

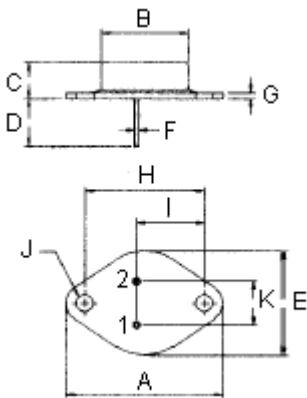
# Silicon NPN Power Transistor



## Feature:

- Low collector - Emitter saturation voltage :  
 $V_{CE(SAT)} = 4 \text{ V}$  (Maximum) at  $I_C = 20 \text{ A}$ ,  $I_B = 4 \text{ A}$

## TO-3



- Pin** 1. Base  
 2. Emitter  
 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

## Maximum Ratings

Parameter	Symbol	2N3772	Unit
Collector - emitter voltage	$V_{CEO}$	60	V
Collector - emitter voltage	$V_{CEX}$	80	V
Collector - base voltage	$V_{CBO}$	100	V
Emitter - base voltage	$V_{EBO}$	7	V
Collector current - continuous - peak	$I_C$ $I_{CM}$	20 30	A
Base current - continuous - peak	$I_B$ $I_{BM}$	5 15	A
Collector power dissipation at $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	150 0.857	W W/ $^\circ\text{C}$
Operating and storage junction temperature range	$T_J, T_{STG}$	-65 to +200	$^\circ\text{C}$

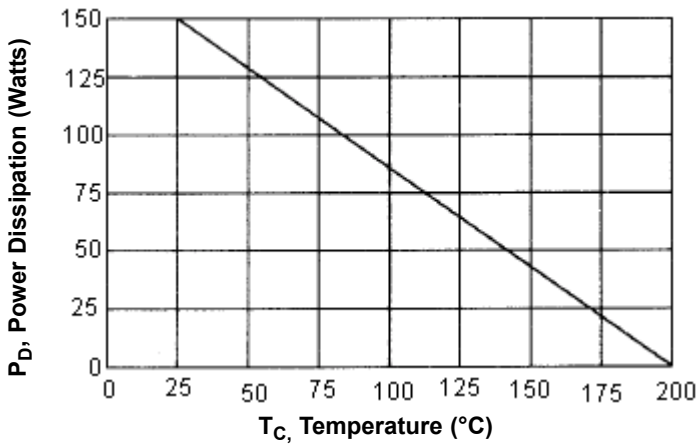
# Silicon NPN Power Transistor



## Thermal Characteristics

Characteristic	Symbol	Maximum	Unit
Thermal resistance junction to case	$R_{\theta jc}$	1.17	$^{\circ}C/W$

Figure-1 Power Derating



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

Characteristic	Symbol	Minimum	Maximum	Unit
<b>OFF Characteristics</b>				
Collector - emitter sustaining voltage (1) ( $I_C = 200 \text{ mA}$ , $I_B = 0$ )	$V_{CEO(SUS)}$	60	-	V
Collector - emitter sustaining voltage ( $I_C = 0.2 \text{ A}$ , $V_{BE(off)} = 1.5 \text{ V}$ , $R_{BE} = 100 \text{ Ohms}$ )	$V_{CEX(SUS)}$	80	-	V
Collector cut off current ( $V_{CE} = 50 \text{ V}$ , $I_B = 0$ )	$I_{CEO}$	-	10	mA
Collector cut off current ( $V_{CE} = 100 \text{ V}$ , $V_{BE(off)} = 1.5 \text{ V}$ )	$I_{CEV}$	-	5	mA
Collector cut off current ( $V_{CE} = 100 \text{ V}$ , $I_E = 0$ )	$I_{CBO}$	-	5	mA
Emitter cut off current ( $V_{EB} = 7 \text{ V}$ , $I_C = 0$ )	$I_{EBO}$	-	5	mA
<b>ON Characteristics (1)</b>				
DC current gain ( $I_C = 10 \text{ A}$ , $V_{CE} = 4 \text{ V}$ ) ( $I_C = 20 \text{ A}$ , $V_{CE} = 4 \text{ V}$ )	$h_{FE}$	15 5	60	-
Collector - emitter saturation voltage ( $I_C = 10 \text{ A}$ , $I_B = 1 \text{ A}$ ) ( $I_C = 20 \text{ A}$ , $I_B = 4 \text{ A}$ )	$V_{CE(sat)}$	-	1.4 4	V
Base - emitter on voltage ( $I_C = 10 \text{ A}$ , $V_{CE} = 4 \text{ V}$ )	$V_{BE(on)}$	-	2.2	V

