

This documentation process conversion measures necessary to comply with this revision shall be completed by 30 September 1999

INCH-POUND

MIL-PRF-19500/413C  
30 July 1999  
SUPERSEDING  
MIL-S-19500/413B  
24 March 1993

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, HIGH-POWER  
TYPES 2N3771 AND 2N3772, JAN, JANTX, AND JANTXV

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the performance requirements for NPN silicon, high-power transistors for use in high-speed power-switching applications. Three levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (T0-3).

1.3 Maximum ratings.  $R_{\theta JC} = 1.17^\circ\text{C/W}$ ,  $R_{\theta JA} = 29.2^\circ\text{C/W}$ .

	P <sub>T</sub>		V <sub>CBO</sub>	V <sub>CEO</sub>	V <sub>EBO</sub>	I <sub>B</sub>	I <sub>C</sub>	T <sub>STG</sub> and T <sub>J</sub>
	T <sub>A</sub> = +25°C	T <sub>C</sub> = +25°C						
	1/	2/						
	<u>W</u>	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>°C</u>
2N3771	6	150	50	40	7	7.5	30	-65 to +200
2N3772	6	150	100	60	7	5.0	20	-65 to +200

1/ Derate linearly 34.2 mW/°C for T<sub>A</sub> > +25°C.

2/ Derate linearly 857 mW/°C for T<sub>C</sub> > +25°C.

1.4 Primary electrical characteristics.

	HFE2 at V <sub>CE</sub> = 4 V dc				V <sub>CE(SAT)</sub> 1/		V <sub>CE(SAT)</sub> 1/	
	I <sub>C</sub> = 15 A dc		I <sub>C</sub> = 10 A dc		I <sub>C</sub> = 15 A dc I <sub>B</sub> = 1.5 A dc		I <sub>C</sub> = 10 A dc I <sub>B</sub> = 1.5 A dc	
	Min	Max	Min	Max	Min	Max	Min	Max
2N3771	5	60			1.5 V dc			
2N3772			15	60			1.2 V dc	

1/ Pulsed (see 4.5.1).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAC, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

Limits	hfe	Cobo	Switching (see figure 2)			
	VCE = 4 V dc IC = 1 A dc f = 100 kHz	VCB = 10 V dc IE = 0 100 kHz ≤ f ≤ 1 MHz	ton, toff 2N3771		ton, toff 2N3772	
Min	6		μs	μs	μs	μs
Max	30	1,200 pF	10	12	8	10

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-PRF-19500 - Performance Specification Semiconductor Devices, General Specification for.

STANDARD

MILITARY

MIL-STD-750 - Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Defense Automated Printing Service, 700 Robbins Avenue, Building 4D (DPM-DODSSP), Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

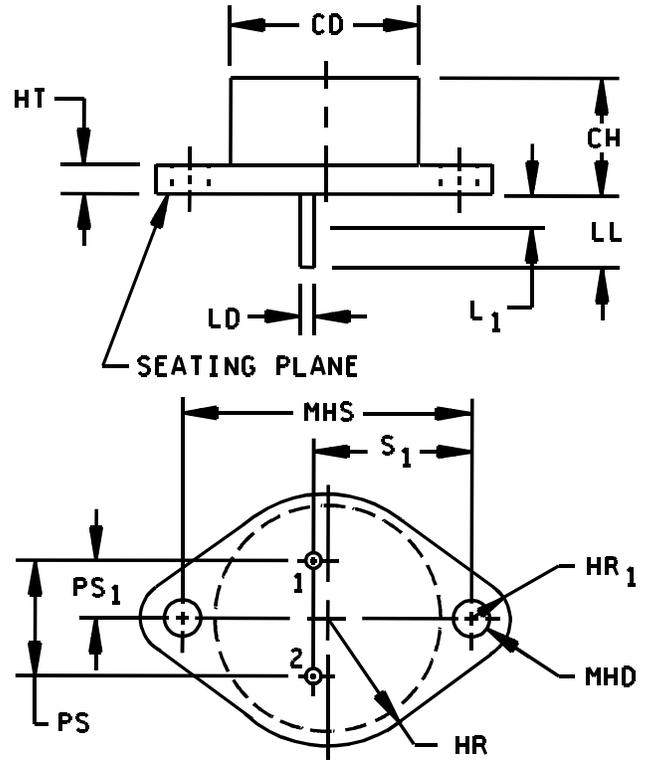
3.1 Qualification. Devices furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.4).

3.2 Associated specification. The individual item requirements shall be in accordance with MIL-PRF-19500 and as specified herein.

