The documentation and process conversion measures necessary to comply with this revision shall be completed by 28 April 2002.

INCH-POUND

MIL-PRF-19500/323H
28 January 2002
SUPERSEDING
MIL-PRF-19500/323G
22 June 2001

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, SWITCHING
TYPES 2N3250A, 2N3251A, 2N3250AUB, 2N3251AUB,
JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the performance requirements for PNP silicon switching transistors. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500. Two levels of product assurance are provided for die.

1.2 Physical dimensions. See figures 1 (similar to TO-18), 2 (surface mount), and 3 (die) herein.

1.3 Maximum ratings.

P_T (1) T_A = +25°C	V_{CBO}	V_{CEO}	V_{EBO}	I_C	T_{OP} and T_{STG}	$R_{\theta JA}$ (1)
W	V dc	V dc	V dc	mA dc	°C	°C/W
0.36	60	60	5.0	200	-65 to +200	417

(1) Derate linearly 2.4 mW/°C above T_A = +25°C.

1.4 Primary electrical characteristics.

Limits	h_{FE1} V_{CE} = 1.0 V dc I_C = 0.1 mA dc		h_{FE3} (1) V_{CE} = 1.0 V dc I_C = 10 mA dc		h_{FE4} (1) V_{CE} = 1.0 V dc I_C = 50 mA dc		$\|h_{fe}\|$ f = 100 MHz V_{CE} = 20 V dc; I_C = 10 mA dc	
	Min	Max	Min	Max	Min	Max	Min	Max
2N3250A, AUB	40		50	150	15		2.5	9.0
2N3251A, AUB	80		100	300	30		3.0	9.0

(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: Defense Supply Center, Columbus, ATTN: DSCC/VAC, Post Office Box 3990, 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 - Continued.

Limits	$r_b'C_C$ V_{CE} = 20 V dc I_C = 10 mA dc f = 31.8 MHz	$V_{CE(SAT)1}$ I_C = 10 mA dc I_B = 1.0 mA dc	C_{obo} V_{CB} = 10 V dc I_E = 0 100 kHz ≤ f ≤ 1 MHz	t_{on} I_C = 10 mA dc I_B = 1.0 mA dc	t_{off} I_C = 10 mA dc I_B = 1.0 mA dc		N_F V_{CE} = 5 V dc I_C = .1 mA dc Rg = 1kΩ f = 100 Hz
					2N3250A, AUB	2N3251A, AUB	
	ps	V dc	pF	ns	ns	ns	dB
Min	5						
Max	250	0.25	6	70	250	300	6

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 Government documents.

2.2.1 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

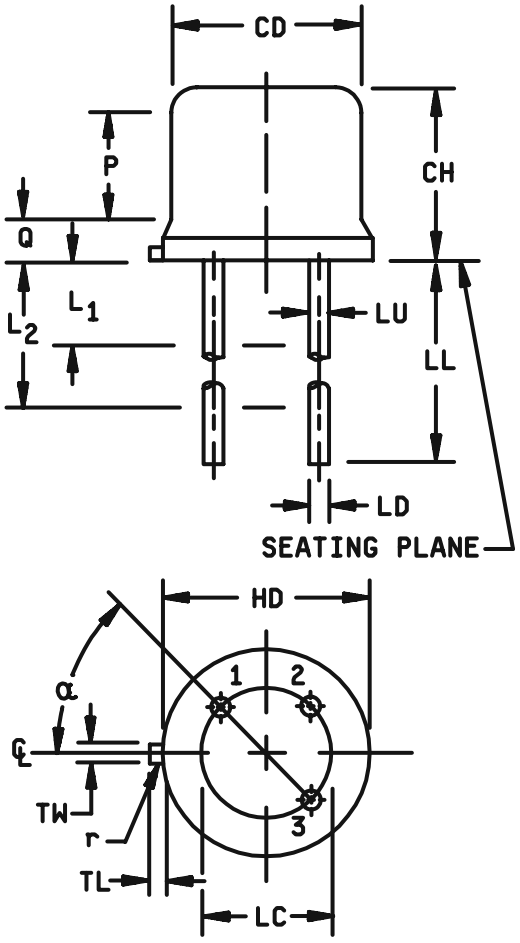
DEPARTMENT OF DEFENSE

MIL-STD-750 - Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Services (DAPS), Building 4D (DPM-DODSSP), 700 Robbins Avenue, 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, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

