The documentation and process conversion measures necessary to comply with this revision shall be completed by 5 December 1997.

INCH POUND

MIL-PRF-19500/510C
5 September 1997
SUPERSEDING
MIL-S-19500/510B
18 April 1995

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER
TYPES 2N6249, 2N6250, AND 2N6251
JAN, JANTX, JANTXV, JANS, JANHC AND JANKC

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 power transistors. Four levels of product assurance are provided for each encapsulated device type as specified in MIL-PRF-19500. Two levels of product assurance are provided for each unencapsulated device type.

1.2 Physical dimensions. See figure 1 (Similar to TO-3) and figure 2 (JANHC and JANKC).

1.3 Maximum ratings.

Type	P_T 1/ T_A = +25°C	P_T 2/ T_C = +25°C	V_{CBO}	V_{CEO}	V_{EBO}	I_C	I_B	T_{op} and T_{STG}	$R_{\Theta JC}$ max
	W	W	V dc	V dc	V dc	A dc	A dc	°C	°C/W
2N6249	5.5	175	300	200	6.0	10	5.0	-55	1.0
2N6250	5.5	175	375	275	6.0	10	5.0	to	1.0
2N6251	5.5	175	450	350	6.0	10	5.0	+200	1.0

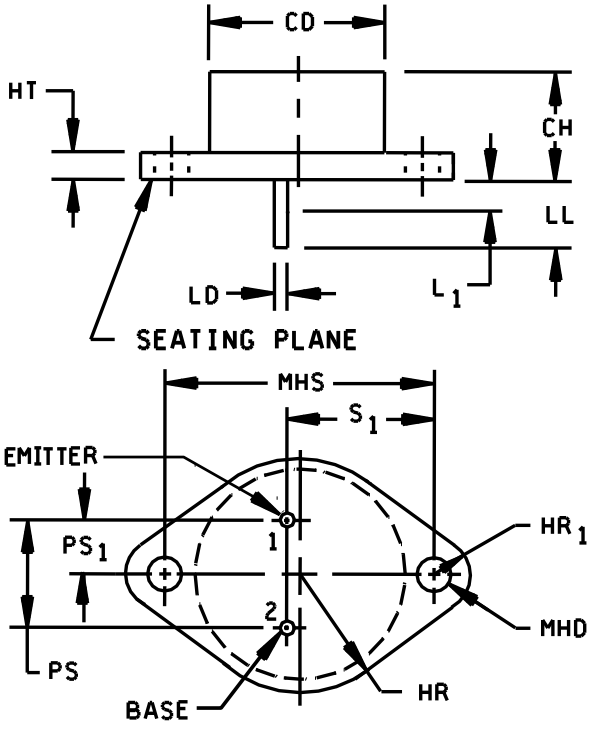
1/ Derate linearly at 34.2 mW/°C for T_A > 25°C.
2/ Derate linearly at 1.0 W/°C for T_C > 25°C.

1.4 Primary electrical characteristics at T_A = 25°C.

		h_{FE}	C_{obo}	$\|h_{fe}\|$	Pulse response	
Types	Limits	I_C = 10 A dc V_{CE} = 3 V dc	V_{CB}= 10 V dc I_E = 0 V dc 100 kHz ≤ f ≤ 1 Mhz	V_{CE} = 10 V dc I_C = 1 A dc f = 1 MHz	t_{on}	t_{off}
			pF		µs	µs
2N6249	Minimum	10		2.5		
	Maximum	50	500	15.0	2.0	4.5
2N6250	Minimum	8		2.5		
	Maximum	50	500	15.0	2.0	4.5
2N6251	Minimum	6		2.5		
	Maximum	50	500	15.0	2.0	4.5

