The documentation and process conversion measures necessary to comply with this revision shall be completed by 30 April 93

INCH-POUND

MIL-S-19500/357D
31 December 1992
SUPERSEDING
MIL-S-19500/357C
23 July 1981

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, AMPLIFIER TYPES 2N3634 THROUGH 2N3637, 2N3634L THROUGH 2N3637L 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 detail requirements for PNP, silicon, low-power amplifier, and switching transistors. Three levels of product assurance are provided for each device type as specified in MIL-S-19500.

1.2 Physical dimensions. See figure 1.

1.3 Maximum ratings.

Types	P_T 1/ T_A = +25°C	P_T 2/ T_C = +25°C	V_{CBO}	V_{CEO}	V_{EBO}	I_C	T_J and T_{STG}
	W	W	V dc	V dc	V dc	A dc	°C
2N3634, 2N3634L	1	5	140	140	5	1	-65 to +200
2N3635, 2N3635L							
2N3636, 2N3636L	1	5	175	175	5	1	-65 to +200
2N3637, 2N3636L							

1/ Derate linearly 5.71 mW/°C for T_A > +25°C.
2/ Derate linearly 28.6 mW/°C for T_C > +25°C.

1.4 Primary electrical characteristics at T_A = +25°C.

Types	h_{FE} at V_{CE} = 10 V dc										$\|h_{fe}\|$		C_{obo}	
	h_{FE1} I_C = 0.1 mA dc 1/		h_{FE2} I_C = 1.0 mA dc 1/		h_{FE3} I_C = 10 mA dc 1/		h_{FE4} I_C = 50 mA dc 1/		h_{FE5} I_C = 150 mA dc 1/		V_{CE} = 30 V dc I_C = 30 mA dc f = 100 Mhz		V_{CB} = 20 V dc I_E = 0 100 Khz ≤f≤ 1 Mhz	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
2N3634, 2N3634L	25		45		50		50	150	30		1.5	8.0		10
2N3635, 2N3635L	55		90		100		100	300	60		2.0	8.5		10
2N3636, 2N3636L	25		45		50		50	150	30		1.5	8.0		10
2N3637, 2N3636L	55		90		100		100	300	60		2.0	8.5		10

1/ Pulsed (see 4.5.1).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U S. Army Laboratory Command Electronics Technology and Devices Laboratory ATTN: SLCET-RS Fort Monmouth, NJ 07703-5601 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or letter.

AMSC N/A FSC 5961

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	$V_{CE(sat)1}$ I_C = 10 mA dc 1/ I_B = 1 mA dc	$V_{CE(sat)2}$ I_C = 50 mA dc 1/ I_B = 5 mA dc	$V_{BE(sat)1}$ I_C = 10 mA dc 1/ I_B = 1 mA dc	$V_{BE(sat)2}$ I_C = 50 mA dc 1/ I_B = 5 mA dc	Switching parameters (see figure 3)			
					t_d	t_r	t_s	t_f
	V dc	V dc	V dc	V dc	ns	ns	ns	ns
Minimum				0.65				
Maximum	0.3	0.6	0.8	0.90	100	100	500	150

1/ Pulsed (see 4.5.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification, 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

MILITARY

MIL-S-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, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094)

2.2 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 detail specification. The individual item requirements shall be in accordance with MIL-S-19500 and as specified herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be specified in MIL-S-19500.

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-S-19500 and on figure 1.

3.3.1 Lead finish. Lead finish shall be gold, tin, or solder as defined in MIL-S-19500, MIL-STD-750, and herein. Where choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.4 Marking. Marking shall be in accordance with MIL-S-19500. At the option of the manufacturer, marking of the country of origin may be omitted from the body of the transistor, but shall be retained on the initial container.

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4. QUALITY ASSURANCE PROVISIONS

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

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

4.3 Screening (JANTX, JANTXV, and JANS levels only). Screening shall be in accordance with table II of MIL-S-19500, 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 II of MIL-S-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
9	I_{CBO1} and h_{FE5}	Not applicable
11	I_{CBO1} and h_{FE5} ΔI_{CBO1} = 100 percent of initial value or 10 nA dc, whichever is greater; Δh_{FE5} = ±15 percent of initial value.	I_{CBO1} and h_{FE5}
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein; ΔI_{CBO1} = 100 percent of initial value or 10 nA dc, whichever is greater. Δh_{FE5} = ±15 percent of initial value.	Subgroup 2 of table I herein; ΔI_{CBO1} = 100 percent of initial value or 10 nA dc, whichever is greater. Δh_{FE5} = ±15 percent of initial value.

4.3.1 Power burn-in test conditions and operation life test conditions. Power burn-in and operation life test conditions are as follows:

JANS level (all device types): V_{CB} = 10 V dc, P_T = 1.0 W at T_A = +25°C ±3°C.

JANTX and JANTXV levels: V_{CB} = 100 V dc, P_T = 1.0 W at T_A = +25°C ±3°C.

NOTE: No heat sink or forced air cooling on the devices shall be permitted.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-S-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-S-19500, and table I herein. Electrical measurements (end-points) and delta requirements 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 table IVa (JANS) and table IVb (JANTX and JANTXV) of MIL-S-19500. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table II herein.

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4.4.2.1 Group B inspection, table IVa (JANS) of MIL-S-19500.

a. Subgroup 4: Condition for intermittent operation life are as follows: V_{CB} = 10 V dc; P_T = 1.0 W at T_A = +25° ±3°C; t_{on} = t_{off} = 3 minutes minimum for 2,000 cycles. No heat sink forced air on the devices shall be permitted.

b. Subgroup 5: Condition for steady-state operation life (accelerated) are as follows: V_{CB} = 10 V dc; T_A = +125° ±25°C for 96 hours; P_T = 1.0 W at 100°C or adjusted as required by the chosen T_A to give an average lot T_J = +275°C. Marking legibility requirements shall not apply.

c. Subgroup 6: Condition for thermal resistance, (see 4.5.3).

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

a. Subgroup 3: Condition for steady-state operation life, (see 4.3.1).

b. Subgroup 5: Condition for thermal resistance, (see 4.5.3).

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table V of MIL-S-19500. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table II herein.

4.4.3.1 Group C inspection, table V of MIL-S-19500. Subgroup 6: Condition for steady-state operation life, (see 4.3.1).

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 section 4 of MIL-STD-750.

4.5.2 Noise figure test. Noise figure shall be measured using a model 310B Quan Tech Laboratories test set, or equivalent. Conditions shall be as specified in table I herein.

4.5.3 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 application shall be 160 mA dc for $R_{\theta JC}$ and 32 mA dc for $R_{\theta JA}$.

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

c. Reference temperature measuring point shall be the case for $R_{\theta JC}$ and ambient air for $R_{\theta JA}$.

d. Reference point temperature shall be selected with 25°C ≤ T_R ≤ 35°C and recorded before test is started.

e. Mounting arrangement shall be with heat sink to case for $R_{\theta JC}$ and without heat sink for $R_{\theta JA}$.

f. Maximum limits shall be $R_{\theta JC}$ = 35°C/W and $R_{\theta JA}$ = 175°C.

NOTE: Unless otherwise specified by the procuring activity, the choice of measuring $R_{\theta JC}$ or $R_{\theta JA}$ will satisfy the requirements of this test.

