

The documentation and process conversion measures necessary to comply with this revision shall be completed by 17 August 2016.

INCH-POUND

MIL-PRF-19500/415C
 17 May 2016
 SUPERSEDING
 MIL-S-19500/415B
 14 January 2015

PERFORMANCE SPECIFICATION SHEET

TRANSISTOR, NPN, SILICON, HIGH POWER,
 STUD MOUNT CASE, TYPES 2N2812 AND 2N2814,
 QUALITY LEVELS 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.

The requirements for acquiring the product described herein shall consist of this specification sheet and [MIL-PRF-19500](#).

1. SCOPE

1.1 Scope. This specification covers the performance requirements for NPN, silicon, high-power transistors. Three levels of product assurance (JAN, JANTX, and JANTXV) are provided for each encapsulated device type as specified in [MIL-PRF-19500](#).

1.2 Package outlines. The device package outline is a TO-210AC (formerly TO-61) in accordance with [figure 1](#) for all encapsulated device types.

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 $T_C > +100^\circ\text{C}$.

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

AMSC N/A

FSC 5961



MIL-PRF-19500/415C

1.4 Primary electrical characteristics. Unless otherwise specified, $T_A = +25^\circ\text{C}$.

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} $ $V_{CE} = 10 \text{ V dc}$ $I_C = 1.0 \text{ A dc}$ $f = 10 \text{ MHz}$
Minimum	<u>V dc</u>	<u>V dc</u>	<u>pF</u>	40	1.5
Maximum	1.2	0.5	350	120	7

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

(1) Pulsed (see 4.5.1).

1.5 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.4 for PIN construction example and 6.5 for a list of available PINs.

* 1.5.1 JAN certification mark and quality level. The quality level designators for encapsulated devices that are applicable for this specification sheet are "JAN", "JANTX", and "JANTXV".

1.5.2 Device type. The designation system for the device types of transistors covered by this specification sheet are as follows.

1.5.2.1 First number and first letter symbols. The transistors of this specification sheet use the first number and letter symbols "2N".

1.5.2.2 Second number symbols. The second number symbols for the transistors covered by this specification sheet are as follows: "2812" and "2814".

1.5.3 Suffix symbols. Suffix symbols are not applicable for this specification sheet.

1.5.4 Lead finish. The lead finishes applicable to this specification sheet are listed on QML-19500.

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 cited in the solicitation or contract.

[MIL-PRF-19500](#) - Semiconductor Devices, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-750](#) - Test Methods for Semiconductor Devices.

(Copies of these documents are available online at <http://quicksearch.dla.mil>.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, 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.

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. The 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](#)).

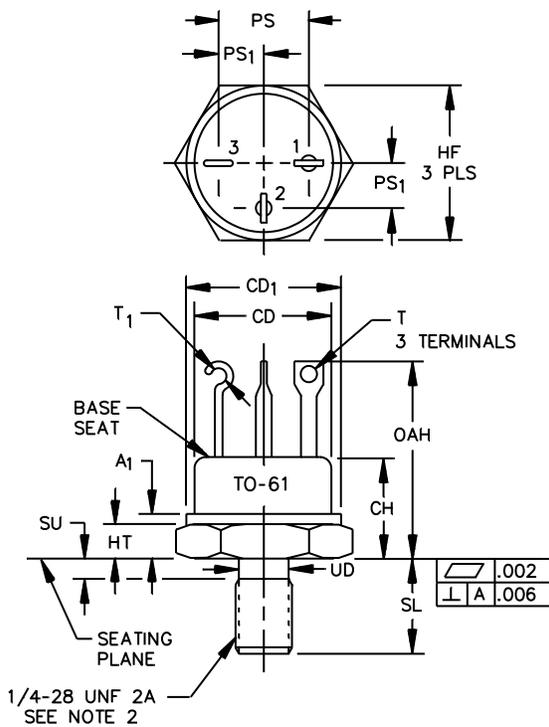
3.4.2 Pin-out. The pin-out of the device types shall be as shown on [figure 1](#). Terminal 1 is the emitter, terminal 2 is the base, and terminal 3 is the collector. The collector shall be electrically connected to the case.

