

# High Power Silicon Power Transistor

## V<sub>CEO</sub> 60V, I<sub>c</sub> 20A, 150W, TO-3

**multicomp** PRO

**RoHS  
Compliant**



### Features

Forward Biased Second Breakdown Current Capability  
 2N3772 -- I<sub>s/b</sub> = 2.5 A DC @ V<sub>CE</sub> = 60 V DC

**APPLICATIONS:** Linear amplifiers, series pass regulators, and inductive switching applications.

**ABSOLUTE MAXIMUM RATINGS** (T<sub>a</sub> = 25°C)

Rating	Symbol	2N3772	Units
Collector - Emitter Voltage	V <sub>CEO</sub>	60	V DC
Collector - Emitter Voltage	V <sub>CEX</sub>	80	V DC
Collector - Base Voltage	V <sub>CB</sub>	100	V DC
Emitter Base Voltage	V <sub>EB</sub>	7	V DC
Collector Current - Continuous Peak	I <sub>c</sub>	20 30	A DC
Base Current - Continuous Peak	I <sub>B</sub>	5 15	A DC
Total Device Dissipation @ TC = 25°C Derate above 25°C	P <sub>D</sub>	150 0.855	Watts W/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65°C to +200°C	°C

### Thermal Characteristics

Characteristic	Symbol	2N3771, 2N3772	Unit
Thermal Resistance, Junction to case	θ <sub>J-C</sub>	1.17	°C/W

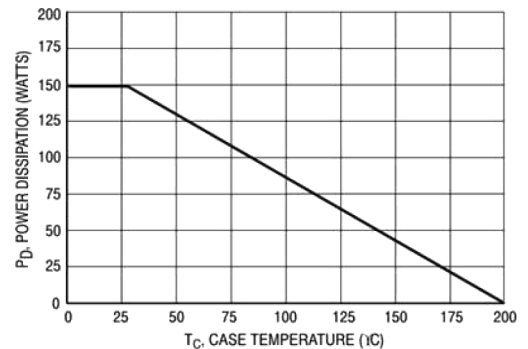


Figure 1. Power Derating

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### Electrical Characteristics at T<sub>a</sub> = 25°C unless otherwise specified)

Characteristic	Symbol	Min	Max	Units	
<b>*Off Characteristics</b>					
*Collector Emitter Sustaining Voltage (1) (I <sub>c</sub> = 0.2A DC, I <sub>B</sub> = 0)	2N3772	V <sub>CEO(sus)</sub>	40 60	- -	V DC
Collector Emitter Sustaining Voltage (I <sub>c</sub> = 0.2A DC, V <sub>EB(off)</sub> = 1.5 V DC R <sub>BE</sub> = 100Ω)	2N3772	V <sub>CEX(sus)</sub>	50 80	- -	V DC
Collector Emitter Sustaining Voltage (I <sub>c</sub> = 0.2A DC, R <sub>BE</sub> = 100Ω)	2N3772	V <sub>CER(sus)</sub>	45 70	- -	V DC
*Collector Cut Off Current (V <sub>CE</sub> = 30V DC, I <sub>B</sub> = 0) (V <sub>CE</sub> = 50V DC, I <sub>B</sub> = 0) (V <sub>CE</sub> = 25V DC, I <sub>B</sub> = 0)	2N3772	I <sub>CEO</sub>	- -	10 10	mA DC
*Collector Cut Off Current (V <sub>CE</sub> = 50V DC, V <sub>EB(off)</sub> = 1.5V DC (V <sub>CE</sub> = 100V DC, V <sub>EB(off)</sub> = 1.5V DC (V <sub>CE</sub> = 45V DC, V <sub>EB(off)</sub> = 1.5V DC (V <sub>CE</sub> = 30V DC, V <sub>EB(off)</sub> = 1.5V DC, T <sub>c</sub> = 150°C (V <sub>CE</sub> = 45V DC, V <sub>EB(off)</sub> = 1.5V DC, T <sub>c</sub> = 150°C	2N3772 2N3772	I <sub>CEV</sub>	-	2 5 4 10 10	mA DC
*Collector Cut Off Current (V <sub>CB</sub> = 50V DC, I <sub>E</sub> = 0) (V <sub>CB</sub> = 100V DC, I <sub>E</sub> = 0)	2N3772	I <sub>CBO</sub>	-	2 5	mA DC
*Emitter Cut Off Current (V <sub>BE</sub> = 5V DC, I <sub>C</sub> = 0) (V <sub>BE</sub> = 7V DC, I <sub>C</sub> = 0)	2N3772	I <sub>EBO</sub>	-	5 5	mA DC
<b>*On Characteristics</b>					
DC Current Gain (1) (I <sub>c</sub> = 15A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> ) (I <sub>c</sub> = 10A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> ) (I <sub>c</sub> = 8A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> ) (I <sub>c</sub> = 30A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> ) (I <sub>c</sub> = 20A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> )	2N3772 2N3772	h <sub>FE</sub>	15 15 5 5	60 60 - -	-
Collector Emitter Saturation Voltage (I <sub>c</sub> = 15A DC, I <sub>B</sub> = 1.5 A <sub>DC</sub> ) (I <sub>c</sub> = 10A DC, I <sub>B</sub> = 1 A <sub>DC</sub> ) (I <sub>c</sub> = 30A DC, I <sub>B</sub> = 6 A <sub>DC</sub> ) (I <sub>c</sub> = 20A DC, I <sub>B</sub> = 4 A <sub>DC</sub> )	2N3772 2N3772	V <sub>CE(sat)</sub>	- -	2 1.4 4 4	V DC
Base Emitter on Voltage (I <sub>c</sub> = 15A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> ) (I <sub>c</sub> = 10A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> ) (I <sub>c</sub> = 8A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> )	2N3772	V <sub>BE(on)</sub>	-	2.7 2.2	V DC
<b>*Dynamic Characteristics</b>					
Current-Gain - Bandwidth Product (I <sub>c</sub> = 1A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> , f <sub>test</sub> = 50 kHz)		f <sub>T</sub>	0.2	-	MHz
Small-Signal Current Gain (I <sub>c</sub> = 1A DC, V <sub>CE</sub> = 4 V <sub>DC</sub> , f = 1 kHz)		h <sub>fe</sub>	40	-	-