3.3 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500, and as follows:

3.4 Interface requirements and physical dimensions. The Interface requirements and physical dimensions shall be as specified in MIL-PRF-19500, and figure 1 herein.

Symbol	Dimension				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CH	.270	.380	6.86	9.65	
LD	.038	.053	0.97	1.35	7
CD	---	.875	---	22.22	
PS	.420	.440	10.67	11.18	4
PS <sub>1</sub>	.205	.225	5.21	5.72	4
HT	.060	.135	1.52	3.43	
LL	.312	.500	7.92	12.70	
L <sub>1</sub>	---	.050	---	1.27	
MHD	.151	.165	3.84	4.19	
MHS	1.177	1.197	29.90	30.40	
HR	.495	.525	12.57	13.33	
HR <sub>1</sub>	.131	.188	3.33	4.78	
S <sub>1</sub>	.655	.675	16.64	17.15	



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Terminal 1 is base; terminal 2 is emitter; case is collector.
4. 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.
5. The seating place of the header shall be flat within .004 inch (0.03 mm) inside a .930 inch (23.62 mm) diameter circle on the center of the header and flat within .004 inch (0.03 mm) concave to .006 inch (0.15 mm) convex overall.
6. Collector shall be electrically connected to the case.
7. Dimension  $\phi b$  applies to the length of the leads beyond L<sub>1</sub>. Diameter is uncontrolled in L<sub>1</sub>.

FIGURE 1. Physical dimensions of T-4 family. (Similar to TO-3)

3.4.1 Lead finish. Where a choice of lead finish is desired, it shall be specified in the contract or purchase order (see 6.2).

3.5 Marking. Marking shall be in accordance with MIL-PRF-19500. At the option of the manufacturer, the country of origin marking may be omitted from the body of the transistor.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4 and table I.

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in Table I.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Qualification inspection (see 4.2).
- b. Screening (see 4.3)
- c. Conformance inspection (see 4.4).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.3 Screening (JANTXV and JANTX levels). Screening shall be in accordance with MIL-PRF19500 (table IV) and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screen (see table IV of MIL-PRF-19500)	Measurement
	JANTX and JANTXV levels
9	I <sub>CEX1</sub>
11	I <sub>CEX1</sub> and h <sub>FE2</sub> ; ΔI <sub>CEX1</sub> = 100 percent of initial value of 200 μA dc, whichever is greater.
12	Burn-in (see 4.3.1)
13	ΔI <sub>CEX1</sub> = 100 percent of initial value or 500 μA dc, whichever is greater; Δh <sub>FE2</sub> = ±25 percent of initial reading. Subgroup 2 of table I herein.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

$$T_A \leq +35^\circ\text{C}; V_{CB} = 25 \text{ V dc } \pm 5 \text{ V dc}; T_J = +187.5^\circ\text{C } \pm 12.5^\circ\text{C}$$

Note: No heat sink or forced air cooling on the devices shall be permitted.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500 and table I herein. End-point electrical measurements shall be in accordance with table I, subgroup 2 herein.

MIL-PRF-19500/413C

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VIb (JANTX, and JANTXV) of MIL-PRF-19500 and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with table I subgroup 2 herein. Delta requirement shall be in accordance with 4.5.3 herein.

4.4.2.1 Group B inspection, table VIb of MIL-PRF-19500.

4.4.2.2 Group B inspection, (JAN, JANTX, and JANTXV). 1/ Electrical endpoints shall be in accordance with Group A, subgroup 2, herein.

Subgroup	Method	Condition
2	1051	Temperature cycling; test condition A.
3	1037 1027 2037	For solder die attach: Intermittent operation life; 2,000 cycles; $V_{CB} \geq 10$ V dc; $T_A \leq 35^\circ\text{C}$ For eutectic die attach: $T_A \leq 35^\circ\text{C}$ , $V_{CB} \geq 10$ V dc; Adjust $P_T$ to achieve $T_J = 175^\circ\text{C}$ minimum. Bond strength; Test condition A or C as applicable. All internal leads for each device shall be pulled separately.
5	3131	See 4.5.2
6	1031	High-temperature life (non-operating), $T_A = +200^\circ\text{C}$ . $n = 22$ , $c = 0$ .

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500 and as follows. Electrical measurements (end-points) and delta requirements shall be in accordance with Table I group A, subgroup 2. Delta requirements shall be in accordance with 4.5.3 herein..

