

**MJ2955 (See 2N3055)
 MJ2955A
 (See 2N3055A)**

Medium-Power Complementary Silicon Transistors

... for use as output devices in complementary general purpose amplifier applications.

- High DC Current Gain — $h_{FE} = 4000$ (Typ) @ $I_C = 5.0$ Adc
- Monolithic Construction with Built-in Base-Emitter Shunt Resistors

**PNP
 MJ2500
 MJ2501*
 NPN
 MJ3000
 MJ3001***

*Motorola Preferred Device

**10 AMPERE
 DARLINGTON
 POWER TRANSISTORS
 COMPLEMENTARY
 SILICON
 60-80 VOLTS
 150 WATTS**

MAXIMUM RATINGS

| Rating | Symbol | MJ2500 MJ3000 | MJ2501 MJ3001 | Unit |
|---|----------------|------------------|------------------|------------------------------|
| Collector-Emitter Voltage | V_{CEO} | 60 | 80 | Vdc |
| Collector-Base Voltage | V_{CB} | 60 | 80 | Vdc |
| Emitter-Base Voltage | V_{EB} | 5.0 | | Vdc |
| Collector Current | I_C | 10 | | Adc |
| Base Current | I_B | 0.2 | | Adc |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 150 | 0.857 | Watts W/ $^\circ\text{C}$ |
| Operating and Storage Junction Temperature Range | T_J, T_{stg} | -55 to +200 | | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|--------------------------------------|---------------|------|---------------------------|
| Thermal Resistance, Junction to Case | θ_{JC} | 1.17 | $^\circ\text{C}/\text{W}$ |

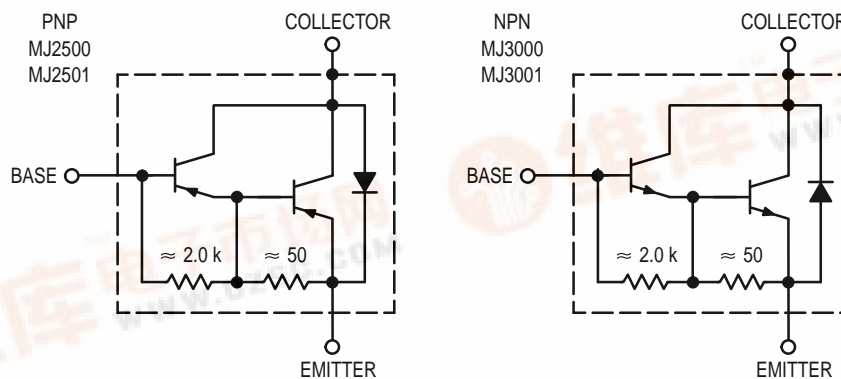
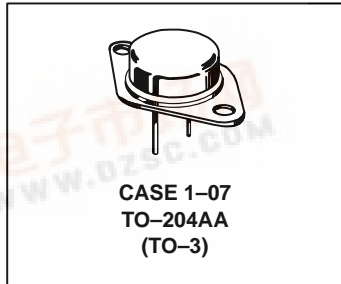


Figure 1. Darlington Circuit Schematic

Preferred devices are Motorola recommended choices for future use and best overall value.