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## V<sub>CE0</sub> 60V, I<sub>c</sub> 20A, 150W, TO-3

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Characteristic	Symbol	Min	Max	Units
<b>*Second Breakdown</b>				
Second Breakdown Energy with Base Forward Biased, t = 1s (non- repetitive) (V <sub>CE</sub> = 60 V DC 2N3772	I <sub>s/b</sub>	2.75	-	ADC

\* Indicates JEDEC Registered Data  
(1) Pulse Test: 300s, Rep. Rate 60 cps

### Typical Characteristics Curves

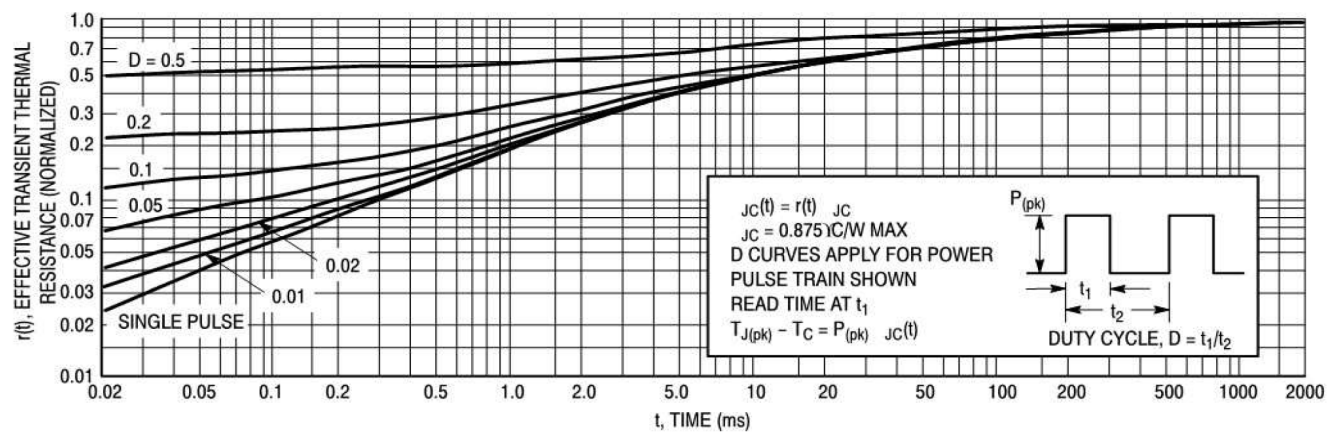


Figure 2. Thermal Response — 2N3772

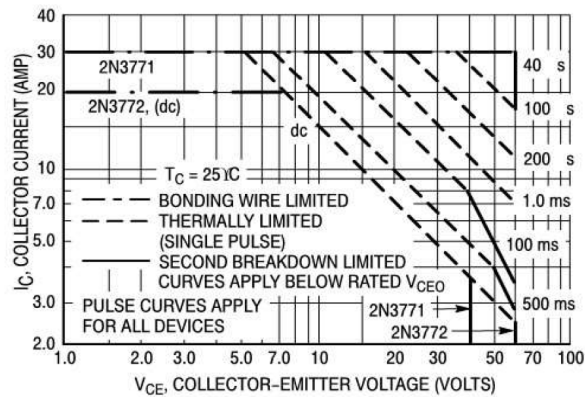


Figure 3. Active-Region Safe Operating Area  
2N3772

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### Typical Characteristics Curves

