The documentation and process conversion measures necessary to comply with this document shall be completed by 25 January 2011.

INCH-POUND

MIL-PRF-19500/728C
25 October 2010
MIL-PRF-19500/728B
SUPERSEDING
16 December 2007

PERFORMANCE SPECIFICATION SHEET

* SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, SWITCHING,
TYPES 2N3724, 2N3724L, 2N3724UB, 2N3725, 2N3725L, 2N3725UB, JAN, JANTX, JANTXV,
JANS, JANSM, JANSD, JANSP, JANSL, JANSR, JANSF, JANHC, AND JANKC

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

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-PRF-19500.

1. SCOPE

* 1.1 Scope. This specification covers the performance requirements for NPN, silicon, switching transistors. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500 and two levels of product assurance are provided for each unencapsulated device type. RHA level designators “M”, “D”, “P“, “L” “R”, and “F’ are appended to the device prefix to identify devices which have passed RHA requirements.

1.2 Physical dimensions. See figure 1 (TO-5 and TO-39), figure 2 (UB), and figure 3 (JANHC and JANKC).

1.3 Maximum ratings unless otherwise specified T_A = +25°C.

Types	I_C	V_{CBO}	V_{CEO}	V_{EBO}	T_J and T_{STG}
	A dc	V dc	V dc	V dc	°C
2N3724, L, UB	1	50	30	6.0	-65 to +200
2N3725, L, UB	1	80	50	6.0	-65 to +200

Types	P_T T_A = +25°C (1)	P_T T_C = +25°C (1)	P_T $T_{SP(IS)}$ = +25°C (1)	$R_{\theta JA}$ (2) (3)	$R_{\theta JC}$ (2) (3)	$R_{\theta JSP(IS)}$ (2) (3)
	W	W	W	°C/W	°C/W	°C/W
2N3724	0.800	5	N/A	175	35	N/A
2N3725	0.800	5	N/A	175	35	N/A
2N3724L	0.800	5	N/A	175	35	N/A
2N3725L	0.800	5	N/A	175	35	N/A
2N3724UB	0.500	N/A	1.5	350	N/A	90
2N3725UB	0.500	N/A	1.5	350	N/A	90

(1) For derating, see figures 4, 5, 6, and 7.
(2) See 3.3.
(3) For thermal impedance curves, see figures 8, 9 10, and 11.

* Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dscc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.daps.dla.mil .

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

Types	h_{FE1} I_C = 100 mA dc V_{CE} = 1 V dc		h_{FE2} I_C = 300 mA dc V_{CE} = 1 V dc		h_{FE3} I_C = 500 mA dc V_{CE} = 1.0 V dc		$\lvert h_{fe} \rvert$ f = 100 MHz V_{CE} = 10 V dc I_C = 50 mA dc		C_{obo} 100 kHz ≤ f ≤ 1 MHz V_{CB} = 10 V dc I_E = 0	
	Min	Max	Min	Max	Min	Max	Min	Max	Min pF	Max pF
2N3724, L	60	240	40		35		3.0			12
2N3724UB	60	240	40		35		3.0			12
2N3725, L	60	240	35		30		3.0			12
2N3725UB	60	240	35		30		3.0			12

Types	$V_{CE(sat)2}$ (1) I_C = 100 mA dc I_B = 10 mA dc		$V_{CE(sat)1}$ (1) I_C = 10 mA dc I_B = 1.0 mA dc		$V_{BE(sat)1}$ (1) I_C = 10 mA dc I_B = 1.0 mA dc		$V_{BE(sat)2}$ (1) I_C = 100 mA dc I_B = 10 mA dc		Switching (saturated) t_{on} See figure 12		Switching (saturated) t_{off} See figure 13	
	V dc Min	V dc Max	V dc Min	V dc Max	V dc Min	V dc Max	V dc Min	V dc Max	ns Min	ns Max	ns Min	ns Max
2N3724, L, UB,		.2		.25		.76		.86		50		60
2N3725, L, UB		.26		.25		.76		.86		50		60

(1) Pulsed see 4.5.1.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 of documents cited in sections 3, 4, or 5 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

