2N3771 & 2N3772

NPN High Power Silicon Transistor

Rev. V1

Features

- Available in JAN, JANTX, JANTXV per MIL-PRF-19500/413
- TO-3 (TO-204AA) Package
- Designed for High Speed Switching and Amplifier Applications

Electrical Characteristics (T_A = +25°C unless otherwise noted)

Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Base Breakdown Voltage	I_C = 200 mA dc, 2N3771 I_C = 200 mA dc, 2N3772	$V_{(BR)CEO}$	V dc	40 60	—
Collector - Emitter Breakdown Voltage	I_C = 200 mA dc; R_{BE} = 100Ω, 2N3771 I_C = 200 mA dc; R_{BE} = 100Ω, 2N3772	$V_{(BR)CER}$	V dc	45 70	—
Collector - Emitter Breakdown Voltage	I_C = 200 mA dc; V_{BE} = -1.5 V dc, 2N3771 I_C = 200 mA dc; V_{BE} = -1.5 V dc, 2N3772	$V_{(BR)CEX}$	V dc	50 90	—
Collector - Emitter Cutoff Current	V_{CE} = 30 V dc, 2N3771 V_{CE} = 50 V dc, 2N3772	I_{CEO}	mA dc	—	5 5
Emitter - Base Cutoff Current	V_{EB} = 7.0 V dc	I_{EBO}	mA dc	—	2.0
Collector - Emitter Cutoff Current	V_{BE} = 1.5 V dc V_{CE} = 50 V dc, 2N3771 V_{CE} = 100 V dc, 2N3772	I_{CEX1}	µA dc	—	20 20
Forward-Current Transfer Ratio	I_C = 1.0 A dc; V_{CE} = 4 V dc	h_{FE1}	-	40	
Forward-Current Transfer Ratio	I_C = 15 A dc; V_{CE} = 4 V dc, 2N3771 I_C = 10 A dc; V_{CE} = 4 V dc, 2N3772	h_{FE2}	-	15 15	60 60
Collector - Emitter Saturation Voltage	I_C = 15 A dc; I_B = 1.5 A dc, 2N3771 I_C = 10 A dc, I_B = 1.0 A dc, 2N3772	$V_{CE(SAT)1}$	V dc	—	1.5 1.2
Collector - Emitter Saturation Voltage	I_C = 30 A dc; I_B = 6 A dc, 2N3771 I_C = 20 A dc, I_B = 4 A dc, 2N3772	$V_{CE(SAT)2}$	V dc	—	4 4
Emitter - Base Saturation Voltage	V_{CE} = 4 V dc I_C = 15 A dc, 2N3771 I_C = 10 A dc, 2N3772	V_{BE}	Vdc	—	2.3 2.0

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Parameter	Test Conditions	Symbol	Units	Min.	Max.
Collector - Emitter Cutoff Current	T_A = +150°C V_{BE} = -1.5 V dc; V_{CE} = 50 V dc, 2N3771 V_{BE} = -1.5 V dc; V_{CE} = 100 V dc, 2N3772	I_{CEX2}	mA dc	—	1.5 1.5
Forward-Current Transfer Ratio	T_A = -55°C V_{CE} = 4 V dc; I_C = 15 A dc, 2N3771 V_{CE} = 4 V dc; I_C = 10 A dc, 2N3772	h_{FE3}		10 10	
Turn On Time	V_{CC} = 30 V dc I_C = 15 A dc; I_{B1} = 1.5 A dc, 2N3771 I_C = 10 A dc; I_{B1} = 1.0 A dc, 2N3772	t_{on}	µs		10 8
Turn Off Time	V_{CC} = 30 V dc I_C = 15 A dc; I_{B1} = 1.5 A dc; I_{B2} = -1.5 A dc 2N3771 I_C = 10 A dc; I_{B1} = 1 A dc; I_{B2} = -1 A dc 2N3772	t_{off}	µs		12 10
Magnitude of Common Emitter Small-Signal Short-Circuited Forward-Current Transfer Ratio	V_{CE} = 4 V dc; I_C = 1.0 A dc; f = 100 kHz	$\|h_{fe}\|$	—	6	30
Small-Signal Short-Circuit Forward-Current Transfer Ratio	V_{CE} = 10 V dc; I_C = 1.0 A dc; f = 1 kHz	h_{fe}	—	40	
Output Capacitance (Open Circuit)	V_{CB} = 10 V dc; I_E = 0; 100 kHz ≤ f≤ 1 MHz	C_{obo}	pF		1,200

Absolute Maximum Ratings (T_A = +25°C unless otherwise noted)

