

## NPN HIGH POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/518

### Devices

2N3771

2N3772

### Qualified Level

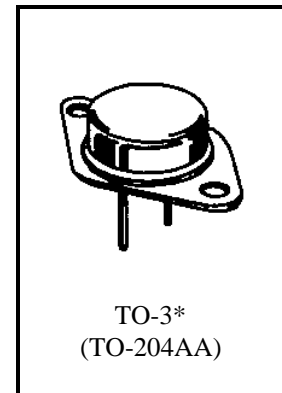
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### MAXIMUM RATINGS

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	$P_T$	@ $T_A = +25^{\circ}C$ <sup>(1)</sup>	6.0	W
		@ $T_C = +25^{\circ}C$ <sup>(2)</sup>	150	W
Operating & Storage Junction Temperature Range	$T_J, T_{stg}$	-65 to +200		$^{\circ}C$

1) Derate linearly 34.2 mW/ $^{\circ}C$  for  $T_A > +25^{\circ}C$

2) Derate linearly 857 mW/ $^{\circ}C$  for  $T_C > +25^{\circ}C$



\*See Appendix A for Package Outline

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}C$ unless otherwise noted)

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

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics		Symbol	Min.	Max.	Unit
<b>ON CHARACTERISTICS</b> <sup>(3)</sup>					
Forward-Current Transfer Ratio		$h_{FE}$			
$I_C = 15 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	2N3771		15	60	
$I_C = 10 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	2N3772		15	60	
$I_C = 1.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	Both		40	-	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$			
$I_C = 15 \text{ Adc}, I_B = 1.5 \text{ Adc}$	2N3771			1.5	Vdc
$I_C = 30 \text{ Adc}, I_B = 6.0 \text{ Adc}$	2N3771			4.0	
$I_C = 10 \text{ Adc}, I_B = 1.0 \text{ Adc}$	2N3772			1.2	
$I_C = 20 \text{ Adc}, I_B = 4.0 \text{ Adc}$	2N3772			4.0	
Base-Emitter Voltage (non-saturated)		$V_{BE}$			
$I_C = 15 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	2N3771			2.3	Vdc
$I_C = 10 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}$	2N3772			2.0	

**DYNAMIC CHARACTERISTICS**

Small-Signal Cutoff Frequency		$h_{fe}$	40		
$I_C = 1.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward-Current Transfer		$ h_{fe} $	6.0	30	
$I_C = 1.0 \text{ Adc}, V_{CE} = 4.0 \text{ Vdc}, f = 100 \text{ kHz}$					
Output Capacitance		$C_{obo}$		1200	$p^f$
$V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$					

**SWITCHING CHARACTERISTICS**

Turn-On Time		$t_{on}$			
$V_{CC} = 30 \text{ Vdc}; I_C = 15 \text{ Adc}; I_{B1} = 1.5 \text{ Adc}$	2N3771			10	$\mu\text{s}$
$V_{CC} = 30 \text{ Vdc}; I_C = 10 \text{ Adc}; I_{B1} = 1.0 \text{ Adc}$	2N3772			8.0	
Turn-Off Time		$t_{off}$			
$V_{CC} = 30 \text{ Vdc}; I_C = 15 \text{ Adc}; I_{B1} = 1.5 \text{ Adc}; I_{B2} = -1.5 \text{ Adc}$	2N3771			12	$\mu\text{s}$
$V_{CC} = 30 \text{ Vdc}; I_C = 10 \text{ Adc}; I_{B1} = 1.0 \text{ Adc}; I_{B2} = -1.0 \text{ Adc}$	2N3772			10	

**SAFE OPERATING AREA****DC Tests**

$T_C = +25^\circ\text{C}$ , 1 Cycle,  $t = 1.0 \text{ s}$

**Test 1 (2N3771 only)**

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

**Test 2 (2N3771 only)**

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

**Test 3 (2N3772 only)**

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

**Test 4 (2N3772 only)**

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

**Clamped Inductive**

$T_A = +25^\circ\text{C}$ ; duty cycle  $\leq 10\%$ ;  $R_S = 0.1 \Omega$

**Test 1 (2N3771 only)**

$R_{BB1} = 2.0 \Omega; V_{BB1} \leq 14 \text{ Vdc}; R_{BB2} = 100 \Omega; V_{CC} = 20 \pm 5.0 \text{ Vdc}; V_{BB2} = 1.5 \text{ Vdc}; I_C = 30 \text{ Adc}; R_L \leq 0.67 \Omega; L = 5.0 \text{ mH}$

**Test 2 (2N3772 only)**

$R_{BB1} = 2.0 \Omega; V_{BB1} \leq 10 \text{ Vdc}; R_{BB2} = 100 \Omega; V_{CC} = 40 \pm 5.0 \text{ Vdc}; V_{BB2} = 1.5 \text{ Vdc}; I_C = 20 \text{ Adc}; R_L \leq 2.0 \Omega; L = 5.0 \text{ mH}$

(3) Pulse Test: Pulse Width =  $300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .