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

INCH POUND

MIL-PRF-19500/382C
28 July 1999
SUPERSEDING
MIL-S-19500/382B
4 October 1993

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, LOW-POWER
TYPE 2N2944A, 2N2945A, AND 2N2946A
JAN, JANTX, JANTXV, AND JANS

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

1. SCOPE

1.1 Scope. This specification covers the performance requirements for low-power, high-speed chopper, PNP, silicon transistors. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimension. See figure 1 (similar to T0-46).

1.3 Maximum ratings.

Types	P_T 1/ T_A = +25°C	V_{EBO}	V_{CBO}	V_{CEO}	V_{ECO}	I_C	T_J and T_{STG}
	mW	V dc	V dc	V dc	V dc	mA dc	°C
2N2944A	400	-15	-15	-10	-10	-100	-65 to +200
2N2945A	400	-25	-25	-20	-20	-100	-65 to +200
2N2946A	400	-40	-40	-35	-35	-100	-65 to +200

1/ Derate linearly 2.3 mW/°C above T_A = +25°C.

1.4 Primary electrical characteristis.

Limits	h_{FE1} V_{CE} = -0.5 V dc I_C = -1 mA dc			h_{FE} (inv)$_1$ V_{EC} = -0.5 V dc I_B = -200 µA dc			r_{ec} (on)$_2$ I_B = -1 mA dc I_e = 100 µA ac(rms) I_E = 0; f = 1 kHz			C_{ibo} V_{EB} = -6 V dc I_C = 0 100 kHz ≤ f ≤1 MHz
	2N2944A	2N2945A	2N2946A	2N2944A	2N2945A	2N2946A	2N2944A	2N2945A	2N2946A	
							ohms	ohms	ohms	pF
Min	100	70	50	50	30	20				
Max							4	6	8	6

Limits	V_{EC} (ofs) I_B = -200 µA dc I_E = 0			V_{EC} (ofs) I_R = -1.0 mA dc I_E = 0			$\lvert h_{fe} \rvert$ f = 1 MHz V_{CE} = -6 V dc I_C = -1 mA dc			C_{obo} V_{CB} = -6 V dc I_E = 0 100 kHz ≤ f ≤ 1 MHz
	2N2944A	2N2945A	2N2946A	2N2944A	2N2945A	2N2946A	2N2944A	2N2945A	2N2946A	
	mV dc	mV dc	mV dc	mV dc	mV dc	mV dc				pF
Min							15	10	5	
Max	-0.3	-0.5	-0.8	-0.6	-1.0	-2.0	55	55	55	10

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-VAC, 3990 East Broad St., Columbus, OH 43216-5000, by using the addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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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 - Performance Specification 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 Defense Automated Printing Sevice, 700 Robbins Avenue, Building 4D (DPM-DODSSP), 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 6.4).

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

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

$V_{(BR)ECO}$ - - - Breakdown voltage, emitter to collector, with base open-circuited.

h_{FE} (inv) - - Forward-current transfer ratio except that the collector and emitter shall be interchanged, i.e., I_E / I_B .

I_e - - - - - - Emitter current (rms).

r_{ec} (on)- - - Small-signal emitter-collector on-state resistance.

V_{EC} (ofs) - - Emitter to collector offset voltage, i.e., open-circuit voltage between emitter collector when the base-collector junction is forward-biased.

V_{ec} - - - - - Emitter to collector voltage (rms).

3.4 Interface requirements and physical dimensions. The Interface requirements and physical dimensions shall be as specified in MIL-PRF-19500, and herein.

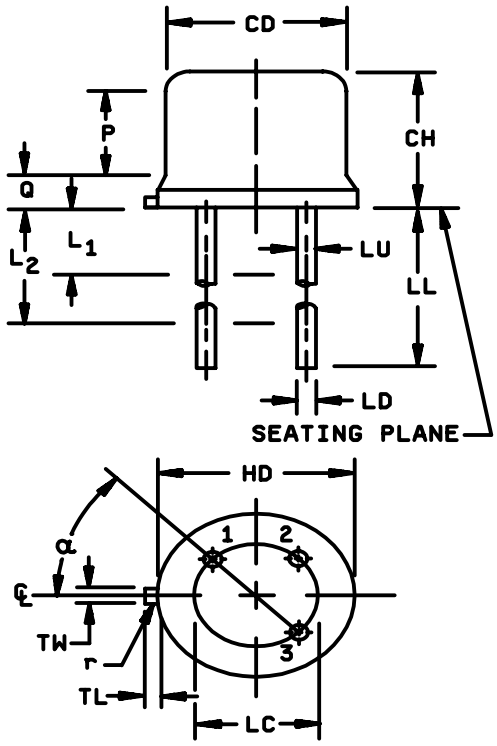
3.4.1 Lead finish. Unless otherwise specified herein, lead finish shall be solderable in accordance with MIL-PRF-19500, MIL-STD-750, and herein.

