

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 converter.

FEATURES:

* Collector-Emitter Sustaining Voltage -

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

* Collector-Emitter Saturation Voltage -

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

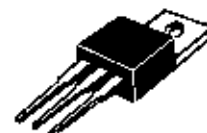
* Switching Time - $t_f = 0.5 \text{ us (Max.) @ } I_C = 5.0 \text{ A}$

NPN
2SC4242

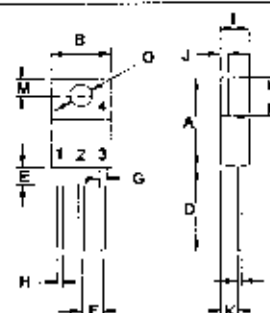
7 AMPERE
SILICON POWER
TRANSISTORS
400 VOLTS
40 WATTS

MAXIMUM RATINGS

Characteristic	Symbol	2SC4242	Unit
Collector-Emitter Voltage	V_{CE0}	400	V
Collector-Base Voltage	V_{CBO}	450	V
Emitter-Base Voltage	V_{EBO}	8.0	V
Collector Current - Continuous - Peak	I_C I_{CM}	7.0 14	A
Base current	I_B	2.0	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32	W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$



TO-220

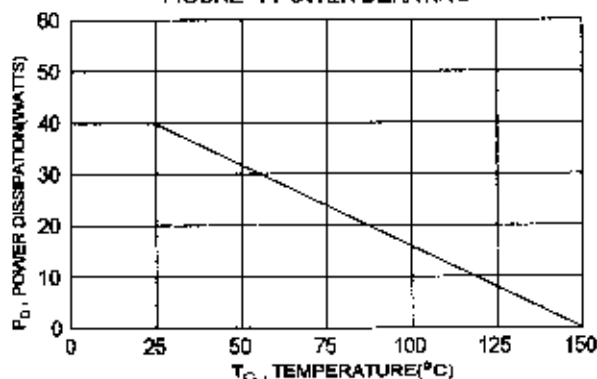


PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR (CASE)

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	3.125	$^\circ\text{C/W}$

FIGURE -1 POWER DERATING



DIM	MILLIMETERS	
	MIN	MAX
A	14.86	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 ($I_C = 100\text{ mA}$, $I_E = 0$)	$V_{CEO(sus)}$	400		V
Collector- Base Breakdown Voltage ($I_C = 1.0\text{ mA}$, $I_E = 0$)	$V_{(BR)CBO}$	450		V
Emitter- Base Breakdown Voltage ($I_E = 1.0\text{ mA}$, $I_C = 0$)	$V_{(BR)EBO}$	8.0		V
Collector Cutoff Current ($V_{CB} = 450\text{ V}$, $I_E = 0$)	I_{CBO}		100	μA
Emitter Cutoff Current ($V_{EB} = 8.0\text{ V}$, $I_C = 0$)	I_{EBO}		100	μA

ON CHARACTERISTICS (1)

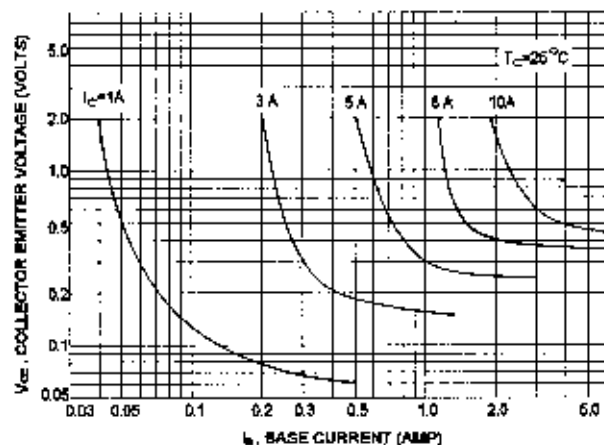
DC Current Gain ($I_C = 4.0\text{ A}$, $V_{CE} = 5.0\text{ V}$)	h_{FE}	10		
Collector-Emitter Saturation Voltage ($I_C = 4.0\text{ A}$, $I_E = 800\text{ mA}$)	$V_{CE(sat)}$		0.8	V
Base-Emitter Saturation Voltage ($I_C = 4.0\text{ A}$, $I_E = 800\text{ mA}$)	$V_{BE(sat)}$		1.2	V

