INCH-POUND

MIL-PRF-19500/652
4 May 2001

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, HIGH VOLTAGE,
FIELD EFFECT, N-CHANNEL, SILICON, TYPE 2N7387 AND 2N7387U1,
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 high voltage N-channel, enhancement-mode, power MOSFET transistor, with avalanche energy maximum ratings (E_{AS}) and maximum avalanche current (I_{AS}). Four levels of product assurance are provided for each encapsulated device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (TO-254AA), and figure 2 for surface mount (U1).

1.3 Maximum ratings. (T_A = +25°C, unless otherwise specified).

Type	$V_{(BR)DSS}$ min V_{GS} = 0 Vdc I_D = 1.0 mA dc	P_T (1) T_C = +25°C	P_T T_A = +25°C	I_{D1} (2) T_C = +25°C	I_{D2} (2) T_C = +100°C	I_S	I_{DM} (3)	T_{op} and T_{STG}
	V dc	W	W	A dc	A dc	A dc	A(pk)	°C
2N7387 2N7387U1	1000	125	4	3	1.9	3	9	-55 to +150

See notes 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: Defense Supply Center Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43216-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

1.3 Maximum ratings - Continued.

Type	I_{AR} (2)	V_{GS}	E_{AS}	$r_{DS(on)}$max (4) V_{GS} = 10V dc; I_D = 1.9A		$R_{\theta JC}$ max
				T_J = +25°C	T_J = +150°C	
	A	V dc	mj	ohms	ohms	°C/W
2N7387	3	±20	245	4.00	9.60	1.0

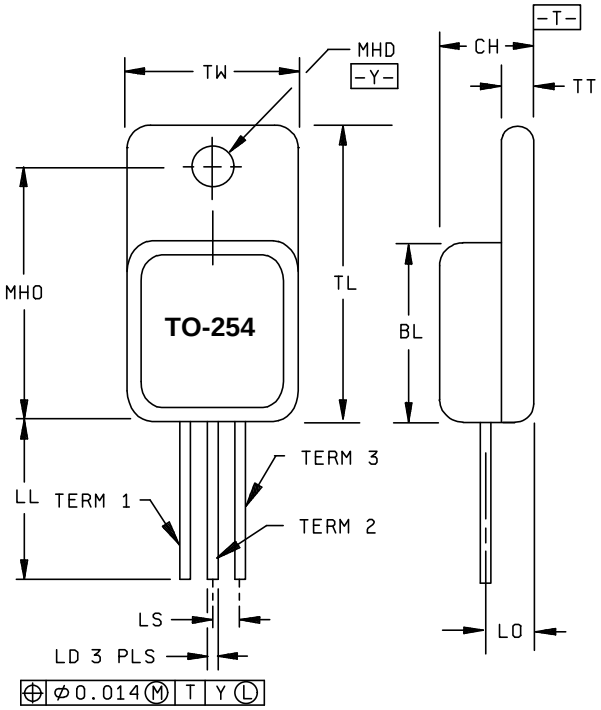
(1) Derate linearly 1.0 W/°C for T_C > +25°C; $\frac{T_{J(max)} - T_C}{R_{\Theta JX}}$ P_T =

(2) ID = sqrt {[$T_{J(max)}$ - T_C]/[$R_{\theta JX}$ x ($R_{ds(on)}$ at $T_{J(max)}$)]}
(3) I_{DM} = 3_{D1} as calculated in footnote 2/.
(4) Pulsed (see 4.5.1).

1.4 Primary electrical characteristics. $T_{C =}$ +25°C (unless otherwise specified).

Type	$V_{(BR)DSS}$ min V_{GS} = 0 V dc I_D = 1.0 mA dc	$V_{GS(th)1}$ $V_{DS} \geq V_{GS}$ I_D = 0.25 mA dc		I_{DSS1} max V_{GS} = 0 V dc V_{DS} = 800 V dc	$r_{DS(on)}$ (1) V_{GS} = 10 V dc I_D = 1.9 A dc
	V dc	V dc		µA dc	ohms
		min	max		
2N7387	1000	2.0	4.0	25	4.00

