

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, DC -DC and conveter

FEATURES:

*Collector-Emitter Sustaining Voltage-

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

* Collector-Emitter Saturation Voltage -

$$V_{CE(sat)} = 1.0 \text{ V (Max.) @ } I_C = 4.0 \text{ A, } I_B = 0.8 \text{ A}$$

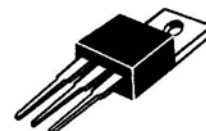
* Switching Time - $t_f = 1.0 \text{ us (Max.) @ } I_C = 5.0 \text{ A}$

NPN
2SC3039

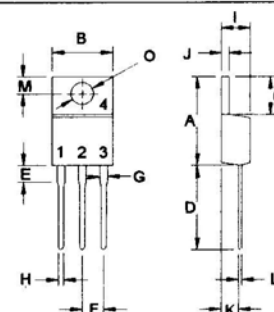
7.0 AMPERE
SILICON POWER
TRANSISTORS
400 VOLTS
50 WATTS

MAXIMUM RATINGS

Characteristic	Symbol	2SC3039	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}	7.0 14	A
Base current	I_B	3.0	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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

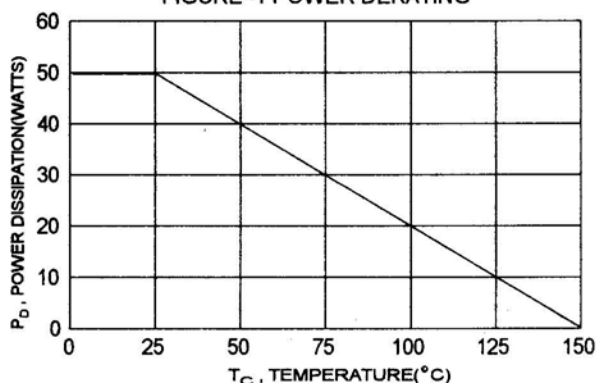


PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

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	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

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

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage ($I_C = 7.0\text{ A}$, $I_{B1} = 1.4\text{ A}$, $L = 50\text{ }\mu\text{H}$)	$V_{CEO(sus)}$	400		V
Collector-Base Breakdown Voltage ($I_C = 1.0\text{ mA}$, $I_E = 0$)	$V_{(BR)CBO}$	500		V
Collector-Emitter Breakdown Voltage ($I_C = 5.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	400		V
Emitter-Base Breakdown Voltage ($I_E = 1.0\text{ mA}$, $I_C = 0$)	$V_{(BR)EBO}$	7.0		V
Collector Cutoff Current ($V_{CB} = 400\text{ V}$, $I_E = 0$)	I_{CBO}		10	μA
Emitter Cutoff Current ($V_{EB} = 5.0\text{ V}$, $I_C = 0$)	I_{EBO}		10	μA

ON CHARACTERISTICS (1)

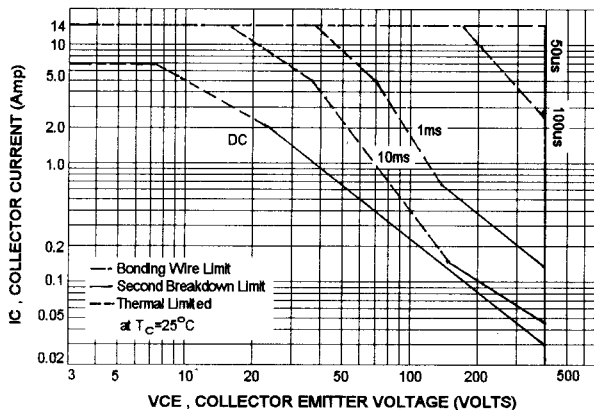
DC Current Gain ($I_C = 0.8\text{ A}$, $V_{CE} = 5.0\text{ V}$) ($I_C = 4.0\text{ A}$, $V_{CE} = 5.0\text{ V}$)	$h_{FE(2)}$ h_{FE}	15 8.0	50	
Collector-Emitter Saturation Voltage ($I_C = 4.0\text{ A}$, $I_B = 800\text{ mA}$)	$V_{CE(sat)}$		1.0	V
Base-Emitter Saturation Voltage ($I_C = 4.0\text{ A}$, $I_B = 800\text{ mA}$)	$V_{BE(sat)}$		1.5	V