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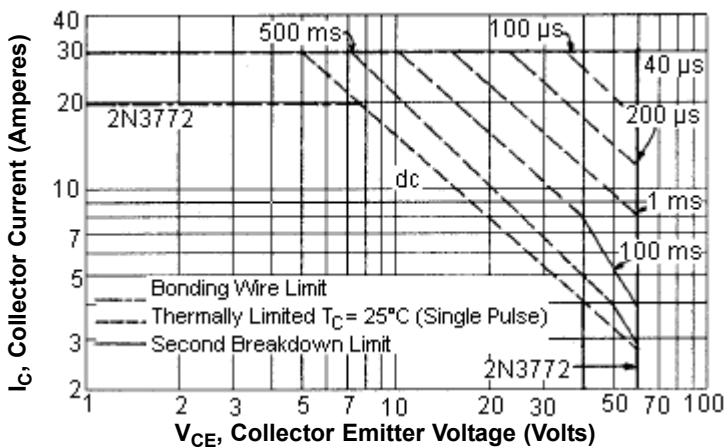
## Electrical Characteristics ( $T_C = 25^\circ\text{C}$ Unless Otherwise Specified)

Characteristic	Symbol	Minimum	Maximum	Unit
<b>Dynamic Characteristics</b>				
Current gain - bandwidth product (2) ( $I_C = 1\text{ A}$ , $V_{CE} = 4\text{ V}$ , $f = 50\text{ KHz}$ )	$f_T$	0.2	-	MHz

(1) Pulse Test : Pulse width = 300  $\mu\text{s}$ , duty cycle  $\leq 2\%$

(2)  $f_T = |h_{fe}| f_{\text{test}}$

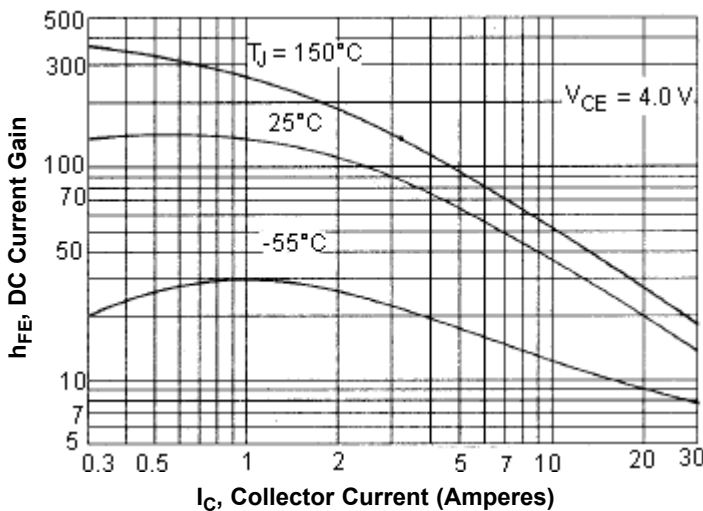
**Active - Region Safe Operating area (SOA)**



