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MJE1090 thru MJE1093 PNP (SILICON) MJE2090 thru MJE2093 MJE1100 thru MJE1103 NPN MJE 2100 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

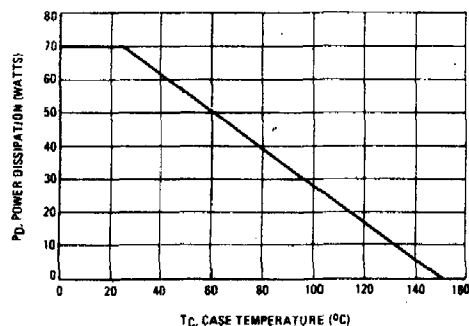
MAXIMUM RATINGS

Rating	Symbol	MJE1090	MJE1092	Unit
		MJE1091	MJE1093	
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	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	70	Watts
		0.56	0.56	W/ $^\circ\text{C}$
Operating and Storage Junction Temperating 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	$^\circ\text{C}/\text{W}$

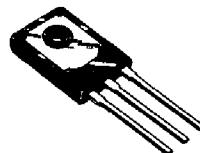
FIGURE 1 – POWER DERATING



5.0 AMPERE DARLINGTON POWER TRANSISTORS COMPLEMENTARY SILICON

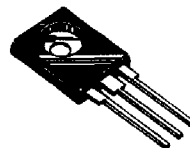
60-80 VOLTS
70 WATTS

MJE1090
MJE1091
MJE1092
MJE1093
MJE1100
MJE1101
MJE1102
MJE1103



CASE 90-05

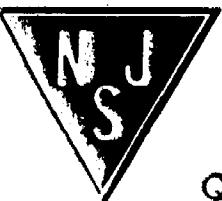
MJE2090
MJE2091
MJE2092
MJE2093
MJE2100
MJE2101
MJE2102
MJE2103



CASE 199-04

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Quality Semi-Conductors



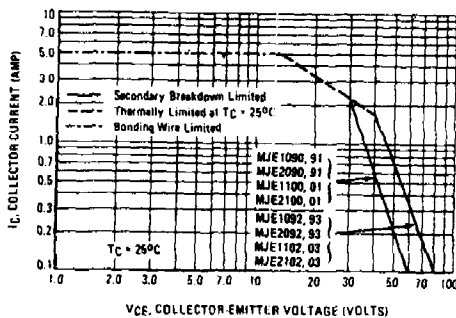
MJE1090 thru MJE1093 PNP/MJE1100 thru MJE1103 NPN (continued)
MJE2090 thru MJE2093 PNP/MJE2100 thru MJE2103 NPN

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 60 80 80	- - - -	Vdc
Collector Cutoff Current ($V_{CE} = 30 \text{ Vdc}, I_B = 0$)	I_{CEO}	- -	500 500	$\mu\text{A dc}$
Collector Cutoff Current ($V_{CE} = 40 \text{ Vdc}, I_B = 0$)		- -	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 2.0	mA dc
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	- -	-
DC Current Gain ($I_C = 4.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}$)		750 750	- -	
Collector-Emitter Saturation Voltage ($I_C = 3.0 \text{ A dc}, I_B = 12 \text{ mA dc}$)	$V_{CE(sat)}$	- -	2.5 2.5	Vdc
Collector-Emitter Saturation Voltage ($I_C = 4.0 \text{ A dc}, I_B = 16 \text{ mA dc}$)		- -	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 2.5	Vdc
Base-Emitter On Voltage ($I_C = 4.0 \text{ A dc}, V_{CE} = 3.0 \text{ Vdc}$)		- -	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	-	-

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

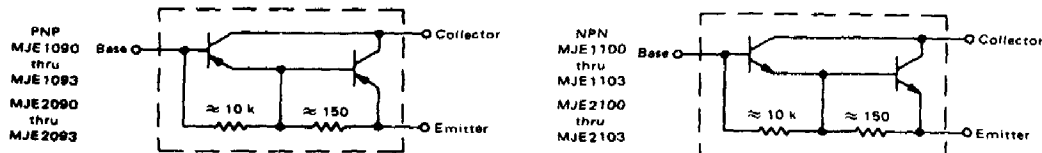
FIGURE 2 - DC SAFE OPERATING AREA



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.

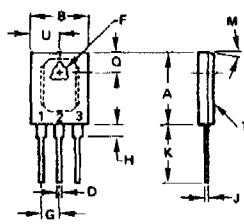
At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by secondary breakdown. (See AN-415)

FIGURE 3 - DARLINGTON CIRCUIT SCHEMATIC



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

MJE1090
MJE1091
MJE1092
MJE1093
MJE1100
MJE1101
MJE1102
MJE1103



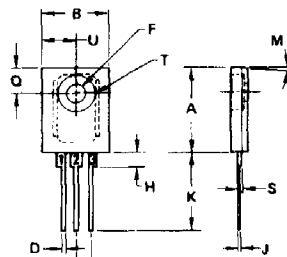
STYLE 2:
PIN 1. EMITTER
2. COLLECTOR
3. BASE

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	90° TYP		90° 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

CASE 90-05

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	0.69	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 CENTERLINE OF LEADS.

CASE 199-04