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

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

3.7 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

Symbol	Inches		Millimeter		Note
	Min	Max	Min	Max	
CD	.178	.195	4.52	4.95	
CH	.065	.085	1.65	2.16	
HD	.209	.230	5.31	5.84	
LC	.707 TP		1.80 TP		4
LD		.021		.53	2, 6
LL	.500		12.70		6
LU	.016	.019	.41	.48	3, 6
L_1		.050		1.27	
L_2	.250		6.35		
TL	.028	.048	.71	1.22	
TW	.036	.046	.91	1.17	
P	.100		2.54		
Q		.040		1.02	
r		.007		.18	
α	45° TP		45° TP		



NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Symbol TL is measured from HD maximum.
4. Details of outline in this zone are optional.
5. Symbol CD shall not vary more than 0.010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
6. Leads at gauge plane 0.054 inch (1.37 mm) +0.001 inch (0.03 mm) -0.000 inch (0.00 mm) below seating plane shall be within 0.007 inch (0.18 mm) radius of TP relative to tab. Device may be measured by direct methods or by gauge.
7. Symbol LU applies between L_1 and L_2. Dimensions LD applies between L_2 and LL minimum. Lead diameter shall not exceed 0.042 inch (1.07 mm) within L_1 and beyond LL minimum.
8. Lead designation, shall be as follows:
   1 - Emitter; 2 - Base; 3 - Collector
9. Collector is electrically connected to case.
10. Beyond r maximum, TW shall be held for a minimum length of 0.011 inch (0.28 mm).
11. Symbol r applied to both inside corners of tab.
12. In accordance with ANSI Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions (similar to T0-46).

4. VERIFICATION

4.1 Classification of Inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.2).

b. Screening (see 4.3)

c. Conformance inspection (see 4.4).

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

4.3 Screening (JANS, JAN, JANTX, and JANTXV levels only). Screening shall be in accordance with MIL-PRF-19500 (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 table IV of MIL-PRF-19500)	Measurement	
	JANS	JAN, JANTX and JANTXV
9	I_{CBO1} and h_{FE} $(inv)_1$	N/A
11	I_{CBO1} ; h_{FE} $(inv)_1$; ΔI_{CBO1} = 100 percent of initial value or 0.2 nA dc for 2N2944 and 2N2945, 0.5 nA dc for 2N2946 Δh_{FE} $(inv)_1$ = 25% of initial value.	I_{CBO1} and h_{FE} $(inv)_1$
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 0.2 nA dc for 2N2944 and 2N2945, 0.5 nA dc for 2N2946; Δh_{FE} $(inv)_1$ = 25% of initial value.	Subgroups 2 of table I herein; ΔI_{CBO1} = 100 percent of initial value or 0.2 nA dc for 2N2944A and 2N2945A, 0.5 nA dc for 2N2946A; Δh_{FE} $(inv)_1$ = 25% of initial value.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows: T_A = Room ambient as defined in the general requirements of MIL-STD-750, paragraph 4.5;

P_T = +400 mW
2N2944A: V_{CB} = -8 V dc
2N2945A: V_{CB} = -16 V dc
2N2946A: V_{CB} = -28 V dc

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 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 VIa (JANS) of 19500 and 4.4.2.1 herein. Electrical measurements (end-points) requirements shall be in accordance with group A, subgroup 2 herein. Delta requirements shall be in accordance with 4.5.6 herein. See 4.4.2.2 herein for JAN, JANTX, and JANTXV group B testing. Electrical measurements (end-points) requirements shall be in accordance with group A, subgroup 2 herein. Delta requirements shall be in accordance with 4.5.6 herein.

