

MOTOROLA SEMICONDUCTOR TECHNICAL DATA

**MJ900, MJ901
NPN
MJ1000, MJ1001**

MEDIUM-POWER COMPLEMENTARY SILICON TRANSISTORS

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

- High DC Current Gain — $h_{FE} = 6000$ (Typ) @ $I_C = 3.0 \text{ A dc}$
- 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°C	P_D	90	0.515	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	$R_{\theta JC}$	1.94	$^\circ\text{C/W}$

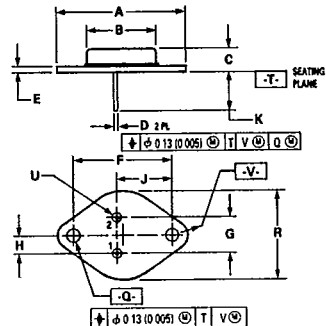
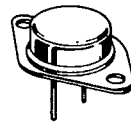
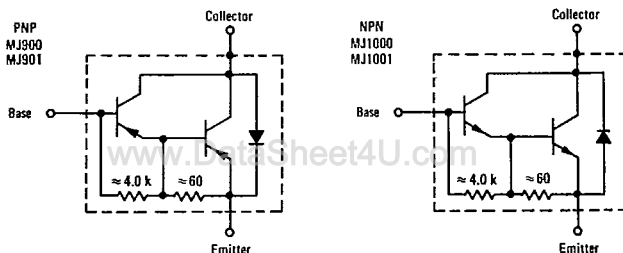


FIGURE 1 — DARLINGTON CIRCUIT SCHEMATIC



NOTES.

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

STYLE 1
PIN 1 BASE
2 EMITTER
CASE COLLECTOR

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

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (1) (I _C = 100 mA, I _B = 0)	V _{(BR)CEO}	60 80	— —	V _{dc}
Collector-Emitter Leakage Current (V _{CE} = 60 Vdc, R _{BE} = 1.0 k ohm)	I _{CER}	—	1.0	mA
(V _{CE} = 80 Vdc, R _{BE} = 1.0 k ohm)		—	1.0	
(V _{CE} = 60 Vdc, R _{BE} = 1.0 k ohm, T _C = 150°C)		—	5.0	
(V _{CE} = 80 Vdc, R _{BE} = 1.0 k ohm, T _C = 150°C)		—	5.0	
Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0)	I _{EBO}	—	2.0	mA
Collector-Emitter Leakage Current (V _{CE} = 30 Vdc, I _B = 0)	I _{CEO}	—	500	μA
(V _{CE} = 40 Vdc, I _B = 0)		—	500	

ON CHARACTERISTICS

DC Current Gain(1) (I _C = 3.0 A, V _{CE} = 3.0 Vdc) (I _C = 4.0 A, V _{CE} = 3.0 Vdc)	h _{FE}	1000 750	— —	—
Collector-Emitter Saturation Voltage(1) (I _C = 3.0 A, I _B = 12 mA) (I _C = 8.0 A, I _B = 40 mA)	V _{CE(sat)}	— —	2.0 4.0	V _{dc}
Base-Emitter Voltage(1) (I _C = 3.0 A, V _{CE} = 3.0 Vdc)	V _{BE}	—	2.5	V _{dc}

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

FIGURE 2 — DC CURRENT GAIN

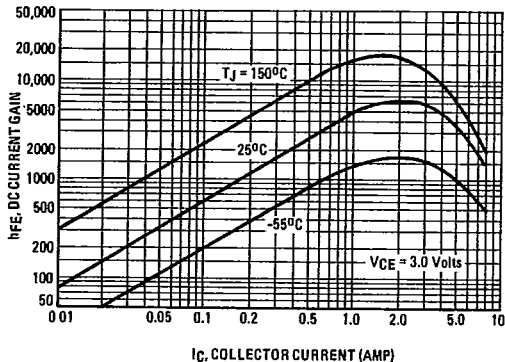
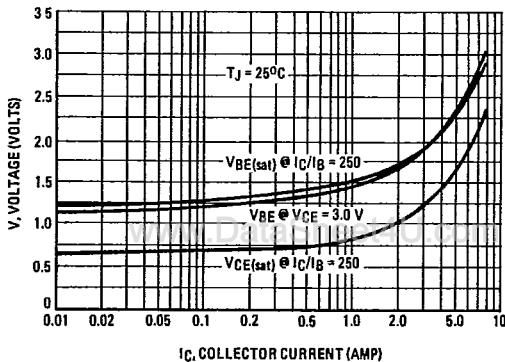


FIGURE 4 — "ON" VOLTAGES



There are two limitations on the power handling ability of a transistor: average 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

FIGURE 3 — SMALL-SIGNAL CURRENT GAIN

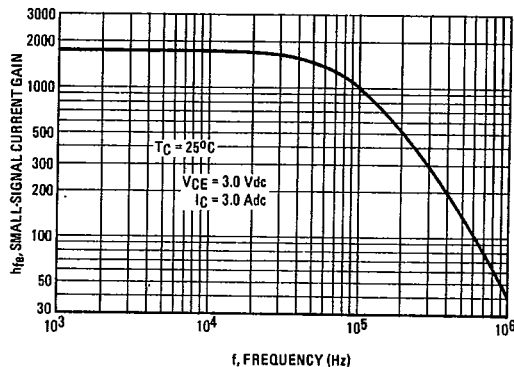
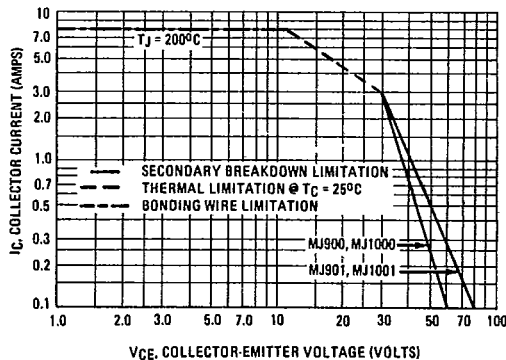


FIGURE 5 — DC SAFE OPERATING AREA



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.