SUPERSEDING
MIL-S-19500/331 (EL)
5 May 1965

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, GERMANIUM, POWER TYPES 2N1553A THROUGH 2N1556A

1. SCOPE

1.1 Scope.- This specification covers the detail requirements for germanium, PNP, power transistors for particular use in power-switching, electronic-circuit applications. (See 3.4 and 6.2) herein.)

1.2 Outline and dimensions.- See Fig. 1 herein. (TO-3)

1.3 Maximum ratings.-(At T_C =+25° C, unless otherwise specified):

	P_T 1/	T_J	V_{CBO}	V_{CEO}	V_{EBO}	I_B	I_C	T_A (range)
	W	°C	Vdc	Vdc	Vdc	Adc	Adc	°C
2N1553A	90	100	-50	-20	-20	-5	-15	-65 to +100
2N1554A	90	100	-60	-30	-30	-5	-15	-65 to +100
2N1555A	90	100	-80	-40	-40	-5	-15	-65 to +100
2N1556A	90	100	-100	-70	-50	-5	-15	-65 to +100

1/ Between T_C > 25° C and up to T_C = +100° C, derate linearly at 1.20 W/° C.

1.4 Particular electrical characteristics.-(At T_C=+25° C, unless otherwise specified):

	h_{FE}				V_{BE}(sat)		V_{CE}(sat)		$\|h_{fe}\|$		Switching			
	I_C=-5Adc V_{CE}=-2Vdc		I_C=-10Adc V_{CE}=-2Vdc		I_C=-10Adc I_B=-1Adc		I_C=-10Adc I_B=-1Adc		f=100kHz I_C=-5Adc V_{CE}=-2Vdc		t_d	t_r	t_s	t_f
											(See Table I and Fig. 2 herein)			
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Max	Max	Max	Max
	---	---	---	---	Vdc	Vdc	Vdc	Vdc	---	---	usec	usec	usec	usec
All Types	30	90	30	60	---	-1.0	---	-0.7	1.0	4.0	2	10	5	30

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATIONS
MILITARY

MIL-S-19500	Semiconductor Devices, General Specification For

STANDARDS
MILITARY

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-750	Test Methods for Semiconductor Devices

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. Both the title and number or symbol should be stipulated when requesting copies.)

3. REQUIREMENTS

3.1 Requirements.-Requirements for the transistor shall be in accordance with Specification MIL-S-19500 and as otherwise specified herein.

3.2 Abbreviations and symbols.-The abbreviations and symbols used herein are defined in Specification MIL-S-19500.

3.3 Design and construction.-The transistor shall be of the design, construction, and physical dimensions specified in Figure 1.

3.3.1 Terminal arrangement.-The terminal arrangement on the transistor shall be as indicated in Figure 1.

3.3.2 Operating position.-The transistor shall be capable of proper operation in any position.

3.4 Performance characteristics.-The transistor performance characteristics shall be as specified in Tables I, II, and III herein.

3.5 Marking.-Except as otherwise specified herein, marking shall be in accordance with specification MIL-S-19500.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.-Sampling and inspection shall be in accordance with specification MIL-S-19500, and as specified herein.

4.1.1 Inspection lot.-Applicable to the semiconductor device(s) covered herein, the term "inspection lot" shall be as defined in paragraph 4.3.2.1 of specification MIL-S-19500 except that the 6-week-period time limitation stipulated therein shall be considered as not compulsory.

4.1.1.1 Preconditioned-unit constituency of inspection lots.-All semiconductor devices covered herein, in each inspection lot presented for Quality Conformance inspection, shall have been subjected to the following preconditioning:

(a) Maintained at T_A=+100°C minimum, for 96±8 hours minimum.

4.2 Qualification and acceptance inspection.-Qualification and Quality Conformance inspection shall be in accordance with specification MIL-S-19500, Quality Assurance Provisions, and as otherwise specified herein. Groups A, B, and C inspection shall consist of the examinations and tests specified in Tables I, II, and III, respectively, herein. Quality Conformance inspection shall include inspection of Preparation for Delivery (see 5.1 herein).

4.2.1 Special Group A criteria for Qualification inspection.-For Qualification inspection, only 10 failures will be permitted for all Group A tests combined. Hereto, where the manufacturer deems that the data in paragraph 4.4.2 of specification MIL-S-19500 are invokable, notification shall be made to the Chief, Components and Materials Standardization Branch, Procurement and Production Directorate, Fort Monmouth, New Jersey 07703, Attention: AMSEL-PP-EM-2.

