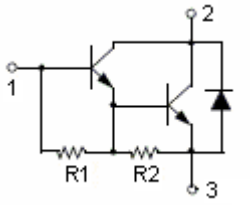
Darlington Power Transistor

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.)

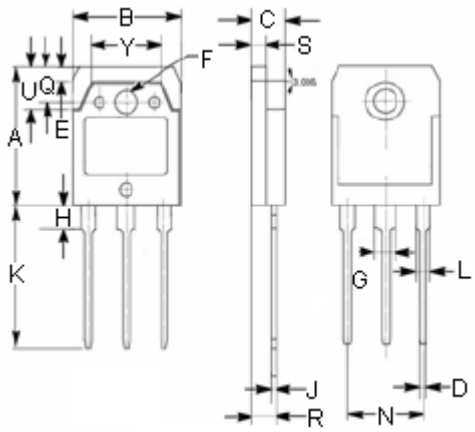
Applications:

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

Absolute Maximum Ratings (T_a = 25°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°C	125	W
T_j	Junction temperature	150	°C
T_{stg}	Storage temperature range	-65 to 150	°C

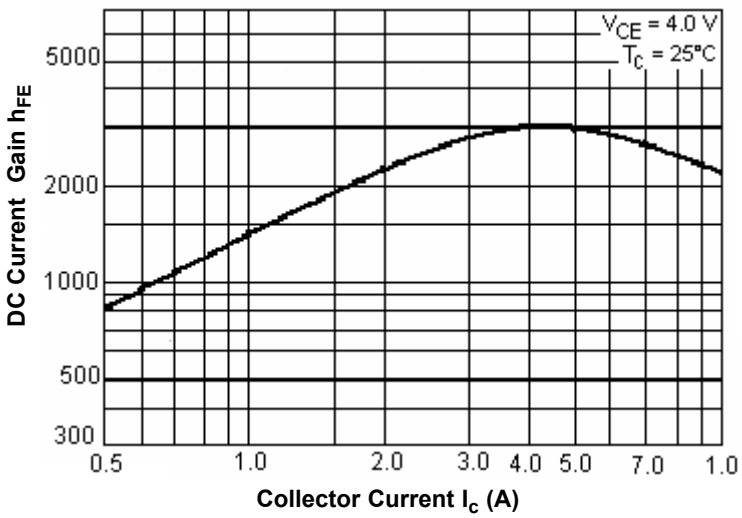
Thermal Characteristics

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

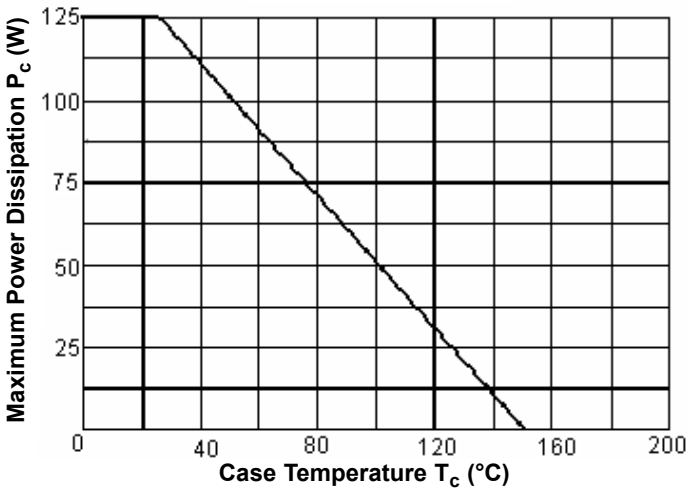
Electrical Characteristics (T_C = 25°C Unless Otherwise Specified)

Symbol	Parameter	Conditions	Minimum	Typical	Maximum	Unit
$V_{CEO\ (SUS)}$	Collector - emitter sustaining Voltage	I_C = 30 mA; I_B = 0	100	-	-	V
$V_{CE(sat)-1}$	Collector - emitter saturation voltage	I_C= 5 A, I_B = 10 mA	-	-	2	V
$V_{CE(sat)-2}$	Collector - emitter saturation voltage	I_C = 10 A, I_B = 40 mA	-	-	3	V
$V_{BE\ (sat)}$	Base - emitter saturation voltage	I_C = 10 A, I_B = 40 mA	-	-	3.5	V
$V_{BE\ (on)}$	Base - emitter on voltage	I_C = 10 A; V_{CE} = 4 V	-	-	3	V
I_{CBO}	Collector cut off current	V_{CB} = 100 V, I_E = 0	-	-	1	mA
I_{CEO}	Collector cut off current	V_{CE} = 50 V, I_B = 0	-	-	2	mA
I_{EBO}	Emitter cut off current	V_{EB} = 5 V; I_C = 0	-	-	2	mA
h_{FE-1}	DC current gain	I_C = 5 A; V_{CE} = 4 V	1,000	-	-	-
h_{FE-2}	DC current gain	I_C= 10 A ; V_{CE} = 4 V	500	-	-	-
Switching Times						
t_d	Delay time	V_{CC} = 30 V, I_C = 5 A, I_B = 20 mA; Duty Cycle ≤ 20% I_{B1} = I_{B2}, R_C and R_B Varied, T_J = 25°C	-	0.15	-	µs
t_r	Rise time		-	0.55	-	µs
t_{stg}	Storage time		-	2.5	-	µs
t_f	Fall time		-	2.5	-	µs

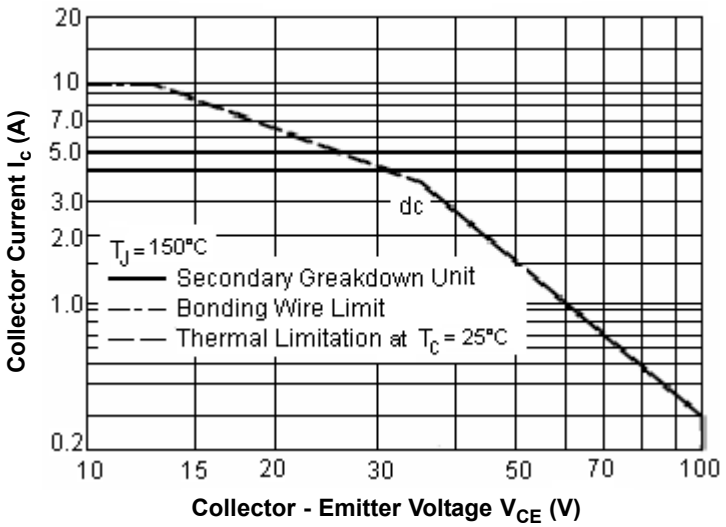
h_{FE} - I_c Characteristics



Power Derating



Safe Operating Area



Part Number Table

Description	Part Number
Darlington Power Transistor	TIP142