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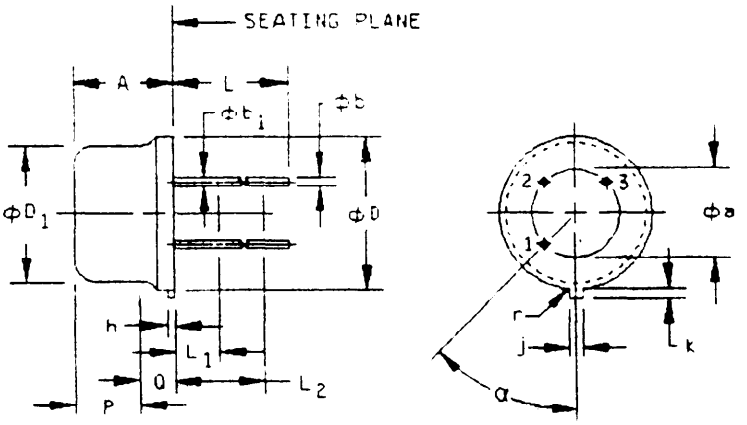

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
ϕa	.200 TP		5.08 TP		10
A	.240	.260	6.10	6.60	
ϕb	.016	.021	.41	.53	11
$ϕb_1$	.016	.019	.41	.48	11
ϕD	.335	.370	8.51	9.40	
$ϕD_1$	.305	.335	7.75	8.51	
h	.009	.041	.23	1.04	
j	.028	.034	.71	.86	4,6
k	.029	.045	.74	1.14	6,7
L	See note 11, 13, and 14				
L_1		.050		1.27	11
L_2	.250		6.35		11
P	.100		2.54		9
Q		.050		1.27	8
r		.010		.25	12
α	45° TP		45°TP		10

FIGURE 1. Physical dimensions.

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NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Refer to rules for dimensioning Semiconductor Product Outlines included in Publication No. 76.
4. Lead number 4 omitted on this variation.
5. Tab shown omitted.
6. Beyond r maximum, j must be held to a minimum length of .021 inch (.53 mm).
7. K measured from maximum ϕD.
8. Details of outline in this zone optional.
9. ϕD_1 shall not vary more than .010 inch (.25 mm) in zone P. This zone is controlled for automatic handling.
10. Leads at gauge plane .054 - .055 inch (1.37-1.40 mm) below seating plane shall be within .007 inch (.18 mm) radius of true position (TP) at a maximum material condition (MMC) relative to the tab at MMC. The device may be measured by direct methods or by the gauge and gauging procedure described on gauge drawing on figure 2.
11. ϕb_1 applies between L_1 and L_2. ϕb applies between L_2 and L minimum. Diameter is uncontrolled in L_1 and beyond L minimum.
12. r (radius) applies to both inside corners of tab.
13. For transistor types 2N3634 through 2N3637, L is .500 inch (12.70 mm) minimum, and .750 inch (19.50 mm) maximum.
14. For transistor types 2N3634L through 2N3637L, L is 1.500 inches (38.10 mm) minimum, and 1.750 inches (44.45 mm) maximum.

FIGURE 1. Physical dimensions - Continued.

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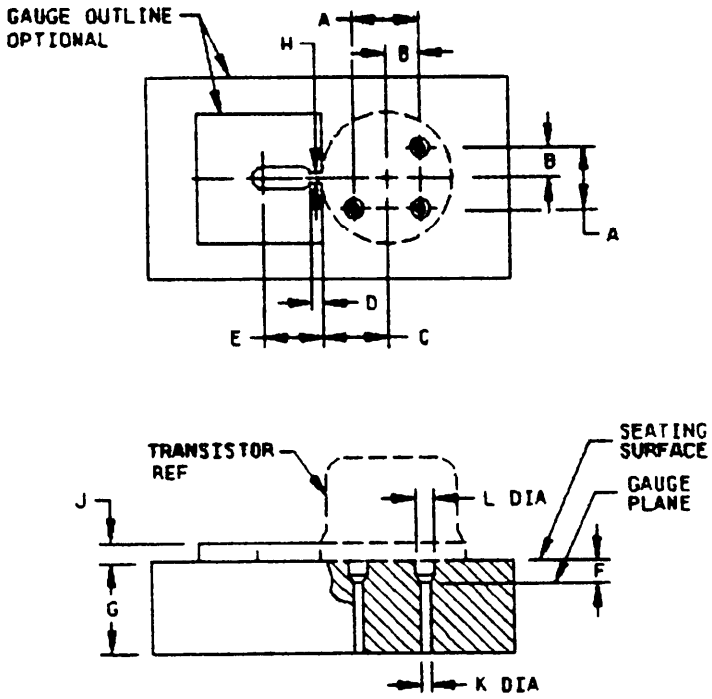