MJ2500 MJ2501 MJ3000 MJ3001

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit | |
|---|--|---------------|------------------|--------------------------|------|
| OFF CHARACTERISTICS | | | | | |
| Collector Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 100\text{ mAdc}$, $I_B = 0$) | MJ2500, MJ3000 MJ2501, MJ3001 | $V_{(BR)CEO}$ | 60 80 | — — | Vdc |
| Collector–Emitter Leakage Current ($V_{EB} = 60\text{ Vdc}$, $R_{BE} = 1.0\text{ k ohm}$) ($V_{EB} = 80\text{ Vdc}$, $R_{BE} = 1.0\text{ k ohm}$) ($V_{EB} = 60\text{ Vdc}$, $R_{BE} = 1.0\text{ k ohm}$, $T_C = 150^\circ\text{C}$) ($V_{EB} = 80\text{ Vdc}$, $R_{BE} = 1.0\text{ k ohm}$, $T_C = 150^\circ\text{C}$) | MJ2500, MJ3000 MJ2501, MJ3001 MJ2500, MJ3000 MJ2501, MJ3001 | I_{CER} | — — — — | 1.0 1.0 5.0 5.0 | mAdc |
| Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$) | | I_{EBO} | — | 2.0 | mAdc |
| Collector Emitter Leakage Current ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$) ($V_{CE} = 40\text{ Vdc}$, $I_B = 0$) | MJ2500, MJ3000 MJ2501, MJ3001 | I_{CEO} | — — | 1.0 1.0 | mAdc |
| ON CHARACTERISTICS⁽¹⁾ | | | | | |
| DC Current Gain ($I_C = 5.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$) | | h_{FE} | 1000 | — | — |
| Collector–Emitter Saturation Voltage ($I_C = 5.0\text{ Adc}$, $I_B = 20\text{ mAdc}$) ($I_C = 10\text{ Adc}$, $I_B = 50\text{ mAdc}$) | | $V_{CE(sat)}$ | — — | 2.0 4.0 | Vdc |
| Base Emitter Voltage ($I_C = 5.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$) | | $V_{BE(on)}$ | — | 3.0 | Vdc |

(1) Pulse Test: Pulse Width $\leq 300\ \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