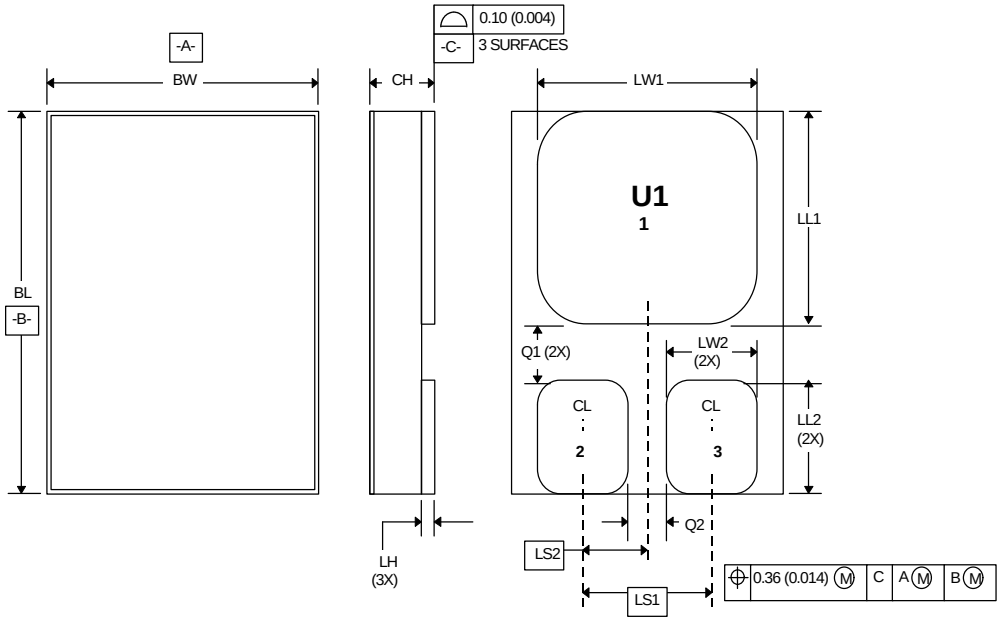
(1) Pulsed (see 4.5.1).



Dimensions				
Symbol	Inches		Millimeters	
	Min	Max	Min	Max
BL	.535	.545	13.59	13.84
CH	.249	.260	6.32	6.60
LD	.035	.045	0.89	1.14
LL	.510	.550	12.95	13.97
LO	.150 typ		3.81 typ	
LS	.150 bsc		3.81 bsc	
MHD	.139	.149	3.53	3.78
MHO	.665	.685	16.89	17.40
TL	.790	.800	20.07	20.32
TT	.040	.050	1.02	1.27
TW	.535	.545	13.54	13.84
Term 1	Drain			
Term 2	Source			
Term 3	Gate			

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Dimensioning and tolerancing are in accordance with ANSI, Y14.5M, 1982.
4. All terminals are isolated from the case.

FIGURE 1. Physical dimensions (TO-254AA).



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.620	.630	15.74	16.00
BW	.445	.455	11.30	11.55
CH	.129	.139	3.27	3.53
LH	.010	.020	0.25	0.51
LW1	.370	.380	9.39	9.65
LW2	.135	.145	3.43	3.68
LL1	.410	.420	10.41	10.66
LL2	.152	.162	3.86	4.11
LS1	.200	.220	5.08	5.59
LS2	.100	.110	2.54	2.79
Q1	.035		0.89	
Q2	.050		1.27	
TERM 1	Drain			
TERM 2	Gate			
TERM 3	Source			

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for information only.

FIGURE 2. Physical dimensions for 2N7387U1 (surface mount).

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 shall be 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

DEPARTMENT OF DEFENSE

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, 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.

3. REQUIREMENTS

3.1 General. The requirements for acquiring the product described herein shall consist of this document and MIL-PRF-19500.

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

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

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1 and 2 herein. Methods used for electrical isolation of the terminal feedthroughs shall employ materials that contain a minimum of 90 percent Al_2O_3 (ceramic). Examples of such construction techniques are metallized ceramic eyelets or ceramic walled packages. The preferred measurements used herein are the metric SI system. However, since this item was originally designed using inch-pound units of measurement, in the event of a conflict between the metric and inch-pound units, the inch-pound units shall take precedence.