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.1409	.1419	3.579	3.604
B	.0702	.0712	1.783	1.808
C	.182	.199	4.62	5.05
D	.009	.011	.23	.28
E	.125 Nominal		3.18 Nominal	
F	.054	.055	1.37	1.40
G	.372	.378	9.45	9.60
H	.0350	.0355	.889	.902
J	.150 Nominal		3.81 Nominal	
K	.0325	.0335	.826	.851
L	.0595	.0605	1.511	1.537

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. The following gauging procedure shall be used: The used of a pin straightener prior to insertion in the gauge is permissible. The device being measured shall be inserted until its seating plane is .125 ±.010 inch (3.18 ±.25 mm) from the seating surface of the gauge. A spacer may be used to obtain the .125 inch (3.18 mm) distance from the gauge seat prior to force application. A force of 8 oz ±.5 oz shall then be applied parallel and symmetrical to the device's cylindrical axis. When examined visually after the force application (the force need not be removed) the seating plane of the device shall be seated against the gauge.
4. The location of the tab locator, within the limits of dimension C, will be determined by the tab and flange dimension of the device being checked.

FIGURE 2. Gauge for lead and tab location.

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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 base	3001	Bias condition D, I_C = 100 µA dc	$V_{(BR)CBO}$			
2N3634, 2N3634L 2N3635, 2N3635L				140		V dc
2N3636, 2N3636L 2N3637, 2N3637L				175		V dc
Breakdown voltage, emitter to base	3026	Bias condition D, I_E = 10 µA dc	$V_{(BR)EBO}$	5.0		V dc
Breakdown voltage, collector to emitter	3011	Bias condition D, I_C = 10 mA dc pulsed (see 4.5.1)	$V_{(BR)CEO}$			
2N3634, 2N3634L 2N3635, 2N3635L				140		V dc
2N3636, 2N3636L 2N3637, 2N3637L				175		V dc
Collector to base cutoff current	3036	Bias condition D, V_{CB} = 100 V dc	I_{CBO1}		100	nA dc
Emitter to base cutoff current	3061	Bias condition D, V_{EB} = 3 V dc	I_{EBO}		50	nA dc
Collector to emitter cutoff current	3041	Bias condition D, V_{CE} = 100 V dc	I_{CEO}		10	µA dc
Forward-current transfer ratio	3076	V_{CE} = 10 V dc, I_C = 0.1 mA dc pulsed (see 4.5.1)	h_{FE1}			
2N3634, 2N3634L 2N3636, 2N3636L				25		
2N3635, 2N3635L 2N3637, 2N3637L				55		

See footnote at end of table.

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TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 2 - Continued						
Forward-current transfer ratio	3076	V_{CE} = 10 V dc, I_C = 1.0 mA dc pulsed (see 4.5.1)	h_{FE2}			
2N3634, 2N3634L 2N3636, 2N3636L				45		
2N3635, 2N3635L 2N3637, 2N3637L				90		
Forward-current transfer ratio	3076	V_{CE} = 10 V dc, I_C = 10 mA dc pulsed (see 4.5.1)	h_{FE3}			
2N3634, 2N3634L 2N3636, 2N3636L				50		
2N3635, 2N3635L 2N3637, 2N3637L				100		
Forward-current transfer ratio	3076	V_{CE} = 10 V dc, I_C = 50 mA dc pulsed (see 4.5.1)	h_{FE4}			
2N3634, 2N3634L 2N3636, 2N3636L				50	150	
2N3635, 2N3635L 2N3637, 2N3637L				100	300	
Forward-current transfer ratio	3076	V_{CE} = 10 V dc, I_C = 150 mA dc pulsed (see 4.5.1)	h_{FE5}			
2N3634, 2N3634L 2N3636, 2N3636L				30		
2N3635, 2N3635L 2N3637, 2N3637L				60		
Collector to emitter voltage (saturated)	3071	I_C = 10 mA dc, I_B = 1 mA dc pulsed (see 4.5.1)	$V_{CE(sat)1}$		0.3	V dc
Collector to emitter voltage (saturated)	3071	I_C = 50 mA dc, I_B = 5 mA dc pulsed (see 4.5.1)	$V_{CE(sat)2}$		0.6	V dc
Base-emitter voltage (saturated)	3066	Test condition A I_C = 10 mA dc, I_B = 1.0 mA dc pulsed (see 4.5.1)	$V_{BE(sat)1}$		0.8	V dc
Base-emitter voltage (saturated)	3066	Test condition A I_C = 50 mA dc, I_B = 5 mA dc pulsed (see 4.5.1)	$V_{BE(sat)2}$	0.65	0.90	V dc