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. 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.



Ltr	Dimension				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
A ₁		.270		6.86	
CD	.570	.610	14.48	15.49	4
CD ₁	.610	.687	15.49	17.45	4
CH	.325	.460	8.26	11.68	
HF	.667	.687	16.94	17.45	
HT	.090	.150	2.29	3.81	5
OAH	.640	.875	16.26	22.22	6
PS	.340	.415	8.64	10.54	7
PS ₁	.170	.213	4.32	5.41	7
SL	.422	.455	10.72	11.56	
SU		.090		2.29	8
T	.047	.072	1.19	1.83	9
T ₁	.046	.077	1.17	1.96	10
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". Maximum recommended mounting torque 20 in-lb (2.26 N-m).
3. Pin out: Terminal 1 = emitter, terminal 2 = base, terminal 3 = collector. The collector shall be electrically connected to the case.
4. Package contour with the exception of the hexagon is optional with dimensions specified.
5. Chamfer or undercut on one or both ends of hexagon portion is optional.
6. All three terminals.
7. Terminal spacing measured at seat only. Position of terminals in relation to hexagon is not controlled.
8. Length of incomplete or undercut threads.
9. Two leads (base and emitter).
10. This terminal can be flattened and pierced or hook type.
11. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions TO-210AC (similar to TO-61) package.

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 4.6](#)).

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 for qualification or requalification only. In case qualification was awarded to a prior revision of the specification sheet that did not request the performance of [table II](#) tests, the tests specified in [table II](#) herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

4.2.2 Transient thermal impedance. The transient thermal impedance measurements shall be performed in accordance with test method 3131 of [MIL-STD-750](#) using the guidelines in that test method for determining I_M , I_H , t_H , t_{sw} , (and V_H where appropriate). See [table II](#), subgroup 4 herein.

* 4.3 Screening (quality levels JANTX and JANTXV only). Screening shall be in accordance with table E-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	Measurement
	Quality levels JANTX and JANTXV
2	Required, $T_A = +200^\circ\text{C}$
9	I_{CBO}
11	I_{EBO} , I_{CBO} 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; $\Delta I_{CBO} = 100$ 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: $V_{CE} = 10$ to 30 V dc; power shall be applied to achieve $T_J = +175^\circ\text{C}$ minimum using a minimum power dissipation equal to 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.

MIL-PRF-19500/415C

* 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 E-VIB of MIL-PRF-19500 for JAN, JANTX, and JANTXV group B testing. Delta measurements shall be in accordance with 4.6 herein.

	<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
*	B3	1037	$V_{CB} \geq 10$ V dc.
	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 E-VII of MIL-PRF-19500. Delta measurements shall be in accordance with 4.6 herein.

	<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
	C2	2036	Tension, condition A, weight = 10 lbs (4.54 Kg), time = 10 seconds.
	C2	2036	Terminal torque, condition D1, torque = 6 in-oz (4.24 N-cm), time = 15 seconds.
	C2	2036	Stud torque condition D2, torque = 20 in-lbs (2.26 N-m), time = 15 seconds.
*	C6	1037	$V_{CB} \geq 10$ V dc.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of MIL-PRF-19500 and as specified 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.

4.6 Delta measurements. Delta measurements for groups B, C and E shall be taken as specified below.

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

The following details shall apply:

- a. The measurements for group B quality levels JAN, JANTX and JANTXV (table E-VIB of MIL-PRF-19500) are as follows: For subgroups 3 and 6, step 1.
- b. The measurements for group C (table E-VII of MIL-PRF-19500) are as follows: For subgroup 6, step 1.
- c. The measurements for group E (table E-IX of MIL-PRF-19500) are as follows: For subgroups 1 and 2, step 1.

