The documentation and process conversion measures necessary to comply with this revision shall be completed by 30 September 1999.

INCH-POUND

MIL-PRF-19500/315F
30 June 1999
SUPERSEDING
MIL-S-19500/315E
10 March 1992

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER
TYPES 2N2880, 2N3749, 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 NPN, silicon, power transistors. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. Type 2N2880, see figure 1 (TO – 59) and for type 2N3749, see figure 2 (TO – 59).

1.3 Maximum ratings.

P_T 1/ T_A = 25°C	P_T 2/ T_C = 100°C	V_{CBO}	V_{CEO}	V_{EBO}	I_C	I_B	T_{STG} and T_{OP}
W	W	V dc	V dc	V dc	A dc	A dc	°C
2	30	110	80	8	5	0.5	-65 to +200

1/ Derate linearly 11.4 mW/°C for T_A > 25°C.

2/ Derate linearly 300 mW/°C for T_C > 100°C.

1.4 Primary electrical characteristics at T_C = 25°C.

Limits	h_{FE3} 1/ V_{CE} = 5 V dc I_C = 5 A dc	h_{FE2} 1/ V_{CE} = 2 V dc I_C = 1 A dc	$\|h_{fe}\|$ V_{CE} = 10 V dc I_C = 1 A dc f = 10 MHz	$V_{BE(sat)}$ 1/ I_C = 1 A dc I_B = 100 mA dc	$V_{CE(sat)}$ 1/ I_C = 1 A dc I_B = 100 mA dc	C_{obo} V_{CB} = 10 V dc I_E = 0 100 kHz ≤ f ≤ 1 MHz	$R_{\theta JC}$
				V dc	V dc	pF	°C/W
Min	15	40	3	---	---	---	---
Max	---	120	12	1.2	0.25	150	3.33

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.

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 section 3 and 4 of this specification, whether or not they are listed.

2.1.1 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 federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, 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, MIL-HDBK-6100 and figures 1 - 2N2880 (TO-59), and figure 2, 2N3749 (TO-59).

3.3.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500. Where a choice of lead finish is desired, it shall be specified in the contract or purchase order (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 manufacturer's list before contract award (see 4.2 and 6.3).

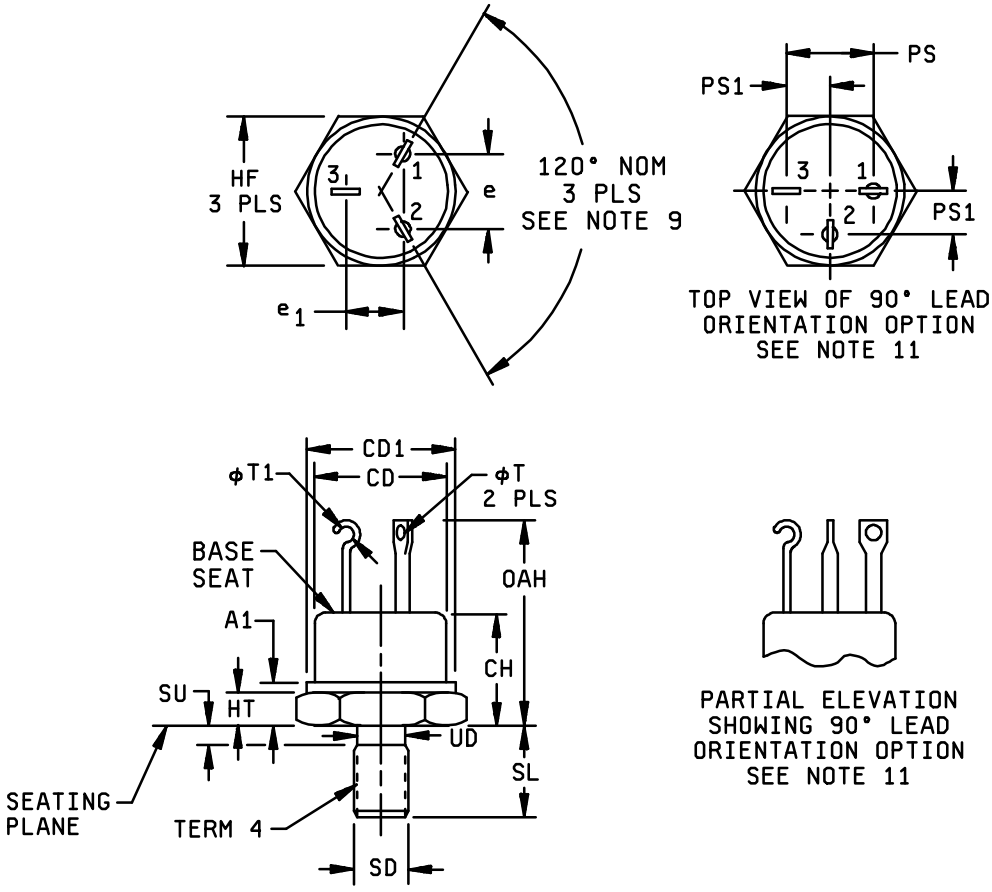


FIGURE 1. Physical dimensions of transistor type 2N2880 (TO-59).

