

The documentation process conversion measures necessary to comply with this revision shall be completed by 10 December 1999.

INCH-POUND

MIL-PRF-19500/581A
10 September 1999
SUPERSEDING
MIL-S-19500/581
23 April 1990

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON AMPLIFIER,
TYPES 2N4237, 2N4238 AND 2N4239 JAN, JANTX AND JANTXV

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 NPN, silicon, amplifier transistors. Three levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1, (TO-39).

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

Type	P_T 1/ $T_A = +25^\circ\text{C}$ 1/	P_T $T_C = +25^\circ\text{C}$ 2/	V_{CBO}	V_{CEO}	V_{EBO}	I_C	I_B	T_{op} and T_{STG}
	<u>W</u>	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>A dc</u>	<u>°C</u>
2N4237	1.0	6.0	50	40	6.0	1.0	0.5	-65 to +200
2N4238	1.0	6.0	80	60	6.0	1.0	0.5	-65 to +200
2N4239	1.0	6.0	100	80	6.0	1.0	0.5	-65 to +200

1/ Derate linearly 5.7 mW/°C for $T_A > +25^\circ\text{C}$;

2/ Derate linearly 34 mW/°C for $T_C > +25^\circ\text{C}$;

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

Limits	h_{FE} at $V_{CE} = 1.0$ V dc 1/			$R_{\theta JC}$ max	$h_{fe} /$ $f = 10$ MHz $V_{CE} = 10$ V dc $I_C = 100$ mA dc	C_{obo} $f = 1.0$ MHz $V_{CB} = 10$ V dc $I_C = 0$	$V_{CE(sat)}$ 2 1/ $I_C = 1.0$ A dc $I_B = 0.1$ A dc	$V_{BE(sat)}$ 2 1/ $I_C = 1.0$ A dc $I_B = 0.1$ A dc
	h_{FE1} $I_C = 100$ mA dc	h_{FE2} $I_C = 250$ mA dc	h_{FE3} $I_C = 500$ mA dc					
Min Max	30	30 150	30	<u>°C</u> 29	3.0	<u>pF</u> 100	0.6	<u>V dc</u> 1.5

1 Pulsed see 4.5.1.

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-VAC, 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.

AMSC N/A

FSC 5961

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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 Defense Automated Printing Service, 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 (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 Associated specification. The individual item requirements shall be in accordance with MIL-PRF-19500, and as specified herein.

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 (TO-39) herein.

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

3.6 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

3.7 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).

