

# Silicon Power Transistor



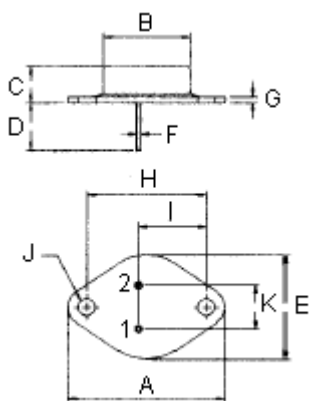
## Features:

- High DC current gain at  $I_C = 10\text{ A}$ :  $h_{FE} = 2,400$
- Collector - emitter sustaining voltage  $V_{CEO(sus)} = 100\text{ V}$  (Minimum)
- Monolithic construction with built-in base - emitter shunt resistor

## Application:

Designed for use general-purpose amplifier and low - frequency switching applications

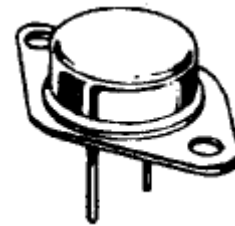
### TO-3



- Pin**
1. Base
  2. Emitter
  3. Collector (Case)

Dimension	Millimetres	
	Minimum	Maximum
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.2	26.67
F	0.92	1.09
G	1.38	1.62
H	29.9	30.4
I	16.64	17.3
J	3.88	4.36
K	10.67	11.18

Dimensions : Millimetres



**TO-3**  
**Darlington**  
**20 Amperes**  
**Complementary Silicon**  
**Power Transistor**

## Maximum Ratings

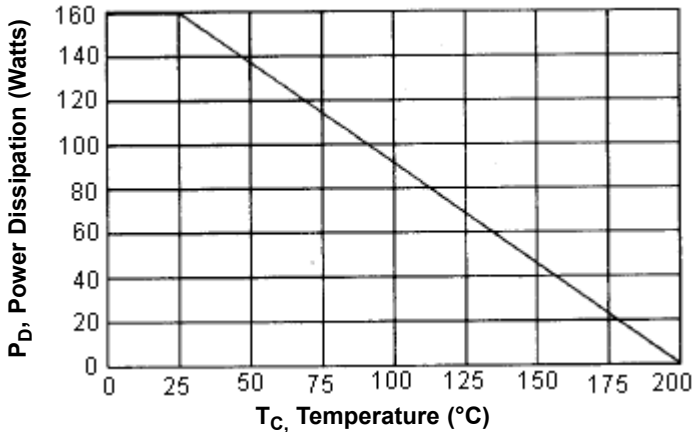
Characteristic	Symbol	2N6284	Unit
Collector - emitter voltage	$V_{CEO}$	100	V
Emitter - base voltage	$V_{CBO}$	100	V
Collector - emitter voltage	$V_{EBO}$	5	V
Collector current - Continuous - Peak	$I_C$	20 40	A
Base current	$I_B$	0.5	A
Total power dissipation at $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	160 0.915	W W/ $^\circ\text{C}$
Operating and storage junction temperature range	$T_J, T_{STG}$	-65 to +200	$^\circ\text{C}$

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## Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal resistance junction to case	$R_{\theta jc}$	1.09	$^{\circ}C/W$