4.2.2 Permissible Group B or Group C combined-subgroup testing.-At option of the manufacturer, all of the tests on one subgroup in Group B (Table II herein) may be combined with all of the tests in one or more other subgroup(s) of Group B for sequential performance; the same option applies to Group C (Table III herein) constituent subgroup. Under this option, the sample units per applicable LTPD or lambda (λ) for one of the subgroups may be used to form the sample quantity required per LTPD or lambda(λ) for anyone of the other subgroups. Accept-reject criteria normally applicable for each respective subgroup shall be effective. The following administrative requirements shall apply hereto:

a. It shall be understood that the above option may be adopted by manufacturer for Qualification testing of product, or for Quality Conformance inspection of any individual lot submitted by manufacturer for lot acceptance.

b. Prior notification as to adoption of this testing option, and concurrent information as to the predesignated sample quantities to be used shall be made to the Government inspection authority concerned.

c. Complete record of the combined-subgroup testing-program results shall be maintained and be available to the Government inspection authority.

4.2.3 Group B-Group C life test samples.-Samples that have been subjected to Group B, 340-hour life test may be continued on test for 1000 hours in order to satisfy Group C life test requirements. These samples shall be predesignated, and shall remain subjected to the Group C, 1000-hour evaluation after they have passed the Group B, 340-hour acceptance criteria. The cumulative total of failures found during 340-hour test and during the subsequent interval up to 1000 hours shall be computed for 1000-hour acceptance. (See 4.2.4 below).

4.2.4 Group C testing.-Group C tests shall be performed on a lot every 6 months. (See Table III herein). The contractor shall, throughout the course of a contract or order, permit the Government representative to scrutinize all test data and findings covering manufacturer's test program on Group C characteristics and parameters for the product concerned. Upon determination by the Government inspector (in advance of Group C, 6-month, test results) that Group C parameters are not being adequately met, the Government inspector may require lot-by-lot inspection, normally for a minimum of 3 consecutive lots, to be performed for required Group C tests.

4.2.5 Disposition of sample units.-Sample units that have been subjected to Group B, Subgroup 2 and 4 tests shall not be delivered on the contract or order. Sample units that have been subjected to and have passed Group B, Subgroups 1, 3, 5, 6, and 7 tests and all Group C tests (these tests to be considered non-destructive), may be delivered on the contract or order provided that, after Group B and C inspection is terminated, those sample units are subjected to and pass Group A inspection. Defective units from any sample group that may have passed group inspection shall not be delivered on the contract ororder until the defect(s) has been remedied to the satisfaction of the Government.

4.3 Particular examination and test requirements.-

4.3.1 "Pulse measurements".-Conditions for "Pulse Measurements" shall be as specified in Section 4 of MIL-STD-750.

4.3.2 Hermetic seal test.-The transistors shall be subjected to hermetic seal test(s) in accordance with Method 1071 in MIL-STD-750 except that the following test conditions therein shall apply hereto:

a. Fine-leak test: per Test Condition G or H; however, a maximum leakage rate of 5 x 10^{-7} atm cc/sec shall be effective for acceptance.

b. Gross-leak test: per Test Condition A, C, D, or F.

4.3.3 Safe operating are (DC operation) test.-Satisfactory endurance of the transistors throughout Test #1, #2, #3, respectively, (per Table II, Subgroup 5, herein) is directly related to the "safe operating area: for the transistors as determinable from the graphs of Figure 3 herein. (The 3 points tested per Test #1, 2, 3 are locatable on the boundaries of "safe operating area".)

4.3.4 Marking resistance to solvents test.-The device samples shall be subjected to test per Method 215 in MIL-STD-202. The following details shall apply:

a. All surface areas on the body of the device where marking has been applied shall be brushed.

b. All marking shall have remained legible, and there shall be no evidence of mechanical damage to the device, upon examination after test.

4.3.5 Maximum current test.-With the base lead electrically connected to the collector terminal, the current specified shall be applied through the emitter lead for the time duration specified. Suitable means should be employed so that the case temperature will not exceed +71° C.

