

INCH-POUND

* The documentation and process conversion measures necessary to comply with this document shall be completed by 30 June 2006.

MIL-PRF-19500/312E
30 March 2006
SUPERSEDING
MIL-PRF-19500/312D
20 February 2001

* PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, SWITCHING,
TYPE 2N708, JAN, JANTX, AND JANHC

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 detail requirements for NPN silicon switching transistors. Two levels of product assurance are provided for the device type as specified in MIL-PRF-19500. One level of product assurance is provided for die.

1.2 Physical dimensions. See figure 1 (TO-18) and figure 2 (die).

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

P_T (1)	$R_{\theta JA}$	V_{CBO}	V_{CEO}	V_{EBO}	V_{CER}	T_J and T_{STG}
$T_A = +25^\circ\text{C}$					$R_{BE} \leq 10$ ohms	
<u>W</u>	<u>$^\circ\text{C/W}$</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>$^\circ\text{C}$</u>
0.5	325	40	15	5.0	20	-65 to +200

(1) Derate linearly 3.08 mW/ $^\circ\text{C}$ above $T_A = +37.5^\circ\text{C}$.

* Comments, suggestions, or questions on this document should be addressed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dsc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

* 1.4 Primary electrical characteristics at T_A = +25°C.

Limits	h _{FE2} (1)	V _{CE(SAT)1}	V _{BE(SAT)1}	t _{on}	t _{off}	h _{fe}
		V _{CE} = 1.0 V dc I _C = 10 mA dc	I _C = 10 mA dc I _B = 1.0 mA dc	I _C = 10 mA dc I _B = 1.0 mA dc	I _C = 10 mA dc I _{B1} = 3 mA dc V _{BE} = 2 V dc	I _C = 10 mA dc I _{B1} = 3 mA dc I _{B2} = 1 mA dc
Min	40	<u>V dc</u>	<u>V dc</u>	<u>ns</u>	<u>ns</u>	3.0
Max	120	0.4	0.80	40	75	9.0

(1) Pulsed (see 4.5.1).

* 2. APPLICABLE DOCUMENTS

* 2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 of documents cited in sections 3, 4, or 5 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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

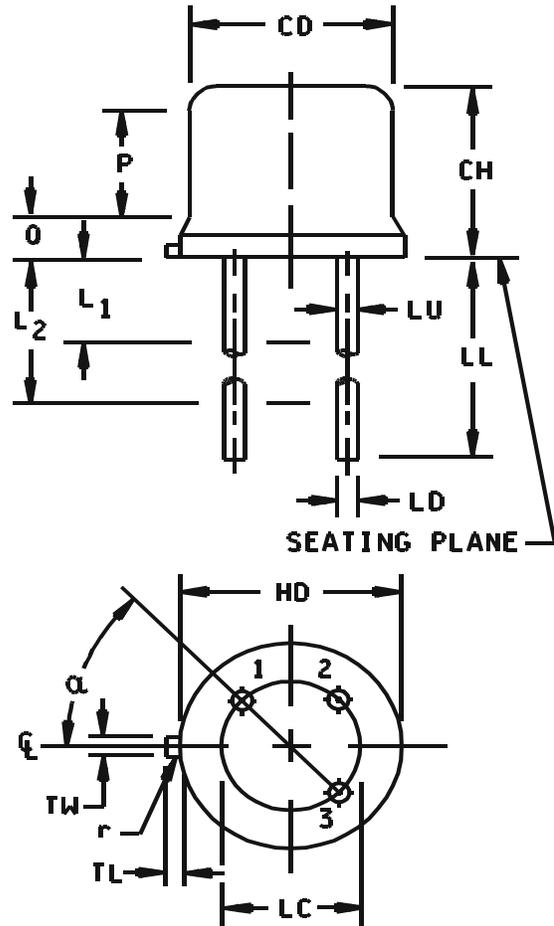
DEPARTMENT OF DEFENSE STANDARDS

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

* (Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, 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.