Figure-1 Power Derating



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

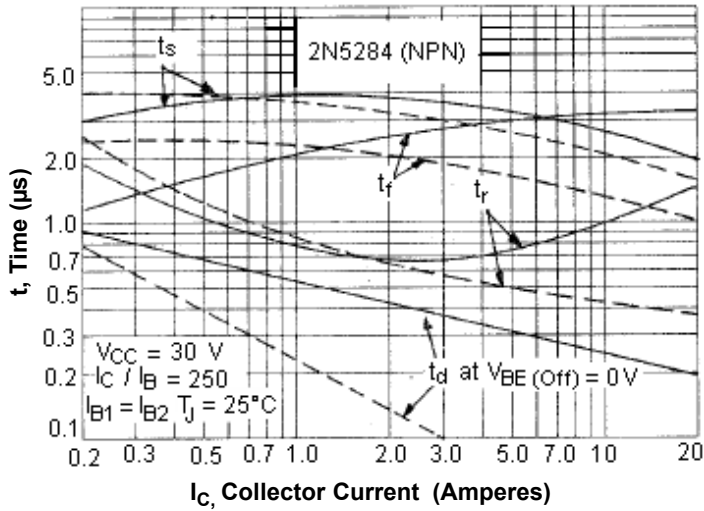
Characteristic	Symbol	Minimum	Maximum	Unit
<b>OFF Characteristics</b>				
Collector - emitter sustaining voltage (1) ( $I_C = 100 \text{ mA}$ , $I_B = 0$ )	$V_{CEO (SUS)}$	100	-	V
Collector - emitter breakdown voltage (1) ( $V_{CE} = 50 \text{ V}$ , $I_B = 0$ )	$I_{CEO}$	-	1	mA
Collector cut off current ( $V_{CE} = 100 \text{ V}$ , $V_{BE (off)} = 1.5 \text{ V}$ ) ( $V_{CE} = 100 \text{ V}$ , $V_{BE (off)} = 1.5 \text{ V}$ , $T_C = 150^{\circ}C$ )	$I_{CEX}$	-	0.5 5	mA
Emitter cut off current ( $V_{EB} = 5 \text{ V}$ , $I_C = 0$ )	$I_{EBO}$	-	2	mA
<b>ON Characteristics (1)</b>				
DC current gain ( $I_C = 7.5 \text{ A}$ , $V_{CE} = 3 \text{ V}$ ) ( $I_C = 20 \text{ A}$ , $V_{CE} = 3 \text{ V}$ )	$h_{FE}$	75 100	18,000	-
Collector - emitter saturation voltage ( $I_C = 10 \text{ A}$ , $I_B = 40 \text{ mA}$ ) ( $I_C = 20 \text{ A}$ , $I_B = 200 \text{ mA}$ )	$V_{CE (sat)}$	-	2 3	V
Base - emitter saturation voltage ( $I_C = 20 \text{ A}$ , $I_B = 200 \text{ mA}$ )	$V_{BE (sat)}$	-	4	
Base - emitter on voltage ( $I_C = 10 \text{ A}$ , $V_{CE} = 3 \text{ V}$ )	$V_{BE (on)}$	-	2.8	V
<b>Dynamic Characteristics</b>				
Current capacitance ( $V_{CB} = 10 \text{ V}$ , $I_E = 0$ , $f = 1 \text{ MHz}$ )	$C_{ob}$	-	400	pF
Small - signal current gain ( $I_C = 10 \text{ A}$ , $V_{CE} = 3 \text{ V}$ , $f = 1 \text{ KHZ}$ )	$h_{fe}$	300	-	-

(1) Pulse Test: Pulse width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2\%$

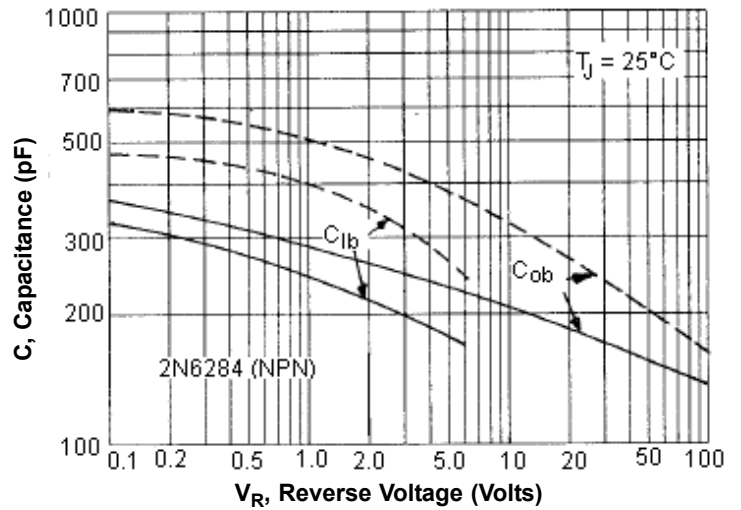
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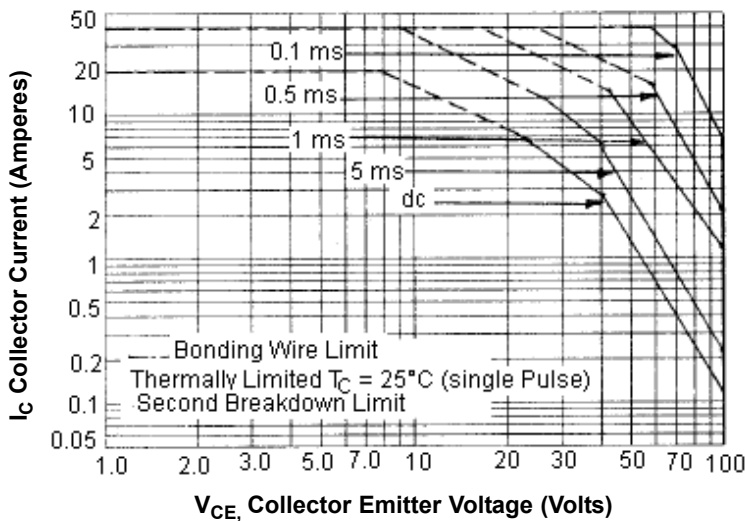
Switching Time



