

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-

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

* Collector-Emitter Saturation Voltage -

$$V_{CE(sat)} = 0.7 \text{ V (Max.) @ } I_C = 5.0 \text{ A, } I_B = 0.5 \text{ A}$$

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

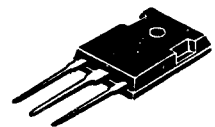
NPN

2SC2938

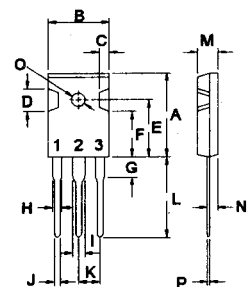
**10 AMPERE
SILICON POWER
TRANSISTORS
400 VOLTS
100 WATTS**

MAXIMUM RATINGS

Characteristic	Symbol	2SC2938	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	I_C	10	A
- Peak	I_{CM}	20	A
Base current	I_B	4.0	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	100 0.8	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$



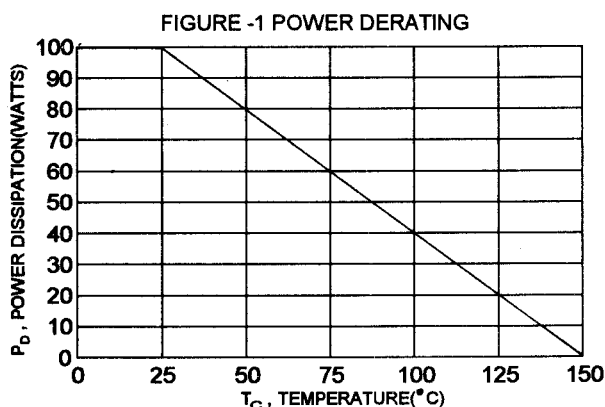
TO-247(3P)



PIN 1.BASE
2.COLLECTOR
3.EMITTER

THERMAL CHARACTERISTICS

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



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

ON CHARACTERISTICS (1)

DC Current Gain ($I_C = 5.0\text{ A}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 10\text{ A}$, $V_{CE} = 5.0\text{ V}$)	h_{FE}	15 8.0		
Collector-Emitter Saturation Voltage ($I_C = 4.0\text{ A}$, $I_B = 400\text{ mA}$)	$V_{CE(sat)}$		0.7	V
Base-Emitter Saturation Voltage ($I_C = 4.0\text{ A}$, $I_B = 400\text{ mA}$)	$V_{BE(sat)}$		1.5	V

DYNAMIC CHARACTERISTICS

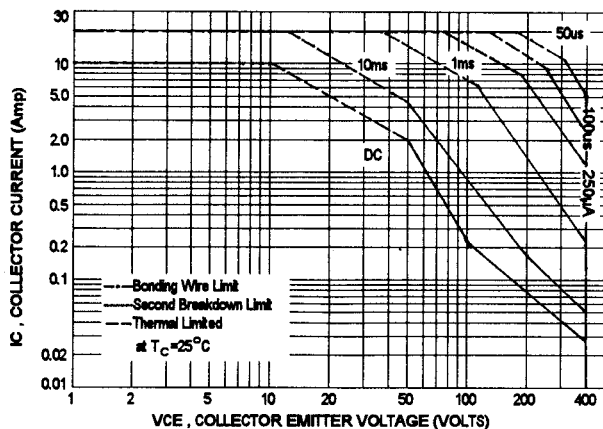
Current-Gain-Bandwidth Product ($I_C = 1.0\text{ A}$, $V_{CE} = 10\text{ V}$, $f = 1.0\text{ MHz}$)	f_T	5.0		MHz
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SWITCHING CHARACTERISTICS

