

ALPHANUMERIC INDEX — CROSS-REFERENCE

The following table represents an index and cross-reference guide for all low-frequency power transistors which are either manufactured directly by Motorola or for which Motorola manufactures a suitable equivalent. Where the Motorola part num-

ber differs from the industry part number, the Motorola device is a "form, fit and function" replacement for the industry type number — however, subtle differences in characteristics and/or specifications may exist.

| Industry Part Number | Motorola Direct Replacement | Motorola Similar Replacement | Page Number | Industry Part Number | Motorola Direct Replacement | Motorola Similar Replacement | Page Number |
|----------------------|-----------------------------|------------------------------|-------------|----------------------|-----------------------------|------------------------------|-------------|
| 1S110A-100 | | MJ16018 | 3-782 | 2N3441 | 2N3441 | | 3-13 |
| 2N1487 | | 2N5877 | 3-120 | 2N3442 | 2N3442 | | 3-15 |
| 2N1488 | | 2N5878 | 3-120 | 2N3445 | 2N3447 | | 3-18 |
| 2N1489 | | 2N5877 | 3-120 | 2N3446 | 2N3448 | | 3-18 |
| 2N1490 | | 2N5878 | 3-120 | 2N3447 | 2N3447 | | 3-18 |
| 2N1702 | | 2N5877 | 3-120 | 2N3448 | 2N3448 | | 3-18 |
| 2N3016 | | 2N5337 | 3-97 | 2N3583 | 2N3583 | | 3-20 |
| 2N3021 | | 2N3789 | 3-56 | 2N3584 | 2N3584 | | 3-20 |
| 2N3022 | | 2N3789 | 3-56 | 2N3585 | 2N3585 | | 3-20 |
| 2N3023 | | 2N3789 | 3-56 | 2N3667 | | 2N5881 | 3-123 |
| 2N3024 | | 2N3791 | 3-56 | 2N3713 | | 2N5881 | 3-123 |
| 2N3025 | | 2N3791 | 3-56 | 2N3714 | 2N3714 | | 3-26 |
| 2N3026 | | 2N3791 | 3-56 | 2N3715 | 2N3715 | | 3-26 |
| 2N3054 | 2N3054 | | 3-2 | 2N3715JAN | 2N3715JAN | | 3-26 |
| 2N3054A | 2N3054A | | 3-2 | 2N3715JTX | 2N3715JTX | | 3-26 |
| 2N3055 | 2N3055 | | 3-6 | 2N3715JTXV | 2N3715JTXV | | 3-26 |
| 2N3055A | 2N3055A | | 3-9 | 2N3716 | 2N3716 | | 3-26 |
| 2N3055H | | 2N3055A | 3-9 | 2N3716JAN | 2N3716JAN | | 3-26 |
