MOSPEC

NPN SILICON POWER DARLINGTON TRANSISTORS

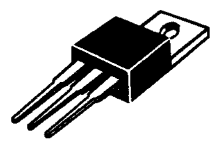
...designed for use in automotive ignition. switching and motor control applications.

FEATURES:

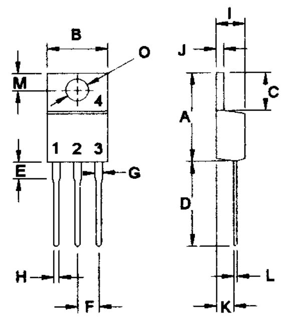
* Collector-Emitter Sustaining Voltage-
  $V_{CEO(sus)}$ = 300 V (Min) - TIP150
  = 350 V (Min) - TIP151
  = 400 V (Min) - TIP152
* Collector-Emitter Saturation Voltage
  $V_{CE(sat)}$ = 2.0 V (Max.) @ I_C = 5.0 A
* Reverse-Base SOA — 300 V to 400 V at 7 A

NPN
TIP150
TIP151
TIP152

7 AMPERE
DARLINGTON
POWER TRANSISTORS
300-400 VOLTS
80 WATTS



TO-220



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

DIM	MILLIMETERS	
	MIN	MAX
A	14.68	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

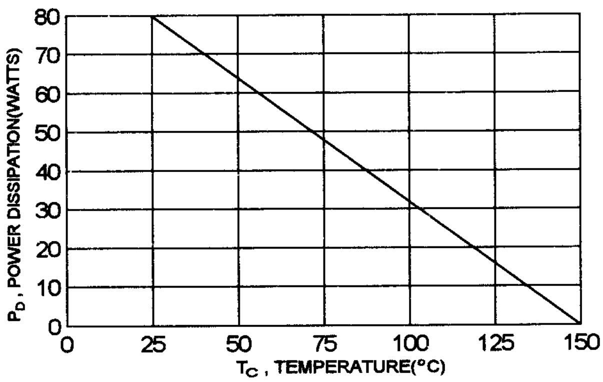
MAXIMUM RATINGS

Characteristic	Symbol	TIP150	TIP151	TIP152	Unit
Collector-Emitter Voltage	V_{CEO}	300	350	400	V
COllector-Base Voltage	V_{CBO}	300	350	400	V
Emitter-Base Voltage	V_{EBO}	8.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	7.0 10			A
Base Current	I_B	1.5			A
Total Power Dissipation @T_C= 25°C Derate above 25°C	P_D	80 0.64			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	1.56	°C/W

FIGURE -1 POWER DERATING



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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector - Emitter Breakdown Voltage (1) (I_C = 10 mA, I_B = 0)	TIP150 TIP151 TIP152	$V_{(BR)CEO}$	300 350 400		V
Collector - Base Breakdown Voltage (1) (I_C = 1.0 mA, I_B = 0)	TIP150 TIP151 TIP152	$V_{(BR)CBO}$	300 350 400		V
Collector Cutoff Current (V_{CE} = 300 V, I_B = 0) (V_{CE} = 350 V, I_B = 0) (V_{CE} = 400 V, I_B = 0)	TIP150 TIP151 TIP152	I_{CEO}		250 250 250	uA
Emitter Cutoff Current (V_{EB} = 8.0 V, I_C = 0)		I_{EBO}		15	mA
ON CHARACTERISTICS (1)					
DC Current Gain (I_C = 2.5 A, V_{CE} = 5.0 V) (I_C = 5.0 A, V_{CE} = 5.0 V) (I_C = 7.0 A, V_{CE} = 5.0 V)		hFE	150 50 15		
Collector-Emitter Saturation Voltage (I_C = 1.0 A, I_B = 10 mA) (I_C = 2.0 A, I_B = 100 mA) (I_C = 5.0 A, I_B = 250 mA)		$V_{CE(sat)}$		1.5 1.5 2.0	V
Base-Emitter Saturation Voltage (I_C = 2.0 A, I_B = 100 mA) (I_C = 5.0 A, I_B = 250 mA)		$V_{BE(sat)}$		2.2 2.3	V
Diode Forward Voltage (I_F = 7.0 A)		V_F		3.5	V
DYNAMIC CHARACTERISTICS					
Small-Signal Current Gain (I_C = 0.5 A, V_{CE} = 5.0 V, f = 1.0 KHz)		h_{fe}	200		
Output Capacitance (V_{CB} = 10 V, I_E = 0 , f = 1.0 MHz)		C_{ob}		150	pF

SWITCHING CHARACTERISTICS

Characteristic	Conditions	Symbol	Min	Max	Unit
Delay Time	V_{CC} = 250 V, I_C = 5.0 A I_{B1} = $-I_{B2}$ = 250 mA, tp = 20us, Duty Cycle ≦2.0%	t_d	30(typ)		ns
Rise Time		t_r	180(typ)		ns
Storage Time		t_s	3.5(typ)		us
Fall Time		t_f	1.6(typ)		us

