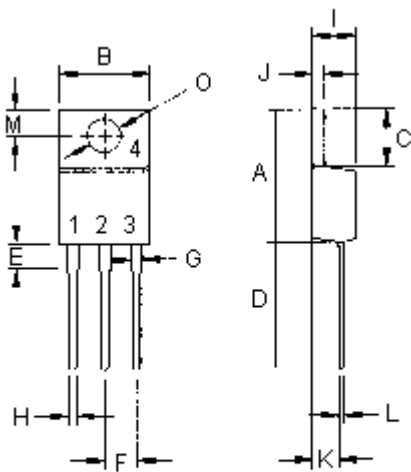




### Features:

- Collector-Emitter Sustaining Voltage  
 $V_{CEC(SUS)} = 30V$  (Minimum)
- Collector-Emitter Saturation Voltage  
 $V_{CE(sat)} = 2.0V$  (Maximum) at  $I_C = 5.0 A$
- Reverse-Base SOA - 300V to 400V at 7A



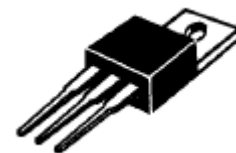
Pin 1. Base  
2. Collector  
3. Emitter  
4. Collector (Case)

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	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.90

Dimensions : Millimetres

**NPN**  
TIP150

7 Ampere  
Darlington  
Power Transistors  
300-400 Volts  
80 Watts



**TO-220**

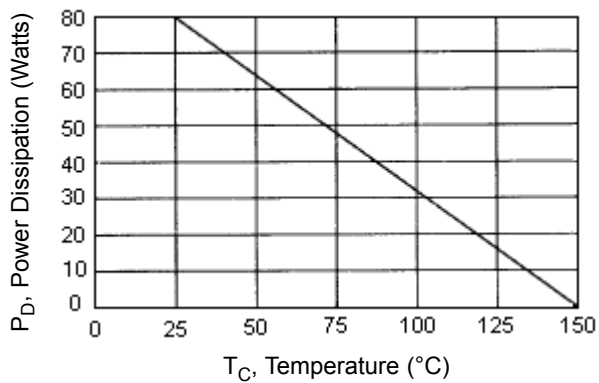
## Maximum Ratings

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	$I_C$ $I_{CM}$	7.0 10	A
Base Current	$I_B$	1.5	
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	80 0.64	W $\text{W}/^\circ\text{C}$
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

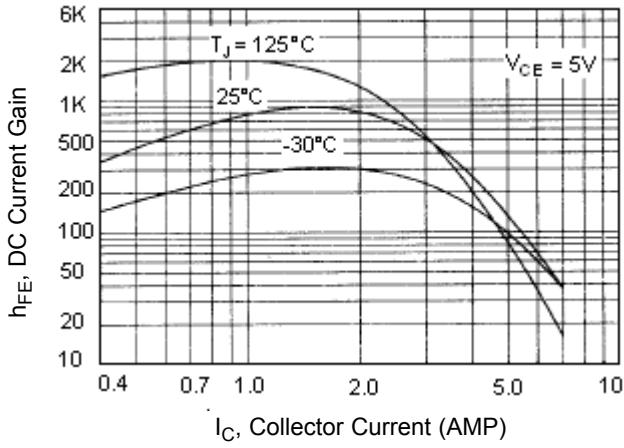


## Electrical characteristics ( $T_c = 25^\circ\text{C}$ unless otherwise noted)

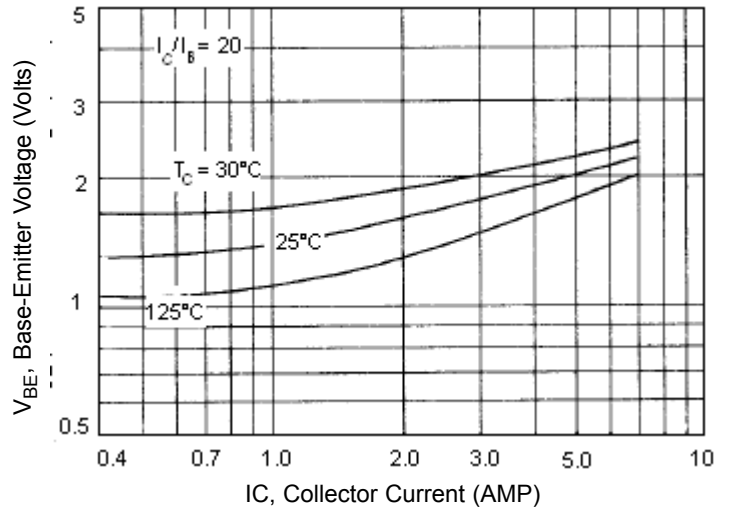
Characteristic	Symbol	Minimum	Maximum	Unit	
<b>OFF Characteristics</b>					
Collector - Emitter Breakdown Voltage (1) ( $I_c = 10\text{mA}, I_B = 0$ )	TIP150	300	-	V	
Collector - Base Breakdown Voltage (1) ( $I_c = 1.0\text{mA}, I_B = 0$ )	TIP150		-		
Collector Cutoff Current ( $V_{CE} = 300\text{V}, I_B = 0$ )	TIP150	$I_{CEO}$	-	250	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 8.0\text{V}, I_c = 0$ )		$I_{EBO}$	-	15	mA
<b>ON Characteristics (1)</b>					
DC Current Gain ( $I_c = 2.5\text{A}, V_{CE} = 5.0\text{V}$ ) ( $I_c = 5.0\text{A}, V_{CE} = 5.0\text{V}$ ) ( $I_c = 7.0\text{A}, V_{CE} = 5.0\text{V}$ )		$h_{FE}$	150 50 15	-	-
Collector-Emitter Saturation Voltage ( $I_c = 1.0\text{A}, I_B = 10\text{mA}$ ) ( $I_c = 2.0\text{A}, I_B = 100\text{mA}$ ) ( $I_c = 5.0\text{A}, I_B = 250\text{mA}$ )		$V_{CE(sat)}$	-	1.5 1.5 2.0	V
Base-Emitter Saturation Voltage ( $I_c = 2.0\text{A}, I_B = 100\text{mA}$ ) ( $I_c = 5.0\text{A}, I_B = 250\text{mA}$ )		$V_{BE(sat)}$	-	2.2 2.3	
Diode Forward Voltage ( $I_F = 7.0\text{A}$ )		$V_F$	-	3.5	
<b>Dynamic Characteristics</b>					
Small-Signal Current Gain ( $I_c = 0.5\text{A}, V_{CE} = 5.0\text{V}, f = 1.0\text{KHz}$ )		$h_{fe}$	200	-	-
Output Capacitance ( $V_{CB} = 10\text{V}, I_E = 0, f = 1.0\text{MHz}$ )		$C_{ob}$	-	150	PF
<b>Switching Characteristics</b>					
Delay Time	$V_{CC} = 250\text{V}, I_c = 5.0\text{A}$	$t_d$	30 (typical)	-	ns
Rise Time		$t_r$	180 (typical)	-	
Storage Time	$I_{B1} = -I_{B2} = 250\text{mA},$ $t_p = 20\mu\text{s}, \text{Duty Cycle} \leq 2.0\%$	$t_s$	3.5 (typical)	-	$\mu\text{s}$
Fall Time		$t_f$	1.6 (typical)	-	