4.4.3.1 Group C inspection, table VII of MIL-PRF-19500.

Subgroup	Method	Condition
2	1056	Thermal shock; test condition A.
2	2036	Test condition A, weight = 10 lbs., $t = 15$ s.
5		Not applicable
6	1037 1027	For solder die attach: Intermittent operation life, 6,000 cycles; $V_{CB} \geq 10$ V dc; $T_A \leq 35^\circ\text{C}$ For eutectic die attach: $T_A \leq 35^\circ\text{C}$ , $V_{CB} \geq 10$ V dc; Adjust $P_T$ to achieve $T_J = 175^\circ\text{C}$ minimum.

4.5 Method of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows.

4.5.1 Pulse measurements. Conditions for pulse measurement shall be as specified in section 4 of MIL-STD-750.

4.5.2 Thermal resistance. Thermal resistance measurements shall be conducted in accordance with method 3131 of MIL-STD-750. The following details shall apply:

- a.  $I_M$  measurement..... 10 mA.
- b.  $V_{CE}$  measurement voltage..... 20 V.
- c.  $I_H$  collector heating current ..... 2.6 A (minimum)
- d.  $V_H$  collector emitter heating voltage..... 20 V (minimum).
- e.  $t_H$  heating time ..... Steady-state (see MIL-STD-750, method 3131).
- f.  $t_{MD}$  measurement delay time..... 20  $\mu\text{s}$ .
- g.  $t_{SW}$  sample window time ..... 10  $\mu\text{s}$  maximum

MIL-PRF-19500/413C

4.5.3 Delta requirements. Delta requirements shall be as specified below:

Step	Inspection	MIL-STD-750		Symbol	Limit		Unit
		Method	Conditions		Min	Max	
1	Forward-current transfer ratio  2N3771 2N3772	3076	V <sub>CE</sub> = 4 V dc, pulsed (see 4.5.1)  I <sub>C</sub> = 15 A dc I <sub>C</sub> = 10 A dc	ΔhFE <sub>2</sub> <u>1/</u>			±25% change from previously measured value

1/ Devices which exceed the group A limits for this test shall not be acceptable.

2/ The electrical measurements for table IVb, (JAN, JANTX and JANTXV) of MIL-PRF-19500 are as follows:

- a. Subgroup 3, see table II herein, step 1.
- b. Subgroup 6, see table II herein, steps 1.

3/ The electrical measurements for table V of MIL-PRF-19500 are as follows:

- a. Subgroup 2, see table II herein, step 1.
- b. Subgroup 6, see table II herein, step 1.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Breakdown voltage, collector to base	3011	Bias condition D, pulsed (see 4.5.1), $I_C = 200$ mA dc	$V_{(BR)CEO}$	40 60		V dc V dc
Breakdown voltage collector to emitter	3011	Bias condition B, $I_C = 200$ mA dc, $R_{BE} = 100\Omega$ , pulsed (see 4.5.1)	$V_{(BR)CER}$	45 70		V dc V dc
Breakdown voltage, collector to emitter	3011	Bias condition A, $I_C = 200$ mA dc, $V_{BE} = -1.5$ V dc, pulsed (see 4.5.1)	$V_{(BR)CEX}$	50 90		V dc V dc
Collector-emitter cutoff current	3041	Bias condition D	$I_{CEO}$		5 5	mA dc mA dc
Emitter to base cutoff current	3061	Bias condition D, $V_{BE} = 7.0$ V dc	$I_{EBO}$		2.0	mA dc
Collector-emitter cutoff current	3041	Bias condition A, $V_{BE} = 1.5$ V dc	$I_{CEX1}$		500 500	$\mu$ A dc
Base emitter voltage (nonsaturated)	3066	Test condition B, pulsed (see 4.5.1), $V_{CE} = 4$ V dc	$V_{BE}$		2.3 2.0	V dc V dc
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1)	$V_{CE(sat)1}$		1.5 1.2	V dc V dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued						
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1)	$V_{CE(sat)2}$			
2N3771		$I_C = 30 \text{ A dc}, I_B = 6 \text{ A dc}$			4	V dc
2N3772		$I_C = 20 \text{ A dc}, I_B = 4 \text{ A dc}$			4	V dc
Forward-current transfer ratio	3076	Pulsed (see 4.5.1) $V_{CE} = 4 \text{ V dc}$ $I_C = 1.0 \text{ A dc}$	$h_{FE1}$	40		
Forward current transfer ratio	3076	Pulsed (see 4.5.1) $V_{CE} = 4 \text{ V dc}$	$h_{FE2}$			
2N3771		$I_C = 15 \text{ A dc}$		15	60	
2N3772		$I_C = 10 \text{ A dc}$		15	60	
<u>Subgroup 3</u>						
High temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5 \text{ V dc}$	$I_{CEX2}$			
2N3771		$V_{CE} = 50 \text{ V dc}$			1.5	mA dc
2N3772		$V_{CE} = 100 \text{ V dc}$			1.5	mA dc
Low temperature operation:		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	Pulsed (see 4.5.1), $V_{CE} = 4 \text{ V dc}$	$h_{FE3}$			
2N3771		$I_C = 15 \text{ A dc}$		10		
2N3772		$I_C = 10 \text{ A dc}$		10		
<u>Subgroup 4</u>						
Pulse response transfer ratio	3251	Test condition A except test circuit and pulse requirements in accordance with figure 2 herein				
Turn on time		$V_{CC} = 30 \text{ V dc}$	$t_{on}$			
2N3771		$I_C = 15 \text{ A dc}, I_{B1} = 1.5 \text{ A dc}$			10	$\mu\text{s}$
2N3772		$I_C = 10 \text{ A dc}, I_{B1} = 1 \text{ A dc}$			8	$\mu\text{s}$
Turn off time		$V_{CC} = 30 \text{ V dc}$	$t_{off}$			
2N3771		$I_C = 15 \text{ A dc}, I_{B1} = 1.5 \text{ A dc}$ $I_{B2} = -1.5 \text{ A dc}$			12	$\mu\text{s}$
2N3772		$I_C = 10 \text{ A dc}, I_{B1} = 1 \text{ A dc}$ $I_{B2} = -1 \text{ A dc}$			10	$\mu\text{s}$