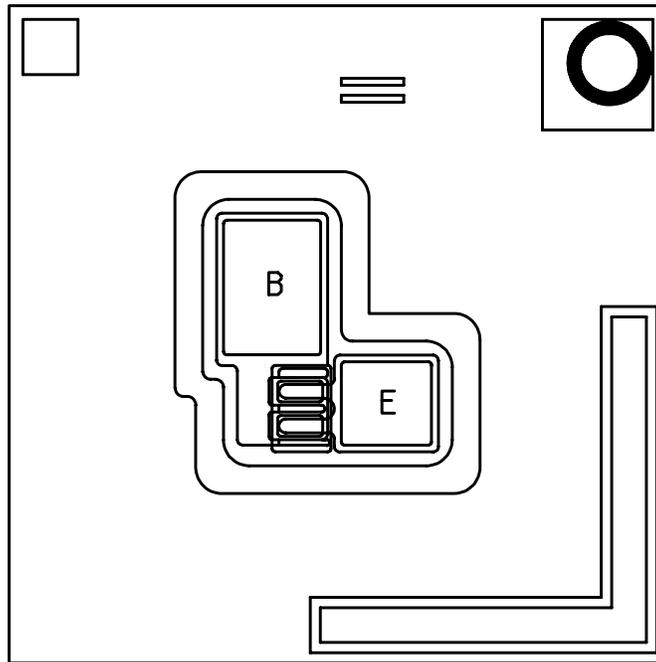
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.178	.195	4.52	4.95	
CH	.170	.210	4.32	5.33	
HD	.209	.230	5.31	5.84	
LC	.100 TP		2.54 TP		5
LD		.021		0.53	3, 8
LL	.500		12.70		8, 9
LU	.016	.019	0.41	0.48	3, 8, 9
L1		.050		1.27	9
L2	.250		6.35		9
P	.100		2.54		
Q		.040		1.02	4
TL	.028	.048	0.71	1.22	7
TW	.036	.046	0.91	1.17	
r	45° TP		45° TP		



NOTES:

1. Dimensions are in inches.
2. Millimeters equivalents are given for general information only.
3. Measured in the zone beyond .250 inch (6.35 mm) from the seating plane.
4. Details of outline in this zone are optional.
5. When measured in a gauging plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below the seating plane of the transistor, maximum diameter leads shall be within .007 inch (0.18 mm) of their true location relative to a maximum width tab. Smaller diameter leads shall fall within the outline of the maximum diameter lead tolerance.
6. The collector shall be internally connected to the case.
7. Measured from the maximum diameter of the actual device.
8. All 3 leads.
9. Symbol LU applies between L1 and L2. Dimension LD applies between L2 and LL minimum. Lead diameter shall not exceed .042 inch (1.07 mm) within L1 and beyond LL minimum.
10. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
11. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions.



NOTES:

1. Chip size: 20 x 20 mils, ± 2 mils.
2. Chip thickness: 10 mils, ± 1.5 mils nominal.
3. Top metal: Aluminum 10,000 Å min, 12,000 Å nominal.
4. Back metal:
 - a. Al/Ti/Ni/Ag 12 kÅ/ 3 kÅ/ 7 kÅ/ 7 kÅ min., 15 kÅ/ 5 kÅ/ 10 kÅ/ 10 kÅ.
 - b. Gold 2,500 Å minimum, 3,000 Å nominal.
 - c. Eutectic mount - no gold.
5. Backside: Collector.
6. Chip size: B = 4 X 4.5 mils, E = 4.5 X 5 mils.

FIGURE 2. JANHC (A-version) die dimensions.

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 manufacturers list 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 and as follows.

$R_{\theta JA}$	Thermal resistance junction to ambient.
$R_{\theta JC}$	Thermal resistance junction to case.
$R_{\theta JSP(AM)}$	Thermal resistance junction to solder pads (adhesive mount to PCB).

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1 and 2.

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

3.6 Electrical test requirements. The electrical test requirements shall be as specified in table I.

3.7 Marking. Marking shall be in accordance with MIL-PRF-19500. At the option of the manufacturer, marking of the country of origin may be omitted from the body of the transistor, but shall be retained on the initial container.

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 and II.).

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 inspection shall be performed for qualification or re-qualification only. In case qualification was awarded to a prior revision of the specification sheet that did not request the performance of table III tests, the tests specified in table III herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

* 4.3 Screening (list applicable JAN levels). 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 level
(1) 3c	Thermal impedance method 3131 of MIL-STD-750. (see 4.3.3)
7	Optional
11	I_{CBO1} and h_{FE2}
12	See 4.3.1
13	Subgroup 2 of table I herein; $\Delta I_{CBO1} = 100$ percent of initial value or 10 nA dc, whichever is greater; $\Delta h_{FE2} = \pm 15$ percent of initial value.
14	Required

(1) Shall be performed anytime after temperature cycling, screen 3a; and does not need to be repeated in screening requirements.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: $V_{CB} = 10 - 30$ V dc; power shall be applied to achieve $T_J = +135^\circ\text{C}$ minimum and 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.