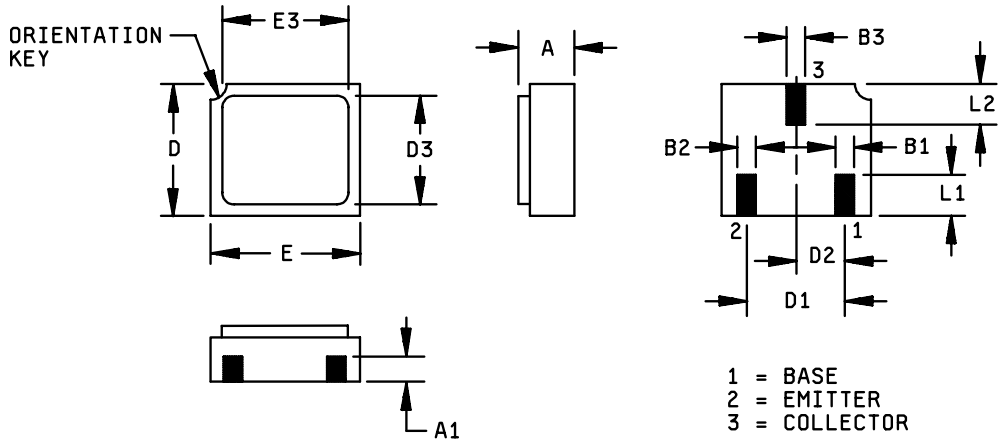
Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.178	.195	4.52	4.95	
CH	.170	.210	4.32	5.34	
HD	.209	.230	5.31	5.84	
LC	.100 TP		2.54 TP		6
LD	.016	.021	0.41	0.53	7, 8
LL	.500	.750	12.70	19.05	7,. 8, 12
LU	.016	.019	0.41	0.48	7, 8
L_1		.050		1.27	7, 8
L_2	.250		6.35		7, 8
P	.100		2.54		
Q		.040		1.02	5
r		.007		0.178	10
TL	.028	.048	0.71	1.22	3, 4
TW	.036	.046	0.91	1.17	3
α	45° TP		45° TP		6



NOTES:

1. Dimension are in inches.
2. Metric equivalents are given for general information only.
3. Beyond r (radius) maximum, TW shall be held for a minimum length of .011 (0.28 mm).
4. Dimension TL measured from maximum HD.
5. Body contour optional within zone defined by HD, CD, and Q.
6. Leads at gauge plane .054 +.001 -.000 inch (1.37 +0.03 -0.00 mm) below seating plane shall be within .007 inch (0.18 mm) radius of true position (TP) at maximum material condition (MMC) relative to tab at MMC. The device may be measured by direct methods.
7. Dimension LU applies between L_1 and L_2. Dimension LD applies between L_2 and LL minimum. Diameter is uncontrolled in L_1 and beyond LL minimum.
8. All three leads.
9. The collector shall be internally connected to the case.
10. Dimension r (radius) applies to both inside corners of tab.
11. In accordance with ANSI Y14.5M, diameters are equivalent to ϕx symbology.