(1) Pulse Test : Pluse Width =  $30\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

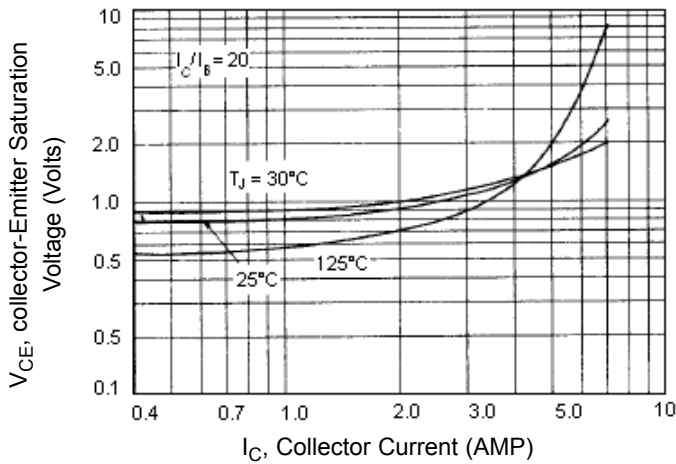
**DC Current Gain**



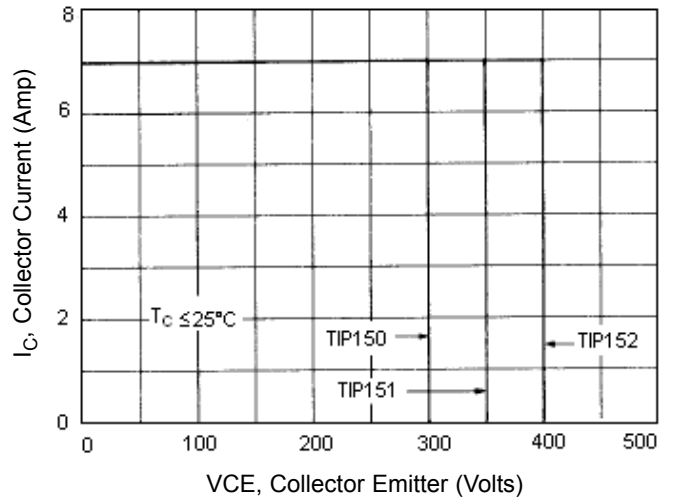
**Base-Emitter Voltage**



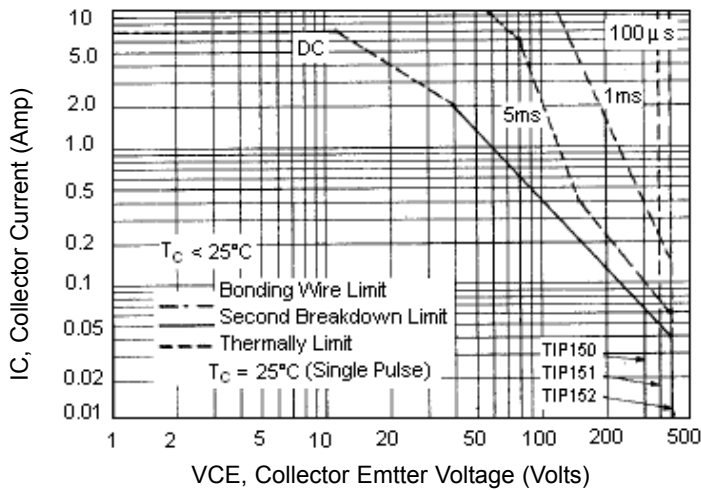
**Collector-Emitter Saturation Voltage**



**Reverse Biase Safe Operating Area**



**Active Region Sage 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  $T_{J(PK)}=150^\circ\text{C}$ ;  $T_C$  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
Transistor, Darlington TO-220	100310

## Notes:

## International Sales Offices:

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