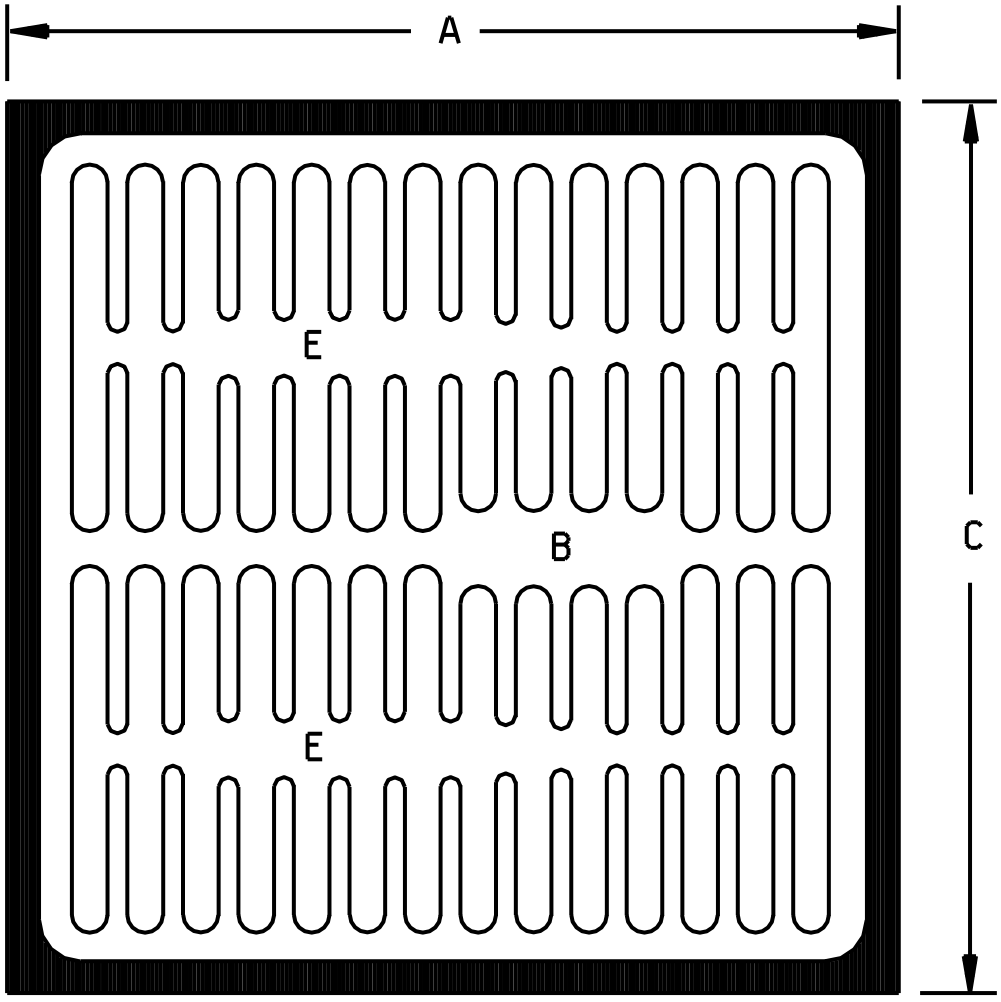
Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAT, 3990 East Broad St., Columbus, OH 43216-5000, by using the addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

Symbol	Inches		Millimeters		Note
	Min	Max	Min	Max	
CD		.875		22.23	
CH	.250	.450	6.35	11.43	
HR	.495	.525	12.57	13.34	
HR1	.131	.188	3.33	4.78	
HT	.050	.135	1.27	3.43	
LD	.038	.053	0.97	1.35	3, 5
LL	.312	.500	7.92	12.70	3
L_1	---	.050	---	1.27	5
MHD	.151	.161	3.84	4.09	
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	2
PS1	.205	.225	5.21	5.72	2, 3
S1	.665	.675	16.64	17.15	2



NOTES:
1. Dimension are in inches. Metric equivalents are given for general information only.
2. These dimensions should be measured at points .050 (1.27 mm) to .055 (1.40 mm) below seating plane. When gage is not used, measurement will be made at seating plane.
3. Two leads.
4. Collector shall be electrically connected to the case.
5. LD applies between L1 and LL max. Diameter is uncontrolled in L1.

FIGURE 1. Physical dimensions (similar to T0-3).



Symbol	Dimension			
	Millimeters		Inches	
	Min	Max	Min	Max
A, C	5.29	6.05	.228	.238

DESIGN DATA

Metallization:

Top: . . . . . Aluminum 40,000 Å minimum, 50,000 Å nominal

Back: . . . . . Gold 2,500 Å minimum, 3,000 Å nominal
Back side . . . . . Collector
Chip thickness . . . . . 10 mils ±2 mils
Bonding pad : B = .016 (0.41 mm) x .060 (1.52 mm).
E = .016 (0.41 mm) x .070 (1.78 mm).

FIGURE 2. JANC (A-version) die dimensions.

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

3.2 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined 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 figures 1 (T0-3) and 2 (die) herein.

3.3.1 Lead finish. Lead finish shall be solderable as defined in MIL-PRF-19500, MIL-STD-750, and herein.

3.4 Marking. Devices shall be marked in accordance with MIL-PRF-19500. At the option of the manufacturer, the marking of the country of origin may be omitted from the body of the transistor.

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

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

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 6.2).

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 as specified herein.

4.2.1 JANHC and JANKC devices. Qualification for JANHC and JANKC devices shall be in accordance with MIL-PRF-19500.

4.3 Screening (JANS, JANTX, AND JANTXV levels only). Screening shall be in accordance with MIL-PRF-19500 (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 table IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
9	I_{CEX1} and h_{FE1}	I_{CEX1} and h_{FE1}
11	I_{CEX1} and h_{FE1}; ΔI_{CEX1} = 100 percent of initial value or 10 µA dc, whichever is greater; Δh_{FE1} = ±15 percent.	I_{CEX1} and h_{FE1}
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein; ΔI_{CEX1} = 100 percent of initial value or 10 µA dc, whichever is greater; Δh_{FE1} = ±25 percent of initial value.	Subgroup 2 of table I herein; ΔI_{CEX1} = 100 percent of initial value or 10 µA dc, whichever is greater; Δh_{FE1} = ±25 percent of initial value.