*

TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Thermal impedance <u>2/</u>	3131	See 4.2.2	$Z_{\theta JX}$		7.0	°C/W
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; $I_C = 10$ μ A dc	BV_{CBO}	80 120		V dc V dc
Breakdown voltage, emitter to base	3026	Bias condition D; $I_E = 10$ μ A dc	BV_{EBO}	8.0		V dc
Collector to emitter cutoff current	3041	Bias condition D; $V_{CE} = 50$ V dc	I_{CEO}		10	μ A 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	μ A dc μ A 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	μ A dc μ A dc
Emitter to base, cutoff current	3061	Bias condition D; $V_{EB} = 6$ V dc	I_{EBO}		0.1	μ A 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		

See footnote 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						
Forward-current transfer ratio	3076	$V_{CE} = 5.0 \text{ V dc}; I_C = 10 \text{ mA dc};$ pulsed (see 4.5.1)	h_{FE4}	10		
Base to emitter voltage (non-saturated)	3066	Test condition B; $V_{CE} = 5.0 \text{ V dc},$ $I_C = 5.0 \text{ A dc},$ pulsed (see 4.5.1)	V_{BE}		1.2	V dc
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 5.0 \text{ A dc},$ $I_B = 0.5 \text{ A dc},$ pulsed (see 4.5.1)	$V_{BE(sat)1}$		1.2	V dc
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 10 \text{ A dc},$ $I_B = 1.0 \text{ A dc},$ pulsed (see 4.5.1)	$V_{BE(sat)2}$		2.0	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 5.0 \text{ A dc}, I_B = 0.5 \text{ A dc},$ pulsed (see 4.5.1)	$V_{CE(sat)1}$		0.5	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 10 \text{ A dc}, I_B = 1.0 \text{ A dc},$ 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; $V_{EB} = 0.5 \text{ V dc}$ $V_{CE} = 60 \text{ V dc}$ $V_{CE} = 80 \text{ V dc}$	I_{CEX2}		50 50	$\mu\text{A dc}$ $\mu\text{A dc}$
Low temperature operation		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = 5.0 \text{ V dc}; I_C = 5.0 \text{ A dc};$ pulsed (see 4.5.1)	h_{FE5}	20		
<u>Subgroup 4</u>						
Magnitude of small-signal short-circuit forward current transfer ratio	3306	$V_{CE} = 10 \text{ V dc}; I_C = 1.0 \text{ A dc};$ $f = 10 \text{ MHz}$	$ h_{fe} $	1.5	7.0	
Small-signal short-circuit forward current transfer ratio	3206	$V_{CE} = 5.0 \text{ V dc}; I_C = 50 \text{ mA dc}$ $f = 1 \text{ kHz}$	h_{fe}	40	150	
Open circuit output capacitance	3236	$V_{CB} = 10 \text{ V dc}; I_E = 0,$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	C_{obo}		350	pF
Pulse response	3251	See figure 2				
Turn-on time		$V_{CC} = 25.5 \text{ V dc}; V_{BB} = 5.0 \text{ V dc};$ $I_C = 5.0 \text{ A dc}; I_{B1} = 0.5 \text{ A dc}$	t_{ON}		400	ns

See footnote at end of table.

*

TABLE I. Group A inspection - Continued.

