MOSPEC

NPN SILICON POWER DARLINGTON TRANSISTORS

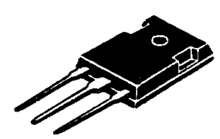
...designed for use in automotive ignition. switching and motor control applications.

FEATURES:

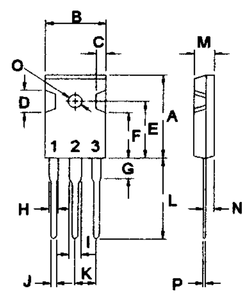
* Collector-Emitter Sustaining Voltage-
  $V_{CEO(SUS)}$ = 320 V (Min) - TIP160
  = 350 V (Min) - TIP161
  = 380 V (Min) - TIP162
* Collector-Emitter Saturation Voltage
  $V_{CE(sat)}$ = 2.9 V (Max.) @ I_C = 10 A
* 10 A Rated Continuous Collector Current

NPN
TIP160
TIP161
TIP162

10 AMPERE
DARLINGTON
POWER TRANSISTORS
320-380 VOLTS
125 WATTS



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

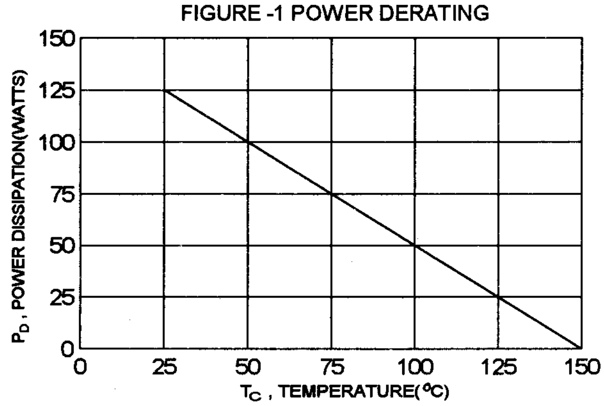
MAXIMUM RATINGS

Characteristic	Symbol	TIP160	TIP161	TIP162	Unit
Collector-Emitter Voltage	V_{CEO}	320	350	380	V
COllector-Base Voltage	V_{CBO}	320	350	380	V
Emitter-Base Voltage	V_{EBO}	5.0			V
Collector Current-Continuous -Peak	I_C I_{CM}	10 15			A
Base Current	I_B	1.0			A
Total Power Dissipation @T_C= 25°C Derate above 25°C	P_D	125 1.0			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	1.0	°C/W

FIGURE -1 POWER DERATING



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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector Cutoff Current (V_{CE} = 320 V, I_B = 0) TIP160 (V_{CE} = 350 V, I_B = 0) TIP161 (V_{CE} = 380 V, I_B = 0) TIP162	I_{CEO}		1.0 1.0 1.0	mA
Emitter Cutoff Current (V_{EB} = 5.0 V, I_C = 0)	I_{EBO}		100	mA
ON CHARACTERISTICS (1)				
DC Current Gain (I_C = 4.0 A, V_{CE} = 2.2 V)	hFE	200		
Collector-Emitter Saturation Voltage (I_C = 6.5 A, I_B = 0.1 A) (I_C = 10 A, I_B = 1.0 A)	$V_{CE(sat)}$		2.8 2.9	V
Base-Emitter Saturation Voltage (I_C = 6.5 A, I_B = 0.1 A)	$V_{BE(sat)}$		2.2	V
Diode Forward Voltage (I_F=10 A)	V_F		3.5	V

SWITCHING CHARACTERISTICS

Characteristic	Conditions	Symbol	Typ	Max	Unit
Delay Time	V_{CC} = 33 V, I_C = 6.5 A I_{B1} = $-I_{B2}$ =100 mA, tp = 20us, Duty Cycle ≦2.0%	t d	0.3(Typ)		us
Rise Time		t r	1.5(Typ)		us
Storage Time		t s	2.3(Typ)		us
Fall Time		t f	2.8(Typ)		us