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

FIG-2 DC CURRENT GAIN

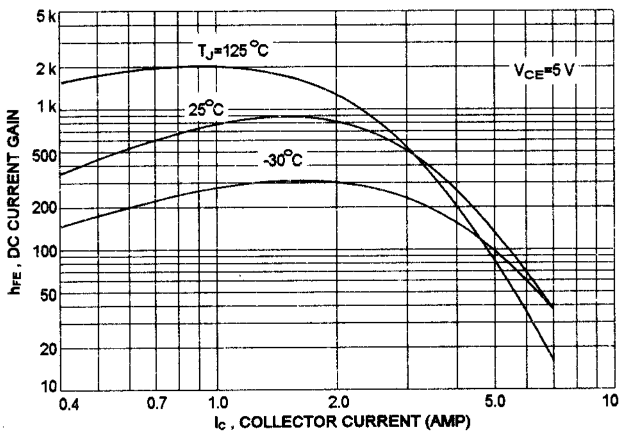


FIG-3 BAES-EMITTER VOLTAGE

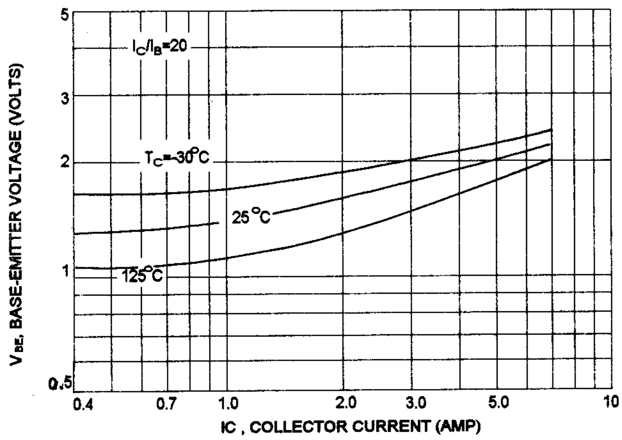


FIG-4 COLLECTOR-EMITTER SATURATION VOLTAGE

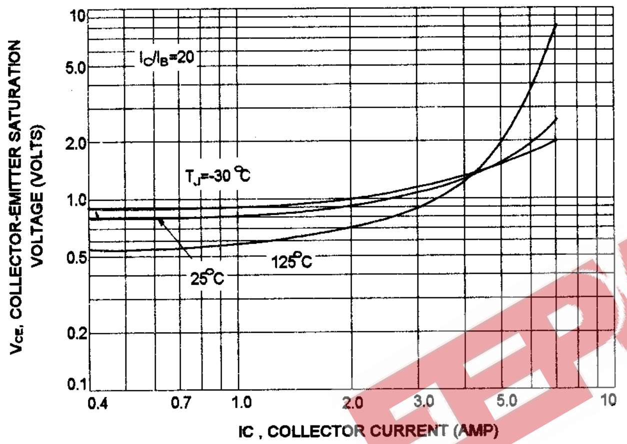


FIG-5 REVERSE BIASE SAFE OPERATING AREA

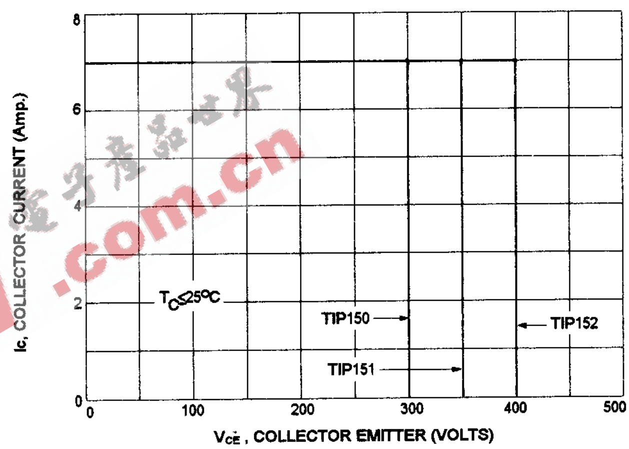
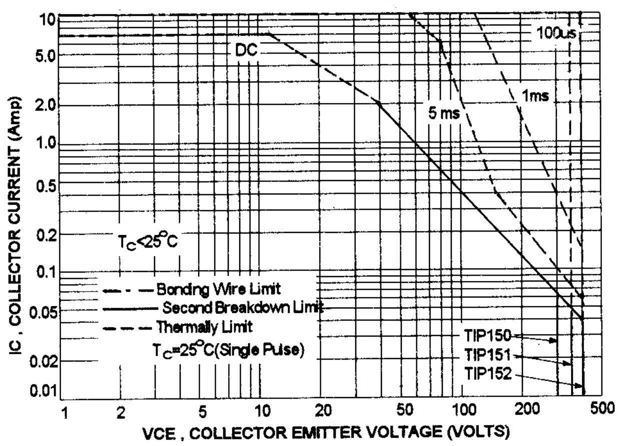


FIG-6 ACTIVE REGION SAFE OPERATING AREA



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-6 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.