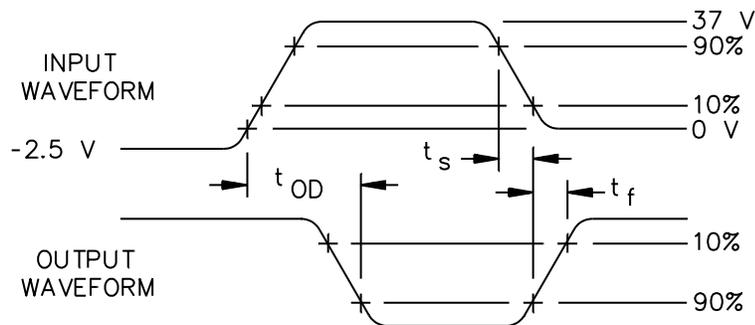
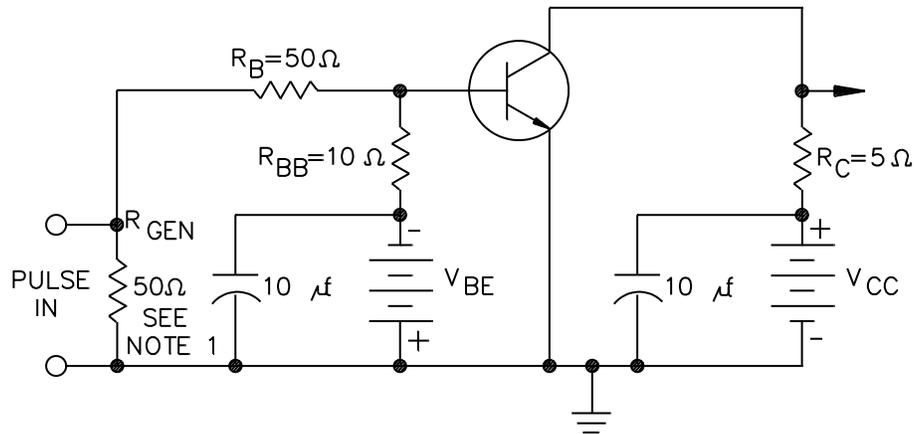
Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u> - continued						
Storage time		$V_{CC} = 25.5 \text{ V dc}; V_{BB} = 5.0 \text{ V dc};$ $I_C = 5.0 \text{ A dc}; I_{B1} = I_{B2} = 0.5 \text{ A dc}$	t_s		1,000	ns
Fall time		$V_{CC} = 25.5 \text{ V dc}; V_{BB} = 5.0 \text{ V dc};$ $I_C = 5.0 \text{ A dc}; I_{B1} = I_{B2} = 0.5 \text{ A dc}$	t_f		400	ns
<u>Subgroup 5</u>						
Safe operating area (continuous dc)	3051	$T_C = +100^\circ\text{C}; 1 \text{ cycle};$ (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 2N2814		$V_{CE} = 50 \text{ V dc}; I_C = 0.2 \text{ A dc}$ $V_{CE} = 70 \text{ V dc}; I_C = 0.1 \text{ A dc}$				
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 I_C); $t_r = t_f \leq 500 \text{ ns}; R_{BB1} = 5 \Omega;$ $V_{BB1} = 13 \text{ V dc}; R_{BB2} = \infty,$ $V_{BB2} = 0; V_{CC} = 22.5 \text{ V dc},$ $I_C = 8 \text{ A dc}, L = 15 \mu\text{H}, \leq 1 \Omega$				
<u>Test 2</u>		$t_p = 25 \mu\text{s}$ (vary to obtain I_C); $t_r = t_f \leq 500 \text{ ns}; R_{BB1} = 5 \Omega;$ $V_{BB1} = 13 \text{ V dc}; R_{BB2} = \infty,$ $V_{BB2} = 0; V_{CC} = 22.5 \text{ V dc},$ $I_C = 2.54 \text{ A dc},$ $L = 150 \mu\text{H}, \leq 10 \Omega$				
Electrical end-points		Table I, subgroup 2				

1/ For sampling plan, see [MIL-PRF-19500](#).

- * 2/ This test required for the following end-point measurements only:
 Group B, subgroups 3, 4, and 5 (JANS).
 Group B, subgroups 2 and 3 (JANTXV).
 Group C, subgroup 2 and 6.
 Group E, subgroup 1.