| 2N3055H | | 2N5302JAN | 3-93 | 2N3716JTX | 2N3716JTX | | 3-26 |
| 2N3055JAN | | 2N3055A | 3-9 | 2N3716JTXV | 2N3716JTXV | | 3-26 |
| 2N3055SD | | | | | | | |
| 2N3055SUB | | 2N3055A | 3-9 | 2N3719 | 2N3719 | | 3-32 |
| 2N3076 | | 2N6249 | 3-164 | 2N3720 | 2N3720 | | 3-32 |
| 2N3079 | | 2N6308 | 3-181 | 2N3738 | 2N3738 | | 3-37 |
| 2N3080 | | 2N6543 | 3-215 | 2N3739 | 2N3739 | | 3-37 |
| 2N3171 | | 2N3789 | 3-56 | 2N3739JAN | 2N3739JAN | | 3-37 |
| 2N3172 | | 2N3789 | 3-56 | 2N3739JTX | 2N3739JTX | | 3-37 |
| 2N3173 | | 2N3790 | 3-56 | 2N3739JTXV | 2N3739JTXV | | 3-37 |
| 2N3174 | | MJ15016 | 3-9 | 2N3740 | 2N3740 | | 3-41 |
| 2N3183 | | 2N3789 | 3-56 | 2N3740A | | 2N3740 | 3-41 |
| 2N3184 | | 2N3789 | 3-56 | 2N3740JAN | 2N3740JAN | | 3-41 |
| 2N3185 | | 2N3790 | 3-56 | 2N3740JTX | 2N3740JTX | | 3-41 |
| 2N3186 | | MJ15016 | 3-9 | 2N3740JTXV | 2N3740JTXV | | 3-41 |
| 2N3195 | | 2N3789 | 3-56 | 2N3741 | 2N3741 | | 3-41 |
| 2N3196 | | 2N3790 | 3-56 | 2N3741A | 2N3741A | | 3-41 |
| 2N3198 | | MJ15016 | 3-9 | 2N3741JAN | 2N3741JAN | | 3-41 |
| 2N3202 | | 2N3719 | 3-32 | 2N3741JTX | 2N3741JTX | | 3-41 |
| 2N3203 | | 2N3720 | 3-32 | 2N3741JTXV | 2N3741JTXV | | 3-41 |
| 2N3204 | | 2N6303 | 3-32 | 2N3766 | 2N3766 | | 3-44 |
| 2N3232 | | 2N5877 | 3-120 | 2N3766JAN | 2N3766JAN | | 3-44 |
| 2N3233 | | 2N5882 | 3-123 | 2N3766JTX | 2N3766JTX | | 3-44 |
| 2N3234 | | 2N5760 | 3-116 | 2N3766JTXV | 2N3766JTXV | | 3-44 |
| 2N3235 | | 2N3055 | 3-6 | 2N3767 | 2N3767 | | 3-44 |
| 2N3236 | | 2N5882 | 3-123 | 2N3767JAN | 2N3767JAN | | 3-44 |
| 2N3237 | | 2N5302 | 3-93 | 2N3767JTX | 2N3767JTX | | 3-44 |
| 2N3238 | | 2N5882 | 3-123 | 2N3767JTXV | 2N3767JTXV | | 3-44 |
| 2N3239 | | 2N5882 | 3-123 | 2N3771 | 2N3771 | | 3-48 |
| 2N3240 | | 2N5882 | 3-123 | 2N3772 | 2N3772 | | 3-48 |
| 2N3419 | | 2N5336 | 3-97 | 2N3773 | 2N3773 | | 3-52 |
| 2N3420 | | 2N5336 | 3-97 | 2N3788 | | 2N6543 | 3-215 |
| 2N3421 | | 2N5336 | 3-97 | 2N3789 | 2N3789 | | 3-56 |

