

INCH-POUND

MIL-PRF-19500/396G
21 April 2000
SUPERSEDING
MIL-PRF-19500/396F
15 January 2000

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, SWITCHING
TYPES 2N3762, 2N3762L, 2N3763, 2N3763L, 2N3764, AND 2N3765
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 encapsulated device type as specified in MIL-PRF-19500 and two levels of product assurance are provided for each unencapsulated device type.

1.2 Physical dimensions. See figure 1 2N3762L and 2N3763L (TO-5), 2N3762 and 2N3763 (TO-39), 2N3764 and 2N3765 (TO - 46) and Figure 2 (die) herein.

1.3 Maximum ratings.

Types	P_T $T_A = +25^\circ\text{C}$	V_{CBO}	V_{CEO}	V_{EBO}	I_C	T_{OP} and T_{STG}	$R_{\theta JC}$
	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>°C</u>	<u>°C/W</u>
2N3762	1.0 (1)	40	40	5	1.5	-55 to +200	60
2N3762L	1.0 (1)	40	40	5	1.5	-55 to +200	60
2N3763	1.0 (1)	60	60	5	1.5	-55 to +200	60
2N3763L	1.0 (1)	60	60	5	1.5	-55 to +200	60
2N3764	0.5 (2)	40	40	5	1.5	-55 to +200	88
2N3765	0.5 (2)	60	60	5	1.5	-55 to +200	88

(1) Derate linearly at 5.71 mW/°C above $T_A = +25^\circ\text{C}$.

(2) Derate linearly at 2.86 mW/°C above $T_A = +25^\circ\text{C}$.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAC, 3990 East Broad Street, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

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FSC 5961

MIL-PRF-19500/396G

1.4 Primary electrical characteristics $T_A = +25^\circ\text{C}$. (Unless otherwise indicated, applies to all devices.)

Limits	h_{FE1} $V_{CE} = 1.0 \text{ V dc}; I_C = 10 \text{ mA dc}$	h_{FE3} $V_{CE} = 1.0 \text{ V dc}; I_C = 500 \text{ mA dc}$	h_{FE5} (1) $V_{CE} = 5.0 \text{ V dc}; I_C = 1.5 \text{ A dc}$	
			2N3762 2N3762L 2N3764	2N3763 2N3763L 2N3765
Min	35	40	30	20
Max		140		

Limits	$ h_{FE} $ $f = 100 \text{ MHz}$ $V_{CE} = 10 \text{ V dc}$ $I_C = 50 \text{ mA dc}$		$V_{CE(SAT)3}$ $I_C = 500 \text{ mA dc}$ $I_B = 50 \text{ mA dc}$ (1)	C_{obo} $V_{CE} = 10 \text{ V dc}$ $I_E = 0$ $100 \text{ kHz} \leq f \leq 1 \text{ MHz}$	Pulse response			
					See fig. 3		See fig. 4	
	2N3762 2N3764	2N3763 2N3765	V_{dc}	μF	t_d	t_r	t_s	t_f
Min	1.8	1.5			ns	ns	ns	ns
Max	6.0	6.0	0.5	25	8	35	80	35

(1) Pulsed (see 4.5.1).

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

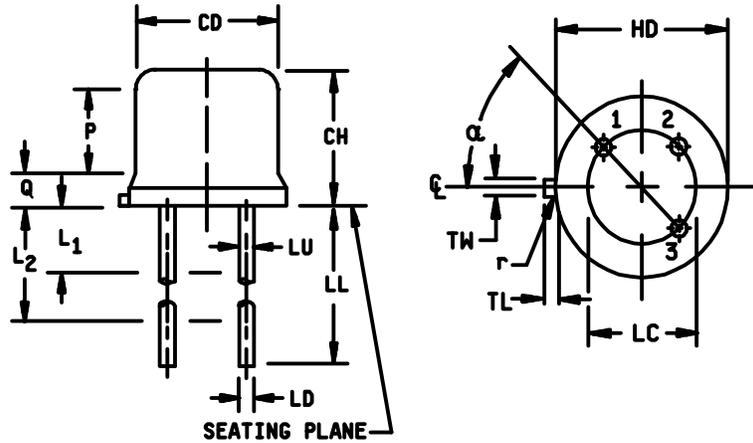
MIL-PRF-19500 - Semiconductor Devices, General Specification for.

