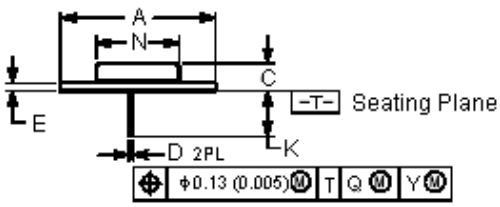
1165892

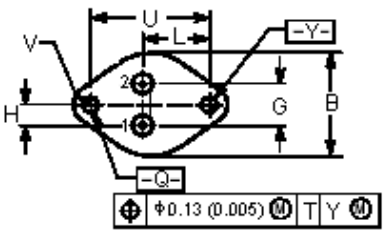
High power NPN silicon power transistors.
These devices are designed for linear amplifiers, series pass regulators, and inductive switching applications.

Features:

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

(TO-3)



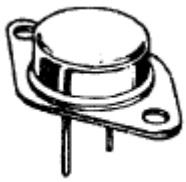


Style 1:
Pin 1. Base
2. Emitter
Collector (Case)

Dimensions	Minimum	Maximum
A	1.550 (39.37) Reference	
B	-	1.050 (26.67)
C	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	
H	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	V dc
Collector-Emitter Voltage	V_{CEX}	80	
Collector-Base Voltage	V_{CB}	100	
Emitter-Base Voltage	V_{EB}	7.0	
Collector Current - Continuous - Peak	I_C	20 30	A dc
Base Current - Continuous - Peak	I_B	5.0 15	
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, 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.
1. Indicates JEDEC registered data.

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

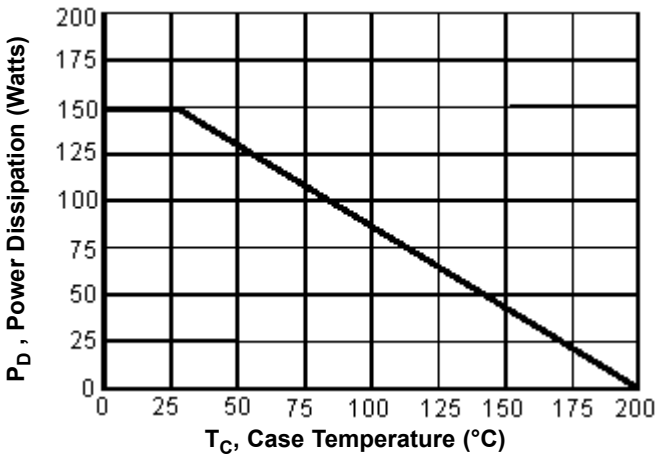
Characteristic		Symbol	Minimum	Maximum	Unit
Off Characteristics					
Collector-Emitter Sustaining Voltage (Note 2 and 3) (I_C = 0.2 A dc, I_B = 0)	2N3772	$V_{EO\ (sus)}$	60	-	V dc
Collector-Emitter Sustaining Voltage (I_C = 0.2A dc, $V_{EB\ (off)}$ = 1.5 V dc, R_{BE} = 100Ω)	2N3772	$V_{CEX\ (sus)}$	80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

