The documentation and process conversion measures necessary to comply with this revision shall be completed by 15 May 1999

INCH - POUND

MIL-PRF-19500/570B
16 February 1999
SUPERSEDING
MIL-S-19500/570A
31 March 1993

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, FIELD EFFECT,
N-CHANNEL, SILICON LOGIC-LEVEL, TYPES 2N6901, AND 2N6903
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 a logic-level N-channel, enhancement-mode, MOSFET, power transistor. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1. TO-205AF (formerly TO-39).

1.3 Maximum ratings. Unless otherwise specified, T_A = +25°C.

Type	P_T 1/ T_C = +25°C	P_T T_A = +25°C	V_{DS}	V_{DG}	V_{GS}	I_{D1} 2/ T_C = +25°C	I_{D2} T_C = +100°C	I_S 2/	I_{DM}	T_{op} and T_{STG}	$R_{\theta JC}$ max
	W	W	V dc	V dc	V dc	A dc	A dc	A dc	A(pk)	°C	°C /W
2N6901	8.33	0.6	100	100	± 10	1.69	1.07	1.69	5	-55 to	15.0
2N6903	8.33	0.6	200	200	± 10	0.98	0.62	0.98	4	+150	15.0

1/ Derate linearly T_C > +25°C - (0.067 W/°C)

2/ Derate above T_C = +25°C according to the formula: $I_D = \sqrt{\frac{P(rated)}{K}}$

where P(rated) = P_T - (T_C - 25) (W/°C) watts; K = Max $r_{DS(on)}$ at T_J = +150°C.

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.

1.4 Primary electrical characteristics. Unless otherwise specified, at T_C = +25°C.

Type	Min $V_{(BR)DSS}$ V_{GS} = 0 V I_D = 1 mA	$V_{GS(th)1}$ $V_{DS} \geq V_{GS}$ I_D = 1 mA	Max I_{DSS1} V_{GS} = 0 V V_{DS} = 80 percent of rated V_{DS}	Max $r_{DS(on)}$ 1/ V_{GS} = 5 V dc	
				T_J = +25°C at I_{D1}	T_J = +150°C at I_D2
	V dc	V dc	µA dc	Ohms	Ohms
		Min Max			
2N6901	100	1.0 2.0	1.0	1.4	2.9
2N6903	200	1.0 2.0		3.65	8.65

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.)

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.