Symbol	Dimension				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CH	0.320	0.468	8.13	11.89	
HT	---	0.250	---	6.35	
CD	0.318	0.380	8.08	9.65	
CD_1	0.380	0.437	9.65	11.10	
HF	0.423	0.438	10.74	11.13	
E	0.125	0.165	3.18	4.19	5, 8, 9
e_1	0.110	0.145	2.79	3.68	5, 8
A_1	0.090	0.150	2.29	3.81	
OAH	0.570	0.763	14.48	19.38	4
UD	0.155	0.189	3.94	4.80	
SL	0.400	0.455	10.16	11.56	
SU	---	0.078	---	1.98	10
ϕT	0.040	0.065	1.02	1.65	
ϕT_1	0.040	0.070	1.02	1.78	
SD	0.190-32UNF-2A				4
PS_1	0.090	0.110	2.29	2.79	5, 8, 9
PS	0.185	0.215	4.70	5.46	5, 8, 9

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Collector shall be electrically connected to the case. This terminal may be flattened and pierced only when the 90° option is used.
4. SD is the outer diameter of coated threads. Reference: Screw thread standards for Federal Service Handbook H28, part I.
5. The orientation of the terminals in relation to the hex flats is not controlled.
6. All three terminals.
7. The case temperature may be measured anywhere on the seating plane within 0.125 (3.18 mm) of the stud.
8. Terminal spacing measured at the base seat only.
9. Dimensions e, e_1, PS_1, and PS are measured from the center line of terminals.
10. Maximum unthreaded dimension.
11. This dimension applies to the location of the center line of the terminals.
12. A 90° angle lead orientation as shown may be used at the option of the manufacturer. All dimensions of the basic outline except e, e_1, and the 120° lead angle apply to this option.
13. Terminal -1, Emitter; Terminal -2, Base; Terminal -3, Collector.
14. A slight chamfer or undercut on one or both ends of the hexagonal is optional.

FIGURE 1. Physical dimensions of transistor type 2N2880 (TO-59)- Continued.

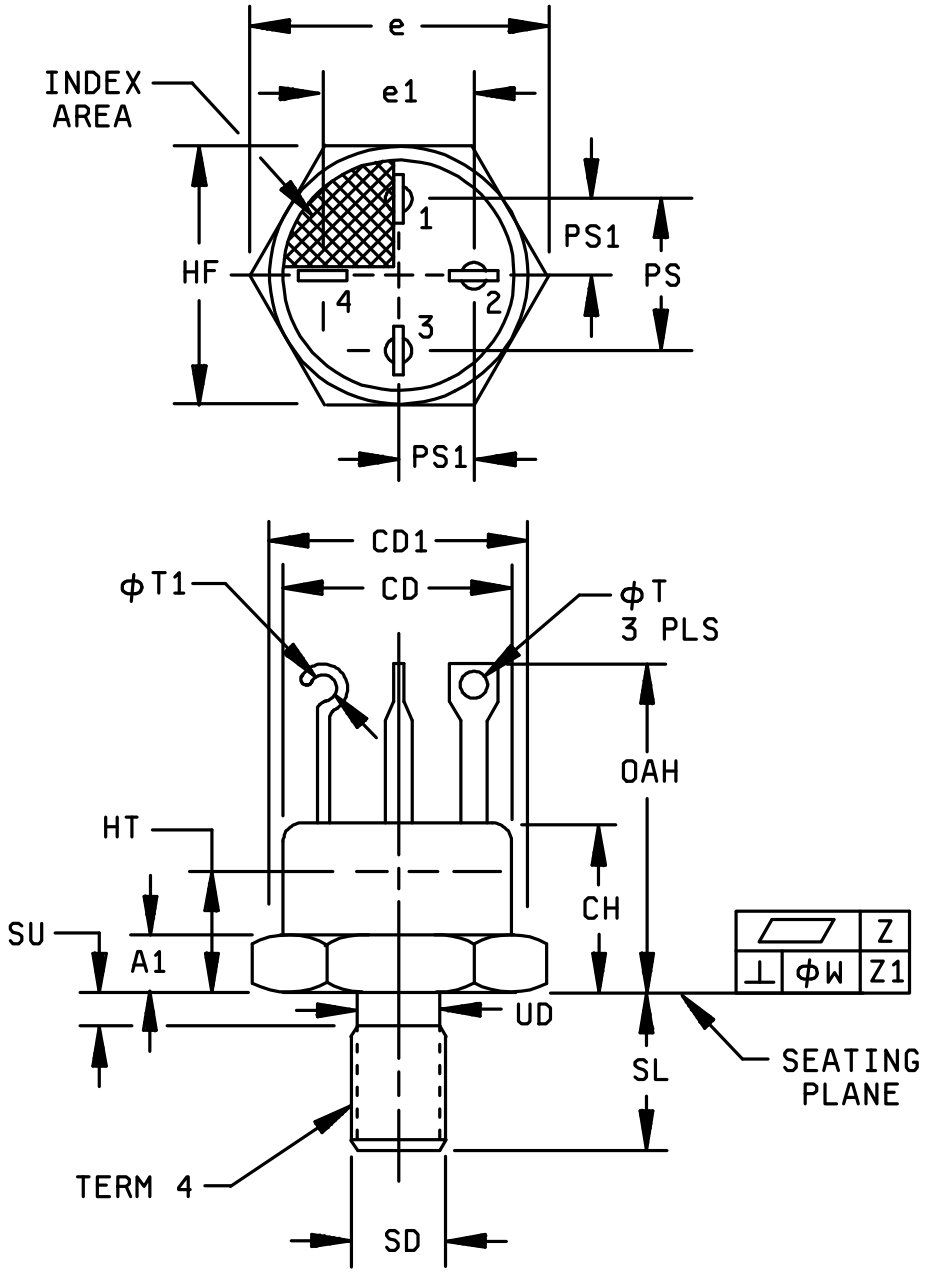


FIGURE 2. Physical dimensions of transistor type 2N3749 (TO-59).