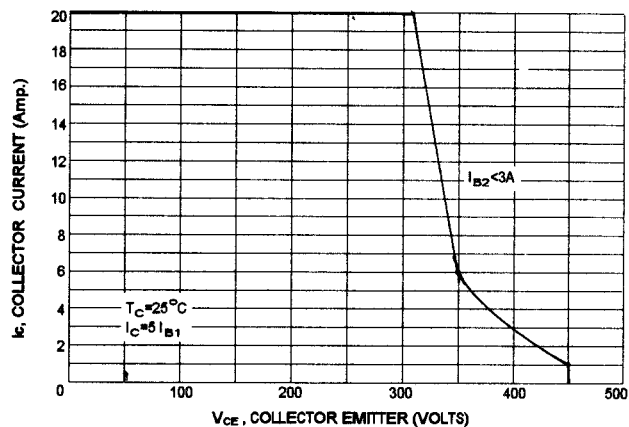
On Time	$V_{CC} = 200\text{ V}$, $I_C = 5.0\text{ A}$ $I_{B1} = -I_{B2} = 1.0\text{ A}$ $R_L = 40\text{ ohm}$	t_{on}	1.0	μs
Storage Time		t_s	3.0	μs
Fall Time		t_f	0.7	μs

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

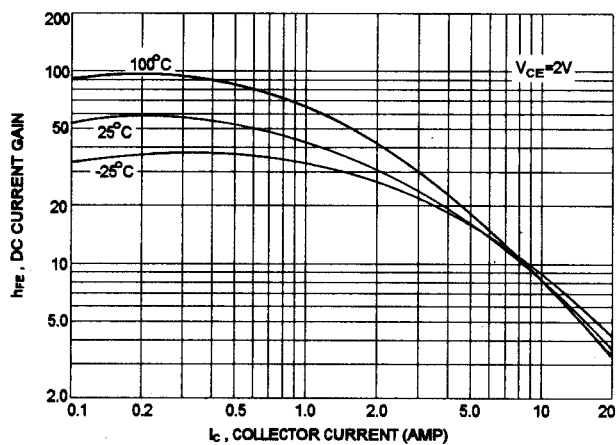
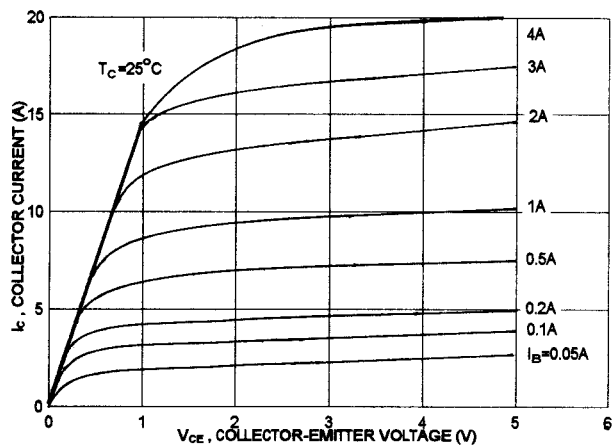
SAFE OPERATING AREA



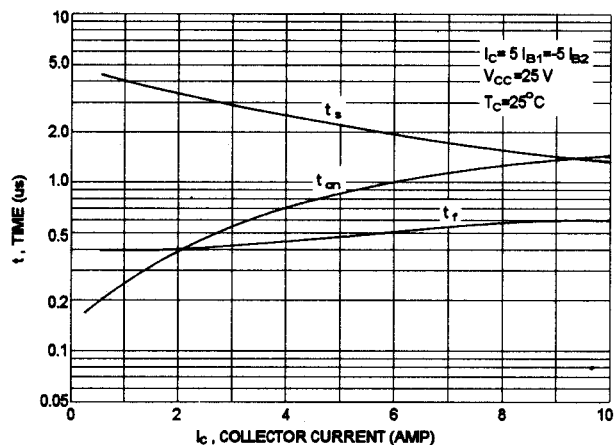
REVERSE BIAS SAFE OPERATING AREA



DC CURRENT GAIN

 $I_C - V_{CE}$ 

SWITCHING TIME



COLLECTOR SATURATION REGION