4.3.6 Mechanical damage resulting from tests.-Except for intentionally deforming, mutilating, or dismembering mechanical-stress tests to which samples are subjected, there shall be no evidence of mechanical damage to any sample unit as a result of any of the Group A, B, or C tests.

Table I. Group A inspection.

Test Method per MIL-STD-750	Examination of test	Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 1		20				
2071	Visual and mechanical examination	---		--	---	---	---
	Subgroup 2		15				
3001	Collector-base breakdown voltage:	Test Cond D I_C=-15mAdc		BV_{CBO}			Vdc
	2N1553A				-50	---	
	2N1554A				-60	---	
	2N1555A				-80	---	
	2N1556A				-100	---	
3011	Collector-emitter breakdown voltage:	Test Cond D I_C=-500mAdc 1/		BV_{CEO}			Vdc
	2N1553A				-20	---	
	2N1554A				-30	---	
	2N1555A				-40	---	
	2N1556A				-70	---	
3011	Collector-emitter breakdown voltage:	Test Cond C I_C=-500mAdc 1/		BV_{CES}			Vdc
	2N1553A				-30	---	
	2N1554A				-45	---	
	2N1555A				-60	---	
	2N1556A				-80	---	
3036	Collector-base cutoff current:	Test Cond D		I_{CBO}			mAdc
	2N1553A	V_{CB}=-25Vdc			---	-3	
	2N1554A	V_{CB}=-40Vdc			---	-3	
	2N1555A	V_{CB}=-55Vdc			---	-3	
	2N1556A	V_{CB}=-65Vdc			---	-3	

Table I. Group A inspection - (Cont'd)

Test Method per MIL-STD-750	Examination or test	Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 2 - (Cont'd)						
3041	Collector-emitter cut-off current:	Test Cond A V_{BE}=+1Vdc		I_{CEX}			mAdc
	2N1553A	V_{CE}=-50Vdc			---	-20	
	2N1554A	V_{CE}=-60Vdc			---	-20	
	2N1555A	V_{CE}=-80Vdc			---	-20	
	2N1556A	V_{CE}=-100Vdc			---	-20	
3061	Emitter-base cutoff current:	Test Cond D		I_{EBO}			mAdc
	2N1553A	V_{EB}=-12Vdc			---	-0.5	
	2N1554A	V_{EB}=-12Vdc			---	-0.5	
	2N1555A	V_{EB}=-12Vdc			---	-0.5	
	2N1556A	V_{EB}=-12Vdc			---	-0.5	
3076	Forward-current transfer ratio	I_C=-5Adc, V_{CE}=-2Vdc		h_{FE}	30	90	--
3076	Forward-current transfer ratio	I_C=-10Adc, V_{CE}=-2Vdc		h_{FE}	30	60	--
3066	Base-emitter saturation voltage	Test Cond A I_C=-10Adc, I_B=-1Adc		$V_{BE}(sat)$	--	-1.0	Vdc
3071	Collector-emitter saturation voltage	I_C=-10Adc, I_B=-1Adc		$V_{CE}(sat)$	--	-0.7	Vdc

Table I. Group A inspection - (Cont'd)

Test Method per MIL-STD-750	Examination or test	Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 3		10				
3251	Pulse response	Test Cond A except test circuit per Fig. 2 herein I_C=-10A V_{CC}=-10V I_{B1}=-I_{B2}=360mA					
	Rise time			t_r	---	10	usec
	Delay time			t_d	---	2	usec
	Storage time			t_s	---	5	usec
	Fall time			t_f	---	30	usec
3306	Magnitude of common-emitter small-signal short-circuit forward-current transfer ratio	I_C=-5Adc V_{CE}=-2Vdc f=100kHz		$\lvert h_{fe} \rvert$	1.0	4.0	--

1/ See 4.3.1 herein.

Table II. Group B inspection.

