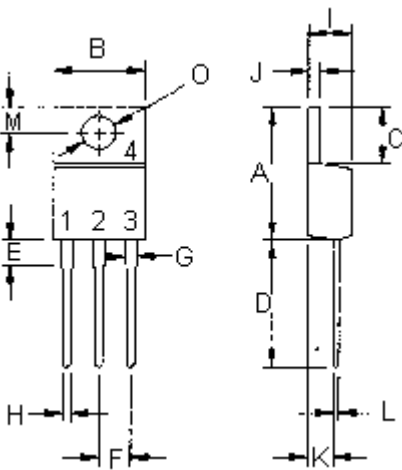




Features:

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



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

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
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

NPN
 TIP150

7 A
 Darlington
 Power Transistors
 300 - 400 V
 80 W

TO-220

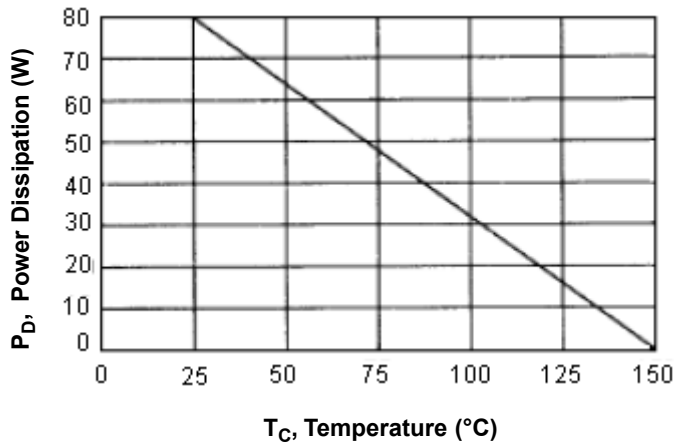
Maximum Ratings

Characteristic	Symbol	TIP150	Unit
Collector-Emitter Voltage	V_{CEO}	300	V
Collector-Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}		
Collector Current-Continuous -Peak	I_C I_{CM}	7 10	A
Base Current	I_B	1.5	
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	80 0.64	W W / $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-65 to +150	$^\circ\text{C}$

Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.56	$^{\circ}\text{C} / \text{W}$

Power Derating



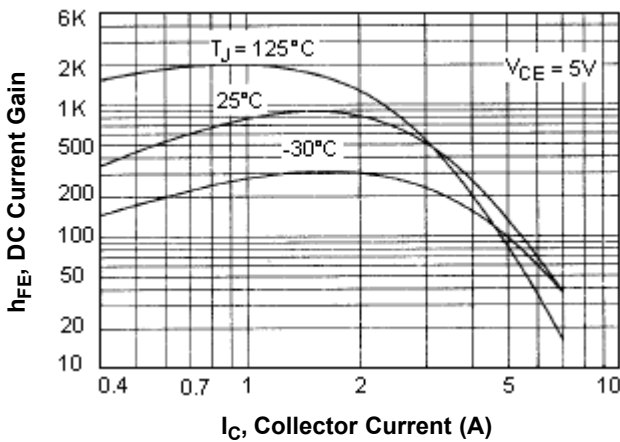
Electrical Characteristics ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Minimum	Maximum	Unit
Off Characteristics				
Collector - Emitter Breakdown Voltage (1) ($I_C = 10 \text{ mA}$, $I_B = 0$)	TIP150 $V_{(BR) CEO}$	300	-	V
Collector - Base Breakdown Voltage (1) ($I_C = 1 \text{ mA}$, $I_B = 0$)	TIP150 $V_{(BR) CBO}$			
Collector Cutoff Current ($V_{CE} = 300 \text{ V}$, $I_B = 0$)	TIP150 I_{CEO}	-	250	μA
Emitter Cutoff Current ($V_{EB} = 8 \text{ V}$, $I_C = 0$)	I_{EBO}	-	15	mA
On Characteristics (1)				
DC Current Gain ($I_C = 2.5 \text{ A}$, $V_{CE} = 5 \text{ V}$) ($I_C = 5 \text{ A}$, $V_{CE} = 5 \text{ V}$) ($I_C = 7 \text{ A}$, $V_{CE} = 5 \text{ V}$)	h_{FE}	150 50 15	-	-
Collector-Emitter Saturation Voltage ($I_C = 1 \text{ A}$, $I_B = 10 \text{ mA}$) ($I_C = 2 \text{ A}$, $I_B = 100 \text{ mA}$) ($I_C = 5 \text{ A}$, $I_B = 250 \text{ mA}$)	$V_{CE (sat)}$	-	1.5 1.5 2	V
Base-Emitter Saturation Voltage ($I_C = 2 \text{ A}$, $I_B = 100 \text{ mA}$) ($I_C = 5 \text{ A}$, $I_B = 250 \text{ mA}$)	$V_{BE (sat)}$	-	2.2 2.3	
Diode Forward Voltage ($I_F = 7 \text{ A}$)	V_F	-	3.5	

