

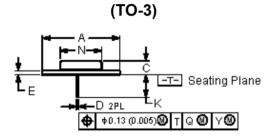


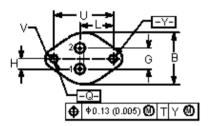
High power NPN silicon power transistors.

These devices are designed for linear amplifiers, series pass regulators, and inductive switching applications.

Features:

- Forward biased second breakdown current capability $I_{S/b} = 2.5 \text{ A dc}$ at $V_{CE} = 60 \text{V dc}$.
- Pb-free packages.





Style 1: Pin 1. Base 2. Emitter Collector (Case)

Dimensions	Minimum Maximun		
А	1.550 (39.37) Reference		
В	-	1.050 (26.67)	
С	0.250 (6.35)	0.335 (8.51)	
D	0.038 (0.97)	0.043 (1.09)	
E	0.055 (1.40)	0.070 (1.77)	
G	0.430 (10.92) BSC		
Н	0.215 (5.46) BSC		
K	0.440 (11.18)	0.480 (12.19)	
L	0.665 (16.89) BSC		
N	-	0.830 (21.08)	
Q	0.151 (3.84)	0.165 (4.19)	
U	1.187 (30.15) BSC		
V	0.131 (3.33)	0.188 (4.77)	

Dimensions : Inches (Millimetres)

20 and 30 Ampere Power Transistors NPN Silicon 40 and 60 Volts, 150 Watts



(TO-3) Case 1-07 Style 1



Maximum Ratings (Note 1)

Rating	Symbol	2N3772	Unit	
Collector-Emitter Voltage	V _{CEO}	60		
Collector-Emitter Voltage	V _{CEX}	80	V / -l-	
Collector-Base Voltage	V _{CB}	100	V dc	
Emitter-Base Voltage	V _{EB}	7.0		
Collector Current - Continuous - Peak	I _C	20 30	A do	
Base Current - Continuous - Peak	I _B	5.0 15	- A dc	
Total Device Dissipation at T _C = 25°C Derate above 25°C	P _D	150 0.855	W W/°C	
Operating and Storage Junction Temperature Range	$T_{J_{i}}T_{stg}$	-65 to +200	°C	

Thermal Characteristics

Characteristics	Symbol	Maximum	Unit
Thermal Resistance, Junction-to-Case	θ^{JC}	1.17	°C/W

Stresses exceeding maximum ratings may damage the device. Maximum ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the recommended operating conditions may affect device reliability.

Electrical Characteristics (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Minimum	Maximum	Unit
Off Characteristics					
Collector-Emitter Sustaining Voltage (Note 2 and 3) ($I_C = 0.2 \text{ A dc}, I_B = 0$)	2N3772	V _{EO (sus)}	60	-	
Collector-Emitter Sustaining Voltage ($I_C = 0.2A \text{ dc}, V_{EB \text{ (off)}} = 1.5 \text{ V dc}, R_{BE} = 100\Omega$)	2N3772	V _{CEX (sus)}	80	-	V dc
Collector-Emitter Sustaining Voltage ($I_C = 0.2A \text{ dc}, R_{BE} = 100\Omega$)	2N3772	V _{CER (sus)}	70	-	
Collector Cut off Current (Note 2) $(V_{CE} = 50V \text{ dc}, I_B = 0)$ $(V_{CE} = 25V \text{ dc}, I_B = 0)$	2N3772	I _{CEO}	-	10	- mA dc
Collector Cut off Current (Note 2) (V_{CE} = 100V dc, $V_{EB (off)}$ = 1.5V dc) (V_{CE} = 45V dc, $V_{EB (off)}$ = 1.5V dc, V_{CE} = 150°C	2N3772 2N3772	I _{CEV}	-	5.0 10	



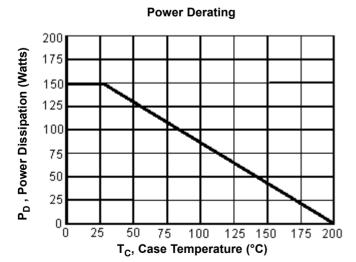
^{1.} Indicates JEDEC registered data.



Electrical Characteristics (T_C = 25°C unless otherwise noted)

