

The documentation process conversion measures necessary to comply with this revision shall be completed by 2 February 1999

INCH-POUND

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2 November 1998
SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON AMPLIFIER, TYPES 2N4234, 2N4335 AND 2N4236 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 PNP, silicon, amplifier transistor. 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>
2N4234	1.0	6.0	40	40	7.0	1.0	0.5	-65 to +200
2N4235	1.0	6.0	60	60	7.0	1.0	0.5	
2N4236	1.0	6.0	80	80	7.0	1.0	0.5	

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

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

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

Limits	h_{FE} at $V_{CE} = 1.0 \text{ V dc}$ 1/			$R_{\theta JC}$ max	$h_{FE} /$ $f = 10 \text{ MHz}$ $V_{CE} = 10 \text{ V dc}$ $I_{CE} = 100 \text{ mA dc}$	C_{obo} $f = 100 \text{ kHz}$ $V_{CB} = 10 \text{ V dc}$ $I_E = 0$	$V_{CE(sat)}$ 1 1/ $I_C = 1.0 \text{ A dc}$ $I_B = 0.1 \text{ A dc}$	$V_{BE(sat)}$ 2 1/ $I_C = 1.0 \text{ A dc}$ $I_B = 0.1 \text{ A dc}$
	h_{FE1} $I_C = 100 \text{ mA dc}$	h_{FE2} $I_C = 250 \text{ mA dc}$	h_{FE3} $I_C = 500 \text{ mA dc}$					
Min	40	30	20	<u>°C</u> 29	3.0	<u>pF</u>		<u>V dc</u>
Max		150				100	0.6	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-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.

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.

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 and as follows.

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 material and finish. Lead material shall be Kovar or Alloy 52 for the TO - 39; a copper core or plated core is permitted. 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 6.5).

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 4.4.2 and 4.4.3 herein.

Symbol (see note 3)	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.355	7.75	8.51	
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.39	
LC	.200 BSC		5.08 BSC		10
LD	.016	.021	0.41	0.53	10, 11
LL	.500	.750	12.70	19.05	11, 12
LU	.016	.019	0.41	0.48	11, 12
L ₁	---	.050	---	1.27	11, 12
L ₂	.250	---	6.35	---	11, 12
P	.100	---	2.54	---	9
Q	---	.050	---	1.27	8
r		.010		0.25	13
TL	.029	.045	0.74	1.14	7
TW	.028	.034	0.72	0.86	6
α	45° BSC				10
Term 1	Emitter				
Term 2	Base				
Term 3	Collector				

NOTES:

- Dimensions are in inches.
- Metric equivalents are given in parentheses for general information only.
- Refer to applicable symbol list.
- 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.
- 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.
- Beyond r (radius) max, TW shall be held for a minimum length of 0.011 inch (0.28 mm).
- TL measured from maximum HD.
- Outline in this zone is not controlled.
- CD shall not vary more than 0.010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
- 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.
- LU applies between L₁ and L₂. LD applies between L₂ and LL minimum. Diameter is uncontrolled in L₁ and beyond LL minimum.
- All three leads.
- r (radius) applies to both inside corners of tab.

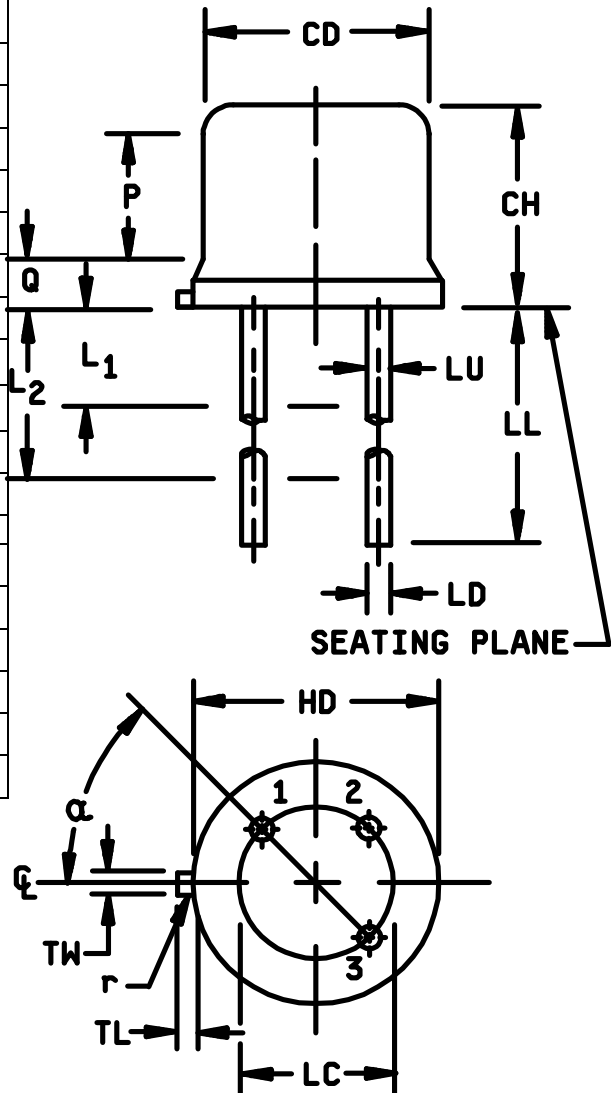


FIGURE 1. Physical dimensions for (TO-39).

