

## SWITCHMODE SERIES NPN POWER TRANSISTORS

... designed for use in high-voltage, high-speed, power switching applications such as switching regulator's, inverters, and conveter.

### FEATURES:

\*Collector-Emitter Sustaining Voltage-

$$V_{CE(sus)} = 800 \text{ V (Min)}$$

\* Collector-Emitter Saturation Voltage -

$$V_{CE(sat)} = 2.0 \text{ V (Max.) @ } I_C = 1.5 \text{ A, } I_B = 0.3 \text{ A}$$

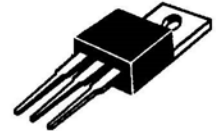
\* Switching Time -  $t_f = 0.7 \text{ us (Max.) @ } I_C = 2.0 \text{ A}$

**NPN**  
**2SC3150**

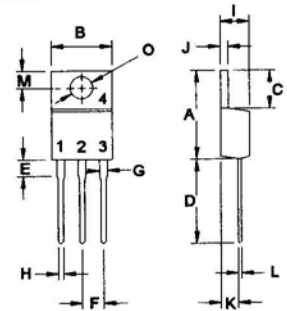
**3 AMPERE**  
**SILICON POWER**  
**TRANSISTORS**  
**800 VOLTS**  
**50 WATTS**

### MAXIMUM RATINGS

Characteristic	Symbol	2SC3150	Unit
Collector-Emitter Voltage	$V_{CEO}$	800	V
Collector-Base Voltage	$V_{CBO}$	900	V
Emitter-Base Voltage	$V_{EBO}$	7.0	V
Collector Current - Continuous	$I_C$	3.0	A
- Peak	$I_{CM}$	10	A
Base current	$I_B$	1.5	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**



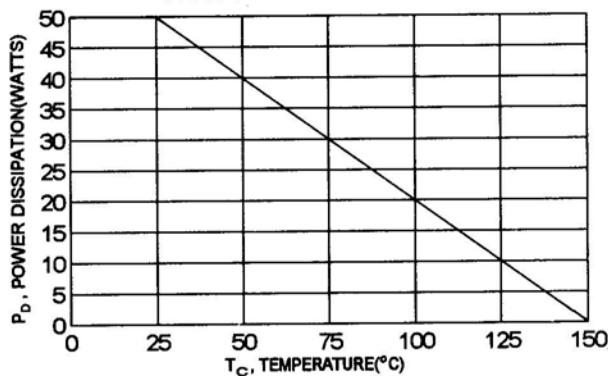
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR(CASE)

### THERMAL CHARACTERISTICS

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

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

FIGURE -1 POWER DERATING



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 ( $I_C = 3.0\text{ A}$ , $I_B = 1.0\text{ A}$ , $L = 500\text{ }\mu\text{H}$ )	$V_{\text{CEO(sus)}}$	800		V
Collector-Emitter Breakdown Voltage ( $I_C = 5.0\text{ mA}$ , $I_B = 0$ )	$V_{\text{(BR)CEO}}$	800		V
Collector-Base Breakdown Voltage ( $I_C = 1.0\text{ mA}$ , $I_E = 0$ )	$V_{\text{(BR)CBO}}$	900		V
Emitter-Base Breakdown Voltage ( $I_C = 1.0\text{ mA}$ , $I_C = 0$ )	$V_{\text{(BR)EBO}}$	7.0		V
Collector Cutoff Current ( $V_{\text{CB}} = 800\text{ V}$ , $I_E = 0$ )	$I_{\text{CBO}}$		10	$\mu\text{A}$
Emitter Cutoff Current ( $V_{\text{EB}} = 5.0\text{ V}$ , $I_C = 0$ )	$I_{\text{EBO}}$		10	$\mu\text{A}$

## ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 0.2\text{ A}$ , $V_{\text{CE}} = 5.0\text{ V}$ ) * ( $I_C = 1.0\text{ A}$ , $V_{\text{CE}} = 5.0\text{ V}$ )	$h_{\text{FE}(2)}$ $h_{\text{FE}}$	10 8.0	40	
Collector-Emitter Saturation Voltage ( $I_C = 1.5\text{ A}$ , $I_B = 300\text{ mA}$ )	$V_{\text{CE(sat)}}$		2.0	V
Base-Emitter Saturation Voltage ( $I_C = 1.5\text{ A}$ , $I_B = 300\text{ mA}$ )	$V_{\text{BE(sat)}}$		1.5	V

## DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product ( $I_C = 0.2\text{ A}$ , $V_{\text{CE}} = 10\text{ V}$ , $f = 1.0\text{ MHz}$ )	$f_T$	7.0		MHz
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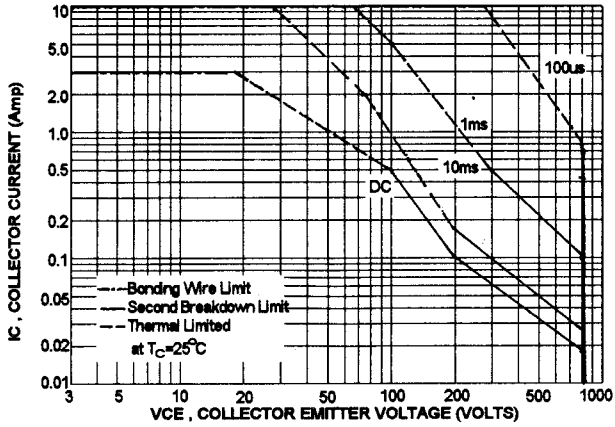
## SWITCHING CHARACTERISTICS

