

The documentation and process conversion measures necessary to comply with this revision shall be completed by 8 November 2011.

INCH-POUND

MIL-PRF-19500/428H
8 August 2011
SUPERSEDING
MIL-PRF-19500/428G
16 May 2006

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, FIELD-EFFECT TRANSISTOR, N-CHANNEL SILICON,
TYPE 2N4416A AND 2N4416AUB,
JAN, JANTX, JANTXV, AND JANS

JANS level is inactive for new design.

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 N-channel, junction, silicon field-effect transistors. Three levels of product assurance are provided for the device type as specified in [MIL-PRF-19500](#). (The JANS level is inactive for new designs.)

1.2 Physical dimensions. See [figure 1](#) (TO-72) and [figure 2](#) (surface mount, UB).

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

Types	P_T (1) $T_A = +25^{\circ}\text{C}$	V_{DG} and V_{DS}	V_{GS}	I_G	T_{STG} and T_J
	<u>mW</u>	<u>V dc</u>	<u>V dc</u>	<u>mA dc</u>	<u>$^{\circ}\text{C}$</u>
2N4416A, 2N4416AUB	300	35	-35	10	-65 to +200

(1) Derate linearly, 1.7 mW/ $^{\circ}\text{C}$ for $T_A > +25^{\circ}\text{C}$.

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1.4 Primary electrical characteristics at $T_A = +25^\circ\text{C}$.

Limit	I_{DSS} (1) $V_{\text{DS}} = 15 \text{ V dc}$ $V_{\text{GS}} = 0$	$V_{\text{GS(off)}}$ $V_{\text{DS}} = 15 \text{ V dc}$ $I_{\text{D}} = -1.0 \text{ nA dc}$	NF
			$V_{\text{DS}} = 15 \text{ V dc}$ $I_{\text{D}} = 5 \text{ mA dc}$ $R_{\text{G}} = 1 \text{ k ohms}$ $f = 100 \text{ MHz}$
	<u>mA dc</u>	<u>V dc</u>	<u>dB</u>
Minimum	5.0	-2.5	
Maximum	15.0	-6.0	2

Limit	$ y_{\text{fs}} $ (2) $V_{\text{DS}} = 15 \text{ V dc}$ $V_{\text{GS}} = 0$ $f = 1 \text{ kHz}$	$ y_{\text{os}} $ (2) $V_{\text{DS}} = 15 \text{ V dc}$ $V_{\text{GS}} = 0$ $f = 1 \text{ kHz}$	C_{oss} $V_{\text{DS}} = 15 \text{ V dc}$ $V_{\text{GS}} = 0$ $f = 1 \text{ MHz}$	C_{iss} $V_{\text{DS}} = 15 \text{ V dc}$ $V_{\text{GS}} = 0$ $f = 1 \text{ MHz}$	C_{rss} $V_{\text{DS}} = 15 \text{ V dc}$ $V_{\text{GS}} = 0$ $f = 1 \text{ MHz}$
	<u>mS</u>	<u>μS</u>	<u>pF</u>	<u>pF</u>	<u>pF</u>
Minimum	4.5				
Maximum	7.5	50	2	4	0.8

(1) Pulsed (see 4.5.1).

(2) Pulsed width = 100 ms; duty cycle = 10 percent.

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.

