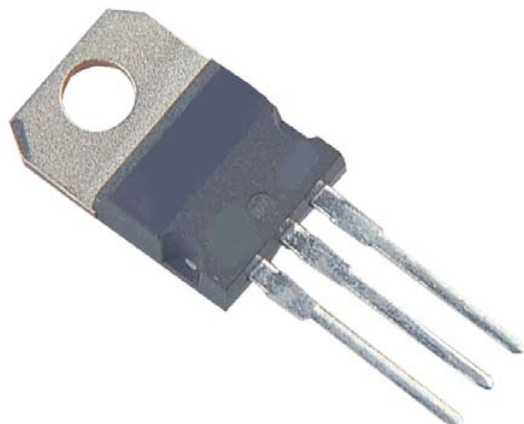


# 2N6388

## Darlington Power Transistor



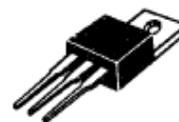
Darlington silicon power transistors are designed for general-purpose amplifier and low speed switching applications.

### Features:

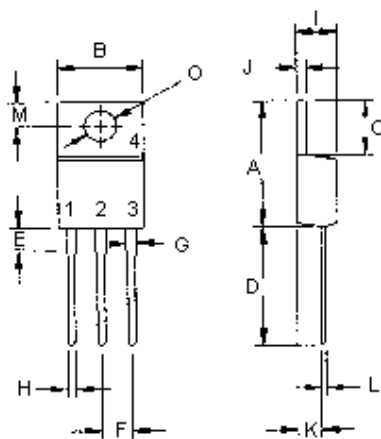
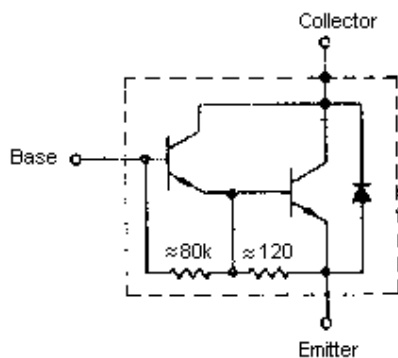
- Collector-Emitter Sustaining Voltage  
 $V_{CE(sus)} = 80V$  (Minimum).
- Collector-Emitter Saturation Voltage  
 $V_{CE(sat)} = 2.0V$  (Maximum) at  $I_C = 5.0A$ .
- DC Current Gain  $h_{FE} = 2500$  (Typical) at  $I_C = 4.0A$ .

**NPN**  
**2N6388**

10 Ampere  
Darlington  
Power Transistors  
NPN Silicon  
80 Volts  
65 Watts



**TO-220**



- 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	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	2.20	2.97
L	0.33	0.55
M	2.48	2.98
O	3.70	3.90

Dimensions : Millimetres



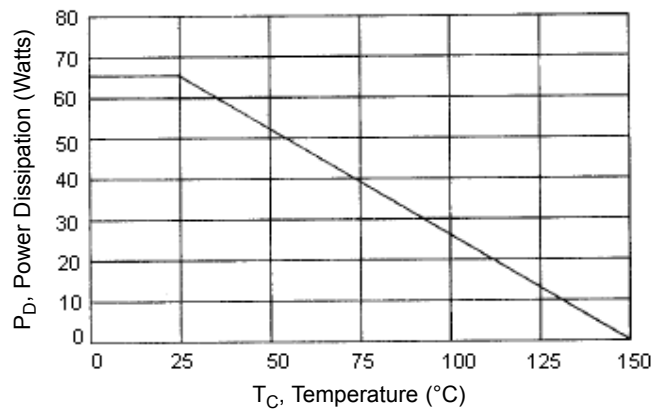
### Maximum Ratings

Characteristic	Symbol	Rating	Unit
Collector-Emitter Voltage	$V_{CEO}$	80	V
Collector-Base Voltage	$V_{CBO}$		
Emitter-Base Voltage	$V_{EBO}$	5.0	
Collector Current-Continuous -Peak	$I_C$	10	A
	$I_{CM}$	15	
Base Current	$I_B$	0.25	
Total Power Dissipation at $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	65	W W/ $^\circ\text{C}$
		0.52	
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	$R_{\theta jc}$	1.92	$^\circ\text{C}/\text{W}$