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

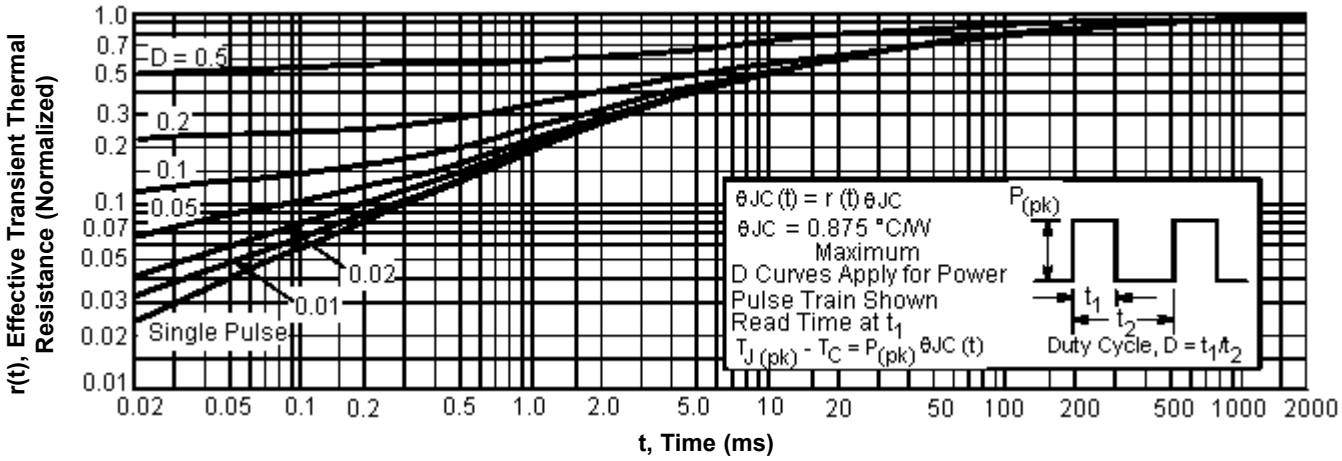
Characteristic		Symbol	Minimum	Maximum	Unit
Collector Cut off Current (Note 2) (V_{CB} = 100V dc, I_E = 0)	2N3772	I_{CBO}	-	5.0	mA dc
Emitter Cut off Current (Note 2) (V_{BE} = 7.0Vdc, I_C = 0)	2N3772	I_{EBO}	-	5.0	
On Characteristics (Note 2)					
DC Current Gain (Note 3) (I_C = 10A dc, V_{CE} = 4.0V dc) (I_C = 20A dc, V_{CE} = 4.0V dc)	2N3772 2N3772	h_{FE}	15 5.0	60 -	-
Collector-Emitter Saturation Voltage (I_C = 10A dc, I_B = 1.0A dc) (I_C = 20A dc, I_B = 4.0A dc)	2N3772 2N3772	$V_{CE\ (sat)}$	-	1.4 4.0	V dc
Base-Emitter on Voltage (I_C = 10A dc, V_{CE} = 4.0V dc) (I_C = 8.0A dc, V_{CE} = 4.0V 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 = 1.0A dc, V_{CE} = 4.0V dc, f = 1.0kHz)		h_{fe}	40	-	-
Second Breakdown					
Second Breakdown Energy with Base Forward Biased, t = 1.0s (non-repetitive) (V_{CE} = 60V dc)	2N3772	$I_{S/b}$	2.5	-	A dc

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

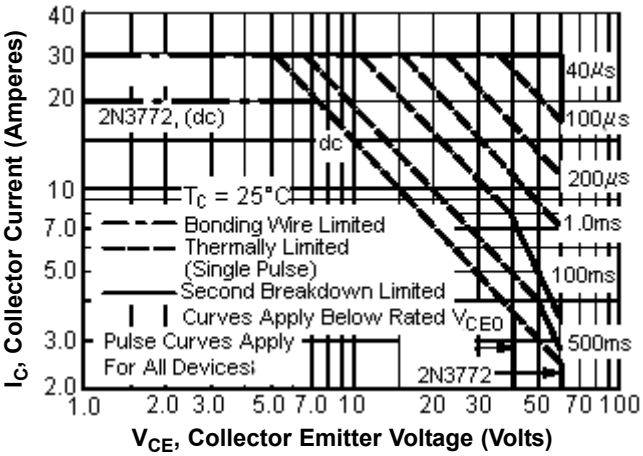
Power Derating



Thermal Response

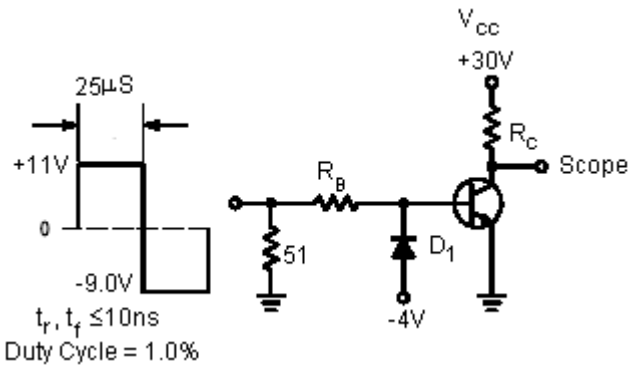


Active-Region Safe Operating Area



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.

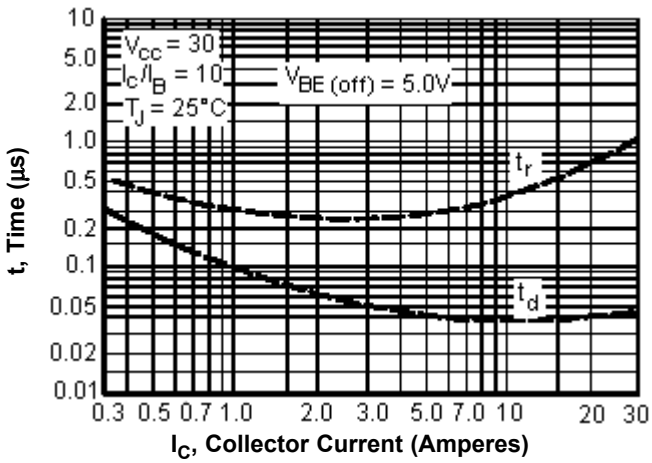
Is based on JEDEC registered data. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J\,(pk)}$ < 200°C. $T_{J\,(pk)}$ may be calculated from the data of using data of and the pulse power limits of Figure 3, $T_{J\,(pk)}$ will be found to be less than $T_{J\,(max)}$ for pulse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