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

V_{CB} = 100 V dc

T_J = +187.5° C ±12.5° C

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. Group A inspection shall be performed on each sublot.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500 and table I 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 (JAN, JANTX, JANTXV), of MIL-PRF-19500. Electrical measurements (end points) shall be in accordance with table I, group A, subgroup 2 herein.

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

Subgroup	Method	Condition
B3	2037	Test condition A, all internal leads for each device shall be pulled separately.
B4	1037	$V_{CE} \geq$ 20 V dc minimum; $t_{on} = t_{off}$ = 3 minutes minimum for 2,000 cycles.
B5	1027	V_{CB} = 10 V dc minimum; T_A = +150° C maximum.
B6	3131	See 4.5.2.

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

Subgroup	Method	Condition
B3	1031	$V_{CE} \geq$ 20 V dc minimum; $t_{on} = t_{off}$ = 3 minutes minimum for 2,000 cycles.
B5	3131	See 4.5.2.

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, group A, subgroup 2 herein.

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

Subgroup	Method	Condition
C2	2036	Test condition A; weight - 10 pounds; time - 15 seconds.
C3	2016	Non-operating 1,500 G; 0.5 ms, 5 blows in each orientation: X_1, Y_1, Y_2, Z_1 (total 20 blows)
C6	1026	V_{CE} = 20 V dc; T_J = +187.5° C ±12.5° C; $t_{on} = t_{off}$ = 3 minutes minimum or 6,000 cycles.

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 resistance. Thermal resistance measurement shall be conducted in accordance with test method 3131 of MIL-STD-750. The following details shall apply:

a. Collector current magnitude during power applications shall be 3.0 A dc.

b. Collector to emitter voltage magnitude shall be 10 V dc.

c. Reference temperature measuring point shall be the case.

d. Reference point temperature shall be 25° C $\leq t_r \leq$ 75° C and recorded before the test is started.

e. Mounting arrangement shall be with heat sink to header.

f. Maximum limit for $R_{\Theta JC}$ shall be 1.0° C/W.

4.5.3 Coil selection for safe operating area (SOAR) tests. In selecting coils for use in the clamped and unclamped inductive SOAR tests, prime consideration should be given to the recommended commercially available coil. However, due to the extreme critical nature of the coil in these circuits and the wide tolerance of some commercially available coils (+100, -50 percent), it shall be the semiconductor manufacturer's responsibility, to prove upon request, compliance or equivalency of any coil used (commercial or in-plant designed) to within (+20,-10 percent), of the specified inductance at the rated current and dc resistance.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Breakdown voltage, collector to emitter	3011	Bias condition D, I_C = 200 mA dc, L = 42 mH; f = 30-60 Hz (see figure 3)	$V_{(BR)CEO}$			
2N6249				200		V dc
2N6250				275		V dc
2N6251				350		V dc
Breakdown voltage, collector to emitter	3011	Bias condition B, I_C = 200 mA dc L = 14 mH; f = 30-60 Hz; R_{BE} = 50 ohms (see figure 3)	$V_{(BR)CER}$			
2N6249				225		V dc
2N6250				300		V dc
2N6251				375		V dc
Emitter to base cutoff current	3061	Bias condition D, V_{EB} = 6 V dc	I_{EBO}		100	µA dc
Collector to emitter cutoff current	3041	Bias condition D	I_{CEO}			
2N6249		V_{CE} = 150 V dc			1.0	mA dc
2N6250		V_{CE} = 225 V dc			1.0	mA dc
2N6251		V_{CE} = 300 V dc			1.0	mA dc
Collector to emitter cutoff current	3041	Bias condition A, V_{BE} = -1.5 V dc	I_{CEX}			
2N6249		V_{CE} = 225 V dc			100	µA dc
2N6250		V_{CE} = 300 V dc			100	µA dc
2N6251		V_{CE} = 375 V dc			100	µA dc
Collector to base cutoff current	3036	Bias condition D	I_{CBO}			
2N6249		V_{CB} = 300 V dc			0.5	mA dc
2N6250		V_{CB} = 375 V dc			0.5	mA dc
2N6251		V_{CB} = 450 V dc			0.5	mA dc
Forward-current transfer ratio	3076	V_{CE} = 3 V dc; I_C = 10 A dc; pulsed (see 4.5.1)	h_{FE}			
2N6249				10	50	
2N6250				8	50	
2N6251				6	50	