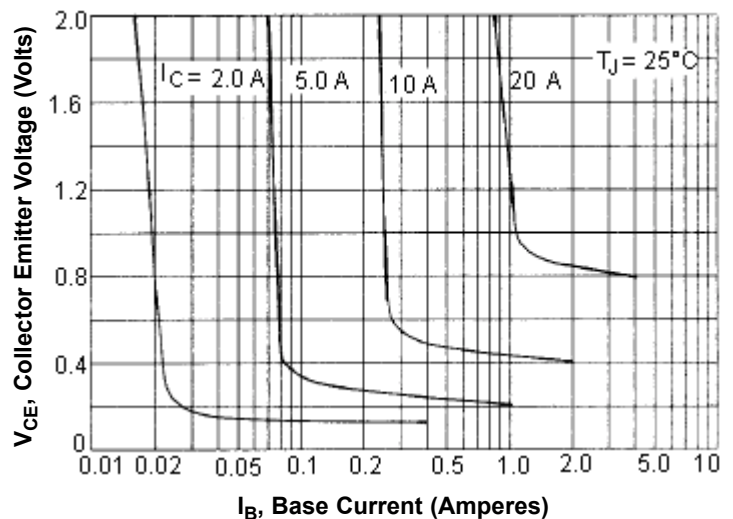
There are two limitation on the power handling ability of a transistor: average junction temperature and second breakdown safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation i.e., the transistor must not be subjected to greater dissipation 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  $T_{J(PK)} \leq 200^\circ\text{C}$ , 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**



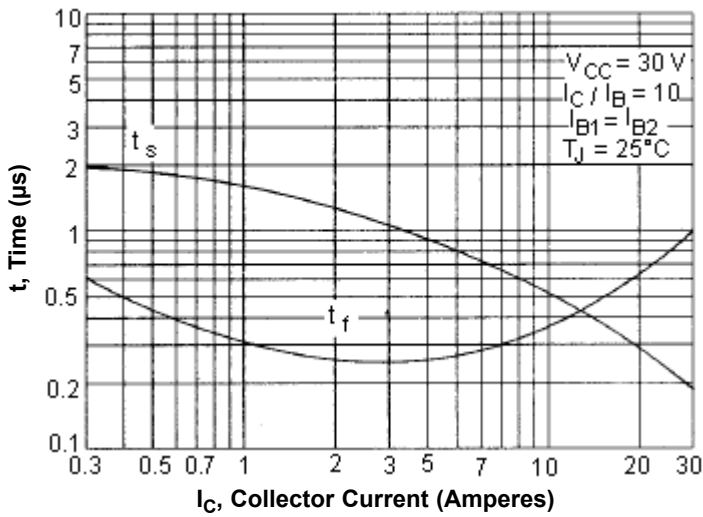
**Collector Saturation Region**



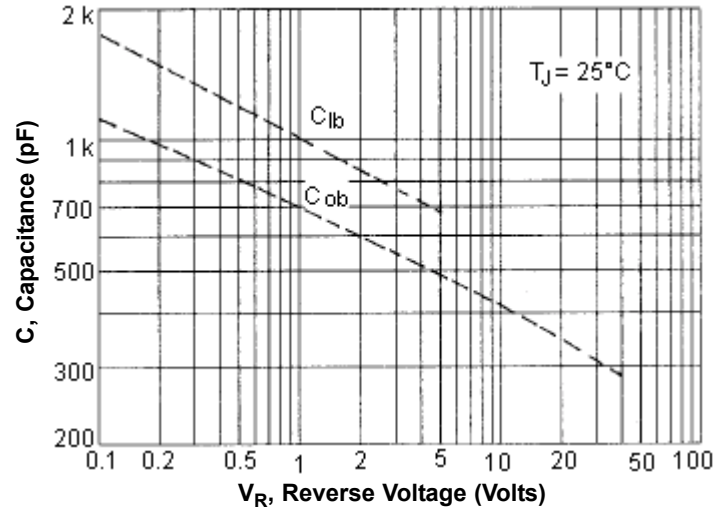
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Turn - off Time



Capacitances



## Part Number Table

Description	Part Number
Silicon NPN Power Transistor	2N3772

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