Symbol	Dimension				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CH	0.320	0.458	8.13	11.89	
HT	---	0.250	---	6.35	5
E	---	0.505	---	12.83	
CD	0.318	0.380	8.08	9.65	
CD_1	0.380	0.437	9.65	11.10	5
HF	0.423	0.438	10.74	11.13	
e_1	0.180	0.215	4.57	5.46	7
E	0.080	0.110	2.03	2.79	7
A_1	0.090	0.150	2.29	3.81	4, 8
OAH	0.570	0.763	14.48	19.38	
SL	0.400	0.455	10.16	11.56	
SU	---	0.078	---	1.98	9
ϕT	0.040	0.065	1.02	1.65	
ϕT_1	0.040	0.070	1.02	1.78	6
SD	0.190-32UNF-2A				10
Z	---	0.002	---	0.05	
Z_1	---	0.006	---	0.15	

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Terminal 1 - Emitter; Terminal 2 - Base; Terminal 3 - Collector; Terminal 4 - Case.
4. Chamfer or undercut on one or both ends of hexagonal portion is optional.
5. The outline contour with the exception of the hexagon is optional within cylinder defined by CD_1 and HT.
6. Terminal 4 can be flattened and pierced or hook type. A visual index is required when the flattened and pierced tab terminal contour (identical to the adjacent terminals) option is used.
7. Angular orientation of terminals with respect to hexagon is optional.
8. A_1 dimension does not include sealing flanges.
9. SU is the length of incomplete or undercut threads.
10. SD is the outer diameter of coated threads. Reference: Screw thread standards for Federal Service Handbook H28, part I.

FIGURE 2. Physical dimensions of transistor type 2N3749 (TO-59) - 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.

4.3 Screening. Screening shall be in accordance with MIL-PRF-19500 table IVb (JANS, JANTX and JANTXV), 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_{CBO1} and h_{FE2}	I_{CBO1}
11	I_{CBO1} and h_{FE2}; ΔI_{CBO1} = 100 percent of initial reading or 50 nA dc, whichever is greater; Δh_{FE2} = +15 percent, -10 percent	I_{CBO1} and h_{FE2} ΔI_{CBO1} = 100 percent of initial reading or 100 nA dc, whichever is greater.
12	See 4.3.1	See 4.3.1
13(a)	Subgroups 2 and 3 of table I herein; ΔI_{CBO1} = 100 percent of initial value or 50 nA dc, whichever is greater; Δh_{FE2} = +15 percent, -10 percent	Subgroup 2 of table I herein ΔI_{CBO1} = 100 percent of initial value or 100 nA dc, whichever is greater; Δh_{FE2} = +20 percent, -10 percent
13(b) (2N3749 only)	MIL-STD-750, method 1016 insulation resistance test condition B (short connector, emitter, and base terminals together) $R_{ISO} = 10^9$ ohms (min)	MIL-STD-750, method 1016 insulation resistance test condition B (short connector, emitter, and base terminals together). $R_{ISO} = 10^9$ ohms (min)

4.3.1 Power burn-in conditions. Power burn-in conditions (all levels) are as follows:

T_J = 187.5 ±12.5°C $T_A \leq 100°C$ V_{CE} = 25 ±5 V dc

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. (Endpoint electrical measurements shall be in accordance with table I, subgroup 2 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 VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and paragraphs 4.4.2.1 and 4.4.2.2 herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

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

Subgroup	Method	Condition
B4	1037	$V_{CE} \geq 5$ V dc; $T_A = 25 \pm 3°C$, 2,000 cycles.
B5	1027	$V_{CE} \geq 5$ V dc; 96 hours. P_T = 2W at $T_A = 100°C$ or adjusted as required by the chosen T_A to give an average lot $T_J = 275°$. Marking legibility requirements shall not apply.
B6	3131	See 4.5.2.
B7	3053	Load condition C; 22 devices; c = 0 (unclamped inductive load) (see figure 5) $T_A = 25°C$; duty cycle ≤ 10 percent $R_S = 0.1\Omega$; $T_p = 640$ µs. Test 1, $R_{BB1} = 39\Omega$; $V_{BB1} = 20$ V dc; $R_{BB2} = \infty$; $V_{BB2} = 0$; $V_{CC} = 15$ V dc; $I_C = 5$ A dc; L = 1 mH; (0.5Ω, 5 A dc) (tower #7870 or equivalent). Test 2, $T_P = 2.88$ ms; $R_{BB1} = 120\Omega$; $V_{BB1} = 20$ V dc; $R_{BB2} = \infty$; $V_{BB} = 0$; $V_{CC} = 15$ V dc; $I_C = 1.6$ A dc; L = 10 mH; (0.11Ω, 12.5 A dc) (stancor c-2688 or equivalent).
B7	3053	See figures 6 and 7, (clamped inductive load) $T_A = 25°C$; $I_B = 0.5$ A dc; $I_C = 5$ A dc; $V_{CC} = 55$ V dc (destructive test).