TABLE 13 — POWER SWITCHING TRANSISTORS (continued)

| I _C Cont Amps Max | V _{CEO} (sus) Volts Min | Device Type | | h _{FE} Min/Max | @ I _C Amp | Resistive Switching | | | f _T MHz Min | P _D (Case) Watts @ 25°C | Case JEDEC/MOT |
|------------------------------------|----------------------------------------|--------------------------|------------------|----------------------------|-------------------------|-----------------------------|-----------------------------|-------------------------|------------------------------|------------------------------------------|-------------------------------------------|
| | | NPN | PNP | | | t _s μs Max | t _f μs Max | @ I _C Amp | | | |
| | | | | | | | | | | | |
| 4 | 30 | BD185 | | 15 min | 2 | | | | 20 | 40 | TO-225AA/77 |
| | 45 | BD785 | BD786 | 20 min | 2 | | | | 50 | 15 | TO-225AA/77 |
| | 60 | 2N4877 BD189 BD787 | BD788 | 20/100 15 min 20 min | 4 2 2 | 1.5 | 0.5 | 4 | 30 20 50 | 10 40 15 | TO-205AD/79 TO-225AA/77 TO-225AA/77 |
| | 80 | BD789 | BD790 | 10 min | 2 | | | | 40 | 15 | TO-225AA/77 |
| | 100 | BD791 | BD792 | 10 min | 2 | | | | 40 | 15 | TO-225AA/77 |
| 5 | 80 | 2N5337 | 2N6191 | 60/240 | 2 | 2 | 0.2 | 2 | 30 | 10 | TO-205AD/79 |
| | 100 | 2N5339 | 2N6193 | 60/240 | 2 | 2 | 0.2 | 2 | 30 | 10 | TO-205AD/79 |
| 7 | 60 | 2N6315 | 2N6317 | 20/100 | 2.5 | 1 | 0.8 | 2.5 | 4 | 90 | TO-213AA/80 |
| | 80 | 2N5428 2N6316 | 2N6318 | 60/240 20/100 | 2 2.5 | 2 1 | 0.2 0.8 | 2 2.5 | 30 4 | 60 90 | TO-213AA/80 TO-213AA/80 |
| | 100 | 2N5430 | | 60/240 | 2 | 2 | 0.2 | 2 | 30 | 60 | TO-213AA/80 |
| 7.5 | 60 | 2N3447 | | 40/120 | 5 | 2 | 0.35 | 5 | 10 | 115 | TO-204/1 |
| | 80 | 2N3448 | | 40/120 | 5 | 2 | 0.35 | 5 | 10 | 115 | TO-204/1 |
| 8 | 120 | MJE15028 | MJE15029 | 20 min | 4 | 0.4 typ | 0.18 typ | 5 | 30 | 50 | TO-220/221A |
| | 150 | MJE15030 | MJE15031 | 20 min | 4 | 0.4 typ | 0.18 typ | 5 | 30 | 50 | TO-220/221A |
| 10 | 60 | 2N5877 | 2N5875 | 20/100 | 4 | 1 | 0.8 | 4 | 4 | 150 | TO-204/1 |
| | 80 | 2N5878 | 2N5876 | 20/100 | 4 | 1 | 0.8 | 4 | 4 | 150 | TO-204/1 |
| 15 | 60 | 2N5881 | 2N5879 | 20/100 | 6 | 1 | 0.8 | 6 | 4 | 160 | TO-204/1 |
| | 80 | 2N5882 | 2N5880 | 20/100 | 6 | 1 | 0.8 | 6 | 4 | 160 | TO-204/1 |
| 18 | 160 | BUX41N | | 8 min | 12 | 1.2 | 0.25 | 12 | 8 | 120 | TO-204/1 |
| 20 | 75 | 2N5039 | | 20/100 | 10 | 1.5 | 0.5 | 10 | 60 | 140 | TO-204/1 |
| | 80 | 2N5303 | 2N5745 | 15/60 | 10 | 2 | 1 | 10 | 2 | 200 | TO-204/1 |
| | 90 | 2N5038 | | 20/100 | 12 | 1.5 | 0.5 | 12 | 60 | 140 | TO-204/1 |
| | 125 | BUX40 | | 8 min | 15 | 1 | 0.25 | 15 | 8 | 120 | TO-204/1 |
| | 160 | BUV11N | | 10 min | 15 | 1.2 | 0.25 | 15 | 8 | 150 | TO-204/1 |
| 25 | 60 | 2N5885 | 2N5883 | 20/100 | 10 | 1 | 0.8 | 10 | 4 | 200 | TO-204/1 |
| | 80 | 2N5886 | 2N5884 2N6436 | 20/100 30/120 | 10 10 | 1 1 | 0.8 0.25 | 10 10 | 4 40 | 200 200 | TO-204/1 TO-204/1 |
| | 100 | 2N6338 | 2N6437 | 30/120 | 10 | 1 | 0.25 | 10 | 40 | 200 | TO-204/1 |
| | 120 | 2N6339 | 2N6438 | 30/120 | 10 | 1 | 0.25 | 10 | 40 | 200 | TO-204/1 |
| | 125 | BUV10 BUV10N | | 10 min 10 min | 20 20 | 1.2 1.55 | 0.25 0.45 | 20 15 | 8 10 | 150 175 | TO-204/1 TO-204/1 |
| | 140 | 2N6340 | | 30/120 | 10 | 1 | 0.25 | 10 | 40 | 200 | TO-204/1 |
| | 150 | 2N6341 | | 30/120 | 10 | 1 | 0.25 | 10 | 40 | 200 | TO-204/1 |
| 30 | 40 | 2N5301 | 2N4398 | 15/60 | 15 | 2 | 1 | 10 | 2 | 200 | TO-204/1 |
| | 60 | 2N5302 | 2N4399 | 15/60 | 15 | 2 | 1 | 10 | 2 | 200 | TO-204/1 |
| | 90 | BUX39 | | 8 min | 20 | 1 | 0.25 | 20 | 8 | 120 | TO-204/1 |