Test Method per MIL-STD-750	1/ Examination or test	2/ Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 1		20				
2066	Physical dimensions	See Fig. 1					
	Subgroup 2		15				
2031	Soldering heat	1 cycle		--	---	---	--
1051	Temperature cycling	Test Cond B except $T_{(high)}$ = $+100^{\circ}\ ^{+3}_{-0}C$		--	---	---	--
1056	Thermal shock (glass strain)	Test Cond B		--	---	---	--
2036	Terminal strength:						
	Tension	Test Cond A Weight=10 lbs. t=15 sec each terminal					
	Torque	Test Cond D1 Torque=6 oz-in t=15 sec each terminal					
1071	Hermetic seal	3/		--	---	5×10^{-7}	atm cc/sec
1021	Moisture resistance	No initial conditioning		--	---	---	--
	End-Point tests:						
3036	Collector-base cutoff current	Test Cond D		I_{CBO}			mAdc
	2N1553A	V_{CB}=-25Vdc			---	-3	
	2N1554A	V_{CB}=-40Vdc			---	-3	
	2N1555A	V_{CB}=-55Vdc			---	-3	
	2N1556A	V_{CB}=-65Vdc			---	-3	

Table II. Group B inspection - (Cont'd)

Test Method per MIL-STD-750	1/ Examination or test	2/ Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 2 - (Cont'd)						
3076	Forward current transfer ratio	I_C = -10Adc V_{CE} = -2Vdc		h_{FE}	30	60	--
	Subgroup 3		15				
2016	Shock	Non-operating 1500G 5 blows of 0.5 msec ea. in orientations X1, Y1, Y2, Z1 (total =20 blows)		--	---	---	--
2056	Vibration, variable frequency	10G		--	---	---	---
2006	Constant acceleration (centrifugal)	5000G Orientations X1, Y1, Y2, Z1		--	---	---	--
	End-Point tests:						
	Same as for Subgroup 2 above						
	Subgroup 4		15				
1041	Salt atmosphere (corrosion)	4/		--	---	---	--
	Subgroup 5		15				
3052	Safe operating area (pulsed):	5/ f=200Hz t_p=250 usec See Fig. 4		--	---	---	--

Table II. Group B inspection - (Cont'd)

Test Method per MIL-STD-750	1/ Examination or test	2/ Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 5 - (Cont'd)						
3052 (Cont'd)	Test #1:	I_C=-20A					
	2N1553A	V_{CE}=-25V					
	2N1554A	V_{CE}=-35V					
	2N1555A	V_{CE}=-45V					
	2N1556A	V_{CE}=-45V					
	Test #2:						
	2N1553A	I_C=-1.0A V_{CE}=-29V					
	2N1554A	I_C=-1.0A V_{CE}=-43V					
	2N1555A	I_C=-2.2A V_{CE}=-55V					
	2N1556A	I_C=-3.0A V_{CE}=-65V					
	Test #3:	T_C=+70°$^{+3}_{-0}$C See Fig. 5 t=5 minutes, min., continuous					
	2N1553A	I_C=-1.8A V_{CE}=-20V					
	2N1554A	I_C=-1.25A V_{CE}=-30V					
	2N1555A	I_C=-1.0A V_{CE}=-37V					
	2N1556A	I_C=-0.75A V_{CE}=-50V					
	End-Point tests:						
	Same as for Group B, Subgroup 2						

Table II. Group B inspection - (Cont'd)

Test Method per MIL-STD-750	1/ Examination or test	2/ Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 6		10				
1032	High-temperature life (non-operating)	T_{stg}=100°$^{+3°}_{-0°}$C t=340 hrs. 6/		--	---	---	--
	End-Point tests:						
3036	Collector-base cutoff current:	Test Cond D		I_{CBO}			mAdc
	2N1553A	V_{CB}=-25Vdc			---	-4.5	
	2N1554A	V_{CB}=-40Vdc			---	-4.5	
	2N1555A	V_{CB}=-55Vdc			---	-4.5	
	2N1556A	V_{CB}=-65Vdc			---	-4.5	
3076	Forward-current transfer ratio	I_C=-10Adc V_{CE}=-2Vdc		h_{FE}	23	70	--
	Subgroup 7		20				
1027	Steady-state operation life	T_C=+80°$^{+3°}_{-0°}$C P_T=20W V_{CB}=-15$^{+10}_{-0}$Vdc t=340 hrs. 6/					
	End-Point tests:						
	Same as for Subgroup 6 above						

1/ See 3.4 herein.
2/ See 4.2.2 herein.
3/ See 4.3.2 herein.
4/ Electrical rejects from the same lot under evaluation may be used for this test.
5/ See 4.3.3 herein.
6/ See 4.2.3 herein.

