

NPN Silicon Power Darlington Transistor are designed for use in automotive ignition, switching and motor control applications

Features

- Collector-Emitter Sustaining Voltage - $V_{CE(sus)} = 380V$ (Minimum)
- Collector-Emitter Saturation Voltage $V_{CE(sat)} = 2.9V$ (Maximum) at $I_C = 10A$
- 10A Rated continuous collector current

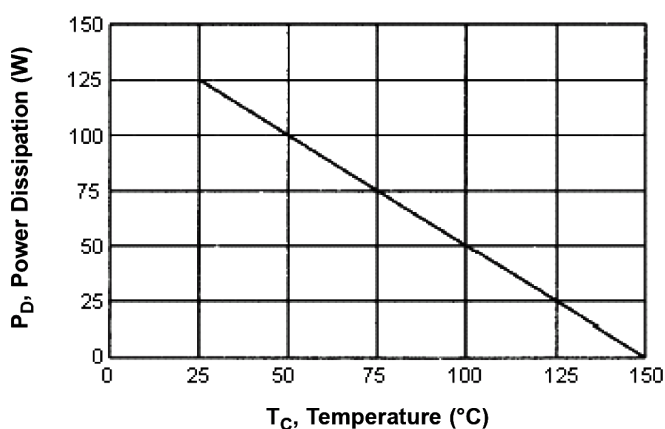
Maximum Ratings

Characteristic	Symbol	Ratings	Unit
Collector - Emitter Voltage	V_{CEO}	380	V
Collector - Base Voltage	V_{CBO}		
Emitter - Base Voltage	V_{EBO}		
Collector Current - Continuous	I_C	10	A
- Peak	I_{CM}	15	
Base Current	I_B	1	
Total Power Dissipation at $T_C = 25^\circ C$	P_D	125	W
Derate above $25^\circ C$		1	W / $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ C$

Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to case	$R_{\theta JC}$	1	$^\circ C / W$

Figure - 1 Power Derating



Electrical Characteristics (T_C = 25°C unless otherwise specified)

Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector Cut off Current (V _C E = 380V, I _B = 0)	I _C EO (sus)	-	1	mA
Emitter Cut off Current (V _E B = 5V, I _C = 0)	I _E BO	-	100	
ON Characteristics (1)				
DC Current Gain (I _C = 4A, V _C E = 2.2V)	h _F FE	200	-	-
Collector-Emitter Saturation Voltage (I _C = 6.5A, I _B = 0.1A) (I _C = 10A, I _B = 1A)	V _C E (sat)	-	2.8 2.9	V
Base-Emitter Saturation Voltage (I _C = 6.5A, I _B = 0.1A)	V _B E (sat)	-	2.2	
Diode Forward Voltage (I _F = 10A)	V _F	-	3.5	
Switching Characteristics				
Delay Time	V _{CC} = 33V, I _C = 6.5A I _B 1 = -I _B 2 = 100mA tp = 20μs, Duty cycle ≤2%	td	0.3 (Typical)	μs
Rise Time		tr	1.5 (Typical)	
Storage Time		ts	2.3 (Typical)	
Fall Time		tf	2.8 (Typical)	

