

The documentation process conversion measures necessary to comply with this revision shall be completed by 24 February 1998

INCH-POUND

MIL-PRF-19500/598A
 24 November 1997
 SUPERSEDING
 MIL-S-19500/598
 11 December 1991

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, QUAD, FIELD EFFECT TRANSISTOR,
 P-CHANNEL, AND N-CHANNEL, SILICON TYPE 2N7336,
 JAN, JANTX, JANTXV, AND JANS

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 quad N-channel and P-channel, enhancement-mode, MOSFET, power transistor. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500, with avalanche energy ratings (E_{AS} and E_{AR}) and maximum avalanche current (I_{AR}).

1.2 Physical dimensions. See figure 1 (MO-Q36AB) (14 Pin Dip).

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

Type	P_T $T_A = +25^\circ\text{C}$ (free air)	V_{GS}	$I_{D1} \ 2/$ $T_C = +25^\circ\text{C}$		$I_{D2} \ 2/$ $T_C = +100^\circ\text{C}$		I_S	
	<u>W</u>	<u>V dc</u>	A dc		A dc		A dc	
			N-channel	P-channel	N-channel	P-channel	N-channel	P-channel
2N7336	1.4	± 20	1.0	-.75	.6	.5	1.0	-.75

E_{AS}	E_{AR}	$I_{AR} \ 2/$		$I_{DM} \ 3/$		T_{op} and T_{STG}	Max $r_{DS(on)} \ 1/$ $V_{GS} = 10 \text{ V dc}, I_D = I_{D2}$				$R_{\theta JA1}$ max 1 die	$R_{\theta JA2}$ max 4 die
		A		A (pk)			$T_J = +25^\circ\text{C}$		$T_J = +150^\circ\text{C}$			
<u>mJ</u>	<u>mJ</u>	A		A (pk)		<u>$^\circ\text{C}$</u>	<u>Ω</u>		<u>Ω</u>		<u>$^\circ\text{C/W}$</u>	<u>$^\circ\text{C/W}$</u>
		N-channel	P-channel	N-channel	P-channel	-55 to +150	N-channel	P-channel	N-channel	P-channel		
75	.14	1.0	-.75	4.0	-3.0		0.7	1.4	1.4	2.5	90	50

See footnotes on next page.

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

1/ Derate linearly 0.11 W/°C for $T_C > +25^\circ\text{C}$.
$$P_T = \frac{T_J \text{ max} - T_C}{R_{\theta/C}}$$

2/
$$I_D = \sqrt{\frac{T_J \text{ max} - T_C}{(R_{\theta/A}) \times (R_{DS(on)} \text{ at } T_J \text{ max})}}$$

3/ $I_{DM} = 4 I_{D1}$; I_{D1} as calculated in 2/.

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

Type	Min $V_{(BR)DSS}$ $V_{GS} = 0 \text{ V}$ $I_D = 1 \text{ mA dc}$	$V_{GS(th)1}$ $V_{DS} \geq V_{GS}$ $I_D = 0.25 \text{ mA}$	Max I_{DSS1} $V_{GS} = 0 \text{ V}$	Max $r_{DS(on)1}$ 1/ $V_{GS} = 10 \text{ V dc}$ $I_D = I_{D2}$	
			$V_{DS} = 80$ percent of rated V_{DS}	$T_J = +25^\circ\text{C}$	
2N7336	<u>V dc</u>	<u>V dc</u>		<u>Ω</u>	
	100	<u>Min</u> <u>Max</u>	<u>$\mu\text{A dc}$</u>	N-channel	P-channel
		2.0 4.0	25	0.7	1.4

