

MJE1090 thru MJE1093 PNP (SILICON)
MJE2090 thru MJE2093
MJE1100 thru MJE1103 NPN
MJE2100 thru MJE2103

**PLASTIC MEDIUM-POWER
 COMPLEMENTARY SILICON TRANSISTORS**

Designed for use in driver and output stages in complementary audio amplifier applications.

- High DC Current Gain –
 $h_{FE} = 750$ (Min) @ $I_C = 3.0$ and 4.0 Adc
- True Three Lead Monolithic Construction – Emitter-Base Resistors to Prevent Leakage Multiplication are Built in.
- Available in Two Packages – Case 90 or Case 199

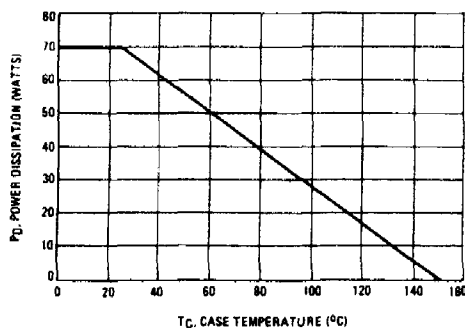
MAXIMUM RATINGS

Rating	Symbol	MJE1090 MJE1091 MJE1100 MJE1101 MJE2090 MJE2091 MJE2100 MJE2101	MJE1092 MJE1093 MJE1102 MJE1103 MJE2092 MJE2093 MJE2102 MJE2103	Unit
Collector-Emitter Voltage	V_{CE0}	60	80	Vdc
Collector-Base Voltage	V_{CB}	60	80	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current	I_C	5.0		Adc
Base Current	I_B	0.1		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	70	0.56	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.8	$^\circ\text{C}/\text{W}$

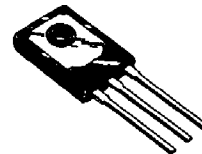
FIGURE 1 – POWER DERATING



**5.0 AMPERE
 DARLINGTON
 POWER TRANSISTORS
 COMPLEMENTARY SILICON**

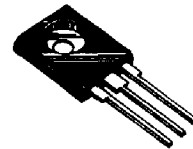
**60-80 VOLTS
 70 WATTS**

MJE1090
 MJE1091
 MJE1092
 MJE1093
 MJE1100
 MJE1101
 MJE1102
 MJE1103



CASE 90-05

MJE2090
 MJE2091
 MJE2092
 MJE2093
 MJE2100
 MJE2101
 MJE2102
 MJE2103



CASE 199-04

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MJE1090 thru MJE1093 PNP/MJE1100 thru MJE1103 NPN (continued)
MJE2090 thru MJE2093 PNP/MJE2100 thru MJE2103 NPN

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage ⁽¹⁾ ($I_C = 100 \text{ mA dc}, I_B = 0$)	BV_{CEO}	60	—	Vdc
		60	—	
		80	—	
		80	—	
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}, I_B = 0$)	I_{CEO}	—	500	$\mu\text{A dc}$
		—	500	
($V_{CE} = 40 \text{ Vdc}, I_B = 0$)		—	500	
		—	500	
Collector Cutoff Current ($V_{CB} = \text{Rated } BV_{CEO}, I_E = 0$) ($V_{CB} = \text{Rated } BV_{CEO}, I_E = 0, T_C = 100^\circ\text{C}$)	I_{CBO}	—	0.2	mA dc
		—	2.0	
Emitter Cutoff Current ($V_{BE} = 5.0 \text{ Vdc}, I_C = 0$)	I_{EBO}	—	2.0	mA dc

ON CHARACTERISTICS (1)

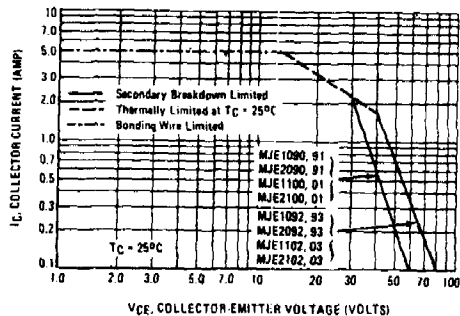
DC Current Gain ($I_C = 3.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}$)	h_{FE}	750	—	—
		750	—	
($I_C = 4.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}$)		750	—	
		750	—	
Collector-Emitter Saturation Voltage ($I_C = 3.0 \text{ A dc}, I_B = 12 \text{ mA dc}$)	$V_{CE(sat)}$	—	2.5	Vdc
		—	2.5	
($I_C = 4.0 \text{ A dc}, I_B = 16 \text{ mA dc}$)		—	2.8	
		—	2.8	
Base-Emitter On Voltage ($I_C = 3.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}$)	$V_{BE(on)}$	—	2.5	Vdc
		—	2.5	
($I_C = 4.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}$)		—	2.5	
		—	2.5	

DYNAMIC CHARACTERISTICS

Small-Signal Current Gain ($I_C = 3.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}, f = 1.0 \text{ MHz}$)	h_{fe}	1.0	—	—
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(1) Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

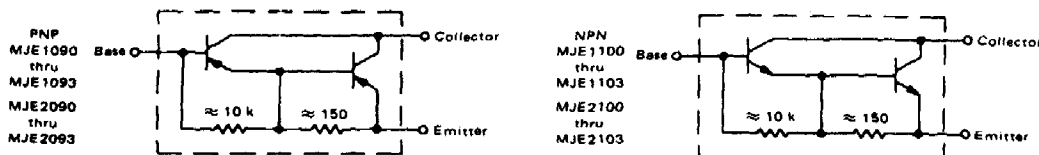
FIGURE 2 — DC SAFE OPERATING AREA



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. (See AN-415)

FIGURE 3 — DARLINGTON CIRCUIT SCHEMATIC



MJE1090 thru MJE1093 PNP/MJE1100 thru MJE1103 NPN (continued)
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