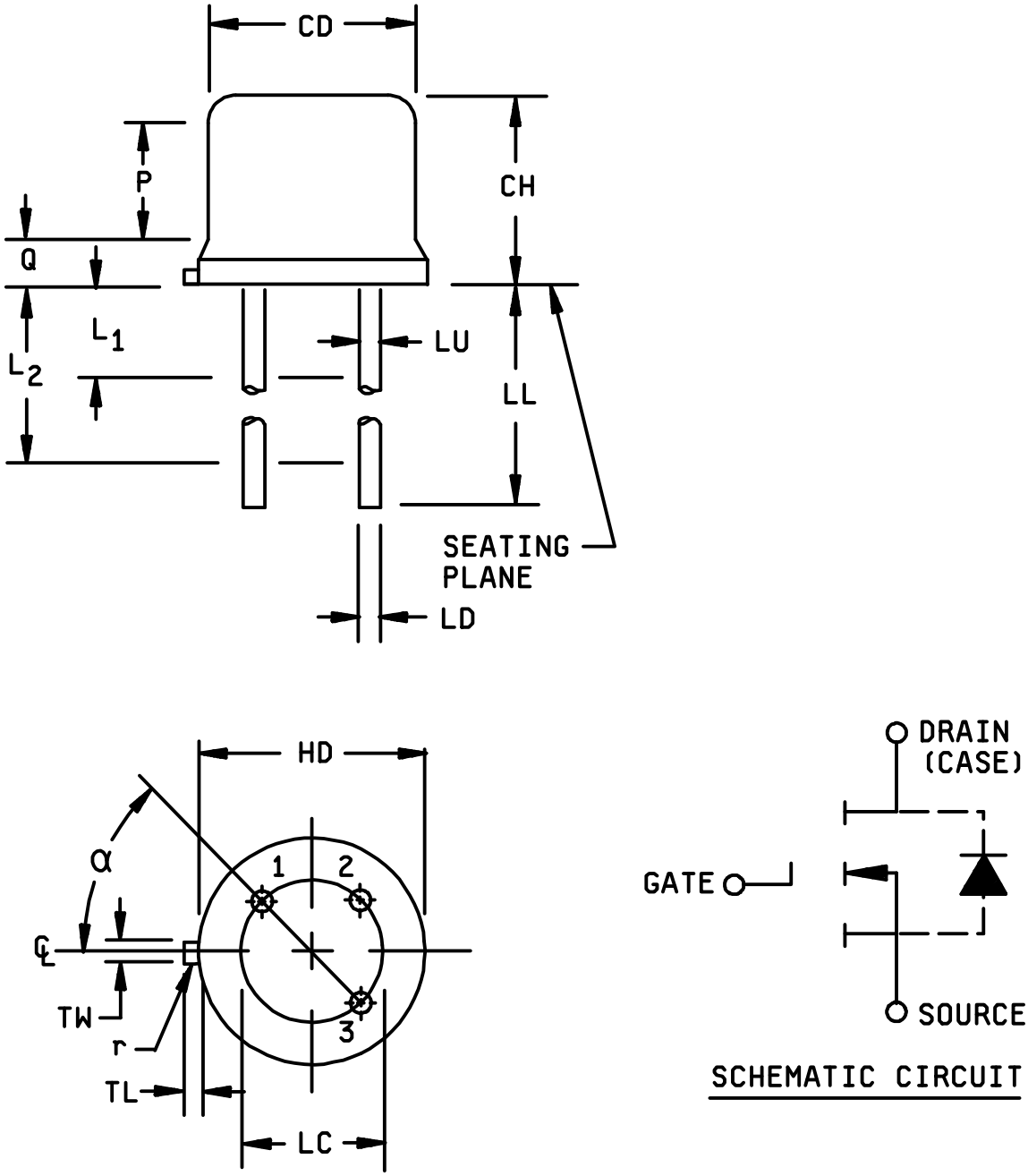

FIGURE 1. Physical dimensions for TO-205 AF.

Dimensions					
Ltr	Inches		Millimeters		Notes
	Min	Max	Min	Max	
CH	.160	.180	4.07	4.57	
LC	.200 TP		5.08 TP		
LD	.016	.021	0.41	0.63	8,9
LU	.016	.019	0.41	0.48	8,9
HD	.335	.370	8.51	9.40	
CD	.305	.335	7.75	8.51	
TW	.028	.034	0.71	0.86	3
TL	.029	.045	0.74	1.14	4
LL	.500	.750	12.70	19.05	8,9
L_1	---	.050	---	1.27	8,9
L_2	.250	---	6.35	---	8,9
P	.100	---	2.54	---	6
Q	---	.050	---	1.27	5
r	---	.010	---	0.25	10
α	45 TP		45 TP		6

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Beyond radius(r) maximum, TW shall be held for a minimum length of .011 (0.028 mm).
4. Dimension TL measured from maximum HD.
5. Outline in this zone is not controlled.
6. Dimension CD shall not vary more than .010 (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. Leads at gauge plane .054 +.001, -.000 (1.37 +0.03, -0.00 mm) below seating plane shall be within .007 (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods or by the gauge and gauging procedure shown on figure 2.
8. LU applies between L_1 and L_2. LD applies between L_2 and LL minimum. Diameter is uncontrolled in L_1 and beyond LL minimum.
9. All three leads.
10. Radius(r) applies to both inside corners of tab.
11. Drain is electrically connected to the case.
12. Pin out: 1- source, 2 - gate, 3 - drain (case).

FIGURE 1. Physical dimensions for TO-205 AF - Continued.

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 manufacturers list before contract award (see 4.2 and 6.3).

3.2 Associated specification. The individual item performance requirements shall be in accordance with MIL-PRF-19500, and as specified herein.

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

C - - - - - - - - - - Coulomb

3.4 Interface requirements and physical dimensions. The interface requirements and physical dimensions for the purpose of interchangeability shall be as specified in MIL-PRF-19500 and on figure 1 herein.

