

The documentation and process conversion measures necessary to comply with this revision shall be completed by 31 January 2004.

INCH-POUND

MIL-PRF-19500/415A
 31 October 2003
 SUPERSEDING
 MIL-S-19500/415(USAF)
 10 July 1969

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, HIGH-POWER
 TYPES 2N2812 AND 2N2814 JAN, JANTX, AND JANTXV

Inactive for new design after 7 June 1999.

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. Three levels of product assurance are provided for each encapsulated device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (TO-61).

1.3 Maximum ratings. Unless otherwise specified, $T_A = +25^\circ\text{C}$.

Types	$P_T (1)$ $T_A = +25^\circ\text{C}$	$P_T (2)$ $T_C = +100^\circ\text{C}$	V_{CBO}	V_{EBO}	V_{CEO}	I_C	I_B	$R_{\theta JC}$	T_{STG} and T_{OP}
	<u>W</u>	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>A dc</u>	<u>°C/W</u>	<u>°C</u>
2N2812	4.0	50	80	8.0	60	10	2.0	2.0	-65 to +200
2N2814	4.0	50	120	8.0	80	10	2.0	2.0	

- (1) Derate linearly 22.8 mW/°C for $T_A > +25^\circ\text{C}$.
- (2) Derate linearly 0.5 mW/°C for $T_C > +100^\circ\text{C}$.

1.4 Primary electrical characteristics.

Limit	$V_{BE(sat)}$ $I_C = 5.0 \text{ A dc}$ $I_B = 0.5 \text{ A dc}$	$V_{CE(sat)}$ $I_C = 5.0 \text{ A dc}$ $I_B = 0.5 \text{ A dc}$	C_{OBO} $V_{CB} = 10 \text{ V dc}$ $I_E = 0$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	h_{FE2} $V_{CE} = 5.0 \text{ V dc}$ $I_C = 5.0 \text{ A dc}$	$ h_{fe} $ $V_{CE} = 10 \text{ V dc}$ $I_C = 1.0 \text{ A dc}$ $f = 10 \text{ MHz}$
	<u>V dc</u>	<u>V dc</u>	<u>pF</u>		
Min.				40	1.5
Max.	1.2	0.5	350	120	7

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

AMSC N/A
 DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

FSC 5961

1.4 Primary electrical characteristics - continued.

Limit	h_{FE} at $V_{CE} = 5$ V dc (1)			Switching time		
	h_{FE1} $I_C = 1.0$ A dc	h_{FE3} $I_C = 10$ A dc	h_{FE4} $I_C = 10$ mA dc	t_{ON}	t_s	t_f
Min.	50	15	10	<u>ns</u>	<u>ns</u>	<u>ns</u>
Max.	150			400	1000	400

(1) Pulsed (see 4.5.1).

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 - Semiconductor Devices, General Specification for.

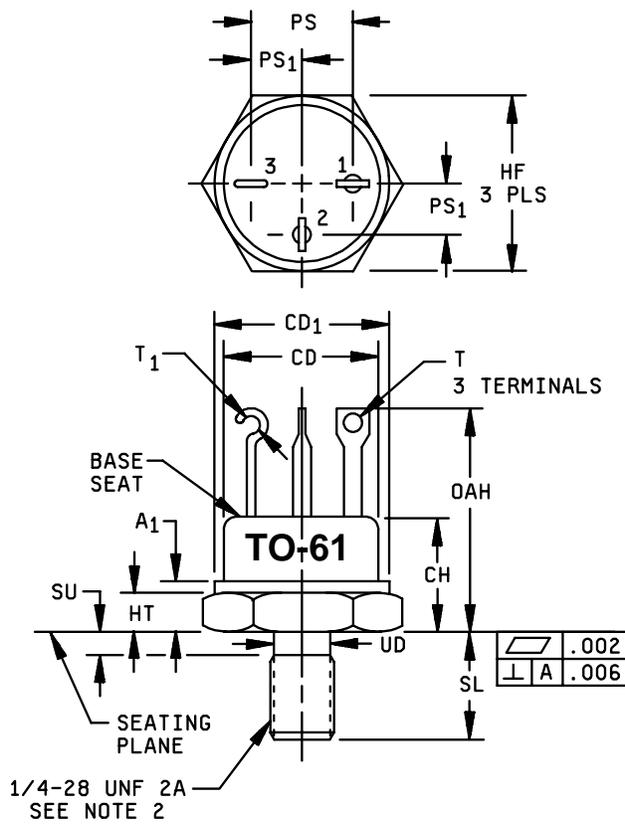
STANDARD

DEPARTMENT OF DEFENSE

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, 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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.