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 Defense Automated Printing Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

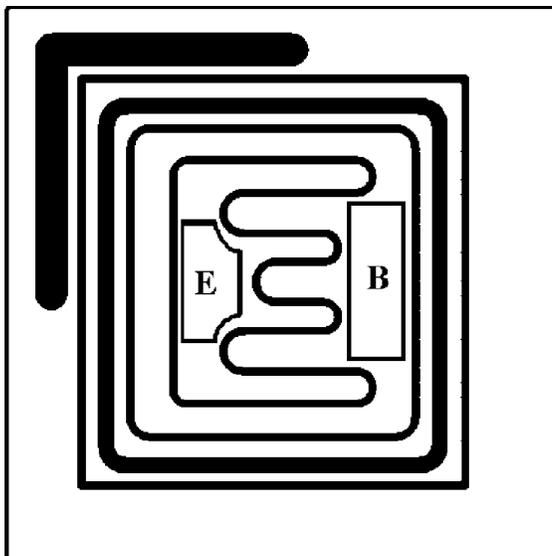


Symbol	TO-5, 39		TO-46		Notes
	Min	Max	Min	Max	
CD	0.305	0.355	0.178	0.195	
CH	0.240	0.260	0.065	0.085	
HD	0.355	0.370	0.209	0.230	
LC	0.200 TP		0.100 TP		4
LD	0.016	0.021	0.016	0.021	4, 5
LL	See notes 4, 5, 6, 7				
LU	0.016	0.021	0.016	0.021	5
L1		0.050		0.050	5
L2	0.250		0.250		5
TL	0.029	0.045	0.028	0.048	2
TW	0.028	0.034	0.036	0.046	
P	0.100				
Q		0.040			3
r		0.010		0.007	2
a	45° TP		45° TP		

NOTES:

1. Dimension are in inches.
2. Dimension TL measured from maximum HD. Dimension r (radius) applies to both inside corners of tab.
3. Body contour optional within zone defined by HD, CD, and Q. Dimension P not applicable to TO-46.
4. 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 or by the gauge and gauging procedure.
5. Dimension LU applies between L₁ and L₂. Dimension LD applies between L₂ and LL minimum. Diameter is uncontrolled in L₁ and beyond LL minimum.
6. For TO-5 packages, dimension LL shall be 1.5 inches (38.1) mm minimum and 1.75 inches (44.4 mm) maximum.
7. For TO-39 and TO-46 packages, dimension LL shall be 0.5 inches (12.7) mm minimum and 0.75 inches (19.0 mm) maximum.
8. In accordance with ANSI Y14.5M, diameters are equivalent to ϕx symbology.
9. Lead 1 = emitter, lead 2 = base, lead 3 = collector (internally connected to the case).

FIGURE 1. Physical dimensions 2N3762L and 2N3763L (TO - 5), 2N3762 and 2N3763 (TO - 39), 2N3764 and 2N3765 (TO - 46).



1. Chip size.....40 x 40 mils \pm 1 mil
2. Chip thickness.....10 \pm 1.5 mil
3. Top metal.....Aluminum 15,000Å minimum, 18,000Å nominal
4. Back metal.....A. Al/Ti/Ni/Ag 12kÅ/3kÅ/7kÅ/7kÅ min., 15kÅ/5kÅ/10kÅ/10kÅ nom.
B. Gold 2,500Å minimum, 3,000Å nominal
C. Eutectic Mount – No Gold
5. Backside.....Collector
6. Bonding pad.....B = 6 x 8 mils, E = 6 x 4 mils

FIGURE 2. JANHCA and JANKCA die dimensions.

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

3. REQUIREMENTS

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

3.2 Associated specification. The individual item 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.

3.4 Interface requirements and physical dimensions. The interface requirements and physical dimensions shall be as specified in MIL-PRF-19500 and on figures 1 and 2 herein.

3.4.1 Lead finish. Lead finish shall be solderable as defined in 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. Devices shall be marked in accordance with MIL-PRF-19500.

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

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

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 and 6.3 herein.

