

**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

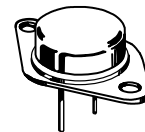
**10 AMPERE**  
**DARLINGTON**  
**POWER TRANSISTORS**  
**COMPLEMENTARY**  
**SILICON**  
**60-80 VOLTS**  
**150 WATTS**

## MAXIMUM RATINGS

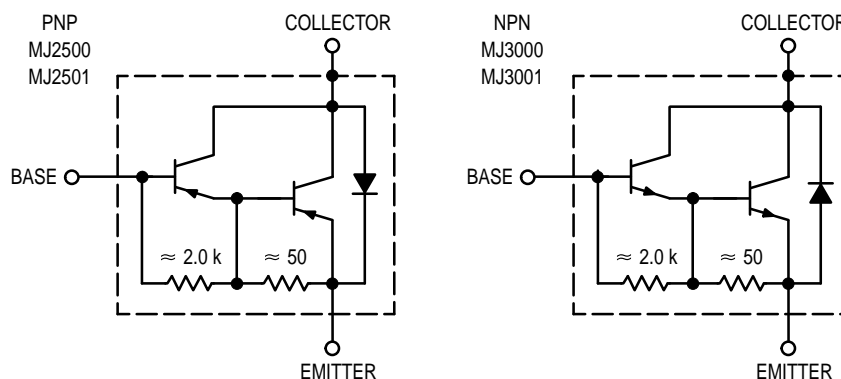
Rating	Symbol	MJ2500 MJ3000	MJ2501 MJ3001	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	80	Vdc
Collector-Base Voltage	$V_{CB}$	60	80	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0		Vdc
Collector Current	$I_C$	10		Adc
Base Current	$I_B$	0.2		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	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	$\theta_{JC}$	1.17	$^\circ\text{C}/\text{W}$



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



**Figure 1. Darlington Circuit Schematic**

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

REV 7

# MJ2500 MJ2501 MJ3000 MJ3001

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

Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector Emitter Breakdown Voltage <sup>(1)</sup> ( $I_C = 100\text{ mAdc}$ , $I_B = 0$ )	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
<b>ON CHARACTERISTICS<sup>(1)</sup></b>					
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

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

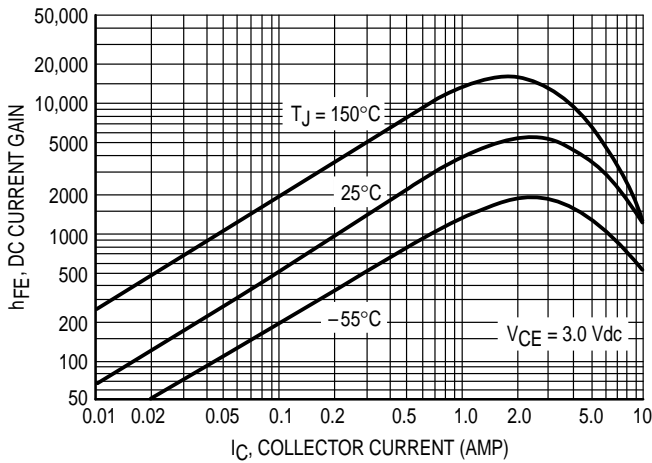


Figure 2. DC Current Gain

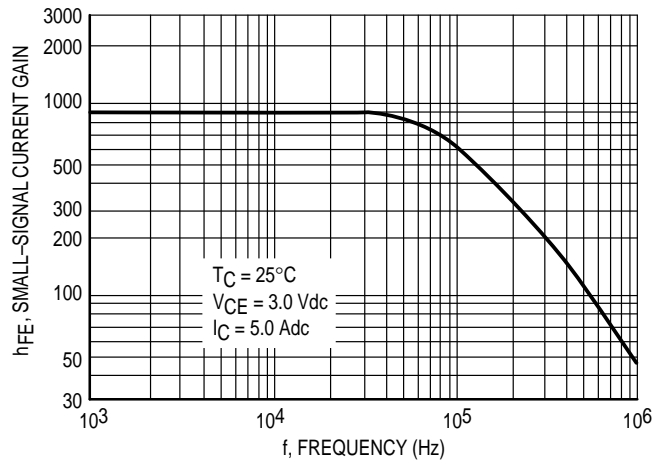


Figure 3. Small-Signal Current Gain

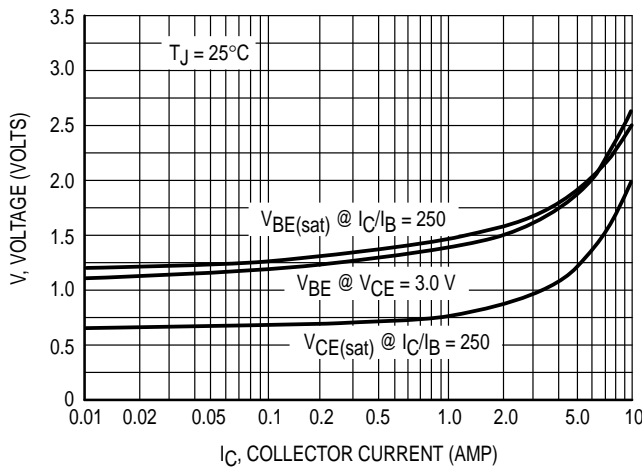


Figure 4. "On" Voltages

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

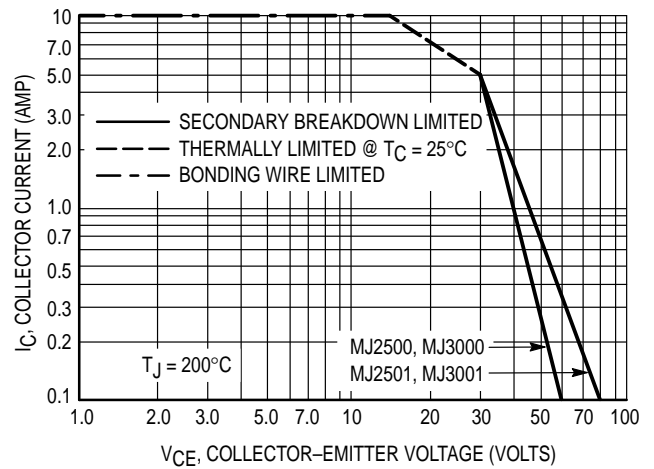
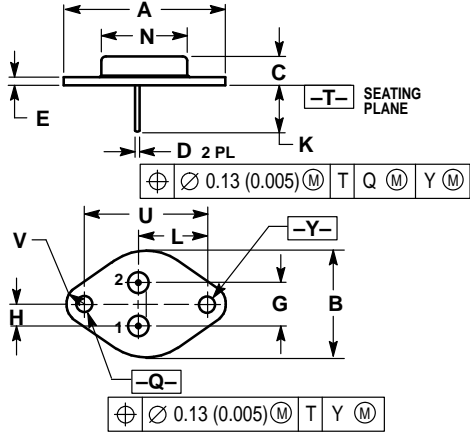


Figure 5. DC Safe Operating Area

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.

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

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