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

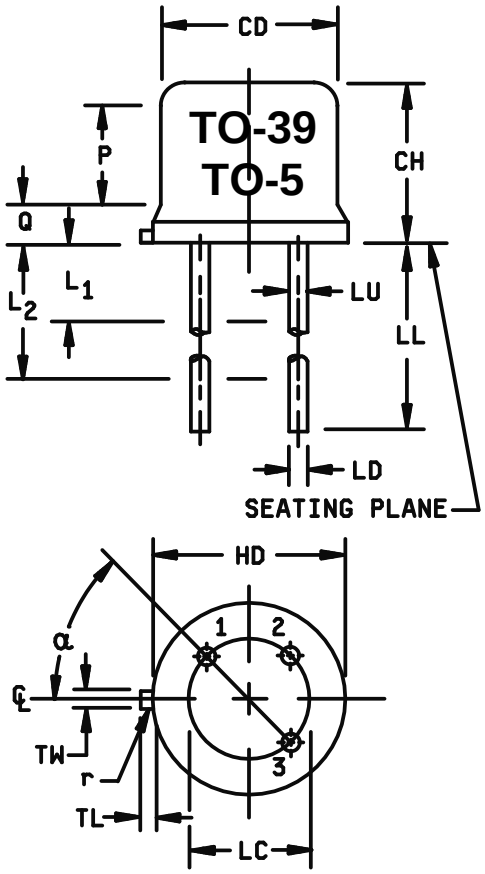
DEPARTMENT OF DEFENSE STANDARDS

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

* (Copies of these documents are available online at https://assist.daps.dla.mil/quicksearch or https://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

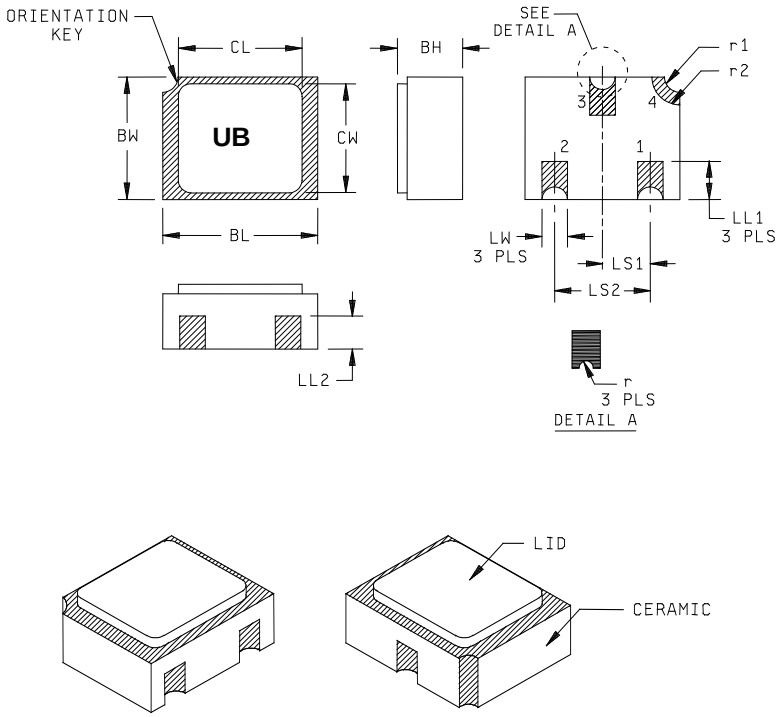
* 2.3 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.240	.260	6.10	6.60	
HD	.335	.370	8.51	9.40	
LC	.200 TP		5.08 TP		7
LD	.016	.019	0.41	0.48	8,9
LL	See note 14				
LU	.016	.019	0.41	0.48	8,9
L_1		.050		1.27	8,9
L_2	.250		6.35		8,9
P	.100		2.54		7
Q		.030		0.76	5
TL	.029	.045	0.74	1.14	3,4
TW	.028	.034	0.71	0.86	3
r		.010		0.25	10
α	45° TP		45° TP		7



NOTES:
1. Dimensions are in inches.
2. Millimeters 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. CD shall not vary more than .010 inch (0.25 mm) in zone P. This zone is controlled for automatic handling.
7. 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.
8. 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.
9. All three leads.
10. The collector shall be internally connected to the case.
11. Dimension r (radius) applies to both inside corners of tab.
12. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.
13. Lead 1 = emitter, lead 2 = base, lead 3 = collector.
14. For L suffix devices (TO-5), dimension LL = 1.5 inches (38.10 mm) min. and 1.75 inches (44.45 mm) max. For non-L suffix types (TO-39), dimension LL = .5 inch (12.70 mm) min. and .750 inch (19.05 mm) max.