See footnote at end of table.

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TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3						
High temperature operation:		T_A = +150°C				
Collector to base cutoff current	3036	Bias condition D, V_{CB} = -100 V dc	I_{CBO2}		100	µA dc
Low-temperature operation:		T_A = -55°C				
Forward-current transfer ratio	3076	V_{CE} = 10 V dc, I_C = 50 mA dc	h_{FE6}			
2N3634, 2N3634L 2N3636, 2N3636L				25		
2N3635, 2N3635L 2N3637, 2N3637L				50		
Subgroup 4						
Small-signal short-circuit forward-current transfer ratio	3306	V_{CE} = 30 V dc, I_C = 30 mA dc, f = 100 MHz	$\|h_{fe}\|$			
2N3634, 2N3634L 2N3636, 2N3636L				1.5	8.0	
2N3635, 2N3635L 2N3637, 2N3637L				2.0	8.5	
Small-signal short-circuit forward current transfer ratio	3206	V_{CE} = 10 V dc, I_C = 10 mA dc, f = 1 kHz	h_{fe}			
2N3634, 2N3634L 2N3636, 2N3636L				40	160	
2N3635, 2N3635L 2N3637, 2N3637L				80	320	
Small-signal short-circuit input impedance	3201	V_{CE} = 10 V dc, I_C = 10 mA dc, f = 1 kHz	h_{ie}			
2N3634, 2N3634L 2N3636, 2N3636L				100	600	Ω
2N3635, 2N3635L 2N3637, 2N3637L				200	1200	Ω

See footnote at end of table.

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See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750 Method	MIL-STD-750 Conditions	Symbol	Limits Min	Limits Max	Unit
Subgroup 4 - Continued						
Small-signal open-circuit reverse-voltage transfer ratio	3211	V_{CE} = 10 V dc, I_C = 10 mA dc, f = 1 kHz	h_{re}		$3x10^{-4}$	
Small-signal open-circuit output admittance	3216	V_{CE} = 10 V dc, I_C = 10 mA dc, f = 1 kHz	h_{oe}		200	µS
Open-circuit output capacitance	3236	V_{CB} = 20 V dc, I_E = 0, 100 kHz ≤ f ≤ 1 MHz	C_{obo}		10	pF
Input capacitance (output open-circuited)	3240	V_{EB} = 1 V dc, I_C = 0, 100 kHz ≤ f ≤ 1 MHz	C_{ibo}		75	pF
Noise figure	3246	V_{CE} = 10 V dc, I_C = 0.5 mA dc, Rg = 1 kΩ (see 4.5.2)	NF			
		f = 100 Hz			5	dB
		f = 1 kHz			3	dB
		f = 10 kHz			3	dB
Pulse response	3251	Test condition A				
Switching parameters						
Pulse delay time		See figure 3	t_d		100	ns
Pulse rise time		See figure 3	t_r		100	ns
Pulse storage time		See figure 3	t_s		500	ns
pulse fall time		See figure 3	t_f		150	ns
t_{off}		t_s & t_f	t_{off}		600	ns
Subgroup 5						
Safe operating area (continuous dc)	3051	T_C = +25°C, t = 1 s, 1 cycle (see figure 4)				
Test 1						
2N3634, 2N3634L, 2N3635, 2N3635L		V_{CE} = 100 V dc, I_C = 30 mA dc				
2N3636, 2N3636L, 2N3637, 2N3637L		V_{CE} = 130 V dc, I_C = 20 mA dc				

See footnote at end of table.