Ratings	Symbol	Value
Collector - Emitter Voltage 2N3771 2N3772	V_{CEO}	 40 V dc 60 V dc
Collector - Base Voltage 2N3771 2N3772	V_{CBO}	 50 V dc 100 V dc
Emitter - Base Voltage	V_{EBO}	7 V dc
Base Current 2N3771 2N3772	I_B	 7.5 V dc 5.0 V dc
Collector Current 2N3771 2N3772	I_C	 30 A dc 20 A dc
Total Power Dissipation @ T_A = 25°C[1] @ T_A = 25°C[2]	P_T	 6 W 150 W
Operating & Storage Temperature Range	T_J, T_{STG}	-65°C to +200°C

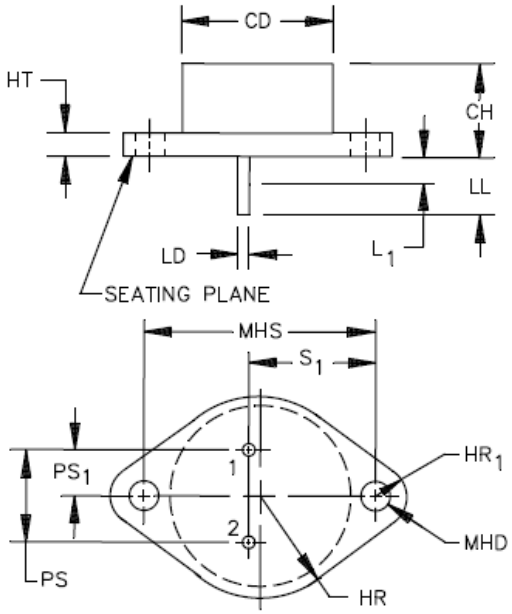
Thermal Characteristics

Characteristics	Symbol	Max. Value
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.17°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	29.2°C/W

(1) Derate linearly 34.2 mW/°C above T_A > +25°C
(2) Derate linearly 857 mW/°C above T_C > +25°C

Outline Drawing (TO-3)

Ltr	Dimension				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.22	
CH	.270	.380	6.86	9.65	
HR	.495	.525	12.57	13.33	3
HR_1	.131	.188	3.33	4.78	3
HT	.060	.135	1.52	3.43	
LD	.038	.053	0.97	1.35	3, 4
LL	.312	.500	7.92	12.70	4
L_1		.050		1.27	4
MHD	.151	.165	3.84	4.19	3
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	5
PS_1	.205	.225	5.21	5.72	5
S_1	.655	.675	16.64	17.15	



NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Terminal 1 is base; terminal 2 is emitter; case is collector. The collector shall be electrically connected to the case.
3. Two places.
4. LD within L_1. LD applies between L_1 and LL. Lead diameter shall not exceed twice LD within L_1.
5. These dimensions should be measured at points .050 - .055 inch (1.27 mm - 1.40 mm) below seating plane. When gauge is not used, measurement will be made at seating plane.
6. The seating place of the header shall be flat within .004 inch (0.102 mm) inside a .930 inch (23.62 mm) diameter circle on the center of the header and flat within .004 inch (0.102 mm) concave to .006 inch (0.15 mm) convex overall.

* 7. In accordance with ASME Y14.5, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions and configurations of TO-204AA (formerly TO-3) package.