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

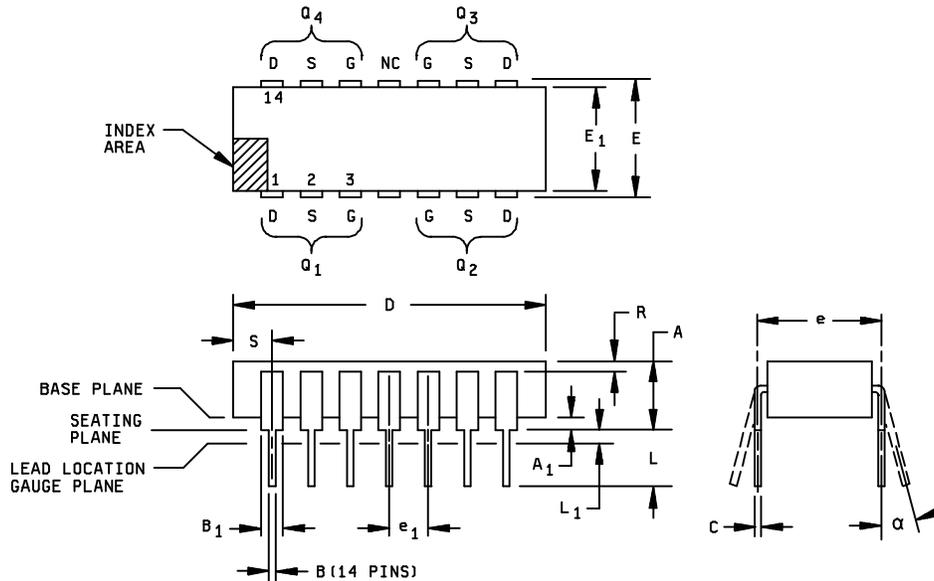
MIL-PRF-19500 - Semiconductor Devices, General Specification for.

STANDARD

MILITARY

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Refer to applicable symbol list.
4. Dimensioning and tolerancing in accordance with ANSI, Y14.5-1973.
5. Leads within 0.13 mm (.005 inch) radius of true position (TP) at gauge plane with maximum material condition and unit installed.
6. e_1 and e_A applies in zone L_1 when unit installed.
7. α applies to spread leads prior to installation.
8. N is the number of terminal positions.
9. Outlines on which the seating plane is coincident with the base plane ($A_1 = 0$), terminal lead standoffs are not required, and B_1 may equal B along any part of the lead above the seating/base plane.
10. E_1 does not include particles of package materials.
11. This dimension shall be measured with the device seated in the seating plane gauge JEDEC outline No. GS-3.
12. Controlling dimension: Inch.
13. Q_1 and Q_3 are N-channel, Q_2 and Q_4 are P-channel.

Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
A	.105	.175	2.67	4.44	11
A_1	.025	.055	0.64	1.39	11
B	.015	.021	.381	.533	
B_1	.038	.060	0.97	1.52	
C	.008	.012	.204	.304	
D	.690	.770	17.53	19.55	
E	.290	.325	7.37	8.25	
E_1	.280	.310	7.12	7.87	10
e_1	.100 TP		2.54 TP		5, 6
e_A	.300 TP		7.62 TP		5, 6
L	.125	.175	3.18	4.44	11
L_1	.000	.030	0.00	0.76	
α	0°	15°	0°	15°	7
N	14		14		8
Q_1	.010	---	0.25	---	
S	.030	.095	.77	2.41	

FIGURE 1. Dimensions and configuration (M0-Q36AB).

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

3. REQUIREMENTS

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

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

3.3 Interface requirements and physical dimensions. The interface requirements and physical dimensions shall be as specified in MIL-PRF-19500 and on figure 1 (MO-Q36AB) herein.

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

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

3.5 Electrostatic discharge protection. The devices covered by this specification require electrostatic discharge protection.

3.5.1 Handling. MOS devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. However, the following handling practices are recommended (see 3.5).