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

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

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

3.7 Electrical test requirements. The electrical test requirements shall be 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, appendix E, table IX 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
1/ 2/	Method 3470, (see 4.5.4) optional	Method 3470, (see 4.5.4) optional
1/	Method 3161, (see 4.5.3)	Method 3161, (see 4.5.3)
9	I_{GSS1}, I_{DSS1}, gate stress test (see4.5.5) subgroup 2 of table I herein.	Gate stress test see (4.5.5) subgroup 2 of table I herein. 3/
10	Method 1042, test condition B	Method 1042, test condition B
11	Subgroup 2 of table I herein; I_{GSS1}, I_{DSS1}, $r_{DS(on)1}$, $V_{GS(th)1}$ ΔI_{GSS1} = ± 20 nA dc or ± 100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±.2 µA dc or ± 100 percent of initial value, whichever is greater.	Subgroup 2 of table I herein I_{GSS1}, I_{DSS1}, $r_{DS(on)1}$, $V_{GS(th)1}$
12	Method 1042, test condition A, t = 240 hours	Method 1042, test condition A or t = 48 hours minimum at+175°C minimum.
13	Subgroups 2 and 3 of table I herein; ΔI_{GSS1} = + 20 nA dc or ± 100 percent of initial value, whichever is greater ΔI_{DSS1} = ±.2 µA dc or ± 100 percent of initial value, whichever is greater $\Delta r_{DS(on)1}$ = ± 20 percent of initial value. $\Delta V_{GS(th)1}$ = ± 20 percent of initial value.	Subgroup 2 of table I herein; ΔI_{GSS1} = ± 20 nA dc or ± 100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±.2 µA dc or ± 100 percent of initial value, whichever is greater. $\Delta r_{DS(on)1}$ = ± 20 percent of initial value. $\Delta V_{GS(th)1}$ = ± 20 percent of initial value.

1/ Shall be performed anytime before screen 10.
2/ This test method in no way implies an avalanche energy rating. This is a stress test designed to ensure a rugged product. This test need not be performed in group A when performed as a screen.
3/ These tests shall be performed after methods 3470, 3161, and gate stress test and shall precede screen 10.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-PRF-19500. Alternate flow is allowed for quality conformance inspection in accordance with figure 2 of MIL-PRF-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with appendix E, table V of 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 (JAN, JANTX and JANTXV) of MIL-PRF-19500, and as follows. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table II herein.

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

Subgroup	Method	Conditions
B3	1051	Test condition F3, except T_{Low} = - 55°C.
B3	2037	Test condition A, all internal wires for each device shall be pulled separately.
B4	1042	Test condition D: 2,000 cycles. The heating cycle shall be 1 minute minimum.
B5	1042	Test condition A, V_{DS} = rated, T_A = +175°C, t = 120 hours. Read and record $V_{BR(DSS)}$ (pre and post) at 1 mA = I_D. Read and record I_{DSS} (pre and post), as specified in table III.
B5	1042	Test condition B, V_G = rated, T_A = +175°C, t = 24 hours.
B5	3161	Test condition A.

4.4.2.2 Group B inspection, appendix E, table VIb of MIL-PRF-19500.

Subgroup	Method	Conditions
B2	1051	Test condition G.
B3	1042	Test condition D: 2,000 cycles. The heating cycle shall be 30 seconds minimum.
B3	2037	Test condition A, all internal bond wires for each device shall be pulled separately.
B6	1032	T_A = +150°C.

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 the applicable steps of table II herein.

4.4.3.1 Group C inspection appendix E, table VII of MIL-PRF-19500.

Subgroup	Method	Conditions
C2	2036	Test condition E.
C6	1042	Test condition D: 6,000 cycles. The heating cycle shall be 30 seconds minimum.

4.4.3 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 the applicable steps of table II herein.