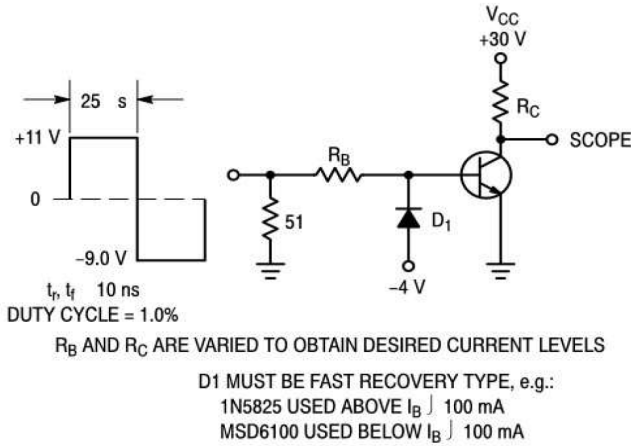


Figure 4. Switching Time Test Circuit

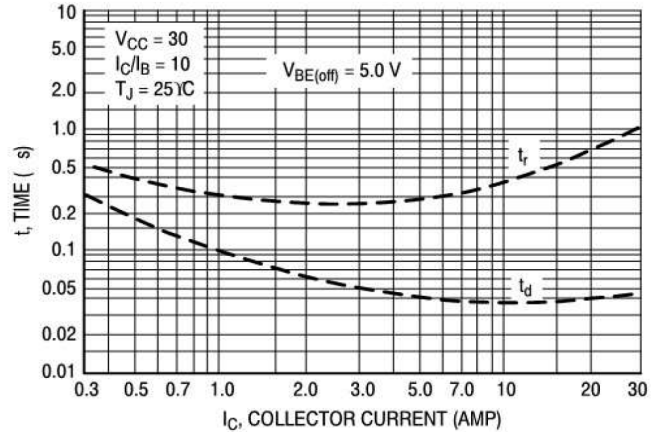


Figure 5. Turn-On Time

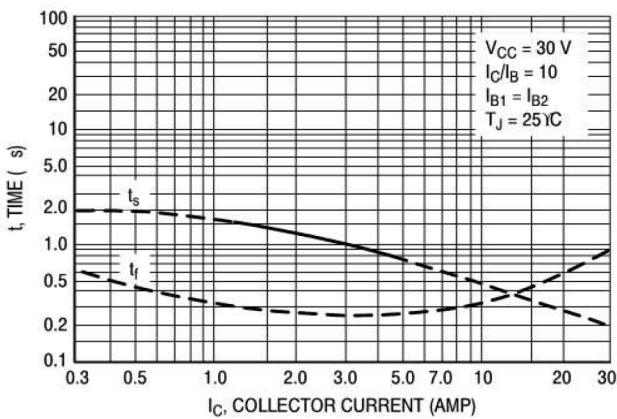


Figure 6. Turn-Off Time

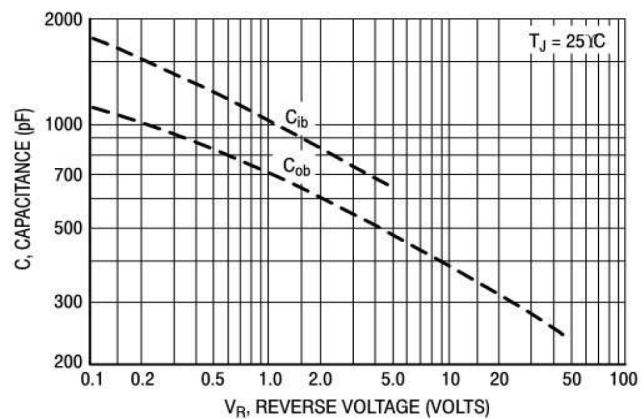


Figure 7. Capacitance

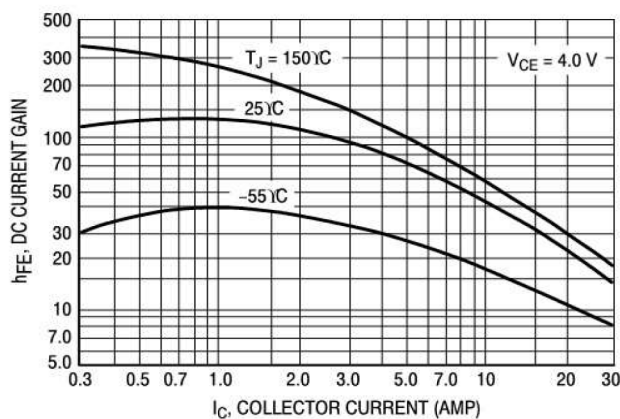


Figure 8. DC Current Gain

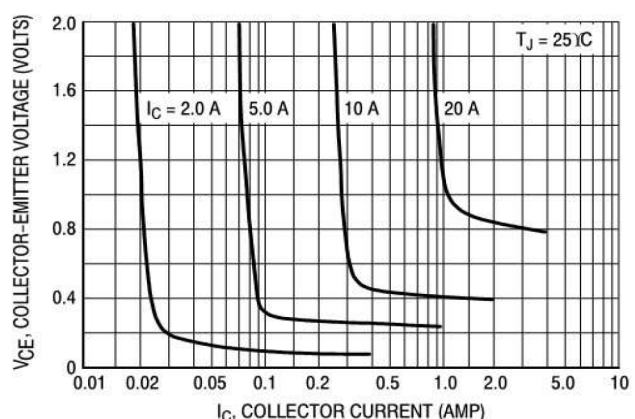


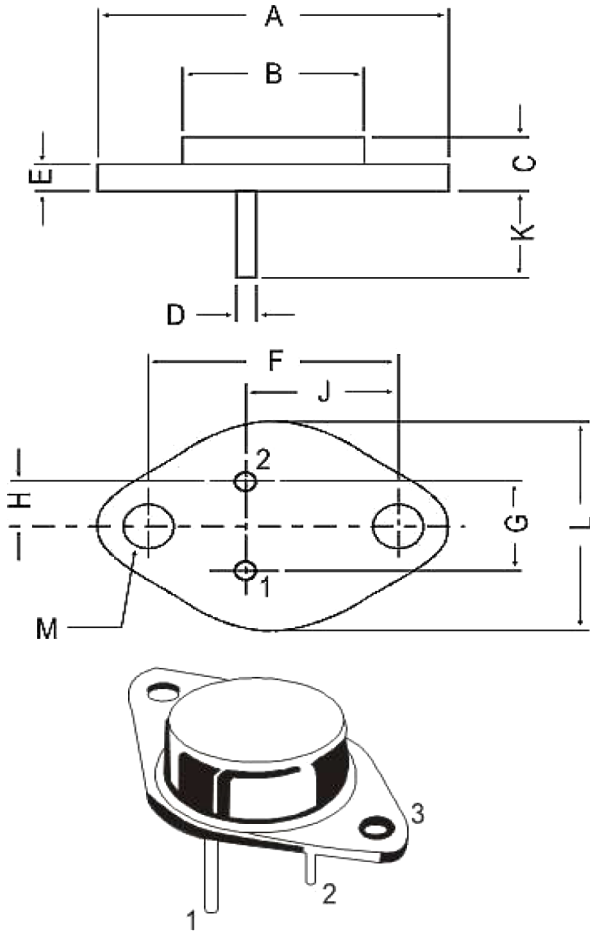
Figure 9. Collector Saturation Region

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### Package Details



Dimensions : Millimetres

Dim	Min.	Max.
A	-	39.37
B	-	22.22
C	6.35	8.5
D	0.96	1.09
E	-	1.77
F	29.9	30.4
G	10.69	11.18
H	5.2	5.72
J	16.64	17.15
K	11.15	12.25
L	-	26.67
M	3.84	4.19

#### PIN CONFIGURATION

1. BASE
2. EMITTER
3. COLLECTOR

### Part Number Table

Description	Part Number
Silicon High Power Transistor, NPN, 60V, 20A, TO-3	2N3772

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