3.4.1 Lead formation, material and finish. Lead material shall be Kovar or Alloy 52; a copper core or plated core is permitted. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of lead formation, material or finish is desired, it shall be specified in the acquisition document (see 6.2). When lead formation is performed, as a minimum, the vendor shall perform 100 percent hermetic seal in accordance with screen 14 of table II of MIL-PRF-19500 and 100 percent DC testing in accordance with group A, subgroup 2 herein.

3.4.2 Internal construction. Multiple chip construction shall not be permitted.

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

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

3.6.1 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.

a. Devices should be handled on benches with conductive and grounded surfaces.

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

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

3.8 Electrical test requirements. The electrical test requirements shall be the subgroups specified in 4.4.2 and 4.4.3 herein.

3.9 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, II and III).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein. Alternate flow is allowed for qualification inspection in accordance with figure 4 of MIL-PRF-19500.

4.2.1 Group E Inspection. Group E inspection shall be in accordance with table II herein.

4.3 Screening (JANTX, JANTXV, and JANS 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	
	JANS level	JANTX and JANTXV levels
(1)	Gate stress test (see 4.4.4.2)	Gate stress test (see 4.4.4.2)
(1)	Method 3470 (see 4.4.4.1)	Method 3470 (see 4.4.4.1)
(1)	Method 3161 (see 4.3.1)	Method 3161 (see 4.3.1)
(1) 9	Subgroup 2 of table I herein I_{GSS1}, I_{DSS1}	Not applicable
10	Method 1042 of MIL-STD-750, test condition B	Method 1042 of MIL-STD-750, test condition B
11	I_{GSS1}, I_{DSS1}, $r_{DS(on)1}$, $V_{GS(th)1}$ in subgroup 2 of table I herein ΔI_{GSS1} = ±20 nA dc or ±100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±25 µA dc or ±100 percent of initial value, whichever is greater.	I_{GSS1}, I_{DSS1}, $r_{DS(on)1}$, $V_{GS(th)1}$ in subgroup 2 of table I herein
12	Method 1042 of MIL-STD-750, condition A	Method 1042 of MIL-STD-750, condition A
13	Subgroups 2 & 3 of table I herein; ΔI_{GSS1} = ±20 nA dc or ±100 percent of initial value, whichever is greater. ΔI_{DSS1} = ±25 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} = ±25 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.

4.3.1 Thermal impedance ($Z_{\theta JC}$) measurements. The $Z_{\theta JC}$ measurements shall be performed in accordance with method 3161 of MIL-STD-750. The maximum limit (not to exceed 0.72°C/W or figure 3 thermal impedance curve) for $Z_{\theta JC}$ in screening (table IV of MIL-PRF-19500) shall be derived by each vendor by means of statistical process control. When the process has exhibited control and capability, the capability data shall be used to establish the fixed screening limit. In addition to screening, once a fixed limit has been established, monitor all future sealing lots using a random five piece sample from each lot to be plotted on the applicable X, R chart. If a lot exhibits an out of control condition, the entire lot shall be removed from the line and held for engineering evaluation and disposition. This procedure may be used in lieu of an inline monitor. The following parameter measurements shall apply:

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

b. I_H drain heating current ..... 3.3 A minimum.

c. t_H heating time..... 100 ms. (25 ms for U1 device)

d. V_H drain-source heating voltage .... 25 V.

e. t_{MD} measurement time delay..... 30 to 60 µs.

f. t_{SW} sample window time..... 60 µs maximum.

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. Electrical measurements (end-points) shall be in accordance with the applicable steps of table III herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VIa (JANS) and table VIb (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 III herein.

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

Subgroup	Method	Conditions
3	1051	Test condition G.
3	2037	Test condition A. All internal wires for each device shall be pulled separately. If group B3 is to be continued to C6, strength test may be performed after C6.
4	1042	Test condition D, 2,000 cycles. The heating cycle shall be 30 seconds minimum. No heat sink nor forced air cooling on the device shall be permitted during the "on" cycle.
5	1042	A separate sample may be pulled for each test. Condition B, V_{GS} = rated, T_A = 175C, t = 24hours min. or T_A = 150C, t = 48 hours min. Condition A, V_{DS} = rated, T_A = 175C, t = 120hours min. or T_A = 150C, t = 240hours min.
6		See 4.4.4

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

Subgroup	Method	Conditions
2	1051	Test condition G.
3	1042	Test condition D, 2,000 cycles. The heating cycle shall be 30 seconds minimum. No heat sink nor forced air cooling on the device shall be permitted during the "on" cycle.
3	2037	Test condition A. All internal wires for each device shall be pulled separately. If group B3 is to be continued to C6, bond strength test may be performed after C6.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in 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 III herein.