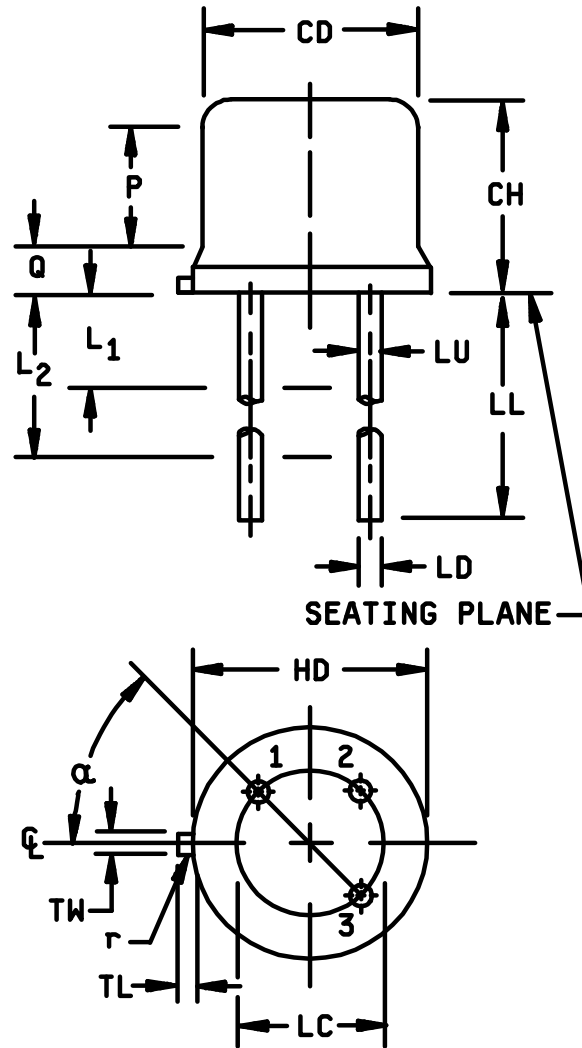


FIGURE 1. Physical dimensions for (TO-39).

Symbol (see note 3)	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	0.305	0.355	7.75	8.51	
CH	0.240	0.260	6.10	6.60	
HD	0.335	0.370	8.51	9.39	
LC	0.200 BSC		5.08 BSC		10
LD	0.016	0.021	0.41	0.53	10, 11
LL	0.500	0.750	12.70	19.05	11, 12
LU	0.016	0.019	0.41	0.48	11, 12
L ₁	---	0.050	---	1.27	11, 12
L ₂	0.250	---	6.35	---	11, 12
P	0.100	---	2.54	---	9
Q	---	0.050	---	1.27	8
R		0.010		0.25	13
TL	0.029	0.045	0.74	1.14	7
TW	0.028	0.034	0.72	0.86	6
α	45° BSC				10
Term 1	Emitter				
Term 2	Base				
Term 3	Collector				

FIGURE 1. Physical dimensions for (TO-39) continued.

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given in parentheses for general information only.
3. Refer to applicable symbol list.
4. The US Government preferred system of measurement is the metric SI system. However, 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.
5. Lead number 1 is the emitter, lead number 2 is the base, lead number 4 is omitted from this outline. The collector is number 3 and is electrically connected to the case.
6. Beyond r (radius) max, TW shall be held for a minimum length of 0.011 inch (0.28 mm).
7. TL measured from maximum HD.
8. Outline in this zone is not controlled.
9. CD shall not vary more than 0.010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
10. Leads at gauge plane $0.054 + 0.001 - 0.000$ inch ($1.37 + 0.03 - 0.00$ mm) below seating plane shall be within 0.007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC.
11. 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.
12. All three leads.
13. r (radius) applies to both inside corners of tab.

FIGURE 1. Physical dimensions for (TO-39) continued.

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 and herein.

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

4.3 Screening (JANTX, and JANTXV levels only). 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
	JANTX and JANTXV level
<u>1/</u>	Method 3131 (see 4.5.2)
11	I_{CBO} , and h_{FE2}
12	See 4.3.1
13	Subgroup 2 of table I herein $\Delta I_{CBO} = 100$ percent of initial value, or 10 nA dc whichever is greater; $\Delta h_{FE2} = \pm 15$ percent of initial value.

1/ Shall be performed anytime before screen 10.

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

$$V_{CB} \geq 20 \text{ V dc}; P_T = 1.0 \text{ W at } T_A = 30^\circ\text{C} \pm 5^\circ\text{C}.$$

NOTE: No heat sink or forced air cooling on the devices shall be permitted.

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 table V of MIL-PRF-19500, and table I herein. End-point electrical measurements shall be in accordance with table I, subgroup 2.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified. Separate samples may be used for each step. In the event of a group B failure, the manufacturer may pull a new sample at double the sample size from either the failed assembly lot or from another assembly lot from the same wafer lot. If the new "assembly lot" option is exercised, the failed assembly lot shall be scrapped. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

