

The documentation and process conversion measures necessary to comply with this revision shall be completed by 10 March 1998

INCH-POUND

MIL-PRF-19500/384D  
 10 December 1997  
 SUPERSEDING  
 MIL-S-19500/384C  
 3 January 1992

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON HIGH-POWER  
 TYPES 2N3584, 2N3585, 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, power transistors. Three levels of product assurance are provided for this device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (TO-66).

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

Type	$P_T$ $T_A = +25^\circ\text{C}$ 1/	$P_T$ $T_C = +25^\circ\text{C}$ 2/	$V_{CBO}$	$V_{CEO}$	$V_{EBO}$	$I_B$	$I_C$	$T_J$ and $T_{STG}$	$R_{\theta JC}$	$V_{CER}$
	<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>	<u>°C/W</u>	<u>V dc</u>
2N3584	2.5	35	375	250	6.0	1.0	2.0	-65 to +200	5.0	300
2N3585	2.5	35	500	300	6.0	1.0	2.0	-65 to +200	5.0	400

1/ Derate linearly, 14.85 mW/°C for  $T_A > +25^\circ\text{C}$ .

2/ Derate linearly, 200 mW/°C for  $T_C > +25^\circ\text{C}$ .

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.

1.4 Primary electrical characteristics.

Limits	hFE <u>1/</u>		C <sub>obo</sub>	h <sub>fe</sub>	V <sub>BE(SAT)</sub> <u>1/</u>	V <sub>BE(SAT)</sub> <u>1/</u>	Switching	
							t <sub>on</sub>	t <sub>off</sub>
	I <sub>C</sub> = 1 A dc V <sub>CE</sub> = 10 V dc	I <sub>C</sub> = 100 mA dc V <sub>CE</sub> = 10 V dc	100 KH < f < 1 MHz V <sub>CB</sub> = 10 V dc I <sub>E</sub> = 0	f = 5 MHz I <sub>C</sub> = 200 mA dc V <sub>CE</sub> = 10 V dc	I <sub>C</sub> = 1.0 A dc I <sub>B</sub> = 0.1 A dc	I <sub>C</sub> = 1 A dc I <sub>B</sub> = 125 mA dc	(See table I and figure 2 herein)	
			pF		V dc	V dc	μs	μs
Min	25	40		3.0				
Max	100		120	15	1.4	0.75	3.0	7.0

1/ Pulsed.

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.)

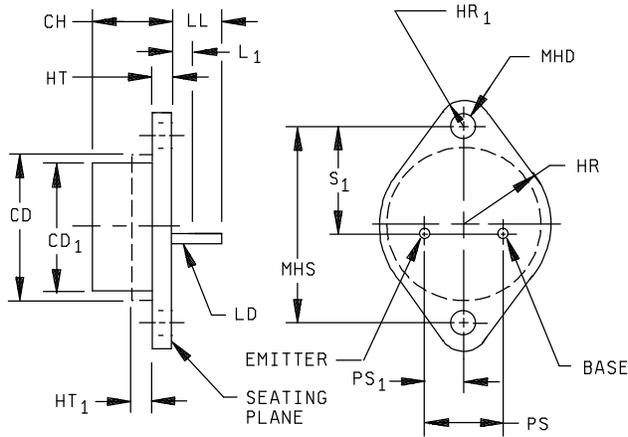
2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500.



Lead number	
1	Emitter
2	Base
Case	Collector

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	---	.620	---	15.75	3
CD <sub>1</sub>	.470	.500	11.94	12.70	3
CH	.250	.340	6.35	8.64	
HT	.050	.075	1.27	1.91	3
HT <sub>1</sub>	---	.050	---	1.27	3
HR	---	.350	---	8.89	
HR <sub>1</sub>	.115	.145	2.92	3.68	6
LD	.028	.034	0.71	0.86	5, 9
LL	.360	.500	9.14	12.70	5
L <sub>1</sub>	---	.050	---	1.27	5, 9
MHD	.142	.152	3.61	3.86	7
MHS	.958	.962	24.33	24.43	
PS	.190	.210	4.83	5.33	4
PS <sub>1</sub>	.093	.107	2.36	2.72	4
S <sub>1</sub>	.570	.590	14.48	14.99	4

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Body contour is optional within zone defined by LD and CD.
4. These dimensions should be measured at points .050 inch (1.27 mm) to .055 inch (1.40 mm) below seating plane. When gauge is not used, measurement will be made at seating plane.
5. Both terminals.
6. At both ends.
7. Two holes.
8. The collector shall be electrically connected to the case.
9. LD applies between L<sub>1</sub> and LL. Diameter is uncontrolled in L<sub>1</sub>.