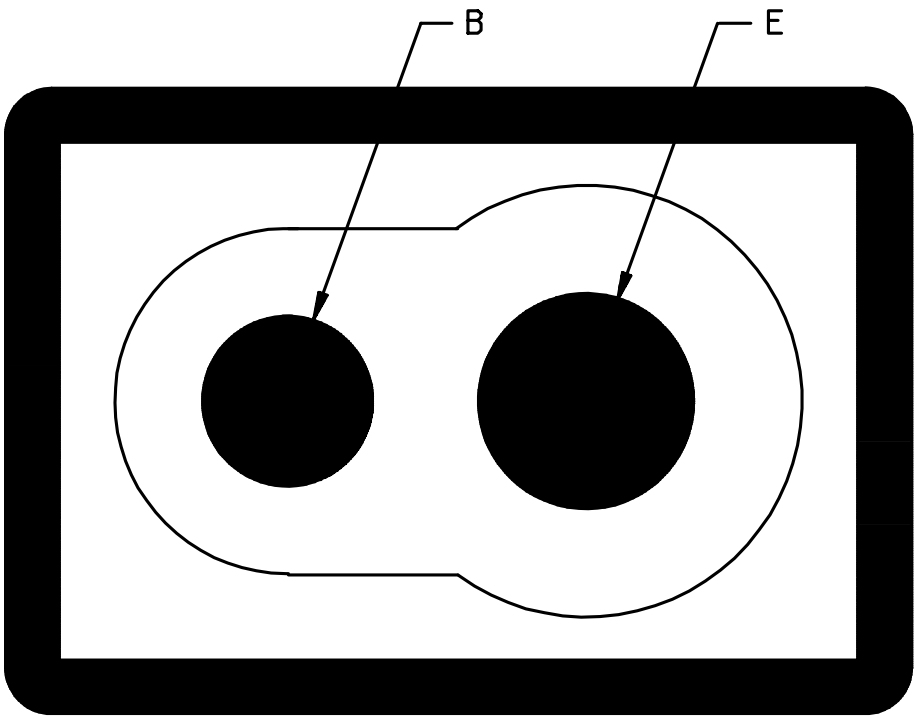
FIGURE 1. Physical dimensions (similar to TO-18).



Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
A	.046	.056	0.97	1.42	
A1	.017	.035	0.43	0.89	
B1	.016	.024	0.41	0.61	
B2	.016	.024	0.41	0.61	
B3	.016	.024	0.41	0.61	
D	.085	.108	2.41	2.74	
D1	.071	.079	1.81	2.01	
D2	.035	.039	0.89	0.99	
D3	.085	.108	2.41	2.74	
E	.115	.128	2.82	3.25	
E3		.128		3.25	
L1	.022	.038	0.56	0.96	
L2	.022	.038	0.56	0.96	

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 2. Physical dimensions, surface mount (UB version).



NOTES:

1. Chip size ..... 15 x 19 mils ±1 mil.
2. Chip thickness ..... 10 ±1.5 mil.
3. Top metal ..... Aluminum 15,000Å minimum, 18,000Å nominal.
4. Back metal ..... A. Gold 2,500Å minimum, 3,000Å nominal.
   B. Eutectic Mount – No Gold.
5. Backside ..... Collector.
6. Bonding pad ..... B = 3 mils, E = 4 mils diameter.
7. Passivation ..... Si_3N_4 (Silicon Nitride) 2 kÅ min, 2.2 kÅ nom.

FIGURE 3. Physical dimensions, JANHCA and JANKCA die.

3. REQUIREMENTS

3.1 General. The requirements for acquiring the product described herein shall consist of this document and MIL-PRF-19500.

3.2 Qualification. Devices furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified manufacturer's list (QML) before contract award (see 4.2 and 6.3).

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

I_{BEX} - - - Base cutoff current (dc) with specified circuit between the collector and emitter.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figure 1 (TO-18), figure 2 (UB surface mount), and figure 3 (die) herein.

3.4.1 Lead finish. Lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein. Where a choice of lead finish is desired, it shall be specified in the acquisition document (see 6.2).

3.5 Marking. Marking shall be in accordance with MIL-PRF-19500.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characterics 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 herein.

3.8 Workmanship. Semiconductor devices shall be processed in such a manner as to be uniform in quality and shall be free from other defects that will affect life, serviceability, or appearance.

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, and tables I, II, and III).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500 and as specified herein.

* 4.2.1 JANHC and JANKC qualification. JANHC and JANKC qualification inspection shall be in accordance with MIL-PRF-19500.

