

## 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:

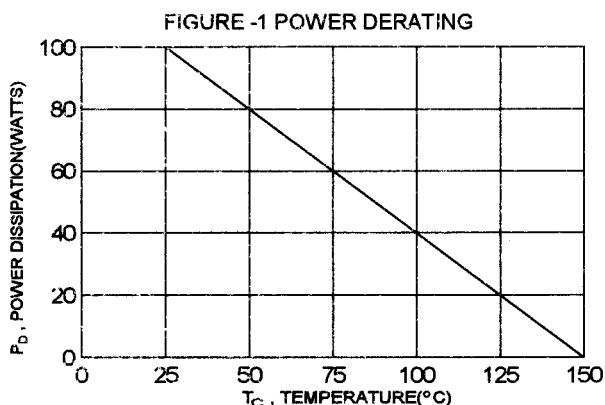
- \* Collector-Emitter Sustaining Voltage -  $BV_{CEO} = 450V$
- \* Collector-Emitter Saturation Voltage -  $V_{CE(sat)} = 2.5 V (Max.) @ I_C = 3.0 A, I_B = 0.4A/0.3A$
- \* Switching Time -  $t_f = 0.4 \mu s (Max.) @ I_C = 3.0 A$
- \* SOA and Switching Application Information.

### 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	$I_C$	5	A
- Peak	$I_{CM}$	10	
Base current	$I_B$	4	A
Total Power Dissipation @ $T_C = 25^\circ C$	$P_D$	100	W
Derate above $25^\circ C$		800	mW/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150	$^\circ C$

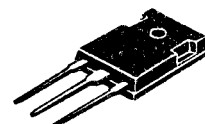
### THERMAL CHARACTERISTICS

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

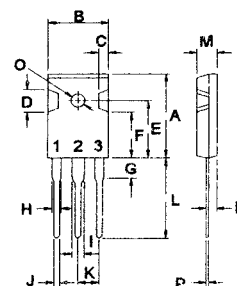


**NPN**  
**MJH16002**  
**MJH16004**

**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	hFE	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
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

**DYNAMIC CHARACTERISTICS**

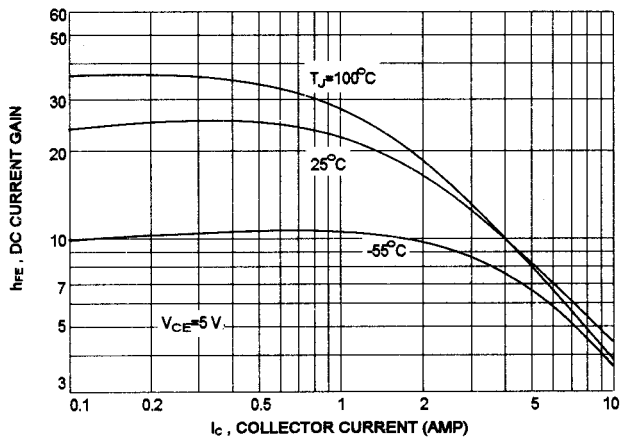
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ kHz}$ )	$C_{ob}$		200	pF
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**SWITCHING CHARACTERISTICS**

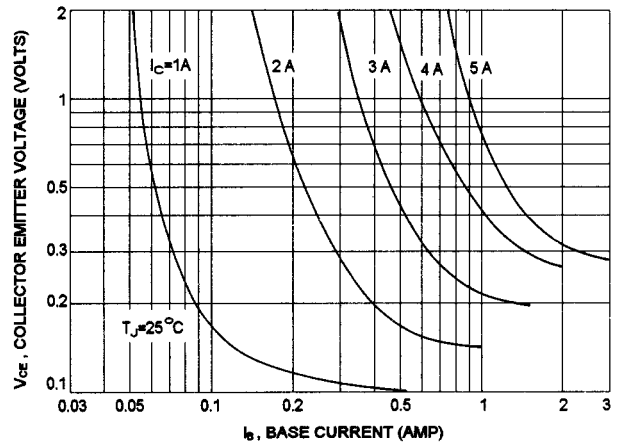
Delay Time	$V_{CC} = 250\text{ V}$ , $I_C = 3.0\text{ A}$ $2I_{B1} = -I_{B2} = 0.8\text{ A}$ $t_p = 30\text{ us}$ , Duty Cycle $\leq 2.0\%$	$t_d$	0.1	us
Rise Time		$t_r$	0.4	us
Storage Time		$t_s$	3.0	us
Fall Time		$t_f$	0.4	us