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u> - Continued						
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	V <sub>CE</sub> = 4 V dc I <sub>C</sub> = 1.0 A dc f = 100 kHz	h <sub>fe</sub>	6	30	
Small-signal short-circuit forward-current transfer ratio	3206	V <sub>CE</sub> = 10 V dc I <sub>C</sub> = 1.0 A dc f = 1 kHz	h <sub>fe</sub>	40		
Output capacitance (open circuit)	3236	V <sub>CB</sub> = 10 V dc, I <sub>E</sub> = 0, 100 kHz ≤ f ≤ 1 MHz	C <sub>obo</sub>		1,200	pF
<u>Subgroup 5</u>						
Safe operating area (dc operation)	3051	T <sub>C</sub> = +25°C, t = 1 s, 1 cycle, see figure 3				
Test 1 (2N3771 only)		I <sub>C</sub> = 30 A dc V <sub>CE</sub> = 5 V dc				
Test 2 (2N3771 only)		I <sub>C</sub> = 3.75 A dc V <sub>CE</sub> = 40 V dc				
Test 3 (2N3772 only)		I <sub>C</sub> = 20 A dc V <sub>CE</sub> = 7.5 V dc				
Test 4 (2N3772 only)		I <sub>C</sub> = 2.5 A dc V <sub>CE</sub> = 60 V dc				
Safe operating area (clamped inductive)	3053	Load condition B, T <sub>C</sub> = +25°C, duty cycle ≤ 10 percent, (vary pulse width to achieve I <sub>C</sub> ), R <sub>S</sub> = 0.1Ω, (see figure 5) R <sub>BB1</sub> = 2Ω V <sub>BB1</sub> ≤ 14 V dc, R <sub>BB2</sub> = 100Ω V <sub>BB2</sub> ≤ 1.5 V dc, I <sub>C</sub> = 30 A dc, V <sub>CC</sub> = 20 ±5 V dc, R <sub>L</sub> ≤ .67Ω, L = 5 mH, 0.01 (Signal transformer Co. CH-30 or equivalent), CR = 1N1186A, clamp voltage = 50 +0, -5 V dc, (device fails if clamp voltage not reached)				
Test 1 (2N3771 only)						