* 4.3 Screening (JANS, JANTX and JANTXV levels only). Screening shall be in accordance with table IV of MIL-PRF-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 IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
3c	Thermal impedance, method 3131 of MIL-STD-750.	Thermal impedance, method 3131 of MIL-STD-750.
9	h_{FE3}, I_{CBO2}	Not applicable
11	I_{CBO2}; h_{FE3}; ΔI_{CBO2} = 100 percent of initial value or 5 nA dc, whichever is greater, Δh_{FE3} = 25 percent change from initial value	I_{CBO2} and h_{FE3}
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 5 nA dc, whichever is greater; Δh_{FE3} = 25 percent change from initial value.	Subgroup 2 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 5 nA dc, whichever is greater; Δh_{FE3} = 25 percent change from initial value.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: T_A = room ambient as defined in 4.5 of MIL-STD-750; V_{CB} = 10- 30 V dc (10 V dc for JANS); P_T = 360 mW. NOTE: No heat sink or forced air cooling on the devices shall be permitted.

* 4.3.2 Screening JANC. Screening of JANHC and JANKC die shall be in accordance with MIL-PRF-19500, “Discrete Semiconductor Die/Chip Lot Acceptance”. Burn-in duration for the JANKC level follows JANS requirements; the JANHC follows JANTX requirements.

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 table V of MIL-PRF-19500 and table I herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VIa (JANS) and table VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with group A, subgroup 2 herein. Delta requirements shall be in accordance with the steps of table III herein as specified in the notes for table III.

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

Subgroup	Method	Conditions
B4	1037	V_{CB} = 10 V dc.
B5	1027	NOTE: If a failure occurs, resubmission shall be at the test conditions of the original sample. V_{CB} = 10 V dc, $P_D \geq$ 100 percent of maximum rated P_T (see 1.3). Option 1: 96 hours minimum, sample size in accordance with table VIa of MIL-PRF-19500, adjust T_A or P_D to achieve T_J = +275°C minimum. Option 2: 216 hours minimum, sample size = 45, c = 0; adjust T_A or P_D to achieve T_J = +225°C minimum.
B6	3131	See 4.5.3 herein.

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

Subgroup	Method	Conditions
B3	1027	V_{CB} = 10 - 30 V dc; T_A = room ambient as defined in the general requirements of MIL-STD-750. Power shall be applied to achieve T_J = +150°C minimum and a minimum power dissipation $P_D \geq$ 75 percent of maximum rated P_T as defined in 1.3.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500. Electrical measurements (end-points) shall be in accordance with group A, subgroup 2 herein. Delta requirements shall be in accordance with the steps of table III herein as specified in the notes for table III.

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

Subgroup	Method	Conditions
C2	2036	Test condition E, not applicable to surface mount.
C5	3131	See 4.5.3.
C6	1027	V_{CB} = 10 - 30 V dc; T_A = room ambient as defined in the general requirements of MIL-STD-750. Power shall be applied to achieve T_J = +150°C minimum and a minimum power dissipation $P_D \geq$ 75 percent of maximum rated P_T as defined in 1.3.

* 4.4.4 Group E inspection. Group E inspection shall be performed for qualification or re-qualification only. In case qualification was awarded to a prior revision of the slash sheet that did not request the performance of table II tests, the tests specified in table II herein must be performed to maintain qualification.

4.5 Method of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows.

4.5.1 Pulse measurements. Conditions for pulse measurement shall be as specified in section 4 of MIL-STD-750.

4.5.2 Collector - base time constant. This parameter may be determined by applying an rf signal voltage of 1.0 volt (rms) across the collector-base terminals, and measuring the ac voltage drop (V_{eb}) with a high impedance rf voltmeter across the emitter-base terminals. With f = 31.8 MHz used for the 1.0 V signal, the following computation applies; $r_b'C_c$ (ps) = 5 x V_{eb} (millivolts), see figure 4.

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

a. Minimum collector magnitude shall be 36 mA dc.