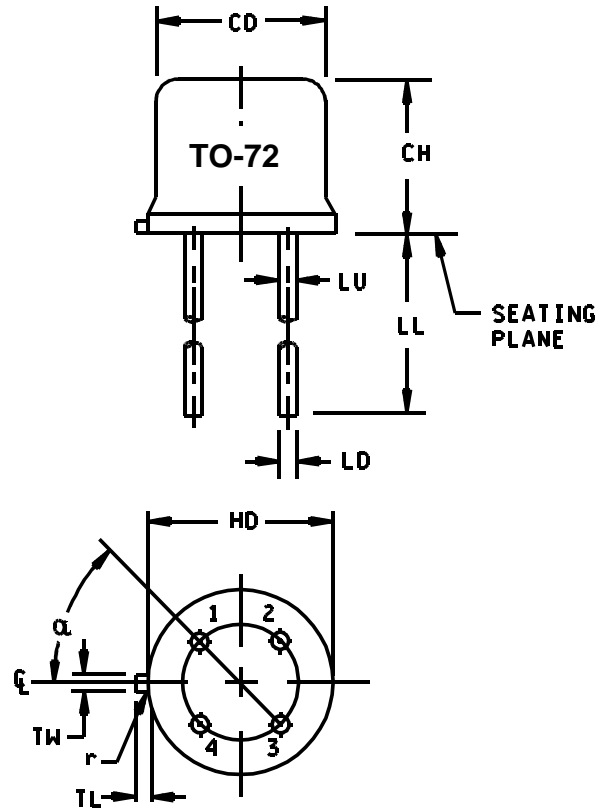
DEPARTMENT OF DEFENSE STANDARDS

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

* (Copies of these documents are available online at <https://assist.daps.dla.mil/quicksearch/> or <https://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. 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.

	Dimensions				Notes
Ltr					
	Inches		Millimeters		
	Min	Max	Min	Max	
HD	.209	.230	5.31	5.84	
CD	.178	.195	4.52	4.95	
CH	.170	.210	4.32	5.33	
LL	.500	.750	12.70	19.05	6
LD		.021		0.53	2, 6
LU	.016	.019	0.41	0.48	3, 6
TL	.028	.048	0.71	1.22	5
TW	.036	.046	0.91	1.17	

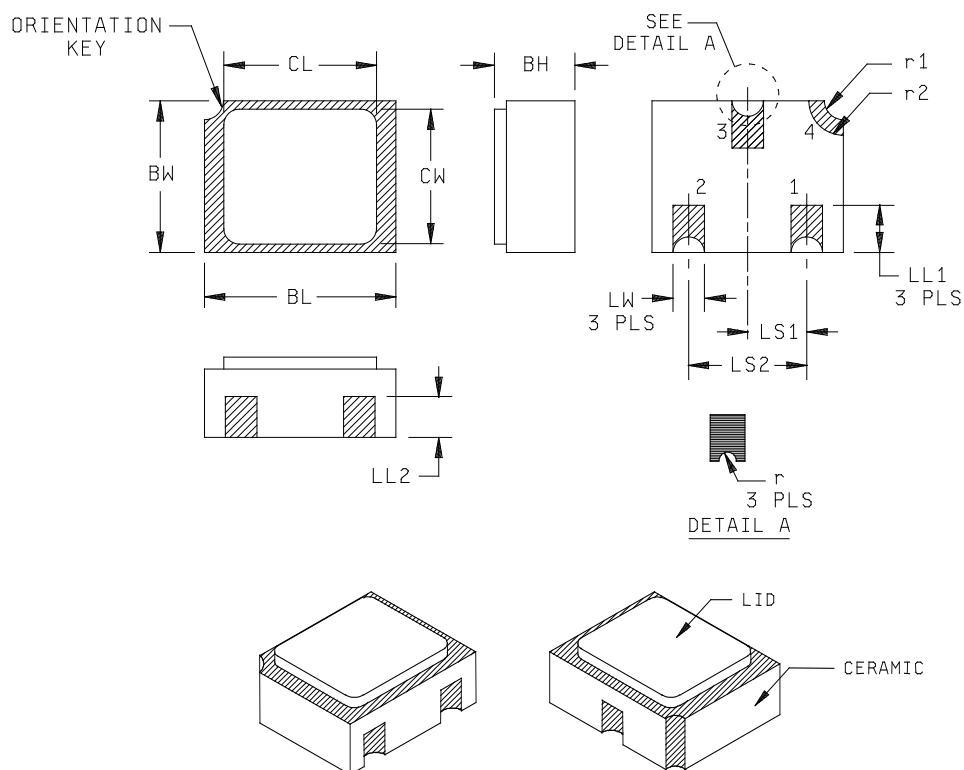


NOTES:

1. Dimensions are in inches, millimeters are given for general information only.
2. Measured in the zone beyond .250 (6.35 mm) from the seating plane.
3. Measured in the zone .050 (1.27 mm) and .250 (6.35 mm) from the seating plane.
4. When measured in a gauging plane .054 \pm .001, - .000 (1.37 \pm 0.03, -0.00 mm) below the seating plane of the transistor, maximum diameter leads shall be within .007 (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.
5. Measured from the maximum diameter of the actual device.
6. All four leads.
7. Lead 1 = source, lead 2 = drain, lead 3 = gate, lead 4 = case.
8. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions 2N4416A.