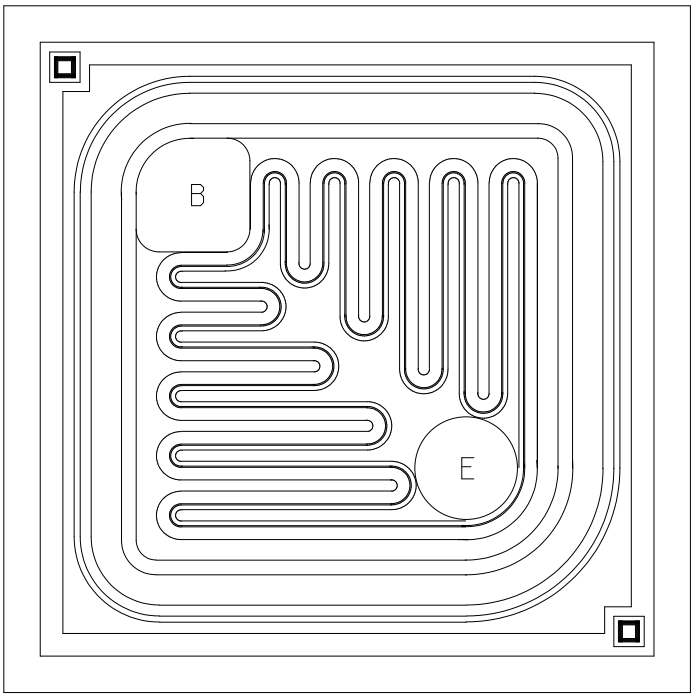
FIGURE 1. Physical dimensions for 2N3724 and 2N3725 (TO-5 and TO-39).



Symbol	Dimensions				Note	Symbol	Dimensions				Note
	Inches		Millimeters				Inches		Millimeters		
	Min	Max	Min	Max			Min	Max	Min	Max	
BH	.046	.056	1.17	1.42		LS_1	.035	.039	0.89	0.99	
BL	.115	.128	2.92	3.25		LS_2	.071	.079	1.80	2.01	
BW	.085	.108	2.16	2.74		LW	.016	.024	0.41	0.61	
CL	.115	.128	2.92	3.25		r		.008		0.20	
CW	.085	.108	2.16	2.74		r1		.012		0.31	
LL1	.022	.038	0.56	0.97		r2		.022		0.56	
LL2	.017	.035	0.43	0.89							

NOTES:
1. Dimensions are in inches.
2. Millimeters equivalents are given for general information only.
3. Hatched areas on package denote metallized areas
4. Pad 1 = Base, Pad 2 = Emitter, Pad 3 = Collector, Pad 4 = Shielding connected to the lid.
5. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

* FIGURE 2. Physical dimensions, surface mount 2N3724UB and 2N3725UB (UB version).



NOTES:

1.	Die size:	.025 x .025 inch ±.002 inch (0.635 mm x 0.635 mm).
2.	Die thickness:	.010 ±.0015 inch (0.254 mm ±0.0381 mm).
3.	Base bonding pad:	.004 x .004 inch (0.1016 mm x 0.1016 mm).
4.	Emitter bonding pad:	.004 x .004 inch (0.1016 mm x 0.1016 mm).
5.	Back metal:	Gold, 5,000 Å.
6.	Top metal:	Aluminum, 15,000Å minimum, 18,000 Å nominal.
7.	Back side:	Collector.
8.	Glassivation:	Si_3N_4, 8,000 Å nominal.

FIGURE 3. JANHC and JANKC die dimensions.

3. REQUIREMENTS

3.1 General. The individual item requirements shall be as specified in MIL-PRF-19500 and as modified herein.

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 manufacturers list 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.

PCB	Printed circuit board.
$R_{\theta JA}$	Thermal resistance junction to ambient.
$R_{\theta JC}$	Thermal resistance junction to case.
$R_{\theta JSP(IS)}$	Thermal resistance junction to solder pads (infinite sink mount to PCB).

3.4 Interface and physical dimensions. The interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1, 2, and 3 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 Radiation hardness assurance (RHA). Radiation hardness assurance requirements, PIN designators, and test levels shall be as defined in MIL-PRF-19500.

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

* 3.7 Electrical test requirements. The electrical test requirements shall be as specified in table I.

