

SWITCHMODE SERIES NPN SILICON POWER TRANSISTORS

... designed for use in high-voltage, high-speed, power switching in inductive circuit, where fall time and RBSOA are critical. They are particularly well-suited for line-operated switchmode applications such as switching regulator's, inverters, Motor Controls, and Deflection circuits

FEATURES:

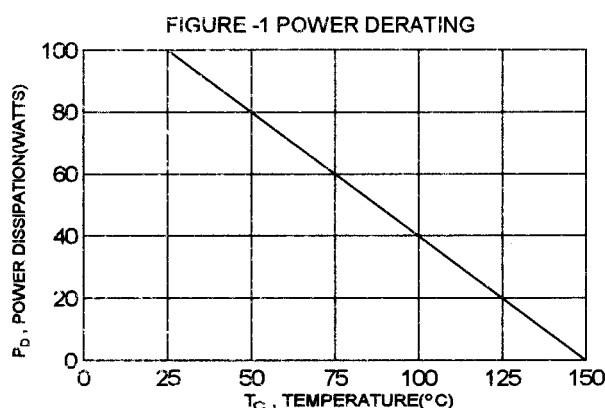
- * Collector-Emitter Sustaining Voltage - $BV_{CEO} = 450V$
- * Collector-Emitter Saturation Voltage - $V_{CE(sat)} = 2.5 V \text{ (Max.) @ } I_C = 3.0 A, I_B = 0.4A/0.3A$
- * Switching Time - $t_f = 0.4 \mu s \text{ (Max.) @ } I_C = 3.0 A$
- * SOA and Switching Application Information.

MAXIMUM RATINGS

Characteristic	Symbol	MJH16002, MJH16004	Unit
Collector-Emitter Voltage	V_{CEO}	450	V
Collector-Emitter Voltage	V_{CEV}	850	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current - Continuous - Peak	I_C I_{CM}	5 10	A
Base current	I_B	4	A
Total Power Dissipation @ $T_C = 25^\circ C$ Derate above $25^\circ C$	P_D	100 800	W mW/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ C$

THERMAL CHARACTERISTICS

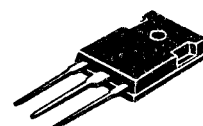
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.25	$^\circ C/W$



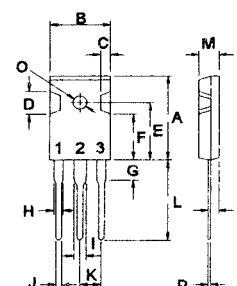
NPN

MJH16002
MJH16004

5 AMPERE
POWER
TRANSISTORS
450 VOLTS
100 WATTS



TO-247(3P)



PIN 1.BASE
2.COLLECTOR
3.EMITTER

DIM	MILLIMETERS	
	MIN	MAX
A	20.63	22.38
B	15.38	16.20
C	1.90	2.70
D	5.10	6.10
E	14.81	15.22
F	11.72	12.84
G	4.20	4.50
H	1.82	2.46
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.50	21.50
M	4.68	5.36
N	2.40	2.80
O	3.25	3.65
P	0.55	0.70

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage ($I_C = 100\text{ mA}$, $I_B = 0$)	$V_{CEO(sus)}$	450		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}		0.25 1.5	mA
Emitter Cutoff Current ($V_{EB} = 6.0\text{ V}$, $I_C = 0$)	I_{EBO}		1.0	mA