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Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
BH	.046	.056	1.17	1.42	
BL	.115	.128	2.92	3.25	
BW	.085	.108	2.16	2.74	
CL		.128		3.25	
CW		.108		2.74	
LL1	.022	.038	0.56	0.96	
LL2	.017	.035	0.43	0.89	
LS1	.036	.040	0.91	1.02	
LS2	.071	.079	1.81	2.01	
LW	.016	.024	0.41	0.61	
r		.008		.203	
r1		.012		.305	
r2		.022		.559	

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Hatched areas on package denote metallized areas.
4. Lid material: Kovar.
5. Pad 1 = Drain, Pad 2 = Source, Pad 3 = Gate, Pad 4 = Shielding connected to the lid.
6. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

* FIGURE 2. Physical dimensions, surface mount (2N4416AUB).

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](#) and as follows.

mS millisiemens
 R_G Transformed equivalent source resistance.
 μS microsiemens
 $|y_{os}|$ Magnitude of small-signal common-source short-circuit output admittance.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in [MIL-PRF-19500](#), and on [figures 1](#) (TO-72) and [2](#) (surface mount, UB).

3.4.1 Lead finish. Unless otherwise specified, 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 [table I](#) as specified herein.

3.7 Marking. Marking shall be in accordance with [MIL-PRF-19500](#), except for the UB suffix package. Marking on the UB package shall consist of an abbreviated part number, the date code, and the manufacturers symbol or logo. The prefixes JAN, JANTX, JANTXV, and JANS can be abbreviated as J, JX, JV, and JS respectively. The "2N" prefix and the "AUB" suffix can also be omitted.

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](#).

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 (JANS, JANTX, and JANTXV levels 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 (see table E-IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
9 and 10	Not applicable.	Not applicable.
11	I_{GSS1} and I_{DSS}	I_{GSS1} and I_{DSS}
12	See 4.3.1, 240 hours minimum.	See 4.3.1, 160 hours minimum.
13	Subgroups 2 and 3 of table I herein; $\Delta I_{DSS} = 10$ percent of initial value.	Subgroup 2 of table I herein; $\Delta I_{DSS} = 10$ percent of initial value.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: Method 1039 of MIL-STD-750, condition A; $T_A = +175^\circ\text{C}$; $V_{GS} = -24$ V dc; $V_{DS} = 0$.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. Group A inspection shall be performed on each subplot.

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 conditions specified for subgroup testing in tables E-VIA (JANS) and E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500, 4.4.2.1, and 4.4.2.2 herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

4.4.2.1 Group B inspection, table E-VIA (JANS) of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B3	2037	Test condition A.
B4	1037	$P_T = 300$ mW at $T_A = +25^\circ\text{C}$; $t_{on} = t_{off} = 3$ minutes minimum for 2,000 cycles. No heat sink or forced air cooling shall be permitted.
B5	2037	(Al-Au die interconnects only) test condition A.
B5	1027	$V_{DS} = 15$ V dc; $I_D = 20$ mA dc at $T_A = +100^\circ\text{C}$ or adjusted as required by the chosen T_A to achieve an average lot $T_J = +275^\circ\text{C}$.

4.4.2.2 Group B inspection, table E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B3	1027	$V_{GS} = -24$ V dc; $V_{DS} = 0$; $T_A = +175^{\circ}\text{C} \pm 3^{\circ}\text{C}$. No heat sink or forced-air cooling on the devices shall be permitted.
B3	2037	Test condition A.
B6	1032	$T_A = +200^{\circ}\text{C}$.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E; not applicable for UB devices.
C6	1026	$V_{GS} = -24$ V dc; $V_{DS} = 0$; $T_A = +175^{\circ}\text{C} \pm 3^{\circ}\text{C}$. No heat sink or forced-air cooling on the devices shall be permitted.