Figure - 1 Power Derating



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

Characteristic	Symbol	Minimum	Maximum	Unit
<b>OFF Characteristics</b>				
Collector-Emitter Sustaining Voltage (1) ( $I_C = 200\text{mA}$ , $I_B = 0$ )	$V_{CEO(sus)}$	80	-	V
Collector Cut off Current ( $V_{CE} = 80\text{V}$ , $I_B = 0$ )	$I_{CEO}$	-	1.0	mA
Collector Cut off Current ( $V_{CE} = 80\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ ) ( $V_{CE} = 80\text{V}$ , $V_{BE(off)} = 1.5\text{V}$ , $T_C = 125^\circ\text{C}$ )	$I_{CEX}$	-	0.3 3.0	
Emitter Cut off Current ( $V_{EB} = 5.0\text{V}$ , $I_C = 0$ )	$I_{EBO}$	5.0	-	
<b>ON Characteristics (1)</b>				
DC Current Gain ( $I_C = 5.0\text{A}$ , $V_{CE} = 3.0\text{V}$ ) ( $I_C = 10\text{A}$ , $V_{CE} = 3.0\text{V}$ )	$h_{FE}$	1000 100	20,000	-
Collector-Emitter Saturation Voltage ( $I_C = 5.0\text{A}$ , $I_B = 10\text{mA}$ ) ( $I_C = 10\text{A}$ , $I_B = 100\text{mA}$ )	$V_{CE(sat)}$	-	2.0 3.0	V
Base-Emitter On Voltage ( $I_C = 5.0\text{A}$ , $V_{CE} = 3.0\text{V}$ ) ( $I_C = 10\text{A}$ , $V_{CE} = 3.0\text{V}$ )	$V_{BE(on)}$	-	2.8 4.5	
<b>Dynamic Characteristics</b>				
Small-Signal Current Gain ( $I_C = 1.0\text{A}$ , $V_{CE} = 5.0\text{V}$ , $f = 1.0\text{KHz}$ )	$h_{fe}$	1000	-	-
Output Capacitance ( $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 1.0\text{MHz}$ )	$C_{ob}$	-	200	pF

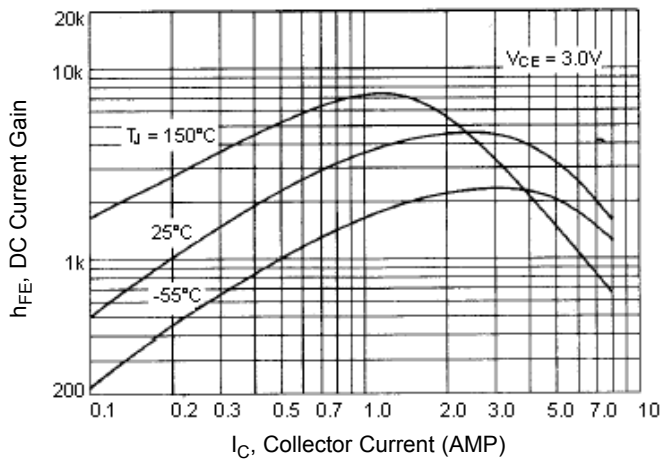
(1) Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