4.3.2 Screening (JANHC). Screening of JANHC die shall be in accordance with MIL-PRF-19500. As a minimum, die shall be 100-percent probed to insure compliance with table I, group A, subgroup 2.

* 4.3.3 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3131 of MIL-STD-750 using the guidelines in that method for determining I_M , I_H , t_H , t_{SW} (V_C and V_H where appropriate). Measurement delay time (t_{MD}) = 70 μs max. The thermal impedance limit used in screen 3c and table I, subgroup 2 shall be set statistically by the supplier over several die lots and submitted to the qualifying activity for approval.

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 4.4.2.1 herein. Electrical measurements (end-points) and delta requirements shall be after each step in 4.4.2.1 and shall be in accordance with table I, subgroup 2 and table II herein.

* 4.4.2.1 Group B inspection, (JAN and JANTXV). Separate samples may be used for each step. In the event of a lot failure, the resubmission requirements of MIL-PRF-19500 shall apply. In addition, all catastrophic failures during CI shall be analyzed to the extent possible to identify root cause and corrective action.

<u>Step</u>	<u>Method</u>	<u>Condition</u>
1	1026	Steady-state life: 1,000 hours minimum, $V_{CB} = 10$ V dc, power shall be applied to achieve $T_J = +150^\circ\text{C}$ minimum using a minimum of $P_D = 75$ percent of maximum rated P_T as defined in 1.3. $n = 45$ devices, $c = 0$. The sample size may be increased and the test time decreased as long as the devices are stressed for a total of 45,000 device hours minimum, and the actual time of test is at least 340 hours.
2	1048	Blocking life, $T_A = +150^\circ\text{C}$, $V_{CB} = 80$ percent of rated voltage, 48 hours minimum. $n = 45$ devices, $c = 0$.
3	1032	High-temperature life (non-operating), $t = 340$ hours, $T_A = +200^\circ\text{C}$. $n = 22$, $c = 0$.

* 4.4.2.3 Group B sample selection. Samples selected from group B inspection shall meet all of the following requirements:

- For JAN and JANTX samples shall be selected randomly from a minimum of three wafers (or from each wafer in the lot) from each wafer lot. See MIL-PRF-19500.
- Shall be chosen from an inspection lot that has been submitted to and passed table I, subgroup 2, conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for life test (group B for JAN and JANTX) may be pulled prior to the application of final lead finish.

* 4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the test and conditions specified for subgroup testing in table VII of MIL-PRF-19500, and in 4.4.3.1 (JAN and JANTX) herein for group C testing. Electrical measurements (end-points) and delta requirements shall be in accordance with table I, subgroup 2, and table II.

* 4.4.3.1 Group C inspection (JAN and JANTX), table VII of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E.
C5	3131	$R_{\theta JA}$ only, as applicable (see 1.3).
C6		Not applicable.

* 4.4.3.3 Group C sample selection. Samples for subgroups in group C shall be chosen at random from any inspection lot containing the intended package type and lead finish procured to the same specification which is submitted to and passes table I tests herein for conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for C6 life test may be pulled prior to the application of final lead finish. Testing of a subgroup using a single device type enclosed in the intended package type shall be considered as complying with the requirements for that subgroup.

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

4.5 Methods 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 Real part of small-signal short-circuit input impedance. Test shall be conducted in accordance with method 3266 of MIL-STD-750 except that capacitor "c" as shown in the test circuit shall be removed and connected directly across the collector-emitter output.