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 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 [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.

4.5.2 Disposition of case lead during electrical measurements. All electrical measurements and operating life test shall be performed with the case lead connected to the source.

4.5.3 Small-signal common-source short-circuit input, output, or forward transfer conductance and susceptance. These tests shall be conducted with a General Radio transfer function and admittance bridge model 1607A (or suitable equivalent) in accordance with the portion of its accompanying handbook which is applicable to this measurement. A Hewlett-Packard generator model 608D and Nems-Clarke receiver model 1502A (or suitable equivalents) shall be used with the transfer function and admittance bridge.

4.5.4 Spot noise figure tests. These tests shall be conducted using the equipment and circuit shown on [figures 3](#) and [4](#), or suitable equivalent.

4.5.5 Small-signal common-source insertion power gain. This test shall be conducted using the circuit shown on [figure 4](#), or suitable equivalent.

4.5.6 Small-signal common-source short-circuit output capacitance. This test shall be conducted using the circuit shown on [figure 5](#) or suitable equivalent.

TABLE I. Group A inspection.

Inspection <u>1/</u>	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, gate to source	3401	Bias condition C; I _G = 1 μA dc; V _{DS} = 0	V _{(BR)GSS}	-35		V dc
Gate reverse current	3411	Bias condition C; V _{GS} = 20 V dc; V _{DS} = 0	I _{GSS1}		-0.1	nA dc
Drain current	3413	Bias condition C, V _{DS} = 15 V dc; pulsed (see 4.5.1)	I _{DSS}	5	15	mA dc
Gate to source voltage	3403	V _{DS} = 15 V dc; I _D = 0.5 mA dc	V _{GS}	-1	-5.5	V dc
Gate to source cutoff voltage	3403	V _{DS} = 15 V dc; I _D = 1.0 nA dc	V _{GS(off)}	-2.5	-6.0	V dc
Gate to source forward voltage	3403	V _{DS} = 0; I _G = 1.0 mA dc	V _{GSF}		1	V dc
<u>Subgroup 3</u>						
High-temperature operation:		T _A = +150°C				
Gate reverse current	3411	Bias condition C; V _{GS} = 20 V dc	I _{GSS2}		-0.1	μA dc
Low-temperature operation:		T _A = -55°C				
Magnitude of small-signal, common-source short-circuit forward transfer admittance	3455	V _{DS} = 15 V dc; V _{GS} = 0; f = 1 kHz	y _{fs} ₁		11.25	mS
<u>Subgroup 4</u>						
Magnitude of small-signal, common-source short-circuit forward transfer admittance	3455	V _{DS} = 15 V dc; V _{GS} = 0; f = 1 kHz; pulse width = 100 ms; duty cycle = 10 percent	y _{fs} ₂	4.5	7.5	mS

See footnote 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						
Magnitude of small-signal common- source, short-circuit, output admittance	3453	$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ $f = 1 \text{ kHz}; \text{ pulsed (see 4.5.1)}$	$ y_{os} $		50	μS
Small-signal, common-source short-circuit input capacitance	3431	$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	C_{iss}		4	pF
Small-signal, common-source short-circuit reverse transfer capacitance		$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	C_{rss}		0.8	pF
Small-signal, common-source short-circuit output capacitance		$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz (see 4.5.6)}$	C_{oss}		2	pF
Small-signal, common-source short-circuit input susceptance		$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ (see 4.5.3) $f = 100 \text{ MHz}$	b_{is}		2.5	mS
Small-signal, common-source short-circuit output susceptance		$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ (see 4.5.3) $f = 100 \text{ MHz}$	b_{os}		1	mS
Small-signal, common-source short-circuit input conductance		$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ (see 4.5.3) $f = 100 \text{ MHz}$	g_{is}		0.3	mS
Small-signal, common-source short-circuit output conductance		$V_{DS} = 15 \text{ V dc}; V_{GS} = 0;$ (see 4.5.3) $f = 100 \text{ MHz}$	g_{os}		75	μS
Small signal, common source insertion power gain		$V_{DS} = 15 \text{ V dc}; I_D = 5 \text{ mA dc}; R_G = 1 \text{ k}\Omega \text{ (see 4.5.5)}$ $f = 100 \text{ MHz}$		18		dB
Common source spot noise		$V_{DS} = 15 \text{ V dc}; I_D = 5 \text{ mA dc}; R_G = 1 \text{ k}\Omega \text{ (see 4.5.4)}$ $f = 100 \text{ MHz}$	F		2	dB
<u>Subgroup 5</u>						
Not applicable						