FIGURE 1. Physical dimensions (TO-66) continued.

3.4 Interface requirements and physical dimensions. The interface requirements and physical dimensions shall be as specified in MIL-PRF-19500 and on figure 1 (TO-66) herein.

3.4.1 Lead material and finish. Unless otherwise specified, lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Lead material shall be Kovar or Alloy 52.

3.4.2 Transistor construction. These devices shall be constructed in a manner and using materials which enable the transistor to meet the applicable requirements of MIL-PRF-19500 and this document.

3.5 Marking. Devices shall be marked as specified in MIL-PRF-19500.

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

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

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 4.3).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500.

4.3 Screening (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 levels
<u>1/</u>	Thermal impedance (see 4.5.3)
9	$I_{CEX1}$
11	$h_{FE2}$ ; $I_{CEX1} = \pm 100$ percent of initial value or $\pm 0.1$ mA dc, whichever is greater
12	See 4.3.1
13 <u>2/</u>	Subgroup 2 of table I herein; $\Delta I_{CEX1} = \pm 100$ percent of initial value or $\pm 0.1$ mA dc; $\Delta h_{FE} = \pm 20$ percent of initial value.

1/ Thermal impedance shall be performed any time after sealing provided temperature cycling is performed in accordance with MIL-PRF-19500, screen 3 prior to this thermal test.

2/  $Z_{\theta JX}$  is not required in screen 13 if already previously performed.

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

$$P_T = 2.5 \text{ W, } V_{CB} = 150 \text{ V dc, } T_A = +25^\circ\text{C, minimum}$$

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.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with appendix E, table V of MIL-PRF-19500 and table I herein. The following test conditions shall be used for  $Z_{\theta JX}$ , group A inspection:  $Z_{\theta JX} \leq 5^\circ\text{C/W}$ .

- a.  $I_M$  measurement current..... 1 to 10 mA.
- b.  $I_H$  forward heating current..... 2 A minimum.
- c.  $t_H$  heating time..... 100 ms.
- d.  $t_{MD}$  measurement delay time..... 50  $\mu\text{s}$  to 80  $\mu\text{s}$ .

End-point electrical measurements shall be in accordance with the applicable steps of table II 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 VIb (JANTX and JANTXV) of MIL-PRF-19500, and as follows. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table II herein, except  $Z_{\theta JX}$  shall be performed after intermittent operation life only.

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

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B3	1037	$\Delta T_J = +100^\circ\text{C}$ , 2,000 cycles, test condition D. The heating cycle shall be 1 minute minimum.

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 herein. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table II herein, except  $Z_{\theta JX}$  shall be performed after intermittent operation life only.

4.4.3.1 Group C inspection, appendix E, table VII of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C2	2036	Test condition A, weight = 10 pounds, time = 15 s.
C6	1037	$\Delta T_J = +100^\circ\text{C}$ , 6,000 cycles, test condition D. The heating cycle shall be 1 minute minimum.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in appendix E, table IX of MIL-PRF-19500, and as follows herein. Electrical measurements (end points) and delta requirements shall be in accordance with the applicable steps of table II herein.

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
E1	1051	500 cycles; 22 devices, $c = 0$ .
E2	1039 or 1049	Condition A; 500 hours; 22 devices, $c = 0$ .
E4	3131	$R_{\theta JC} = 5^\circ\text{C/W}$ maximum. See 4.5.2; Sampling plan = 22 devices, $c = 0$ .
E5	1001	Normal mounting pressure = 8 mm Hg $\pm$ 2 mm Hg for 60 s (minimum). 15 devices, $c = 0$ .