- a. Devices should be handled on benches with conductive handling devices.
- b. Ground test equipment, tools, and personnel handling devices.
- c. Do not handle devices by the leads.
- d. Store devices in conductive foam or carriers.
- e. Avoid use of plastic, rubber, or silk in MOS areas.
- f. Maintain relative humidity above 50 percent if practical.
- g. Care should be exercised during test and troubleshooting to apply not more than maximum rated voltage to any lead.
- h. Gate must be terminated to source, $R \leq 100 \text{ k}$, whenever bias voltage is to be applied drain to source.

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 the subgroups specified in 4.4.2 and 4.4.3 herein.

4. VERIFICATION

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

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

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500.

4.2.1 Group E inspection. Group E inspection shall be conducted in accordance with MIL-PRF-19500 and herein.

4.3 Screening (JANS, JANTX and JANTXV levels only). Screening shall be in accordance with MIL-PRF-19500 (Appendix E, table IV), and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screen (see appendix E, table IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
<u>1/</u> <u>2/</u>	Gate stress test (see 4.5.5)	Gate stress test (see 4.5.5)
<u>1/</u>	Method 3161 (see 4.5.3)	Method 3161 (see 4.5.3)
9	I_{GSS1} , I_{DSS1} , subgroup 2 of table I herein	Subgroup 2 of table I herein
10	Method 1042, test condition B	Method 1042, test condition B
11	I_{GSS1} , I_{DSS1} , $r_{DS(on)1}$, $V_{GS(th)1}$ Subgroup 2 of table I herein $\Delta I_{GSS1} = \pm 20$ nA dc or ± 100 percent of initial value, whichever is greater. $\Delta I_{DSS1} = \pm 25$ μ A dc or ± 100 percent of initial value, whichever is greater.	I_{GSS1} , I_{DSS1} , $r_{DS(on)1}$, $V_{GS(th)1}$, subgroup 2 of table I herein
12	Method 1042, test condition A, $t = 240$ hours	Method 1042, test condition A
13	Subgroups 2 and 3 of table I herein; $\Delta I_{GSS1} = \pm 20$ nA dc or ± 100 percent of initial value, whichever is greater. $\Delta I_{DSS1} = \pm 25$ μ A dc or ± 100 percent of initial value, whichever is greater. $\Delta r_{DS(on)1} = \pm 20$ percent of initial value $\Delta V_{GS(th)1} = \pm 20$ percent of initial value	Subgroup 2 of table I herein; $\Delta I_{GSS1} = \pm 20$ nA dc or ± 100 percent of initial value, whichever is greater. $\Delta I_{DSS1} = \pm 25$ μ A dc or ± 100 percent of initial value, whichever is greater. $\Delta r_{DS(on)1} = \pm 20$ percent of initial value $\Delta V_{GS(th)1} = \pm 20$ percent of initial value

1/ Shall be performed anytime before screen 10.

2/ This is a stress test designed to insure a rugged product.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500, and as specified herein. Alternate flow is allowed for quality conformance inspection in accordance with appendix E of MIL-PRF-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500, and table I herein. (End-point electrical measurements shall be in accordance with the applicable steps of table II herein.)

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table VIa (JANS) and table VIb (JANTX and JANTXV) of MIL-PRF-19500, and herein. Electrical measurements (end-points) and delta requirements shall be in accordance with table II herein.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B3	1051	Test condition G.
B3	2077	
B5	1042	Read and record $V_{BR(DSS)}$ (pre and post) at $I_D = 1$ mA. Read and record I_{DSS} (pre and post), in accordance with table II herein.
B6	3161	See 4.5.2.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B2	1051	Condition G.
B3	1042	Condition A, $V_{DS} = 80$ percent of rated bias $T_A = +150^\circ\text{C}$, $t = 160$ hours.
B3	1042	Condition B, $V_{GS} = 80$ percent of rated bias $T_A = +150^\circ\text{C}$, $t = 24$ hours.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E; The sampling plan applies to the number of leads tested. A minimum of three devices shall be tested.

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 follows. Electrical measurements (end-points) and delta requirements shall be in accordance with table II herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
E2	1042	Condition A, 1,000 hours.
E3	2102	
E4	3161	$R_{\theta JA1} = 90^\circ\text{C/W}$ maximum.