Step	Method	Condition
1	1039	Steady-state life: Test condition B, 340 hours, $V_{CB} \geq 10$ V dc, $T_J = 175^\circ\text{C}$ min. No heat sink or forced-air cooling on the devices shall be permitted. $n = 45$ devices, $c = 0$
2	1039	The steady state life test of step 1 shall be extended to 1,000 hours for each die design. Samples shall be selected from a wafer lot every twelve months of wafer production, however, Group B shall not be required more than once for any single wafer lot. $n = 45$, $c = 0$.
3	1032	High-temperature life (non-operating), $T_A = +200^\circ\text{C}$. $n = 22$, $c = 0$

4.4.2.1 Group B sample selection. Samples selected from group B inspection shall meet all of the following requirements:

- For JAN, JANTX, and JANTXV samples shall be selected randomly from a minimum of three wafers (or from each wafer in the lot) from each wafer lot. See MIL-PRF-19500.
- Must be chosen from an inspection lot that has been submitted to and passed group A, subgroup 2, conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for life test (group B for JAN, JANTX, and JANTXV) may be pulled prior to the application of final lead finish.

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. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

4.4.3.1 Group C inspection, table VII (JAN, JANTX, and JANTXV) of MIL-PRF-19500.

Subgroup	Method	Condition
C2	2036	Test condition E.
C6	1026	$V_{CB} \geq 10$ V dc; adjust P_T to achieve $T_J = +175^\circ\text{C}$ minimum; $T_A = +30^\circ\text{C} \pm 5^\circ\text{C}$. No heat sink or forced-air cooling on the device shall be permitted.

4.4.3.2 Group C sample selection. Samples for subgroups in group C shall be chosen at random from any lot containing the intended package type and lead finish procured to the same specification which is submitted to and passes group A tests for conformance inspection. Testing of a subgroup using a single device type enclosed in the intended package type shall be considered as complying with the requirements for that subgroup.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IX 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.

4.4.4.1 Group E inspection, table IX of MIL-PRF-19500.

Subgroup	Method	Condition	Sampling plan
E2	1039	Test condition A, 1,000 hours.	22 devices, $c = 0$
E4	3161	$R_{\theta JC} = 29^\circ\text{C/W}$ maximum. See 4.5.3	22 devices, $c = 0$

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 response(ΔV_{BE} measurement). The ΔV_{BE} measurement shall be performed in accordance with method 3131 of MIL-STD-750. The ΔV_{BE} conditions and maximum V_{BE} limit shall be derived by each vendor. The chosen ΔV_{BE} measurement and conditions for each device in the qualification lot and read and record measurements shall be submitted in the qualification report and a thermal response curve shall be plotted. The chosen V_{BE} values shall be considered final after the manufacturer has had the opportunity to test five consecutive lots. The following measurements shall apply:

- a. Measuring current (I_M) 5 mA.
- b. Measurement voltage (V_{CE}) 20 V (same as V_H).
- c. Collector heating current (I_H) 300 mA (minimum for).
- d. Collector-emitter heating voltage 20 V (minimum).
- e. Heating time (t_H) 1200 ms.
- f. Measurement time delay (t_{MD}) 5 μ s.
- f. Sample window time (t_{SW}) 10 μ s maximum.

4.5.3 Thermal resistance. Thermal resistance measurements shall be conducted in accordance with method 3131 of MIL-STD-750. Maximum limit of $R_{\theta JC}$ shall be 29°C/W. The following test conditions shall apply:

- a. Heating power shall be chosen such that the calculated junction to reference point temperature difference is greater than + 50°C.
- b. Collector to emitter voltage magnitude shall be 20 V dc.
- c. Reference temperature measuring point shall be the case.
- d. Reference point temperature shall be + 25°C $\leq T_R \leq$ +35°C and recorded before the test is started.
- e. Mounting arrangement shall be with heat sink to case.
- f. Maximum limit shall be $R_{\theta JC} = 29^\circ\text{C/W}$.

TABLE I. Group A inspection.