Ltr	Dimension				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
A ₁		.270		6.86	
CD	.570	.610	14.48	15.49	
CD ₁	.610	.687	15.49	17.45	
CH	.325	.460	8.26	11.68	
HF	.667	.687	16.94	17.45	8
HT	.090	.150	2.29	3.81	
OAH	.640	.875	16.26	22.22	6
PS	.340	.415	8.64	10.54	
PS ₁	.170	.213	4.32	5.41	3
SL	.422	.455	10.72	11.56	
SU		.090		2.29	
T	.047	.072	1.19	1.83	7, 10
T ₁	.046	.077	1.17	1.96	
UD	.220	.249	5.59	6.32	

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. See NSB Handbook H28, "Screw-Thread Standards for Federal Services".
3. Lead spacing measured at seat only.
4. Position of leads in relation to hex is not controlled.
5. Maximum recommended mounting torque 20 in-lb.
6. All three leads.
7. Two leads. (Base and emitter).
8. All three locations.
9. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.
10. The collector shall be electrically connected to the case.
11. Pin 1: emitter, pin 2: base, pin 3: collector.

FIGURE 1. Physical dimensions (TO-61).

3. REQUIREMENTS

3.1 General. The individual item requirements shall be as specified in MIL-PRF-19500 and as modified herein.

3.2 Qualification. Devices furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturer's list (QML) before contract award (see 4.2 and 6.3).

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

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

3.4.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.5 Marking. Marking shall be in accordance with MIL-PRF-19500.

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

3.7 Electrical test requirements. The electrical test requirements shall be table I as specified herein.

3.8 Workmanship. Semiconductor devices shall be processed in such a manner as to be uniform in quality and shall be free from other defects that will affect life, serviceability, or appearance.

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 and tables I, II, and III).

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

4.2.1 Group E qualification. Group E qualification shall be performed herein for qualification or requalification only. In case qualification was awarded to a prior revision of the associated specification that did not request the performance of table III tests, the tests specified in table III herein shall be performed by the first inspection lot to this revision to maintain qualification.

4.3 Screening (JANTXV and JANTX levels only). Screening shall be in accordance with table IV of MIL-PRF-19500, 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
2	Required, $T_A = +200^\circ\text{C}$
9	I_{CBO}
11	I_{EBO} , I_{CBO2} and h_{FE2}
12	See 4.3.1; 168 hours minimum
13	Subgroups 2 of table I herein; $\Delta I_{EBO} = 100$ percent of initial value or 10 nA dc, whichever is greater; $\Delta I_{CBO2} = 100$ percent of initial value or 10 nA dc, whichever is greater; $\Delta h_{FE2} = \pm 15$ percent of initial value.

4.3.1. Power burn-in conditions. Power burn-in conditions are as follows: $V_{CE} = 10\text{-}30$ V dc; power shall be applied to achieve $T_J = +175^\circ\text{C}$ minimum using a minimum power dissipation = 75 percent of maximum rated P_T (see 1.3). 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.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the tests and conditions specified for subgroup testing in table VIb for JAN, JANTX, and JANTXV group B testing. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2. Delta measurements shall be in accordance with table II herein.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B3	1037	$V_{CB} \geq 10$ V dc, 2,000 cycles.
B6	1032	$T_A = +200^\circ\text{C}$.

* 4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the tests and conditions specified for subgroup testing in table VII of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2. Delta measurements shall be in accordance with table II herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Tension, condition A, 10 lbs, 10 sec.
C2	2036	Stud torque condition D, torque = 20 in-lbs, time = 15 sec.
C6	1037	$V_{CB} \geq 10$ V dc, 6,000 cycles.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table IX of MIL-PRF-19500 and as specified herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

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.