4.5 Methods of inspection. Methods of inspection and test 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 measurements shall be conducted in accordance with method 3131, MIL-STD-750. The following details shall apply:

- a. Collector current magnitude during power application shall be 0.5 A dc.
- b. Collector to emitter voltage magnitude shall be 15 V dc.
- c. Reference temperature measuring point shall be the case.
- d. Reference point temperature shall be  $+25^{\circ}\text{C} \leq T_R \leq +75^{\circ}\text{C}$  and recorded before the test is started.
- e. Mounting arrangement shall be with heat sink to header.
- f. Maximum limit of  $R_{\theta JC}$  shall be  $5^{\circ}\text{C/W}$ .

4.5.3 Thermal impedance  $Z_{\theta JX}$  measurements for screening. The  $Z_{\theta JX}$  measurements shall be performed in accordance with MIL-STD-750C, method 3161. The maximum limit (not to exceed the group A, subgroup 2 limit) for  $Z_{\theta JX}$  in screening (table IV of MIL-PRF-19500) shall be derived by each vendor by means of statistical process control. When the process has exhibited control and capability, the capability data shall be used to establish the fixed screening limit. In addition to screening, once a fixed limit has been established, monitor all future sealing lots using a random five piece sample from each lot to be plotted on the applicable X, R chart. If a lot exhibits an out of control condition, the entire lot shall be removed from the line and held for engineering evaluation and disposition.

4.5.3.1 Thermal impedance  $Z_{\theta JX}$  measurements for initial qualification or requalification. The  $Z_{\theta JX}$  measurements shall be performed in accordance with MIL-STD-750C, method 3161 (read and record data ( $Z_{\theta JX}$ )).  $Z_{\theta JX}$  shall be supplied on one lot (500 pieces minimum) and a thermal response curve shall be submitted. Twenty-two of these samples shall be serialized and provided to the qualifying activity for correlation prior to shipment of parts. Measurements conditions shall be in accordance with 4.4.1.

4.5.4  $S_{BC}$  test. Set  $V_{CC} = 100$  V dc without pulse applied. Adjust generator to apply a single pulse of 1 second duration obtain  $I_C = 350$  mA dc. The 1 second pulse width shall not be exceeded in adjustment and not more than one pulse shall be applied in any 20 second interval. (See figure 2.)

4.5.5  $S_{BICEX}$  test. Set switch (SW) to required position for test. Adjust  $V_3$  so that the current through  $R_3$  is 2.0 A dc. Device fails test if second breakdown occurs as indicated by collapse of oscilloscope display. (See figure 3.)

4.5.6  $S_{BICER}$  test. Set switch (SW) to required position for test. Adjust  $V_3$  so that the current through  $R_3$  is 1.4 A dc. Device fails test if second breakdown occurs as indicated by collapse of oscilloscope display. (See figure 3.)