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 5.0\text{ A}$, $V_{CE} = 5.0\text{ V}$)	MJH16002 MJH16004	h_{FE}	5.0 7.0	
Collector-Emitter Saturation Voltage ($I_C = 1.5\text{ A}$, $I_B = 200\text{ mA}$) ($I_C = 1.5\text{ A}$, $I_B = 150\text{ mA}$) ($I_C = 3.0\text{ A}$, $I_B = 400\text{ mA}$) ($I_C = 3.0\text{ A}$, $I_B = 300\text{ mA}$)	MJH16002 MJH16004 MJH16002 MJH16004	$V_{CE(sat)}$		1.0 1.0 2.5 2.5 V
Base-Emitter Saturation Voltage ($I_C = 3.0\text{ A}$, $I_B = 400\text{ mA}$) ($I_C = 3.0\text{ A}$, $I_B = 300\text{ mA}$)	MJH16002 MJH16004	$V_{BE(sat)}$		1.5 1.5 V

DYNAMIC CHARACTERISTICS

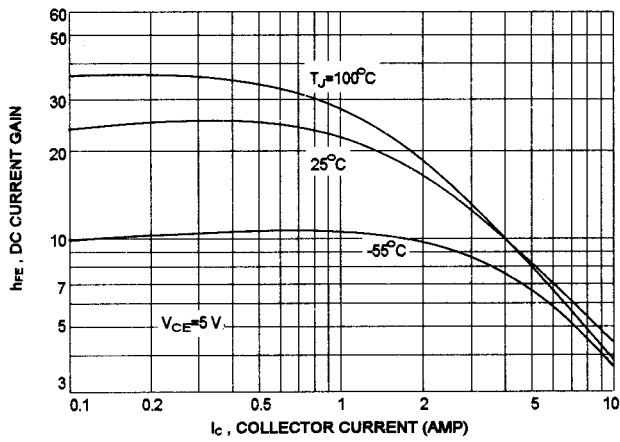
Output Capacitance ($V_{CB} = 10\text{ V}$, $I_E = 0$, $f = 1.0\text{ kHz}$)	C_{ob}		200	pF
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SWITCHING CHARACTERISTICS

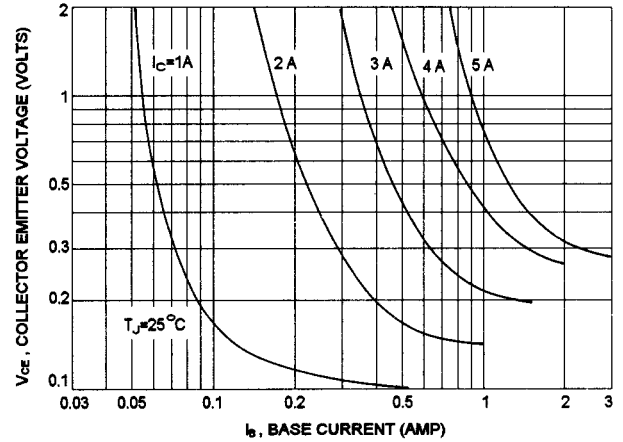
Delay Time	$V_{CC} = 250\text{ V}$, $I_C = 3.0\text{ A}$ $2I_{B1} = -I_{B2} = 0.8\text{ A}$ $t_p = 30\text{ us}$, Duty Cycle $\leq 2.0\%$	t_d		0.1	us
Rise Time		t_r		0.4	us
Storage Time		t_s		3.0	us
Fall Time		t_f		0.4	us