MIL-PRF-19500/312E

* TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1 2/</u>						
Visual and mechanical examination <u>3/</u>	2071	n = 45 devices, c = 0				
Solderability <u>3/ 4/</u>	2026	n = 15 leads, c = 0				
Resistance to solvents <u>3/ 4/ 5/</u>	1022	n = 15 devices, c = 0				
Temp cycling <u>3/ 4/</u>	1051	Test condition C, 25 cycles. n = 22 devices, c = 0				
Electrical measurements <u>4/</u>		Table I, subgroup 2				
Hermetic seal <u>4/ 6/</u> Fine leak Gross leak	1071	n = 22 devices, c = 0				
Bond strength <u>3/ 4/</u>	2037	Precondition T _A = +250°C at t = 24 hours or T _A = +300°C at t = 2 hours n = 11 wires, c = 0				
Decap internal visual (design verification) <u>4/</u>	2075	n = 4 devices, c = 0v				
<u>Subgroup 2</u>						
Thermal impedance	3131	See 4.3.3	Z _{θJX}			°C/W
Breakdown voltage collector to base	3001	Bias condition D; I _C = 1.0 μA dc	V _{(BR)CBO}	40		V dc
Breakdown to voltage emitter to base	3026	Bias condition D; I _E = 10 μA dc	V _{(BR)EBO}	5.0		V dc
Breakdown voltage, collector to emitter	3011	Bias condition D; I _C = 10 mA dc; pulsed (see 4.5.1)	V _{(BR)CEO}	15		V dc
Breakdown voltage, collector to emitter	3011	Bias condition B; I _C = 10 mA dc; R _{BE} ≤ 10 ohms; pulsed (see 4.5.1)	V _{(BR)CER}	20		V dc
Collector to base cutoff current	3036	Bias condition D; V _{CB} = 20 V dc	I _{CBO1}		25	nA dc
Emitter to base cutoff current	3061	Bias condition D; V _{EB} = 4 V dc	I _{EBO}		80	nA dc
Forward-current transfer ratio	3076	V _{CE} = 1 V dc; I _C = 0.5 mA dc	h _{FE1}	15		
Forward-current transfer ratio	3076	V _{CE} = 1 V dc; I _C = 10 mA dc; pulsed (see 4.5.1)	h _{FE2}	40	120	

See footnotes at end of table.

MIL-PRF-19500/312E

* TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued						
Saturation voltage (collector to emitter)	3071	$I_C = 10 \text{ mA dc};$ $I_B = 1 \text{ mA dc}$	$V_{CE(SAT)1}$.40	V dc
Base emitter voltage (saturated)	3066	Test condition A; $I_C = 10 \text{ mA dc};$ $I_B = 1 \text{ mA dc}$	$V_{BE(SAT)1}$.72	.80	V dc
Base emitter voltage (saturated)	3066	Test condition A; $I_C = 1 \text{ mA dc};$ $I_B = 0.1 \text{ mA dc}$	$V_{BE(SAT)2}$.72	V dc
<u>Subgroup 3</u>						
High-temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to base cutoff current	3036	Bias condition D; $V_{CB} = 20 \text{ V dc}; T_A = +125^\circ\text{C}$	I_{CBO2}		15	$\mu\text{A dc}$
Collector to emitter cutoff current	3041	Bias condition A; $V_{CE} = 20 \text{ V dc}; V_{BE} = 0.25 \text{ V dc}$	I_{CEX}		10	$\mu\text{A dc}$
Saturation voltage (collector to emitter)	3071	$I_C = 7 \text{ mA dc};$ $I_B = 0.7 \text{ mA dc}$	$V_{CE(SAT)2}$.40	V dc
Low-temperature operation:		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = 1.0 \text{ V dc}; I_C = 10 \text{ mA dc};$ pulsed (see 4.5.1)	h_{FE3}	15		
Base emitter voltage (saturated)	3066	Test condition A; $I_C = 7 \text{ mA dc}; I_B = 0.7 \text{ mA dc}$	$V_{BE(SAT)3}$.90	V dc
<u>Subgroup 4</u>						
Common emitter small- signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 10 \text{ V dc};$ $I_C = 10 \text{ mA dc}; f = 100 \text{ MHz}$	$ h_{fe} $	3.0	9.0	
Open circuit output capacitance	3236	$V_{CB} = 10 \text{ V dc}; I_E = 0;$ $f = 1 \text{ MHz}$	C_{obo}		6.0	pF
Input capacitance (output open-circuited)	3240	$V_{EB} = 0.5 \text{ V dc}; I_C = 0;$ $f = 1 \text{ MHz}$	C_{ibo}		9.0	pF
Real part small- signal short-circuit input impedance	3266	$V_{CE} = 10 \text{ V dc};$ $I_C = 10 \text{ mA dc};$ $f = 300 \text{ MHz}$ (see 4.5.2)	RE_{hie}		50	Ω

See footnotes at end of table.

* TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u> - Continued						
Charge storage time		$I_C = I_{B1} = -I_{B21} = 10 \text{ mA dc}$ (see figure 3)	t_s		25	ns
Turn-on time		$I_C = 10 \text{ mA dc}$; $I_{B1} = 3 \text{ mA dc}$; $V_{BE(0)} = -2.0 \text{ V dc}$ (see figure 4)	t_{on}		40	ns
Turn-off time		$I_C = 10 \text{ mA dc}$; $I_{B1} = 3 \text{ mA dc}$; $I_{B2} = -1 \text{ mA dc}$; (see figure 4)	t_{off}		75	ns
<u>Subgroups 5, 6, and 7</u>						
Not applicable						

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

2/ For resubmission of failed test in subgroup 1 of table I, double the sample size of the failed test or sequence of tests. A failure in table I, subgroup 1 shall not require retest of the entire subgroup. Only the failed test shall be rerun upon submission.

3/ Separate samples may be used.

4/ Not required for JANS devices.

5/ Not required for laser marked devices.

6/ This hermetic seal test is an end-point to temp-cycling in addition to electrical measurements.

TABLE II. Groups A, B, and C delta measurements. 1/

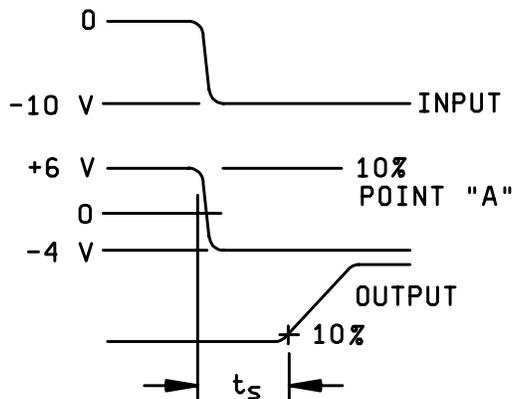
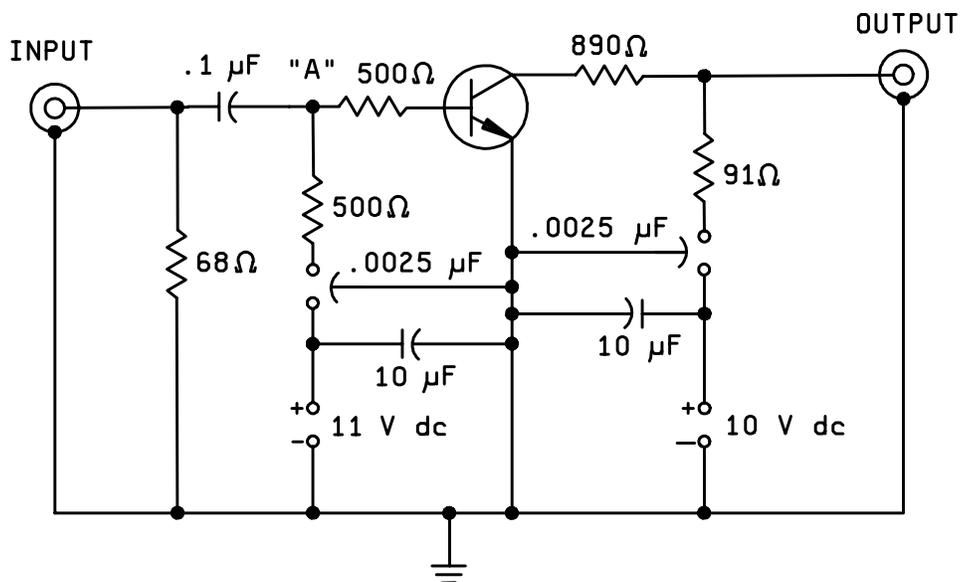
Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Forward-current transfer ratio	3076	$V_{CE} = 1.0 \text{ V dc};$ $I_C = 10 \text{ mA dc};$ pulsed (see 4.5.1)	Δh_{FE2}	±25 percent change from initial value		

1/ The delta measurements for 4.4.2.1 herein (group B, JAN and JANTX) are as follows: All steps of table II shall be performed after each step in 4.4.2.1 herein.

