

**MEDIUM-POWER COMPLEMENTARY SILICON TRANSISTORS**

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

- High DC Current Gain –  $h_{FE} = 6000$  (Typ) @  $I_C = 3.0$  Adc
- Monolithic Construction with Built-In Base-Emitter Shunt Resistors

**8.0 AMPERE DARLINGTON POWER TRANSISTORS COMPLEMENTARY SILICON**

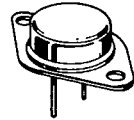
**60-80 VOLTS**  
**90 WATTS**

**MAXIMUM RATINGS**

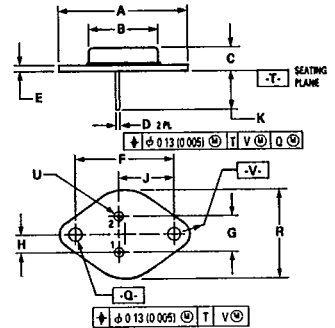
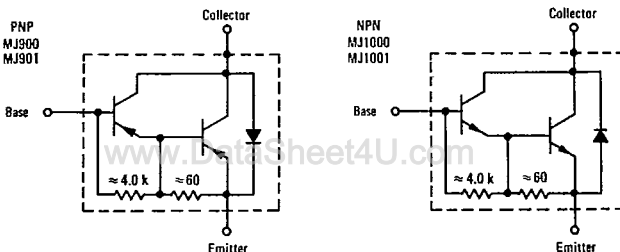
Rating	Symbol	MJ900 MJ1000	MJ901 MJ1001	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	80	Vdc
Collector-Base Voltage	$V_{CB}$	60	80	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0		Vdc
Collector Current	$I_C$	8.0		Adc
Base Current	$I_B$	0.1		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	90		Watts
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	$R_{\theta JC}$	1.94	$^\circ\text{C}/\text{W}$



**FIGURE 1 – DARLINGTON CIRCUIT SCHEMATIC**



**NOTES.**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982
2. CONTROLLING DIMENSION INCH
3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO 2044A OUTLINE SHALL APPLY

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	—	39.37	—	1.550
B	—	21.58	—	0.850
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

STYLE 1  
 PIN 1 BASE  
 2 EMITTER  
 CASE COLLECTOR

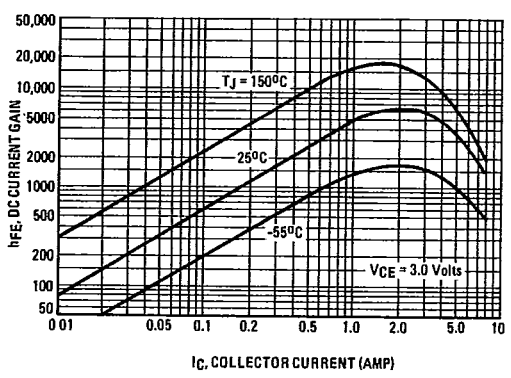
**CASE 1-06**  
**TO-204A**  
**(TO-3)**

**ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)**

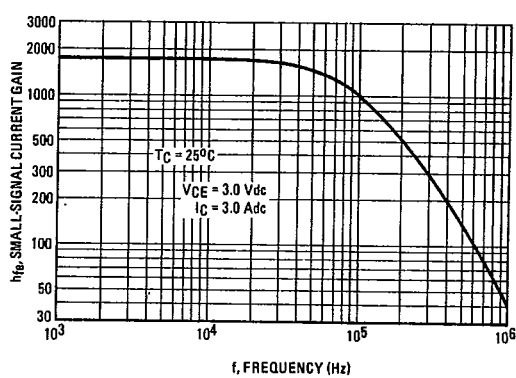
Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (1) (I <sub>C</sub> = 100 mA, I <sub>B</sub> = 0)	MJ900, MJ1000 MJ901, MJ1001	V <sub>(BR)CEO</sub>	60 80	— —	V <sub>dc</sub>
Collector Emitter Leakage Current (V <sub>CB</sub> = 60 Vdc, R <sub>BE</sub> = 1.0 k ohm) (V <sub>CB</sub> = 80 Vdc, R <sub>BE</sub> = 1.0 k ohm) (V <sub>CB</sub> = 60 Vdc, R <sub>BE</sub> = 1.0 k ohm, T <sub>C</sub> = 150°C) (V <sub>CB</sub> = 80 Vdc, R <sub>BE</sub> = 1.0 k ohm, T <sub>C</sub> = 150°C)	MJ900, MJ1000 MJ901, MJ1001 MJ900, MJ1000 MJ901, MJ1001	I <sub>CEr</sub>	— — — —	1.0 1.0 5.0 5.0	mA <sub>dc</sub>
Emitter Cutoff Current (V <sub>BE</sub> = 5.0 Vdc, I <sub>C</sub> = 0)		I <sub>EBO</sub>	—	2.0	mA <sub>dc</sub>
Collector-Emitter Leakage Current (V <sub>CE</sub> = 30 Vdc, I <sub>B</sub> = 0) (V <sub>CE</sub> = 40 Vdc, I <sub>B</sub> = 0)	MJ900, MJ1000 MJ901, MJ1001	I <sub>CEO</sub>	— —	500 500	μA <sub>dc</sub>
<b>ON CHARACTERISTICS</b>					
DC Current Gain(1) (I <sub>C</sub> = 3.0 A, V <sub>CE</sub> = 3.0 Vdc) (I <sub>C</sub> = 4.0 A, V <sub>CE</sub> = 3.0 Vdc)		h <sub>FE</sub>	1000 750	— —	—
Collector-Emitter Saturation Voltage(1) (I <sub>C</sub> = 3.0 A, I <sub>B</sub> = 12 mA) (I <sub>C</sub> = 8.0 A, I <sub>B</sub> = 40 mA)		V <sub>CE(sat)</sub>	— —	2.0 4.0	V <sub>dc</sub>
Base-Emitter Voltage(1) (I <sub>C</sub> = 3.0 A, V <sub>CE</sub> = 3.0 Vdc)		V <sub>BE</sub>	—	2.5	V <sub>dc</sub>

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

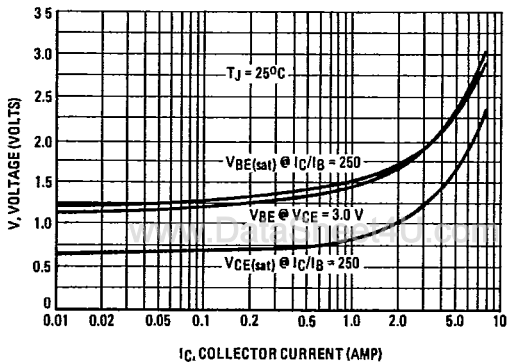
**FIGURE 2 — DC CURRENT GAIN**



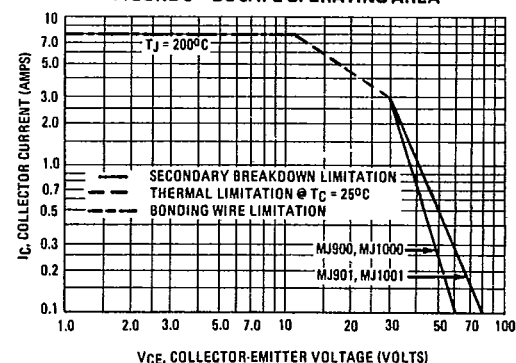
**FIGURE 3 — SMALL-SIGNAL CURRENT GAIN**



**FIGURE 4 — "ON" VOLTAGES**



**FIGURE 5 — DC SAFE OPERATING AREA**



There are two limitations on the power handling ability of a transistor: average junction temperature and secondary breakdown. Safe operating area curves indicate I<sub>C</sub>-V<sub>CE</sub> 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.