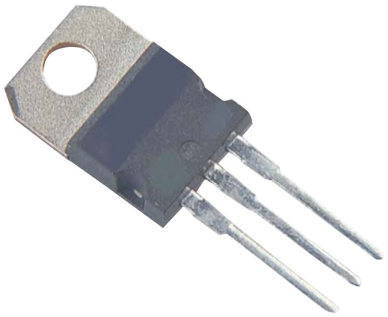
Darlington Power Transistor



Description:

Darlington silicon power transistors are designed for general-purpose amplifier and low speed switching applications.

Features:

- Collector-Emitter Sustaining Voltage
  $V_{CEO(sus)}$ = 80V (Minimum)
- Collector-Emitter Saturation Voltage
  $V_{CE(sat)}$ = 2V (Maximum) at I_C = 5A
- DC Current Gain h_{FE} = 2,500 (Typical) at I_C = 4A

Absolute Maximum Ratings:

Characteristics	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CEO}	80	V
Collector Base Voltage	V_{CBO}		
Emitter-Base Voltage	V_{EBO}	5	
Collector Current-Continuous -Peak	I_C I_{CM}	10 15	A
Base Current	I_B	0.25	
Total Power Dissipation at T_C = 25°C Derate above 25°C, P_D	P_D	65 0.52	W W/°C
Operating and Storage Temperature	T_J T_{stg}	-65 to +150	°C

Thermal Characteristics

Thermal Resistance Junction to Case	$R_{\theta jc}$	1.92	°C/W

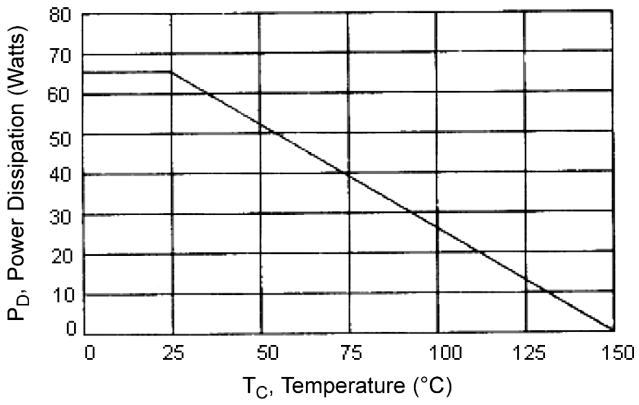
Electrical Characteristics:

(T_a = +25°C unless otherwise specified)

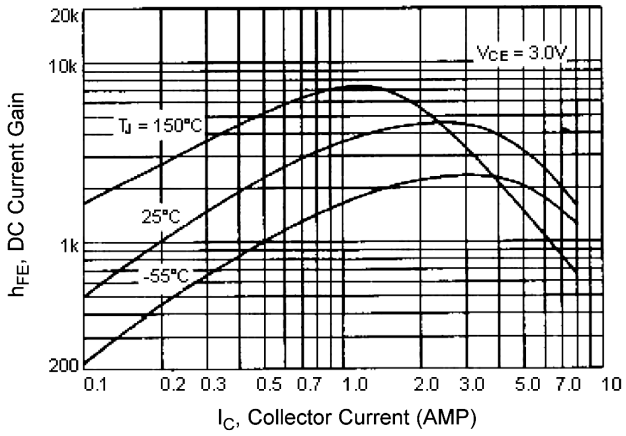
Characteristic	Symbol	Test Condition	Min.	Max.	Unit
OFF Characteristics					
Collector-Emitter Sustaining Voltage (1)	$V_{CEO(sus)}$	I_C = 200mA, I_B = 0	80	-	V
Collector Cut off Current	I_{CEO}	V_{CE} = 80V, I_B = 0	-	1	mA
Collector Cut off Current	I_{CEX}	V_{CE} = 80V, $V_{BE(off)}$ = 1.5V		0.3	
		V_{CE} = 80V, $V_{BE(off)}$ = 1.5V, T_C = 125°C		3	
Emitter Cut off Current	I_{EBO}	V_{EB} = 5.0V, I_C = 0	5	-	
ON Characteristics (1)					
DC Current Gain	h_{FE}	I_C = 5A, V_{CE} = 3V	1,000	20,000	-
		I_C = 10A, V_{CE} = 3V	100		
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 5A, I_B = 10mA	-	2	V
		I_C = 10A, I_B = 100mA		3	
Base-Emitter On Voltage	$V_{BE(on)}$	I_C = 5A, V_{CE} = 3V		2.8	
		I_C = 10A, V_{CE} = 3V		4.5	
Dynamic Characteristics					
Small-Signal Current Gain	h_{fe}	I_C = 1A, V_{CE} = 5V, f = 1KHz	1,000	-	-
Output Capacitance	C_{ob}	(V_{CB} = 10V, I_E = 0, f = 1MHz	-	200	pF