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

Subgroup	Method	Condition
B3	1027	$T_J = 187.5 \pm 12.5°C$; $T_A \leq 35°C$; $V_{CE} = 25 \pm 5$ V dc.
B5	3131	See 4.5.2.
B7	3053	Load condition C; 22 devices; c = 0 (unclamped inductive load) (see figure 5) $T_A = 25°C$; duty cycle ≤ 10 percent $R_S = 0.1\Omega$. Test 1, $T_p = 640$ µs, $R_{BB1} = 39\Omega$; $V_{BB1} = 20$ V dc; $R_{BB2} = \infty$; $V_{BB2} = 0$; $V_{CC} = 15$ V dc; $I_C = 5$ A dc; L = 1 mH; (0.5Ω, 5 A dc) (tower #7870 or equivalent). Test 2, $T_P = 2.88$ ms; $R_{BB1} = 120\Omega$; $V_{BB1} = 20$ V dc; $R_{BB2} = \infty$; $V_{BB} = 0$; $V_{CC} = 15$ V dc; $I_C = 1.6$ A dc; L = 10 mH; (0.11Ω, 12.5 A dc) (stancor c-2688 or equivalent).
B7	3053	See figures 6 and 7, (clamped inductive load) $T_A = 25°C$; $I_B = 0.5$ A dc; $I_C = 5$ A dc; $V_{CC} = 55$ V dc (destructive test).

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) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

Subgroup	Method	Condition
C2	2036	Thermal strength (terminal torque) Test condition D1; torque = 6 inch-ounces; t = 15 s;(tubulated leads only).
C2		Terminal strength (stud torque) Test condition D2; torque = 15 inch-pound; application time = 15 s.
C2		Terminal strength (tension) Test condition A; weight = 7 pounds ±5 ounces; application time = 15 s (tubulated leads only).
C6	1027	T_J = 187.5 ±12.5°C; $T_A \leq$ 35°C; V_{CE} = 25 ±5 V dc.

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 measurements shall be as specified in MIL-STD-750.

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

a. Collector current magnitude during power applications shall be selected with 0.8 A dc $\leq I_C \leq$ 1.2 A dc and recorded before test is started.

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 selected with 25°C $\leq t_R$ 75°C and recorded before the test is started.

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

f. Maximum limit of $R_{\theta JC}$ shall be 3.33°C/W.

4.5.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be conducted at a case temperature (T_C) of 25°C.

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 2/						
Breakdown voltage, collector to base	3001	Bias condition D; I_C = 10 μA dc	$V_{(BR)CBO}$	110		V dc
Breakdown voltage, collector to emitter	3011	Bias condition D; I_C = 100 mA dc Pulsed (see 4.5.1)	$V_{(BR)CEO}$	80		V dc
Breakdown to voltage, emitter to base	3026	Bias condition D; I_E = 10 μA dc	$V_{(BR)EBO}$	8		V dc
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 80 V dc	I_{CBO1}		0.2	μA dc
Collector to emitter cutoff current	3041	Bias condition A; V_{CE} = 110 V dc; V_{BE} = -0.5 V dc	I_{CEX1}		1.0	μA dc
Collector to emitter cutoff current	3041	Bias condition D; V_{CE} = 60 V dc	I_{CEO}		20	μA dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 6 V dc	I_{EBO}		0.2	μA dc
Forward current transfer ratio	3076	V_{CE} = 5 V dc; I_C = 50 mA dc	h_{FE1}	40	120	
Forward current transfer ratio	3076	V_{CE} = 2 V dc; I_C = 1 A dc pulsed (see 4.5.1)	h_{FE2}	40	120	
Forward current transfer ratio	3076	V_{CE} = 5 V dc; I_C = 5 A dc pulsed (see 4.5.1)	h_{FE3}	15		
Collector to emitter voltage (saturated)	3071	I_C = 1.0 A dc; I_B = 0.1 A dc; pulsed (see 4.5.1)	$V_{CE(sat)1}$		0.25	V dc
Collector to emitter voltage (saturated)	3071	Test condition A; I_C = 5.0 A dc; I_B = 0.5 A dc; pulsed (see 4.5.1)	$V_{CE(sat)2}$		1.5	V 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 2 - Continued 2/						
Base to emitter voltage (non-saturated)	3066	Test condition B; V_{CE} = 2 V dc; I_C = 1 A dc; pulsed (see 4.5.1)	V_{BE}		1.2	V dc
Base to emitter voltage (saturated)	3066	Test condition A; I_C = 1 A dc; I_B = 0.1 A dc; pulsed (see 4.5.1)	$V_{BE(sat)}$		1.2	V dc
Subgroup 3						
High-temperature operation:		T_A = 150°C				
Collector to emitter cutoff current	3041	Bias condition A; V_{CE} = 80 V dc; V_{BE} = 0.5 V dc	I_{CEX2}		50	µA dc
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 60 V dc	I_{CBO2}		10	µA dc
Low-temperature operation:		T_A = -55°C				
Forward-current cutoff current	3076	V_{CE} = 5 V dc; I_C = 1 A dc	h_{FE4}	15		
Subgroup 4						
Small-signal short- circuit forward- current transfer ratio	3206	V_{CE} = 5 V dc; I_C = 50 mA dc; f = 1 kHz	h_{fe}	40	140	
Multitude of small-signal short-circuit forward current transfer ratio	3306	V_{CE} = 10 V dc; I_C = 1 A dc; f = 10 MHz	$\|h_{fe}\|$	3	12	
Open circuit output capacitance	3236	V_{CB} = 10 V dc; I_E = 0; 100 ≤ f ≤ 1 MHz	C_{obo}		150	pF
Switching parameters:						
Pulse delay time		See figure 3	t_d		60	ns
Pulse rise time		See figure 3	t_r		300	ns
Pulse storage time		See figure 3	t_s		1.7	µs
Pulse fall time		See figure 3	t_f		300	ns