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 2 - Continued						
Collector to emitter saturation voltage	3071	I_C = 10 A dc; pulsed (see 4.5.1)	$V_{CE(SAT)}$			
2N6249		I_B = 1.0 A dc			1.5	V dc
2N6250		I_B = 1.25 A dc			1.5	V dc
2N6251		I_B = 1.67 A dc			1.5	V dc
Base to emitter saturation voltage	3066	Test condition A; I_C = 10 A dc; pulsed (see 4.5.1)	$V_{BE(SAT)}$			
2N6249		I_B = 1.0 A dc			2.25	V dc
2N6250		I_B = 1.25 A dc			2.25	V dc
2N6251		I_B = 1.67 A dc			2.25	V dc
Subgroup 3						
High temperature operation		T_A = +125°C				
Collector to emitter cutoff current	3041	Bias condition A, V_{BE} = -1.5 V dc	I_{CEX1}			
2N6249		V_{CE} = 225 V dc			1	mA dc
2N6250		V_{CE} = 300 V dc			1	mA dc
2N6251		V_{CE} = 375 V dc			1	mA dc
Low-temperature operation		T_A = -55°C				
Forward-current transfer ratio	3076	V_{CE} = 3.0 V; I_C = 10 A dc; pulsed (see 4.5.1)				
2N6249				5		
2N6250				4		
2N6251				3		
Subgroup 4						
Pulse response:	3251	Test condition A except test circuit and pulse requirements in accordance with figure 4.				
Turn-on time		V_{CC} = 200V dc; I_C = 10 A dc	t_{on}			
2N6249		I_B = 1.0 A dc			2.0	µs
2N6250		I_B = 1.25 A dc			2.0	µs
2N6251		I_B = 1.67 A dc			2.0	µs

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

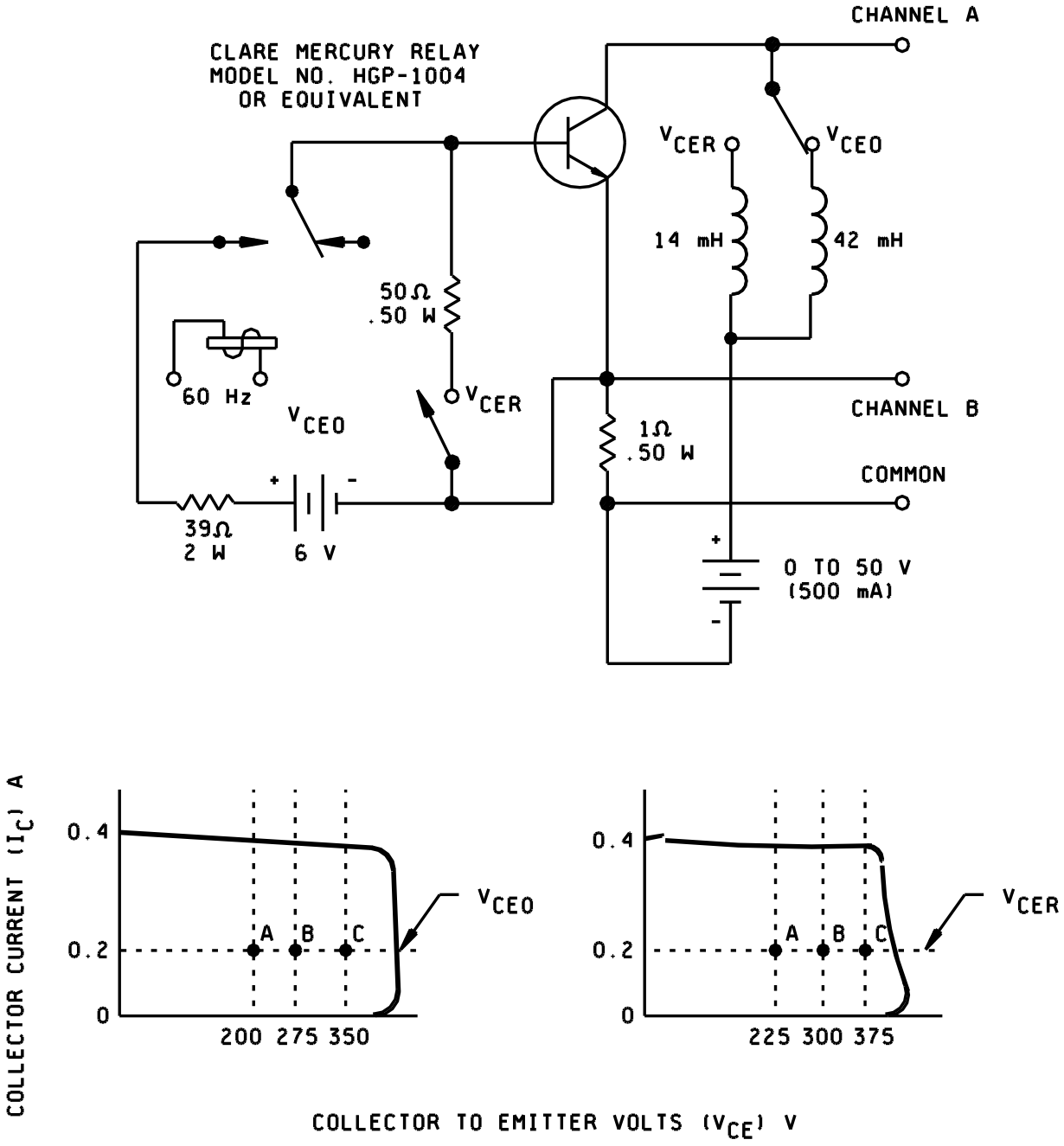
Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 4 - Continued						
Turn-off time		V_{CC} = 200 V dc; I_C = 10 A dc	t_{off}			
2N6249		I_B = 1.0 A dc			4.5	µs
2N6250		I_B = 1.25 A dc			4.5	µs
2N6251		I_B = 1.67 A dc			4.5	µs
Magnitude of small-signal short-circuit forward current transfer ratio	3306	V_{CE} = 10 V dc; I_C = 1.0 A dc; f = 1 MHz	$\lvert h_{FE} \rvert$	2.5	15	
Open capacitance open circuit	3236	V_{CB} = 10 V dc; I_C = 0; 100 kHz ≤ f ≤ 1 MHz	C_{obo}		500	pF
Subgroup 5						
Safe operating area (dc operation)	3051	T_C = +25°C; t = 1 s; 1 cycle (see figure 5)				
Test 1		I_C = 10 A dc; V_{CE} = 17.5 V dc				
Test 2		I_C = 5.8 A dc; V_{CE} = 30 V dc				
Test 3		I_C = 0.3 A dc; V_{CE} = 100 V dc				
Test 4		2N6249 only: I_C = 0.13 A dc, V_{CE} = 200 V dc				
Test 5		2N6250 only: I_C = 0.09 A dc, V_{CE} = 275 V dc				
Test 6		2N6251 only: I_C = 0.065 A dc, V_{CE} = 350 V dc				
Subgroup 6						
Safe operating area (switching)	3053	Load condition C; (unclamped inductive load) see figure 6				
		T_C = +25°C; duty cycle ≤ 10 percent; R_S = 0.1Ω;				
Test 1		t_p ≈ 5 ms (vary to obtain I_C); R_{BB1} = 2 Ω; V_{BB1} = 10 V dc; R_{BB2} = 50 Ω; V_{BB2} = 4 V dc; V_{CC} = 10 V dc; I_C = 10 A dc; L = 50 µH at 10 A dc				

