

# Darlington Power Transistor

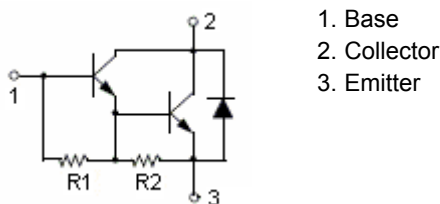


### Features:

- Silicon NPN
- High DC current gain :  $h_{FE} = 1,000$  (Min.) at  $I_C = 5$  A
- Collector - emitter sustaining voltage :  $V_{CEO(SUS)} = 100$  V (Min.)

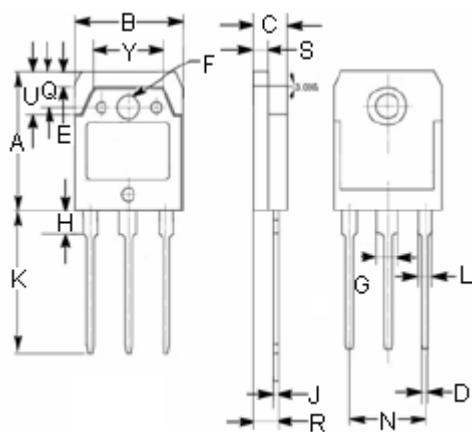
### Applications:

Designed for general purpose amplifier and low frequency switching applications



1. Base
2. Collector
3. Emitter

### TO-3PN



Dimensions	mm	
	Minimum	Maximum
A	19.9	20.1
B	15.5	15.7
C	4.7	4.9
D	0.9	1.1
E	1.9	2.1
F	3.4	3.6
G	2.9	3.1
H	3.2	3.4
J	0.595	0.605
K	20.5	20.7
L	1.9	2.1
N	10.89	10.91
Q	4.9	5.1
R	3.35	3.45
S	1.995	2.005
U	5.9	6.1
Y	9.9	10.1

Dimensions : Millimetres



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## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector - base voltage	100	V
$V_{CEO}$	Collector - emitter voltage	100	V
$V_{EBO}$	Emitter - base voltage	5	V
$I_C$	Collector current - continuous	10	A
$I_{CM}$	Collector current - peak	15	A
$I_B$	Base current - continuous	0.5	A
$P_C$	Collector power dissipation at $T_C = 25^\circ\text{C}$	125	W
$T_j$	Junction temperature	150	$^\circ\text{C}$
$T_{stg}$	Storage temperature range	-65 to 150	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Maximum	Unit
$R_{th\ j-c}$	Thermal resistance, junction to case	1	$^\circ\text{C/W}$
$R_{th\ j-a}$	Thermal resistance, junction to ambient	35.7	$^\circ\text{C/W}$

## Electrical Characteristics ( $T_C = 25^\circ\text{C}$ Unless Otherwise Specified)

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
$V_{CEO(SUS)}$	Collector - emitter sustaining Voltage	$I_C = 30\text{ mA}; I_B = 0$	100	-	-	V
$V_{CE(sat)-1}$	Collector - emitter saturation voltage	$I_C = 5\text{ A}, I_B = 10\text{ mA}$	-	-	2	V
$V_{CE(sat)-2}$	Collector - emitter saturation voltage	$I_C = 10\text{ A}, I_B = 40\text{ mA}$	-	-	3	V
$V_{BE(sat)}$	Base - emitter saturation voltage	$I_C = 10\text{ A}, I_B = 40\text{ mA}$	-	-	3.5	V
$V_{BE(on)}$	Base - emitter on voltage	$I_C = 10\text{ A}; V_{CE} = 4\text{ V}$	-	-	3	V
$I_{CBO}$	Collector cut off current	$V_{CB} = 100\text{ V}, I_E = 0$	-	-	1	mA
$I_{CEO}$	Collector cut off current	$V_{CE} = 50\text{ V}, I_B = 0$	-	-	2	mA
$I_{EBO}$	Emitter cut off current	$V_{EB} = 5\text{ V}; I_C = 0$	-	-	2	mA
$h_{FE-1}$	DC current gain	$I_C = 5\text{ A}; V_{CE} = 4\text{ V}$	1,000	-	-	-
$h_{FE-2}$	DC current gain	$I_C = 10\text{ A}; V_{CE} = 4\text{ V}$	500	-	-	-