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

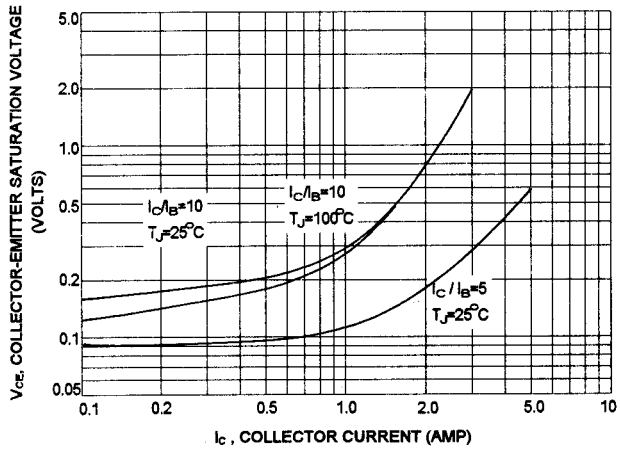
DC CURRENT GAIN



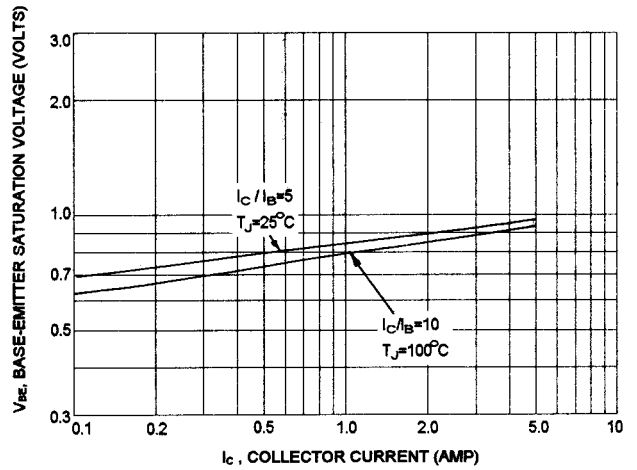
COLLECTOR SATURATION REGION



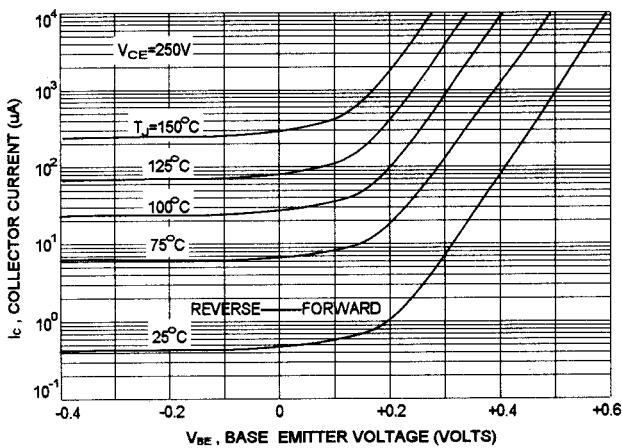
COLLECTOR-EMITTER SATURATION VOLTAGE



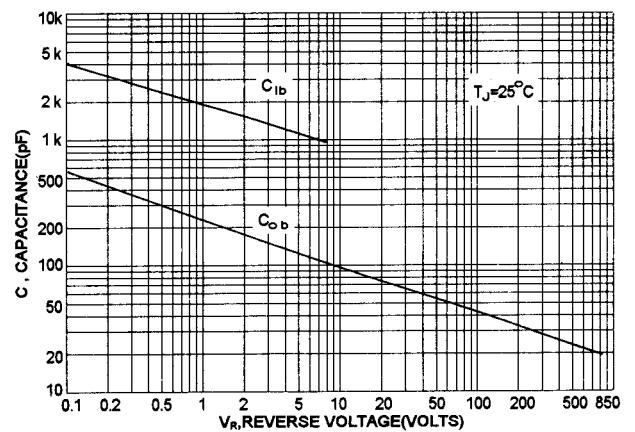