(continued)

**HIGH-SPEED SILICON ANNULAR
 NPN POWER TRANSISTORS**

... for switching and amplifier applications

FEATURES

- Fast Switching: Total Switching Time = 1.2 μ s (Typ) @ 5.0 A
- High Gain: h_{FE} = 40 to 120 @ 5.0 Amps
- Guaranteed DC Safe Area: 1.5 Amps (Min) @ V_{CE} = 40 Vdc
- Low $V_{CE(sat)}$: 1.0 Volt (Typ), 1.5 Volts (Max) @ 5.0 Amps
- Excellent Beta Linearity

APPLICATIONS

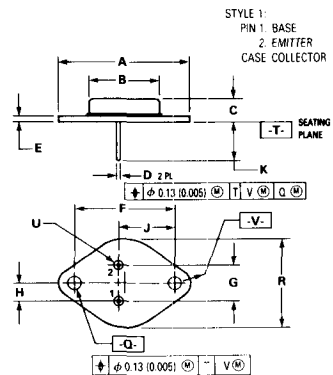
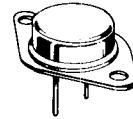
- Specified safe area of this series allows reliable design for inverters, converters, hammer, and servo drivers.
- Fast response makes it ideal for series regulators; high switching speeds enhance its use in switching regulators.
- Wide bandwidth and flat beta hold-up result in exceptional amplifier characteristics.

MAXIMUM RATING

| Rating | Symbol | 2N3447 | 2N3448 | Unit |
|--------------------------------------|-----------|-------------|-------------|--------------|
| Collector-Emitter Voltage | V_{CEO} | 60 | 80 | Vdc |
| Collector-Base Voltage | V_{CB} | 80 | 100 | Vdc |
| Emitter-Base Voltage | V_{EB} | 6.0 | 10 | Vdc |
| Collector Current-Continuous | I_C | 7.5 | | Adc |
| Base Current - Continuous | I_B | 4.0 | | Adc |
| Total Device Dissipation | P_D | Figure 1, 2 | Figure 1, 3 | Watts |
| Operating Junction Temperature Range | T_J | -65 to +200 | | $^{\circ}$ C |

7.5 AMPERE
POWER TRANSISTORS
SILICON NPN

60-80 VOLTS
115 WATTS

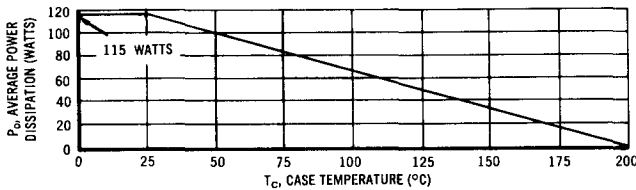


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO 204AA OUTLINE SHALL APPLY.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | — | 39.37 | — | 1.550 |
| B | — | 21.08 | — | 0.830 |
| C | 6.35 | 8.25 | 0.250 | 0.325 |
| D | 0.97 | 1.09 | 0.038 | 0.043 |
| E | 1.40 | 1.77 | 0.055 | 0.070 |
| F | 30 15 BSC | | 1.187 BSC | |
| G | 10.92 BSC | | 0.430 BSC | |
| H | 5.46 BSC | | 0.215 BSC | |
| J | 16.89 BSC | | 0.665 BSC | |
| K | 11.18 | 12.19 | 0.440 | 0.480 |
| Q | 3.84 | 4.19 | 0.151 | 0.165 |
| R | 26.67 | | 1.050 | |
| U | 4.83 | 5.33 | 0.190 | 0.210 |
| V | 3.84 | 4.19 | 0.151 | 0.165 |

CASE 1-06
TO-204AA
(TO-3)

FIGURE 1 - POWER DERATING CURVE



These transistors are also subject to safe area curves as indicated by Figures 2, 3. Both limits are applicable and must be observed.