

The documentation and process conversion measures necessary to comply with this amendment shall be completed by 7 March, 2003.

INCH POUND
MIL-PRF-19500/182F
AMENDMENT 1
7 December 2002

PERFORMANCE SPECIFICATION

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, LOW-POWER
TYPES 2N720A, 2N720AUB, 2N1893, 2N1893S, JAN, JANTX, JANTXV,
JANHC2N720A and JANKC2N720A

This amendment forms a part of MIL-PRF-19500/182F, dated 21 June 2001 and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

1.3, add $R_{\theta JC}$ column before $R_{\theta JA}$ column, with the following values.

Type	$R_{\theta JC}$
	°C/W
2N720A	97
2N720AUB	150
2N1893	58
2N1893S	58

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1.4, $V_{CE(SAT)}$ column, add "(1)".

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FIGURE 1 table, between L_2 and TL, add:

“

Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
P	.100		2.54		
Q		.030		0.76	11

“

After note 10 add, “11. Body contour optional within zone defined by HD, CD, and Q.”.

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FIGURE 2 table, delete “h row”.

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3.7, delete and substitute: “3.7 Marking. Marking shall be in accordance with MIL-PRF-19500.”.

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After 4.2, add,

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

“4.2.2 Group E inspection. Group E inspection shall be conducted in accordance with MIL-PRF-19500 and table II herein 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 the tests specified in table II herein must be performed to maintain qualification.”

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Delete “4.3.1 and 4.3.2”, and substitute:

“4.3.1 Screening (JANHC and JANKC). Screening of JANHC and JANKC die shall be in accordance with MIL-PRF-19500, “Discrete Semiconductor Die/Chip Lot Acceptance”. As a minimum, die shall be 100-percent probed to ensure compliance with group A, subgroup 2. Burn-in duration for the JANKC level follows JANS requirements; the JANHC follows JANTX requirements.

“4.3.2 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 (see 4.5). $V_{CB} = 10 - 30$ V dc, power shall be applied to achieve $T_J = 135^\circ\text{C}$ minimum and minimum power dissipation of $P_D = 75$ percent of maximum rated P_T as defined in 1.3. NOTE: No heat sink or forced air cooling of the devices shall be permitted.

“4.3.3 Thermal impedance $Z_{\theta JX}$ measurements (for qualification only). The $Z_{\theta JX}$ measurements shall be performed in accordance with method 3131 of MIL-STD-750.

- a. I_H forward heating current: 200 mA.
- b. t_H heating time: 30 ms.
- c. I_M measuring current: 5 mA.
- d. t_{MD} measurement delay time: 60 μs maximum.
- e. V_{CE} collector - emitter voltage 10 V dc.

The maximum limit for $Z_{\theta JX} = 50^\circ\text{C/W}$.”

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4.4, delete and substitute,

“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 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).”

4.4.2, delete and substitute,

“4.4.2 Group B inspection. See 4.4.2.1 for JAN, JANTX, and JANTXV group B testing. Electrical measurements (end-points) shall be in accordance with table 1, group A, subgroup 2 herein.”

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4.4.2.1 and 4.4.2.2, delete and substitute:

“4.4.2.1 Group B inspection, (JAN, JANTX, and JANTXV). See note 1/.

<u>Step</u>	<u>Method</u>	<u>Condition</u>
1	1039	Steady-state life: Test condition B, 340 hours, $V_{CB} = 10 - 30$ V dc to achieve $T_J = +150^\circ\text{C}$ minimum using minimum 75 percent of the maximum rated power P_{T2} in accordance with 1.3. $n = 45$ devices, $c = 0$.
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, however, 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), $T_A = +200^\circ\text{C}$. $n = 22$, $c = 0$.

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

- 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.
- 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 (group B for JAN, JANTX, and JANTXV) may be pulled prior to the application of final lead finish.”

4.4.3, delete “table VI” and substitute “table VII”.

4.4.3, delete subgroups C2 and C6 and applicable information.

4.4.3.1, delete and substitute:

“4.4.3.1 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 (not applicable to the 2N720AUB).
C6	1026	Not applicable.

“4.4.3.2 Group C sample selection. Samples selected from group C inspection 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. When the final lead finish is solder or any plating prone to oxidation at high temperature, the samples for C6 life test may be pulled prior to the application of final lead finish. 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.

“4.4.4 Group E inspection. Group E inspection shall be conducted accordance with the conditions specified in table II herein.”

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TABLE I, subgroup 2, after collector-emitter saturated voltage, method 3071, add:

Inspection	Method	Conditions	Symbol	Min	Max	Unit
Collector-emitter saturated voltage	3071	$I_C = 50 \text{ mA dc}$, $I_B = 5 \text{ mA dc}$, pulsed (see 4.5.1)	$V_{CE(sat)2}$		1.2	V dc

TABLE I, subgroup 2, after base-emitter saturated voltage, method 3066, add:

Inspection	Method	Conditions	Symbol	Min	Max	Unit
Base-emitter saturated voltage	3066	$I_C = 50 \text{ mA dc}$, $I_B = 5 \text{ mA dc}$, pulsed (see 4.5.1)	$V_{BE(sat)2}$		1.2	V dc

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TABLE I, subgroup 4, small signal short circuit input impedance, symbol column, delete " h_{ie} " and substitute with " h_{ib} ".

TABLE I, subgroup 4, small signal short circuit output admittance, symbol column, delete " h_{oe} " and substitute with " h_{ob} ".

TABLE I, subgroup 4, small signal open circuit reverse voltage transfer ratio, conditions column, delete " h_{re} " and substitute with " h_{rb} ".

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TABLE II, subgroups 3, 4, and 5, delete and substitute,

Inspection	Method	Conditions	Qualification
<u>Subgroup 3</u> Not applicable			
<u>Subgroup 4</u> Thermal resistance	3131	See 4.5.2	22 devices, c = 0.
<u>Subgroup 5</u> Not applicable			

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

Preparing activity:
DLA - CC

(Project 5961-2547)

Review activities:
Army - AR, MI, SM
Navy - AS, MC
Air Force - 19, 71, 99