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

c. Reference point temperature shall be $+25°C \leq T_R \leq +35°C$. The chosen reference temperature shall be recorded before the test is started.

d. Maximum $R_{\theta JA}$ limit shall be 417°C/W.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 60 V dc	I_{CBO1}		10	µA dc
Emitter to base cutoff current	3026	Bias condition D; V_{EB} = 5 V dc	I_{EBO}		10	µA dc
Breakdown voltage collector - emitter	3011	Bias condition D; I_C = 10 mA dc; pulsed (see 4.5.1)	$V_{(BR)CEO}$	60		V dc
Collector - base cutoff current	3036	Bias condition D; V_{CB} = 40 V dc	I_{CBO2}		20	nA dc
Collector - emitter cutoff current	3041	Bias condition A; V_{BE} = 3.0 V dc, V_{CE} = 40 V dc	I_{CEX1}		20	nA dc
Base cutoff current	3041	Bias condition A; V_{BE} = 3.0 V dc; V_{CE} = 40 V dc	I_{BEX}		50	nA dc
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 0.1 mA dc	h_{FE1}			
2N3250A, 2N3250AUB				40		
2N3251A, 2N3251AUB				80		
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 1.0 mA dc	h_{FE2}			
2N3250A, 2N3250AUB				45		
2N3251A, 2N3251AUB				90		
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 10 mA dc, pulsed (see 4.5.1)	h_{FE3}			
2N3250A, 2N3250AUB				50	150	
2N3251A, 2N3251AUB				100	300	

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 2 - Continued						
* Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 50 mA dc, pulsed (see 4.5.1)	h_{FE4}			
2N3250A, 2N3250AUB				15		
2N3251A, 2N3251AUB				30		
Current gain linearity		$\frac{\lvert h_{FE3} - h_{FE1} \rvert}{h_{FE3}} \; x \; 100$	h_{FE}			
2N3250A, 2N3250AUB					40	%
2N3251A, 2N3251AUB					30	%
Collector - emitter saturated voltage	3071	I_C = 10 mA dc; I_B = 1.0 mA dc	$V_{CE(SAT)1}$		0.25	V dc
Collector - emitter saturated voltage	3071	I_C = 50 mA dc; I_B = 5.0 mA dc; pulsed (see 4.5.1)	$V_{CE(SAT)2}$		0.50	V dc
Base - emitter saturated voltage	3066	Test condition A; I_C = 10 mA dc; I_B = 1.0 mA dc	$V_{BE(SAT)1}$	0.60	0.90	V dc
Base - emitter saturated voltage	3066	Test condition A; I_C = 50 mA dc; I_B = 5.0 mA dc; pulsed (see 4.5.1)	$V_{BE(SAT)2}$		1.20	V dc
Subgroup 3						
High-temperature operation:		T_A = +150°C				
Collector - emitter cutoff current	3041	Bias condition A; V_{CE} = 40 V dc; V_{BE} = 3.0 V dc	I_{CEX2}		20	µA dc
Low-temperature operation:		T_A = -55°C				
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 1.0 mA dc	h_{FE5}			
2N3250A, 2N3250AUB				20		
2N3251A, 2N3251AUB				40		

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 4						
Small-signal short-circuit forward-current transfer ratio	3206	V_{CE} = 10 V dc; I_C = 1 mA dc; f = 1 kHz	h_{fe}			
2N3250A, 2N3250AUB				50	200	
2N3251A, 2N3251AUB				100	400	
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	V_{CE} = 20 V dc; I_C = 10 mA dc; f = 100 MHz	$\lvert h_{fe} \rvert$			
2N3250A, 2N3250AUB				2.5	9.0	
2N3251A, 2N3251AUB				3.0	9.0	
Open circuit output capacitance	3236	V_{CB} = 10 V dc; I_E = 0 100 kHz ≤ f ≤ 1 MHz	C_{obo}		6	pF
Input capacitance (output open-circuited)	3240	V_{EB} = 1.0 V dc; I_C = 0; 100 kHz ≤ f ≤ 1 MHz	C_{ibo}		8	pF
Collector - base time constant		V_{CE} = 20 V dc; I_C = 10 mA dc; f = 31.8 MHz; (see 4.5.2 and figure 4)	$r_b'C_c$	5	250	ps
Noise figure	3246	V_{CE} = 5.0 V dc; I_C = 100 µA dc; Rg = 1 kΩ; f = 100 Hz	NF		6	dB
Pulse response:						
On-time	3251	Test condition A; I_C = 10 mA dc; I_{B1} = 1.0 mA dc; (see figure 5)	t_{on}		70	ns