4.4.3.1 Group E inspection appendix E, table IX of MIL-PRF-19500. 1/

Subgroup	Method	Conditions	Sampling plan
E1	1051	Test condition G, 200 cycles	45 devices, c = 0
E1	1071		45 devices, c = 0
		Electrical measurements See table II, steps 1, 2, 3, 4, 5, 6 and 7.	
E2	1042	Condition A: 1,000 hours	45 devices, c = 0
		Electrical measurements See table II, steps 1, 2, 3, 4, 5, 6 and 7.	
E2	1042	Condition B: 1,000 hours	45 devices, c = 0
		Electrical measurements See table II, steps 1, 2, 3, 4, 5, 6 and 7.	
E3		Not applicable	
E4	3161	$R_{\theta JC}$ = 15°C /W max. See 4.5.2	5 devices, c = 0
E5		Not applicable	

1/ A separate sample for each test may be pulled.

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 measurements 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. $R_{\theta JC}$(max) = 15°C /W.

a. I_M measuring current.....10 mA.

b. I_H drain heating current .....5 A.

c. t_H heating time.....Steady state (see MIL-STD-750 method 3161 for definition)

d. V_H drain-source heating voltage.....12 V.

e. t_{MD} measurement time delay.....10 to 80 µs.

f. t_{SW} sample window time.....10 (max) µs.

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 V_{SD} limit shall be derived by each vendor from the thermal response curves (see figure 3). The chosen ΔV_{SD} measurement and conditions for each device in the qualification lot shall be submitted in the qualification report. The chosen ΔV_{SD} shall be considered final after the manufacturer has had the opportunity to test five consecutive lots.

a. I_M measuring current ..... 10 mA.

b. I_H drain heating current ..... 5 (min) A.

c. t_H heating time ..... 10 ms.

d. V_H drain-source heating voltage ..... 12 (min) V.

e. t_{MD} measurement time delay ..... 10 to 80 µs.

f. t_{SW} sample window time ..... 10 (max) µs.

4.5.4 Unclamped inductive switching.

a. Peak current, I_D ..... rated I_{D1}.

b. Peak gate voltage, V_{GS} ..... 10 V.

c. Gate to source resistor, R_{GS} ..... $25W < R_{GS} < 200W$

d. Initial case temperature ..... +25°C, +10°C -5°C.

e. Inductance ..... 100 µH ±10 percent.

f. Number of pulses to be applied ..... 1 pulse.

4.5.5 Gate stress test.

V_{GS} = 15 V min.

t = 250 µs min.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical inspection	2071					
Subgroup 2						
Breakdown voltage drain to source	3407	I_D = 1.0 mA dc, bias condition C, V_{GS} = 0 V	$V_{(BR)DSS}$			V dc
2N6901				100		
2N6903				200		
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 1.0 mA dc	$V_{GS(th)1}$	1.0	2.0	V dc
Gate current	3411	V_{GS} = +10 V dc and -10 V dc, bias condition C, V_{DS} = 0 V	I_{GSS1}		±100	nA dc
Drain current	3413	Bias condition C, V_{GS} = 0 V	I_{DSS1}			
2N6901		V_{DS} = 80 V dc			1.0	µA dc
2N6903		V_{DS} = 160 V dc			1.0	µA dc
Static drain to source "on-state" resistance	3421	V_{GS} = 5 V dc, bias condition A, pulsed (see 4.5.1)	$r_{DS(on)1}$			Ω
2N6901		I_D = 1.07 A dc			1.4	
2N6903		I_D = 0.62 A dc			3.65	
Drain to source "on-state" voltage	3405	V_{GS} = 5 V dc, bias condition A, pulsed (see 4.5.1)	$V_{DS(on)}$			V
		I_D = 1.69 A dc			2.4	
		I_D = 0.98 A dc			6.0	
Forward voltage (source drain diode)	4011	Pulsed (see 4.5.1), V_{GS} = 0 V	V_{SD}	0.8	1.6	V
2N6901		I_S = 1.69 A dc				
2N6903		I_S = .98 A dc				
Forward transconductance	3475	I_D = rated I_{D2} (see 1.3), pulsed (see 4.5.1)	g_{FS}	0.5	2.0	S