BASE-EMITTER SATURATION VOLTAGE



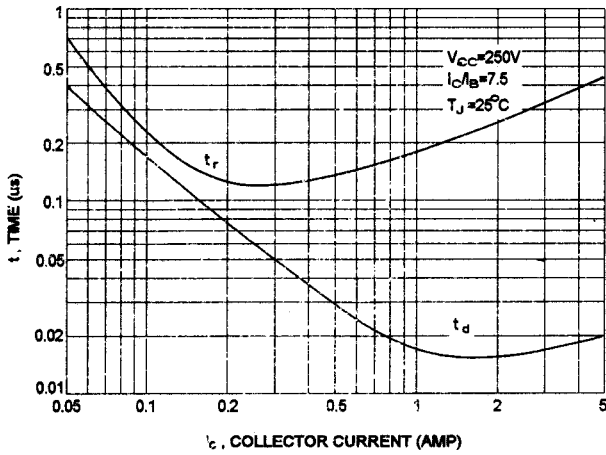
COLLECTOR CUT-OFF REGION



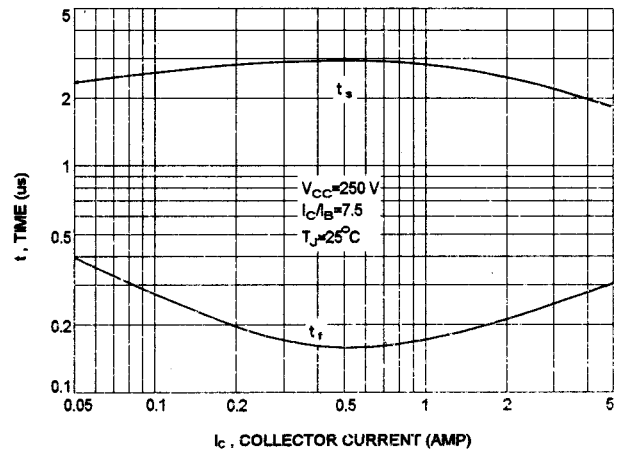
CAPACITANCE



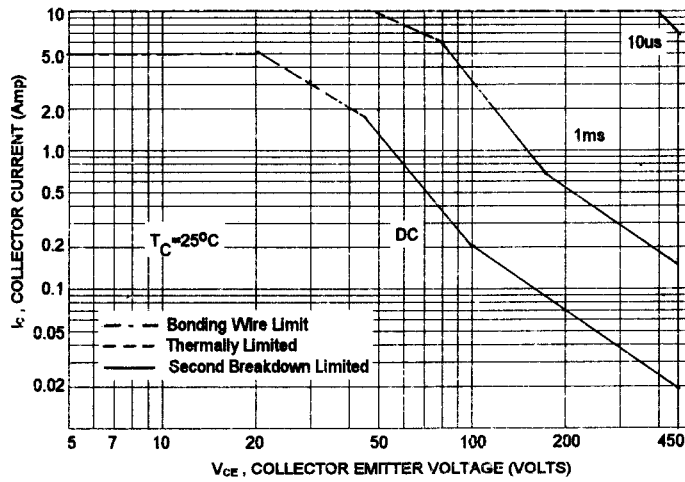
TURN-ON TIME



TURN-OFF TIME



ACTIVE REGION SAFE OPERATING AREA



REVERSE BIAS SWITCHING SAFE OPERATING AREA