On Time	$V_{\text{CC}} = 400\text{ V}$ , $I_C = 2.0\text{ A}$ $I_{\text{B1}} = 0.4\text{ A}$ , $I_{\text{B2}} = -0.8\text{ A}$ $R_L = 200\text{ }\Omega$	$t_{\text{on}}$	1.0	$\mu\text{s}$
Storage Time		$t_s$	3.0	$\mu\text{s}$
Fall Time		$t_f$	0.7	$\mu\text{s}$

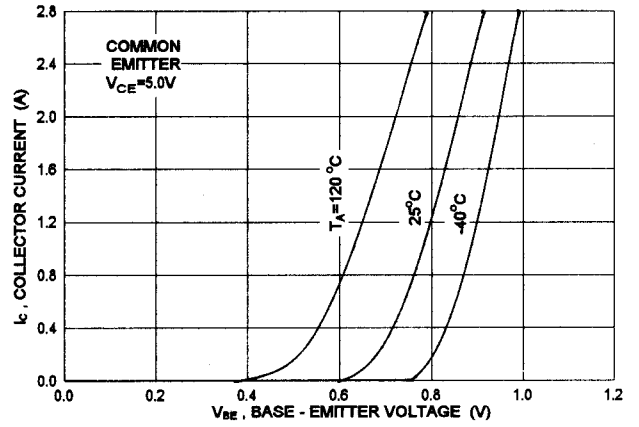
(1) Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ \*  $h_{\text{FE}(2)}$  Classification:

10	K	20	15	L	30	20	M	40
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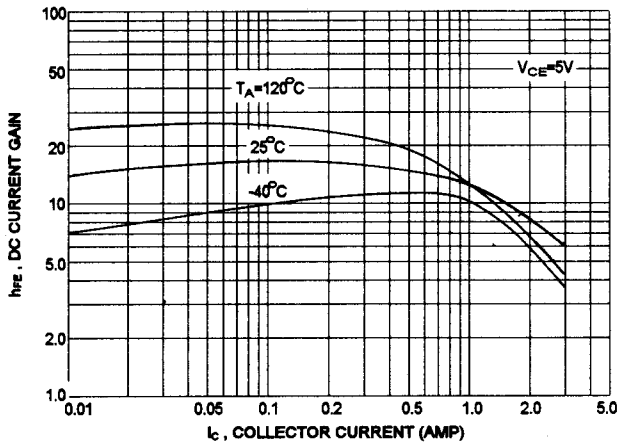
SAFE OPERATING AREA



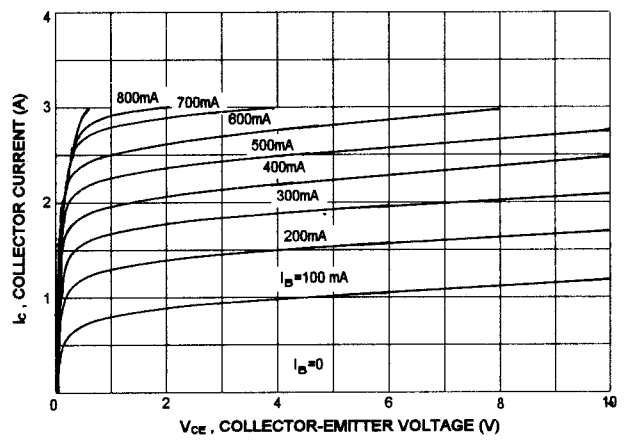
Ic - Vbe



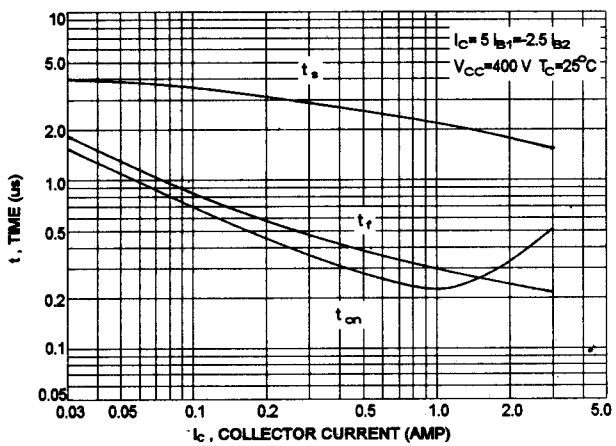
DC CURRENT GAIN



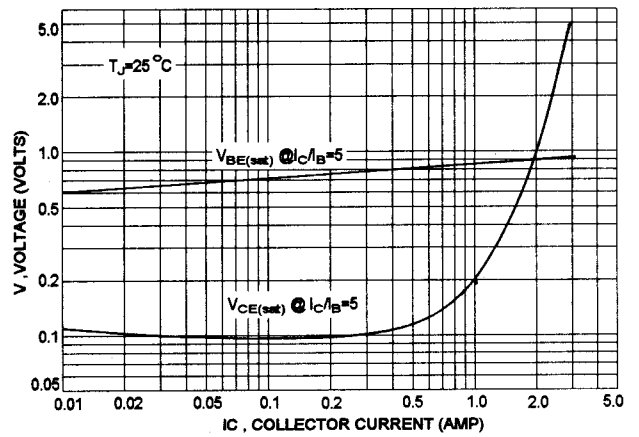
Ic - Vce



SWITCHING TIME



"ON" VOLTAGES



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