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3						
High temperature operation:		$T_C = T_J = +125°C$				
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, $I_D = 1.0$ mA dc	$V_{GS(th)2}$	0.5		V dc
Gate current	3411	$V_{GS} = +10$ V dc and -10 V dc; $V_{DS} = 0$; bias condition C	I_{GSS2}		± 200	nA dc
Drain current	3413	Bias condition C, $V_{GS} = 0$ V	I_{DSS2}		50	µA dc
2N6901 2N6903		$V_{DS} = 80$ V dc $V_{DS} = 160$ V dc				
Static drain to source "on-state" resistance	3421	$V_{GS} = 5$ V dc, pulsed (see 4.5.1)	$r_{DS(on)2}$			Ω
2N6901 2N6903		$I_D = 1.07$ A dc $I_D = 0.62$ A dc			2.6 7.7	
Low temperature operation:		$T_C = T_J = -55°C$				
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, $I_D = 1.0$ mA dc	$V_{GS(th)3}$		3.0	V dc
Subgroup 4						
Switching time test	3472	I_D = rated I_{D2}, (see 1.3); $V_{GS} = 5$ V dc, gate drive impedance = 25Ω				
Turn-on delay time			$t_{d(on)}$		25	ns
2N6901 2N6903		$V_{DD} = 50$ V dc $V_{DD} = 100$ V dc				
Rise time			t_r		80	ns
2N6901 2N6903		$V_{DD} = 50$ V dc $V_{DD} = 100$ V 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	
Subgroup 4 - Continued						
Turn-off delay time			$t_{d(off)}$			ns
2N6901		V_{DD} = 50 V dc			45	
2N6903		V_{DD} = 100 V dc			40	
Fall time			t_f		80	ns
2N6901		V_{DD} = 50 V dc				
2N6903		V_{DD} = 100 V dc				
Subgroup 5						
Safe operating area test	3474	See figure 3 V_{DS} = 80 percent of rated V_{DS} and $V_{DS} \leq$ 200 V max				
High voltage dc SOA		t_p = 1 s				
Electrical measurements		See table III, steps 1, 2, 3, 4, 5, 6, and 7				
Single pulse unclamped inductive switching	3470	See 4.5.4; c = 0, 116 devices				
Electrical measurements		See table III steps 1, 2, 3, 4, 5, and 6				
Subgroups 6						
Not applicable						
Subgroup 7						
Gate charge	3471	Condition A or B				
On-state gate charge			$Q_{g(on)}$			nC
2N6901				1.3	3.5	
2N6903				1.5	3.5	

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 7 - Continued						
Gate to source charge			Q_{gs}			nC
2N6901				0.3	1.0	
2N6903				0.2	0.8	
Gate to drain charge			Q_{gd}			nC
2N6901				1.0	2.9	
2N6903				0.8	2.7	
Reverse recovery time	3473	$V_{DD} \leq 30$ V; di/dt = 100 A/µs I_F = 1 A	t_{rr}			ns
2N6901					250	
2N6903					500	

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

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

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Breakdown voltage, drain to source 2N6901 2N6903	3407	I_D = 1 mA dc Bias condition C V_{GS} = 0 V	$V_{(BR)DSS}$	 100 200		V dc
2.	Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS;}$ I_D = 1 mA dc	$V_{GS(th)1}$	1.0	2.0	V dc
3.	Gate current	3411	V_{GS} = +10 V dc and -10 V dc Bias condition C V_{DS} = 0 V	I_{GSS1}		± 100	nA dc
4.	Drain current 2N6901 2N6903	3413	Bias condition C V_{GS} = 0 V V_{DS} = 80 V dc V_{DS} = 160 V dc	I_{DSS1}		50	µA dc
5.	Static drain to source" on-state" resistance 2N6901 2N6903	3421	V_{GS} = 5 V dc Bias condition A Pulsed (see 4.5.1) I_D = 1.07 A dc I_D = 0.62 A dc	$r_{DS(on)1}$		 1.4 3.65	Ω
6.	Drain to source "on- state" voltage 2N6901 2N6903	3405	V_{GS} = 5 V dc Bias condition A Pulsed (see 4.5.1) I_D = 1.69 A dc I_D = 0.98 A dc	$V_{DS(on)}$		 2.4 6.0	
7.	Forward voltage (source drain diode) 2N6901 2N6903	4011	Pulsed (see 4.5.1) V_{GS} = 0 V I_S = 1.69 A dc I_S = 0.98 A dc	V_{SD}	0.8	1.6	V
8.	Thermal response	3161	See 4.5.3	ΔV_{SD}			

See footnotes at top of next page.