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

Subgroup	Method	Condition
B3	2037	Condition A
B4	1037	P_T = 400 mW; T_A = room ambient as defined in the general requirements of MIL-STD-750, section 4.5; t_{on} = t_{off} = 3 minutes minimum for 2,000 cycles. No heat sink or forced air cooling on the devices shall be permitted. V_{CB} = -8 V dc (2N2944A); V_{CB} = -16 V dc (2N2945A); V_{CB} = -28 V dc (2N2946A).
B5	1027	T_A = 125°C ±25°C; for 96 hours; P_T = 400 mW 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; V_{CB} = -8 V dc (2N2944A); V_{CB} = -16 V dc (2N2945A); V_{CB} = -28 V dc (2N2946A).

4.4.2.2 Group B inspection, (JAN, JANTX, and JANTXV). 1/ Electrical endpoints shall be in accordance with Group A, subgroup 2, herein.

Step	Method	Condition
1	1039	Steady-state life: Test condition B, 340 hours, V_{CB} = -8 V dc (2N2944A), V_{CB} = -16 V dc (2N2945A), V_{CB} = -28 V dc (2N2946A), adjust to achieve T_J = 150°C min. No heat sink on the device shall be permitted. n = 45 devices, c = 0.
2	1039	The steady state life test of step 1 shall be extended to 1000 hours for each die design. Samples shall be selected from a wafer lot ever twelve months of wafer production, however, Group B shall not be required more than once for any single wafer lot. n = 45, c = 0.
3	1032	High-temperature life (non-operating), T_A = +200°C. n = 22, c = 0.

1/ Separate samples may be used for each step. In the event of a group B failure, the manufacturer may pull a new sample at double size from either the failed assembly lot or from another assembly lot from the same wafer lot. If the new "assembly lot" option is exercised, the failed assembly lot shall be scrapped.

4.4.2.3 Group B sample selection. Samples selected from group B inspection shall meet all of the following requirements:

a. For JAN, JANTX, and JANTXV samples shall be selected randomly from a minimum of three wafers (or from each wafer in the lot) from each wafer lot. For JANS, samples shall be selected from each inspection lot. See MIL-PRF-19500.

b. Must be chosen from an inspection lot that has been submitted to and passed group A, subgroup 2, conformance inspection. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for life test (subgroups B4 and B5 for JANS, and group B for JAN, JANTX, and JANTXV) may be pulled prior to the application of final lead finish.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table VII of MIL-PRF-19500, and 4.4.3.1 (JANS), and 4.4.3.2 (JAN, JANTX, and JANTXV) herein for group C testing. Electrical measurements (end-points) and delta requirements shall be in accordance with group A, subgroup 2 and 4.5.6 herein.

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

Subgroup	Method	Conditions
C2	2036	Test condition E.
C6	1037	Intermittent operation life (sampling plan); V_{CB} = -8 V dc (2N2944A), V_{CB} = -16 V dc (2N2945A), V_{CB} = -28 V dc (2N2946A) T_J = +150°C. No heat sink or forced-air cooling on the devices.

4.4.3.2 Group C inspection, table VII (JAN, JANTX, and JANTXV) of MIL-PRF-19500.

Subgroup	Method	Conditions
C2	2036	Test condition E.
C6	1037	Not applicable

4.4.3.3 Group C inspection sample selection. Samples for subgroups in group C shall be chosen at random from any lot containing the intended package type and lead finish procured to the same specification which is submitted to and passes group A tests for conformance inspection. Testing of a group using a single device type enclosed in the intended package type shall be considered as complying with the requirements for that subgroup.

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

4.5.1 Input capacitance. This test shall be conducted in accordance with MIL-STD-750, method 3240, except the output capacitor shall be omitted.

4.5.2 Emitter to collector breakdown voltage. Method of test shall be in accordance with method 3011 of MIL-STD-750, condition D, except that all references to the collector and the emitter of the transistor shall be interchanged.

4.5.3 Forward-current transfer ratio (inverted connection). Method of test shall be in accordance with method 3076 of MIL-STD-750, except that all references to the collector and the emitter of the transistor shall be interchanged. Then:

$$h_{FE} \text{ (inv)} = I_E / I_B$$

4.5.4 Emitter to collector offset voltage. The transistor shall be tested in the circuit of figure 2. The base current shall be adjusted to the specified value. The voltage between the emitter and collector shall then be measured using a voltmeter with an input impedance high enough that halving it does not change the measured value within the required accuracy of the measurement.

