

## PLASTIC DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

... designed for general-purpose and low-speed switching application.

### FEATURES

- \* High DC Current Gain-  
hFE = 2000 (Typ) @  $I_C = 2.0$  A
- \* Monolithic Construction with Built-in Base-Emitter  
Resistors Limit Leakage Multiplication

### MAXIMUM RATINGS

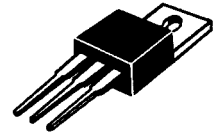
Characteristic	Symbol	MJE700T MJE701T MJE800T MJE801T	MJE702T MJE703T MJE802T MJE803T	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	80	V
Collector-Base Voltage	$V_{CBO}$	60	80	V
Emitter-Base Voltage	$V_{EBO}$	5.0		V
Collector current	$I_C$	4.0		A
Base current	$I_B$	0.1		A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50 0.4		W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 55 to +150		$^\circ\text{C}$

### THERMAL CHARACTERISTICS

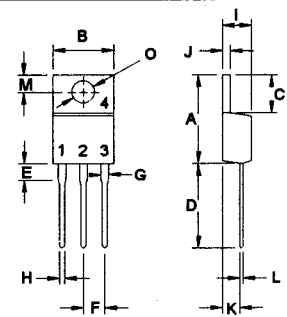
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	2.50	$^\circ\text{C/W}$

PNP	NPN
MJE700T	MJE800T
MJE701T	MJE801T
MJE702T	MJE802T
MJE703T	MJE803T

4.0 AMPERE  
DARLINGTON  
POWER TRANSISTORS  
COMPLEMENTARY SILICON  
60-80 VOLTS  
40 WATTS



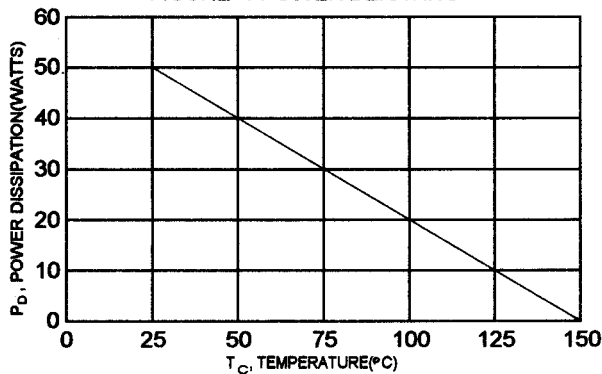
TO-220



PIN 1.BASE  
2.COLLECTOR  
3.EMITTER  
4.COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

FIGURE -1 POWER DERATING



**MJE700T thru MJE703T PNP / MJE800T thru MJE803T NPN**

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

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector - Emitter Breakdown Voltage ( $I_c = 50\text{ mA}$ , $I_B = 0$ ) MJE700T,MJE701T MJE800T,MJE801T MJE702T,MJE703T MJE802T,MJE803T	$V_{CEO}$	60 80		V
Collector Cutoff Current ( $V_{CE} = 60\text{ V}$ , $I_B = 0$ ) MJE700T,MJE701T MJE800T,MJE801T ( $V_{CE} = 80\text{ V}$ , $I_B = 0$ ) MJE702T,MJE703T MJE802T,MJE803T	$I_{CEO}$		100 100	$\mu\text{A}$
Collector Cutoff Current ( $V_{CB} = \text{Rated } V_{CBO}$ , $I_E = 0$ ) ( $V_{CB} = \text{Rated } V_{CBO}$ , $I_E = 0$ , $T_c = 100^\circ\text{C}$ )	$I_{CBO}$		100 500	$\mu\text{A}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ V}$ , $I_c = 0$ )	$I_{EBO}$		2.0	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_c = 1.5\text{ A}$ , $V_{CE} = 3.0\text{ V}$ ) MJE700T,MJE702T MJE800T,MJE802T ( $I_c = 2.0\text{ A}$ , $V_{CE} = 3.0\text{ V}$ ) MJE701T,MJE703T MJE801T,MJE803T ( $I_c = 4.0\text{ A}$ , $V_{CE} = 3.0\text{ V}$ ) All devices	hFE	750 750 100		
Collector-Emitter Saturation Voltage ( $I_c = 1.5\text{ A}$ , $I_B = 30\text{ mA}$ ) MJE700T,MJE702T MJE800T,MJE802T ( $I_c = 2.0\text{ A}$ , $I_B = 40\text{ mA}$ ) MJE701T,MJE703T MJE801T,MJE803T ( $I_c = 4.0\text{ A}$ , $I_B = 40\text{ mA}$ ) All devices	$V_{CE(sat)}$		2.5 2.8 3.0	V
Base-Emitter On Voltage ( $I_c = 1.5\text{ A}$ , $V_{CE} = 3.0\text{ V}$ ) MJE700T,MJE702T MJE800T,MJE802T ( $I_c = 2.0\text{ A}$ , $V_{CE} = 3.0\text{ V}$ ) MJE701T,MJE703T MJE801T,MJE803T ( $I_c = 4.0\text{ A}$ , $V_{CE} = 3.0\text{ V}$ ) All devices	$V_{BE(on)}$		2.5 2.5 3.0	V