TABLE II. Groups A, B, C, and E electrical measurements - Continued.

1/ The electrical measurements for appendix E, table VIa (JANS) 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, see table II herein, steps 1, 2, 3, 4, 5, 6, 7, and 8.

c. Subgroup 5, Accelerated steady-state operation life, see table II herein, steps 1, 2, 3, 4, 5, 6, and 7. 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 the $\Delta I_{(DSS)}$ greater than 50 µA.

Accelerated steady-state gate stress, see table II herein, steps 1, 2, 3, 4, 5, 6, and 7.

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, see table II herein, steps 1, 2, 3, 4, 5, 6, 7, and 8.

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

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, 6, and 7.

c. Subgroup 6, see table II herein, steps 1, 2, 3, 4, 5, 6, 7, and 8.

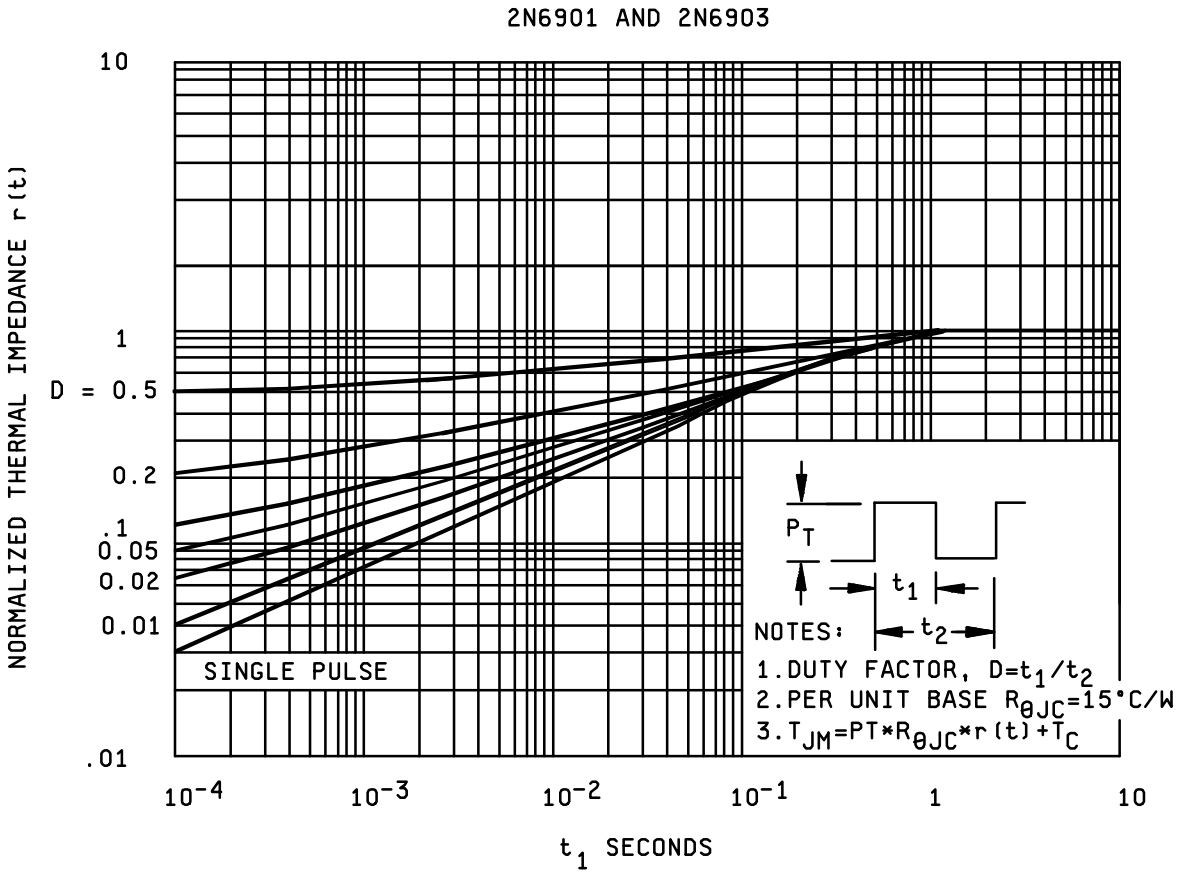

FIGURE 2. Transient thermal response.