MIL-PRF-19500/396G

4.3 Screening (JANTX, JANTXV and JANS 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 Level
1b	Required	Required (JANTXV only)
2	Optional	Optional
3a 3b 3c (1)	Required Not Applicable Required (see 4.3.2)	Required Not Applicable Required (see 4.3.2)
4	Required	Optional
5 and 6	Required	Not Applicable
7a and 7b (3)	Required	Required
8	Required	Not Required
9	I_{CBO2} , h_{FE3} read and record	Not Applicable
10	24 hours minimum	24 hours minimum
11	I_{CBO2} ; h_{FE3} ; ΔI_{CBO2} = 100 percent of initial value or 10 nA dc, whichever is greater. Δh_{FE3} = ± 15 percent	I_{CBO2} ; h_{FE3}
12	See 4.3.1, 240 hours minimum	See 4.3.1, 80 hours minimum
13 (2)	Subgroups 2 and 3 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 10 nA dc, whichever is greater; Δh_{FE3} = ± 15 percent	Subgroups 2 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 10 nA dc, whichever is greater; Δh_{FE3} = ± 15 percent
14a, and 14b (3)	Optional	Optional
15 and 16	Not Required	Not Required

- (1) Thermal impedance may be performed any time after sealing provided temperature cycling is performed in accordance with MIL-PRF-19500, screen 3 prior to this thermal test.
- (2) PDA = 5 percent for screen 13, applies to ΔI_{CBO2} , Δh_{FE3} , I_{CBO2} , h_{FE3} . Thermal impedance ($Z_{\theta JX}$) is not required in screen 13.
- (3) Hermeticity evaluation may be performed in either step 7 or step 14.

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 (all product assurance levels);

JANS level:		JANTX and JANTXV levels			
V _{CB} = 10 V dc; P _T = 1.0 W	V _{CB} = 10 V dc; P _T = 0.5 W	V _{CB} = 30 V dc; P _T = 1.0 W	V _{CB} = 40 V dc; P _T = 1.0 W	V _{CB} = 30 V dc; P _T = 0.5 W	V _{CB} = 40 V dc; P _T = 0.5 W
2N3762, 2N3763	2N3764, 2N3765	2N3762	2N3763	2N3764	2N3765

NOTE: No heat sink or forced air cooling on the devices shall be permitted. Power burn-in conditions for "L" suffix devices are identical to their corresponding non-L suffix devices.

4.3.2 Thermal impedance (Z_{θJX} measurements). The Z_{θJX} measurements shall be performed in accordance with method 3131 of MIL-STD-750.

- a. I_M measurement current5 mA.
- b. I_H forward heating current200 mA (minimum).
- c. t_H heating time.....25 - 30 ms.
- d. t_{md} measurement delay time60 μs maximum.
- e. V_{CE} collector-emitter voltage.....10 V dc

The maximum limit for Z_{θJX} under these test conditions are :

Z_{θJX} (max) (2N3762, L, 2N3763, L = 60°C/W).

Z_{θJX} (max) (2N3764, L, 2N3765, L = 88°C/W).

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. If alternate screening is being performed in accordance with MIL-PRF-19500, a sample of screened devices shall be submitted to and pass the requirements of group A1 and group A2 inspection only (table VIb, group B, subgroup 1 is not required to be performed again if group B has already been satisfied in accordance with 4.4.2 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) of MIL-PRF-19500 and 4.4.2.1 herein. Electrical measurements (end-points) and delta requirements shall be in accordance with group A, subgroup 2 and 4.5.2 herein except for thermal impedance. See 4.4.2.2 for JAN, JANTX, and JANTXV group B testing. Electrical measurements (end-points) and delta requirements for JAN, JANTX, and JANTXV shall be after each step in 4.4.2.2 and shall be in accordance with group A, subgroup 2 and 4.5.2 herein except for thermal impedance.

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

Subgroup	Method	Conditions
B4	1037	2N3762, 2N3762L - $V_{CB} = 10 - 30$ V dc, $P_T = 1.0$ W (for 2N3762, 2N3762L, 2N3763, and 2N3763L), $P_T = 0.5$ W (for 2N3764 and 2N3765). $t_{on} = t_{off} = 3$ minutes minimum for 2,000 cycles.
B5	1027	$V_{CB} = 10 - 30$ V dc, $P_T = 1.0$ W (for 2N3762, 2N3762L, 2N3763, and 2N3763L), $P_T = 0.5$ W (for 2N3764 and 2N3765) at $T_A = +125^\circ\text{C} \pm 25^\circ\text{C}$ for 96 hours with P_T adjusted according to the chosen T_A to give an average lot. $T_J = +275^\circ\text{C}$.