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

Subgroup	Method	Conditions
2	2036	Test condition A; weight = 10 pounds, t = 15 s. Not applicable to surface mount version.
6	1042	Test condition D, 6,000 cycles. The heating cycle shall be 30 seconds minimum. No heat sink nor forced air cooling on the device shall be permitted during the "on" cycle.

4.4.4 Thermal resistance. Thermal resistance measurements shall be performed in accordance with method 3161 of MIL-STD-750. The maximum limit for $R_{\theta JC(max)}$ shall be 1.0°C/W for all devices. The following parameter measurements shall apply:

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

b. I_H drain heating current ..... 3.3 A.

c. t_H heating time..... Steady state (method 3161 of MIL-STD-750).

d. V_H drain-source heating voltage .... 25 V minimum.

e. t_{MD} measurement time delay..... 30 to 60 µs maximum.

f. t_{SW} sample window time..... 10 µs maximum.

4.4.4.1 Single pulse unclamped inductive switching.

a. Peak current, I_{AS}.....3 A.

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

c. Gate to source resistor, R_{GS}.....$25 \leq R_g \leq 200$ ohms.

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

e. Inductance, L .....51.72 mH minimum.

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

g. Supply voltage (V_{DD}) .....50 V.

4.4.4.2 Gate stress test.
a. V_{GS} = ± 30 V minimum.
b. t = 250 µs minimum.

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.

TABLE I. Group A inspection.

Inspections 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Breakdown voltage, drain to source	3407	Bias condition C, V_{GS} = 0 V dc, I_D = 1.0 mA dc	$V_{(BR)DSS}$	1000		V dc
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 0.25 mA dc	$V_{GS(th)1}$	2.0	4.0	V dc
Gate reverse current	3411	Bias condition C, V_{DS} = 0 V dc, V_{GS} = +20 V dc and -20 V dc	I_{GSS1}		±100	nA dc
Drain current	3413	Bias condition C, V_{GS} = 0 V dc, V_{DS} = 800 V dc	I_{DSS1}		25	µA dc
Static drain to source on-state resistance	3421	Condition A, pulsed (see 4.5.1); V_{GS} = 10 V dc, I_D = 1.9 A dc	$r_{DS(on)1}$		4.0	ohm
Static drain to source on-state resistance	3421	Condition A, pulsed (see 4.5.1); V_{GS} = 10 V dc, I_D = 3 A dc	$r_{DS(on)2}$		4.2	ohm
Forward voltage (source drain diode)	4011	Pulsed (see 4.5.1), V_{GS} = 10 V dc, I_D = 3 A dc	V_{SD}		1.8	V dc
Subgroup 3						
High temperature operation:		$T_C = T_J$ = +125°C				
Gate reverse current	3411	Bias condition C, V_{GS} = +20 V dc and -20 V dc, V_{DS} = 0 V dc	I_{GSS2}		±200	nA dc
Drain current	3413	Bias condition C, V_{GS} = 0 V dc, V_{DS} = 1,000 V dc	I_{DSS2}		1.0	mA dc
		V_{DS} = 800 V dc	I_{DSS3}		0.5	mA dc
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 0.25 mA dc	$V_{GS(th)2}$	1.0		V dc
Static drain to source on-state resistance	3421	Condition A, pulsed (see 4.5.1); V_{GS} = 10 V dc, I_D = 1.9 A dc	$r_{DS(on)3}$		8.0	ohm