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 5						
Safe operating area (D.C.)	3051	T_C = +100°C; Powers application time = 10 s (see figure 4)				
Test 1		V_{CE} = 80 V dc , I_C = 80 mA dc				
Test 2		V_{CE} = 20 V dc, I_C = 1.5 A dc				
Safe operating area (clamped switching)		See figures 6 and 7 (clamped inductive load) T_A = +25°C; I_B = 0.5 A dc; I_C = 5 A dc; V_{CC} = 15 V dc				
Endpoint electrical measurements		See table I, subgroup 2 herein.				
Subgroups 6 and 7						
Not applicable						

1/ For sampling plan, see MIL-PRF-19500.
2/ For JANS level, all devices required by the specified sampling plan shall be subjected to subgroups 2, 3, and 4 combined.

TABLE II. Groups B, C, and E delta measurements. 3/ 4/ 5/

Step	Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector to base cutoff current	3036	Bias condition D; V_{CB} = 80 V dc	ΔI_{CBO1} 1/		100 percent of initial value or 100 nA dc, whichever is greater.	
2.	Forward current transfer ratio	3076	V_{CE} = 2 V dc; I_C = 1 A dc; pulsed (see 4.5.1)	Δh_{FE2} 1/		+20 percent, -10 percent change from initial reading.	
3.	Collector to emitter voltage (saturated)	3071	I_C = 1.0 A dc; I_B = 0.1 A dc; pulsed (see 4.5.1)	$\Delta V_{CE(sat)1}$ 1/		50 mV dc change from previously measured value.	

1/ See MIL-PRF-19500 for sampling plan.

2/ Devices which exceed the group A limits for this test shall not be accepted.

3/ The delta measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:

a. Subgroup 4, see table II herein, steps 1, 2 and 3.

b. Subgroup 5, see table II herein, steps 1, 2 and 3.

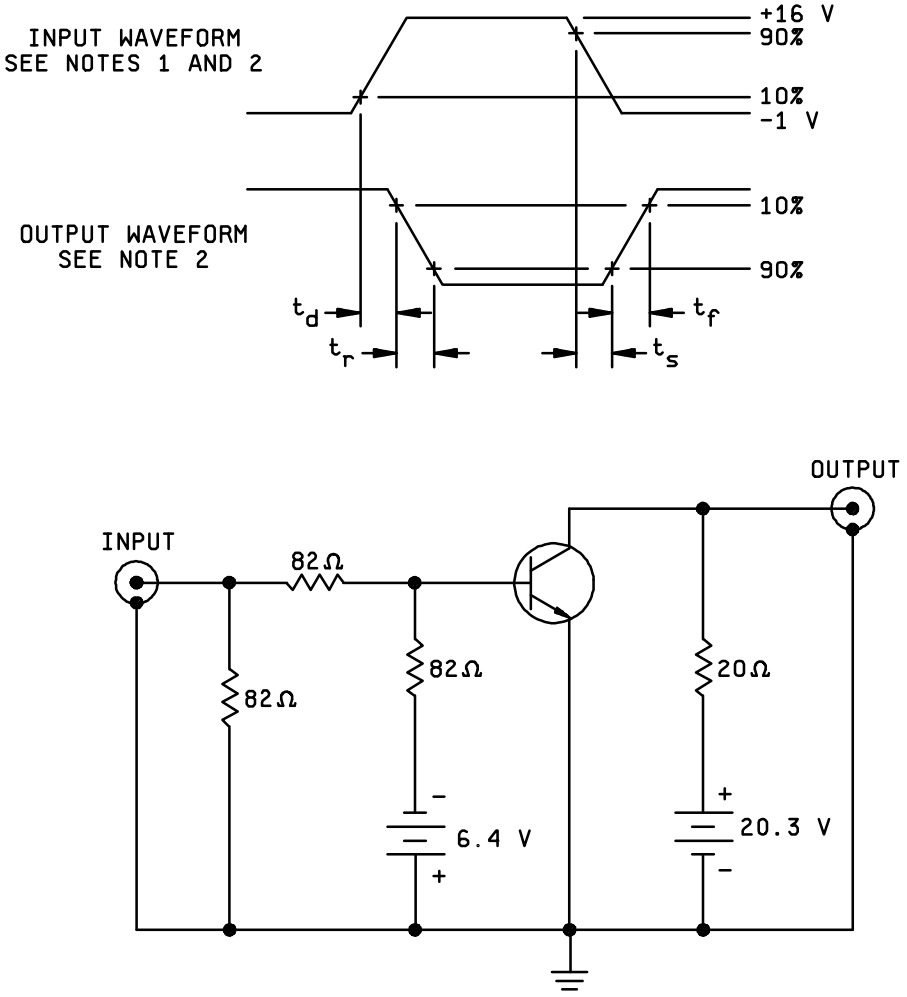
4/ The delta measurements for table VIb (JANTX and JANTXV) of MIL-PRF-19500 are as follows:

a. Subgroup 3, see table II herein, step 2.

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

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

a. Subgroup 6, see table II herein, steps 1 and 2 (JANS) and step 2 (JAN, JANTX and JANTXV).