Maximum Safe Operating Area

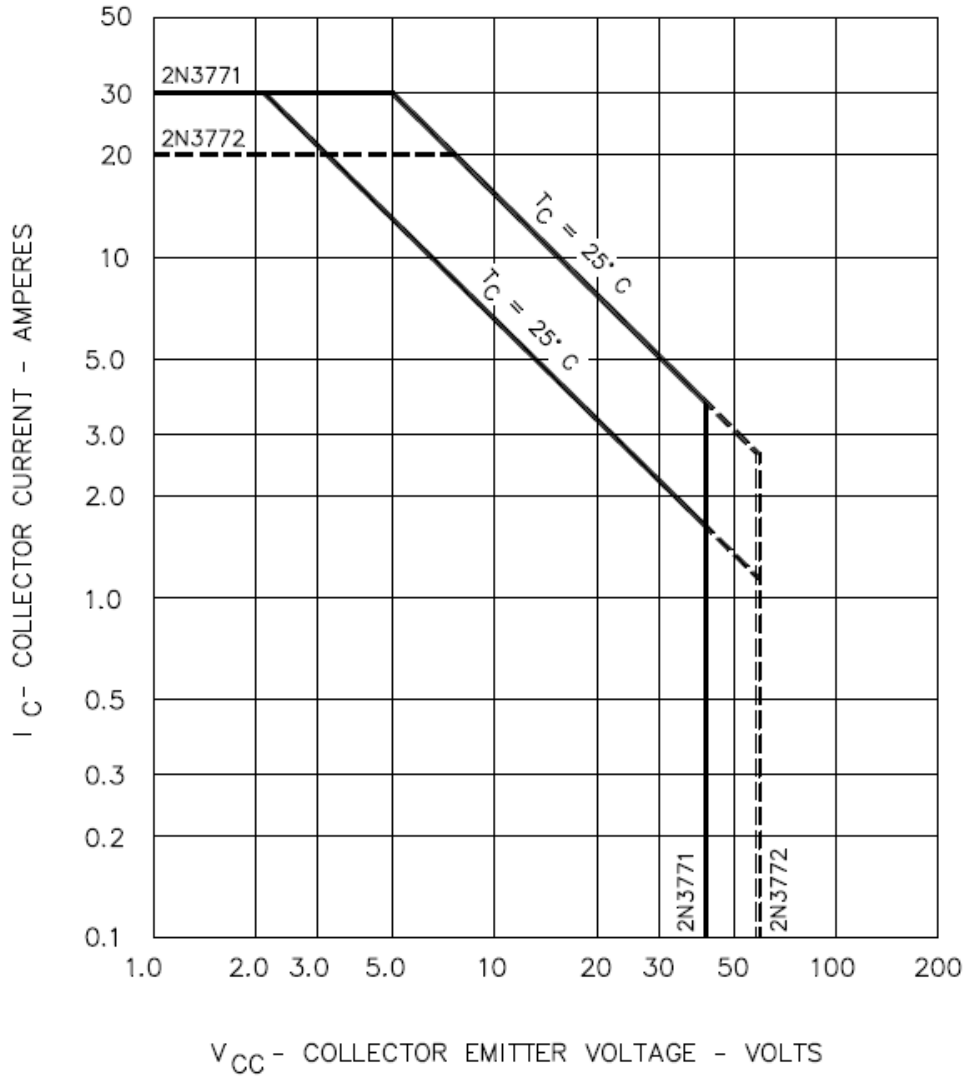


FIGURE 3. Maximum safe operating area graph (continuous dc).