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 4 - Continued						
Off time	3251	Test condition A; I_C = 10 mA dc; I_{B1} = I_{B2} = 1.0 mA dc (see figure 6)	t_{off}			
2N3250A, 2N3250AUB					250	ns
2N3251A, 2N3251AUB					300	ns
Small-signal open circuit reverse-voltage transfer ratio	3211	V_{CE} = 10 V dc; I_C = 1.0 mA dc; f = 1 kHz	h_{re}			
2N3250A, 2N3250AUB					10	x 10^{-4}
2N3251A, 2N3251AUB					20	x 10^{-4}
Small-signal short circuit input impedance	3201	V_{CE} = 10 V dc; I_C = 1.0 mA dc; f = 1 kHz	h_{ie}			
2N3250A, 2N3250AUB				1	6	kΩ
2N3251A, 2N3251AUB				2	12	kΩ
Small-signal open circuit output admittance		V_{CE} = 10 V dc; I_C = 1.0 mA dc; f = 1 kHz	h_{oe}			
2N3250A, 2N3250AUB				4	40	µmhos
2N3251A, 2N3251AUB				10	60	µmhos

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

TABLE II. Group E inspection (all quality levels) - for qualification only.

Inspection	MIL-STD-750		Qualification
	Method	Conditions	
Subgroup 1			45 devices c = 0
Temperature cycling (air to air)	1051	Test condition C, 500 cycles	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See group A, subgroup 2 herein.	
* Subgroup 2			45 devices c = 0
Intermittent life	1037	V_{CB} = 10 V dc , 6,000 cycles, forced air cooling allowed on cooling cycle only.	
Electrical measurements		See group A, subgroup 2 herein.	
Subgroup 3			
Not applicable			
Subgroup 4, 5, 6 and 7			
Not applicable			
Subgroup 8			45 devices c = 0
Reverse stability	1033	Condition A for devices ≥ 400 V. Condition B for devices < 400 V.	

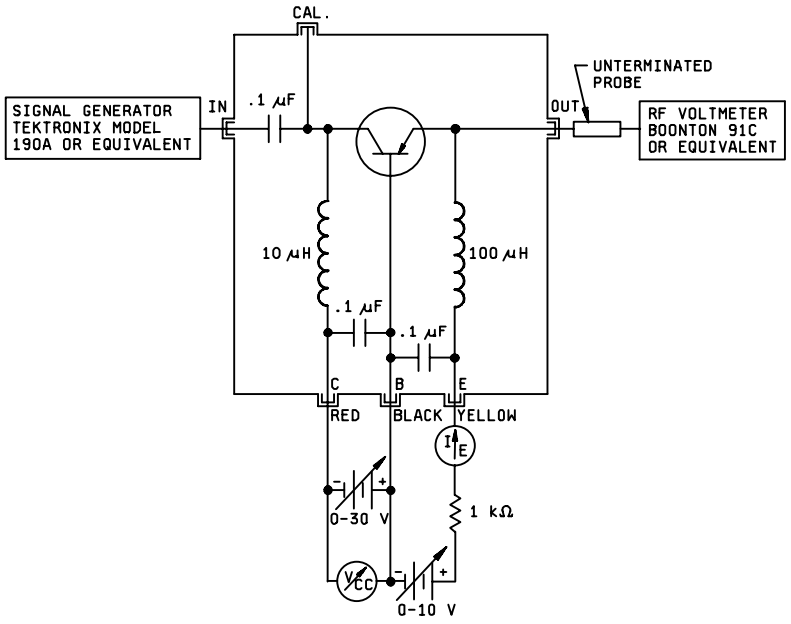
TABLE III. Group B and group C delta measurements. 1/ 2/ 3/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 10 mA dc; pulsed (see 4.5.1)	Δh_{FE3}	± 25 percent change from initial value.		
2.	Collector - base cutoff current	3036	Bias condition D; V_{CB} = 40 V dc	ΔI_{CBO2}	100 percent of initial value or 5 nA dc, whichever is greater.		
3.	Collector - emitter voltage (saturated)	3071	I_C = 50 mA dc; I_B = 5.0 mA dc	$\Delta V_{CE(Sat)2}$	50 mV dc change from initial value.		