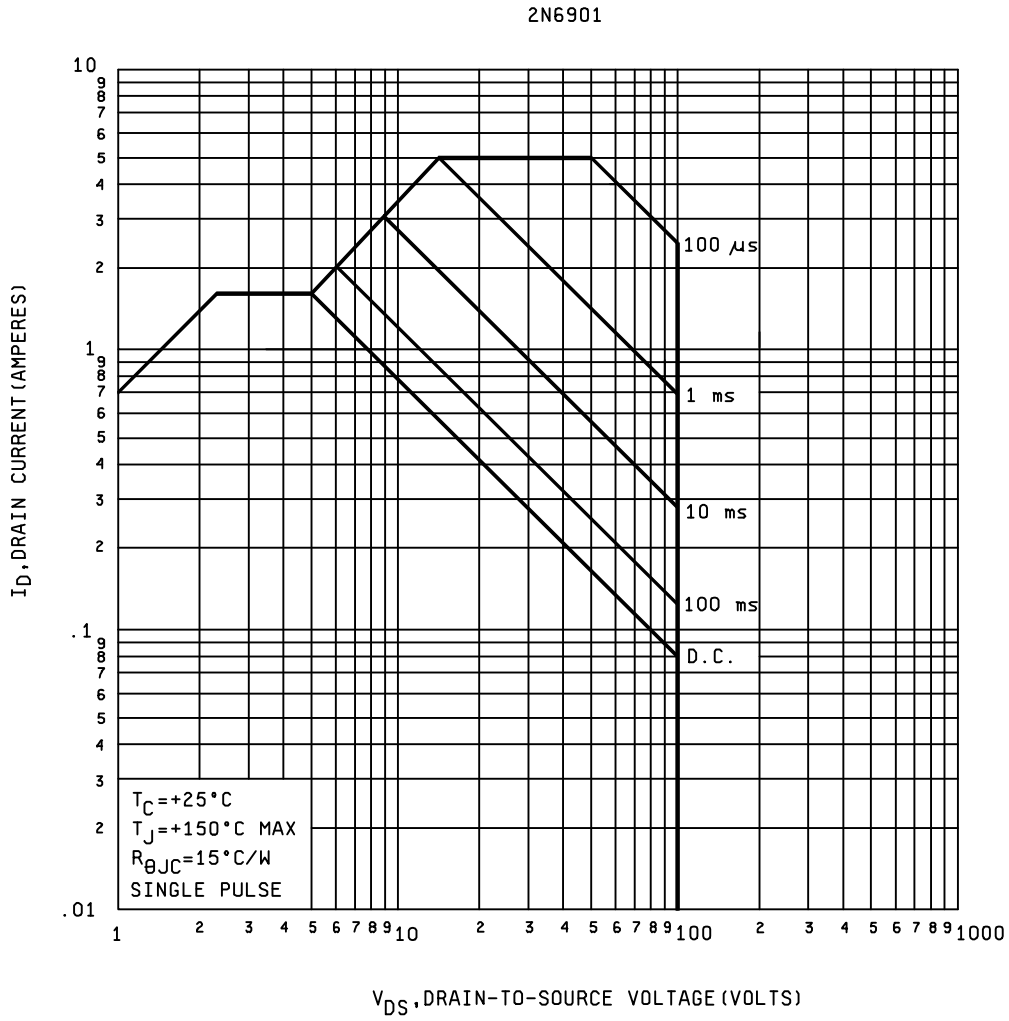

FIGURE 3. Maximum safe operating area.