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

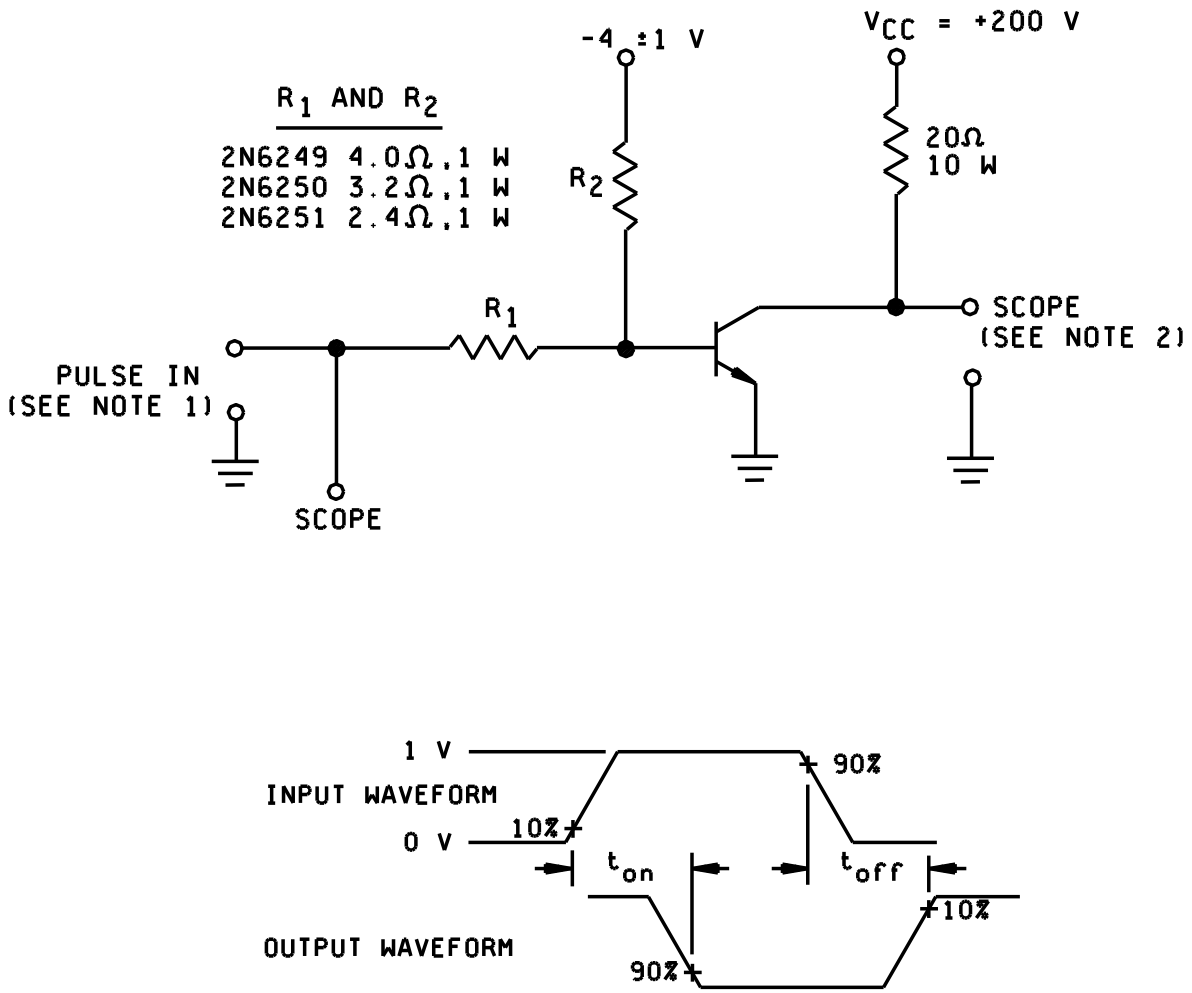
Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 6 - Continued						
Test 2		$t_p \approx 5$ ms (vary to obtain I_C); $R_{BB1} = 40\Omega$ $V_{BB1} = 10$ V dc $R_{BB2} = 50\ \Omega$ $V_{BB2} = 4$ V dc $V_{CC} = 10$ V dc $I_C = 2.0$ A dc L = 500 µH at 2.0 A dc $R_L \leq .01\ \Omega$				
Subgroup 7						
Safe operating area (switching)		(See figure 7) $T_C = +25°C$; duty cycle ≤ 10 percent; $t_p \approx 5$ ms (vary to obtain I_C); $R_s = 0.1\ \Omega$ $V_{CC} = 10$ V dc $I_C = 10$ A dc Clamp voltage: 2N6249 = 200 V dc 2N6250 = 275 V dc 2N6251 = 350 V dc				