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 Thermal resistance. Thermal resistance measurements shall be performed in accordance with method 3161 of MIL-STD-750. $R_{\theta JA1}$ maximum = 90°C/W . $R_{\theta JA1}$ shall be performed on each die.

- I_M measuring current..... 10 mA
- I_H drain heating current 0.15 A minimum
- t_H heating time Steady-state (see method 3161 of MIL-STD-750, for definition)
- V_H drain-source heating voltage..... 15 V
- t_{MD} measurement time delay..... 30 to 60 μs
- t_{SW} sample window time 10 μs maximum

4.5.3 Thermal response (ΔV_{SD} measurements). The ΔV_{SD} measurements shall be performed in accordance with method 3161 of MIL-STD-750. The ΔV_{SD} conditions (I_H and V_H) and maximum limit shall be derived by each vendor from the thermal response curves (see figure 3). The ΔV_{SD} measurement and conditions for each device in the qualification lot shall be submitted (read and record) in the qualification report. The chosen ΔV_{SD} shall be considered final after the manufacturer has had the opportunity to test five consecutive lots. The following parameter measurements shall apply:

- a. I_M measuring current..... 10 mA
- b. I_H drain heating current..... 0.15 A minimum
- c. t_H heating time 100 ms
- d. V_H drain-source heating voltage 15 V minimum
- e. t_{MD} measurement time delay..... 30 to 60 μ s
- f. t_{SW} sample window time 10 μ s maximum

4.5.4 Single pulse avalanche energy (E_{AS}).

- a. Peak current, I_{AS} I_{D1}
- b. Peak gate voltage, V_{GS} 10 V
- c. Gate to source resistor, R_{GS} $25 \leq R_{GS} \leq 200\Omega$
- d. Initial case temperature $+25^\circ\text{C} +10, -5^\circ\text{C}$
- e. Inductance $\left[\frac{2E_{AS}}{(I_{D1})^2} \right] \left[\frac{V_{BR} - V_{DD}}{V_{BR}} \right]$ *mH minimum*
- f. Number of pulses to be applied 1 pulse minimum
- g. Supply voltage (V_{DD}) 25 V minimum

4.5.5 Gate stress test.

- a. $V_{GS} = 30$ V minimum.
- b. $t = 250$ μ s minimum.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical inspection	2071					
<u>Subgroup 2</u>						
Breakdown voltage, drain to source	3407	$V_{GS} = 0$ V dc; $I_D = 1$ mA dc condition C	$V_{(BR)DSS}$	100		V dc
Gate to source voltage (threshold)	3404	$V_{DS} \geq V_{GS}$ $I_D = 0.25$ mA dc.	$V_{GS(th)1}$	2.0	4.0	V dc
Gate current	3411	$V_{GS} = +20$ V dc and -20 V dc bias condition C; $V_{DS} = 0$	I_{GSS1}		± 100	nA dc
Drain current	3413	$V_{GS} = 0$ V dc; $V_{DS} = 80$ percent of rated V_{DS} ; bias condition C.	I_{DSS1}		25	μ A dc
Static drain to source on-state resistance	3421	$V_{GS} = 10$ V dc, pulsed (see 4.5.1) condition A, $I_D = \text{rated } I_{D2}$ (see 1.3).	$r_{DS(on)1}$			Ω
N-channel P-channel					0.7 1.4	
Forward voltage (source drain diode)	4011	Pulsed (see 4.5.1) $V_{GS} = 0$ V, $I_D = I_{D1}$.	V_{SD}			V
N-channel P-channel					1.5 5.5	
<u>Subgroup 3</u>						
High temperature operation:		$T_C = T_J = +125^\circ\text{C}$				
Gate current	3411	Bias condition C; $V_{DS} = 0$ V dc $V_{GS} = +20$ V dc and -20 V dc.	I_{GSS2}		± 200	nA dc
Drain current	3413	Bias condition C; $V_{GS} = 0$ V dc $V_{DS} = 100$ percent of rated V_{DS} $V_{DS} = 80$ percent of rated V_{DS} .	I_{DSS2} I_{DSS3}		1.0 0.25	mA dc mA dc