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TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071	n = 45 devices, c = 0				
<u>Subgroup 2</u>						
Breakdown voltage, collector to emitter 2N2812 2N2814	3011	Bias condition D; I _C = 10 mA dc; pulsed (see 4.5.1)	BV _{CEO}	60 80		V dc V dc
Breakdown voltage, collector to emitter 2N2812 2N2814	3011	Bias condition D; I _C = 100 mA dc, pulsed (see 4.5.1)	BV _{CEO}	60 80		V dc V dc
Breakdown voltage, collector to base 2N2812 2N2814	3001	Bias condition D; I _C = 10 μA dc	BV _{CBO}	80 120		V dc V dc
Breakdown voltage, emitter to base	3026	Bias condition D; I _E = 10 μA dc	BV _{EBO}	8.0		V dc
Collector to emitter cutoff current	3041	Bias condition D; V _{CE} = 50 V dc	I _{CEO}		10	μA dc
Collector to emitter cutoff current 2N2812 2N2814	3041	Bias condition A; V _{EB} = 0.5 V dc V _{CE} = 80 V dc V _{CE} = 120 V dc	I _{CEX1}		1.0 1.0	μA dc μA dc
Collector to base cutoff current 2N2812 2N2814	3036	Bias condition D V _{CB} = 60 V dc V _{CB} = 80 V dc	I _{CBO}		0.1 0.1	μA dc μA dc
Emitter to base, cutoff current	3061	Bias condition D; V _{EB} = 6 V dc	I _{EBO}		0.1	μA dc
Forward-current transfer ratio	3076	V _{CE} = 5.0 V dc; I _C = 1.0 A dc; pulsed (see 4.5.1)	h _{FE1}	50	150	
Forward-current transfer ratio	3076	V _{CE} = 5.0 V dc; I _C = 5.0 A dc; pulsed (see 4.5.1)	h _{FE2}	40	120	
Forward-current transfer ratio	3076	V _{CE} = 5.0 V dc; I _C = 10 A dc; pulsed (see 4.5.1)	h _{FE3}	15		
Forward-current transfer ratio	3076	V _{CE} = 5.0 V dc; I _C = 10 mA dc; pulsed (see 4.5.1)	h _{FE4}	10		
Base to emitter voltage (non-saturated)	3066	Test condition B; V _{CE} = 5.0 V dc, I _C = 5.0 A dc, pulsed (see 4.5.1)	V _{BE}		1.2	V dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - continued						
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 5.0$ A dc, $I_B = 0.5$ A dc, pulsed (see 4.5.1)	$V_{BE(sat)1}$		1.2	V dc
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 10$ A dc, $I_B = 1.0$ A dc, pulsed (see 4.5.1)	$V_{BE(sat)2}$		2.0	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 5.0$ A dc, $I_B = 0.5$ A dc, pulsed (see 4.5.1)	$V_{CE(sat)1}$		0.5	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 10$ A dc, $I_B = 1.0$ A dc, pulsed (see 4.5.1)	$V_{CE(sat)2}$		1.5	V dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current 2N2812 2N2814	3041	Bias condition A; $V_{EB} = 0.5$ V dc $V_{CE} = 60$ V dc $V_{CE} = 80$ V dc	I_{CEX2}		50 50	μA dc μA dc
Low temperature operation		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = 5.0$ V dc; $I_C = 5.0$ A dc; pulsed (see 4.5.1)	h_{FE5}	20		
<u>Subgroup 4</u>						
Magnitude of small-signal short-circuit forward current transfer ratio	3306	$V_{CE} = 10$ V dc; $I_C = 1.0$ A dc; $f = 10$ MHz	$ h_{fe} $	1.5	7.0	
Small-signal short-circuit forward current transfer ratio	3206	$V_{CE} = 5.0$ V dc; $I_C = 50$ mA dc; $f = 1$ kHz	h_{fe}	40	150	
Open circuit output capacitance	3236	$V_{CB} = 10$ V dc; $I_E = 0$, 100 kHz $\leq f \leq 1$ MHz	C_{obo}		350	pF
Pulse response	3251	See figure 2				
Turn-on time		$V_{CC} = 25.5$ V dc; $V_{BB} = 5.0$ V dc; $I_C = 5.0$ A dc; $I_{B1} = 0.5$ A dc	t_{ON}		400	ns
Storage time		$V_{CC} = 25.5$ V dc; $V_{BB} = 5.0$ V dc; $I_C = 5.0$ A dc; $I_{B1} = I_{B2} = 0.5$ A dc	t_S		1,000	ns
Fall time		$V_{CC} = 25.5$ V dc; $V_{BB} = 5.0$ V dc; $I_C = 5.0$ A dc; $I_{B1} = I_{B2} = 0.5$ A dc	t_F		400	ns