MIL-PRF-19500/312E

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

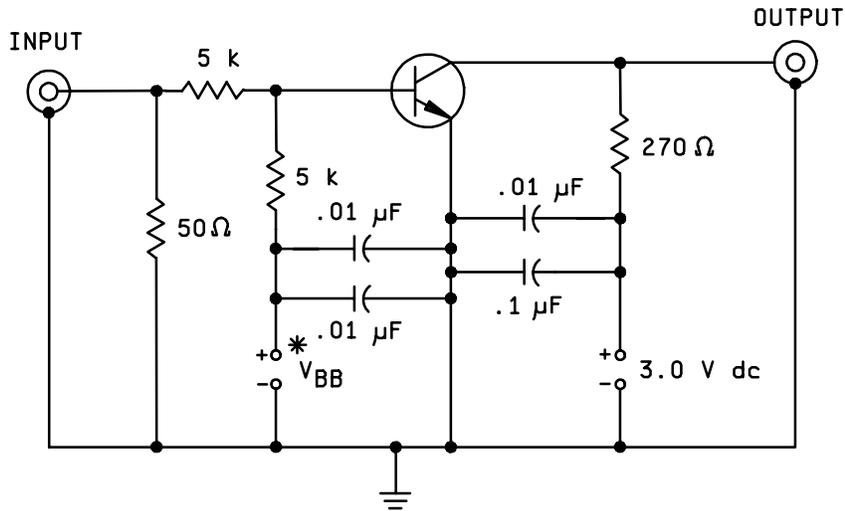
Inspection	MIL-STD-750		Qualification
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling (air to air)	1051	Test condition C, 500 cycles	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See table I, subgroup 2 and table II herein.	
<u>Subgroup 2</u>			45 devices c = 0
Intermittent life	1037	Intermittent operation life: $V_{CB} = 10$ V dc, 6,000 cycles. Adjust device current, or power, to achieve a minimum ΔT_J of $+100^\circ\text{C}$.	
Electrical measurements		See table I, subgroup 2 and table II herein.	
<u>Subgroup 4</u>			Sample size N/A
Thermal impedance curves		See MIL-PRF-19500.	
<u>Subgroup 5</u>			
Not applicable			
<u>Subgroup 6</u>			3 devices
Electrostatic discharge (ESD)	1020		
<u>Subgroup 8</u>			45 devices c = 0
Reverse stability	1033	Condition B for devices < 400 V.	



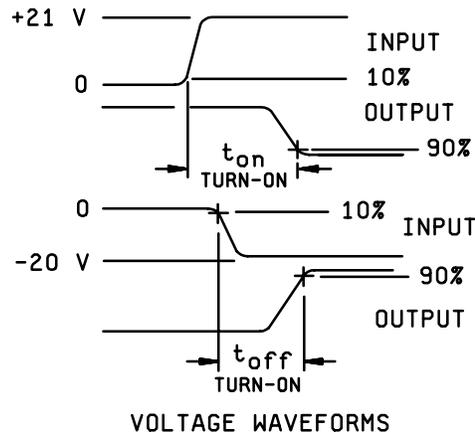
NOTES:

1. The input waveform is supplied by a pulse generator with the following characteristics: $Z_{out} = 50\Omega$, $t_r \leq 1$ ns, $PW \geq 300$ ns, duty cycle ≤ 2 percent.
2. Output waveforms are monitored on a sampling oscilloscope with the following characteristics: $Z_{in} \geq 100$ k Ω , $t_r \leq 1$ ns.

FIGURE 3. Charge storage time.



* $V_{BB} = -4.0$ V dc FOR t_{ON} , $+17.0$ V dc FOR t_{off}



NOTES:

1. The input waveform is supplied by a pulse generator with the following characteristics: $Z_{out} = 50\Omega$, $t_r \leq 1$ ns, $PW \geq 300$ ns, duty cycle ≤ 2 percent.
2. Output waveforms are monitored on a sampling oscilloscope with the following characteristics: $Z_{in} \geq 100$ k Ω , $t_r \leq 1$ ns.

FIGURE 4. Turn-on and turn-off time test circuit.

5. PACKAGING

* 5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's system commands. 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 should 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. Product assurance level and type designator.

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 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 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 43218-3990 or e-mail vqe.chief@dla.mil.

6.4 Suppliers of JANHC die. The qualified JANHC suppliers with the applicable letter version (example, JANHCA2N708) will be identified on the QML.

JANHC ordering information	
PIN	Manufacturer
	43611
2N708	JANHCA2N708

* 6.5 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
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2993)

Review activities:
Army - AR, AV, MI, SM
Navy - AS, MC, OS, SH
Air Force - 19

* 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 <http://assist.daps.dla.mil>.