See footnotes at end of page.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u> - Continued						
Test 2 (2N3772 only)		RBB1 = 2 $\Omega$ , VBB1 $\leq$ 10 V dc, RBB2 = 100 $\Omega$ , VBB2 = 1.5 V dc, I <sub>C</sub> = 20 A dc, V <sub>CC</sub> = 40 $\pm$ 5 V dc, R <sub>L</sub> $\leq$ 2 $\Omega$ , L = 5 mH, 0.01 $\Omega$ (Signal transformer Co. CH-30 or equivalent), CR = 1N1186A, clamp voltage = 90 +0, -5 V dc, (device fails if clamp voltage not reached)				
End point electrical measurements		See table I, subgroup 2				
<u>Subgroup 6</u>						
Safe operating area (unclamped inductive)	3053	Load condition C (unclamped inductive load) see figure 4 herein; T <sub>C</sub> = 25°C; duty cycle $\leq$ 10%; R <sub>S</sub> = 0.1 $\Omega$ ; RBB2 = 100 $\Omega$ ; VBB2 = 1.5 V dc; V <sub>CC</sub> $\leq$ 15 V dc.				
Test 1 (2N3771 only)		RBB1 = 1 $\Omega$ ; VBB1 $\leq$ 12 V dc; I <sub>C</sub> = 30 A dc; L = 1 mH, 0.005 $\Omega$ (Signal transformer Co. CH-100 or equivalent); t <sub>p</sub> $\approx$ 5 ms.				
Test 2 (2N3772 only)		RBB1 = 2 $\Omega$ ; VBB1 $\leq$ 12 V dc; I <sub>C</sub> = 20 A dc; L = 2 mH, 0.01 $\Omega$ (Signal transformer Co. CH-50 or equivalent); t <sub>p</sub> $\approx$ 5 ms.				
Test 3 (both types)		RBB1 $\leq$ 30 $\Omega$ ; VBB1 $\leq$ 10 V dc; I <sub>C</sub> = 5 A dc; L = 40 mH, 0.3 $\Omega$ (Signal transformer Co. CH-8 or equivalent); t <sub>p</sub> $\approx$ 20 ms.				
Safe operating area (clamped inductive) (destructive)	3053	Load condition B; T <sub>C</sub> = 25°C; duty cycle $\leq$ 10%; R <sub>S</sub> = 0.1 $\Omega$ ; (see figure 5).				

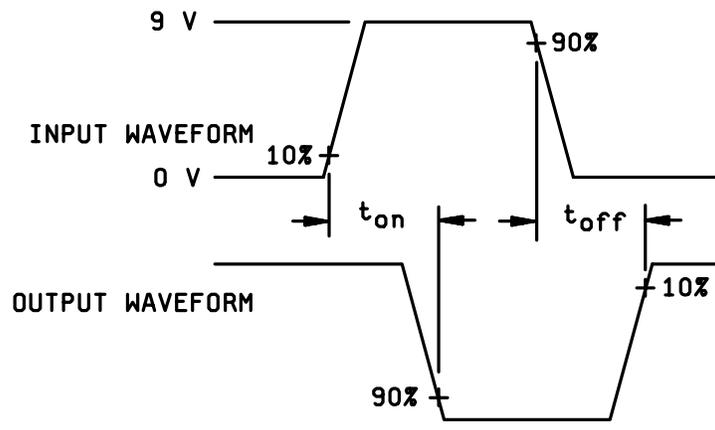
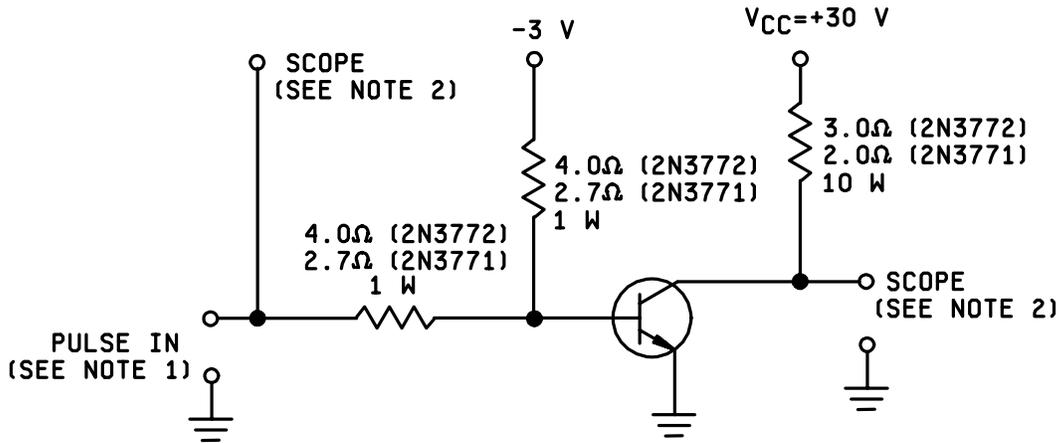
See footnotes at end of table.

MIL-PRF-19500/413C

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 6</u> - Continued						
Test 1 (2N3771 only)		RBB1 = 2Ω; VBB1 ≤ 14 V dc; RBB2 = 100Ω; VBB2 = 1.5 V dc; I <sub>C</sub> = 30 A dc; V <sub>CC</sub> = 50 +0, -5 V dc; R <sub>L</sub> = 1.67Ω; L = 5 mH, 0.01Ω (Signal transformer Co. CH-30 or equivalent); CR = 1N1186A; Clamp voltage = 50 +0, -5 V dc.				
Test 2 (2n3772 only)		RBB1 = 2Ω; VBB1 ≤ 10 V dc; RBB2 = 100Ω; VBB2 = 1.5 V dc I <sub>C</sub> = 20 A dc; V <sub>CC</sub> = 90 +0, -5 V dc; R <sub>L</sub> = 4.5Ω; L = 5 mH, 0.01Ω (Signal transformer Co. CH-30 or equivalent); CR = 1N1186A; Clamp voltage = 90 +0, -5 V dc.				
Electrical measurements		See table I, subgroup 2				

1/ For sampling plan, see MIL-PRF-19500.



NOTES:

1. The rise time ( $t_r$ ) and fall time ( $t_f$ ) of the applied pulse shall be each  $\leq 20$  nanoseconds; duty cycle  $\leq 2\%$ ; generator source impedance shall be  $50\Omega$ ; pulse width =  $20 \mu s$ .
2. Output sampling oscilloscope:  $Z_{in} \geq 100 k\Omega$ ;  $C_{in} \leq 50 pF$ ; rise time  $\leq 2.0$  nanoseconds.

FIGURE 2. Pulse response test circuit.

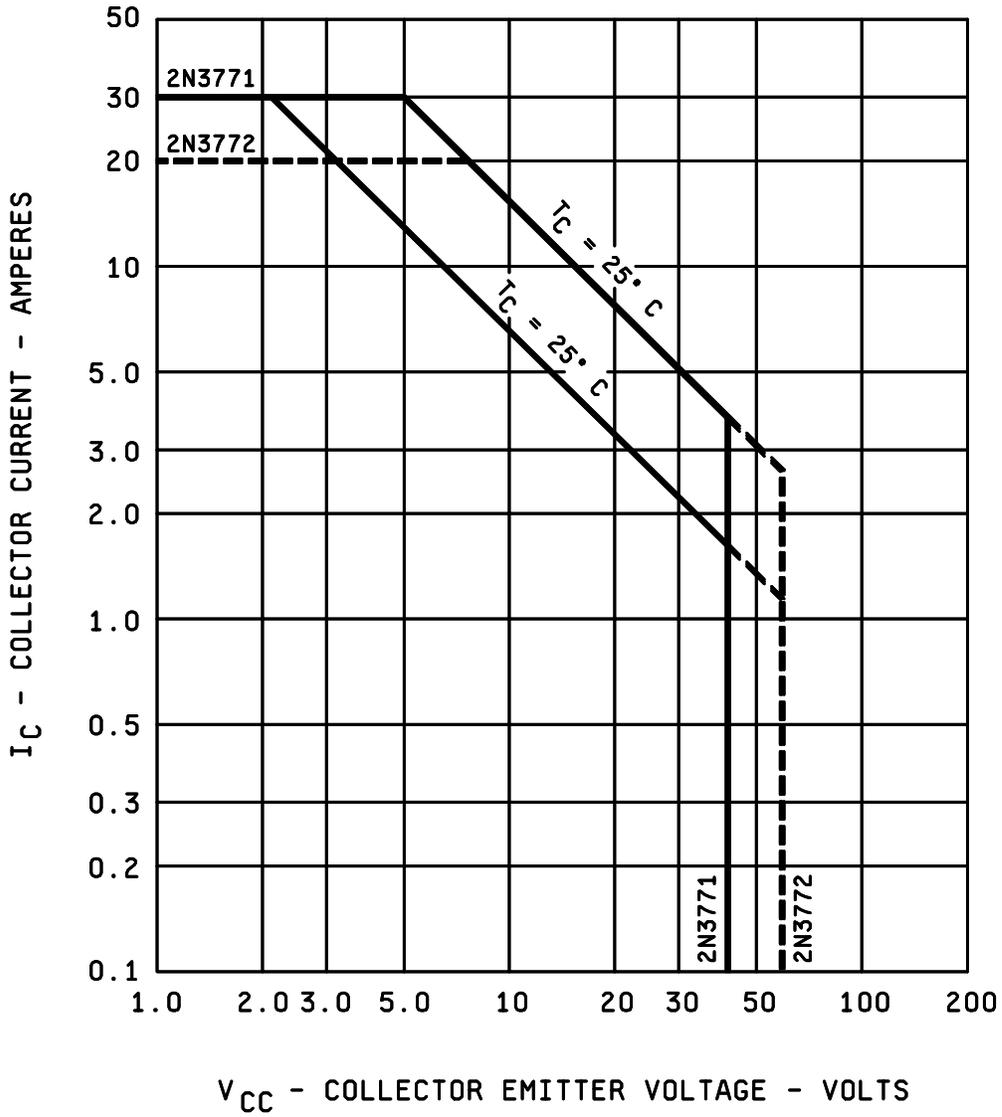


FIGURE 3. Maximum safe operating area graph (continuous dc).