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspections 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3 - Continued		$T_C = T_J = -55°C$				
Low temperature operation:						
Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, $I_D = 0.25$ mA dc	$V_{GS(th)3}$		5.0	V dc
Subgroup 4						
Switching time test	3472	$V_{GS} = 10$ V dc pulsed, $V_{DD} = 400$ V dc, RG = 9.1 ohms, $I_D = 3.0$ A dc				
Turn-on delay time			$t_{d(on)}$		25	ns
Rise time			t_r		45	ns
Turn-off delay time			$t_{d(off)}$		150	ns
Fall time			t_f		65	ns
Subgroup 5						
Safe operating area test	3474	See figure 4, $V_{DS} = 200$ V dc, $t_p = 10$ ms				
Electrical measurements		See table III steps 1, 2, 3, 4, 5, 6, and 7				
Subgroup 6						
Not applicable						
Subgroup 7						
Gate charge	3471	Condition B				
On-state gate charge			$Q_{g(on)}$		120	nC
Gate to source charge			Q_{gs}		16	nC
Gate to drain charge			Q_{gd}		75	nC
Reverse recovery time	3473	$V_{DD} \leq 30$ V, $d_i/d_t \leq 100$ A/µs, $I_D = 3$ A dc	t_{rr}		1100	ns

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

TABLE II. Group E inspection (all quality levels) for qualification only.

Inspection	MIL-STD-750		Sampling plan
	Method	Conditions	
Subgroup 1			45 devices, c = 1
Temperature cycling	1051	500 cycles, test condition G	
Hermetic seal	1071		
Electrical measurements		See table III steps 1, 2, 3, 4, 5, 6, and 7	
Subgroup 2 1/			45 devices, c = 1
Steady state reverse bias	1042	Condition A, 1,000 hours	
Electrical measurements		See table III steps 1, 2, 3, 4, 5, 6, and 7	
Steady-state gate bias	1042	Condition B, 1,000 hours	
Electrical measurements		See table III steps 1, 2, 3, 4, 5, 6, and 7	
Subgroup 3			3 devices, c = 0
Destructive physical analysis	2101		
Subgroup 4			5 devices, c = 0
Thermal impedance	3161	See 4.4.4	
Subgroup 5			15 devices, c = 0
Barometric pressure (reduced)	1001	Condition C	

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

TABLE III. Groups A, B, C, and E electrical end-point measurements.

Step	Inspection 1/ 2/ 3/	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Breakdown voltage, drain to source	3407	Bias condition C, V_{GS} = 0 V dc, I_D = 1.0 mA dc	$V_{(BR)DSS}$	1,000		V dc
2.	Gate to source voltage (threshold)	3403	$V_{DS} \geq V_{GS}$, I_D = 0.25 mA	$V_{GS(th)1}$	2.0	4.0	V dc
3.	Gate reverse current	3411	Bias condition C, V_{GS} = +20 V dc and -20 V dc, V_{DS} = 0 V dc	I_{GSS1}		±100	nA dc
4.	Drain current	3413	Bias condition C, V_{DS} = 800 V dc, V_{GS} = 0 V dc	I_{DSS1}		25	µA dc
5.	Static drain to source on-state resistance	3421	Condition A, pulsed (see 4.5.1); V_{GS} = 10 V dc, I_D = 1.9 A dc	$r_{DS(on)1}$		4.0	Ohm
6.	Static drain to source on-state resistance	3421	Condition A, pulsed (see 4.5.1); V_{GS} = 10 V dc, I_D = 3 A dc	$r_{DS(on)2}$		4.2	Ohm
7.	Forward voltage (source drain diode)	4011	V_{GS} = 10 V dc, pulsed (see 4.5.1), I_D = 3 A dc	V_{SD}		1.8	V dc
8.	Thermal impedance	3101		$Z_{\theta JC}$		0.72	°C/W

1/ The electrical measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:
   a. Subgroup 3 - steps 1, 2, 3, 4, 5, 6, and 7.
   b. Subgroup 4 - steps 1, 2, 3, 4, 5, 6, 7, and 8.
   c. Subgroup 5 - after the accelerated steady-state reverse bias test; 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 ΔI_{DSS} greater than 50 µA. After the accelerated steady-state gate stress test; steps 1, 2, 3, 4, 5, 6, and 7.

2/ The electrical measurements for table VIb (JANTX and JANTXV) of MIL-PRF-19500 are as follows:
   a. Subgroup 2 - steps 1, 2, 3, 4, 5, 6, and 7.
   b. Subgroup 3 - steps 1, 2, 3, 4, 5, 6, 7, and 8.

3/ The electrical measurements for table VII of MIL-PRF-19500 are as follows:
   a. Subgroup 2 - steps 1, 2, 3, 4, 5, 6, and 7.
   b. Subgroup 3 - steps 1, 2, 3, 4, 5, 6, and 7.
   c. Subgroup 6 - steps 1, 2, 3, 4, 5, 6, 7, and 8.