Table III. Group C inspection. 1/

Test Method per MIL-STD-750	Examination or test	Conditions 2/	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 1		15				
3/	Marking resistance to solvents	4/		--	---	---	--
	Subgroup 2		15				
3151	Thermal resistance	---		θ_{J-C}	---	0.8	°C/W
5/	Maximum current	I_E=-15Adc t=1 hour		--	---	---	--
	End-Point tests:						
3036	Collector-base cutoff current	Test Cond D		I_{CBO}			mAdc
	2N1553A	V_{CB}=-25Vdc			---	-4.5	
	2N1554A	V_{CB}=-40Vdc			---	-4.5	
	2N1555A	V_{CB}=-55Vdc			---	-4.5	
	2N1556A	V_{CB}=-65Vdc			---	-4.5	
3076	Forward current transfer ratio	I_C=-10Adc V_{CE}=-2Vdc		h_{FE}	23	70	--
	Subgroup 3 6/		15				
7/	High-temperature operation:	T_C=+90°$^{+3°}_{-0°}$C					
3036	Collector-base cutoff current:	Test Cond D		I_{CBO}			mAdc
	2N1553A	V_{CB}=-15Vdc			---	-20	
	2N1554A	V_{CB}=-22.5Vdc			---	-20	
	2N1555A	V_{CB}=-30Vdc			---	-20	
	2N1556A	V_{CB}=-37.5Vdc			---	-20	

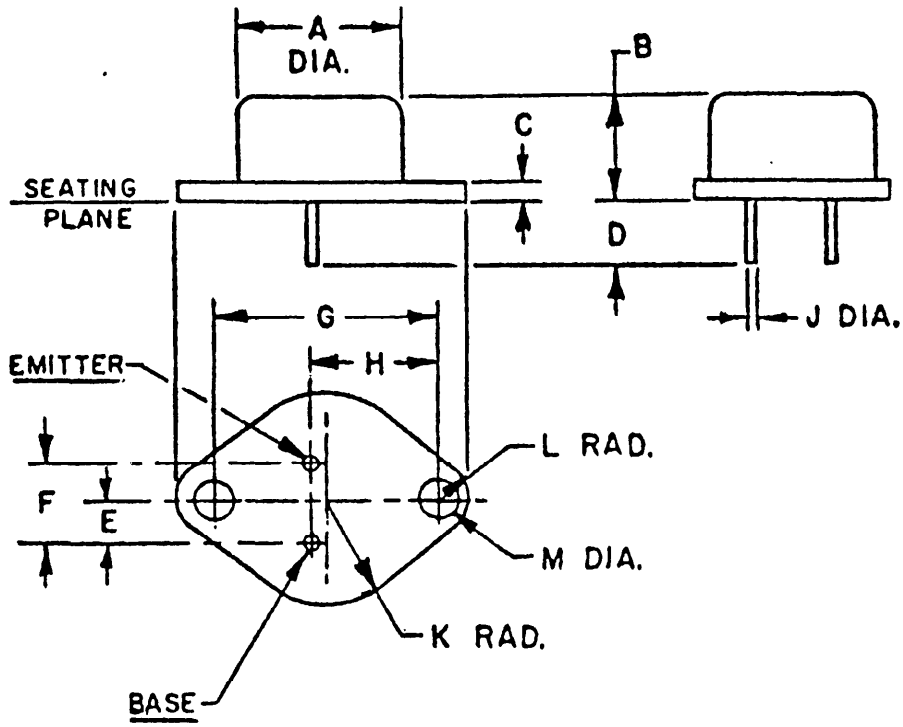
Table III. Group C inspection.[1/] - (Cont'd)

Test Method per MIL-STD-750	Examination or test	Conditions [2/]	LTPD	Symbol	Limits Min	Limits Max	Unit
	Subgroup 3 [6/] - (Cont'd)						
[7/]	Low-temperature operation:	T_C=-55°C $^{+0°}_{-3°}$C					
3076	Forward-current transfer ratio:	I_C=-10Adc V_{CE}=-2Vdc		h_{FE}	23	---	--
	Subgroup 4		λ=10				
1031	High-temperature life (non-operating):	T_{stg}=+100° $^{+3}_{-0}$C t=1000 hrs. [8/]		---	---	---	--
	End-Point tests:						
3036	Collector-base cutoff current:	Test Cond D		I_{CBO}			mAdc
	2N1553A	V_{CB}=-25Vdc			---	-4.5	
	2N1554A	V_{CB}=-40Vdc			---	-4.5	
	2N1555A	V_{CB}=-55Vdc			---	-4.5	
	2N1556A	V_{CB}=-65Vdc			---	-4.5	
3076	Forward-current transfer ratio:	I_C=-10Adc V_{CE}=-2Vdc		h_{FE}	23	70	--
	Subgroup 5		λ=20				
1026	Steady-state operation life	T_C=+80° $^{+3}_{-0}$C P_T=20W V_{CB}=-15 $^{+10}_{-0}$Vdc t=1000 hrs. [8/]		--	---	---	--
	End-Point tests:						
	Same as for Subgroup 4 above						