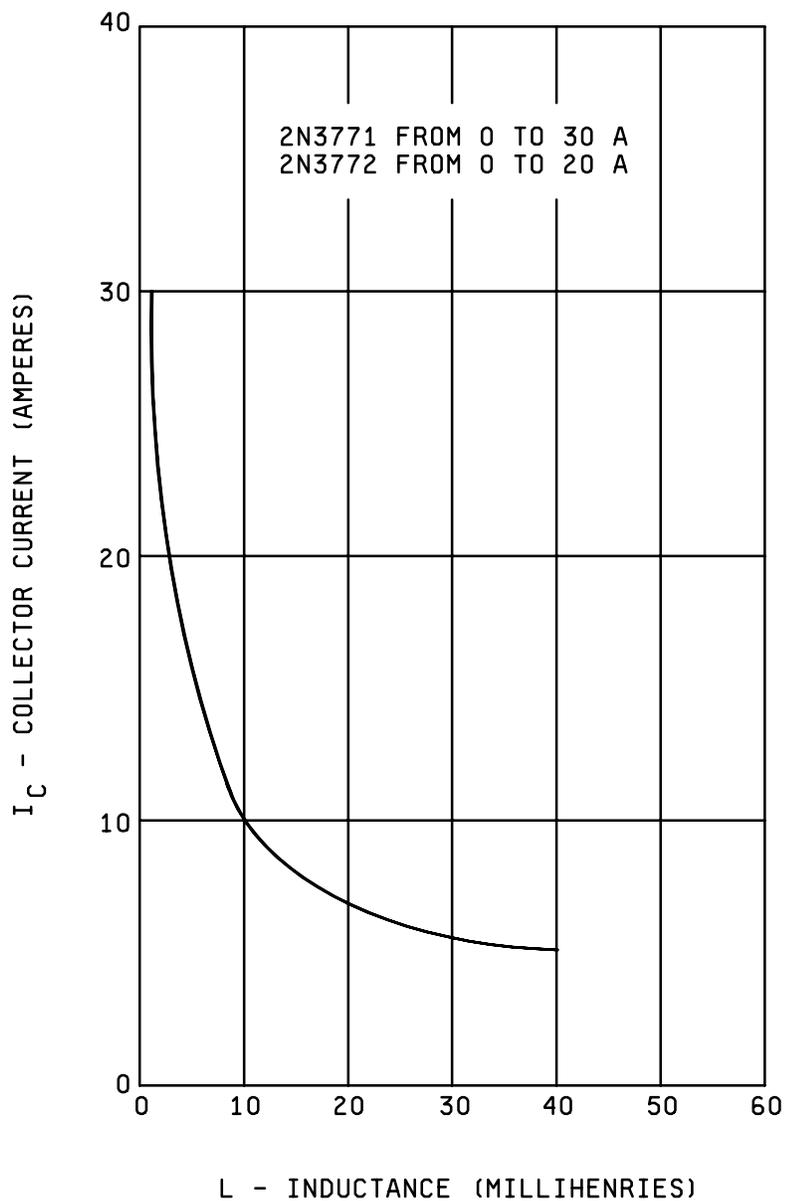


FIGURE 4. Save operating area switching between saturation and cutoff (unclamped inductive load).