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u>						
Safe operating area (continuous dc)	3051	$T_C = +100^\circ\text{C}$; 1 cycle; (see figure 3); $t = 1\text{ s}$				
<u>Test 1</u>		$V_{CE} = 5.0\text{ V dc}$; $I_C = 10\text{ A dc}$				
<u>Test 2</u>		$V_{CE} = 10\text{ V dc}$; $I_C = 5.0\text{ A dc}$				
<u>Test 3</u>						
2N2812		$V_{CE} = 50\text{ V dc}$; $I_C = 0.2\text{ A dc}$				
2N2814		$V_{CE} = 70\text{ V dc}$; $I_C = 0.1\text{ A dc}$				
Safe operating area (switching)	3053	Load cond. C, $T_C = +25^\circ\text{C}$; duty cycle ≤ 2 percent. (see figure 4)				
<u>Test 1</u>		$t_p = 7.82\ \mu\text{s}$ (vary to obtain IC); $t_r = t_f \leq 500\text{ ns}$; $R_{BB1} = 5\ \Omega$; $V_{BB1} = 13\text{ V dc}$; $R_{BB2} = \infty$, $V_{BB2} = 0$; $V_{CC} = 22.5\text{ V dc}$, $I_C = 8\text{ A dc}$, $L = 15\ \mu\text{H}$, $\leq 1\ \Omega$				
<u>Test 2</u>		$t_p = 25\ \mu\text{s}$ (vary to obtain IC); $t_r = t_f \leq 500\text{ ns}$; $R_{BB1} = 5\ \Omega$; $V_{BB1} = 13\text{ V dc}$; $R_{BB2} = \infty$, $V_{BB2} = 0$; $V_{CC} = 22.5\text{ V dc}$, $I_C = 2.54\text{ A dc}$, $L = 150\ \mu\text{H}$, $\leq 10\ \Omega$				
Electrical end-points		Table I, subgroup 2				

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

TABLE II. Groups B and C delta measurements. 1/ 2/ 3/

Step	Inspection	MIL-STD-750		Symbol	Limit		Unit
		Method	Conditions		Min	Max	
1.	Forward current transfer ratio	3076	$V_{CE} = 5.0\text{ V dc}$; $I_C = 5.0\text{ A dc}$, pulsed (see 4.5.1)	Δh_{FE2}	+20, -10 percent of initial value		

1/ The delta measurement for table VIb (JAN, JANTX, and JANTXV) are as follows: Subgroup 3 and 6, see table II herein, step 1.

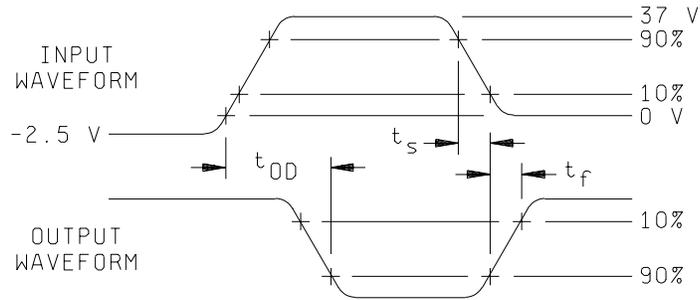
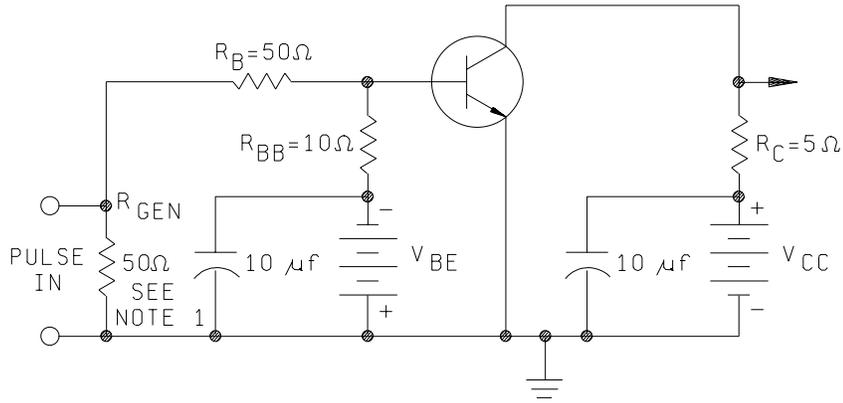
2/ The delta measurements for table VII of MIL-PRF-19500 are as follows: Subgroup 6, see table II herein, step 1.