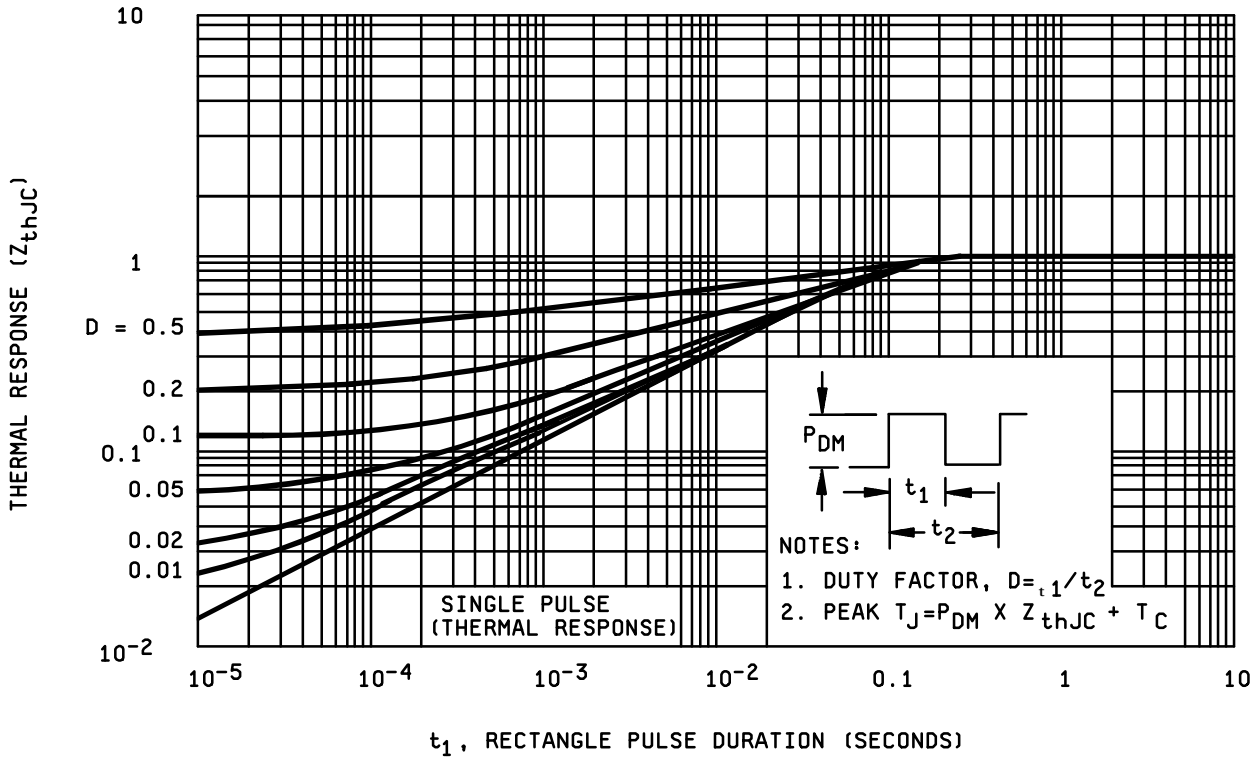


FIGURE 3. Thermal impedance curves.