Inspection <u>1</u> /	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u> <u>2</u> /						
Visual and mechanical <u>3</u> / examination	2071	n = 45 devices, c = 0				
Solderability <u>3</u> /	2026	n = 15 leads, c = 0				
Resistance to <u>3</u> / <u>4</u> / solvent	1022	n = 15 devices, c = 0				
Temp cycling <u>3</u> /	1051	Test condition C, 25 cycles. n = 22 devices, c = 0				
Hermetic seal	1071	n = 22 devices, c = 0				
Fine leak Gross leak						
Electrical measurements		Group A, subgroup 2				
Bond strength <u>3</u> /	2037	Precondition T _A = +250°C at t = 24 hrs or T _A = +300°C at t = 2 hrs, n = 11 wires, c = 0				
<u>Subgroup 2</u>						
Breakdown voltage collector to emitter 2N4237 2N4238 2N4239	3011	Bias condition D, pulsed (see 4.5.1) I _C = 100 mA dc	V _{(BR)CEO}	50 80 100		Vdc
Collector emitter cutoff current 2N4237 2N4238 2N4239	3041	Bias condition A, V _{BE} = 1.5 V dc V _{CE} = 50 V dc V _{CE} = 80 V dc V _{CE} = 100 V dc	I _{CEX1}		100	nA dc
Collector to baser cutoff current 2N4237 2N4238 2N4239	3036	Bias condition D V _{CE} = 50 V dc V _{CE} = 80 V dc V _{CE} = 100 V dc	I _{CBO}		100	nA dc
Emitter to base cutoff current	3061	Bias condition D, V _{BE} = 6 V dc	I _{EBO}		0.5	mA dc
Forward current transfer ratio	3076	Pulsed (see 4.5.1), I _C = 100 mA dc V _{CE} = 1.0 V dc	h _{FE1}	30		

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> Continued						
Forward current transfer ratio	3076	Pulsed (see 4.5.1), I _C = 250 mA dc V _{CE} = 1.0 V dc	h _{FE2}	30	150	
Forward current transfer ratio	3076	Pulsed (see 4.5.1), I _C = 500 mA dc V _{CE} = 1.0 V dc	h _{FE3}	30		
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1), I _C = 500 mA dc I _B = 50 mA dc	V _{CE(sat)1}		0.3	V dc
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1), I _C = 1.0 A dc I _B = 0.1 A dc	V _{CE(sat)2}		0.6	V dc
Base emitter voltage	3066	Test condition A, pulsed (see 4.5.1), I _C = 500 mA dc , I _B = 50 mA dc	V _{BE(sat)1}		1.0	V dc
Base emitter voltage	3066	Test condition A, pulsed (see 4.5.1), I _C = 1.0 mA dc , I _B = 0.1 A dc	V _{BE(sat)2}		1.5	V dc
<u>Subgroup 3</u>						
High-temperature operation:		T _A = +150°C				
Collector to emitter cutoff current 2N4237 2N4238 2N4239	3041	Bias condition A, V _{BE} = 1.5 V dc V _{CE} = 30 V dc V _{CE} = 50 V dc V _{CE} = 70 V dc	I _{CEX2}		1.0	mA dc
Low-temperature operation:		T _A = -55°C				
Forward current transfer ratio	3076	Pulsed (see 4.5.1), I _C = 250 mA dc V _{CE} = 1.0 V dc	h _{FE4}	15		
<u>Subgroup 4</u>						
Magnitude of small-signal short-circuit forward-current transfer ratio	3306	I _C = 100 mA dc, V _{CE} = 10 V dc, f = 10 MHz	h _{FE}	3		
Open circuit output capacitance	3236	I _E = 0, V _{CB} = 10 V dc, f = 100 kHz	C _{obo}		100	pF

