80	180M†	200m	PE	TO3		
59	3TE220	400m	60	§	5.0	2.0	80	4.0	80	10u	5.0	4.5	10	60 #	180M†	200m	DPE	TO3		
60	3TX002	400m	70	§	5.0	100	5.0	80	10m	5.0	5.0	5.0	30	150k	200m	PEΔ	TO3	CØ		
61	4JD20A7	400m	2.0	§	2.0	1.0	50	8.0	30	10u	5.0	1.0	20	60	10MΔ	1.2	DM	MT47		
62	4JD20A8	400m	2.0	§	2.0	1.0	50	8.0	30	10u	5.0	1.0	20	120	10MΔ	1.2	DM	MT47		
63	20A10	400m	30	§	2.0	1.0	125	8.0	30	1.0m	5.0	1.0	90	180	10M	1.0	DM	TO59		
64	20A11	400m	30	§	2.0	1.0	100	8.0	60	1.0m	5.0	1.0	90	180	10M	1.0	DM	TO59		
65	20A12	400m	30	§	2.0	1.0	175	8.0	120	1.0m	5.0	1.0	90	180	10M	1.0	DM	TO59		
66	A0A5	400m	10	§	2.5	100m	750	5.0	750	5.0	5.0	5.0	30	90	7.5M	2.0	DM	TO59		
67	B146000	400m	25	§	10	2.0	50	5.0	40	1.0m	10	3.0	45	90	1.0m	3.0	Δ	TO61	AO	
68	B146001	400m	25	§	10	2.0	50	5.0	40	1.0m	10	3.0	70	140	1.0m	3.0	Δ	TO61	AO	
69	B146002	400m	25	§	10	2.0	50	5.0	40	1.0m	10	3.0	120	240	1.0m	3.0	Δ	TO61	AO	
70	B146003	400m	25	§	10	2.0	70	5.0	60	1.0m	10	3.0	45	90	1.0m	3.0	Δ	TO61	AO	
71	B146004	400m	25	§	10	2.0	70	5.0	60	1.0m	10	3.0	70	140	1.0m	3.0	Δ	TO61	AO	
72	B146005	400m	25	§	10	2.0	70	5.0	60	1.0m	10	3.0	120	240	1.0m	3.0	Δ	TO61	AO	
73	B146006	400m	25	§	10	2.0	90	5.0	80	1.0m	10	3.0	45	90	1.0m	3.0	Δ	TO61	AO	
74	B146007	400m	25	§	10	2.0	90	5.0	80	1.0m	10	3.0	70	140	1.0m	3.0	Δ	TO61	AO	
75	B146008	400m	25	§	10	2.0	90	5.0	80	1.0m	10	3.0	120	240	1.0m					