MOSPEC

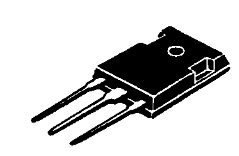
HIGH VOLTAGE NPN SILICON POWER TRANSISTORS

... designed for line operated audio output amplifier, and switching power supply drivers applications.

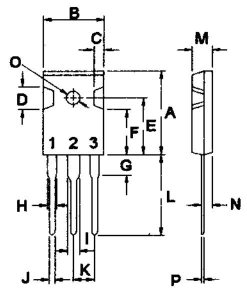
NPN
TIP51
TIP52
TIP53
TIP54

3.0 AMPER
POWER TRANSISTORS
250 -400 VOLTS
100 WATTS

FEATURES:
* Collector-Emitter Sustaining Voltage -250-400V(Min)
* 3 A Rated Collector Current
* f_T= 2.5MHz(Min) @I_C = 200mA



TO-247(3P)



PIN 1.BASE
2.COLLECTOR
3.EMITTER

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

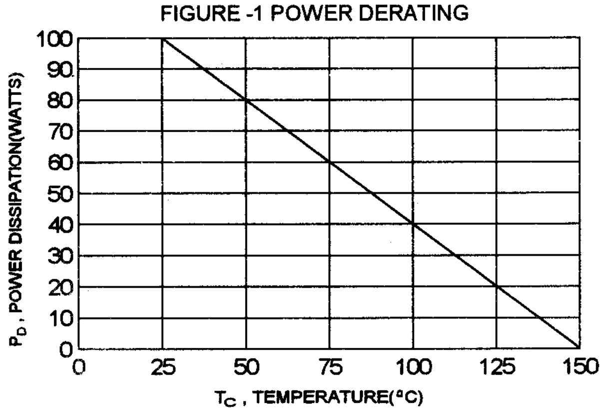
MAXIMUM RATINGS

Characteristic	Symbol	TIP51	TIP52	TIP53	TIP54	Unit
Collector-Emitter Voltage	V_{CEO}	250	300	350	400	V
Collector-Base Voltage	V_{CBO}	350	400	450	500	V
Emitter-Base Voltage	V_{EBO}	5.0				V
Collector Current - Continuous - Peak	I_C	3.0 5.0				A
Base Current	I_B	0.6				A
Total Power Dissipation@T_C = 25°C Derate above 25°C	P_D	100 0.8				W W/°C
Operating and Storage Junction Temperature Range	T_J,T_{STG}	-65 to +150				°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	Rθjc	1.25	°C/W

FIGURE -1 POWER DERATING



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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage(1) (I_C= 30 mA, I_B= 0)	TIP51 TIP52 TIP53 TIP54	$V_{CEO(sus)}$	250 300 350 400		V
Collector Cutoff Current (V_{CE}= 150 V, I_B= 0) (V_{CE}= 200 V, I_B= 0) (V_{CE}= 250 V, I_B= 0) (V_{CE}= 300 V, I_B= 0)	TIP51 TIP52 TIP53 TIP54	I_{CEO}		1.0 1.0 1.0 1.0	mA
Collector Cutoff Current (V_{CE}= 350 V, V_{BE}= 0) (V_{CE}= 400 V, V_{BE}= 0) (V_{CE}= 450 V, V_{BE}= 0) (V_{CE}= 500 V, V_{BE}= 0)	TIP51 TIP52 TIP53 TIP54	I_{CES}		1.0 1.0 1.0 1.0	mA
Emitter Cutoff Current (V_{EB}= 5.0 V, I_C= 0)		I_{EBO}		1.0	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C =0.3 A, V_{CE} = 10 V) (I_C= 3.0 A, V_{CE} = 10 V)		hFE	 30 10	 150	
Collector-Emitter Saturation Voltage (I_C = 3.0 A, I_B =600 mA)		$V_{CE(sat)}$		1.5	V
Base-Emitter On Voltage (I_C =3.0 A,V_{CE}= 10 V)		$V_{BE(on)}$		1.5	V
DYNAMIC CHARACTERISTICS					
Current Gain - Bandwidth Product (2) (I_C = 200 mA , V_{CE} = 10 V , f_{TEST} = 1.0 MHz)		f_T	2.5		MHz
Small Signal Current Gain (I_C = 200 mA , V_{CE} = 10 V , f = 1.0 kHz)		h_{fe}	30		

