

SWITCHMODE SERIES NPN POWER TRANSISTORS

... designed for use in high-voltage, high-speed, power switching in inductive circuit, they are particularly suited for 115 and 220 V switchmode applications such as switching regulator's, inverters, DC -DC conveter, Motor Controls, Solenoid drive and Deflection circuits.

FEATURES:

*Collector-Emitter Sustaining Voltage-

$$V_{CE(sus)} = 400 \text{ V and } 300 \text{ V}$$

* Collector-Emitter Saturation Voltage -

$$V_{CE(sat)} = 3.0 \text{ V (Max.) @ } I_C = 8.0 \text{ A, } I_B = 2.0 \text{ A}$$

* Switching Time - $t_f = 0.7 \text{ us (Max.) @ } I_C = 5.0 \text{ A}$

* SOA and Switching Application Information.

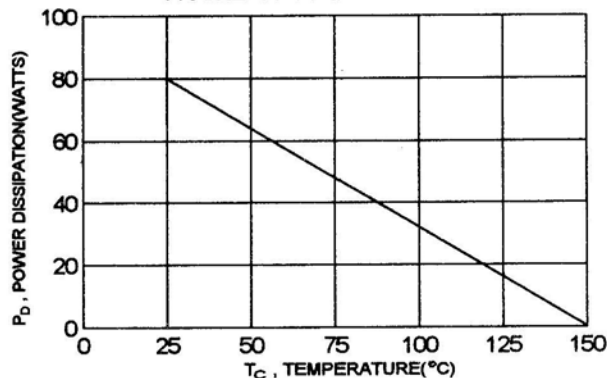
MAXIMUM RATINGS

Characteristic	Symbol	MJE13006	MJE13007	Unit
Collector-Emitter Voltage	V_{CEO}	300	400	V
Collector-Emitter Voltage	V_{CEV}	600	700	V
Emitter-Base Voltage	V_{EBO}	9		V
Collector Current - Continuous - Peak	I_C I_{CM}	8 16		A
Base current	I_B	4		A
Total Power Dissipation @ $T_c = 25^{\circ}C$ Derate above $25^{\circ}C$	P_D	80 640		W mW/ $^{\circ}C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150		$^{\circ}C$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.56	$^\circ\text{C/W}$

FIGURE -1 POWER DERATING



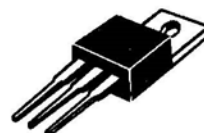
NPN

MJE13006

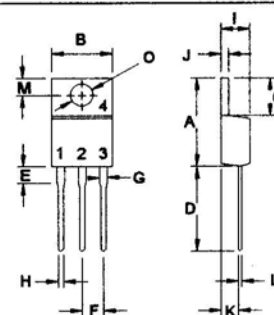
MJE13007

8 AMPERE

**POWER
TRANSISTORS
300-400 VOLTS
80 WATTS**



TO-220



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

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	16.00
B	9.78	10.42
C	5.02	6.60
D	13.00	14.62
E	3.10	4.19
F	2.41	2.67
G	1.10	1.67
H	0.69	1.01
I	3.21	4.98
J	1.14	1.40
K	2.20	3.30
L	0.28	0.61
M	2.48	3.00
O	3.50	4.00

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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage ($I_C = 10\text{ mA}, I_B = 0$) MJE13006 MJE13007	$V_{CEO(sus)}$	300 400		V
Collector Cutoff Current ($V_{CEV} = \text{Rated Value}, V_{BE(off)} = 1.5\text{ V}$) ($V_{CEV} = \text{Rated Value}, V_{BE(off)} = 1.5\text{ V}, T_c = 100^\circ\text{C}$)	I_{CEV}		1.0 5.0	mA
Emitter Cutoff Current ($V_{EB} = 9.0\text{ V}, I_C = 0$)	I_{EBO}		1.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 2.0\text{ A}, V_{CE} = 5.0\text{ V}$) ($I_C = 5.0\text{ A}, V_{CE} = 5.0\text{ V}$)	h_{FE}	8.0 5.0	60 30	
Collector-Emitter Saturation Voltage ($I_C = 2.0\text{ A}, I_B = 400\text{ mA}$) ($I_C = 5.0\text{ A}, I_B = 1.0\text{ A}$) ($I_C = 8.0\text{ A}, I_B = 2.0\text{ A}$)	$V_{CE(sat)}$		1.0 2.0 3.0	V
Base-Emitter Saturation Voltage ($I_C = 2.0\text{ A}, I_B = 400\text{ mA}$) ($I_C = 5.0\text{ A}, I_B = 1.0\text{ A}$)	$V_{BE(sat)}$		1.2 1.6	V