NOTES:

1. The input waveform is supplied by a pulse generator with the following characteristics:

   $t_r \leq 15$ ns, $t_f \leq 15$ ns, $Z_{OUT} = 50\Omega$, PW = 2 µs, duty cycle ≤ 2 percent.

2. Output waveforms are monitored on an oscilloscope with the following characteristics:

   $t_r \leq 15$ ns, $R_{in} \geq 10$ mΩ, $C_{in} \leq 11.5$ pF.

3. Resistors shall be noninductive types.

4. The dc power supplies may require additional by-passing in order to minimize ringing.

FIGURE 3. Pulse response test circuit.

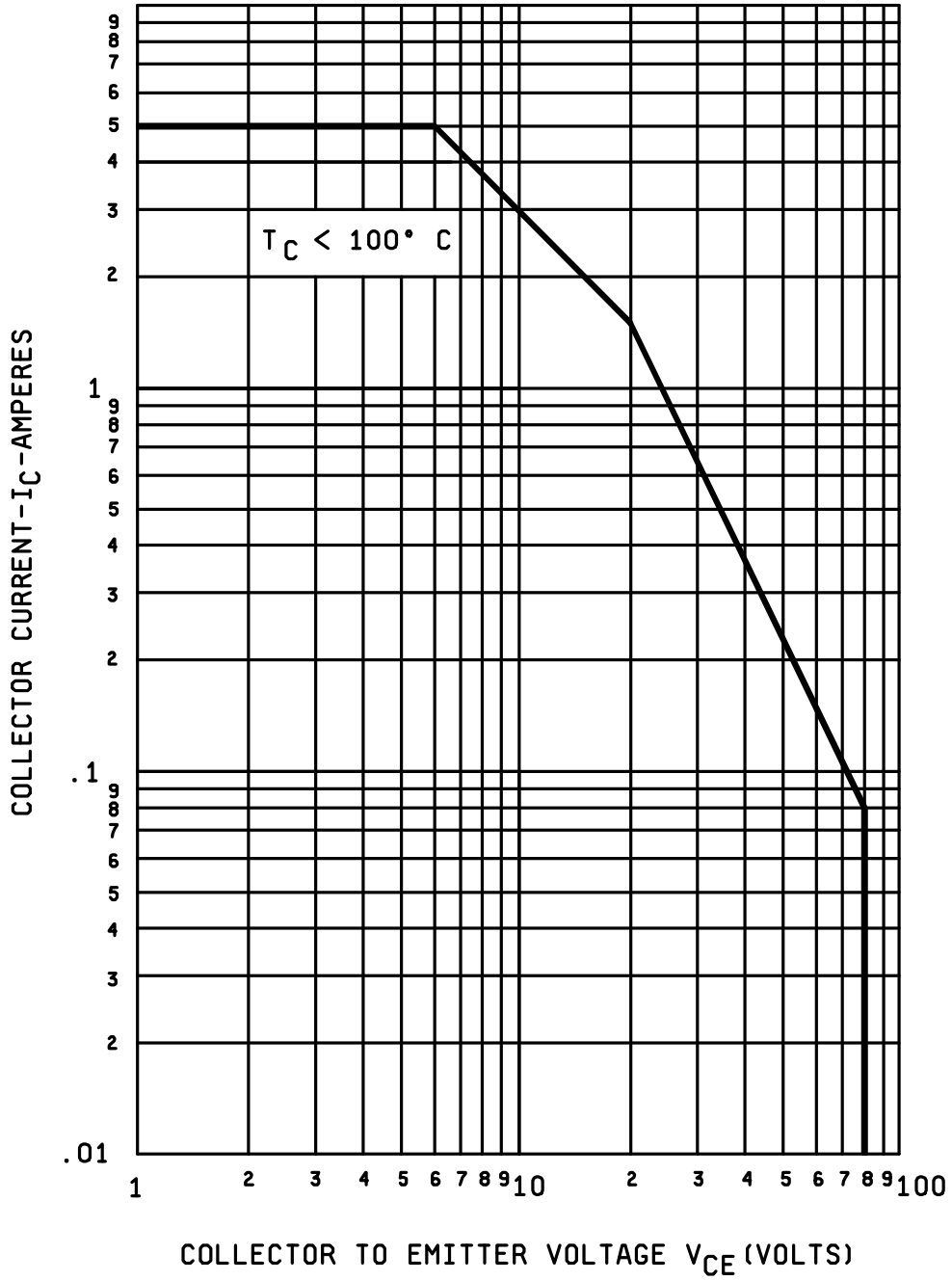


FIGURE 4. Maximum safe operating area graph (dc).