(1) Pulse Test: Pulse Width $\approx 300\text{ us}$, Duty Cycle $\leq 2.0\%$

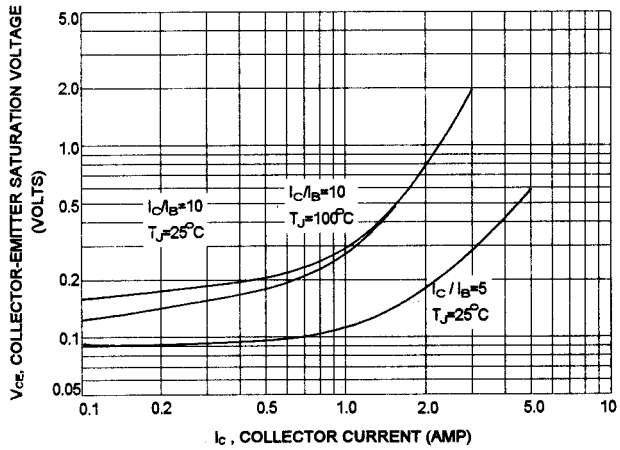
DC CURRENT GAIN



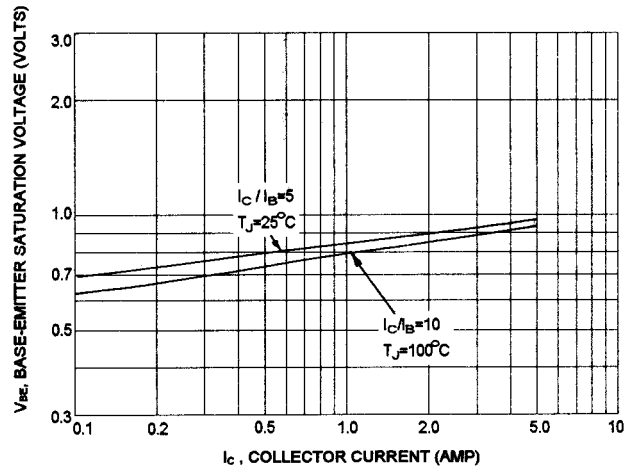
COLLECTOR SATURATION REGION



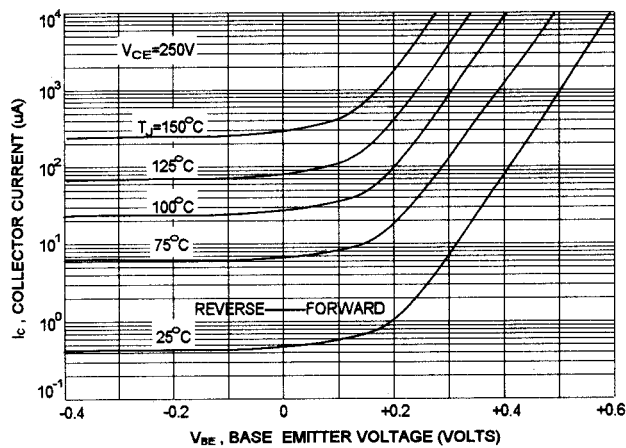
COLLECTOR-EMITTER SATURATION VOLTAGE



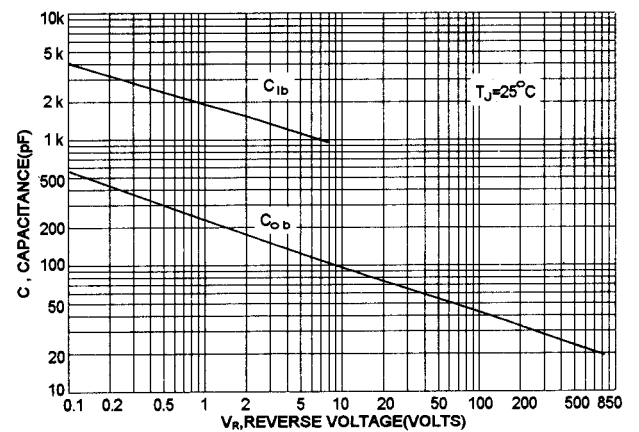
BASE-EMITTER SATURATION VOLTAGE