* 3.8 Marking. Marking shall be in accordance with MIL-PRF-19500, except for the UB suffix package. Marking on the UB package shall consist of an abbreviated part number, the date code, and the manufacturers symbol or logo. The prefixes JAN, JANTX, JANTXV, and JANS can be abbreviated as J, JX, JV, and JS respectively. The "2N" prefix and the "UB" suffix can also be omitted. The radiation hardened designator M, D, P, L, R, F, G, or H shall immediately precede (or replace) the device “2N” identifier (depending upon degree of abbreviation required).

* 3.9 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 and II).

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

* 4.2.1 Group E qualification. Group E inspection shall be performed for qualification or re-qualification only. In case qualification was awarded to a prior revision of the specification sheet that did not request the performance of table III tests, the tests specified in table III herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

4.3 Screening (JANS, JANTX, and JANTXV levels only). Screening shall be in accordance with table E-IV 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 E-IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
2	Optional	Optional
3a 3b 3c	Required Not applicable Thermal impedance (transient), method 3131 of MIL-STD-750 (1)	Required Not applicable Thermal impedance (transient), method 3131 of MIL-STD-750 (1)
4	Required	Optional
5	Required	Not applicable
8	Required	Not required
9	I_{CBO1}, h_{FE1}	Not applicable
10	48 hours minimum	48 hours minimum
11	I_{CBO1}; h_{FE1}; ΔI_{CBO1} = 100 percent of initial value or 5 nA dc, whichever is greater; Δh_{FE1} = ±15 percent	I_{CBO1}; h_{FE1}
12	See 4.3.2	See 4.3.2
13	Subgroups 2 and 3 of table I herein; ΔI_{CBO1} = 100 percent of initial value or 5 nA dc, whichever is greater; Δh_{FE1} = ±15 percent	Subgroup 2 of table I herein; ΔI_{CBO1} = 100 percent of initial value or 5 nA dc, whichever is greater; Δh_{FE1} = ±15 percent
15	Required	Not required
16	Required	Not required

(1) Shall be performed anytime after temperature cycling, screen 3a; and does not need to be repeated in screening requirements.

4.3.2 Power burn-in conditions. Power burn-in conditions are as follows: V_{CB} = 10 - 30 V dc. Power shall be applied to achieve T_J = +135°C minimum using a minimum P_D = 75 percent of P_T maximum, T_A ambient rated as defined in 1.3. With approval of the qualifying activity and preparing activity, alternate burn-in criteria (hours, bias conditions, T_J, and mounting conditions) may be used for JANTX and JANTXV quality levels. A justification demonstrating equivalence is required. In addition, the manufacturing site's burn-in data and performance history will be essential criteria for burn-in modification approval.

4.3.3 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3131 of MIL-STD-750 using the guidelines in that method for determining I_M, I_H, t_H, t_{MD} (and V_C where appropriate). The thermal impedance limit used in screen 3c shall comply with the thermal impedance graph on figures 8, 9, 10, and 11 (less than or equal to the curve value at the same t_H time) and/or shall be less than the process determined statistical maximum limit as outlined in method 3131.

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 table I, subgroup 1, and 2 inspection only (table E-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).

4.4.1 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 tests and conditions specified for subgroup testing in table E-VIa (JANS) of MIL-PRF-19500 and 4.4.2.1. Electrical measurements (end-points) and delta requirements shall be in accordance with table I, subgroup 2 and 4.5.3 herein: delta requirements only apply to subgroups B4 and B5. 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 table I, subgroup 2 and 4.5.3 herein.

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

Subgroup	Method	Condition
B4	1037	V_{CB} = 10 V dc.
B5	1027	V_{CB} = 10 V dc; $P_D \geq$ 100 percent of maximum rated P_T (see 1.3). (NOTE: If a failure occurs, resubmission shall be at the test conditions of the original sample.) Option 1: 96 hours minimum sample size in accordance with MIL-PRF-19500, table E-VIa, 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 a T_J = +225°C minimum.

4.4.2.2 Group B inspection, (JAN, JANTX, and JANTXV). Separate samples may be used for each step. In the event of a lot failure, the resubmission requirements of MIL-PRF-19500 shall apply. In addition, all catastrophic failures during CI shall be analyzed to the extent possible to identify root cause and corrective action. Whenever a failure is identified as wafer lot or wafer processing related, the entire wafer lot and related devices assembled from the wafer lot shall be rejected unless an appropriate determined corrective action to eliminate the failure mode has been implemented and the devices from the wafer lot are screened to eliminate the failure mode.

