

## 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.

### FEATURES:

\*Collector-Emitter Sustaining Voltage-

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

\* Collector-Emitter Saturation Voltage -

$$V_{CE(sat)} = 0.7 \text{ V (Max.) @ } I_C = 3.0 \text{ A, } I_B = 0.3 \text{ A}$$

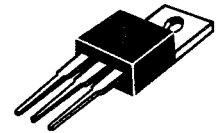
\* Switching Time -  $t_f = 0.7 \text{ us (Max.) @ } I_C = 3.0 \text{ A}$

**NPN**  
**2SC2502**

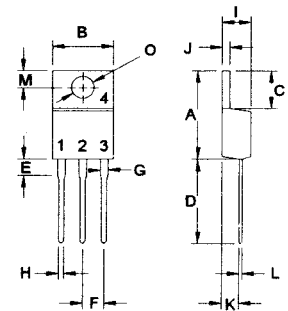
**6.0 AMPERE**  
**SILICON POWER**  
**TRANSISTORS**  
**400 VOLTS**  
**50 WATTS**

### MAXIMUM RATINGS

Characteristic	Symbol	2SC2502	Unit
Collector-Emitter Voltage	$V_{CEO}$	400	V
Collector-Base Voltage	$V_{CBO}$	500	V
Emitter-Base Voltage	$V_{EBO}$	7.0	V
Collector Current - Continuous - Peak	$I_C$ $I_{CM}$	6.0 12	A
Base current	$I_B$	2.0	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	$^\circ\text{C}$



**TO-220**

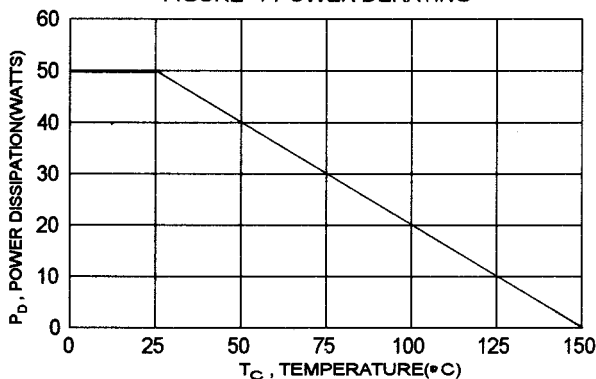


PIN 1.BASE  
2.COLLECTOR  
3.EMITTER  
4.COLLECTOR(CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	2.5	$^\circ\text{C/W}$

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

**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 ( $I_C = 100\text{ mA}$ , $I_B = 0$ )	$V_{CE(sus)}$	400		V
Collector Cutoff Current ( $V_{CE} = 320\text{ V}$ , $I_B = 0$ )	$I_{CEO}$		100	$\mu\text{A}$
Collector Cutoff Current ( $V_{CB} = 500\text{ V}$ , $I_E = 0$ )	$I_{CBO}$		100	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 7.0\text{ V}$ , $I_C = 0$ )	$I_{EBO}$		1.0	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 3.0\text{ A}$ , $V_{CE} = 2.0\text{ V}$ ) ( $I_C = 6.0\text{ A}$ , $V_{CE} = 2.0\text{ V}$ )	hFE	15 8.0		
Collector-Emitter Saturation Voltage ( $I_C = 3.0\text{ A}$ , $I_B = 300\text{ mA}$ )	$V_{CE(sat)}$		0.7	V
Base-Emitter Saturation Voltage ( $I_C = 3.0\text{ A}$ , $I_B = 300\text{ mA}$ )	$V_{BE(sat)}$		1.5	V

**DYNAMIC CHARACTERISTICS**

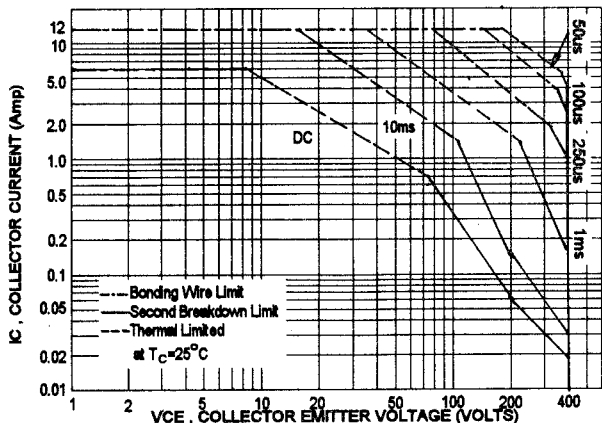
Current-Gain-Bandwidth Product ( $I_C = 0.6\text{ A}$ , $V_{CE} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	10		MHz
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**SWITCHING CHARACTERISTICS**