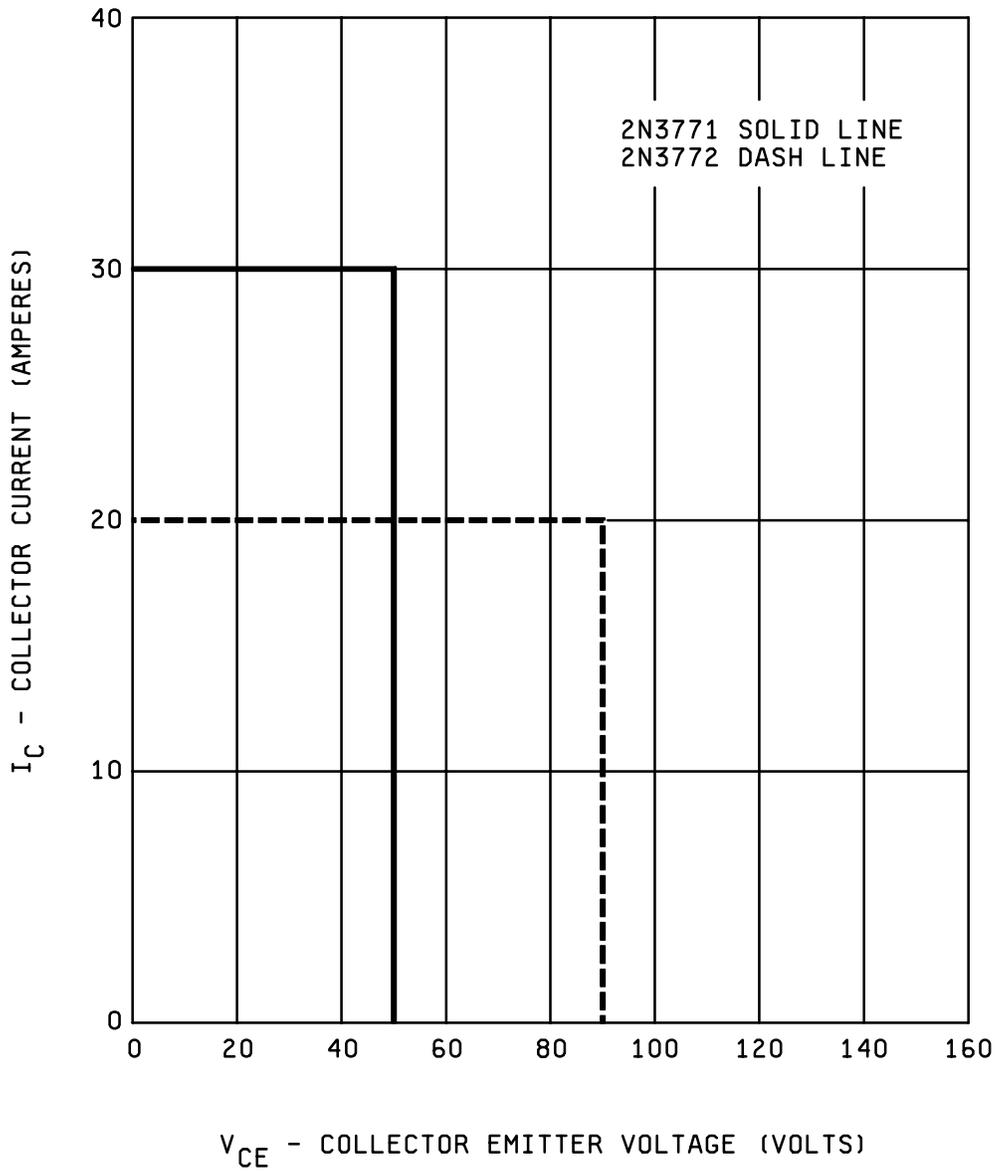


FIGURE 5. Safe operating area for switching between saturation and cutoff (clamped inductive load).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Notes. The notes specified in MIL-PRF-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.2.1).
- b. Lead finish as specified (see 3.4.1).
- c. Type designation and product assurance level.
- d. Packing requirements (see 5.1)

6.3 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List QML -19500 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, ATTN: DSCC-VQE, 3990 East Broad Street, Columbus, OH 43216-5000.

CONCLUDING MATERIAL

Custodians:

Army - CR  
Navy - EC  
Air Force - 11  
NASA - NA  
DLA - CC

Preparing activity:

DLA - CC  
  
(Project 5961-2156)

Review activity:

Air Force - 19, 99

<b>STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL</b>		
<b><u>INSTRUCTIONS</u></b>		
<p>1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.</p> <p>2. The submitter of this form must complete blocks 4, 5, 6, and 7.</p> <p>3. The preparing activity must provide a reply within 30 days from receipt of the form.</p> <p>NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.</p>		
<b>I RECOMMEND A CHANGE:</b>	<b>1. DOCUMENT NUMBER</b> MIL-PRF-19500/413C	<b>2. DOCUMENT DATE</b>
<b>3. DOCUMENT TITLE</b> Semiconductor Device, Transistor, NPN, Silicon, High-Power Types 2N3771, and 2N3772, JANTX and JANTXV		
<b>4. NATURE OF CHANGE</b> (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		
<b>5. REASON FOR RECOMMENDATION</b>		
<b>6. SUBMITTER</b>		
a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) Commercial (614) 692-0510 DSN 850-0510 FAX (614) 692-6939 EMAIL alan_barone@dsc.dla.mil	<b>7. DATE SUBMITTED</b>
<b>8. PREPARING ACTIVITY</b>		
a. Point of Contact Al Barone	d. TELEPHONE (Include Area Code) Commercial DSN 850-0510 FAX (614) 692-6939 EMAIL alan_barone@dsc.dla.mil	
c. ADDRESS Defense Supply Center Columbus ATTN: DSCC-VAC Columbus, OH 43216-5000	<b>IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:</b> Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533, Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888	