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

TABLE II. Groups A, B, C, and E delta measurements. 1/ 2/ 3/ 4/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Magnitude of small-signal, common-source short-circuit forward transfer admittance	3455	$V_{DS} = 15 \text{ V dc}$; $V_{GS} = 0$; $f = 1 \text{ kHz}$; $t_p = 100 \text{ mS}$, duty cycle = 10 percent	$\Delta y_{fs} _2$	20 percent change from initial value		
2.	Drain current	3413	Bias condition C; $V_{DS} = 15 \text{ V dc}$, pulsed (see 4.5.1)	ΔI_{DSS}	10 percent change from initial value.		

1/ The delta measurements for table E-VIA (JANS) of MIL-PRF-19500 are as follows:

- Subgroup 4, see table II herein, step 1.
- Subgroup 5, see table II herein, steps 1 and 2.

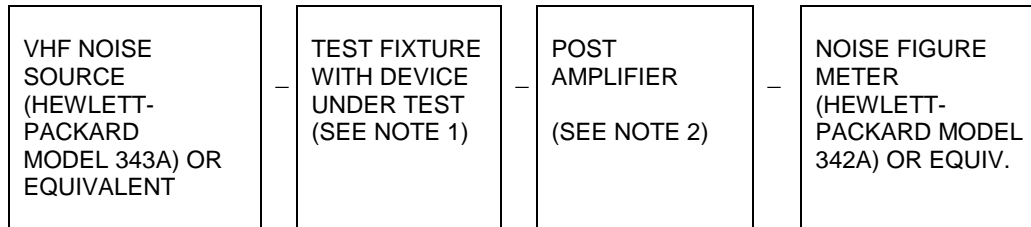
2/ The delta measurements for table E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500 are: Subgroup 3 and 6, see table II herein, step 1.

3/ The delta measurements for table E-VII of MIL-PRF-19500 are as follows: Subgroup 6, see table II herein, steps 1 and 2; for JANS level and step 1 for JAN, JANTX, and JANTXV levels.

4/ The delta measurements for table E-IX of MIL-PRF-19500 are: Subgroups 1 and 2, see table II herein, all steps.

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

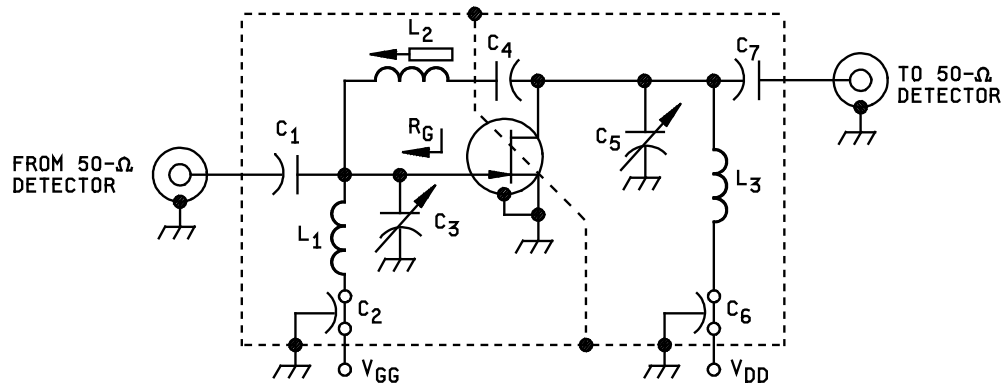
Inspection	MIL-STD-750		Qualification and large lot quality conformance inspection
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling	1051	-55°C to +150°C, 500 cycles	
Hermetic seal	1071	As applicable	
Fine leak			
Gross leak			
Electrical measurements		See table I, subgroup 2 and table II, all steps	
<u>Subgroup 2</u>			45 devices c = 0
Blocking life	1048	1,000 hours minimum, $T_A = +150^\circ\text{C}$, V_{DG} or $V_{GS} = 80$ percent of rated.	
Electrical measurements		See table I, subgroup 2 and table II, all steps	
<u>Subgroups 4 and 5</u>			
Not applicable			