3/ The delta measurements for table IX of MIL-PRF-19500 are as follows: Subgroup 1 and 2, see table II herein, step 1.

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TABLE III. Group E inspection (all quality levels) - for qualification or requalification only.

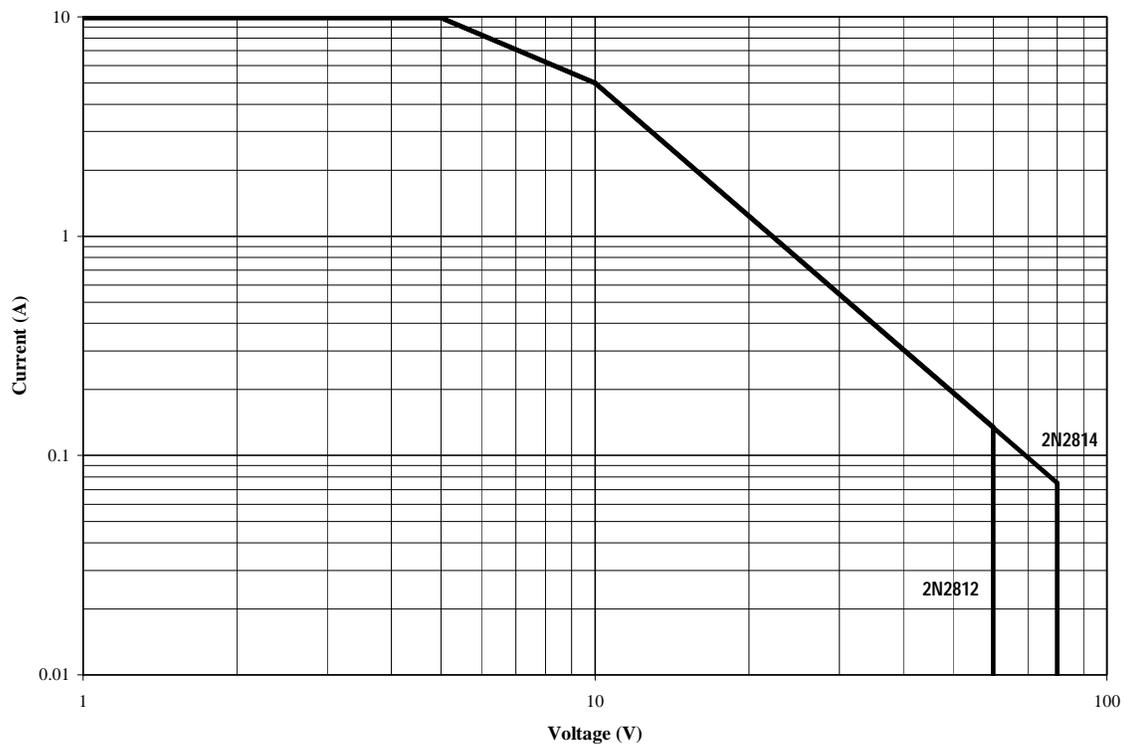
Inspection	MIL-STD-750		Qualification
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling (air to air)	1051	Test condition C, 500 cycles	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See table I, subgroup 2 and table II herein.	
<u>Subgroup 2</u>			45 devices c = 0
Intermittent life	1037	Intermittent operation life: $V_{CB} \geq 10$ V dc , 6,000 cycles.	
Electrical measurements		See table I, subgroup 2 and table II herein.	
<u>Subgroup 3</u>			3 devices, c = 0
DPA	2102		
<u>Subgroup 4</u>			sample size N/A
Thermal impedance curves		Each supplier shall submit their (typical) design thermal impedance curves. In addition, test conditions and $Z_{\theta JX}$ limit shall be provided to the qualifying activity in the qualification report.	
<u>Subgroup 5 and 6</u>			
Not applicable			
<u>Subgroup 7</u>			45 devices c = 0
Reverse stability	1033	Condition A for devices ≥ 400 V dc. Condition B for devices < 400 V dc.	



NOTES:

1. The input waveform is supplied by a pulse generator with the following characteristics:
 pulse width = 20 μ s, $Z_{out} = 50\Omega$, pulse repetition rate = 1 kHz, rise time (t_r) and fall time (t_f) ≤ 10 ns,
 duty cycle ≤ 2 percent.
2. The output waveform is monitored on a sampling oscilloscope with $t_f \leq 15$ ns, $R_{in} \geq 10$ M Ω and $C_{IN} \leq 11.5$ pF.

