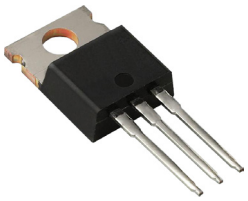
Transistor



Features

- Collector-Emitter Sustaining Voltage - $V_{CEO\ (sus)}$ = 30V (Minimum)
- Collector-Emitter Saturation Voltage $V_{CE\ (sat)}$ = 2V (Maximum) at I_C = 5A
- Reverse-Base SOA - 300V to 400V at 7A

NPN

TIP150

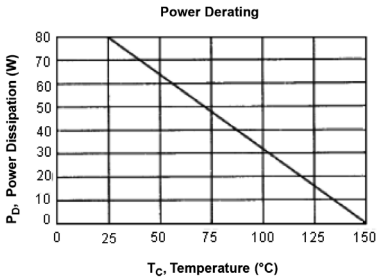
7 Amperes
Darlington
Power Transistor
300V to 400V
80W

Maximum Ratings

Characteristic	Symbol	Ratings	Unit
Collector - Emitter Voltage	V_{CEO}	300	V
Collector - Base Voltage	V_{CBO}		
Emitter - Base Voltage	V_{EBO}	8	
Collector Current - Continuous - Peak	I_C I_{CM}	7 10	A
Base Current	I_B	1.5	
Total Power Dissipation at 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	Maximum	Unit
Thermal Resistance Junction to case	$R_{\theta JC}$	1.56	°C / W

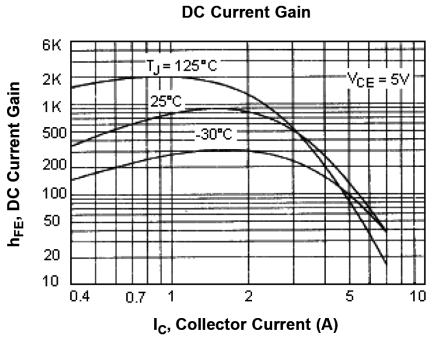


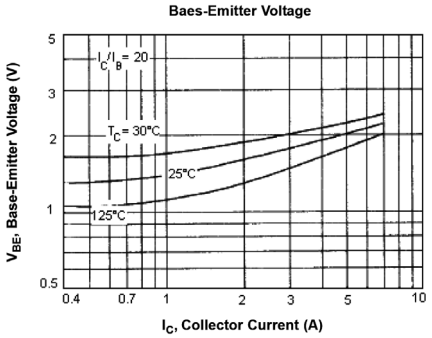
Electrical Characteristics (T_C = 25°C unless otherwise specified)

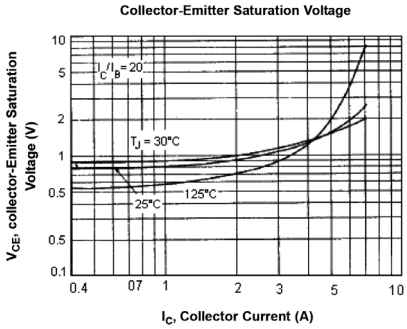
Characteristic	Symbol	Minimum	Maximum	Unit
OFF Characteristics				
Collector - Emitter Breakdown Voltage (1) (I_C = 10mA, I_B = 0)	$V_{(BR)\ CEO}$	300	-	V
Collector - Base Breakdown Voltage (1) (I_C = 1mA, I_B = 0)	$V_{(BR)\ CBO}$			
Collector Cutoff Current (V_{CE} = 300V, I_B = 0)	I_{CEO}	-	250	µA

Characteristic		Symbol	Minimum	Maximum	Unit
Emitter Cut off Current (V_{EB} = 5V, I_C = 0)		I_{EBO}	-	15	mA
ON Characteristics (1)					
DC Current Gain (I_C= 2.5A, V_{CE} = 5V) (I_C= 5A, V_{CE} = 5V) (I_C= 7A, V_{CE} = 5V)		h_{FE}	150 50 15	-	-
Collector-Emitter Saturation Voltage (I_C = 1A, I_B = 10mA) (I_C = 2A, I_B = 100mA) (I_C = 5A, I_B = 250mA)		$V_{CE\ (sat)}$	-	1.5 1.5 2	V
Base-Emitter Saturation Voltage (I_C = 2A, I_B = 100mA) (I_C = 5A, I_B = 250mA)		$V_{BE\ (sat)}$	-	2.2 2.3	
Diode Forward Voltage (I_F = 7A)		V_F	-	3.5	
Dynamic Characteristics					
Small-Signal Current Gain (I_C = 0.5A, V_{CE} = 5V, f = 1kHz)		Hfe	200	-	-
Output Capacitance (V_{CB} = 10V, I_E = 0, f = 1MHz)		Cob	-	150	pF
Switching Characteristics					
Delay Time	V_{CC} = 33V, I_C = 6.5A	t_d	30 (Typical)	-	μs
Rise Time	I_{B1} = -I_{B2} = 250mA tp = 20μs, Duty cycle ≤2%	t_r	180 (Typical)	-	
Storage Time		t_s	3.5 (Typical)	-	
Fall Time		t_f	1.6 (Typical)	-	

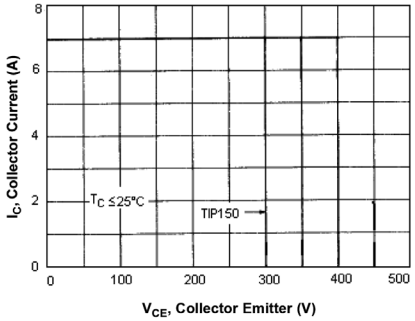
1. Pulse Test : Pulse width = 30μs, Duty cycle = 2%



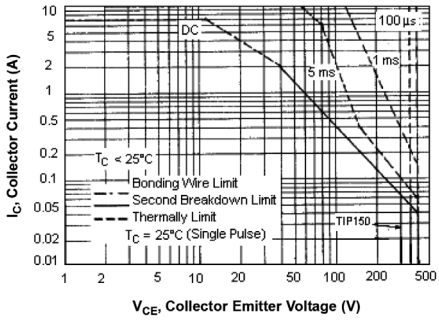




Reverse Biase Safe Operating Area



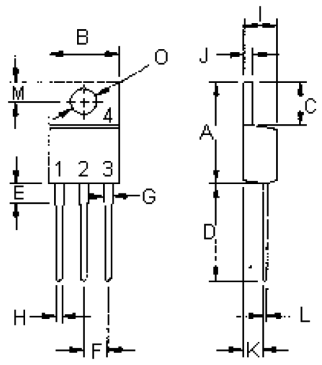
Active Region Sage Operating Area



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 - 6 curve is based on $T_{J\,(PK)}$ = 150°C; TC 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

Diagram



Dimensions	Minimum	Maximum
A	14.68	15.31
B	9.78	10.42
C	5.01	8.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36

Dimensions	Minimum	Maximum
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.2	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.9

Dimensions : Millimetres

Pin 1. Base
2. Collector
3. Emitter
4. Collector (Case)

Part Number Table

Description	Part Number
Darlington Transistor, TO-220	TIP150