# 2N6388

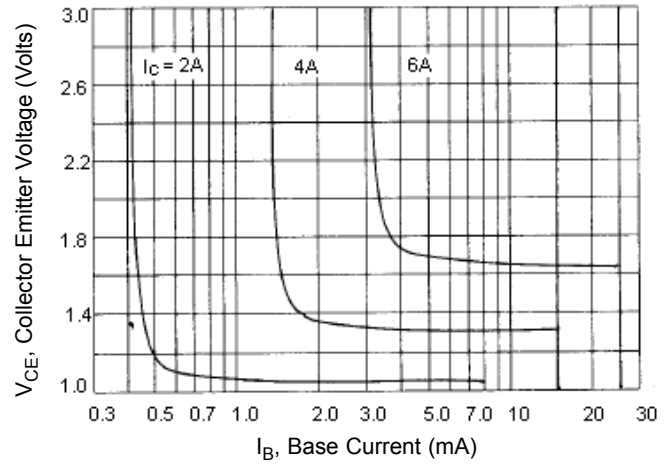
## Darlington Power Transistor



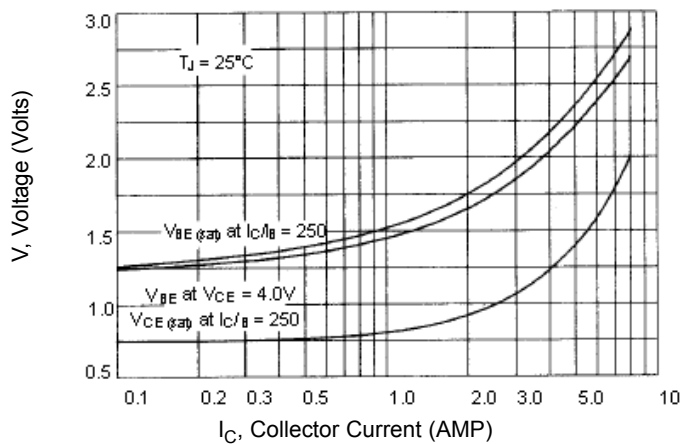
### DC Current Gain



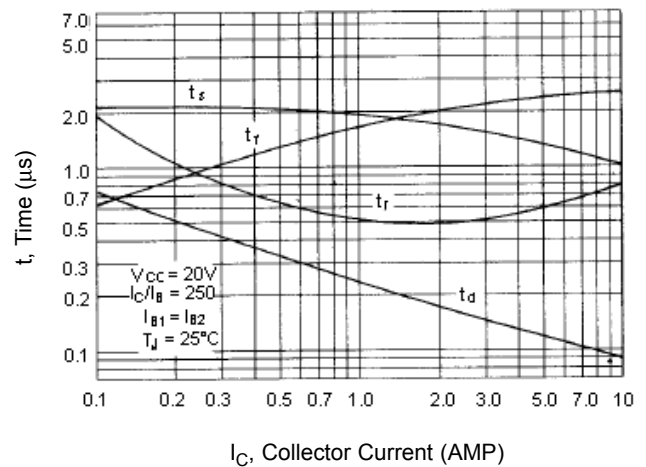
### Collector Saturation Region



### "ON" Voltages



### Switching Time

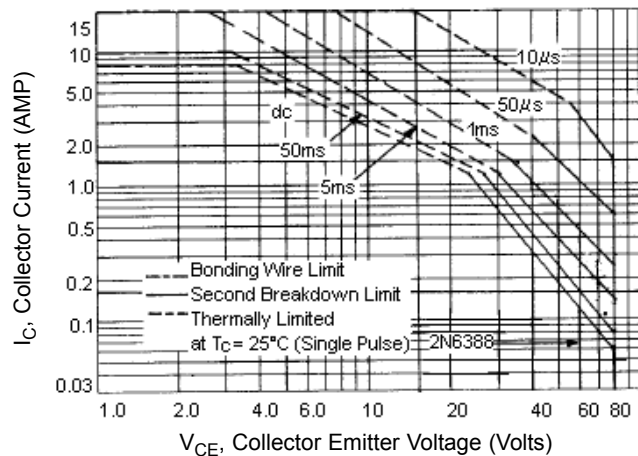


# 2N6388

## Darlington Power Transistor



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

### Specifications

$I_{C(av)}$ maximum (A)	$V_{CE0}$ maximum (V)	$h_{FE}$ minimum at $I_C = 5A$	$P_{tot}$ at $25^\circ\text{C}$ (W)	Package	Type	Part Number
10	80	1000	65	TO-220	NPN	2N6388



# 2N6388

## Darlington Power Transistor

### Notes:

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