4.5.5 Small-signal emitter-collector on-state resistance. The transistor shall be tested in the circuit of figure 3. The base current shall be adjusted to the specified value and an ac sinusoidal signal current, $I_{e'}$, of the specified rms value shall be applied between the emitter and collector. The rms voltage, $V_{ec'}$, between the emitter and collector shall be measured using an ac voltmeter with an input impedance high enough that halving it does not change the measured value within the required accuracy of the measurement. The small-signal emitter-collector on-state resistance shall then be determined as follows:

$$r_{ec}\ (on) = V_{ec} / I_e$$

where V_{ec} is the rms voltage between the emitter and collector.

4.5.6 Delta requirements. Delta requirements shall be as specified below:

Step	Inspection	MIL-STD-750		Symbol	Limit		Unit
		Method	Conditions		Min	Max	
1	Collector to base cutoff current 2N2944A 2N2945A 2N2946A	3036	Bias condition D: $I_E = 0$ $V_{CE} = -15$ V dc $V_{CE} = -25$ V dc $V_{CE} = -40$ V dc	ΔI_{CBO1}	100 percent of initial value		
2	Forward-current transfer ratio (inverted connection)	3076	$V_{EC} = -0.5$ V dc; $I_B = 200$ µA dc; (see 4.5.3)	$\Delta h_{FE}(inv)_1$	25 percent of initial value		

1/ The electrical measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:
a. Subgroup 5, see 4.5.6 herein, steps 1 and 2.

2/ The electrical measurements for table VIb (JANTX and JANTXV) of MIL-PRF-19500 are as follows:
a. Subgroups 3 and 6, see 4.5.6 herein, step 2.

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

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1 2/						
Visual and mechanical 3/ examination	2071	n = 45 devices, c = 0				
Solderability 3/ 4/	2026	n = 15 leads, c = 0				
Resistance to 3/ 4/ 5/ solvent	1022	n = 15 devices, c = 0				
Temp cycling 3/ 4/	1051	Test condition C, 25 cycles. n = 22 devices, c = o				
Heremetic seal 4/	1071	n = 22 devices, c = 0				
Fine leak Gross leak						
Electrical measurements 4/	2037	Group A, subgroup 2 herein				
Bond strength 3/ 4/		Precondition T_A = +250°C at t = 24 hrs or T_A = +300°C at t = 2 hrs, n = 11 wires, c = 0				
Subgroup 2						
Breakdown voltage collector to emitter	3011	Bias condition D; I_C = -10 μA dc	$V_{(BR)CEO}$			
2N2944A				-10		V dc
2N2945A				-20		V dc
2N2946A				-35		V dc
Collector to base cutoff current	3036	Bias condition D; I_C = -10 μA dc	I_{CBO1}			
2N2944A		V_{CB} = -15 V dc			10	μA dc
2N2945A		V_{CB} = -25 V dc			10	μA dc
2N2946A		V_{CB} = -40 V dc			10	μA dc
Emitter to base cutoff current	3061	Bias condition D;	I_{EBO1}		10	μA dc
Breakdown voltage, emitter to collector	3011	Bias condition B; I_E = -10 μA dc; I_B = 0; (see 4.5.2)	$V_{(BR)ECO}$			
2N2944A				-10		V dc
2N2945A				-20		V dc
2N2946A				-35		V dc
Collector to base cutoff current	3036	Bias condition D;	I_{CBO2}			
2N2944A		V_{CB} = -15 V dc			-0.1	nA dc
2N2945A		V_{CB} = -25 V dc			-0.2	nA dc
2N2946A		V_{CB} = -40 V dc			-0.5	nA dc
Emitter to base cutoff current	3061	Bias condition D;	I_{EBO2}			
2N2944A		V_{EB} = -15 V dc			-0.1	nA dc
2N2945A		V_{EB} = -25 V dc			-0.2	nA dc
2N2946A		V_{EB} = -40 V dc			-0.5	nA dc

See footnote at the end of table.