DYNAMIC CHARACTERISTICS

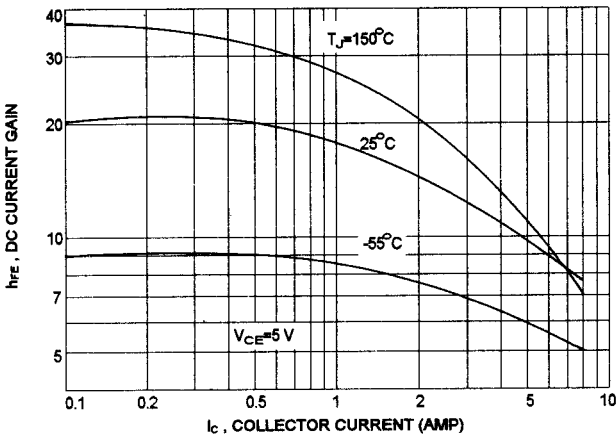
Current Gain - Bandwidth Product ($I_C = 500\text{ mA}, V_{CE} = 10\text{ V}, f = 1.0\text{ MHz}$)	f_T	4.0		MHz
Output Capacitance ($V_{CB} = 10\text{ V}, I_E = 0, f = 0.1\text{ MHz}$)	C_{ob}	110(typ)		pF

SWITCHING CHARACTERISTICS

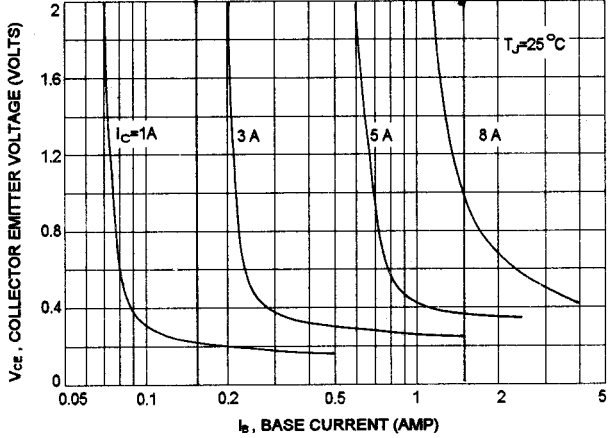
Delay Time	$V_{CC} = 125\text{ V}, I_C = 5.0\text{ A}$ $I_{B1} = -I_{B2} = 1.0\text{ A},$ $t_p = 25\text{ us}, \text{Duty Cycle} \leq 1.0\%$	t_d		0.1	us
Rise Time		t_r		1.5	us
Storage Time		t_s		3.0	us
Fall Time		t_f		0.7	us