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TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 5 - Continued						
Test 2		V_{CE} = 50 V dc I_C = 95 mA dc				
Test 3		V_{CE} = 5 V dc I_C = 1 A dc				
End-point electrical measurements		See table II, steps 1 and 7				
Subgroups 6 & 7						
Not applicable						

1/ For sampling plans, see MIL-S-19500.

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TABLE II. Groups A, B, and C electrical measurements. 1/ 2/ 3/ 4/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1	Collector to base cutoff current	3036	Bias condition D V_{CB} = -100 V dc	I_{CBO1}		100	nA dc
2	Collector to base cutoff current	3036	Bias condition D V_{CB} = -100 V dc	I_{CBO1}		200	nA dc
3	Emitter to base cutoff current	3061	Bias condition D V_{EB} = -3 V dc	I_{EBO}		50	nA dc
4	Collector to emitter voltage (saturated)	3071	I_C = 10 mA dc I_B = 1 mA dc pulsed (see 4.5.1)	$V_{CE(sat)1}$		0.3	V dc
5	Base emitter voltage (saturated)	3066	Test condition A I_C = 10 mA dc I_B = 1 mA dc	$V_{BE(sat)1}$		0.8	V dc
6	Forward-current transfer ratio	3076	V_{CE} = 10 V dc I_C = 1 mA dc pulsed (see 4.5.1)	h_{FE1}			
	2N3634, 2N3634L 2N3636, 2N3636L				25		
	2N3635, 2N3635L 2N3637, 2N3637L				55		
7	Forward-current transfer ratio	3076	V_{CE} = 10 V dc I_C = 50 mA dc pulsed (see 4.5.1)	h_{FE4}			
	2N3634, 2N3634L 2N3636, 2N3636L				50	150	
	2N3635, 2N3635L 2N3637, 2N3637L				100	300	
8	Forward-current transfer ratio	3076	V_{CE} = 10 V dc I_C = 150 mA dc pulsed (see 4.5.1)	h_{FE5}			
	2N3634, 2N3634L 2N3636, 2N3636L				30		
	2N3635, 2N3635L 2N3637, 2N3637L				60		
9	Collector to emitter voltage (saturated)	3071	I_C = 10 mA dc I_B = 1 mA dc pulsed (see 4.5.1)	$\Delta V_{CE(sat)1}$ 5/		±50 mV dc change from previously measured value	

See footnotes at end of table.

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TABLE II. Groups A, B, and C electrical measurements 1/ 2/ 3/ 4/ - Continued.

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
10	Forward-current transfer ratio	3076	V_{CE} = 10 mA dc I_C = 150 mA dc pulsed (see 4.5.1)	Δh_{FE5} 5/		±25 percent change from initial reading	
11	Collector to base cutoff current	3036	Bias condition D V_{CB} = -100 V dc	ΔI_{CBO1} 5/		±100 percent of initial reading or 20 nA dc, whichever is greater	
12	Forward-current transfer ratio	3076	V_{CE} = 10 V dc I_C = 50 mA dc pulsed (see 4.5.1)	Δh_{FE4} 5/		±25 percent change from initial reading	

1/ The electrical measurements for table III of MIL-S-19500, subgroup 5, see table II herein, steps 1 and 7.

2/ The electrical measurements for table IVa (JANS) of MIL-S-19500 are as follows:

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

b. Subgroup 4, see table II herein, steps 1, 3, 4, 5, 6, 7, and 9.

c. Subgroup 5, see table II herein, steps 1, 3, 4, 5, 6, 7, 10, and 11.