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} = -0.5 V dc; I_C = -1.0 mA dc	h_{FE1}			
2N2944A				100		
2N2945A				70		
2N2946A				50		
Forward-current transfer ratio (inverted connection)	3076	V_{EC} = -0.5 V dc; I_B = -200 μA dc; (see 4.5.3)	h_{FE} (inv)$_1$			
2N2944A				50		
2N2945A				30		
2N2946A				20		
Emitter to collector offset voltage	- - -	I_B = -200 μA dc; I_E = 0; (see 4.5.4 and figure 2).	V_{EC} (ofs)$_1$			
2N2944A					-0.3	mV dc
2N2945A					-0.5	mV dc
2N2946A					-0.8	mV dc
Emitter to collector offset voltage	- - -	I_B = -1 mA dc; I_E = 0; (see 4.5.4 and figure 2).	V_{EC} (ofs)$_2$			
2N2944A					-0.6	mV dc
2N2945A					-1.0	mV dc
2N2946A					-2.0	mV dc
Emitter to collector offset voltage	- - -	I_B = -2 mA dc; I_E = 0; (see 4.5.4 and figure 2).	V_{EC} (ofs)$_3$			
2N2944A					-1.0	mV dc
2N2945A					-1.6	mV dc
2N2946A					-2.5	mV dc
Subgroup 3						
High-temperature operation:		T_A = +100°C				
Collector to base cutoff current	3036	Bias condition D; I_C = 0	I_{CBO3}			
2N2944A		V_{CB} = -15 V dc			-10	nA dc
2N2945A		V_{CB} = -25 V dc			-20	nA dc
2N2946A		V_{CB} = -40 V dc			-25	nA dc
Emitter to base cutoff current	3061	Bias condition D; I_C = 0	I_{EBO3}			
2N2944A		V_{CB} = -15 V dc			-10	nA dc
2N2945A		V_{CB} = -25 V dc			-15	nA dc
2N2946A		V_{CB} = -40 V dc			-20	nA dc
Low-temperature operation:		T_A = -55°C				
Forward-current transfer ratio	3076	V_{CE} = -0.5 V dc; I_C = -1 mA dc	h_{FE2}			
2N2944A				35		
2N2945A				25		
2N2946A				20		

See footnote at the end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 3 -Continued						
Forward-current transfer ratio (inverted connection)	3076	V_{EC} = -0.5 V dc; I_B = -200 μA dc (see 4.5.3)	h_{FE} (inv)$_2$			
2N2944A				25		
2N2945A				15		
2N2946A				10		
Subgroup 4						
Small-signal emitter- collector on-state resistance		I_B = -100 μA dc; I_E = 0; I_e = 100 μA ac (rms) f = 1 kHz (see 4.5.5 and figure 3)	r_{ec} (on)$_1$			
2N2944A					10	Ω
2N2945A					12	Ω
2N2946A					14	Ω
Small-signal emitter- collector on-state resistance	- - -	I_B = -1 μA dc; I_E = 0; I_e = 100 μA ac (rms) f = 1 kHz (see 4.5.4 and figure 2).	r_{ec} (on)$_2$			
2N2944A					4	Ω
2N2945A					6	Ω
2N2946A					8	Ω
Magnitude of common-emitter small-signal short-circuit forward-current transfer ratio	- - -	V_{CE} = -6 V dc; I_C = -1 mA dc; f = 1 MHz	h_{fe}			
2N2944A				15	55	
2N2945A				10	55	
2N2946A				5	55	
Open circuit output capacitance	3236	V_{CB} = -6 V dc; I_E = 0; 100 kHz ≤ f ≤ 1 MHz	C_{obo}		10	pF
Input capacitance (output open-circuited)	3240	V_{EB} = -6 V dc; I_C = 0; 100 kHz ≤ f ≤ 1 MHz (see 4.5.1)	C_{ibo}		6.0	pF
Pulse response:						
Delay time	3251	Test condition B (see figure 4)	t_d		50	ns
Rise time	3251	Test condition B (see figure 4)	t_r		100	ns
Storage time	3251	Test condition B (see figure 4)	t_s		350	ns
Fall time	3251	Test condition B (see figure 4)	t_f		100	ns
Subgroups 5, 6, and 7 Not applicable						

1/ For sampling plan, see MIL-PRF-19500.
2/ For resubmission of failed subgroup A1, double the sample size of the failed test or sequence of tests.
3/ Separate samples may be used.
4/ Not required for JANS.
5/ Not required for laser marked devices.