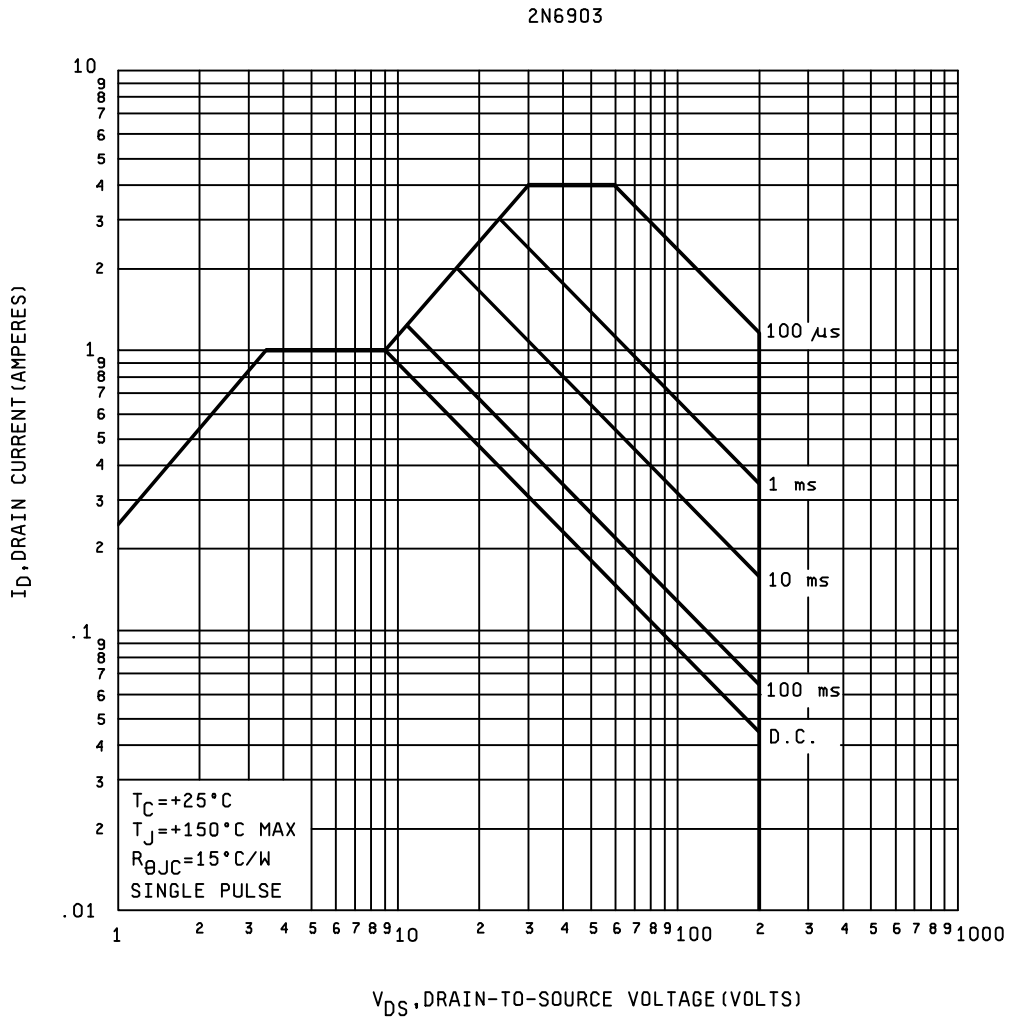

FIGURE 3. Maximum safe operating area - Continued.

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 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-PRF-19500.

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 Handling. MOS devices must be handled with certain precautions to avoid damage due to the accumulation of electrostatic charge. The following handling practices should be followed.

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, $R \leq 100$ k, whenever bias voltage is to be applied drain to source.

6.4 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 Manufacturer's 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 purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, DSCC-VQE, Columbus, OH 43216.

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

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

Preparing activity:
DLA - CC

(Project 5961 - 2035)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of Requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	**1. DOCUMENT NUMBER** MIL-PRF-19500/570B	**2. DOCUMENT DATE (YYMMDD)** 990216

3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, TRANSISTOR, FIELD EFFECT, N-CHANNEL, SILICON LOGIC-LEVEL, TYPES 2N6901, AND 2N6903 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) Commercial DSN FAX EMAIL	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY	
a. Point of contact: Alan Barone	b. TELEPHONE Commercial 614-692-0510 DSN 850-0510 FAX 614-692-6939 EMAIL alan_barone@dscc.dla.mil
c. ADDRESS: 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 DSN 289-2340