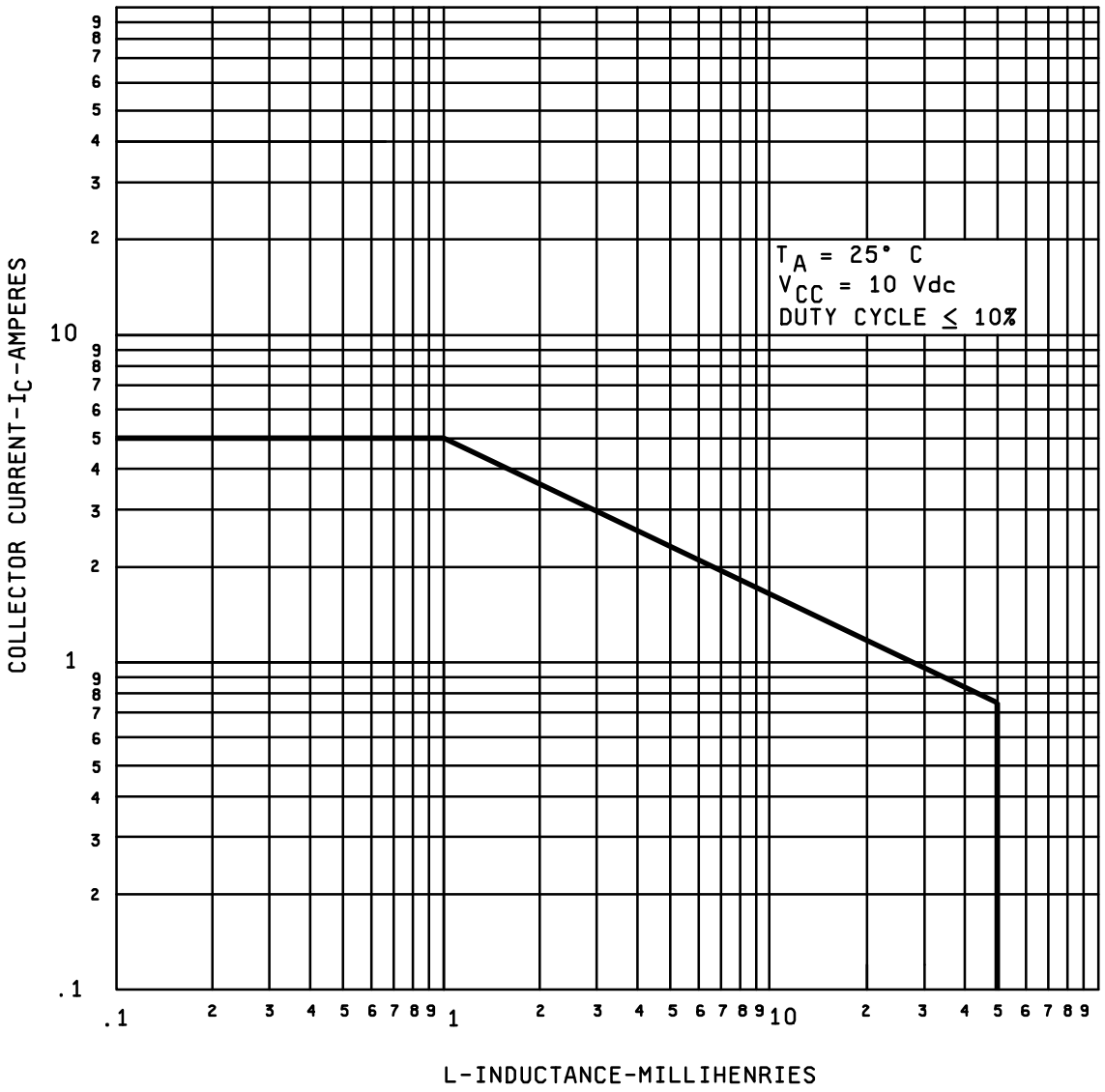
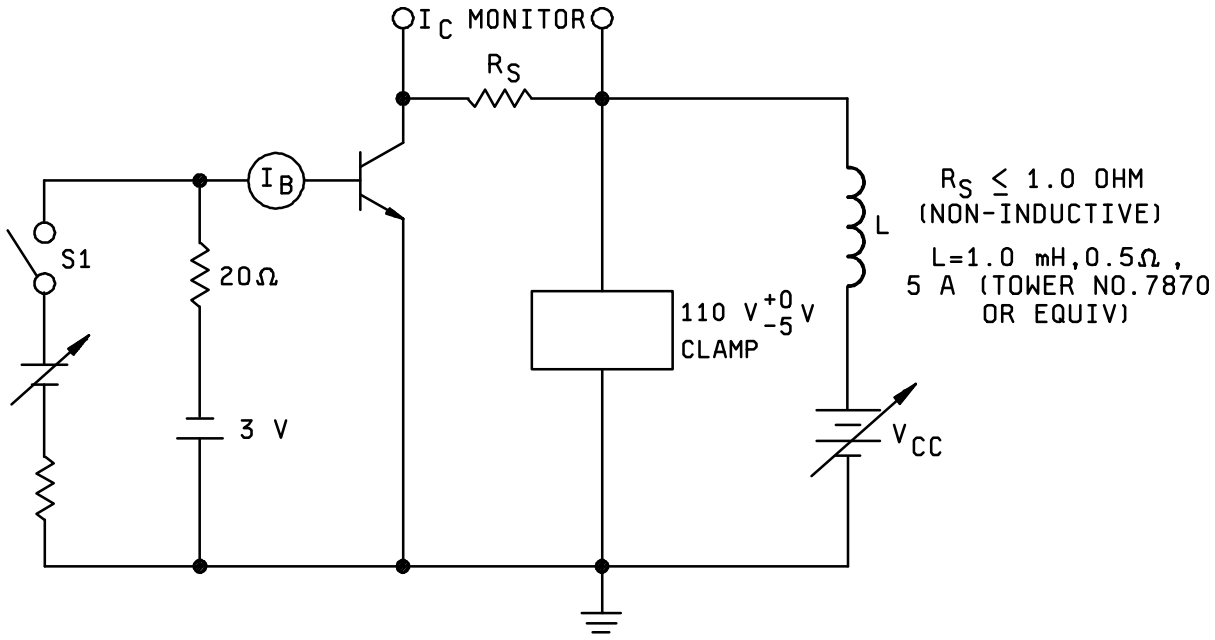


FIGURE 5. Safe operating area for switching between saturation and cutoff - unclamped inductive load.