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

Step	Method	Condition
1	1039	Steady-state life: Test condition B, 340 hours, $V_{CB} = 10 - 30$ V dc, $T_J = +150^\circ\text{C}$ minimum. No heat sink or forced- air cooling on devices shall be permitted. $n = 45$, $C = 0$.
2	1039	The steady-state life test of step 1 shall be extended to 1,000 hours for each die design. Samples shall be selected from a wafer lot every twelve months of wafer production. Group B step 2 shall not be required more than once for any single wafer lot. $N = 45$, $C = 0$.
3	1032	High-temperature life (non operating), $T_A = +200^\circ\text{C}$, $t = 340$ hours, $n = 22$, $C = 0$.

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 in 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 4.5.2 herein except for thermal impedance.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E.
C6	1027	2N3762, 2N3762L - $V_{CB} = 30$ V dc; adjust P_T to achieve $T_J = +150^\circ\text{C}$ minimum. 2N3763, 2N3763L - $V_{CB} = 40$ V dc; adjust P_T to achieve $T_J = +150^\circ\text{C}$ minimum. 2N3764 - $V_{CB} = 30$ V dc; adjust P_T to achieve $T_J = +150^\circ\text{C}$ minimum. 2N3765 - $V_{CB} = 40$ V dc; adjust P_T to achieve $T_J = +150^\circ\text{C}$ minimum. No heat sink or forced-air cooling on the devices shall be permitted.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E.
C6		Not applicable

4.4.3.3 Group C sample selection. Samples for subgroups in group C shall be chosen at random from any inspection 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 subgroup using a single device type enclosed in the intended package type shall be considered as complying with the requirements for that subgroup.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IX of MIL-PRF-19500, and herein. Electrical measurements (end points) and delta requirements shall be in accordance with group A, subgroup 2 and 4.5.2 herein.

4.4.4.1 Group E inspection, table IX of MIL-PRF-19500.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>	<u>Sampling plan</u>
E1	1051	Test condition C, 500 cycles.	12 devices, $c = 0$
E2	1037	$V_{CB} = 10$ V dc; $P_T = 1.0$ W (for 2N3762, 2N3762L, 2N3763, and 2N3763L), $P_T = 0.5$ W (for 2N3764 and 2N3765) at $T_A =$ Room ambient as defined in the general requirements of MIL-STD-750. $t_{on} = t_{off} = 3$ minutes minimum for 2,000 cycles.	45 devices, $c = 0$
E3, E4, E5		Not applicable.	

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 Delta requirements. Delta requirements shall be as specified below:

Step	Inspection	MIL-STD-750		Symbol	Limit
		Method	Conditions		
1	Collector-base cutoff current 2N3762, L; 2N3764 2N3763, L; 2N3765	3036	Bias condition D $V_{CB} = 20 \text{ V dc}$ $V_{CB} = 30 \text{ V dc}$	ΔI_{CB02} (1)	100 percent of initial value or $\pm 10 \text{ nA dc}$, whichever is greater.
2	Forward current transfer ratio	3076	$V_{CE} = 1.0 \text{ V dc}$; $I_C = 150 \text{ mA dc}$; pulsed see 4.5.1	Δh_{FE2} (1)	± 25 percent change from initial reading.
3	Collector to emitter voltage (saturated)	3071	$I_C = 500 \text{ mA dc}$; $I_B = 50 \text{ mA dc}$; pulsed (see 4.5.1)	$\Delta V_{CE(SAT)3}$ (2)	$\pm 50 \text{ mV dc}$ change from previous measured value

(1) Devices which exceed the group A limits for this test shall not be accepted.

(2) Applies to JANS only.

