

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

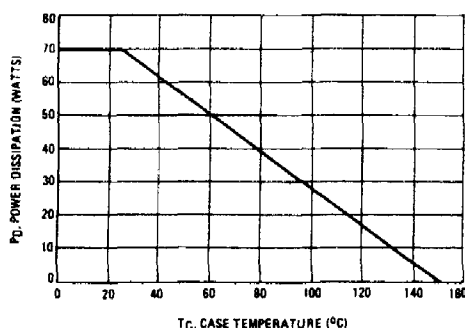
MAXIMUM RATINGS

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	$^\circ\text{C/W}$

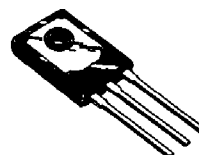
FIGURE 1 – POWER DERATING



**5.0 AMPERE
DARLINGTON
POWER TRANSISTORS
COMPLEMENTARY SILICON**

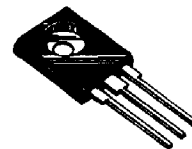
**60-80 VOLTS
70 WATTS**

MJE1090
MJE1091
MJE1092
MJE1093
MJE1100
MJE1101
MJE1102
MJE1103



CASE 90-05

MJE2090
MJE2091
MJE2092
MJE2093
MJE2100
MJE2101
MJE2102
MJE2103



CASE 199-04

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However, NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

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⁾ ($I_C = 100\text{ mAdc}$, $I_B = 0$)	BV_{CEO}	60	—	Vdc
		60	—	
		80	—	
		80	—	
Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $I_B = 0$)	I_{CEO}	—	500	μAdc
		—	500	
($V_{CE} = 40\text{ Vdc}$, $I_B = 0$)		—	500	
		—	500	
Collector Cutoff Current ($V_{CB} = \text{Rated } BV_{CEO}$, $I_E = 0$)	I_{CBO}	—	0.2	mAdc
($V_{CB} = \text{Rated } BV_{CEO}$, $I_E = 0$, $T_C = 100^\circ\text{C}$)		—	2.0	
Emitter Cutoff Current ($V_{BE} = 5.0\text{ Vdc}$, $I_C = 0$)	I_{EBO}	—	2.0	mAdc

ON CHARACTERISTICS (1)

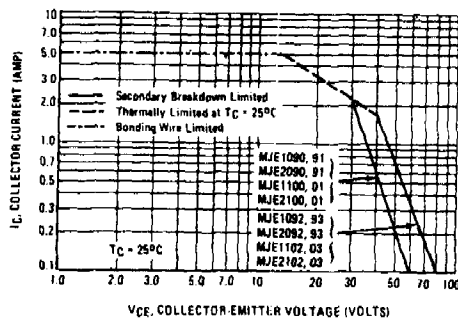
DC Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$)	h_{FE}	750	—	—
		750	—	
($I_C = 4.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$)		750	—	
		750	—	
Collector-Emitter Saturation Voltage ($I_C = 3.0\text{ Adc}$, $I_B = 12\text{ mAdc}$)	$V_{CE(sat)}$	—	2.5	Vdc
		—	2.5	
($I_C = 4.0\text{ Adc}$,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

DYNAMIC CHARACTERISTICS

Small-Signal Current Gain ($I_C = 3.0\text{ Adc}$, $V_{CE} = 3.0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	h_{fe}	1.0	—	—
--	----------	-----	---	---

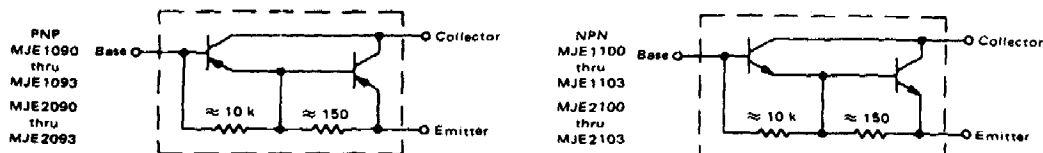
(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

FIGURE 2 — DC SAFE OPERATING AREA



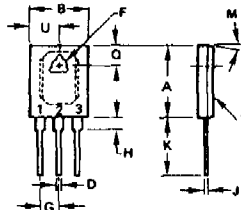
There are two limitations on the power handling ability of a transistor: junction temperature and secondary breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation, e.g., the transistor must not be subjected to greater dissipation 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)
MJE2090 thru MJE2093 PNP/MJE2100 thru MJE2103 NPN

MJE1090
MJE1091
MJE1092
MJE1093
MJE1100
MJE1101
MJE1102
MJE1103

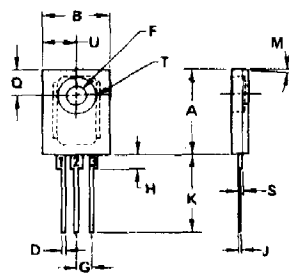


STYLE 2:
PIN 1: EMITTER
2: COLLECTOR
3: BASE

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.13	16.38	0.635	0.645
B	12.57	12.83	0.495	0.505
C	3.18	3.43	0.125	0.135
D	1.09	1.24	0.043	0.049
F	3.51	3.76	0.138	0.148
G	4.22 BSC		0.166 BSC	
H	2.67	2.92	0.105	0.115
J	0.813	0.864	0.032	0.034
K	15.11	16.38	0.595	0.645
M	30° TYP		30° TYP	
Q	4.70	4.95	0.185	0.195
R	1.91	2.16	0.075	0.085
U	6.22	6.48	0.245	0.255

NOTE
1. LEADS WITHIN .005" RAD OF TRUE POSITION (TP) AT MMC

MJE2090
MJE2091
MJE2092
MJE2093
MJE2100
MJE2101
MJE2102
MJE2103



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

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	16.08	16.33	0.633	0.643
B	12.57	12.83	0.495	0.505
C	3.18	3.43	0.125	0.135
D	0.51	0.76	0.020	0.030
F	3.61	3.86	0.142	0.152
G	2.54 BSC		0.100 BSC	
H	2.67	2.92	0.105	0.115
J	0.43	0.89	0.017	0.027
K	14.73	14.99	0.580	0.590
L	2.16	2.41	0.085	0.095
M	30° TYP		30° TYP	
N	1.47	1.73	0.058	0.068
Q	4.78	5.03	0.188	0.198
R	1.91	2.16	0.075	0.085
S	0.81	0.86	0.032	0.034
T	6.99	7.24	0.275	0.285
U	6.22	6.48	0.245	0.255

1. DIM "G" IS TO CENTER LINE OF LEADS.