FIGURE 2. Pulse response test circuit.



NOTE: $T_C = +100^\circ\text{C}$

FIGURE 3. Maximum safe operating area (forward bias, continuous DC).

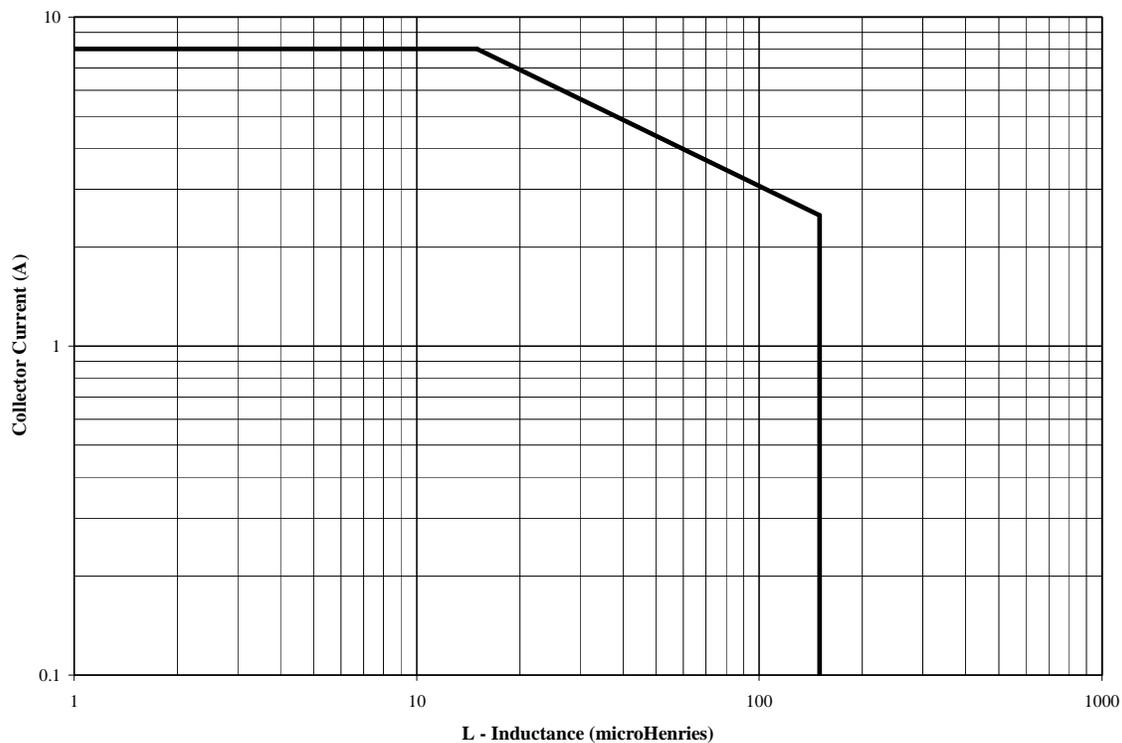


FIGURE 4. Maximum safe operating area (switching unclamped inductive load).

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 materiel 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 Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's 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 Intended use. The notes specified in MIL-PRF-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).
- c. Packaging requirements (see 5.1).
- d. Lead finish (see 3.4.1).
- e. Type designation and product assurance level.

6.3 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) 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 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, P.O. Box 3990, Columbus, OH 43216-5000.

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

Custodians:
Army - CR
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2808)

Review activities:
Army - MI
Air Force - 19, 70, 99

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-19500/415A	2. DOCUMENT DATE 31 October 2003
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3. DOCUMENT TITLE
SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, HIGH-POWER, TYPES 2N2812 AND 2N2814, JAN, JANTX, AND JANTXV

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle initial)	b. ORGANIZATION		
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code)	7. DATE SUBMITTED	
	COMMERCIAL DSN FAX EMAIL		

8. PREPARING ACTIVITY

a. Point of Contact Alan Barone	b. TELEPHONE Commercial DSN FAX EMAIL 614-692-0510 850-0510 614-692-6939 alan.barone@dla.mil		
c. ADDRESS Defense Supply Center Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman, Suite 2533, Fort Belvoir, VA 22060-6221 Telephone (703) 767-6888 DSN 427-6888		