NOTES:

1. The test fixture and procedure shall be in accordance with [figure 4](#).
2. The post amplifier shall contain suitable biasing circuits and shall be constructed utilizing very high frequency design technique. It shall be designed for the test frequency.

FIGURE 3. Block diagram for spot noise figure tests.



Circuit component information (see note)			
	Capacitors	Inductors	
	100 MHz		100 MHz
C ₁ C ₂	7 pF 0.0015 μF	L ₁	0.14 μH, 3.5 T, no. 18 enameled copper wire, .375 inch (9.53 mm) I.D., .25 inch (6.4 mm) long
C ₃ C ₄ C ₅	1-12 pF 1,000 pF 1-12 pF	L ₂	3 μH, 17 T, no. 28 enameled copper wire, close wound, .28 inch (7.1 mm) I.D., powered iron slug
C ₆ C ₇	0.0015 μF 3 pF	L ₃	0.25 μH, 4.5 T, no. 18 enameled copper wire, .375 inch (9.53 mm) I.D., .31 inch (7.9 mm) long

NOTE: Transformed equivalent source resistance is 1,000Ω at 100 MHz for 100 MHz amplifier.

FIGURE 4. Neutralized small-signal common-source insertion power gain and common-source spot noise figure test circuit.

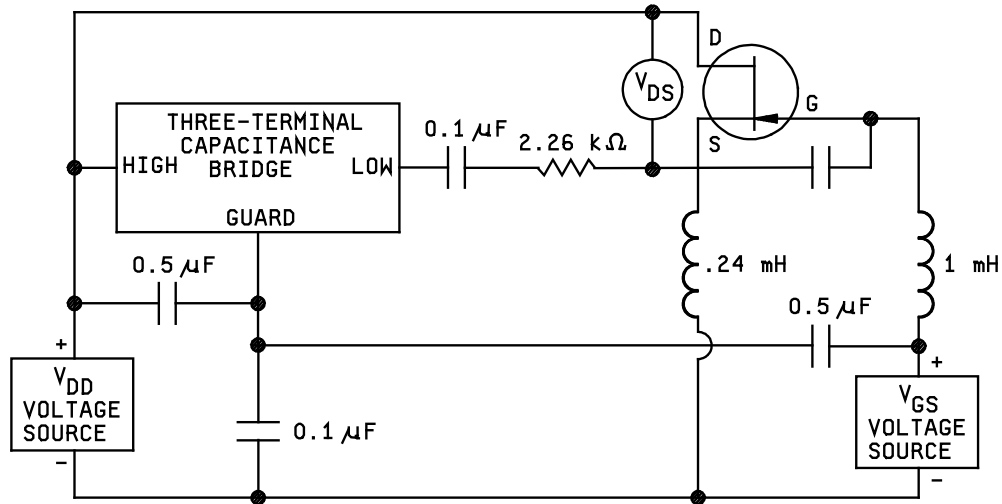


FIGURE 5. Small-signal common-source short-circuit output capacitance test circuit.

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

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

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 DLA Land and Maritime, ATTN: VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail vqe.chief@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.daps.dla.mil>.

6.4 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 - 85
DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2011-044)

Review activities:

Army - MI
Navy - MC
Air Force - 19, 99

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