MIL-PRF-19500/396G

TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1 2/</u>						
Visual and mechanical inspection <u>3/</u>	2071	n = 45 devices, c = 0				
Solderability <u>3/ 5/</u>	2026	n = 15 leads, c = 0				
Resistance to solvents <u>3/ 4/ 5/</u>	1022	n = 15 devices, c = 0				
Temp cycling <u>3/ 5/</u>	1051	Test condition C, 25 cycles. n = 22 devices, c = 0				
Hermetic seal <u>5/</u> Fine leak Gross leak	1071	n = 22 devices, c = 0				
Electrical measurements <u>5/</u>		Group A, subgroup 2				
Bond strength <u>3/ 5/</u>	2037	Precondition T _A = + 250°C at t = 24 hours or T _A = + 300°C at t = 2 hours n = 11 wires, c = 0				
<u>Subgroup 2</u>						
Thermal Impedance 2N3762, L, 2N3763, L 2N3764, L, 2N3765, L	3131	See 4.3.2.	Z _{θJX} (max)		60 88	°C/W
Collector to base, cutoff current 2N3762, 2N3764 2N3763, 2N3765	3036	Bias condition D V _{CB} = 40 V dc V _{CB} = 60 V dc	I _{CBO1}		10	μA dc
Emitter to base, cutoff current 2N3762, 2N3764 2N3763, 2N3765	3061	Bias condition D. V _{EB} = 5 V dc	I _{EBO1}		10	μA dc
Breakdown voltage collector to emitter 2N3762, 2N3764 2N3763, 2N3765	3011	Bias condition D; I _C = 10 mA dc	V _{(BR)CEO}	40 60		V dc
Collector to base cutoff current 2N3762, 2N3764 2N3763, 2N3765	3036	Bias condition D; V _{CB} = 20 V dc V _{CB} = 30 V dc	I _{CBO2}		100	nA dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued.						
Collector to emitter cutoff current 2N3762, 2N3764 2N3763, 2N3765	3041	Bias condition A; $V_{EB} = 2.0$ V dc; $V_{CE} = 20$ V dc $V_{CE} = 30$ V dc	I_{CEX1}		100	nA dc
Emitter to base cutoff current	3061	Bias condition D; $V_{EB} = 2.0$ V dc	I_{EBO2}		200	nA dc
Forward - current transfer ratio	3076	$V_{CE} = 1.0$ V dc; $I_C = 10$ mA dc	h_{FE1}	35		
Forward - current transfer ratio	3076	$V_{CE} = 1.0$ V dc; $I_C = 150$ mA dc; pulsed (see 4.5.1)	h_{FE2}	40		
Forward - current transfer ratio	3076	$V_{CE} = 1.0$ V dc; $I_C = 500$ mA dc; pulsed (see 4.5.1)	h_{FE3}	40	140	
Forward - current transfer ratio	3076	$V_{CE} = 1.5$ V dc; $I_C = 1.0$ A dc; pulsed (see 4.5.1)	h_{FE4}			
2N3762, 2N3764 2N3763, 2N3765				30 20	120 80	
Forward - current transfer ratio	3076	$V_{CE} = 5.0$ V dc; $I_C = 1.5$ A dc; pulsed (see 4.5.1)	h_{FE5}			
2N3762, 2N3764 2N3763, 2N3765				30 20		
Collector to emitter voltage (saturated)	3071	$I_C = 10$ mA dc; $I_B = 1$ mA dc; pulsed (see 4.5.1)	$V_{CE(SAT)1}$		0.10	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 150$ mA dc; $I_B = 15$ mA dc; pulsed (see 4.5.1)	$V_{CE(SAT)2}$		0.22	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 500$ mA dc; $I_B = 50$ mA dc; pulsed (see 4.5.1)	$V_{CE(SAT)3}$		0.50	V dc
Collector to emitter voltage (saturated)	3071	$I_C = 1.0$ A dc; $I_B = 100$ mA dc; pulsed (see 4.5.1)	$V_{CE(SAT)4}$		0.90	V dc
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 10$ mA dc; $I_B = 1$ mA dc	$V_{BE(SAT)1}$		0.80	V dc
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 150$ mA dc; $I_B = 15$ mA dc; pulsed (see 4.5.1)	$V_{BE(SAT)2}$		1.0	V dc

See footnote at end of table.

TABLE I. Group A inspection - Continued.