3/ The electrical measurements for table IVb (JANTX and JANTXV) of MIL-S-19500 are as follows:

a. Subgroup 2, see table II herein, steps 1 and 7.

b. Subgroup 3 and 6, see table II herein, steps 2 and 12.

4/ The electrical measurements for table V of MIL-S-19500 are as follows:

a. Subgroup 2 and 3, see table II herein, steps 1, 3, 4, 5, 6, and 7 for JANS, and steps 1 and 7 for JANTX and JANTXV.

b. Subgroup 6, see table II herein, steps 1, 3, 4, 5, 6, and 7 for JANS, and steps 2 and 12 for JANTX and JANTXV.

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

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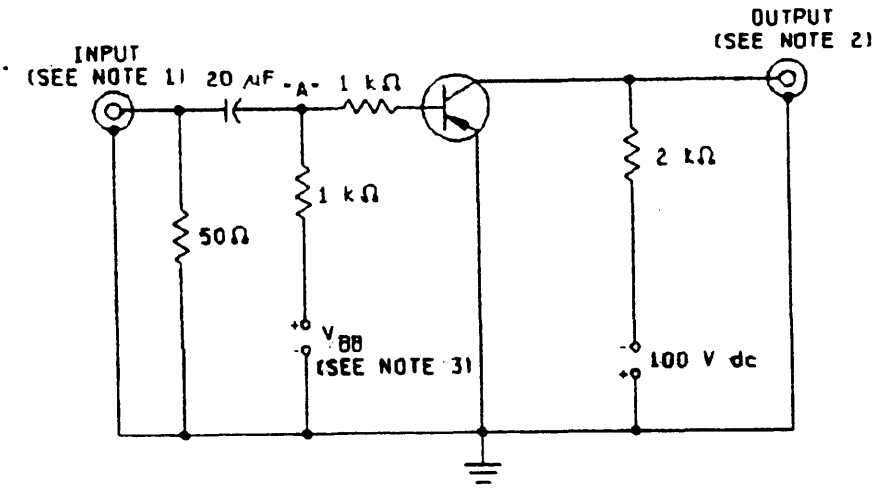
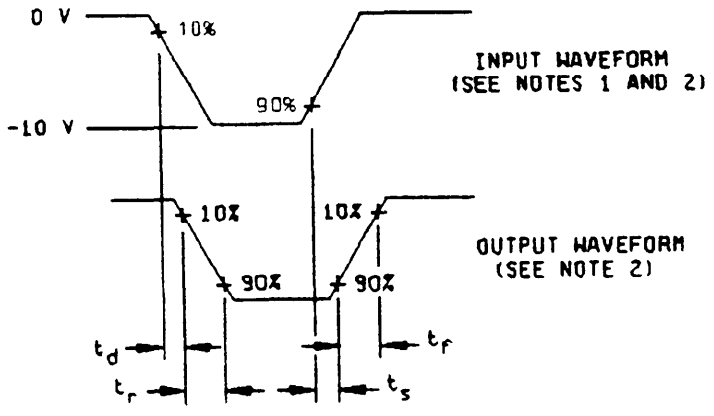


TEST CIRCUIT



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 = 20 µs, duty cycle ≤ 2%

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. V_{BB} = 4.0 V dc for t_{on}, 4.1 for t_{off} at point "A".

4. Resistors shall be noninductive types.

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

FIGURE 3. Pulse response test circuit.