4.5.7  $V_{(BR)CEO}$  and  $V_{(BR)CER}$  tests. The breakdown voltages  $V_{(BR)CEO}$  and  $V_{(BR)CER}$  shall not be measured on a curve tracer.  $V_{(BR)CEO}$  and  $V_{(BR)CER}$  should be measured by means of the test circuit shown on figure 3. Set switch (SW) to required position for test. Adjust  $V_3$  so that the current through  $R_3$  is 200 mA. Device fails test if collector to emitter voltage is less than breakdown voltage limit at 200 mA.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Breakdown voltage, collector to emitter	3011	Pulsed (see 4.5.1), $I_C = 10 \text{ mA dc}$ ; bias condition D.	$V_{(BR)CEO}$	250 300		V dc
2N3584 2N3585						
Breakdown voltage, collector to base	3001	Bias condition D, $I_C = 15 \text{ mA dc}$ , pulsed (see 4.5.1)	$V_{(BR)CER}$	375 500		V dc
2N3584 2N3585						
Emitter to base cutoff current	3061	Bias condition D, $V_{EB} = 6.0 \text{ V dc}$	$I_{EBO}$		0.5	mA dc
Collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5 \text{ V dc}$	$I_{CEX1}$		1.0 1.0	mA dc mA dc
2N3584 2N3585		$V_{CE} = 300 \text{ V dc}$ $V_{CE} = 400 \text{ V dc}$				
Collector to emitter cutoff current	3041	Bias condition D, $V_{CE} = 150 \text{ V dc}$	$I_{CEO}$		5.0	mA dc
Base emitter voltage (saturated)	3066	Test condition A, pulsed (see 4.5.1), $I_C = 1 \text{ A dc}$ , $I_B = 0.1 \text{ A dc}$	$V_{BE(sat)}$		1.4	V dc
Collector to emitter voltage (saturated)	3071	Pulsed (see 4.5.1) $I_C = 1 \text{ A dc}$ , $I_B = 0.125 \text{ A dc}$	$V_{CE(sat)}$		0.75	V dc
Forward-current transit ratio	3076	$V_{CE} = 10 \text{ V dc}$ , $I_C = 1 \text{ A dc}$ , pulsed (see 4.5.1)	$h_{FE1}$	25	100	
Forward-current transit ratio	3076	$V_{CE} = 10 \text{ V dc}$ , $I_C = 100 \text{ mA dc}$ , pulsed (see 4.5.1)	$h_{FE2}$	40		
<u>Subgroup 3</u>						
High temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5 \text{ V dc}$	$I_{CEX2}$		2.0 2.0	mA dc mA dc
2N3854 2N3855		$V_{CE} = 300 \text{ V dc}$ $V_{CE} = 400 \text{ V dc}$				

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection <sup>1/</sup>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u>						
Second breakdown, collector current, base forward biased		$V_{CE} = 100 \text{ V dc}$ (see figure 2 and 4.5.3)	$SBI_C$	350		mA dc
Pulse response transfer ratio	3051	Test condition A, except test circuit and pulse requirements in accordance with figure 2 herein.				
Turn-on time		$V_{CC} = 30 \text{ V dc}$ (see figure 2), $I_C = 1 \text{ A dc}$ , $I_B = 100 \text{ mA dc}$ , $R_C = 29 \Omega$	$t_{on}$		3.0	$\mu\text{s}$
Turn-off time		$V_{CC} = 30 \text{ V dc}$ (see figure 2), $I_C = 1 \text{ A dc}$ , $I_{B1} = -I_{B2} = 100 \text{ mA dc}$ , $R_C = 29 \Omega$	$t_{off}$		7.0	$\mu\text{s}$
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 10 \text{ V dc}$ , $I_C = 200 \text{ mA dc}$ , $f = 5 \text{ MHz}$	$h_{fe}$	3.0	15	
Open circuit (output capacitance)	3236	$V_{CB} = 10 \text{ V dc}$ , $I_E = 0$ , $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	$C_{obo}$		120	pF
Small-signal short-circuit forward-current transfer ratio	3206	$V_{CE} = 10 \text{ V dc}$ , $I_C = 1 \text{ A dc}$ , $f = 1 \text{ kHz}$	$h_{fe}$	25	200	
<u>Subgroup 5</u>						
Safe operating area (continuous dc)	3051	$T_C = +25^\circ\text{C}$ , power application time = 1 second, 1 cycle				
Test 1		$V_{CE} = 17.5 \text{ V dc}$ , $I_C = 2 \text{ A dc}$				
Test 2		$V_{CE} = 100 \text{ V dc}$ , $I_C = 350 \text{ mA dc}$				
Test 3 2N3584 2N3585		$V_{CE} = 250 \text{ V dc}$ , $I_C = 37 \text{ mA dc}$ $V_{CE} = 300 \text{ V dc}$ , $I_C = 17 \text{ mA dc}$				
Electrical measurements		See table II, steps 1 and 4.				
Second breakdown, collector current, base forward biased	3051	$V_{CE} = 100 \text{ V dc}$ (see figure 2, and 4.5.4)	$SBI_C$	350		mA dc
Second breakdown, collector current, base reverse biased		$L = 100 \text{ mH}$ , $R_{BE} = 20 \Omega$ , $V_{BE} = 4 \text{ V dc}$ (see figure 3 and 4.5.5)	$SBI_{CEX}$	2.0		A dc
Second breakdown collector current, base with resistance return		$L = 500 \mu\text{H}$ , $R_{BE} = 50 \Omega$ (see figure 3 and 4.5.6)	$SBI_{CER}$	1.4		A dc