See footnotes 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 5</u>	3051	$T_C = +25^{\circ}\text{C}$; $t \geq 0.5$ s, 1 cycle. $I_C = 1.0$ A dc, $V_{CE} = 6$ V dc, $I_C = 500$ mA dc, $V_{CE} = 12$ V dc, $I_C = 166$ mA dc, $V_{CE} = 30$ V dc, $I_C = 100$ mA dc, $V_{CE} = 50$ V dc, $I_C = 71$ mA dc, $V_{CE} = 70$ V dc, See table I, subgroup 2 herein.				
Safe operating area (continuous dc) <u>5/</u>						
<u>Test 1</u>						
<u>Test 2</u>						
<u>Test 3</u>						
2N4237						
2N4238						
2N4239						
End point electrical measurements						
<u>Subgroups 6 and 7</u>						
Not applicable						

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

2/ For resubmission of failed subgroup A1, double the sample size of the failed test or sequence of tests.

3/ Separate samples may be used.

4/ Not required for laser marked devices.

5/ L = 5 mH (2 each Essex Stancor C-2688 in parallel 1A, 0.5 ohm, or equivalent (see 4.5.2).

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

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector to base cutoff current 2N4237 2N4238 2N4239	3036	Bias condition D $V_{CB} = 50 \text{ V dc}$ $V_{CB} = 80 \text{ V dc}$ $V_{CB} = 100 \text{ V dc}$	ΔI_{CBO} 1/	100 percent of initial value or 10 nA dc whichever is greater.		
2.	Forward current transfer ratio	3076	$I_C = 250 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc};$ Pulsed (see 4.5.1)	Δh_{FE2} 1/			
					± 25 percent change from initial recorded value.		

1/ Devices which exceed the group A limits for this test shall not be shipped.

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

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

3/ The delta measurements for table VII of MIL-PRF-19500 are as follows:

- a. Subgroup 6, see table II herein, steps 1 and 2.

4/ The delta measurements for table IX of MIL-PRF-19500 are as follows:

- b. Subgroup 1, see table II herein, steps 1 and 2.

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.

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. Acquisition documents must specify the following:

- a. Issue of DODISS to be cited in the solicitation (see 2.2.1).
- b. The lead finish as specified (see 3.3.1).
- c. Type designation and quality assurance level.
- d. Packaging requirements (see 5.1).

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 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 Application guidance. The following NPN type transistor is complementary to the PNP device listed herein.

NPN	PNP
2N4237	2N4234
2N4238	2N4235
2N4239	2N4236

6.5 Substitution information. Devices covered by this specification are substitutable for the manufacturer's and user's Part or Identifying Number (PIN). This information in no way implies that manufacturer's PIN's are suitable for the military PIN.

Military PIN	Manufacturer's CAGE Code	Manufacturer's and user's PIN
JAN2N4237 or JANTX2N4237 or JANTXV2N4237	04713	2N4237 ST1027H
JAN2N4238 or JANTX2N4238 or JANTXV2N4238	04713	2N4238 ST1375H
JAN2N4238 or JANTX2N4238 or JANTXV2N4238	04713	2N4239 ST690H2 ST693H1 ST693H2 ST693H3 ST693H4 ST693H32 ST7008H1 ST7008H2 ST7008H3 ST7008H4 ST7008H21 ST7008H32

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - CR
Navy - EC
Air Force - 11
DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2032)

Review activities:

Army - AR, MI, SM
Air Force - 13, 19
Navy - AS, CG, MC, OS

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2. The submitter of this form must complete blocks 4, 5, 6, and 7.
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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-19500/581A

2. DOCUMENT DATE
990910

3. DOCUMENT TITLE

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON AMPLIFIER, TYPES 2N4237, 2N4338 AND 2N4239 JAN, JANTX AND JANTXV

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)
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8. PREPARING ACTIVITY

a. Point of Contact
Alan Barone

b. TELEPHONE

Commercial DSN FAX EMAIL
614-692-0510 850-0510 614-692-6939 alan_barone@dscclia.mil

c. ADDRESS
Defense Supply Center Columbus, ATTN:
DSCC-VAC, 3990 East Broad Street, Columbus,
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