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



NOTE: The sustaining voltages V_{CEO} and V_{CER} are acceptable when the traces fall to the right of point "A" for type 2N6249, point "B" for type 2N6250, and point "C" for type 2N6251 (I_C = 0.2 A).

FIGURE 3. V_{CEO}, V_{CER} measurement circuit.



NOTES:

1. The rise time (t_r) and fall time (t_f) of the applied pulse shall be each < 20 ns, duty cycle ≤ 2 percent; generator source impedance shall be 50 ohms; pulse width = 20 µs.
2. Output sampling oscilloscope; $Z_{in} \geq 100$ kΩ; $C_{in} \leq 50$ pF, rise time < 2 ns.

FIGURE 4. Pulse response test circuit.

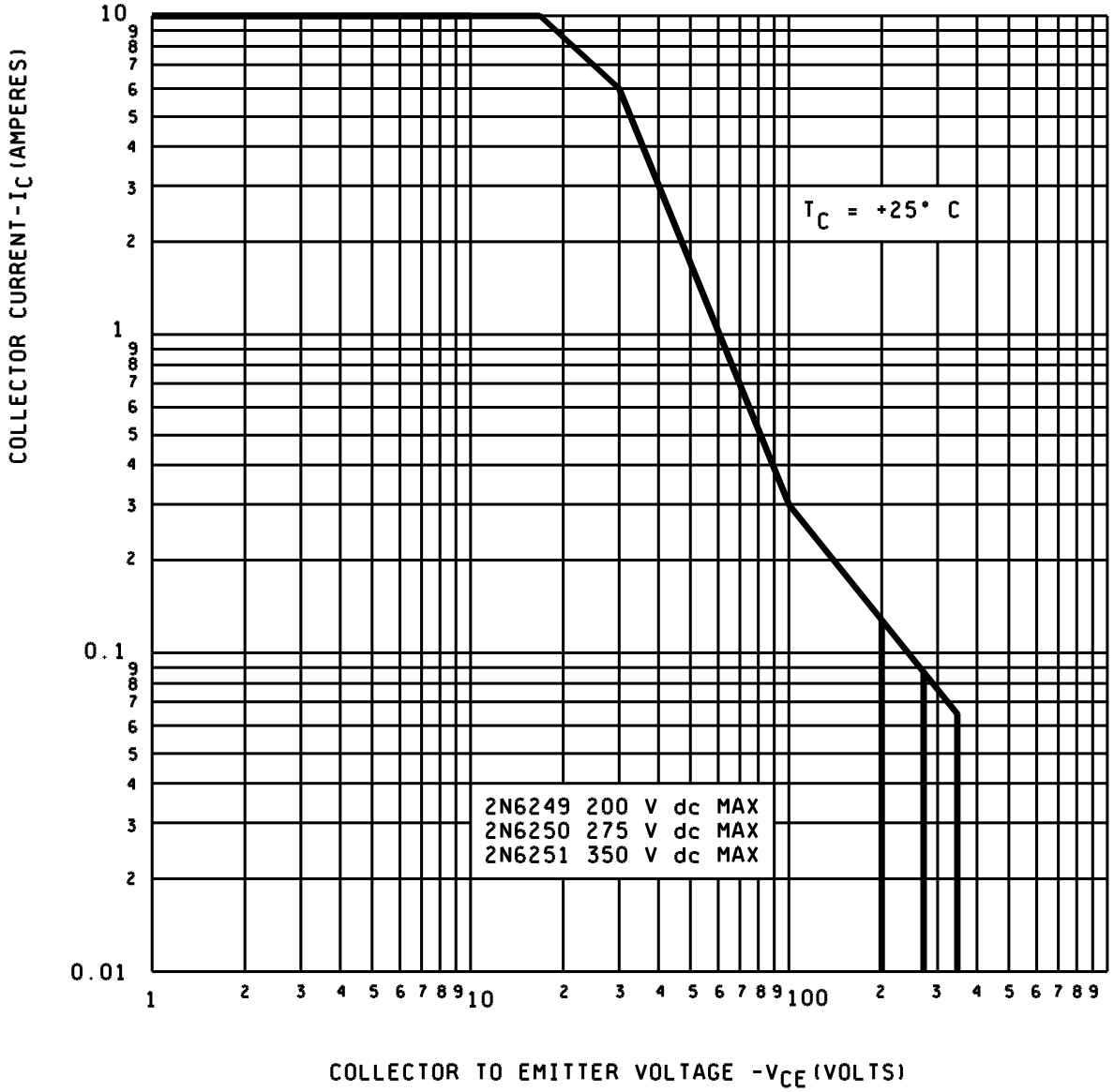


FIGURE 5. Maximum safe operating area graph (continuous dc).

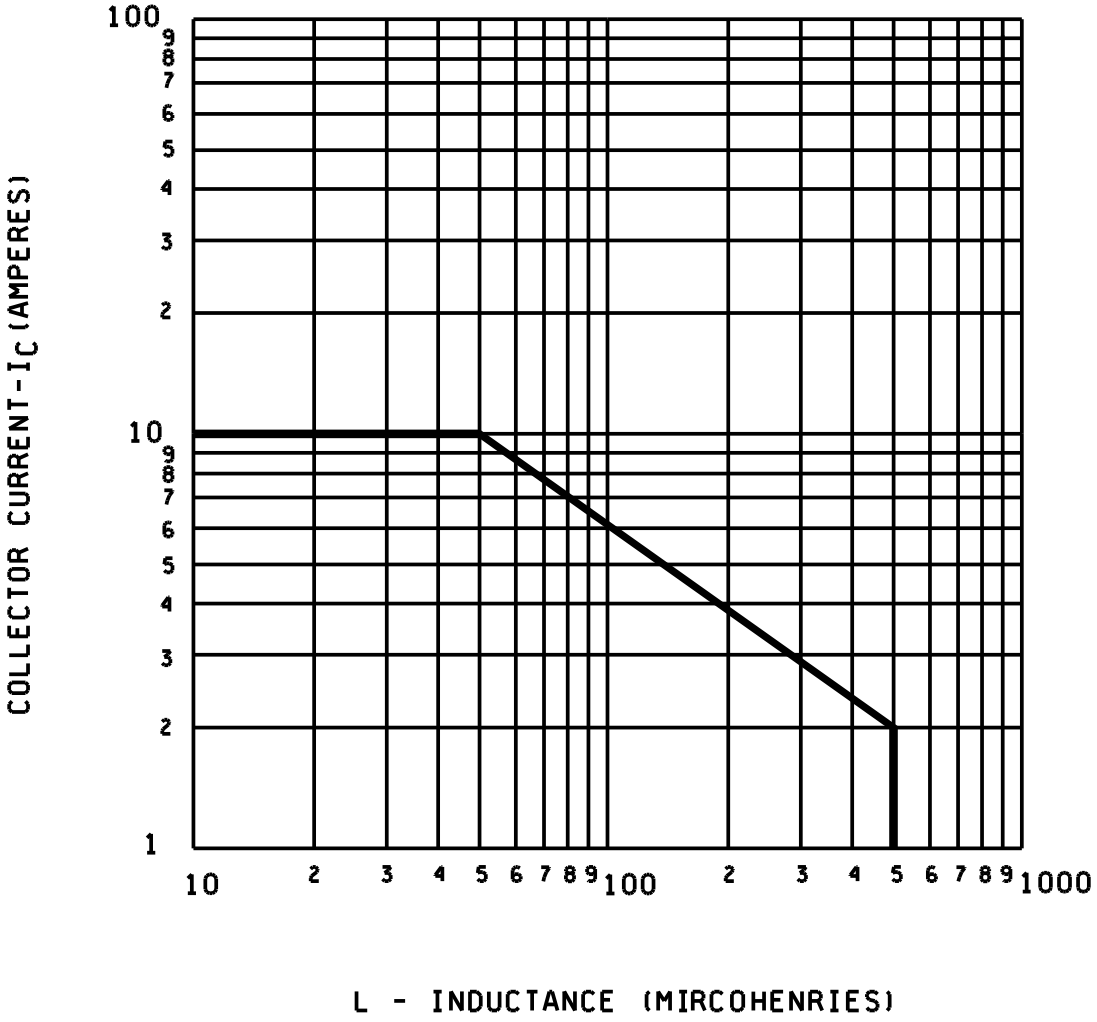
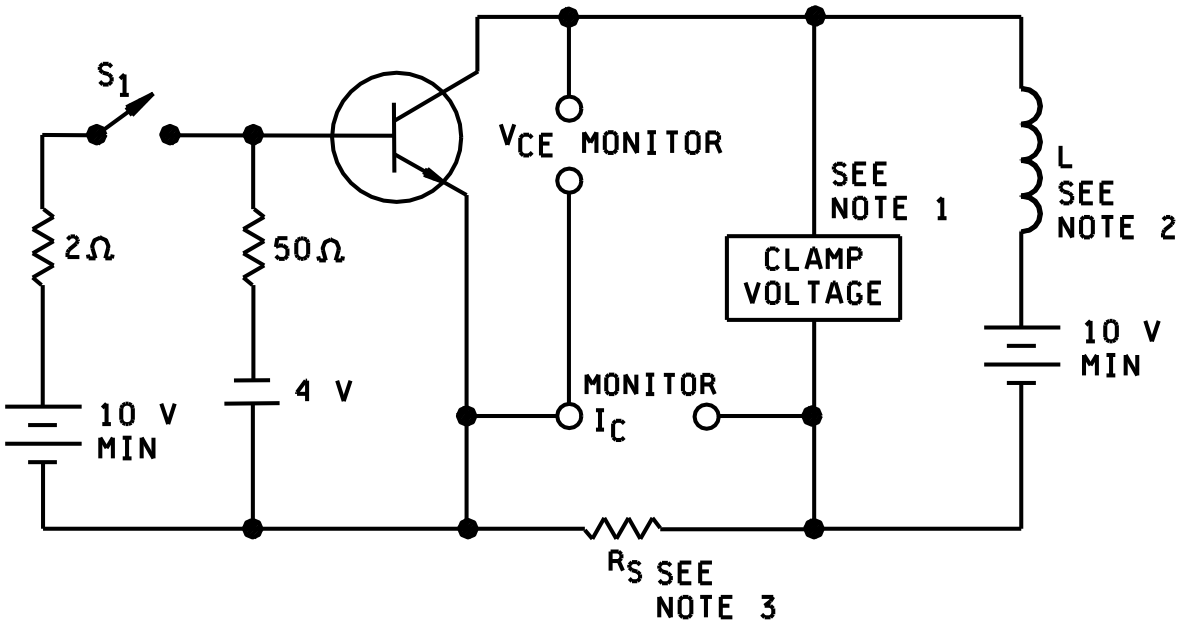