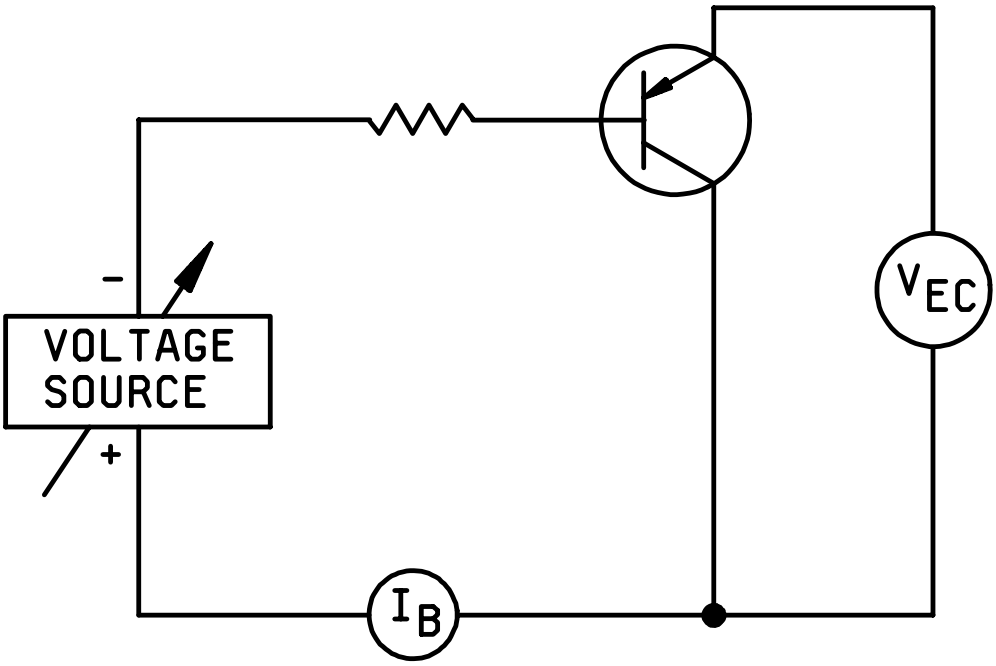


FIGURE 2. Emitter to collector offset voltage test circuit.