SWITCHING CHARACTERISTICS

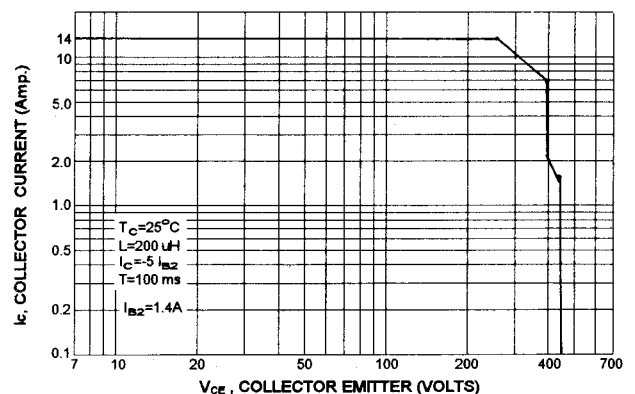
On Time	$V_{CC} = 200\text{ V}$, $I_C = 5.0\text{ A}$ $I_{B1} = -I_{B2} = 1.0\text{ A}$ $R_L = 40\text{ }\Omega$	t_{on}	1.0	μs
Storage Time		t_s	2.5	μs
Fall Time		t_f	1.0	μs

(1) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$,* $h_{FE(2)}$ Classification: L : 15 — 30 ; M : 20 — 40 ; N : 30 — 50