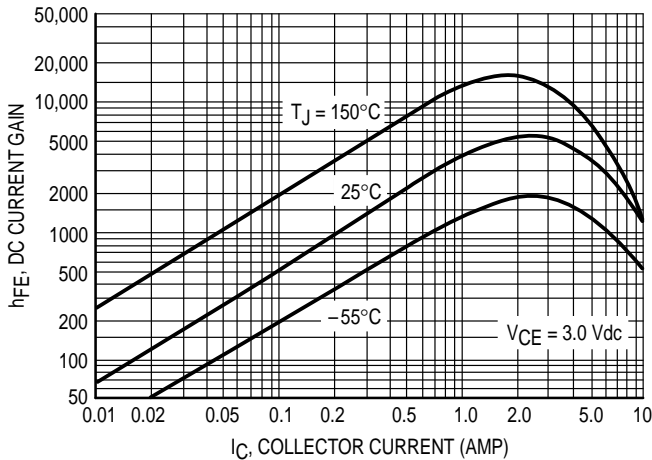


Figure 2. DC Current Gain

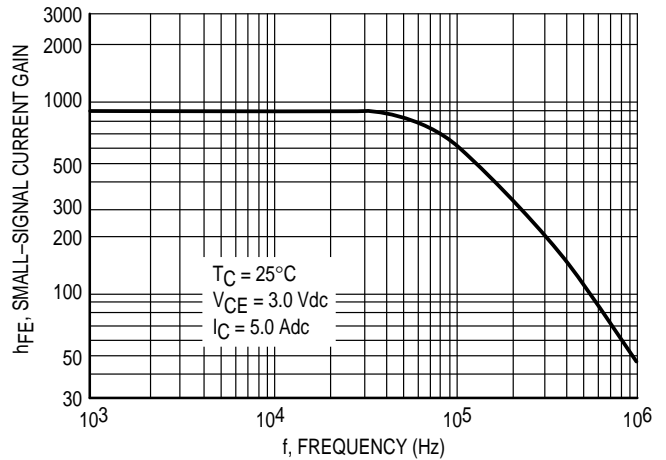


Figure 3. Small-Signal Current Gain

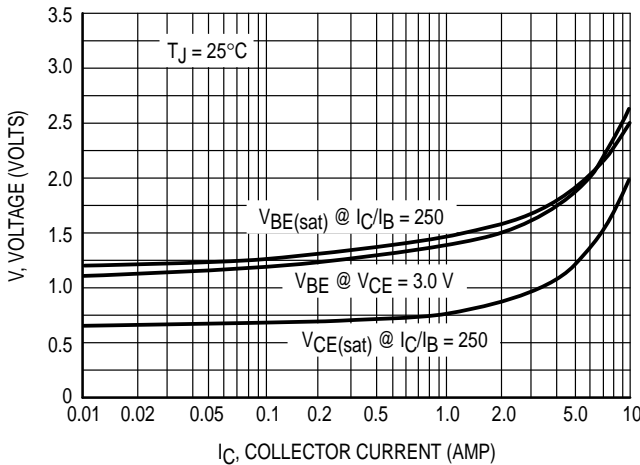


Figure 4. "On" Voltages

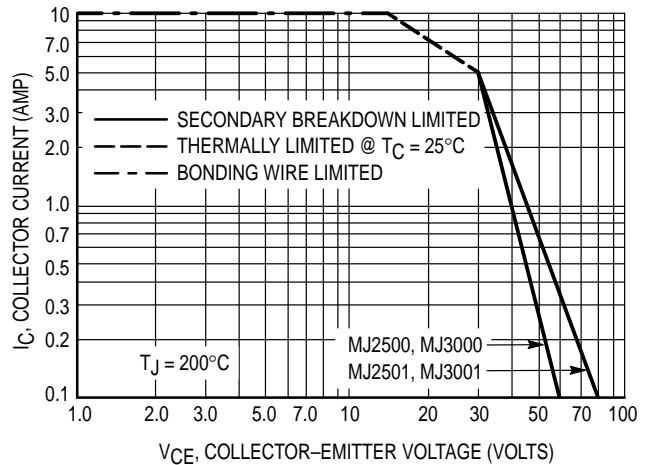


Figure 5. DC Safe Operating Area

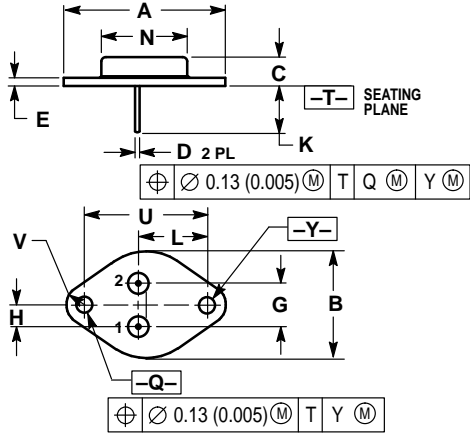
There are two limitations on the power handling ability of a transistor: junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; e.g., the transistor must not be subjected to greater dissipation

than the curves indicate.

At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown.

MJ2500 MJ2501 MJ3000 MJ3001

PACKAGE DIMENSIONS




- 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 | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.550 REF | — | 39.37 REF | — |
| B | — | 1.050 | — | 26.67 |
| C | 0.250 | 0.335 | 6.35 | 8.51 |
| D | 0.038 | 0.043 | 0.97 | 1.09 |
| E | 0.055 | 0.070 | 1.40 | 1.77 |
| G | 0.430 BSC | — | 10.92 BSC | — |
| H | 0.215 BSC | — | 5.46 BSC | — |
| K | 0.440 | 0.480 | 11.18 | 12.19 |
| L | 0.665 BSC | — | 16.89 BSC | — |
| N | — | 0.830 | — | 21.08 |
| Q | 0.151 | 0.165 | 3.84 | 4.19 |
| U | 1.187 BSC | — | 30.15 BSC | — |
| V | 0.131 | 0.188 | 3.33 | 4.77 |

STYLE 1:
 PIN 1: BASE
 2: EMITTER
 CASE: COLLECTOR

**CASE 1-07
 TO-204AA (TO-3)
 ISSUE Z**

MJ2500 MJ2501 MJ3000 MJ3001

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