

PLASTIC DARLINGTON COMPLEMENTARY SILICON POWER TRANSISTORS

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

FEATURES

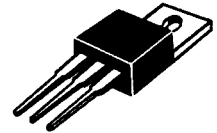
- * High DC Current Gain-
hFE = 2000 (Typ) @ $I_C = 2.0$ A
- * Monolithic Construction with Built-in Base-Emitter
Resistors Limit Leakage Multiplication

PNP	NPN
MJE700T	MJE800T
MJE701T	MJE801T
MJE702T	MJE802T
MJE703T	MJE803T

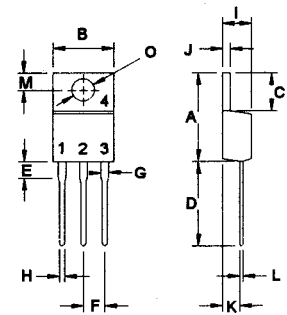
4.0 AMPERE
DARLINGTON
POWER TRANSISTORS
COMPLEMENTARY SILICON
60-80 VOLTS
40 WATTS

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°C	P_D	50 0.4		W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150		$^\circ\text{C}$



TO-220

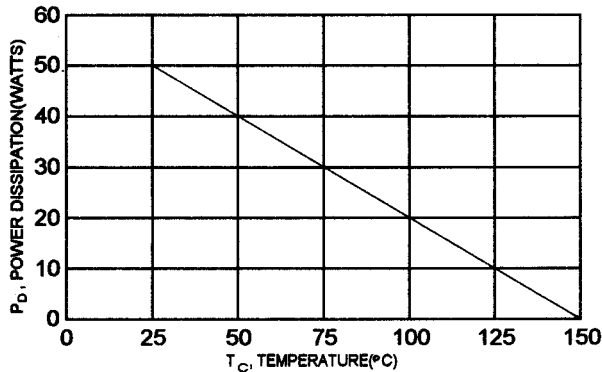


PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

THERMAL CHARACTERISTICS

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

FIGURE -1 POWER DERATING



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

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	μA
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	μA
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	h_{FE}	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 μs , Duty Cycle $\leq 2.0\%$