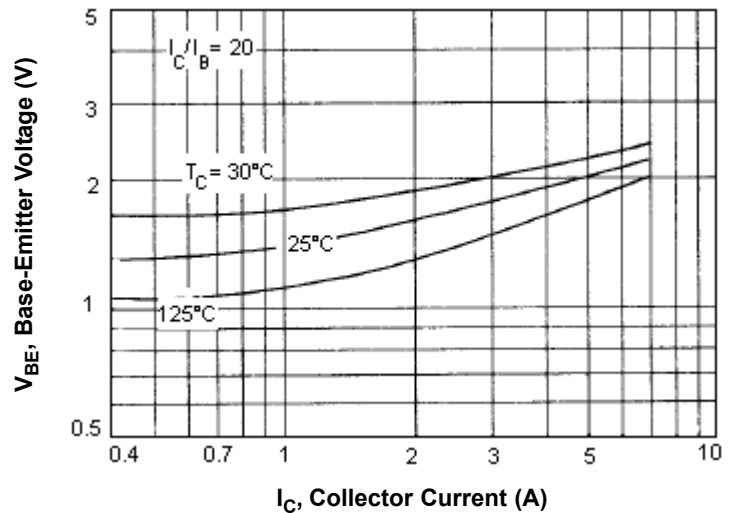
Characteristic	Symbol	Minimum	Maximum	Unit
Dynamic Characteristics				
Small-Signal Current Gain ($I_C = 0.5 \text{ A}$, $V_{CE} = 5 \text{ V}$, $f = 1 \text{ KHz}$)	h_{fe}	200	-	-
Output Capacitance ($V_{CB} = 10 \text{ V}$, $I_E = 0$, $f = 1 \text{ MHz}$)	C_{ob}	-	150	PF
Switching Characteristics				
Delay Time	$V_{CC} = 250 \text{ V}$, $I_C = 5 \text{ A}$	t_d	30 (typical)	ns
Rise Time	$I_{B1} = -I_{B2} = 250 \text{ mA}$ $t_p = 20 \mu\text{s}$, Duty Cycle $\leq 2 \%$	t_r	180 (typical)	
Storage Time		t_s	3.5 (typical)	μs
Fall Time		t_f	1.6 (typical)	

(1) Pulse Test : Pulse width = 30 μs , duty cycle $\leq 2\%$

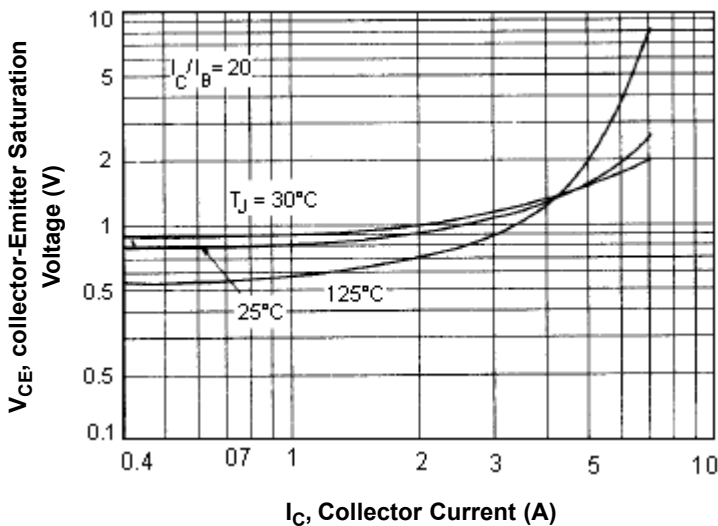
DC Current Gain



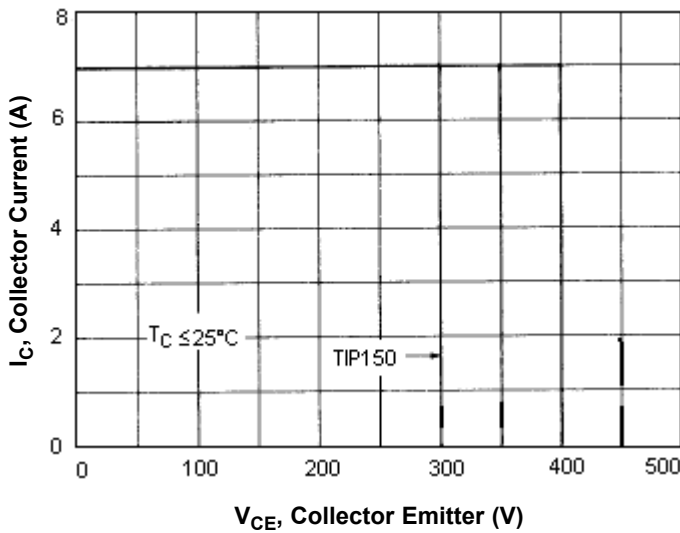
Base-Emitter Voltage



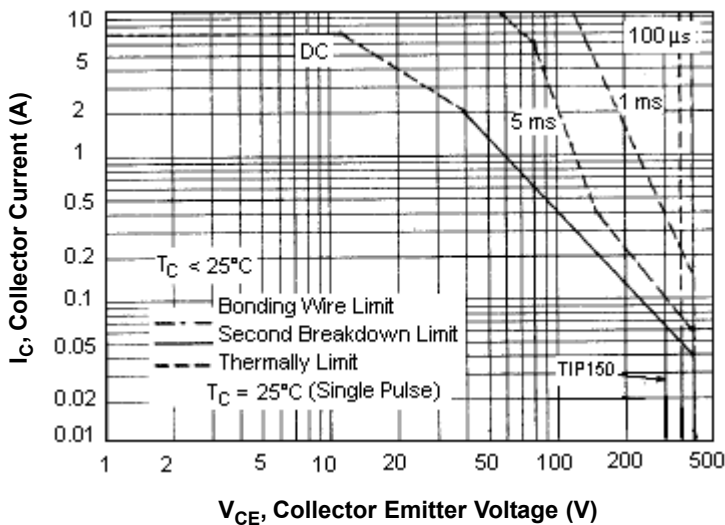
Collector-Emitter Saturation Voltage



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

Part Number Table

Description	Part Number
Darlington Transistor, TO-220	TIP150

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