(1) Pulse Test: Pulse width ≦ 300 μs , Duty Cycle ≦ 2.0 %

(2) $f_T = |h_{fe}| \cdot f_{TEST}$

FIG-2 DC CURRENT GAIN

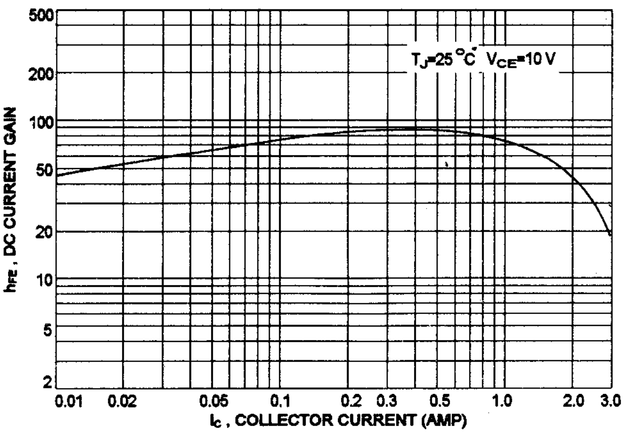


FIG-3 BAES-EMITTER VOLTAGE

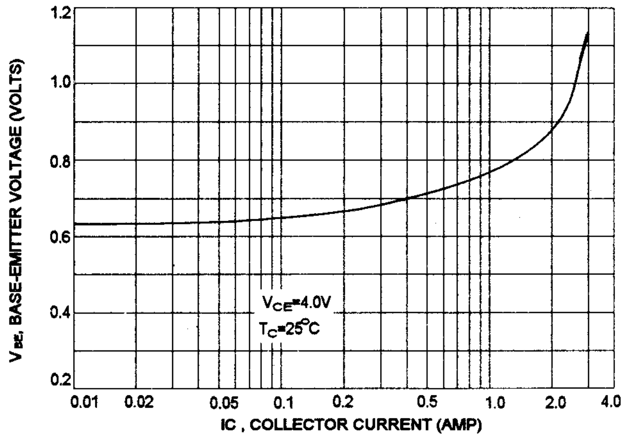


FIG-4 COLLECTOR-EMITTER SATURATION VOLTAGE

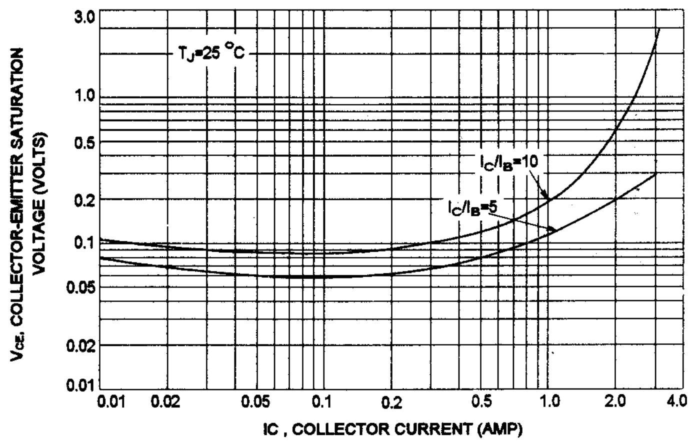
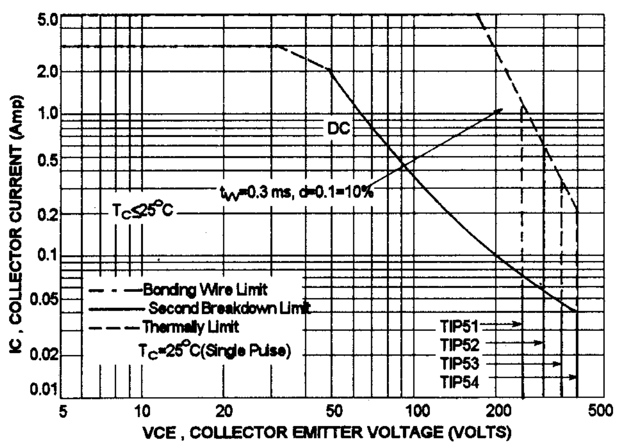


FIG-5 ACTIVE REGION SAFE OPERATING AREA



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 FIG-5 curve is base on $T_{J(PK)}$=150 °C; T_C is variable depending on power level. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)}$ ≤150°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.

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