Safe Operating Area

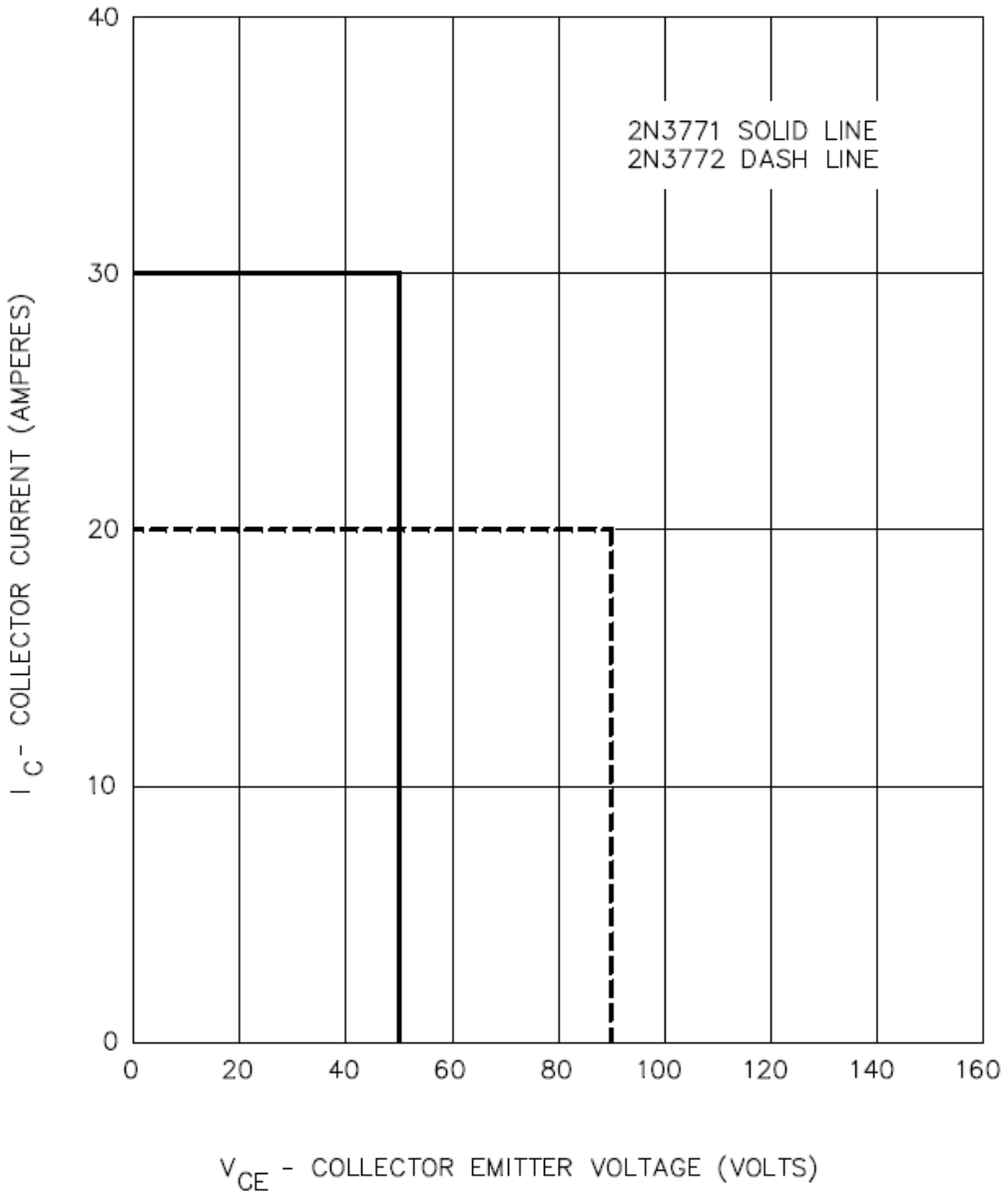


FIGURE 4. Safe operating area for switching between saturation and cutoff (clamped inductive load).

Safe Operating Area

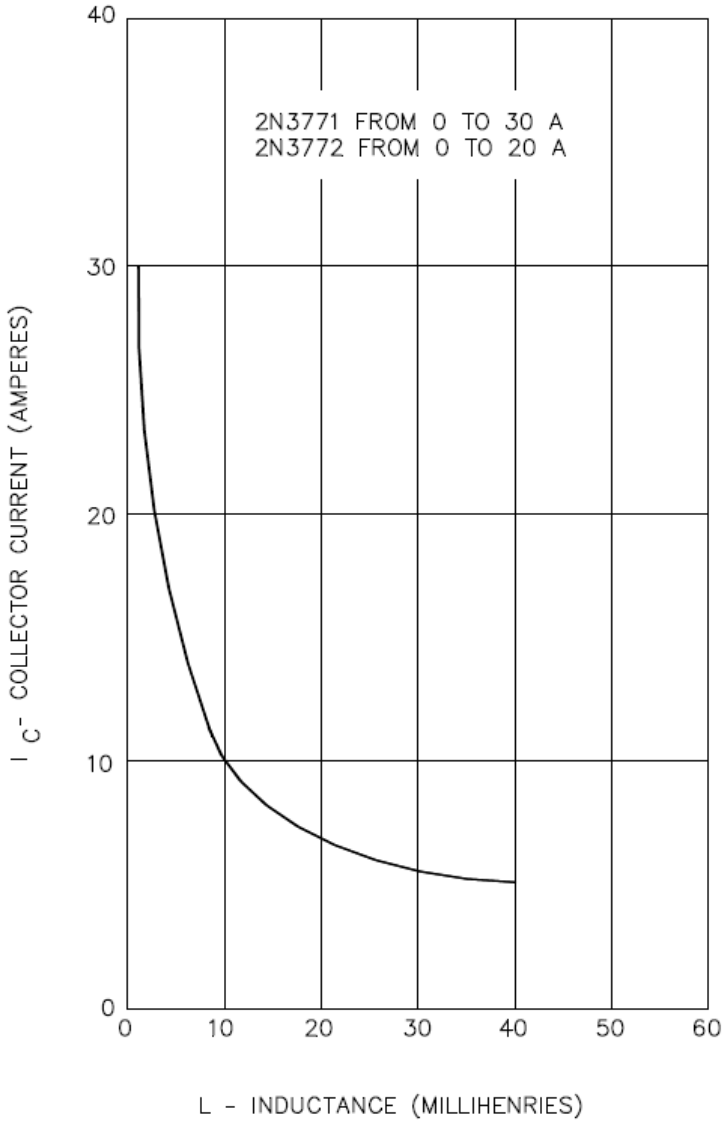


FIGURE 5. Safe operating area switching between saturation and cutoff (unclamped inductive load).