MOSPEC

PNP SILICON HIGH-POWER TRANSISTORS

General Purpose use in amplifier and switching applications.

PNP
2N4398
2N4399
2N5745

20 , 30 AMPERE
PNP SILICON
POWER TRANSISTORS
40-80 Volts
200 Watts

FEATURES:

*DC Current Gain Specified- 1.0 to 30 A
* Low Collector-Emitter Saturation Voltage -
$V_{CE(sat)}$ = 0.75 V (Max.) @ I_C = 10 A - 2N4398, 2N4399
$V_{CE(sat)}$ = 1.0 V (Max.) @ I_C = 10 A - 2N5745
* Complements to NPN 2N5301,2N5302,2N5303

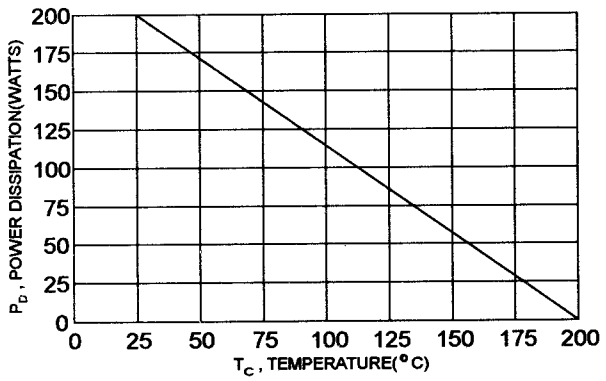
MAXIMUM RATINGS

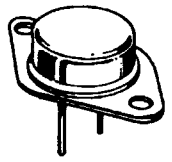
Characteristic	Symbol	2N4398	2N4399	2N5745	Unit
Collector-Emitter Voltage	V_{CBO}	40	60	80	V
Collector-Emitter Voltage	V_{CEO}	40	60	80	V
Emitter-Base Voltage	V_{EB}	5.0			V
Collector Current-Continuous -Peak	I_C	30 50	30 50	20 50	A
Base current - Continuous - Peak	I_B	7.5 15			A
Total Power Dissipation @T_C=25°C Derate above 25°C	P_D	200 1.15			W W/°C
Operating and Storage Junction Temperature Range	T_J,T_{STG}	- 65 to +200			°C

THERMAL CHARACTERISTICS

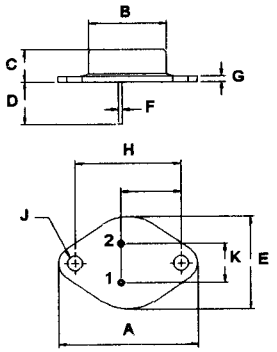
Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	0.875	°C/W

FIGURE -1 POWER DERATING





TO-3



PIN 1.BASE
2.EMITTER
COLLECTOR(CASE)

DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.67	11.18

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Sustaining Voltage (1)		$V_{CEO(SUS)}$			V
(I_C = 200 mA, I_B = 0)	2N4398		40		
	2N4399		60		
	2N5745		80		
Collector Cutoff Current		I_{CEO}			mA
(V_{CE} = 40 V, I_B = 0)	2N4398			5.0	
(V_{CE} = 60 V, I_B = 0)	2N4399			5.0	
(V_{CE} = 80 V, I_B = 0)	2N5745			5.0	
Collector Cutoff Current		I_{CEX}			
(V_{CE} = 40 V, $V_{BE(off)}$ = 1.5 V)	2N4398			5.0	mA
(V_{CE} = 60 V, $V_{BE(off)}$ = 1.5 V)	2N4399			5.0	
(V_{CE} = 80 V, $V_{BE(off)}$ = 1.5 V)	2N5745			5.0	
(V_{CE} = 30 V, $V_{BE(off)}$ = 1.5 V, T_C = 150°C)	2N4398, 2N4399			10	mA
(V_{CE} = 80 V, $V_{BE(off)}$ = 1.5 V, T_C = 150°C)	2N5745			10	
Emitter Cutoff Current		I_{EBO}		5.0	mA
(V_{EB} = 5.0 V , I_C = 0)	All Types				
ON CHARACTERISTICS (1)					
DC Current Gain		hFE			
(I_C = 1.0 A, V_{CE} = 2.0 V)	All Types		40		
(I_C = 10 A, V_{CE} = 2.0 V)	2N5745		15	60	
(I_C = 15 A, V_{CE} = 2.0 V)	2N4398, 2N4399		15	60	
(I_C = 20 A, V_{CE} = 2.0 V)	2N5745		5.0		
(I_C = 30 A, V_{CE} = 4.0 V)	2N4398, 2N4399		5.0		
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			V
(I_C = 10 A, I_B = 1.0 A)	2N4398, 2N4399			0.75	
	2N5745			1.0	
(I_C = 15 A, I_B = 1.5 A)	2N4398, 2N4399			1.0	
	2N5745			1.5	
(I_C = 20 A, I_B = 2.0 A)	2N4398, 2N4399			2.0	
(I_C = 20 A, I_B = 4.0 A)	2N5745			2.0	
(I_C = 30 A, I_B = 6.0 A)	2N4398, 2N4399			4.0	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$			
(I_C = 10 A, I_B = 1.0 A)	2N4398, 2N4399			1.6	V
	2N5745			1.7	
(I_C = 15 A, I_B = 1.5 A)	2N4398, 2N4399			1.85	
	2N5745			2.0	
(I_C = 20 A, I_B = 2.0 A)	2N4398, 2N4399			2.5	
(I_C = 20 A, I_B = 4.0 A)	2N5745			2.5	
Base-Emitter On Voltage		$V_{BE(on)}$			V
(I_C = 10 A, V_{CE} = 2.0 V)	2N5745			1.5	
(I_C = 15 A, V_{CE} = 2.0 V)	2N4398, 2N4399			1.7	
(I_C = 20 A, V_{CE} = 4.0 V)	2N5745			2.5	
(I_C = 30 A, V_{CE} = 4.0 V)	2N4398, 2N4399			3.0	

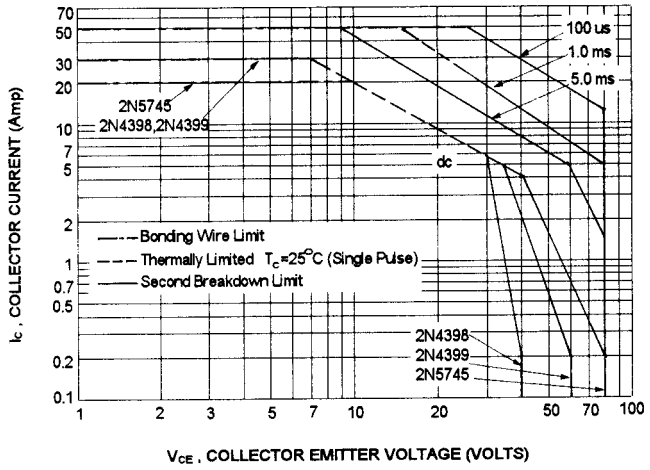
(1) Pulse Test: Pulse width $\leq$ 300 μs , Duty Cycle $\leq$ 2.0%

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
DYNAMIC CHARACTERISTICS					
Current-Gain-Bandwidth Product (2) (I_C = 1.0 A, V_{CE} = 10 V, f = 1.0 MHz)	2N4398, 2N4399 2N5745	f_T	4.0 2.0		MHz
Small-Signal Current Gain (I_C = 1.0 A, V_{CE} = 10 V, f = 1.0 KHz)		h_{fe}	40		
SWITCHING CHARACTERISTICS					
Rise Time	2N4398,2N4399 2N5745	t_r		0.4 1.0	us
Storage Time	V_{CC} = 30 V I_C = 10.0 A I_{B1} = I_{B2} = 1.0 A t_p = 0.1 ms Duty Cycle ≦2.0%	t_s		1.5 2.0	us
Fall Time	2N4398,2N4399 2N5745	t_f		0.6 1.0	us

(1) Pulse Test: Pulse width = 300 us , Duty Cycle ≦ 2.0%
(2) $f_T = |h_{fe}| \cdot f_{test}$

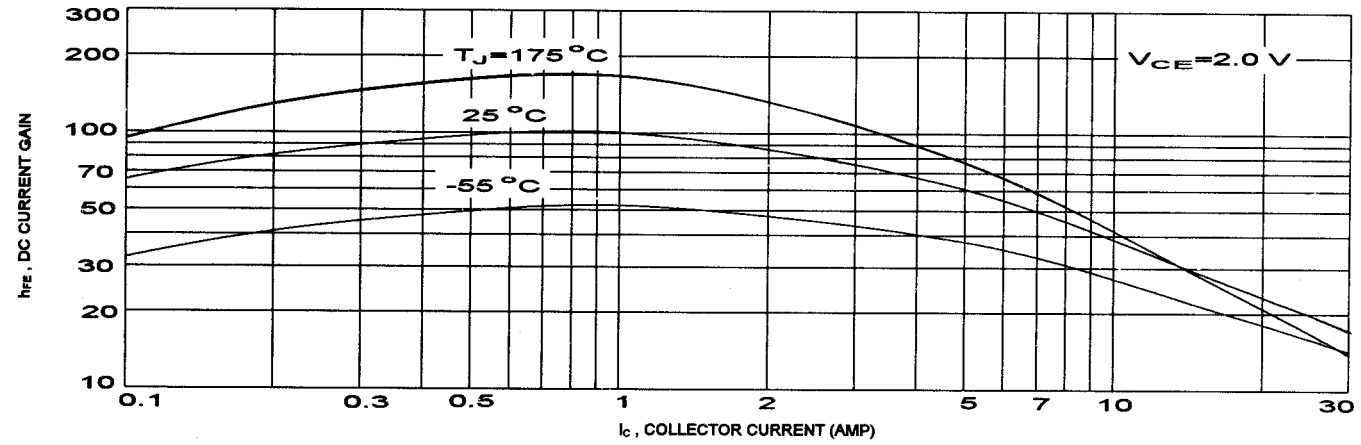
ACTIVE REGION SAFE OPERATING AREA (SOA)



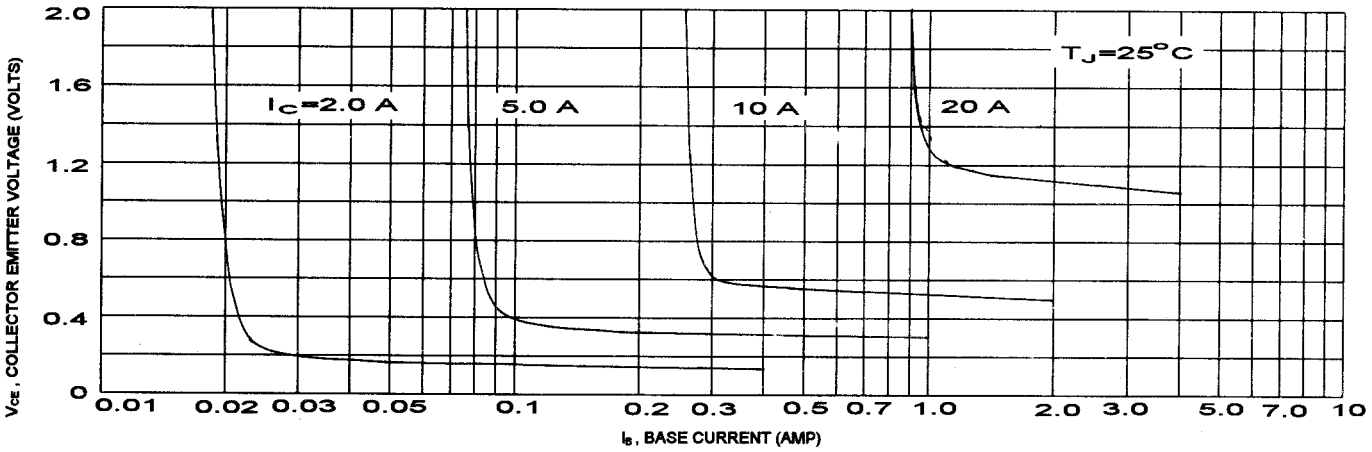
There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation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

The data of SOA curve is base on $T_{J(PK)}$=200 °C;T_C is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)}$<200°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.

DC CURRENT GAIN



COLLECTOR SATURATION REGION



"ON"VOLTAGES