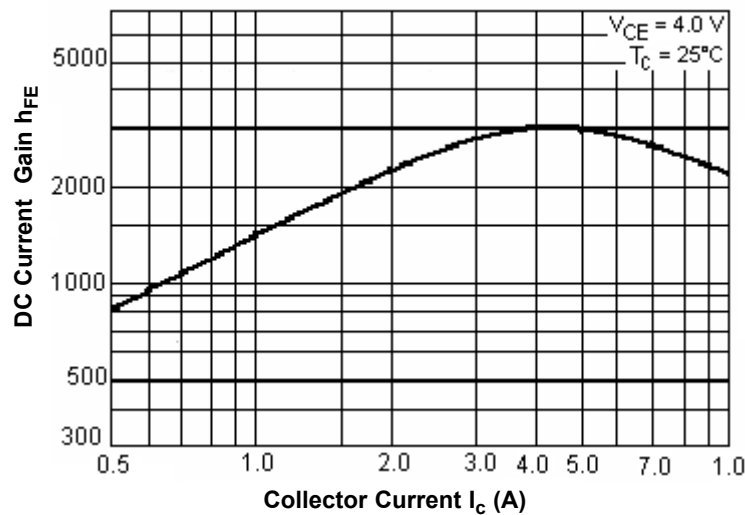
## Switching Times

$t_d$	Delay time	$V_{CC} = 30\text{ V}, I_C = 5\text{ A},$ $I_B = 20\text{ mA};$ Duty Cycle $\leq 20\%$ $I_{B1} = I_{B2},$ $R_C$ and $R_B$ Varied, $T_J = 25^\circ\text{C}$	-	0.15	-	$\mu\text{s}$
$t_r$	Rise time		-	0.55	-	$\mu\text{s}$
$t_{stg}$	Storage time		-	2.5	-	$\mu\text{s}$
$t_f$	Fall time		-	2.5	-	$\mu\text{s}$

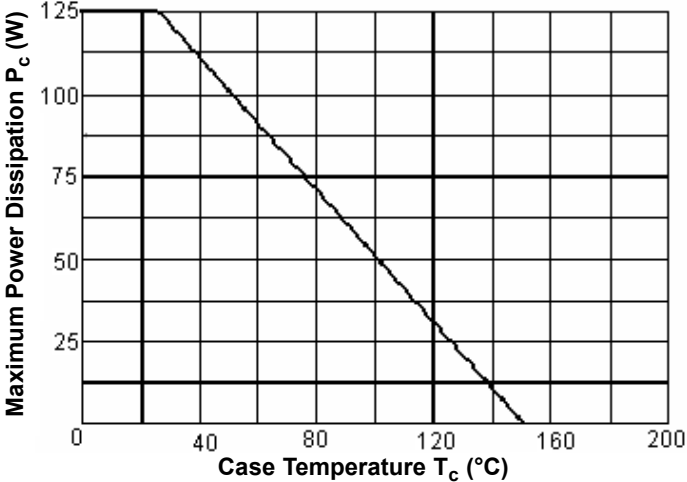
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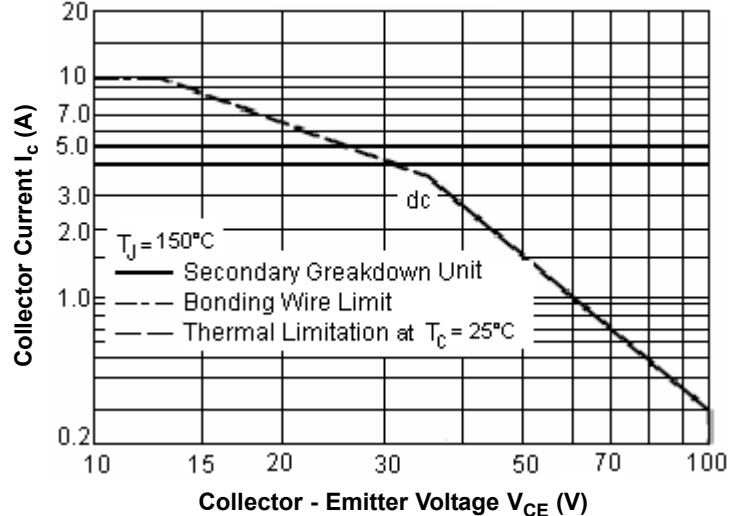
$h_{FE} - I_C$  Characteristics



Power Derating



Safe Operating Area



## Part Number Table

Description	Part Number
Darlington Power Transistor	TIP142

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