Table III. Group C inpsection. 1/ (Cont'd)

Test Method per MIL-STD-750	Examination or test	2/ Conditions	LTPD	Symbol	Limits Min	Limits Max	Unit

1/ See 4.2.4 herein.
2/ See 4.2.2 herein.
3/ See 4.3.4 herein.
4/ Electrical rejects from the same lot under evaluation may be used for this test.
5/ See 4.3.5 herein.
6/ In this Subgroup, the sample units subjected to the High-Temperature Operation test shall be permitted to return to and be stabilized at room ambient temperature prior to their being subjected to the Low-Temperature Operation test.
7/ Measurement(s) shall be made after thermal equilibrium has been reached at the temperature specified.
8/ See 4.2.3 herein.



DIMENSIONS					NOTE
LTR	INCHES		MILLIMETERS		
	MIN	MAX	MIN	MAX	
A	- - -	.875	- - -	22.23	
B	.250	.450	6.35	11.43	4
C	- - -	.135	- - -	3.43	
D	.312	.500	7.92	12.70	3
E	.205	.225	5.21	5.72	
F	.420	.440	10.67	11.18	
G	1.177	1.197	29.90	30.40	
H	.655	.675	16.64	17.15	2
J	.038	.052	.97	1.32	3
K	- - -	.525	- - -	13.34	
L	- - -	.188	- - -	4.78	
M	.151	.161	3.84	4.09	

NOTES:
1. Metric equivalents (to the nearest .01 mm) are given for general information only and are based upon 1 inch = 25.4 mm.
2. This dimension 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.

Figure 1. Outline and dimensions.

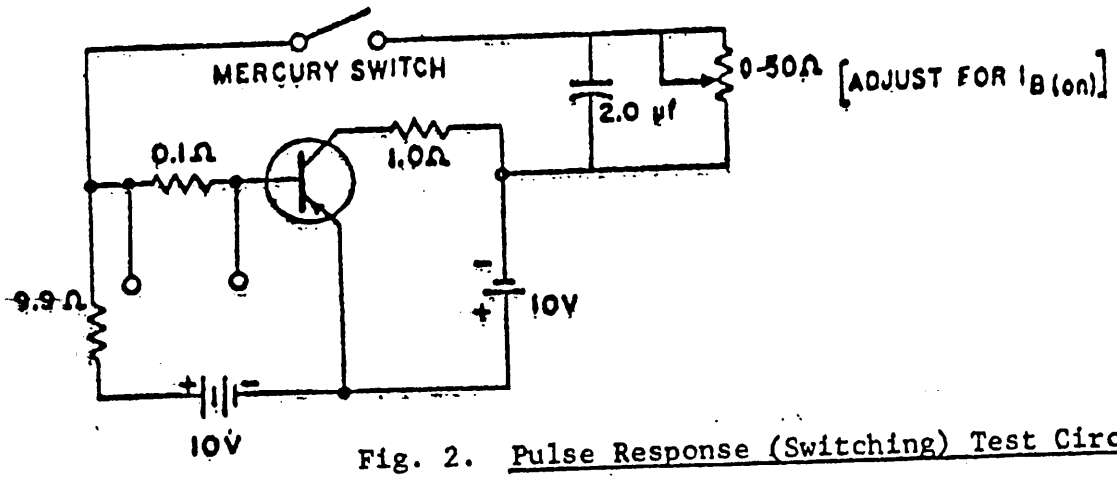


Fig. 2. Pulse Response (Switching) Test Circuit.