(1) Pulse Test: Pulse Width = 300 us, Duty Cycle $\leq 2.0\%$

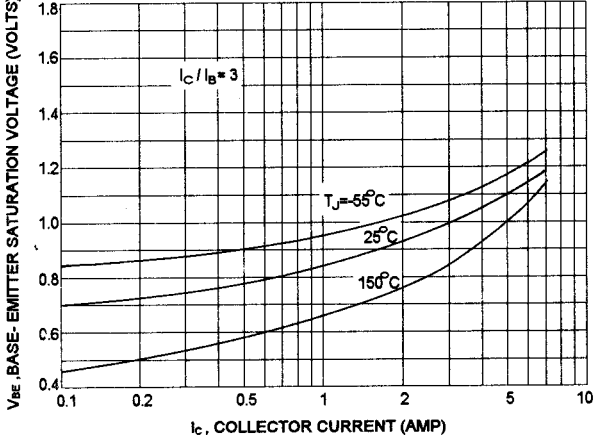
DC CURRENT GAIN



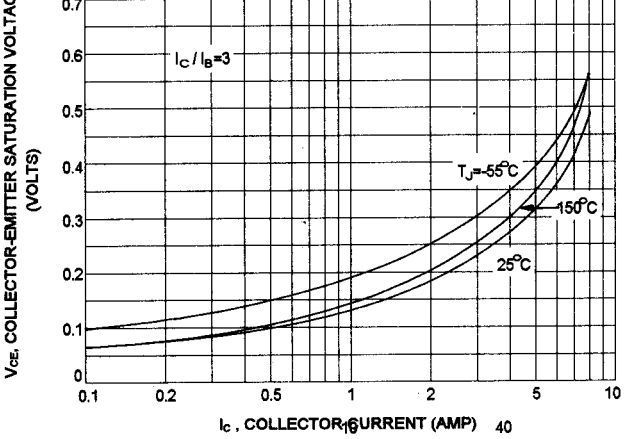
COLLECTOR SATURATION REGION



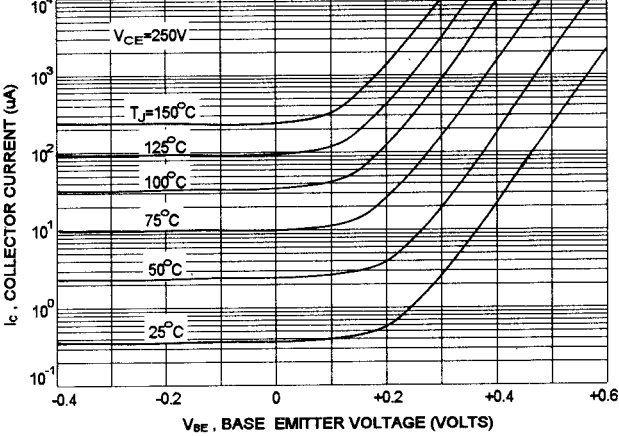
BASE-EMITTER SATURATION VOLTAGE



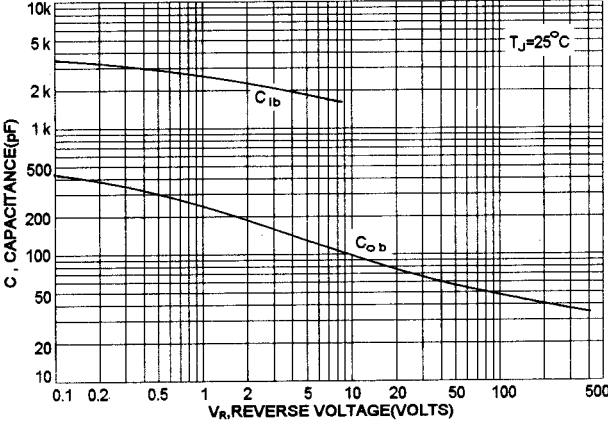
COLLECTOR-EMITTER SATURATION VOLTAGE



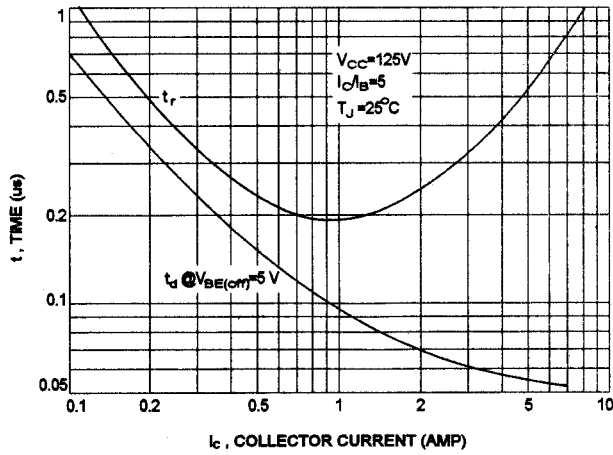
COLLECTOR CUT-OFF REGION



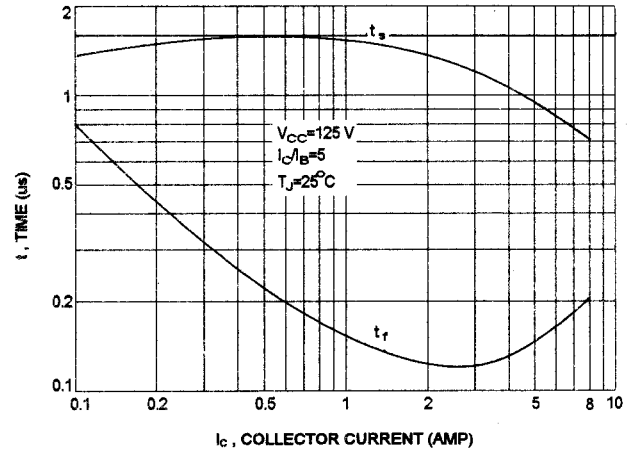
CAPACITANCE



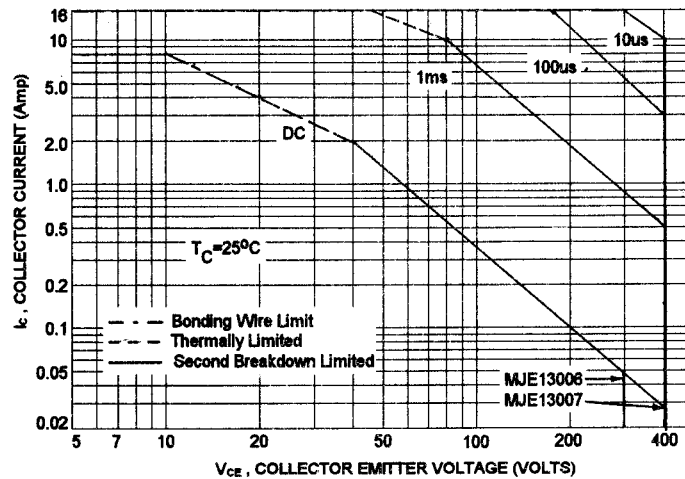
TURN-ON TIME



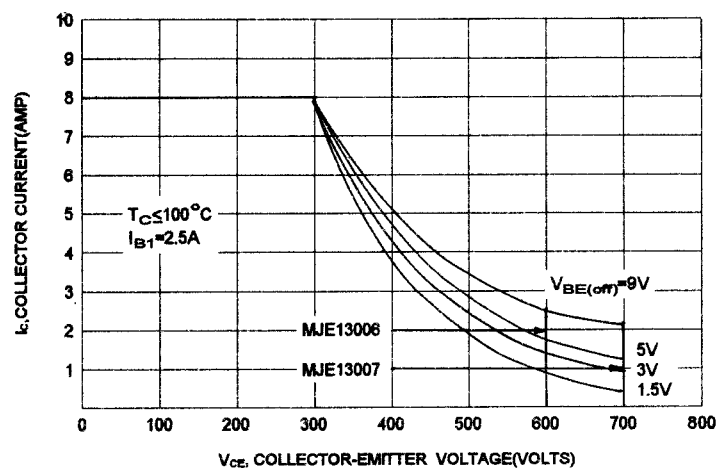
TURN-OFF TIME



ACTIVE REGION SAFE OPERATING AREA



REVERSE BIAS SWITCHING SAFE OPERATING AREA



Notice

MOSPEC reserves the rights to make changes of the content herein the document anytime without notification. MOSPEC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies. Please refer to MOSPEC website for the last document.

MOSPEC disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially incurred.

Application shown on the herein document are examples of standard use and operation. Customers are responsible for comprehending suitable use in particular applications. MOSPEC makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by MOSPEC for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of MOSPEC or others.

These MOSPEC products are intended for usage in general electronic equipment. Please make sure to consult with MOSPEC before you use these MOSPEC products in equipment which require specialized quality and/or reliability, and in equipment which could have major impact to the welfare of human life (atomic energy control, aeronautics , traffic control, combustion control, safety devices etc.)