FIGURE 6. Safe operating area for switching between saturation and cutoff (unclamped inductive load).



NOTES:
1. Either a clamping circuit or clamping diode may be used.
2. The coil used shall provide a minimum inductance of 50 µH at 10 A with a maximum dc resistance of 0.1Ω (see 4.5.3).
3. $R_S \leq 0.1\Omega$, 12 W, 1 percent tolerance maximum (noninductive).

Procedure:
1. With switch S_1 closed, set the specified test conditions.
2. Open S_1. Device fails if clamp voltage not reached and maintained until the current returns to zero.
3. Perform specified end-point tests.

FIGURE 7. Clamped inductive sweep test circuit.

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-STD-129.

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 should specify the following:

a. Issue of DODISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced (see 2.2.1).

b. Lead finish (see 3.3.1).

c. Type designation and product assurance level.

d. Packaging requirements (see 5.1).

6.3 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.

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 Products List QPL-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 Suppliers of JANC die. The qualified JANC suppliers with the applicable letter version (example, JANHCA6249) will be identified on the QPL. The Part or Identifying Number (PIN) is listed below:

JANC ordering information		
	Manufacturer	
PIN	33178	
2N6249	A6249	
2N6250	A6250	
2N6251	A6251	

CONCLUDING MATERIAL

Custodians:
Air Force - 17

Review activities:
Air Force - 19, 85, 99

Preparing activity:
DLA-CC

(Project 5961-1820)

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-19500/510C	**2. DOCUMENT DATE (YYMMDD)** 97/09/05

3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER TYPES 2N6249, 2N6250, AND 2N6251 JAN, JANTX, JANTXV, JANS, JANHC AND JANKC

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) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME Alan Barone	b. TELEPHONE (Include Area Code) (1) Commercial 614-692-0510 (2) AUTOVON 850-0510
c. ADDRESS (Include Zip Code) Defense Supply Center Columbus ATTN: DSCC-VAT 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 AUTOVON 289-2340