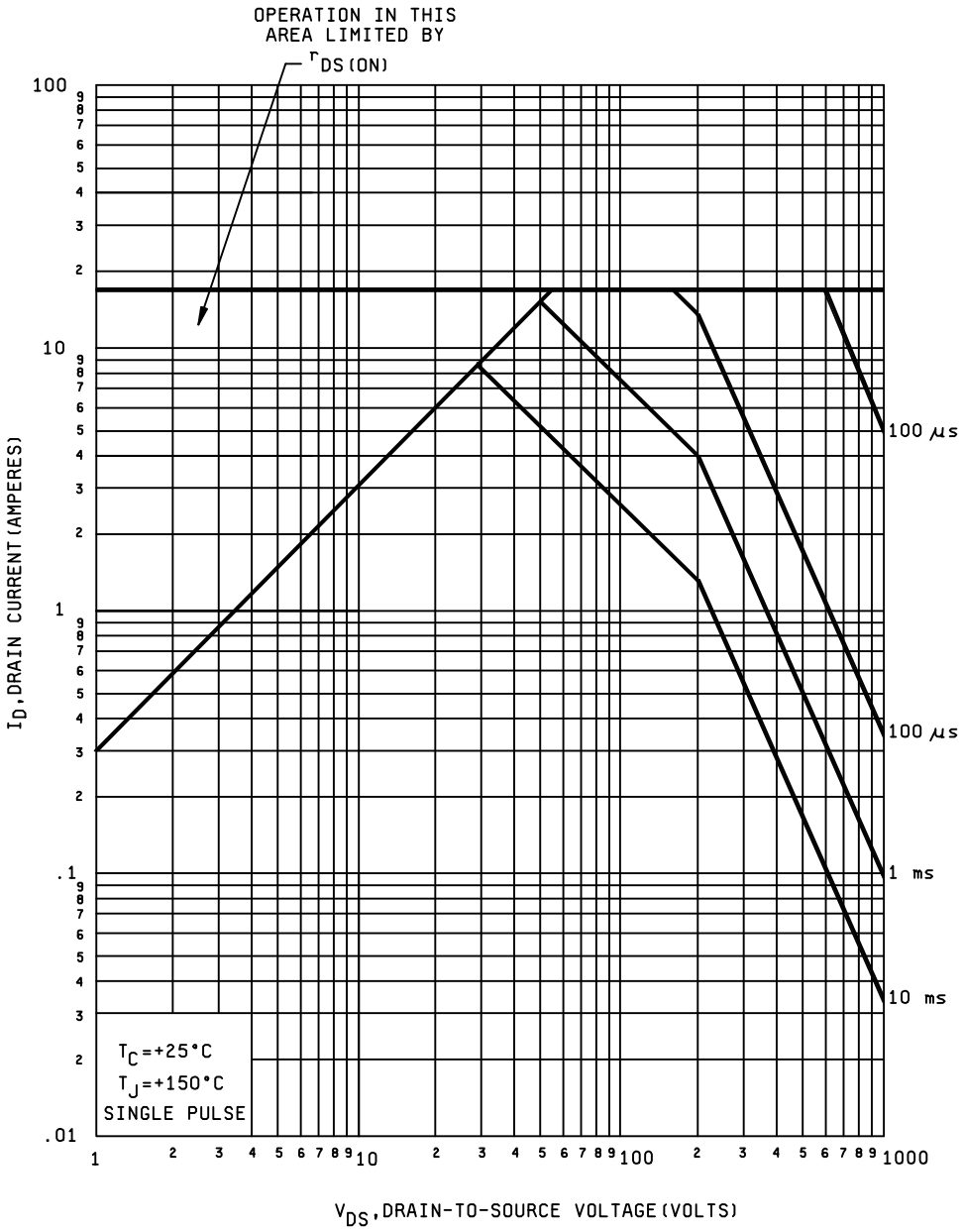


FIGURE 4. Safe operating area graph.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.

b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).

c. Packaging requirements (see 5.1).

d. Lead finish (see 3.4.1).

e. Type designation and product assurance level.

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 Manufacturer's List (QML) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, ATTN: DSCC-VQE, P.O. Box 3990, Columbus, OH 43216-5000.

Custodians:
Army - CR
Navy - NW
Air Force - 11
NASA - NA

Preparing activity:
DLA - CC

(Project 5961-1879)

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, and send to preparing activity.

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-19500/652	2. DOCUMENT DATE 4 May 2001

3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, TRANSISTOR, HIGH VOLTAGE, FIELD EFFECT, N-CHANNEL, SILICON, TYPE 2N7387 and 2N7387U1, 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 (PLEASE PRINT)	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE (Include Area Code) COMMERCIAL DSN FAX EMAIL	7. DATE SUBMITTED

8. PREPARING ACTIVITY

a. NAME Alan Barone	b. TELEPHONE Commercial 614-692-0510 DSN 850-0510 FAX 614-692-6939 EMAIL alan.barone@dscc.dla.mil
c. ADDRESS *(Include Zip Code)* Defense Supply Center Columbus ATTN: DSCC-VAC P.O. Box 3990 Columbus, OH 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703)767-6888 DSN 427-6888