Microsemi LAWRENCE

**TECHNICAL DATA**

# NPN HIGH POWER SILICON TRANSISTOR

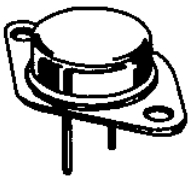
***Qualified per MIL-PRF-19500/518***

| *Devices* | | *Qualified Level* |
|---|---|---|
| **2N3771** | **2N3772** | **JANTX<br>JANTXV** |

**MAXIMUM RATINGS**

| Ratings | Symbol | 2N3771 | 2N3772 | Unit |
|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 40 | 60 | Vdc |
| Collector-Base Voltage | $V_{CBO}$ | 50 | 100 | Vdc |
| Emitter-Base Voltage | $V_{EBO}$ | 7.0 | 7.0 | Vdc |
| Base Current | $I_B$ | 7.5 | 5.0 | Adc |
| Collector Current | $I_C$ | 30 | 20 | Adc |
| Total Power Dissipation @ $T_A = +25^0C$ (1)<br>@ $T_C = +25^0C$ (2) | $P_T$ | 6.0<br>150 | | W<br>W |
| Operating & Storage Junction Temperature Range | $T_J$, $T_{stg}$ | -65 to +200 | | $^0C$ |

1) Derate linearly 34.2 mW/$^0$C for $T_A > +25^0C$
2) Derate linearly 857 mW/$^0$C for $T_C > +25^0C$



TO-3*
(TO-204AA)

*See Appendix A for Package Outline

**ELECTRICAL CHARACTERISTICS ($T_A = 25^0C$ unless otherwise noted)**

| Characteristics | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector-Base Breakdown Voltage<br>$I_C$ = 200 mAdc | 2N3771<br>2N3772 | $V_{(BR)CEO}$ | 40<br>60 | | Vdc |
| Collector-Emitter Breakdown Voltage<br>$I_C$ = 200 mAdc, $R_{BE}$ = 100 Ω | 2N3771<br>2N3772 | $V_{(BR)CER}$ | 45<br>70 | | Vdc |
| Collector-Emitter Breakdown Voltage<br>$I_C$ = 200 mAdc, $V_{BE}$ = -1.5 Vdc | 2N3771<br>2N3772 | $V_{(BR)CEX}$ | 50<br>90 | | Vdc |
| Collector-Emitter Cutoff Current<br>$V_{CE}$ = 30 Vdc<br>$V_{CE}$ = 50 Vdc | 2N3771<br>2N3772 | $I_{CEO}$ | | 5.0<br>5.0 | mAdc |
| Emitter-Base Cutoff Current<br>$V_{BE}$ = 7.0 Vdc | 2N3771<br>2N3772 | $I_{EBO}$ | | 2.0 | mAdc |
| Collector-Emitter Cutoff Current<br>$V_{BE}$ = 1.5 Vdc, $V_{CE}$ = 50 Vdc<br>$V_{BE}$ = 1.5 Vdc, $V_{CE}$ = 100 Vdc | 2N3771<br>2N3772 | $I_{CEX}$ | | 500<br>500 | µAdc |