(1) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤2.0%

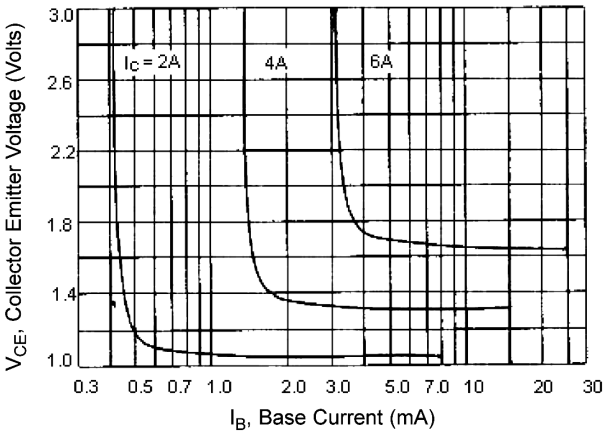
Figure - 1 Power Derating



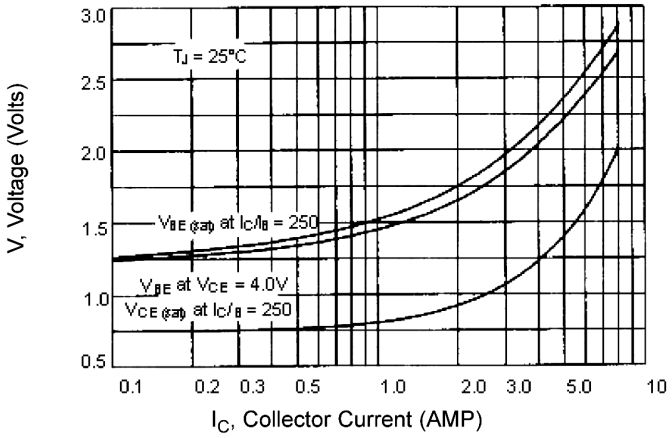
DC Current Gain



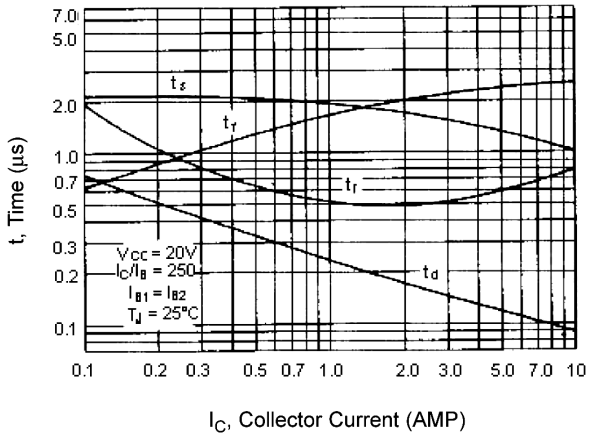
Collector Saturation Region



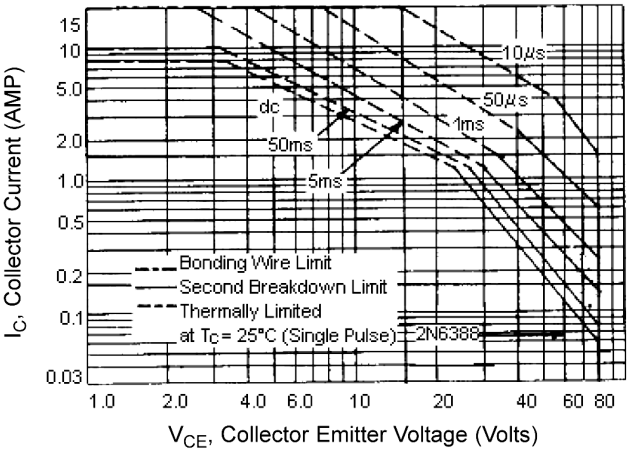
"ON" Voltages



Switching Time



Active-Region Safe Operating Area (SOA)



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 that must not be subjected to greater dissipation than the curves indicate.

The data of SOA curve is based on $T_{J(PK)}$ = 150°C; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)} \leq 150°C$, At high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

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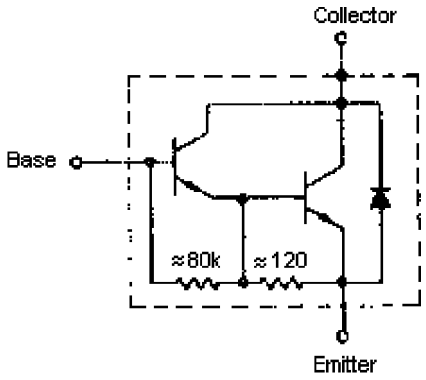

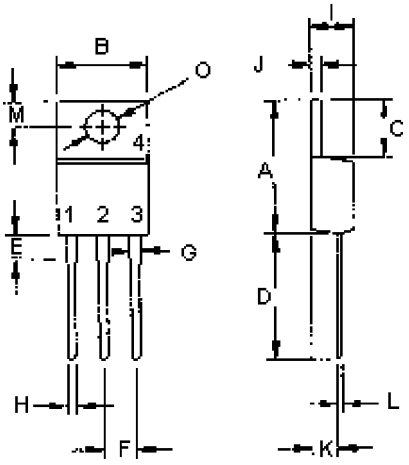

Dim.	Min.	Max.
A	14.68	15.31
B	9.78	10.42
C	5.01	6.52
D	13.06	14.62
E	3.57	4.07
F	2.42	3.66
G	1.12	1.36
H	0.72	0.96
I	4.22	4.98
J	1.14	1.38
K	2.2	2.97
L	0.33	0.55
M	2.48	2.98
O	3.7	3.9

Dimensions : Millimetres

Pin Configuration

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

Part Number Table

Description	Part Number
Darlington Transistor, TO-220	2N6388