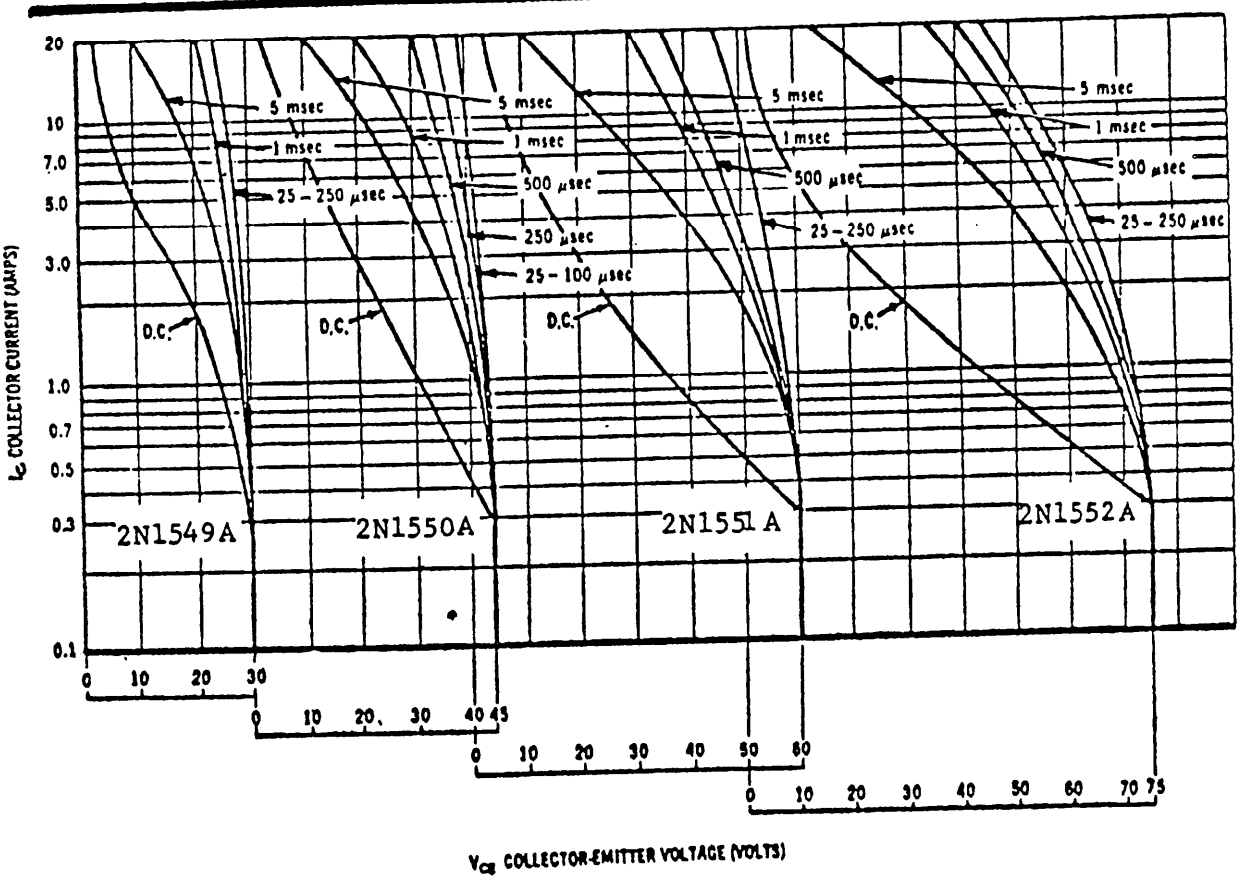
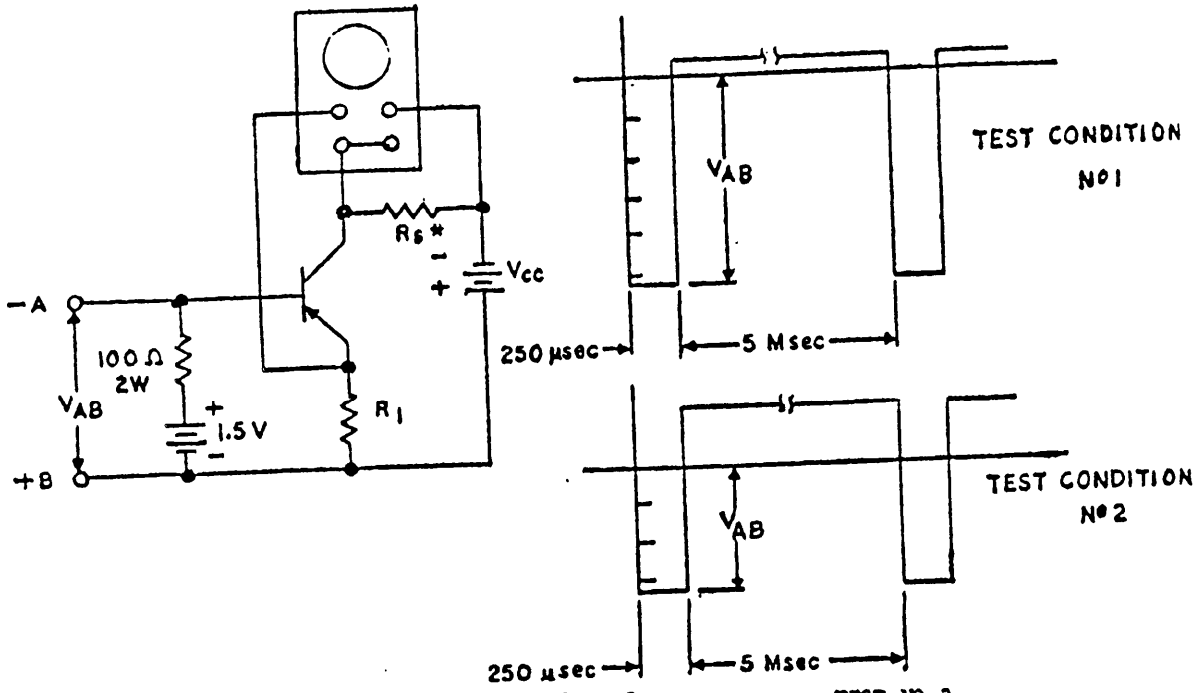