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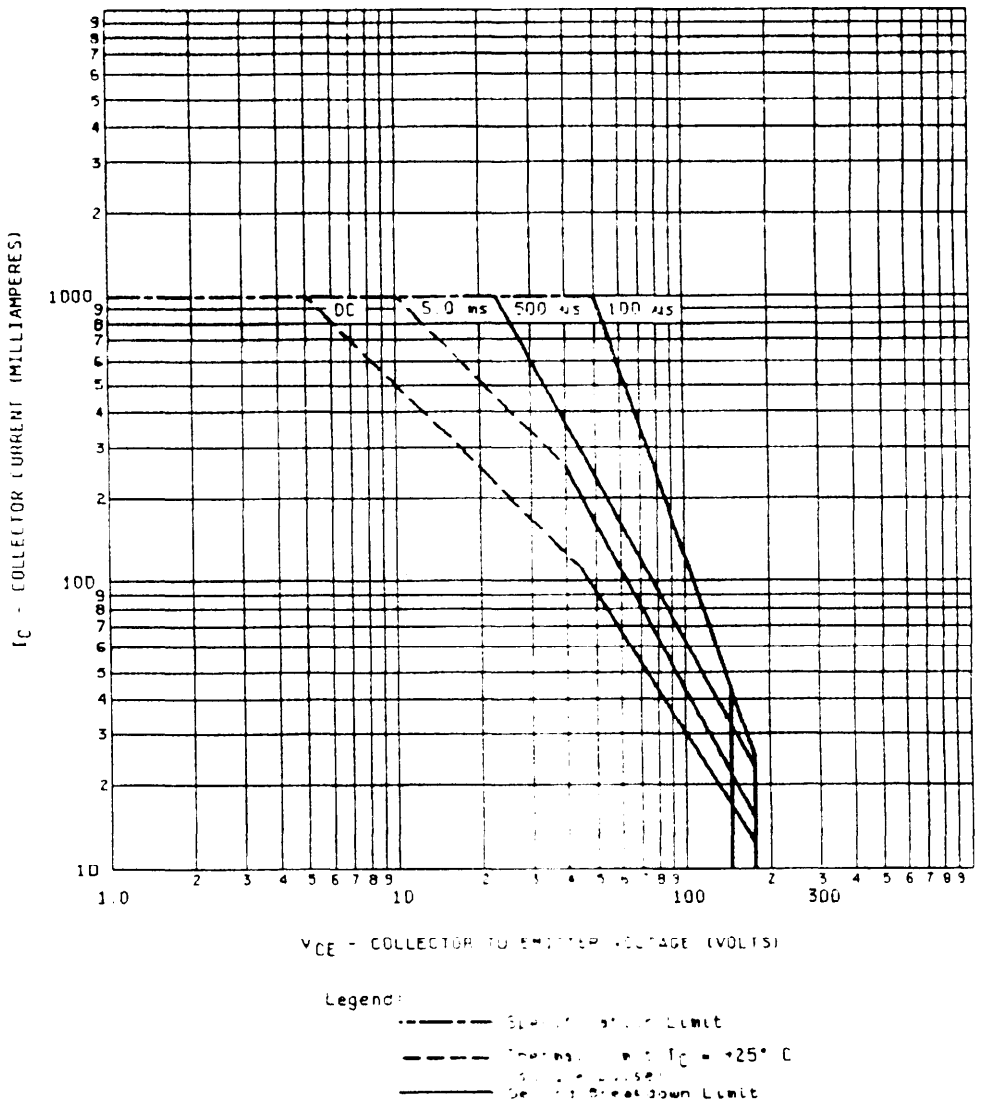

NOTES:
1. T_J = +200°C.
2. Curves are based on a 30 percent derating factor.

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

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5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-S-19500.

6. NOTES

(This section contains information of a general of explanatory nature that may be helpful, but is not mandatory.)

6.1 Notes. The notes specified in MIL-S-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents should specify the following:

6.3 Cross reference list. Parts from this specification may be used to replace the following commercial Part of Identifying Numbers (PIN):

a. Issue of DODISS to be cited in the solicitation.

b. Lead finish as specified (see 3.3.1).

c. Type designation and product assurance level.

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 extensiveness of the changes.

CONCLUDING MATERIAL

Custodians:
Army - ER
Navy - EC
Air Force - 17
NASA - NA

Review activities:
Army - AR, MI
Navy - SH
Air Force - 85
DLA - ES

User activities:
Army - SM
Navy - AS, CG, MC, OS
Air Force - 19

Preparing activity:
Army - ER

Agent:
DLA - ES

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