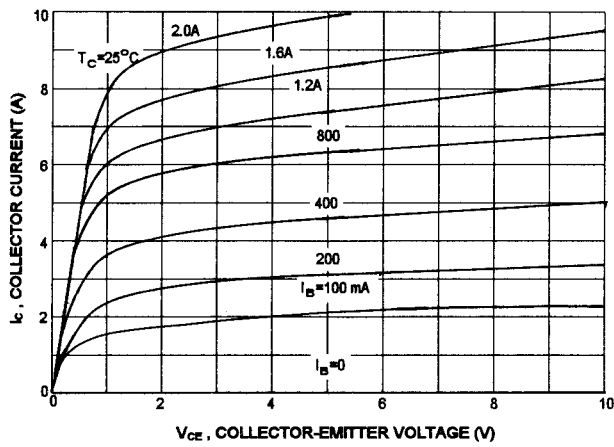
SAFE OPERATING AREA



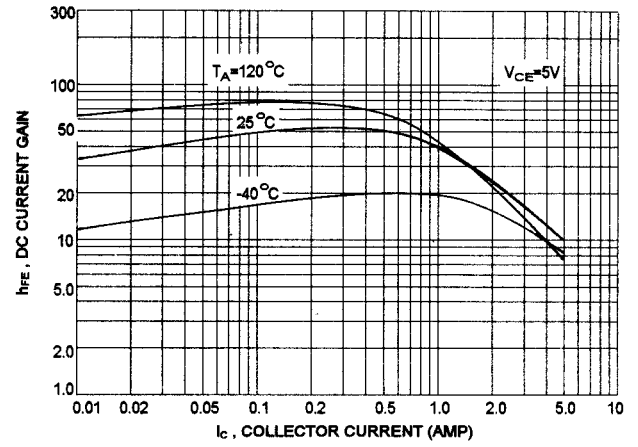
REVERSE BIAS SAFE OPERATING AREA



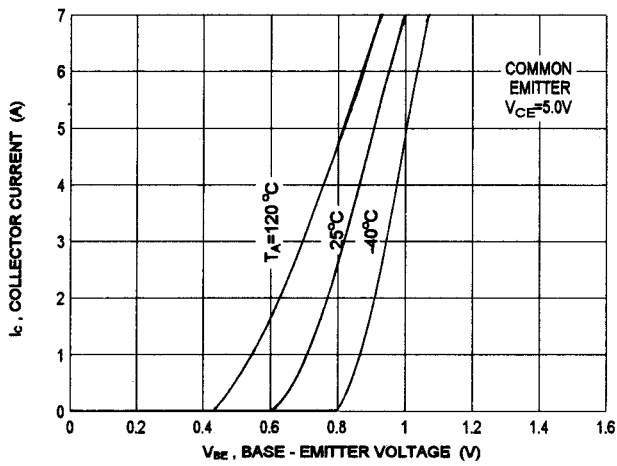
$I_C - V_{CE}$



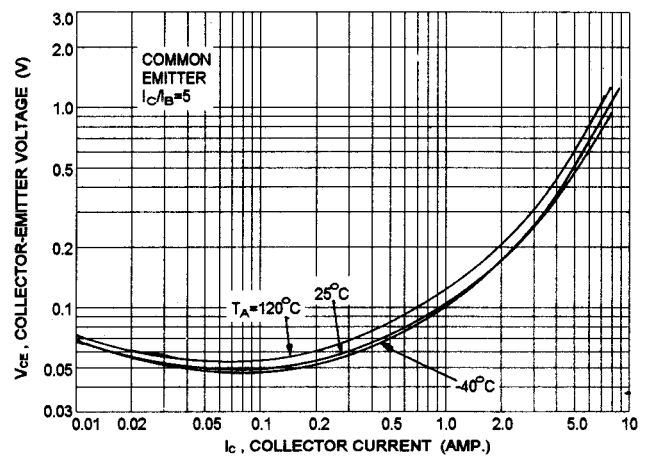
DC CURRENT GAIN



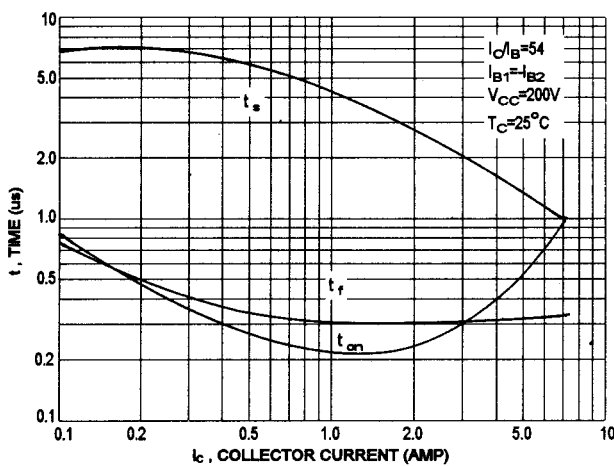
$I_C - V_{BE}$



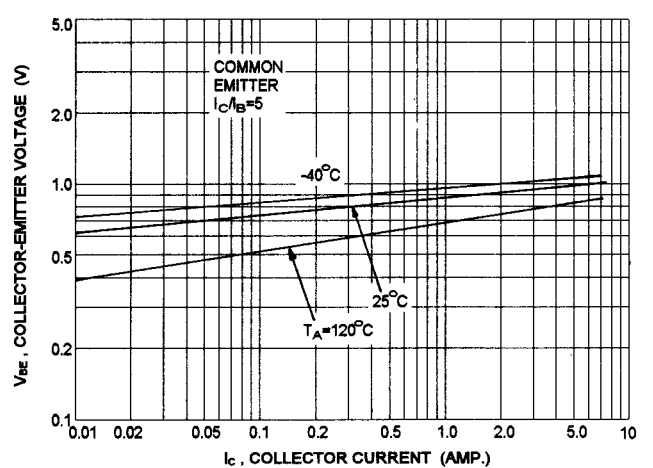
$V_{CE} - I_C$



SWITCHING TIME



$V_{BE} - I_C$



Notice

MOSPEC reserves the rights to make changes of the content herein the document anytime without notification. MOSPEC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies. Please refer to MOSPEC website for the last document.

MOSPEC disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially incurred.

Application shown on the herein document are examples of standard use and operation. Customers are responsible for comprehending suitable use in particular applications. MOSPEC makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by MOSPEC for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of MOSPEC or others.

These MOSPEC products are intended for usage in general electronic equipment. Please make sure to consult with MOSPEC before you use these MOSPEC products in equipment which require specialized quality and/or reliability, and in equipment which could have major impact to the welfare of human life (atomic energy control, aeronautics , traffic control, combustion control, safety devices etc.)