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

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

Step	Inspection	MIL-STD-750		Symbol	Limit		Unit
		Method	Conditions		Min	Max	
1.	Collector to emitter cutoff current  2N3584 2N3585	3041	Bias condition A; $V_{BE} = -1.5$ V dc $V_{CE} = 300$ V dc $V_{CE} = 400$ V dc	$I_{CEX1}$		1.0 1.0	mA dc mA dc
2.	Breakdown voltage collector to emitter  2N3584 2N3585		Bias condition D See figure 3 and 4.5.6; $I_C = 200$ mA dc	$V_{CEO}$	240 285		V dc V dc
3.	Emitter to base cutoff current	3041	Bias condition D; $V_{EB} = 6$ V dc	$I_{EBO}$		0.5	mA dc
4.	Forward-current transfer ratio	3076	$V_{CE} = 10$ V dc; $I_C = 1$ A dc; pulsed (see 4.5.1)	$h_{FE1}$	25	100	
5.	Collector to emitter cutoff current  2N3584 2N3585	3041	Bias condition A; $V_{BE} = -1.5$ V dc $V_{CE} = 300$ V dc $V_{CE} = 400$ V dc	$\Delta I_{CEX1}$	$\pm 100$ percent of initial value or $\pm 0.1$ mA dc, whichever is greater.		
6.	Forward-current transfer ratio	3076	$V_{CE} = 10$ V dc; $I_C = 1$ A dc; pulsed (see 4.5.1)	$\Delta h_{FE1}$	$\pm 25$ percent change from initial value.		
7.	Thermal response	3131	See 4.3.2	$\Delta V_{BE}$			V dc

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

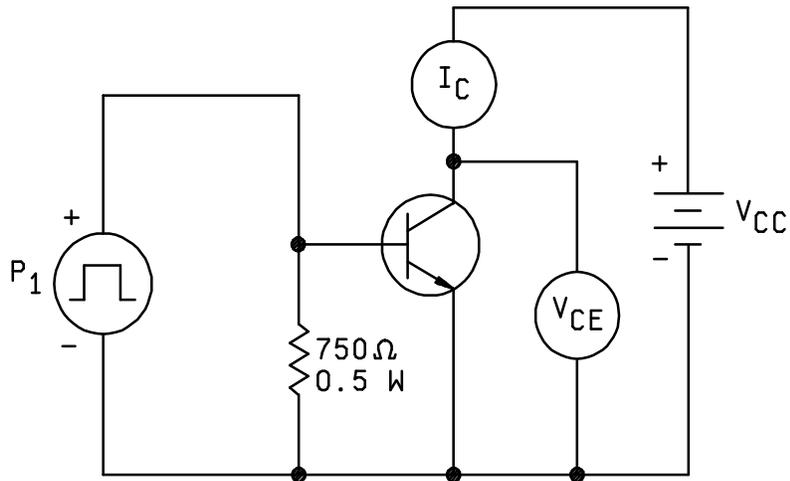
- a. Subgroup 2, see table II herein, steps 1, 2, and 4.
- b. Subgroup 3, see table II herein, steps 1, 2, 6 and 7.
- c. Subgroup 6, see table II herein, steps 1, 2 and 4.

2/ The electrical measurements for appendix E, table VII of MIL-PRF-19500 are as follows:

- a. Subgroup 2, see table II herein, steps 1, 2 and 4.
- b. Subgroup 3, see table II herein, steps 1, 2 and 3.
- c. Subgroup 6, see table II herein, steps 1, 2 and 4.

3/ The electrical measurements for appendix E, table IX of MIL-PRF-19500 are as follows:

- a. Subgroup 1, see table II herein, steps 1, 2, 3, 4, 6 and 7.
- b. Subgroup 2, see table II herein, steps 1, 5, 6 and 7.



Adjust  $V_{CC}$  and  $P_1$  for  $V_{CE} = 100\ V$  at  $I_C = 350\ mA$ .