SWITCHING CHARACTERISTICS

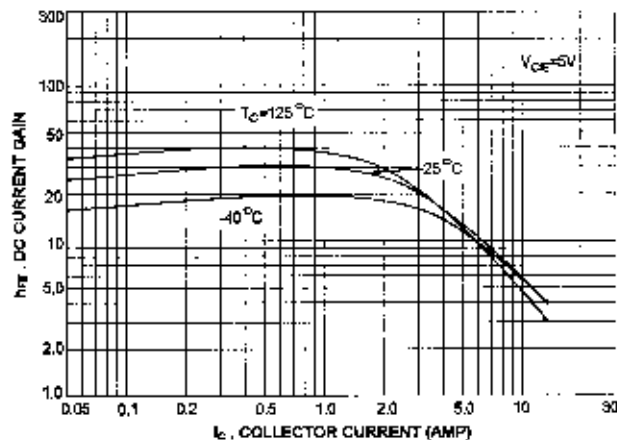
On Time	$V_{CC} = 150\text{ V}$, $I_C = 5.0\text{ A}$ $I_{B1} = -I_{B2} = 1.0\text{ A}$ $R_L = 30\text{ ohm}$	t_{on}	1.0	μs
Storage Time		t_s	2.5	μs
Fall Time		t_f	0.5	μs

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

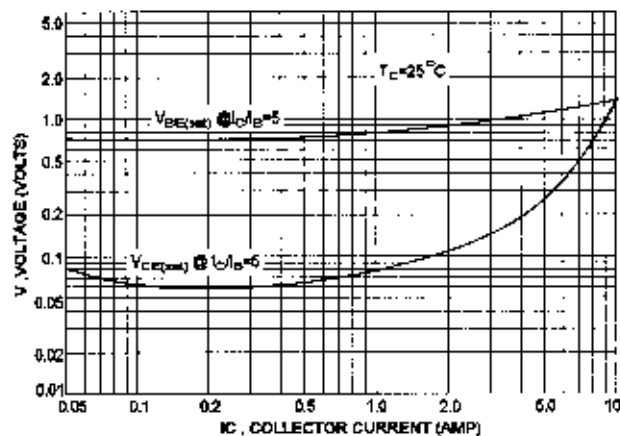
COLLECTOR SATURATION REGION



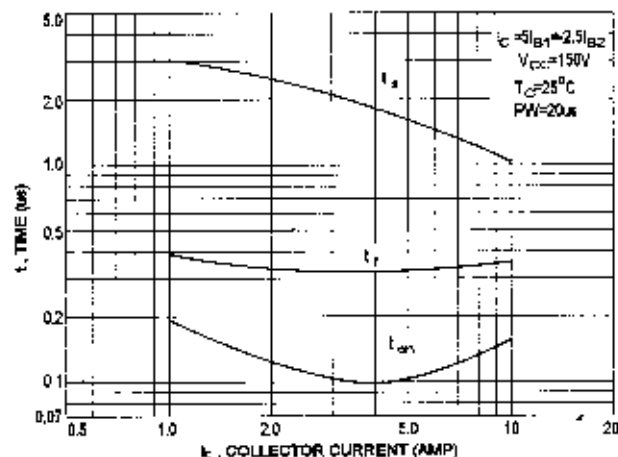
DC CURRENT GAIN



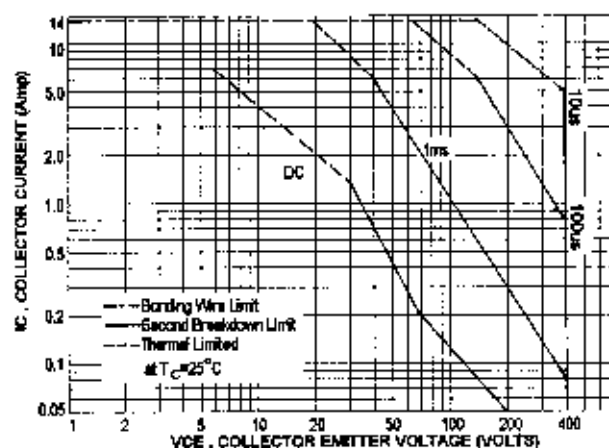
"ON" VOLTAGES



SWITCHING TIME



ACTIVE-REGION SAFE OPERATING AREA (SOA)



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate I_C - V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate.

The data of SOA curve is based on $T_{J(PK)} = 150^\circ\text{C}$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.