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

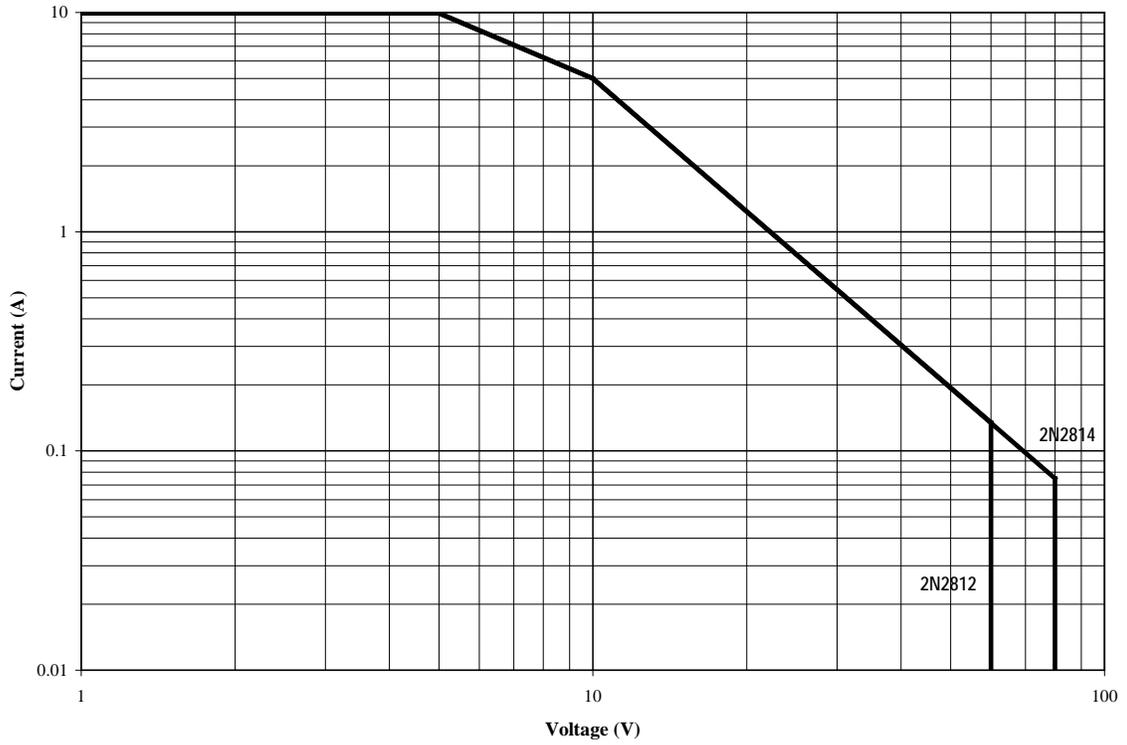
Inspection	MIL-STD-750		Qualification
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling (air to air)	1051	Test condition C, 500 cycles	
Hermetic seal Fine leak Gross leak	1071		
Electrical measurements		See table 1 , subgroup 2 and 4.6 herein.	
<u>Subgroup 2</u>			45 devices c = 0
Intermittent life	1037	Intermittent operation life: $V_{CB} \geq 10$ V dc , 6,000 cycles.	
Electrical measurements		See table 1 , subgroup 2 and 4.6 herein.	
<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>Subgroups 5 and 6</u>			
Not applicable			
<u>Subgroup 7</u>			45 devices c = 0
Reverse stability	1033	Condition B	



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).