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

FIGURE 2 - SWITCHING TIMES TEST CIRCUIT

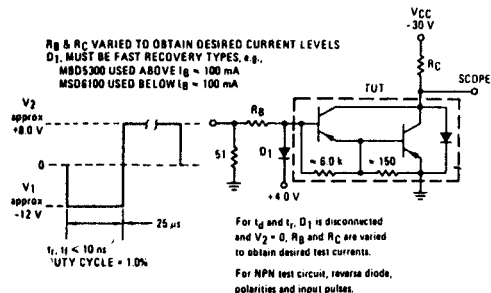


FIG-3 TURN-ON TIME

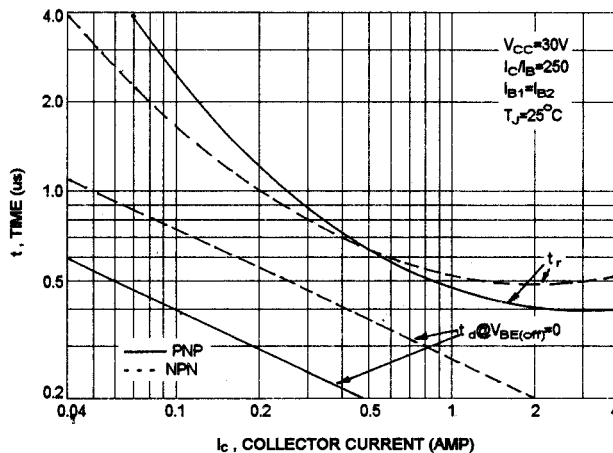


FIG-4 TURN-OFF TIME

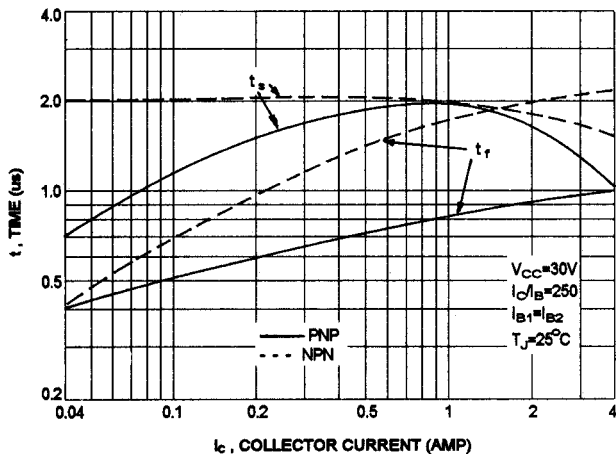


FIG-5 ACTIVE REGION SAFE OPERATING AREA

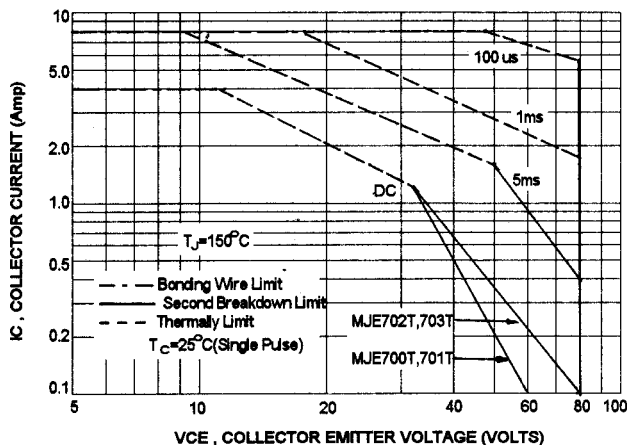
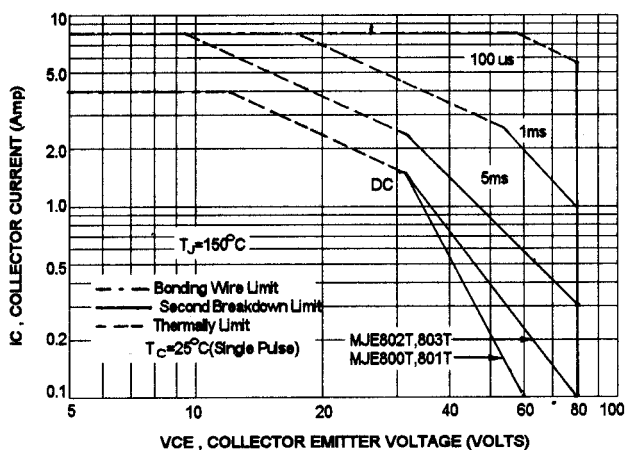