Capacitances



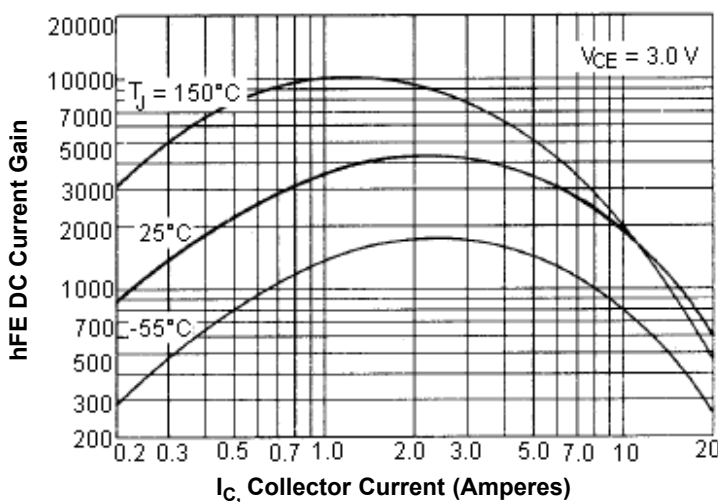
Active - Region Safe Operating Area (SOA)



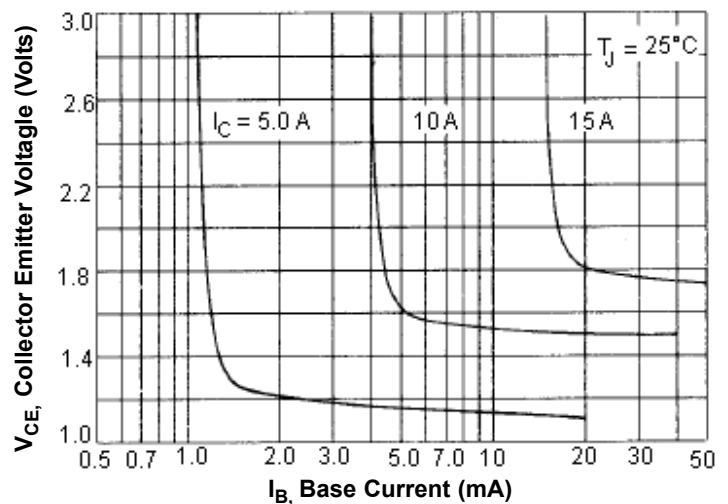
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C$ - $V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation than curves indicate

The data of SOA curve is base on  $T_{J(pk)} = 200^\circ\text{C}$ ;  $T_C$  is variable depending on conditions, second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} < 200^\circ\text{C}$ , at high case temperatures, thermal limitation will reduce the power that can be handled to values less than the limitations imposed by second breakdown

DC Current Gain

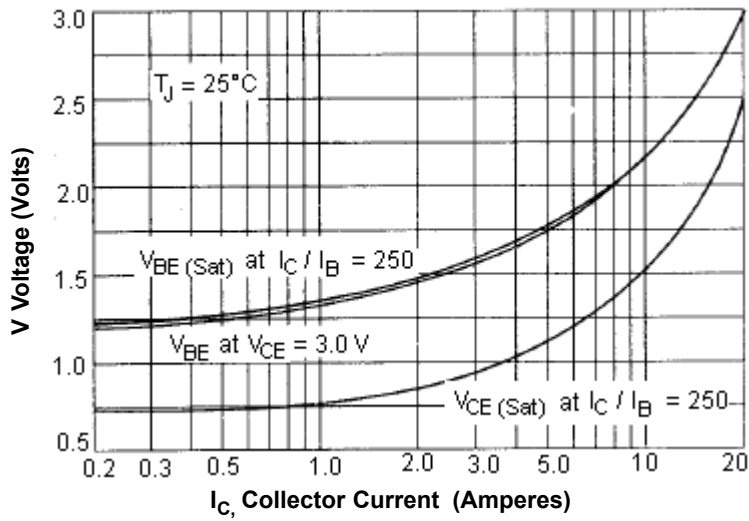


Collector Saturation Region



# Silicon Power Transistor

“ON” Voltages



## Part Number Table

Description	Part Number
Silicon Power Transistor	2N6284

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