1. Pulse Test : Pulse width = 30μs, Duty cycle = 2%

Figure - 2 DC Current Gain

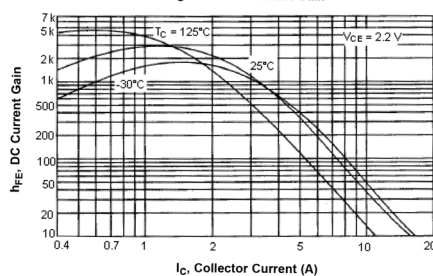


Figure - 3 Base-Emitter Voltage

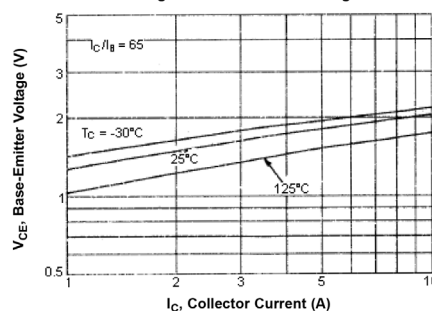


Figure - 4 Base-Emitter Voltage

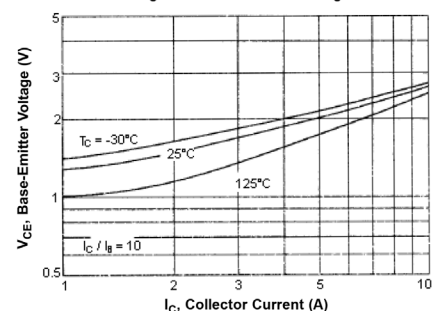


Figure - 5 Collector-Emitter Saturation Voltage

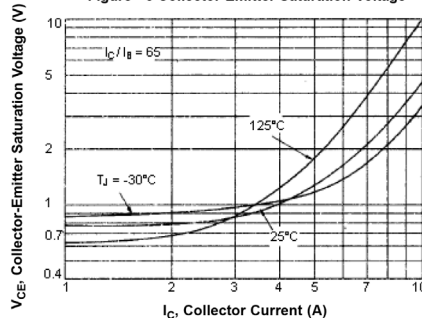


Figure - 6 Collector-Emitter Saturation Voltage

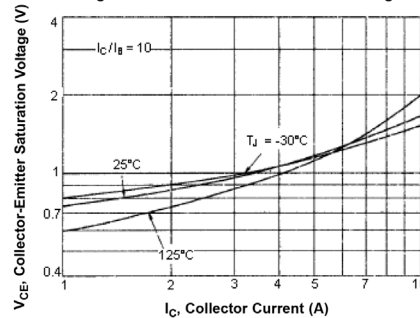
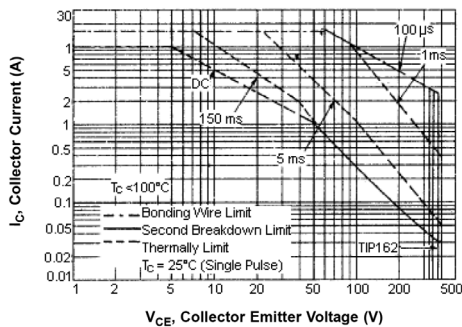


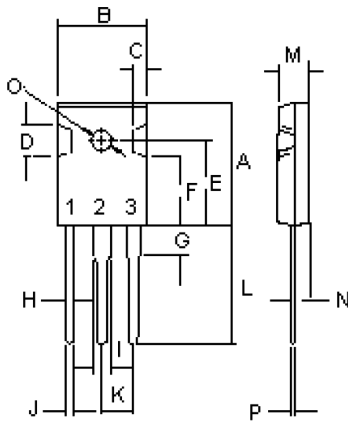
Figure - 7 Active Region Safe Operating Area



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 the curves indicate

The data of Figure - 7 is based on $T_{J(PK)} = 150^\circ\text{C}$; T_C is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150^\circ\text{C}$. At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown

Diagram



Dimensions	Minimum	Maximum
A	20.63	22.38
B	15.38	16.2
C	1.9	2.7
D	5.1	6.1
E	14.81	15.22
F	11.72	12.84
G	4.2	4.5
H	1.82	2.46

Dimensions	Minimum	Maximum
I	2.92	3.23
J	0.89	1.53
K	5.26	5.66
L	18.5	21.5
M	4.68	5.36
N	2.4	2.8
O	3.25	3.65
P	0.55	0.7

Dimensions : Millimetres

Specification Table

I_C (av) (A)	V_{CE0} Maximum (V)	h_{FE} Minimum	I_C (A)	P_{tot} at 25°C (W)	Package	Type	Part Number
10	380	200	4	125	TO-247	NPN	TIP162

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