FIGURE 2 - SWITCHING TIMES TEST CIRCUIT

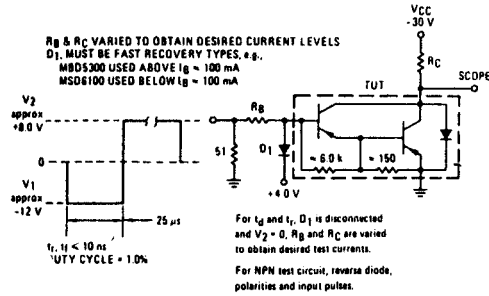


FIG-3 TURN-ON TIME

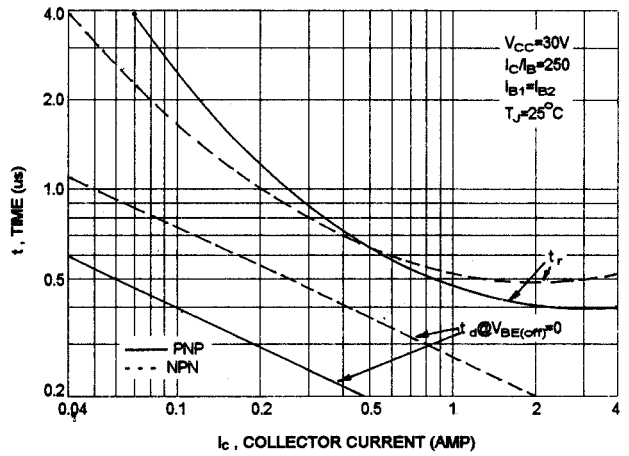


FIG-4 TURN-OFF TIME

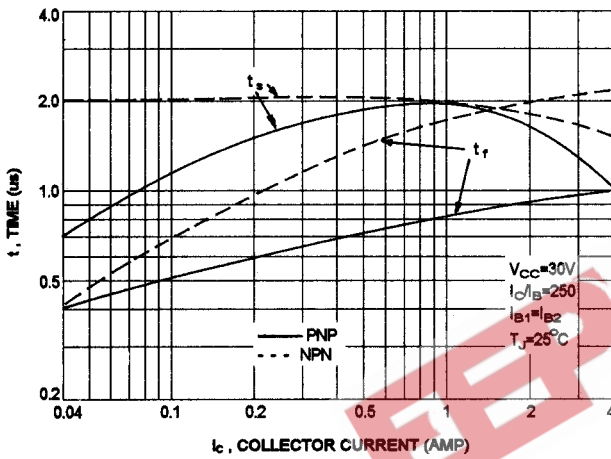


FIG-5 ACTIVE REGION SAFE OPERATING AREA

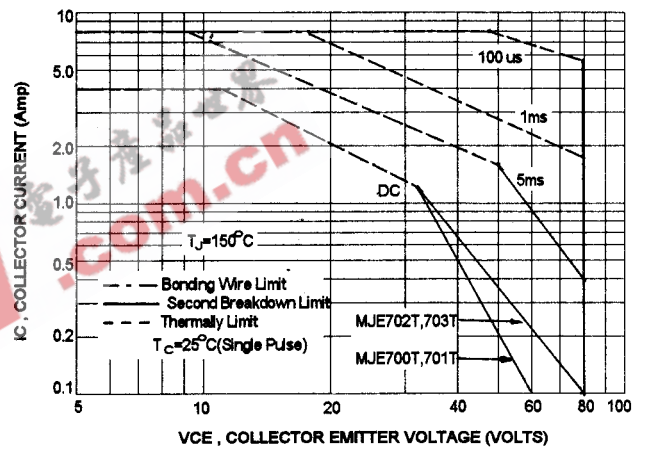
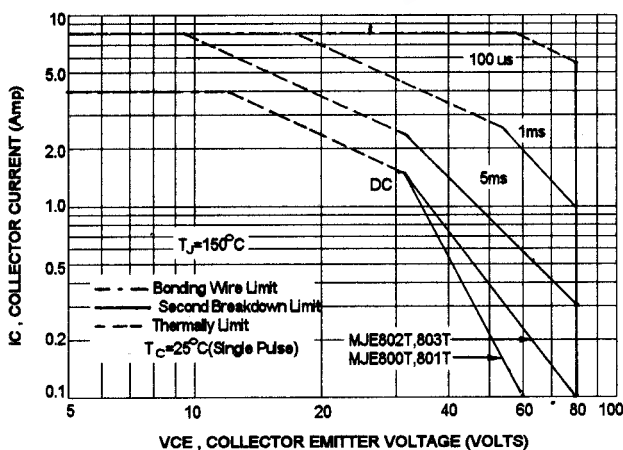


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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 limita - tion 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

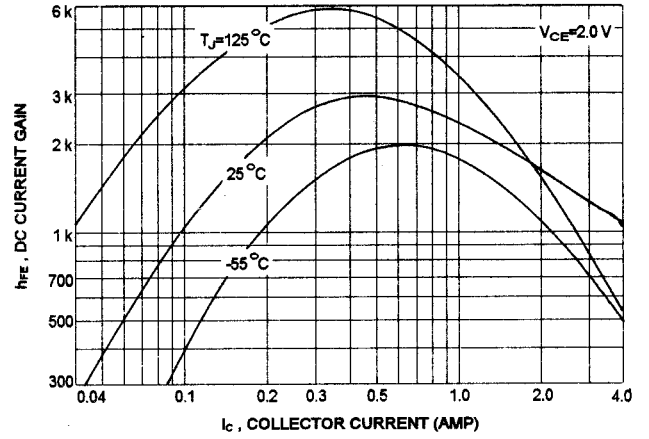
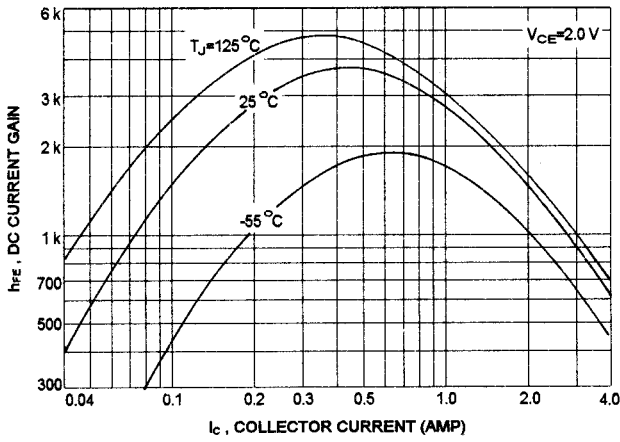


FIG-8 "ON" VOLTAGE

PNP MJE700T Series

NPN MJE800T Series

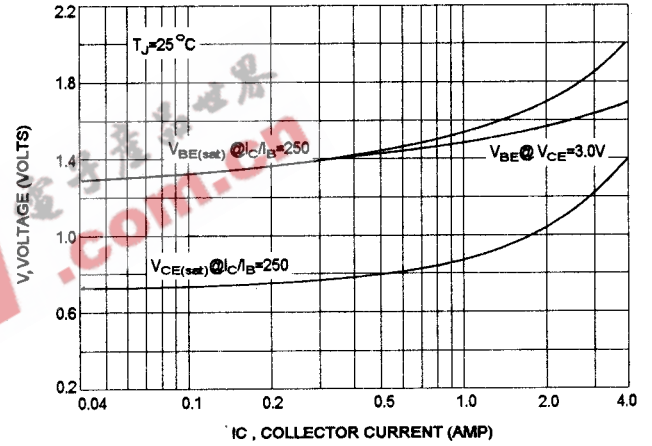
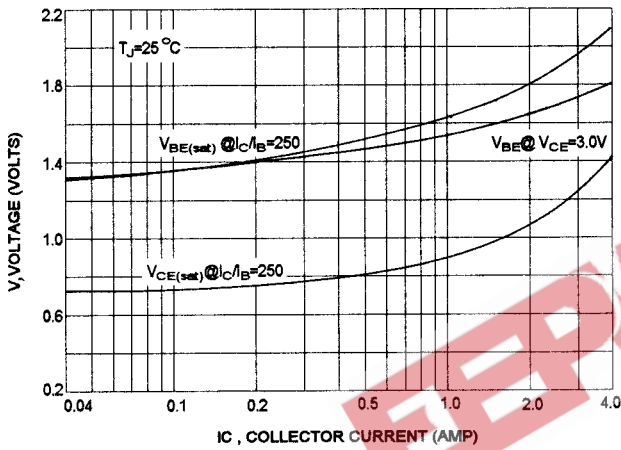


FIG-9 COLLECTOR SATURATION REGION

PNP MJE700T Series

NPN MJE800T Series