FIG-6 ACTIVE REGION SAFE OPERATING AREA



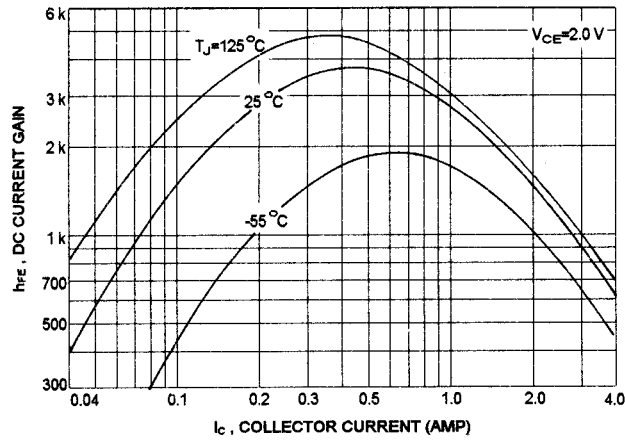
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of Fig-5 and Fig-6 is base on  $T_{J(PK)}=150^\circ\text{C}$ ,  $T_C$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

MJE700T thru MJE703T PNP / MJE800T thru MJE803T NPN

FIG-7 DC CURRENT GAIN

PNP MJE700T Series



NPN MJE800T Series

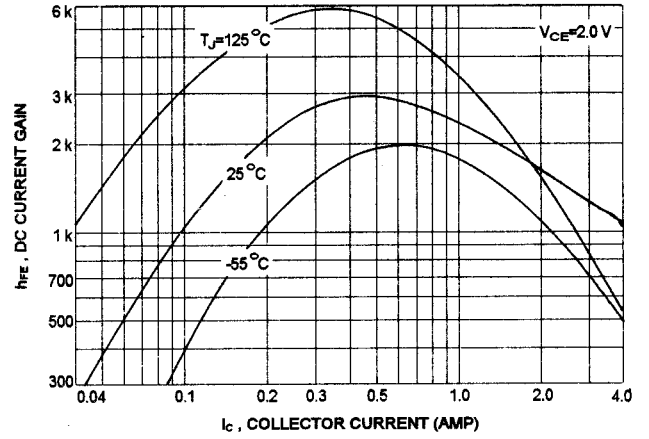
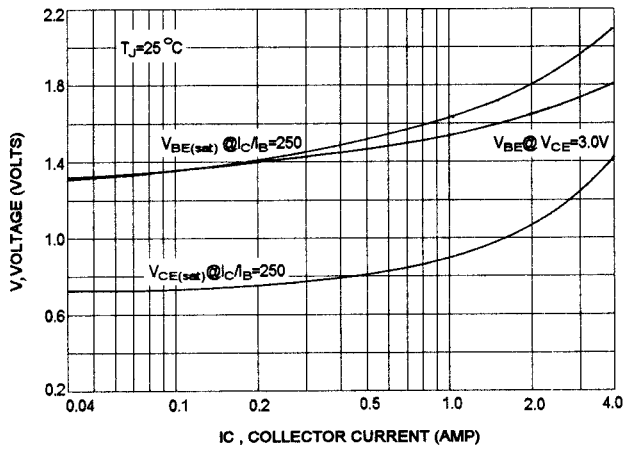


FIG-8 "ON" VOLTAGE

PNP MJE700T Series



NPN MJE800T Series

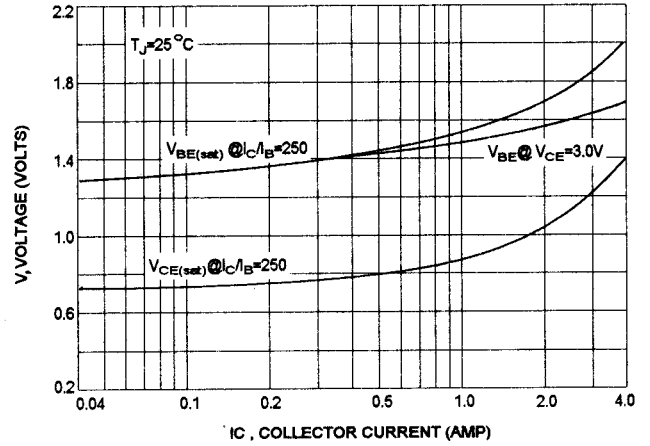
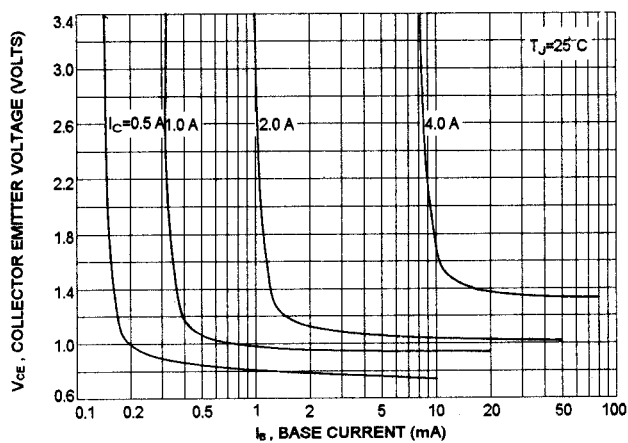


FIG-9 COLLECTOR SATURATION REGION

PNP MJE700T Series



NPN MJE800T Series