## ELECTRICAL CHARACTERISTICS (con't)

| Characteristics | | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **ON CHARACTERISTICS** [3] | | | | | |
| Forward-Current Transfer Ratio | | $h_{FE}$ | | | |
| $I_C$ = 15 Adc, $V_{CE}$ = 4.0 Vdc | 2N3771 | | 15 | 60 | |
| $I_C$ = 10 Adc, $V_{CE}$ = 4.0 Vdc | 2N3772 | | 15 | 60 | |
| $I_C$ = 1.0 Adc, $V_{CE}$ = 4.0 Vdc | Both | | 40 | - | |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | | | |
| $I_C$ = 15 Adc, $I_B$ = 1.5 Adc | 2N3771 | | | 1.5 | Vdc |
| $I_C$ = 30 Adc, $I_B$ = 6.0 Adc | 2N3771 | | | 4.0 | |
| $I_C$ = 10 Adc, $I_B$ = 1.0 Adc | 2N3772 | | | 1.2 | |
| $I_C$ = 20 Adc, $I_B$ = 4.0 Adc | 2N3772 | | | 4.0 | |
| Base-Emitter Voltage (non-saturated) | | $V_{BE}$ | | | |
| $I_C$ = 15 Adc, $V_{CE}$ = 4.0 Vdc | 2N3771 | | | 2.3 | Vdc |
| $I_C$ = 10 Adc, $V_{CE}$ = 4.0 Vdc | 2N3772 | | | 2.0 | |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| Small-Signal Cutoff Frequency<br>$I_C$ = 1.0 Adc, $V_{CE}$ = 10 Vdc, f = 1.0 kHz | | $h_{fe}$ | 40 | | |
| Magnitude of Common Emitter Small-Signal Short-Circuit Forward-Current Transfer<br>$I_C$ = 1.0 Adc, $V_{CE}$ = 4.0 Vdc, f = 100 kHz | | $\lvert h_{fe} \rvert$ | 6.0 | 30 | |
| Output Capacitance<br>$V_{CB}$ = 10 Vdc, $I_E$ = 0, 100 kHz ≤ f ≤ 1.0 MHz | | $C_{obo}$ | | 1200 | $p^f$ |
| **SWITCHING CHARACTERISTICS** | | | | | |
| Turn-On Time | | | | | |
| $V_{CC}$ = 30 Vdc; $I_C$ = 15 Adc; $I_{B1}$= 1.5 Adc | 2N3771 | $t_{on}$ | | 10 | µs |
| $V_{CC}$ = 30 Vdc; $I_C$ = 10 Adc; $I_{B1}$= 1.0 Adc | 2N3772 | | | 8.0 | |
| Turn-Off Time | | | | | |
| $V_{CC}$ = 30 Vdc; $I_C$ = 15 Adc; $I_{B1}$ =1.5 Adc; $I_{B2}$ = -1.5 Adc | 2N3771 | $t_{off}$ | | 12 | µs |
| $V_{CC}$ = 30 Vdc; $I_C$ = 10 Adc; $I_{B1}$ = 1.0 Adc; $I_{B2}$ = -1.0 Adc | 2N3772 | | | 10 | |

**SAFE OPERATING AREA**

**DC Tests**

$T_C$ = +25$^0$C, 1 Cycle, t = 1.0 s

**Test 1 (2N3771 only)**

$V_{CE}$ = 5.0 Vdc, $I_C$ = 30 Adc

**Test 2 (2N3771 only)**

$V_{CE}$ = 40 Vdc, $I_C$ = 3.75 Adc

**Test 3 (2N3772 only)**

$V_{CE}$ = 7.5 Vdc, $I_C$ = 20 Adc

**Test 4 (2N3772 only)**

$V_{CE}$ = 60 Vdc, $I_C$ = 2.5 Adc

**Clamped Inductive**

$T_A$ = +25$^0$C; duty cycle ≤ 10%; $R_S$ = 0.1 Ω

**Test 1 (2N3771 only)**

$R_{BB1}$ = 2.0 Ω; $V_{BB1}$ ≤ 14 Vdc; $R_{BB2}$ = 100 Ω; $V_{CC}$ = 20±5.0 Vdc; $V_{BB2}$ = 1.5 Vdc; $I_C$ = 30 Adc; $R_L$ ≤ 0.67 Ω; L= 5.0 mH

**Test 2 (2N3772 only)**

$R_{BB1}$ = 2.0 Ω; $V_{BB1}$ ≤ 10 Vdc; $R_{BB2}$ = 100 Ω; $V_{CC}$ = 40±5.0 Vdc; $V_{BB2}$ = 1.5 Vdc; $I_C$ = 20 Adc; $R_L$ ≤ 2.0 Ω; L= 5.0 mH

(3) Pulse Test: Pulse Width = 300µs, Duty Cycle ≤ 2.0%.