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u> - Continued						
Static drain to source on-state resistance	3421	$V_{GS} = 10 \text{ V dc}$, pulsed (see 4.5.1); $I_D = \text{rated } I_{D2}$	$r_{DS(on)3}$		1.4 2.3	Ω
N-channel P-channel						
Gate to source voltage (threshold)	3404	$V_{DS} \geq V_{GS}$ $I_D = 0.25 \text{ mA dc}$.	$V_{GS(th)2}$	1.0		V dc
Low operation operation:		$T_C = T_J = -55^\circ\text{C}$.				
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$ $I_D = 0.25 \text{ mA dc}$.	$V_{GS(th)3}$		5.0	V dc
<u>Subgroup 4</u>						
Switching time test	3472	$I_D = \text{rated } I_{D1}$; $V_{DD} = 0.5 V_{BR(DSS)}$ $V_{GS} = 10 \text{ V dc}$; $R_g = 24\Omega$				
Turn-on delay time			$t_{d(on)}$			ns
N-channel P-channel					20 30	
Rise time			t_r			ns
N-channel P-channel					25 60	
Turn-off delay time			$t_{d(off)}$		40	ns
Fall time			t_f			ns
N-channel P-channel					40 60	
<u>Subgroup 5</u>						
Single pulse avalanche energy	3470	See 4.5.4	EAS			
Electrical measurements		See table II herein, steps 1, 2, 3, 4, 5, and 6				

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection ^{1/}	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u> - Continued						
Safe operating area test	3474	$V_{DS} = 80$ percent of rated $V_{BR(DSS)}$ $t_p = 10$ ms				
N-channel		$I_D = 0.25$ A				
P-channel		$I_D = 0.05$ A				
Electrical measurements		See table II herein, steps 1, 2, 3, 4, 5, 6, and 7				
<u>Subgroup 6</u>						
Not applicable						
<u>Subgroup 7</u>						
Gate charge	3471	Condition B				
On-state gate charge			$Q_{g(on)}$		15	nC
Gate to source charge			Q_{gs}			nC
N-channel					7.5	
P-channel					7.0	
Gate to drain charge			Q_{gd}			nC
N-channel					7.5	
P-channel					8.0	
Reverse recovery time	3473	$di/dt = 100$ A/ μ s $V_{DD} \leq 30$ V dc; $I_D = I_{D1}$.	t_r		200	ns

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

TABLE II. Group A, B, C, and E electrical end-point measurements. 1/ 2/ 3/ 4/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Breakdown voltage drain to source	3407	$V_{GS} = 0 \text{ V}$ $I_D = 1.0 \text{ mA dc}$ bias condition C	$V_{(BR)DSS}$	100		V dc
2.	Gate to source voltage (threshold)	3404	$V_{DS} \geq V_{GS}$ $I_D = 0.25 \text{ mA dc.}$	$V_{GS(th)1}$	2.0	4.0	V dc
3.	Gate current	3411	$V_{GS} = \pm 20 \text{ V dc}$ bias condition C	I_{GSS1}		± 100	nA dc
4.	Drain current	3413	$V_{GS} = 0$, $V_{DS} = 80$ percent of rated V_{DS} bias condition C.	I_{DSS1}		25	$\mu\text{A dc}$
5.	Static drain to source on-state resistance	3421	$V_{GS} = 10 \text{ V dc}$ condition A, pulsed (see 4.5.1); $I_D = I_{D2}$	$r_{DS(on)1}$			Ω
6.	N-channel P-channel	4011	Pulsed (see 4.5.1) $V_G = 0 \text{ V}$; $I_D = I_{D1}$.	V_{SD}		0.7 1.4	V
	Forward voltage (source-drain diode)					1.5 5.5	
7.	Thermal response	3161	See 4.5.3	ΔV_{SD}			

See footnotes on next page.