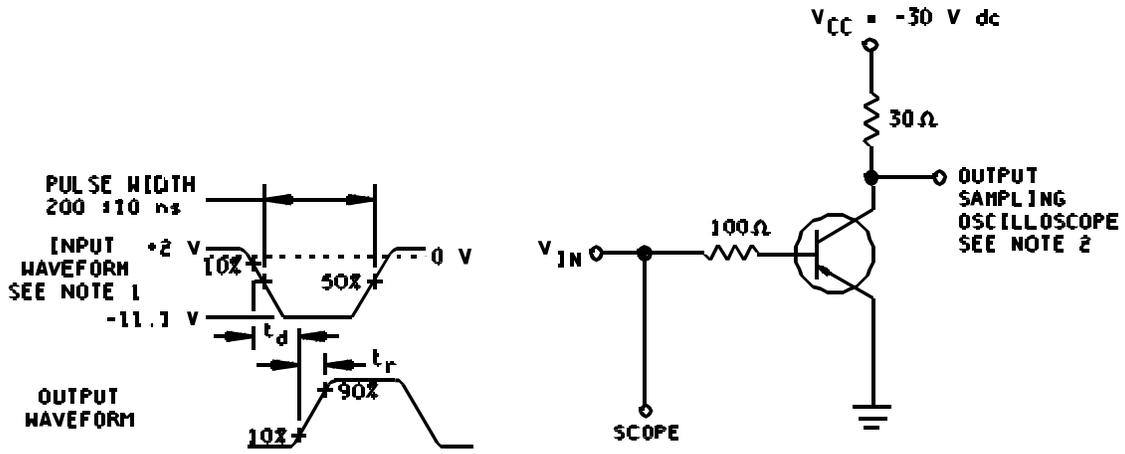
Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued.						
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 500$ mA dc; $I_B = 50$ mA dc Pulsed (see 4.5.1)	$V_{BE(SAT)3}$		1.2	V dc
Base to emitter voltage (saturated)	3066	Test condition A; $I_C = 1.0$ A dc; $I_B = 100$ mA dc Pulsed (see 4.5.1)	$V_{BE(SAT)4}$.90	1.40	V dc
<u>Subgroup 3</u>						
High - temperature operation		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current 2N3762, 2N3764 2N3763, 2N3765		Bias condition A; $V_{EB} = 2$ V dc; $V_{CE} = 20$ V dc; $V_{CE} = 30$ V dc	I_{CEX2}		150	μA dc
Low - temperature operation		$T_A = -55^\circ\text{C}$				
Forward - current transfer ratio	3076	$V_{CE} = 1.0$ V dc; $I_C = 500$ mA dc; Pulsed (see 4.5.1)	h_{FE6}	20		
<u>Subgroup 4</u>						
Magnitude of common emitter, small - signal short - circuit forward - current transfer ratio 2N3762, 2N3764 2N3763, 2N3765	3306	$V_{CE} = 10$ V dc; $I_C = 50$ mA dc; $f = 100$ MHz	$ h_{fe} $	1.8 1.5	6.0 6.0	
Open circuit output capacitance	3236	$V_{CB} = 10$ V dc; $I_E = 0$; 100 kHz $\leq f \leq 1$ MHz	C_{obo}		25	pF
Input capacitance (output open - circuited)	3240	$V_{EB} = .5$ V dc; $I_C = 0$; 100 kHz $\leq f \leq 1$ MHz	C_{ibo}		80	pF
Pulse response						
Pulse delay time	3251	See figure 3	t_d		8	ns
Pulse rise time	3251	See figure 3	t_r		35	ns
Pulse storage time	3251	See figure 4	t_s		80	ns
Pulse fall time	3251	See figure 4	t_f		35	ns

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroups 5 and 6</u> Not applicable						
<u>Subgroups 7</u> <u>5/</u> Decap internal visual (design verification)	2075	n = 1 device, c = 0				