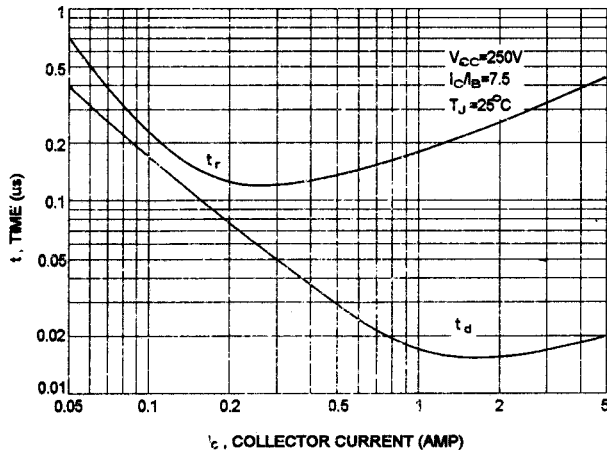
COLLECTOR CUT-OFF REGION



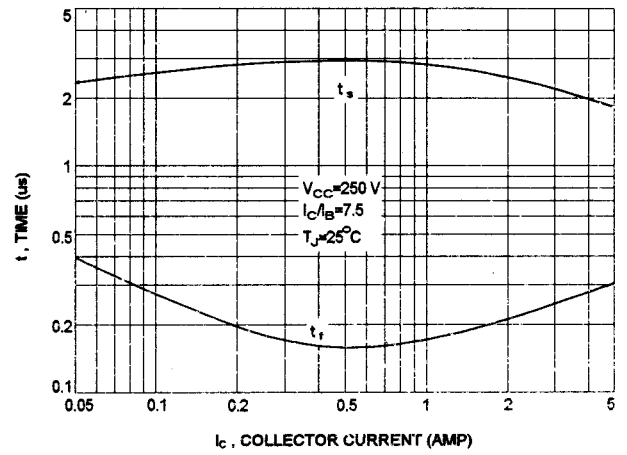
CAPACITANCE



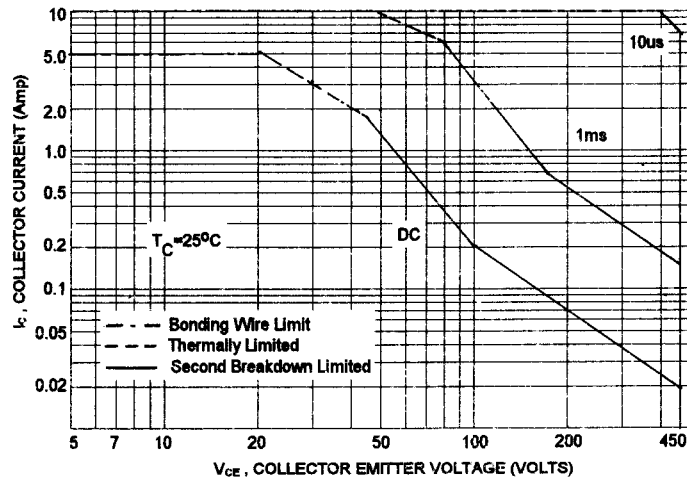
TURN-ON TIME



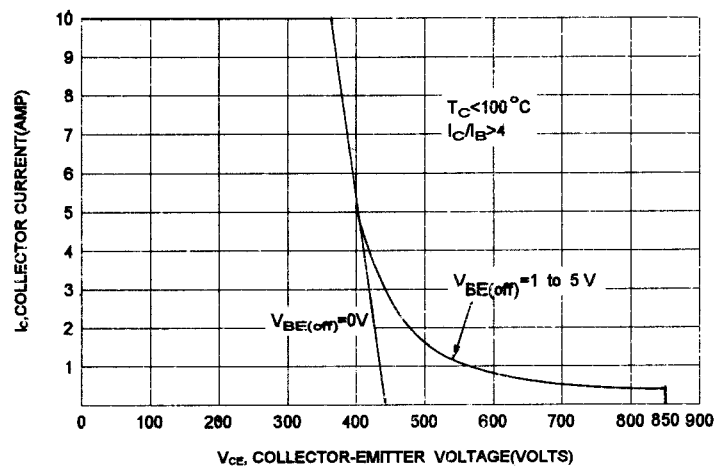
TURN-OFF TIME



ACTIVE REGION SAFE OPERATING AREA



REVERSE BIAS SWITCHING SAFE OPERATING AREA



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