TABLE II. Group A, B, C, and E electrical end-point measurements - Continued.

1/ The electrical measurements for appendix E, table VIa (JANTS) of MIL-PRF-19500 are as follows:

- a. Subgroup 3, see table II herein, steps 1, 2, 3, 4, 5, 6 and 7.
- b. Subgroup 4, accelerated steady state reverse bias see table II herein, steps 1, 2, 3, 4, 5 and 6. No more than 15 percent of the sample shall be permitted to have a $\Delta V_{BR(DSS)}$ shift of more than 10 percent and ΔI_{DSS} greater than 50 μA .

For accelerated steady state gate stress; see table II herein, steps 1, 2, 3, 4, 5 and 6.

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

- a. Subgroup 2, see table II herein, steps 1, 2, 3, 4, 5, 6 and 7.
- b. Subgroup 3, steady state reverse bias see table II herein, steps 1, 2, 3, 4, 5 and 6.

For steady state gate stress; see table II herein, steps 1, 2, 3, 4, 5 and 6.

3/ The electrical measurements for appendix E, table VII of MIL-PRF-19500 are as follows:

- a. Subgroup 2, see table II herein, steps 1, 2, 3, 4, 5, 6 and 7.
- b. Subgroup 3, see table II herein, steps 1, 2, 3, 4, 5 and 6.
- c. Subgroup 6, steady state reverse bias see table II herein, steps 1, 2, 3, 4, 5 and 6.
- d. For steady state gate stress; see table II herein, steps 1, 2, 3, 4, 5 and 6.

4/ The electrical measurements for appendix E, table IX of MIL-PRF-19500 are as follows:

- a. Subgroup 1, see table II herein, steps 1, 2, 3, 4, 5, 6 and 7.
- b. Subgroup 2, see table II herein, steps 1, 2, 3, 4, 5 and 6.

5. PACKAGING

5.1 Packaging. Packaging shall prevent mechanical damage of the devices during shipping and handling and shall not be detrimental to the device. When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

5.2 Marking. Unless otherwise specified (see 6.2), marking shall be in accordance with MIL-STD-129.

6. NOTES

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

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

6.2 Acquisition requirements. See MIL- PRF-19500.

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 Products List QPL No.19500 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, ATTN: DSCC-VQE, 3990 East Broad Street, Columbus, OH 43216-5000.

6.4 Substitution information. Devices covered by this specification are substitutable for the manufacturers' and users' part number. This information in no way implies that manufacturers' part numbers are suitable as a substitute for the military Part or Identifying Number (PIN).

Military PIN	Manufacturers' CAGE code	Manufacturers' and users' PIN
2N7336	59993	IRFG91

6.5 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
 Navy - EC
 Air Force - 17
 NASA - NA

Preparing activity:
 DLA - CC
 (Project 5961-1874)

Review activities:
 Army - AR, MI, SM
 Navy - AS, CG, MC
 Air Force - 13, 19, 85, 99

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 4. 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-19500/598A

2. DOCUMENT DATE (YYMMDD)

971124

3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, QUAD, FIELD EFFECT TRANSISTOR, P-CHANNEL AND N-CHANNEL, SILICON TYPE 2N7336, JAN, JANTX, JANTXV AND JANS

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 (YYMMDD)

(1) Commercial

(2) AUTOVON
(If applicable)

8. PREPARING ACTIVITY

a. NAME Alan Barone

b. TELEPHONE (Include Area Code)

(1) Commercial (614)692-0510 (2) AUTOVON 850-0510

c. ADDRESS (Include Zip Code) from Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad Street, Columbus, OH 43216-5000

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Quality and Standardization Office
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466
Telephone (703) 756-2340 AUTOVON 289-2340