

The documentation and process conversion measures necessary to comply with this amendment shall be completed by 29 December 1992

INCH-POUND

MIL-S-19500/493A(ER)
AMENDMENT 3
29 September 1992
SUPERSEDING
AMENDMENT 2
1 April 1992

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, PNP, THYRISTOR, SILICON, (PROGRAMMABLE UNIJUNCTION TRANSISTOR), TYPES; 2N6116, 2N6117, 2N6118, 2N6137, 2N6138, JAN, JANTX, AND JANTXV

This amendment forms a part of MIL-S-19500/493A(ER), dated 30 March 1990, and is approved for use by the U.S. Army Laboratory Command, and is available for use by all Departments and Agencies of the Department of Defense.

The attached insertable replacement pages listed below are replacements for stipulated pages. When the new pages have been entered in the document, insert the amendment as the cover sheet to the specification.

<u>Replacement page</u>	<u>Pages replaced</u>
7	7
8	8
9	9
10	10

PAGE 13

* TABLE III, subgroup 7, conditions column: Add "LPTD = 10".

The margins of this amendment are marked with an asterisk to indicate where changes (additions, modification, corrections, deletions) from the previous amendment 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 amendment.

CONCLUDING MATERIAL

Custodian:
Army - ER

Preparing activity:
Army - ER

Agent:
DLA - ES

(Project 5961-A083)

4.3 Screening (JANTX, JANTXV, and JANS Levels only). Screening shall be in accordance with MIL-S-19500 (table II), 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 II of MIL-S-19500)	Measurement JANTX and JANTXV Levels
9	N/A
10	N/A
11	I_{GAO} , I_{P2} , and I_{V2}
12	See 4.3.1
13	ΔI_{GAO} = 50% of initial value or 5 nA dc, whichever greater. ΔI_{P2} = $\pm 100\%$ of initial or 25% of maximum I_{P2} , whichever is greater. ΔI_{V2} = $\pm 25\%$ of the initial reading.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

$T_A = +125^\circ\text{C}$; $I_A = 0$; see figure 11; 2N6116, 2N6117, 2N6118,
 2N6137 = $V_{GK} = 40$ V dc, 2N6138 = $V_{GK} = 100$ V dc.

Note: No heatsink or forced air cooling on the devices shall be permitted.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-S-19500, and as specified herein.

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

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IVb (JAN, JANTX, and JANTXV) of MIL-S-19500, and table II herein. Electrical measurements (endpoints) and delta requirements shall be in accordance with the applicable steps of table IV herein.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table V of MIL-S-19500, and table III herein. Electrical measurements (endpoints) and delta requirements shall be in accordance with the applicable steps of table IV herein.

4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows.

4.5.1 Forward on-state voltage. The test circuit of figure 7 may be used to measure this parameter. The specified values (see table I) of V_S , R_G and anode current are applied. The anode (A) to cathode (K) voltage is measured as the on-state forward voltage.

4.5.2 Peak point anode current. This parameter shall be measured in the circuit of figure 6 or a suitable equivalent. The variable supply is adjusted to a point anode current is the maximum value of I_A just prior to oscillation.

Supersedes page 7 of MIL-S-19500/493A(ER)
 of 20 March 1990.

TABLE I. Group A inspection.

Inspection 1/ Method	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical inspection	2071					
<u>Subgroup 2</u>						
Gate anode blocking current 2N6116, 2N6117, 2N6118 2N6137 2N6138	3036	Bias condition D (see 4.5.5) $V_{GAO} = 40$ V dc $V_{GAO} = 40$ V dc $V_{AOS} = 100$ V dc	I_{GAO1}		5 10 10	nA dc nA dc nA dc
Gate cathode blocking current 2N6116, 2N6117, 2N6118 2N6137 2N6138	3036	Bias condition C (see 4.5.6) $V_{GKS} = 40$ V dc $V_{GKS} = 40$ V dc $V_{GKS} = 100$ V dc	I_{GKS}		50 100 100	nA dc nA dc nA dc
Peak point anode current 2N6116, 2N6137, 2N6138 2N6117 2N6118		$V_S = 10$ V dc $R_G = 1$ M Ω See figure 6 (4.5.2)	I_{P1}		2.0 .3 .15	μ A dc μ A dc μ A dc
Peak point anode current 2N6116, 2N6137, 2N6138 2N6117 2N6118		$V_S = 10$ V dc $R_G = 10$ k Ω See figure 6 (4.5.2)	I_{P2}		5 2 1	μ A dc μ A dc μ A dc
Peak point anode current 2N6116 2N6117, 2N6118 2N6137, 2N6138		$V_S = 10$ V dc $R_G = 1$ M Ω See figure 8 (4.5.3)	V_{T1}		.2 .2	1.6 V dc .6 V dc
Peak point anode current		$V_S = 10$ V dc $R_G = 10$ k Ω See figure 8 (4.5.3)	V_{T2}		.2	.6 V dc

See footnote at end of table.

Supersedes page 8 of MIL-S-19500/493A(ER)
of 30 March 1990.

TABLE I. Group A inspection - Continued.

Inspection 1/ Method	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2 - Continued</u>						
Valley point anode current 2N6116, 2N6117, 2N6137, 2N6138 2N6118		$V_S = 10$ V dc $R_G = 1$ M Ω See figure 7 (see 4.5.4)	I_{V1}		50 25	μ A dc μ A dc
Valley point anode current 2N6116, 2N6137, 2N6138, 2N6117, 2N6118		$V_S = 10$ V dc $R_G = 10$ k Ω See figure 7 (see 4.5.4)	I_{V2}	70 50		μ A dc μ A dc
Valley point anode current 2N6137, 2N6138 (only)		$V_S = 10$ V dc $R_G = 200\Omega$ See figure 7 (see 4.5.4)	I_{V3}	1.5		mA dc
Forward on-state forward 2N6116, 2N6117, 2N6118, 2N6137 2N6138		$V_S = 10$ V dc $R_G = 10$ k Ω $I_F = 50$ mA dc See figure 7 (see 4.5.1)	V_F		1.5 1.0	V dc V dc
<u>Subgroup 3</u>						
Low temperature operation		$T_A = -55^\circ\text{C}$				
Peak point anode current		$V_S = 10$ V dc $R_G = 10$ k Ω See figure 6 (4.5.2)	I_{P3}	.001	10	μ A dc
High temperature operation		$T_A = +125^\circ\text{C}$				
Gate anode blocking current 2N6116, 2N6117, 2N6118, 2N6137 2N6138	3036	Bias condition D (see 4.5.5) $V_{GA0} = 40$ V dc $V_{GA0} = 100$ V dc	I_{GA02}		0.5	μ A dc

See footnote at end of table.

Supersedes page 9 of MIL-S-19500/493A(ER)
of 30 March 1990.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u> - Continued						
Valley point anode current		$V_S = 10$ V dc $R_G = 10$ k Ω See figure 7 (see 4.5.4)	I_{V2}			
2N6116, 2N6137, 2N6138, 2N6117, 2N6118				40 10		μ A dc μ A dc
<u>Subgroup 4</u>						
Peak pulse voltage		See figure 9 (see 4.5.7)	V_O			
2N6116, 2N6117, 2N6118, 2N6137, 2N6138				6.0 9.0		V dc V dc
Peak pulse voltage rise time		See figure 9	t_r		80	ns
<u>Subgroup 5, 6, and 7</u>						
Not applicable						

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