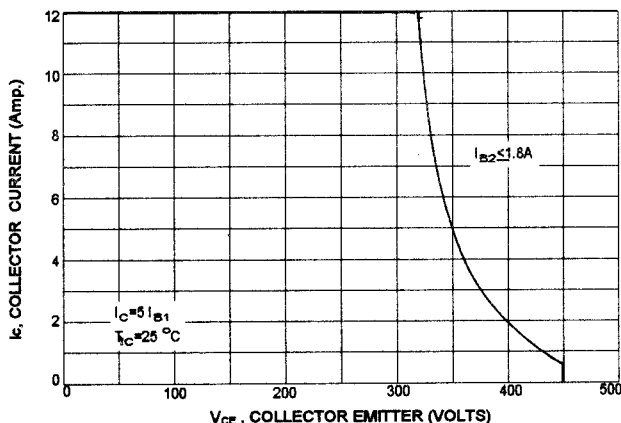
On Time	$V_{CC} = 30\text{ V}$ , $I_C = 3.0\text{ A}$ $I_{B1} = -I_{B2} = 600\text{ mA}$ $R_L = 10\text{ ohm}$	$t_{on}$		1.0	$\mu\text{s}$
Storage Time		$t_s$		3.0	$\mu\text{s}$
Fall Time		$t_f$		0.7	$\mu\text{s}$

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

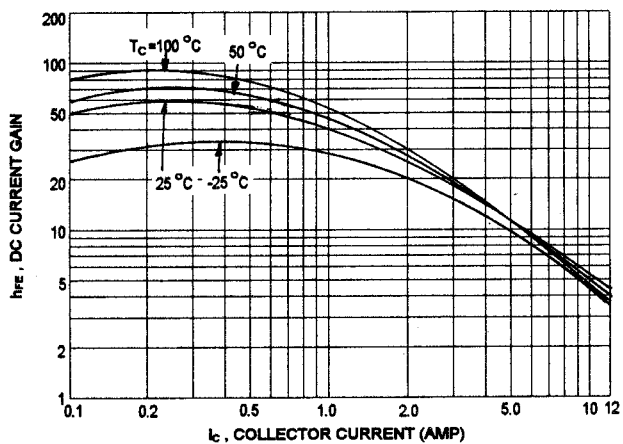
SAFE OPERATING AREA



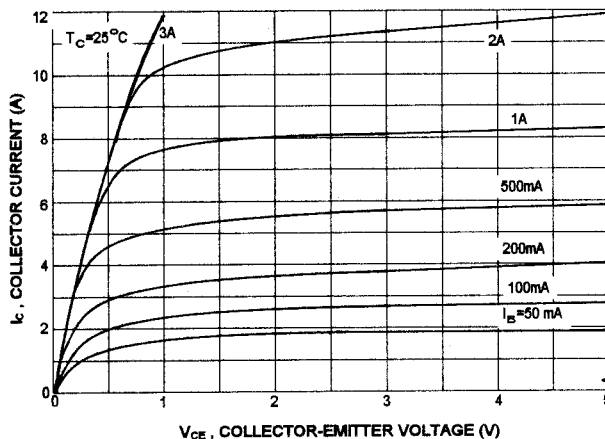
REVERSE BIASE SAFE OPERATING AREA



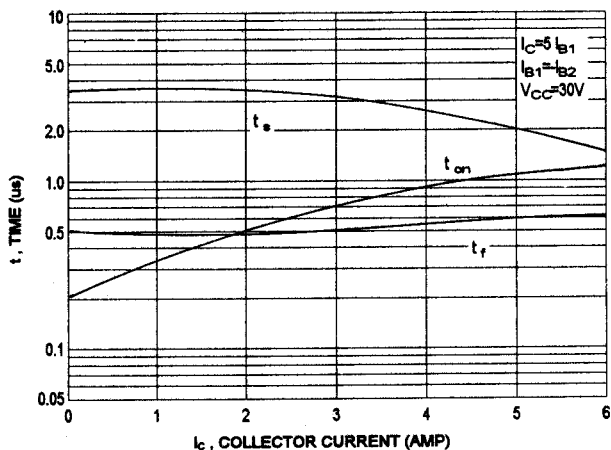
DC CURRENT GAIN



$I_C - V_{CE}$



SWITCHING TIME



COLLECTOR SATURATION REGION