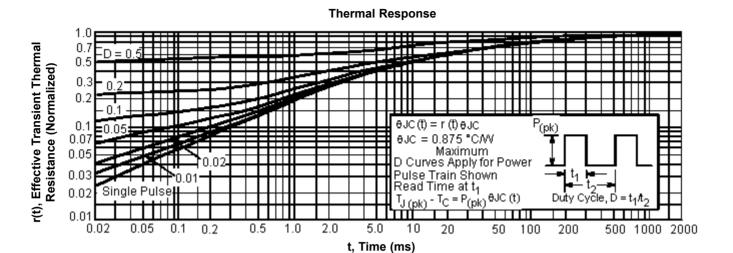
Characteristic		Symbol	Minimum	Maximum	Unit
Collector Cut off Current (Note 2) (V _{CB} = 100V dc, I _E = 0)	2N3772	I _{CBO}	-	5.0	mA dc
Emitter Cut off Current (Note 2) (V _{BE} = 7.0Vdc, I _C = 0)	2N3772	I _{EBO}	-	5.0	IIIA UC
On Characteristics (Note 2)					
DC Current Gain (Note 3) $(I_C = 10A \text{ dc}, V_{CE} = 4.0V \text{ dc})$ $(I_C = 20A \text{ dc}, V_{CE} = 4.0V \text{ dc})$	2N3772 2N3772	h _{FE}	15 5.0	60 -	-
Collector-Emitter Saturation Voltage ($I_C = 10A \text{ dc}$, $I_B = 1.0A \text{ dc}$) ($I_C = 20A \text{ dc}$, $I_B = 4.0A \text{ dc}$)	2N3772 2N3772	V _{CE (sat)}	-	1.4 4.0	V dc
Base-Emitter on Voltage $(I_C = 10A \text{ dc}, V_{CE} = 4.0V \text{ dc})$ $(I_C = 8.0A \text{ dc}, V_{CE} = 4.0V \text{ dc})$	2N3772	V _{BE (on)}	-	2.2	
Dynamic Characteristics (Note 2)					
Current-Gain - Bandwidth Product ($I_C = 1.0A$ dc, $V_{CE} = 4.0V$ dc, $f_{test} = 50kHz$)		f _T	0.2	-	MHz
Small-Signal Current Gain ($I_C = 1.0 A$ dc, $V_{CE} = 4.0 V$ dc, $f = 1.0 A$ dc)		h _{fe}	40	-	-
Second Breakdown			,		
Second Breakdown Energy with Base Forward Biased, $t = (V_{CE} = 60V \text{ dc})$	1.0s (non-repetitive) 2N3772	I _{S/b}	2.5	-	A dc

- 2. Indicates JEDEC registered data.
- 3. Pulse Test: 300µs, Rep. Rate 60cps.

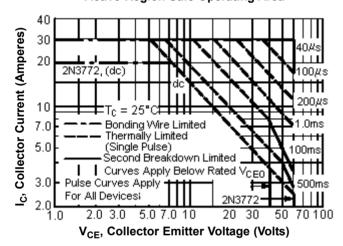






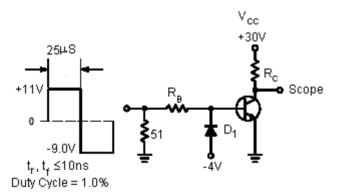


Active-Region Safe Operating Area



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 must not be subjected to greater dissipation than curves indicate.

Is based on JEDEC registered data. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J\,(pk)} < 200^{\circ} C.$ $T_{J\,(pk)}$ may be calculated from the data of using data of and the pulse power limits of Figure 3, $T_{J\,(pk)}$ will be found to be less than $T_{J\,(max)}$ for pulse widths of 1ms and less. When using ON Semiconductor transistors, it is permissible to increase the pulse power limits until limited by $T_{J\,(maximum)}$.



 $\rm R_B$ and $\rm R_C$ are varied to obtain desired current levels D1 must be fast recovery type, e.g.: 1N5825 used above $\rm I_B$ to 100mA MSD6100 used below $\rm I_B$ to 100mA

Switching Time Test Circuit

Turn-On Time

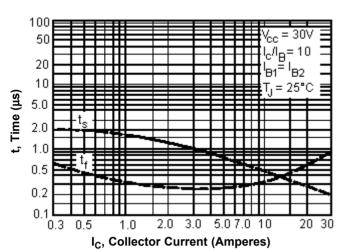
10
5.0
V_{CC} = 30
V_{CC} = 30
V_{BE} (off) = 5.0V

1.0
0.5
0.2
0.1
0.05
0.02
0.01
0.3 0.5 0.7 1.0 2.0 3.0 5.0 7.0 10 20 30
I_C, Collector Current (Amperes)



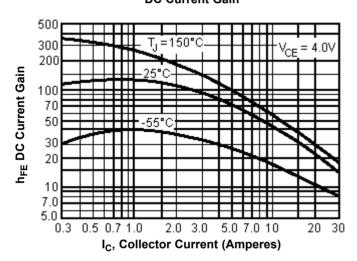




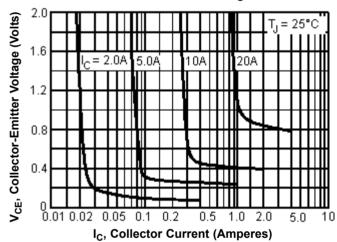


Capacitance 2000 $T_1 = 25^{\circ}C$ C, Capacitance (pF) 1000 700 500 300 200 0.1 0.2 20 50 100 0.5 1.0 2.0 5.0 10 V_R, Reverse Voltage (Volts)

DC Current Gain



Collector Saturation Region



Part Number Table

Description	Part Number		
Transistor, NPN, TO-3	2N3772		

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