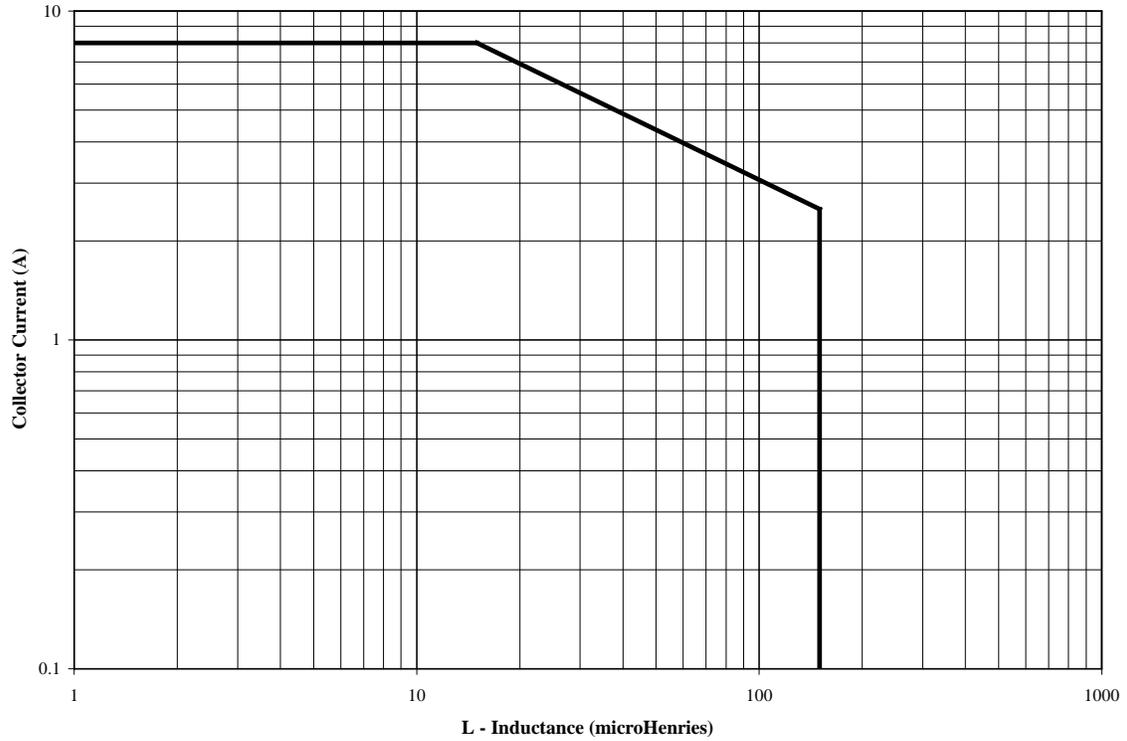


FIGURE 4. Maximum safe operating area (switching unclamped inductive load).

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. The notes specified in [MIL-PRF-19500](#) are applicable to this specification.)

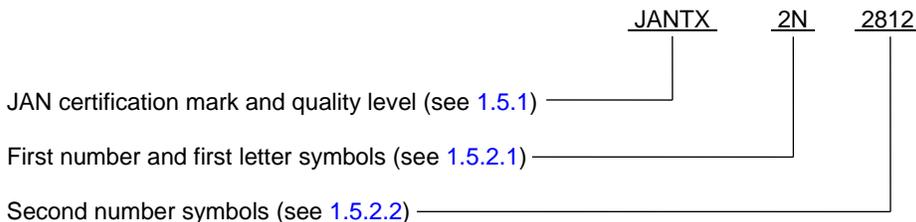
6.1 Intended use. Transistors conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Packaging requirements (see 5.1).
- c. Lead finish (see [3.4.1](#)).
- d. The complete PIN, see [1.5](#) and 6.4.

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 DLA Land and Maritime, ATTN: VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail vqe.chief@dla.mil.

6.4 PIN construction example. The PINs for encapsulated devices are in the following form.



6.5 List of PINs. The following is a list of possible PINs available on this specification sheet.

PINs for devices of the base quality level	PINs for devices of the "TX" quality level	PINs for devices of the "TXV" quality level
JAN2N2812	JANTX2N2812	JANTXV2N2812
JAN2N2814	JANTX2N2814	JANTXV2N2814

6.6 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - CR
Air Force - 85
DLA - CC

Preparing activity:

DLA - CC
(Project 5961-2016-044)

Review activities:

Army - MI
Air Force - 19, 70, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.