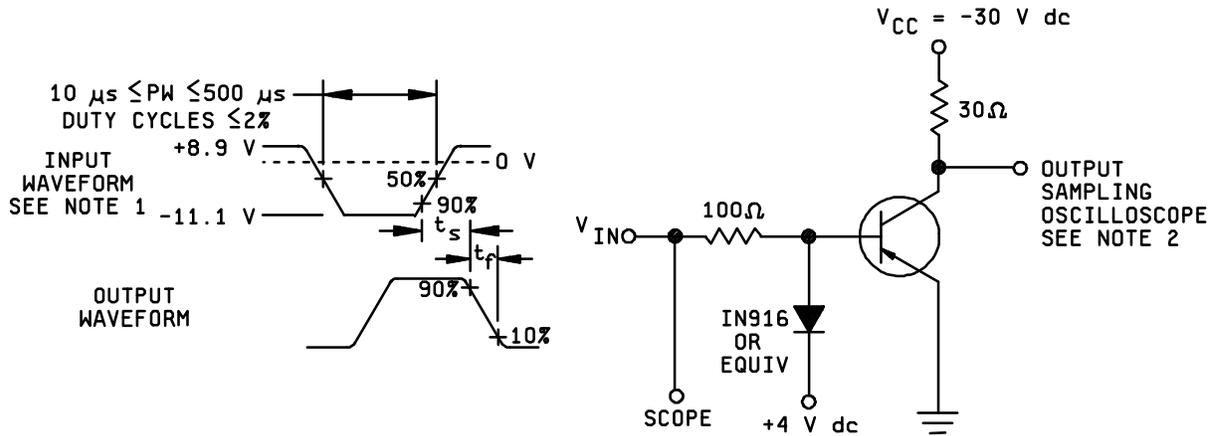
- 1/ For sampling plan, see MIL-PRF-19500. Electrical characteristics for "L" suffix devices are identical to their corresponding non- suffix devices.
- 2/ For resubmission of failed subgroup A1, double the sample size of the failed test or sequence of tests. A failure in group A, subgroup 1 shall not require retest of the entire subgroup. Only the failed test shall be rerun upon submission.
- 3/ Separate samples may be used.
- 4/ Not required for laser marked devices.
- 5/ Not required for JANS devices.



NOTES:

1. The rise time (t_r) of the applied pulse shall be ≤ 2 ns, duty cycle ≤ 2 percent, and the generator source impedance shall be 50Ω .
2. Sampling oscilloscope: $Z_{in} \geq 100$ k Ω , $C_{in} \leq 12$ pF, rise time $\leq .1$ ns.
3. $I_{B1} = -100$ mA dc.

FIGURE 3. Pulse response test circuit for t_d and t_r .



NOTES:

1. The rise time (t_r) of the applied pulse shall be ≤ 2 ns, duty cycle ≤ 2 percent, and the generator source impedance shall be 50Ω .
2. Sampling oscilloscope: $Z_{in} \geq 100$ k Ω , $C_{in} \leq 12$ pF, rise time $\leq .1$ ns.
3. $I_{B1} = +I_{B2} = -100$ mA dc.

FIGURE 4. Pulse response test circuit for t_s and t_f .

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 must specify the following:

- a. Issue of DODISS to be cited in the solicitation (see 2.2.1).
- b. The lead finish as specified (see 3.4.1).
- c. Type designation and quality assurance level.
- d. 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 Products List QPL No.19500 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, ATTN: DSCC-VQE, 3990 East Broad Street, Columbus, OH 43216-5000.

6.4 Changes from previous issue. Changes in this issue entail adding chips only.

6.5 Suppliers of JANHC and JANKC die. The qualified JANHC and JANKC suppliers with the applicable letter version (example, JANHCA2N2369A) will be identified on the QPL.

JANC ordering information	
PIN	Manufacturer
	43611
2N3762	JANHCA2N3762 JANKCA2N3762
2N3763	JANHCA2N3763 JANKCA2N3763
2N3764	JANHCA2N3764 JANKCA2N3764
2N3765	JANHCA2N3765 JANKCA2N3765

Custodians:

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

Preparing activity:

DLA - CC

(Project 5961-2289)

Review activities:

Army - MI
Navy - AS, CG, MC
Air Force - 19, 99

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

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-19500/396G	2. DOCUMENT DATE
3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, TRANSISTOR, PNP, SILICON, SWITCHING TYPES 2N3762, 2N3762L, 2N3763, 2N3763L, 2N3764, AND 2N3765 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 DSN FAX EMAIL 614-692-0510 850-0510 614-692-6939 alan_barone@dsccl.dla.mil	
c. ADDRESS Defense Supply Center Columbus, ATTN: DSCC-VAC, 3990 East Broad Street, Columbus, OH 43213-1199	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	