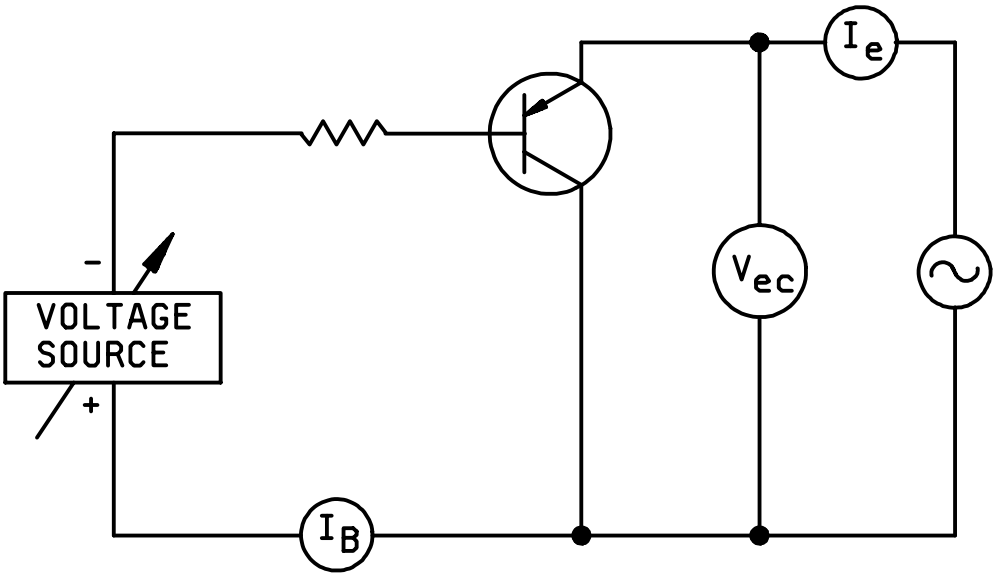
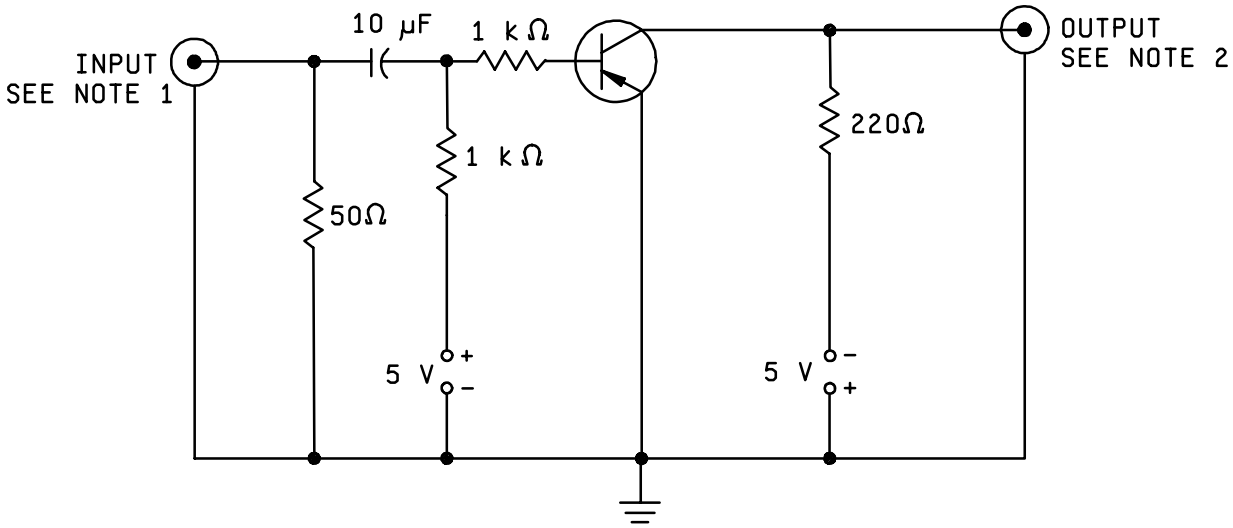
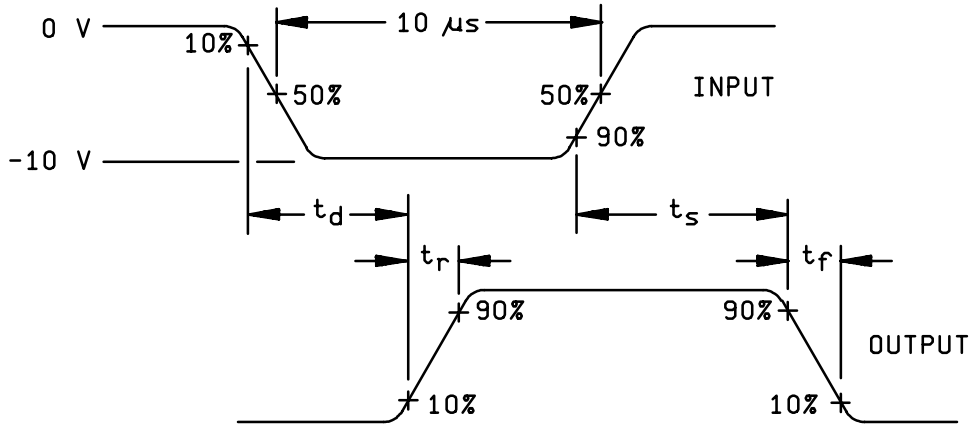


FIGURE 3. Emitter to collector offset voltage test circuit.



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES:

1. The rise time (t_r) and fall time (t_f) of the applied pulse shall be ≤ 10 ns, duty cycle ≤ 2%. The input pulse width shall be 500 ns.
3. Output monitored with an oscilloscope with the following characteristics:
   Z_{in} ≤ 1 MΩ, t_r ≤ 1 ns.

FIGURE 4. Pulse response 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 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.

6. NOTES

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

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

6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Lead finish (see 3.3.1).

c. Type designation and product assurance level.

d. Packaging requirements (see 5.1).

6.3 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.

6.4 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-19500 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, DSCC-VQE, Columbus, OH 43216.

CONCLUDING MATERIAL

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

Review activities:
Army - AV
Air Force - 19, 99

Preparing activity:
DLA -CC

(Project 5961-1845)

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-S-19500/382C	**2. DOCUMENT DATE (YYMMDD)**

3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, LOW-POWER TYPE 2N2944A, 2N2945A, AND 2N2946A JAN, JANTX, JANTXV, AND JANS

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

5. REASON FOR RECOMMENDATION

6. SUBMITTER		
a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) DSN (If applicable) (3) E-mail	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY		
a. NAME Alan Barone	b. TELEPHONE (Include Area Code) (1) Commercial (614) 692-0510	(2) DSN 850-0510
		(3) E-mail alan_barone@dscc.dla.mil
c. ADDRESS (Include Zip Code) Defense Supply Center Columbus, DSCC-VAC, Columbus, OH 43216	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Vaginia 22060-6888 Telephone (703) 767-6888 DSN 427-6888	