Procedure:

1. With switch S1 closed, set the specified test conditions.
2. Open S1. Device fails if clamp voltage is not reached.
3. Perform specified endpoint tests.

FIGURE 6. Clamped inductive sweep test circuit.

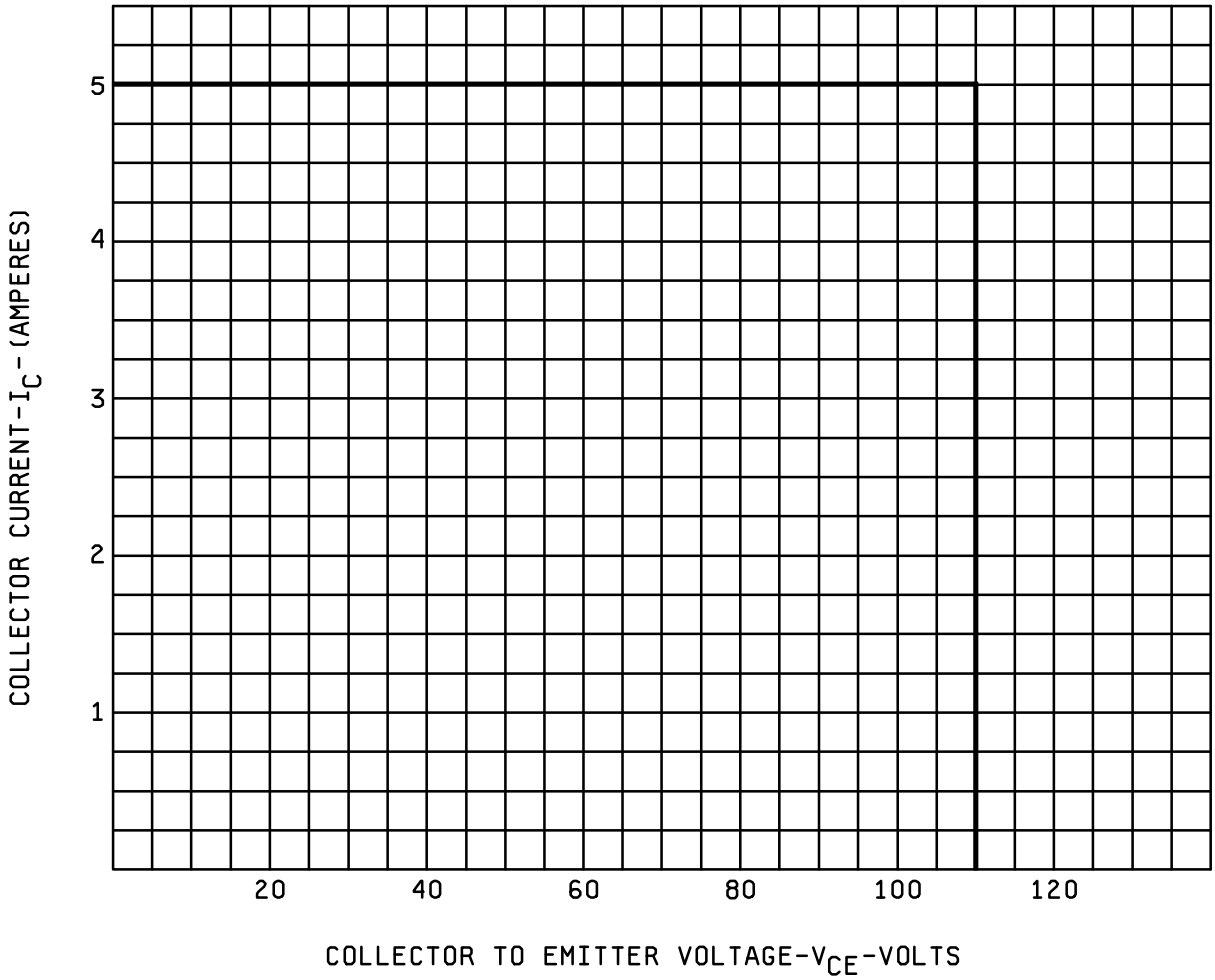


FIGURE 7. Safe operating areas for switching between saturation and cutoff - clamped inductive load.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements should 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 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-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.

6.4 Changes from previous issue. Asterisks 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
NASA - NA
DLA – CC

Review activities:
Army - AR, MI, SM
Air Force - 19, 99
Navy - AS, CG, MC, OS, SH

Preparing activity:
DLA - CC

(Project 5961-2133)

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-19500/315F	**2. DOCUMENT DATE (YYMMDD)** 990630

3. DOCUMENT TITLE
SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER TYPES 2N2880, 2N3749 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 (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) Commercial DSN FAX EMAIL	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY	
a. Point of contact: Alan Barone,	b. TELEPHONE Commercial 614-692-0510 DSN 850-0510 FAX 614-692-6939 EMAIL alan_barone@dscc.dla.mil
c. ADDRESS : Defense Supply Center Columbus, ATTN: DSCC-VQE, 3990 East Broad Street, 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, Suite 2533, Fort Belvoir, VA 22060-6221 Telephone (703) 767-6888 DSN 427-6888