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 table III 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
	JANTX and JANTXV level
<u>1</u> /	Method 3131 (see 4.3.2)
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:

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

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. 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 appendix E, table V of MIL-PRF-19500. End-point electrical measurements shall be in accordance with 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 appendix E, table VIa (JANS) and table VIb (JAN, JANTX and JANTXV) of MIL-PRF-19500, and herein. Electrical measurements (end-points) and delta requirements shall be in accordance with table III herein.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B3	1051	$V_{CB} \geq 10 \text{ V dc}$; $P_T = 1.0 \text{ W}$; $T_A = +30^\circ\text{C} \pm 5^\circ\text{C}$. No heat sink nor forced-air cooling on the device shall be permitted.

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 III herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E.
C6	1026	$V_{CB} \geq 10 \text{ V dc}$; $P_T = 1.0 \text{ W}$; $T_A = +30^\circ\text{C} \pm 5^\circ\text{C}$. No heat sink nor forced-air cooling on the device shall be permitted.

4.4.4 Group E Inspection. Group E inspection shall be conducted in accordance with appendix E, table IX of MIL-PRF-19500 and table II herein. . Electrical measurements (end-points) and delta requirements shall be in accordance with table III herein.

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) 200 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 μs .
- f. Sample window time (t_{SW}) 10 μs 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 $+50^{\circ}\text{C}$.
- 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 $+25^{\circ}\text{C} \leq T_R \leq +35^{\circ}\text{C}$ 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 1/ <u>Subgroup 1</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Visual and mechanical inspection	2071					
<u>Subgroup 2</u>						
Breakdown voltage collector to emitter 2N4234 2N4235 2N4236	3011	Bias condition D, pulsed (see 4.5.1) $I_C = 100 \text{ mA dc}$	$V_{(BR)CEO}$	40 60 80		Vdc
Collector emitter cutoff current 2N4234 2N4235 2N4236	3041	Bias condition D $V_{CE} = 30 \text{ V dc}$ $V_{CE} = 40 \text{ V dc}$ $V_{CE} = 60 \text{ V dc}$	I_{CEO}		1.0	mA dc
Collector emitter cutoff current 2N4234 2N4235 2N4236	3041	Bias condition A, $V_{BE} = 1.5 \text{ V dc}$ $V_{CE} = 40 \text{ V dc}$ $V_{CE} = 60 \text{ V dc}$ $V_{CE} = 80 \text{ V dc}$	I_{CEX1}		100	nA dc
Collector to baser cutoff current 2N4234 2N4235 2N4236	3036	Bias condition D $V_{CE} = 40 \text{ V dc}$ $V_{CE} = 60 \text{ V dc}$ $V_{CE} = 80 \text{ V dc}$	I_{CBO}		100	nA dc
Emitter to base cutoff current	3061	Bias condition D, $V_{BE} = 7 \text{ V dc}$	I_{EBO}		0.5	mA dc
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 100 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$	h_{FE1}	40		
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 250 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$	h_{FE2}	30	150	
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 500 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$	h_{FE3}	20		
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1), $I_C = 1.0 \text{ A dc}$ $I_B = 100 \text{ mA dc}$	$V_{CE(sat)1}$		0.6	V dc
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1), $I_C = 500 \text{ mA dc}$ $I_B = 50 \text{ mA dc}$	$V_{CE(sat)2}$		0.4	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	
<u>Subgroup 2</u> Continued						
Base emitter voltage	3066	Test condition A, pulsed (see 4.5.1)), $I_C = 500 \text{ mA dc}$, $I_B = 50 \text{ mA dc}$	$V_{BE(sat)1}$		1.1	V dc
Base emitter voltage	3066	Test condition A, pulsed (see 4.5.1)), $I_C = 1.0 \text{ A dc}$, $I_B = 100 \text{ mA dc}$	$V_{BE(sat)2}$		1.5	V dc
<u>Subgroup 3</u>						
High-temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current 2N4234 2N4235 2N4236	3041	Bias condition A, $V_{BE} = 1.5 \text{ V dc}$ $V_{CE} = 30 \text{ V dc}$ $V_{CE} = 40 \text{ V dc}$ $V_{CE} = 60 \text{ V dc}$	I_{CEX2}		1.0	mA dc
Low-temperature operation:		$T_A = -55^\circ\text{C}$				
Forward current transfer ratio	3076	Pulsed (see 4.5.1), $I_C = 250 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$	h_{FE4}	15		
<u>Subgroup 4</u>						
Magnitude of small-signal short-circuit forward-current transfer ratio	3306	$I_C = 100 \text{ mA dc}$, $V_{CE} = 10 \text{ V dc}$, $f = 10 \text{ MHz}$	$ h_{FE} $	3		
Open circuit output capacitance	3236	$I_E = 0$, $V_{CB} = 10 \text{ V dc}$, $f = 100 \text{ MHz}$	C_{obo}		100	pF
<u>Subgroup 5</u>						
Safe operating area (continuous dc)	3051	$T_C = +25^\circ\text{C}$; $t \geq 0.5 \text{ s}$, 1 cycle.				
<u>Test 1</u>		$I_C = 1.0 \text{ A dc}$, $V_{CE} = 6 \text{ V dc}$,				
<u>Test 2</u>		$I_C = 500 \text{ mA dc}$, $V_{CE} = 12 \text{ V dc}$,				