Fig. 3. Safe Operating Area Curves.



	TEST NO. 1			TEST NO.2			TEST NO.3		
	R_1	V_{AB}**	V_{CC}	R_1	V_{AB}**	V_{CC}	R_1	V_{AB}**	V_{CC}
2N1553A	1Ω, 50W	21.5V	47V	20Ω, 20W	21.5V	50V	5 Ω, 20W	10V	30V
2N1554A	1Ω, 50W	21.5V	56.5V	20Ω, 20W	20.6V	64.0V	10Ω, 20W	13V	42.5V
2N1555A	1Ω, 50W	21.5V	67V	10Ω, 20W	22.5V	77V	10Ω, 20W	10.6V	47V
2N1556A	1Ω, 50W	21.5V	67V	5Ω, 20W	15.6V	81V	20Ω, 20W	15.6V	66V

V_{CC} AND V_{AB} ARE REGULATED POWER SUPPLIES (± 1% BOTH LINE AND LOAD.)

* R_S IS 0.1Ω NON INDUCTIVE 2 WATT. A CURRENT PROBE MAY BE USED IN LIEU OF THIS SENSE RESISTOR.

** ADJUSTMENT WILL BE NECESSARY TO SET THE EXACT CURRENT AND VOLTAGE POINTS SPECIFIED IN TEST 1, 2 AND 3.

TEST Nº 3 A D.C. REGULATED SUPPLY IS CONNECTED TO POINTS A, B (MINUS TO POINT "A").

FIGURE 4. SAFE AREA TEST CIRCUIT

5. PREPARATION FOR DELIVERY

5.1 Preparation for delivery.-Preparation for delivery and the inspection of Preparation for Delivery shall be in accordance with Specification MIL-S-19500.

6. NOTES

6.1 Notes.-The notes included in Specification MIL-S-19500, with the following additions or exceptions, are applicable to this specification.

6.2 "JAN"type transistors 2N1553A through 2N1556 are recommended as electrical and mechanical replacements for transistor types shown below:

JAN Type	Replacement for
2N1553A	2N1553, 2N677, CTP-1508
2N1554A	2N1554, 2N677A, CTP-1504
2N1555A	2N1555, CTP-1503
2N1556A	2N1556, 2N677B, 2N677C, CTP-1500

6.3 Qualification.-With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in Qualified Products List (QPL)-19500, whether or not such products have actually been so listed by that date. Information pertaining to qualification of products covered by this specification should be requested from the Commanding General, U.S. Army Electronics Command, Fort Monmouth, New Jersey 07703, Attention: AMSEL-PP-EM-2.

6.4 Revision (document) changes.-Revision-letter symbols are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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