$V_{CC}$ : 110 V, 1 amp capability, current limited, voltage regulated supply,  $\pm 1$  percent line and load.

$P_1$ : Pulse current generator, 0 to +140 mA capability.

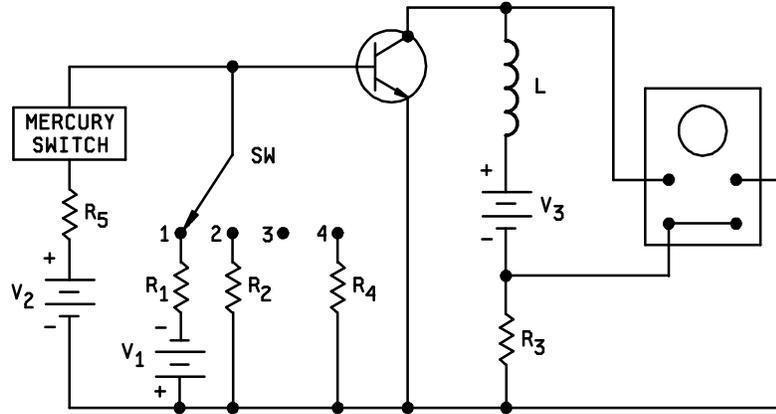
$t_p = 1$  second, Test cycles = 1,  $T_C = +25^\circ C$ .

$I_C$ : Current indicator (meter or sampling resistor and oscilloscope) with voltage drop less than 1 V at 350 mA.

$V_{CE}$ : Voltage indicator with current requirement of  $< 1\ mA$  at 100 V (oscilloscope, VTVM or high impedance multimeter).

Reject criteria: Reject if second breakdown occurs, as indicated by collector current sudden increase and becoming uncontrollable by  $P_1$ .

FIGURE 2.  $SBI_C$  test circuit.



Mercury switch: Clare mercury relay, model number HGP - 1004, or equivalent.  
 Oscilloscope: Hewlett Packard oscilloscope, model number 130B, or equivalent.

<u>Switch position</u>	<u>Test</u>	<u>L</u>	<u>Reject criteria</u>
1.	$SBI_{CEX}$	100 mH	SB occurs
2.	$SBI_{CER}$	500 mH	SB occurs
3.	$V_{(BR)CEO}$	20 mH	$V_{(BR)CEO} < \text{limit}$
4.	$V_{(BR)CER}$	5 mH	$V_{(BR)CER} < \text{limit}$

$R_1 = 20W, 0.5 W$

$R_2 = 50W, 0.5 W$

$R_3 = 1W, 0.5 W$

$R_4 = 200W, 0.5 W$

$R_5 = 27W, 10 W$

$V_1 = -4 V$

$V_2 = 15 V$

$V_3 = 0 \text{ to } 50 V, 3 A$

FIGURE 3.  $SBI_{CEX}$ ,  $SBI_{CER}$ ,  $V_{(BR)CEO}$ ,  $V_{(BR)CER}$  test circuit.

5. PACKAGING

5.1 Packaging. Packaging shall prevent mechanical damage of the devices during shipping and handling and shall not be detrimental to the device. 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. 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 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.

Custodians:  
Army - CR  
Navy - EC  
Air Force - 17:

Preparing activity:  
DLA - CC  
  
(Project 5961-1603)

Review activities  
Army - AR, AV, MI, SM  
Navy - AS, CG, MC, OS, SH  
Air Force - 13, 19, 80, 85, 99

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.

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I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER  
MIL-PRF-19500/384D

2. DOCUMENT DATE (YYMMDD)  
971210

3. DOCUMENT TITLE

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON HIGH POWER, TYPES 2N3584, 2N3585, 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)  
(1) Commercial  
(2) AUTOVON  
(If applicable)

7. DATE SUBMITTED  
(YYMMDD)

8. PREPARING ACTIVITY

a. NAME Alan Barone

b. TELEPHONE (Include Area Code)  
(1) Commercial (2) AUTOVON  
(614) 692-0510 850-0510

c. ADDRESS (Include Zip Code)  
Defense Supply Center Columbus, ATTN:  
DSCC-VAT, 3990 East Broad Street,  
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