1/ The delta measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:
   a. Subgroup 4, see table III herein, step 3.
   b. Subgroup 5, see table III herein, steps 1, 2, and 3.

2/ The delta measurements for table VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 are as follows: Subgroups 3 and 6, see table III herein, step1.

3/ The delta measurements for table VII of MIL-PRF-19500 are as follows: Subgroup 6, see table III herein, steps 1 and 2 (for JANS) and 1 (for JAN, JANTX, and JANTXV).

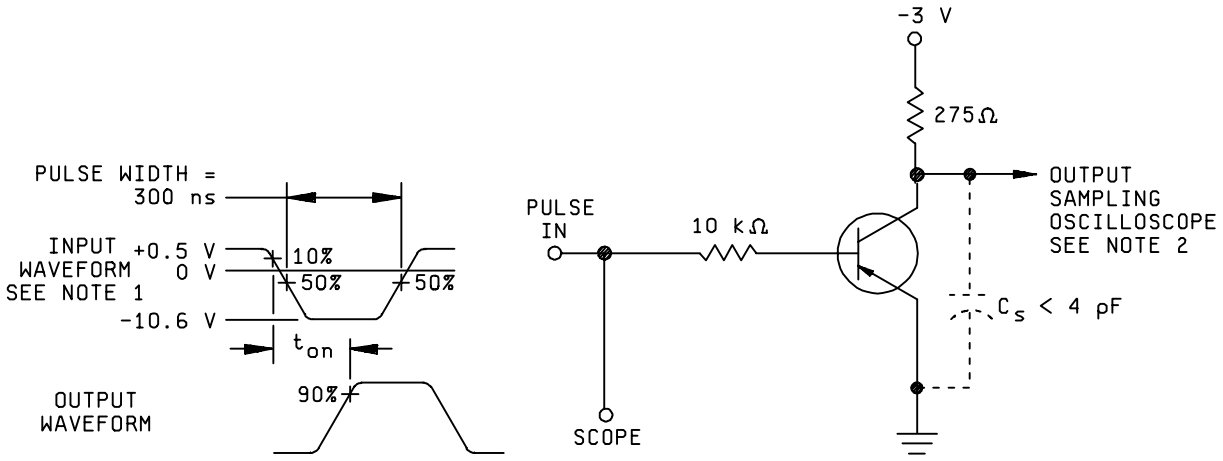


Procedure:

1. Set signal generator to 31.8 MHz and connect to "IN" connector on test jig.
2. Connect low voltage dc power supplies as shown. A 1 K ohm resistor should be placed in series with the emitter power supply to prevent damage to transistors being tested.
3. Set collector supply for V_{CE} = -20 V dc, and emitter supply for I_C = -10 mA.
4. Connect RF voltmeter with unterminated probe adapter to "CAL" connector on test jig. Adjust signal generator until RF voltage is 1 volt (NOTE: Decade switching of voltmeter should be accurate from 1 mV to 3 volts. If not, input voltage may be set using voltage dividers, utilizing lower scales of the RF voltmeter. If this is done, the voltage dividers should be left in place when the voltmeter is removed, as they constitute a load on the input of the circuit.
5. Remove RF voltmeter from "CAL" connector and connect to "OUT" connector. Meter will now read $r_b'C_c$ as follows:

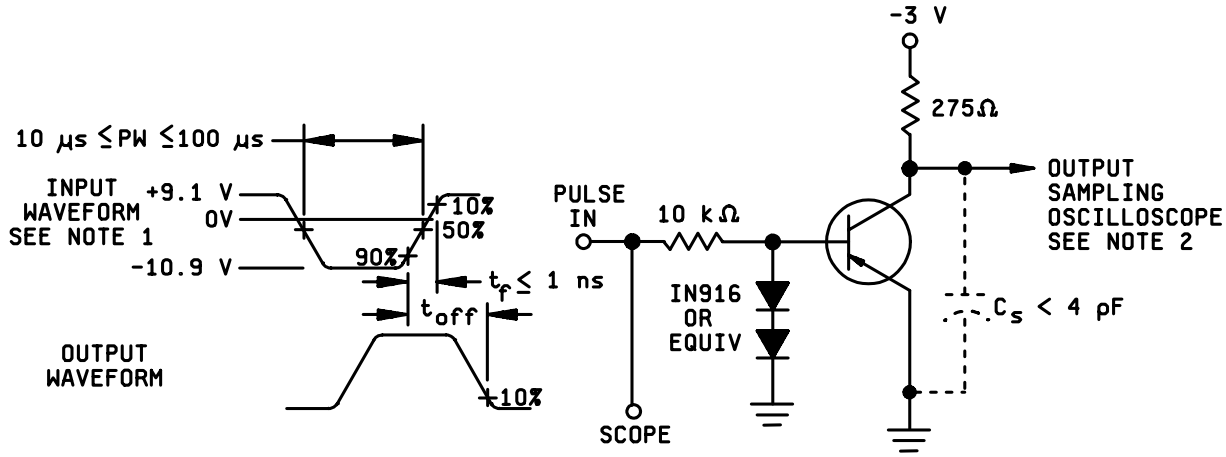
Meter range full scale
3 mV
10 mV
30 mV
.1 volt

FIGURE 4. Collector-base time constant test circuit (an equivalent circuit may be used).



NOTES:
1. The rise time (t_r) of the applied pulse shall be ≤ 1.0 ns, duty cycle ≤ 2 percent, and the generator source Z shall be 50Ω.
2. Sampling oscilloscope: Z_{IN} ≥ 100 kΩ; rise time(t_r) ≤ .1 ns.

FIGURE 5. Delay and rise time, test circuit.



NOTES:
1. The rise time (t_r) of the applied pulse shall be ≤ 1.0 ns, duty cycle ≤ 2 percent, and the generator source Z shall be 50Ω.
2. Sampling oscilloscope: Z_{IN} ≥ 100 kΩ; rise time (t_r) ≤ .1 ns.

FIGURE 6. Storage and fall time, test circuit.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel 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 Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. The notes specified in MIL-PRF-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.

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

c. The lead finish as specified (see 3.4.1).

d. Type designation and quality assurance level.

e. 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 Manufacturers' List (QML) 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 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, P.O. Box 3990, Columbus, OH 43216-5000.

6.4 Suppliers of JANHC and JANKC die. The qualified JANHC/JANKC suppliers with the applicable letter version (example, JANHCA2N3250A) will be identified on the QML.

JANC ordering information	
PIN	Manufacturer
	12498
2N3250A, AUB 2N3251A, AUB	JANHCA2N3250A JANHCA2N3251A
2N3250A, AUB 2N3251A, AUB	JANKCA2N3250A JANKCA2N3251A

6.5 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:
Army - CR
Navy - EC
Air Force - 11
NASA - NA
DLA - CC

Review activities:
Army - AR, AV, MI, SM
Navy - AS, MC
Air Force - 19

Preparing activity:
DLA - CC

(Project 5961-2532)

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-19500/323H	2. DOCUMENT DATE 28 January 2002

3. **DOCUMENT TITLE**
SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, SWITCHING TYPES 2N3250A, 2N3251A, 2N3250AUB, 2N3251AUB, JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) COMMERCIAL DSN FAX EMAIL	7. DATE SUBMITTED

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-VAC Post Office Box 3990 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