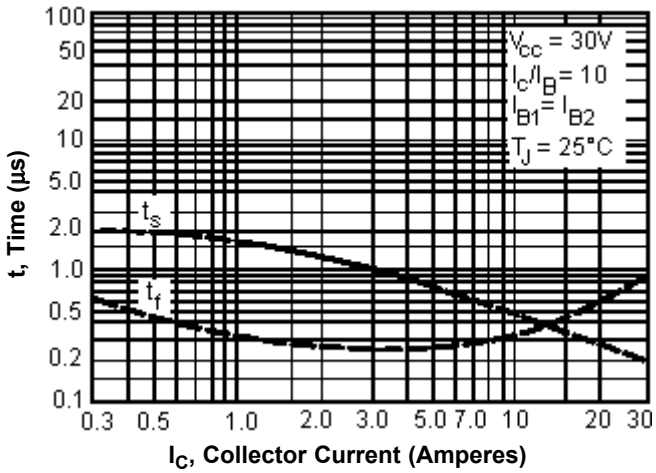
R_B and R_C are varied to obtain desired current levels
D1 must be fast recovery type, e.g.:
1N5825 used above I_B to 100mA
MSD6100 used below I_B to 100mA

Switching Time Test Circuit

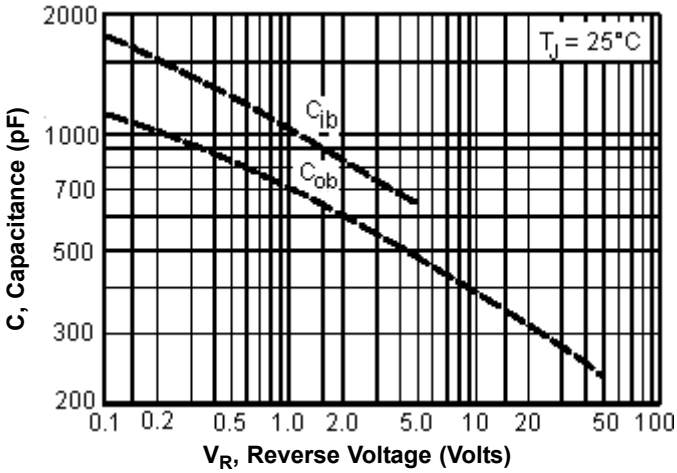
Turn-On Time



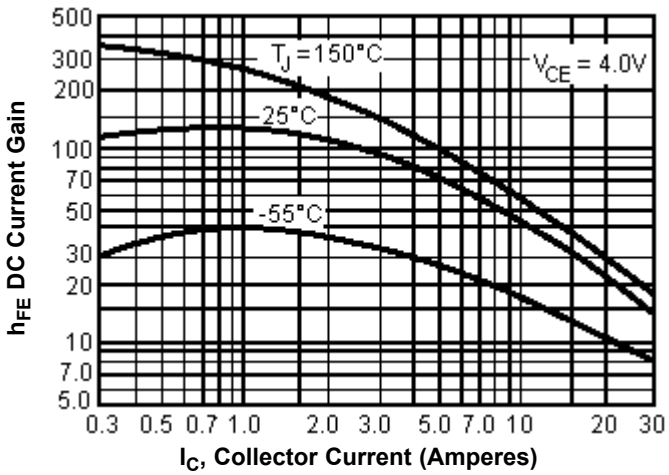
Turn-Off Time



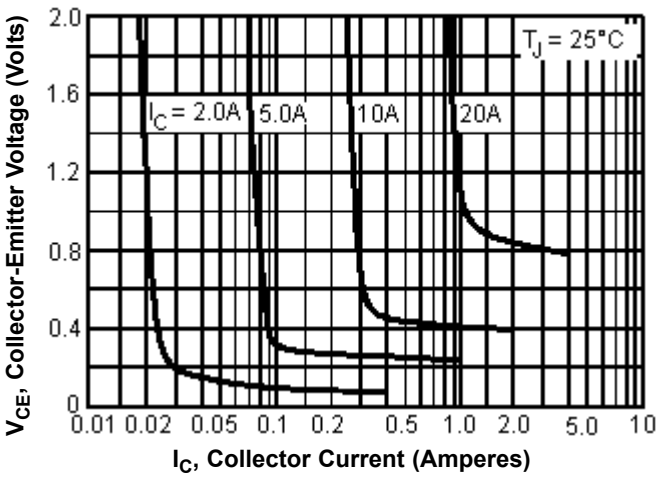
Capacitance



DC Current Gain



Collector Saturation Region



Part Number Table

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