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

FIG-2 DC CURRENT GAIN

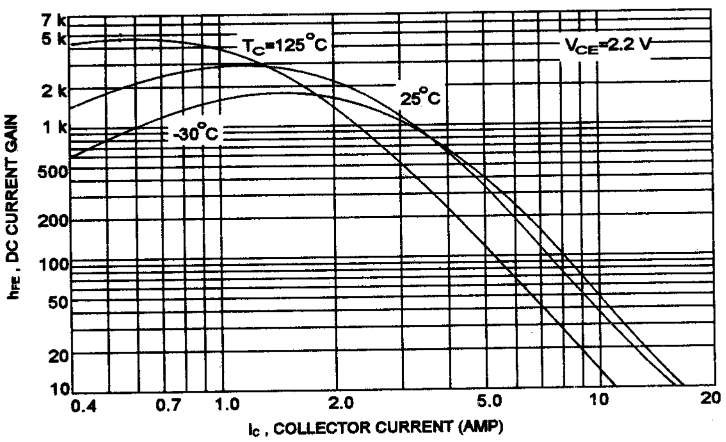


FIG-3 BAES-EMITTER VOLTAGE

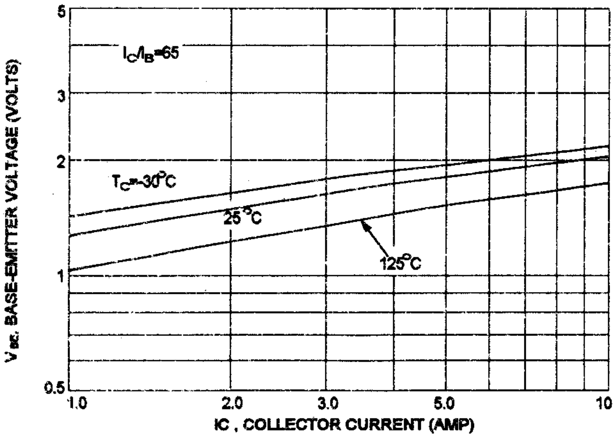


FIG-4 BAES-EMITTER VOLTAGE

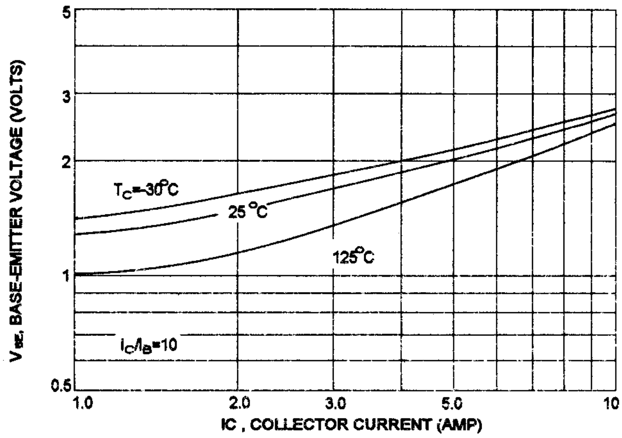


FIG-5 COLLECTOR-EMITTER SATURATION VOLTAGE

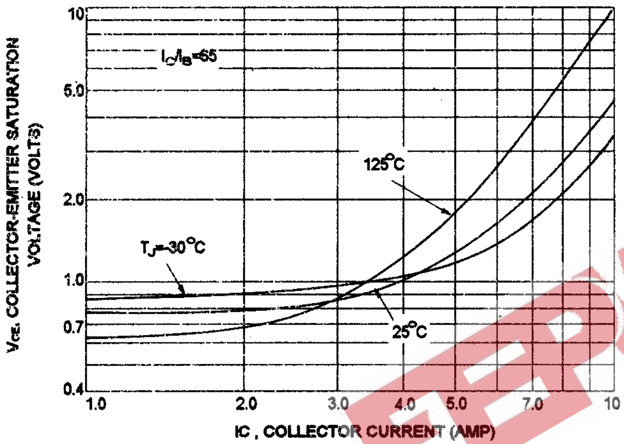


FIG-6 COLLECTOR-EMITTER SATURATION VOLTAGE

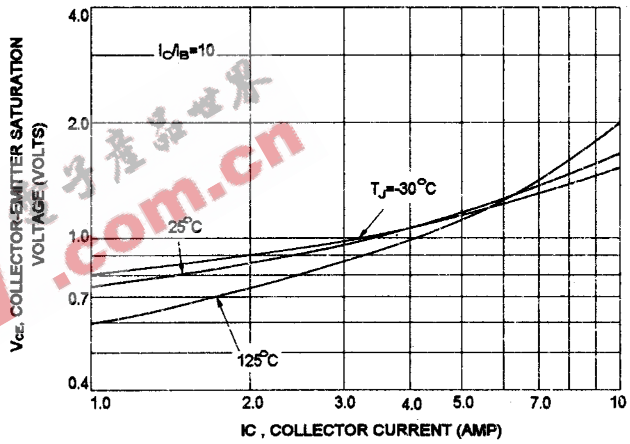
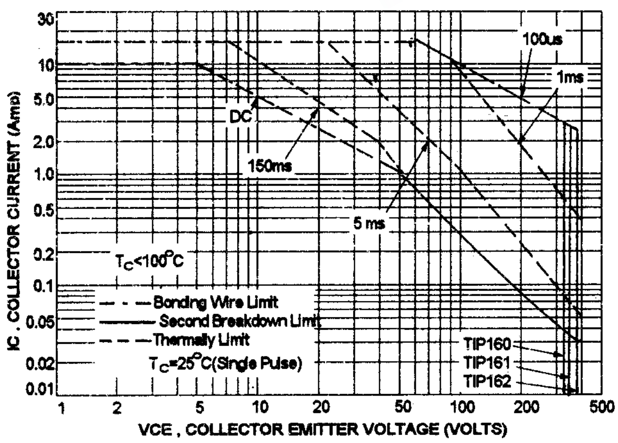


FIG-7 ACTIVE REGION SAFE OPERATING AREA



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-7 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)}\leq$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.