See footnote at end of table.

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TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u> - Continued <u>Test 3</u> 2N4234 2N4235 2N4236 End point electricals <u>Subgroups 6 and 7</u> Not applicable		$I_C = 166 \text{ mA dc, } V_{CE} = 30 \text{ V dc,}$ $I_C = 100 \text{ mA dc, } V_{CE} = 50 \text{ V dc,}$ $I_C = 71 \text{ mA dc, } V_{CE} = 70 \text{ V dc,}$ See table III, steps 1, 2, 3 and 4				

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

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

Inspection	MIL-STD-750		Qualification and large lot quality conformance inspection
	Method	Conditions	
<u>Subgroup 1</u>			22 devices c = 0
Thermal shock (glass strain)	1056	0°C to + 100°C, 100 cycles	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See table III, steps 1, 2, 3, 4, 5 and 6	
<u>Subgroup 2</u>			32 devices c = 0
High temperature reverse bias	1039	Test condition A, 1,000 hours	
Electrical measurements		See table III, steps 1, 2, 3 and 4	
<u>Subgroup 3</u>			3 devices c = 0
DPA	2102		
<u>Subgroup 4</u>			22 devices c = 0
Thermal resistance	3161	$R_{\theta JC} = 29\text{ }^{\circ}\text{C/W}$ maximum. See 4.5.3	
<u>Subgroup 5</u>			
Not applicable			

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

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector to base cutoff current 2N4234 2N4235 2N4236	3036	Bias condition D $V_{CB} = 40 \text{ V dc}$ $V_{CB} = 60 \text{ V dc}$ $V_{CB} = 80 \text{ V dc}$	I_{CBO}		100	nA dc
2.	Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1) $I_C = 500 \text{ mA dc}$ $I_B = 50 \text{ mA dc}$	$V_{CE(sat)2}$		0.4	V dc
3.	Base emitter voltage (saturated)	3066	Test condition A, pulsed (see 4.5.1) $I_C = 500 \text{ mA dc}$ $I_B = 50 \text{ mA dc}$	$V_{BE(sat)1}$		1.1	V dc
4.	Forward current transfer ratio	3076	$I_C = 250 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$; Pulsed (see 4.5.1)	h_{FE2}	30	150	
5.	Collector to base cutoff current 2N4234 2N4235 2N4236	3036	Bias condition D $V_{CB} = 40 \text{ V dc}$ $V_{CB} = 60 \text{ V dc}$ $V_{CB} = 80 \text{ V dc}$	$\Delta I_{CBO} \frac{1/}{1/}$	100 percent of initial value or 10 nA dc whichever is greater.		
6.	Forward current transfer ratio	3076	$I_C = 250 \text{ mA dc}$ $V_{CE} = 1.0 \text{ V dc}$; Pulsed (see 4.5.1)	$\Delta h_{FE2} \frac{1/}{1/}$	± 25 percent change from initial recorded value.		

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

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

- Subgroup 2, see table III herein, steps 1, 2, 3, and 4.
- Subgroup 3, see table III herein, steps 1, 2, 3, 4, 5, and 6.
- Subgroup 6, see table III 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:

- Subgroup 2, see table III herein, steps 1, 2, 3, and 4.
- Subgroup 3, see table III herein, steps 1, 2, 3, and 4.
- Subgroup 6, see table III herein, steps 1, 2, 3, 4, 5, and 6.

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

<u>NPN</u>	<u>PNP</u>
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
JAN2N4234 or JANTX2N4234 or JANTXV2N4234	04713	2N4234 ST1054H
JAN2N4235 or JANTX2N4235 or JANTXV2N4235	04713	2N4235 ST1351H
JAN2N4236 or JANTX2N4236 or JANTXV2N4236	04713	2N4236 ST1374H ST1559H ST1711H ST347H ST675H10 ST675H11 ST675H12 ST688H ST801H ST831H

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 - 17
NASA - NA

Preparing activity:

DLA - CC

(Project 5961-2028)

Review activities:

Army - AR, MI, SM
Air Force - 11, 13, 19, 85
Navy - AS, CG, MC, OS