Step	Method	Condition
1	1026	Steady-state life: 1,000 hours minimum, V_{CB} = 10 V dc, power shall be applied to achieve T_J = +150°C minimum using a minimum of P_D = 75 percent of maximum rated P_T as defined in 1.3. n = 45 devices, c = 0. The sample size may be increased and the test time decreased as long as the devices are stressed for a total of 45,000 device hours minimum, and the actual time of test is at least 340 hours.
2	1048	Blocking life, T_A = +150°C, V_{CB} = 80 percent of rated voltage, 48 hours minimum. n = 45 devices, c = 0.
3	1032	High-temperature life (non-operating), t = 340 hours, T_A = +200°C. 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. Shall be chosen from an inspection lot that has been submitted to and passed table I, 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 test and conditions specified for subgroup testing in table E-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 table I, subgroup 2 and 4.5.3 herein; delta requirements only apply to subgroup C6.

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

Subgroup	Method	Condition
C2	2036	Test condition E; (not applicable for UB devices).
C5	3131	$R_{\theta JA}$ and $R_{\theta JC}$ only, as applicable (see 1.3) and applied thermal impedance curves.
C6	1026	1,000 hours, V_{CB} = 10 V dc, power and ambient temperature shall be applied to the device to achieve T_J = +150°C minimum, and minimum power dissipation of 75 percent of max rated P_T (see 1.3 herein); n = 45, c = 0. The sample size may be increased and the test time decreased so long as the devices are stressed for a total of 45,000 device hours minimum, and the actual time of test is at least 340 hours.

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

Subgroup	Method	Condition
C2	2036	Test condition E; not applicable for UB devices.
C5	3131	$R_{\theta JA}$ and $R_{\theta JC}$ only, as applicable (see 1.3) and applied thermal impedance curves.
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 table I tests herein 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 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 D inspection. Conformance inspection for hardness assured JANS types shall include the group D tests specified in table II herein. These tests shall be performed as required in accordance with MIL-PRF-19500 and method 1019 of MIL-STD-750, for total ionizing dose or method 1017 of MIL-STD-750 for neutron fluence as applicable (see 6.2 herein), except group D, subgroup 2 may be performed separate from other subgroups. Group D inspection may also be performed ahead of the screening lot using die selected in accordance with MIL-PRF-19500 and related documents. Alternate package options may also be substituted for the testing provided there is no adverse effect to the fluence profile.

* 4.4.5 Group E inspection. Group E inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-IX of MIL-PRF-19500 and as specified in table III herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with the applicable steps of 4.5.3.

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

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

Step	Inspection	MIL-STD-750		Symbol	Limit	Unit
		Method	Conditions			
1	Collector-base cutoff current	3036	Bias condition D, V_{CB} = 40 V dc	ΔI_{CB01} (1)	100 percent of initial value or 8 nA dc, whichever is greater.	
2	Forward current transfer ratio	3076	V_{CE} = 1 V dc; I_C = 100 mA dc; pulsed see 4.5.1	Δh_{FE1} (1)	±25 percent change from initial reading.	

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

* TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 1 2/						
Visual and mechanical Examination 3/	2071	n = 45 devices, c = 0				
Solderability 3/ 4/	2026	n = 15 leads, c = 0				
Resistance to solvents 3/ 4/ 5/	1022	n = 15 devices, c = 0				
Temp cycling 3/ 4/	1051	Test condition C, 25 cycles. n = 22 devices, c = 0				
Hermetic seal 4/ 6/ Fine leak Gross leak	1071	n = 22 devices, c = 0				
Electrical measurements 4/		Table I, subgroup 2				
Bond strength 3/ 4/	2037	Precondition T_A = +250°C at t = 24 hours or T_A = +300°C at t = 2 hours n = 11 wires, c = 0				
Decap internal visual (design verification) 4/	2075	n = 4 devices, c = 0				
Subgroup 2						
* Thermal impedance 7/	3131	See 4.3.3	$Z_{\theta JX}$			°C/W
Collector to base cutoff current	3036	Condition D. V_{CB} = 40 V dc, I_E = 0 mA dc	I_{CBO1}		100	nA dc
Emitter to base cutoff current	3061	Condition D. $V_{(BR)EBO}$ = 4 V dc	I_{EBO}		10	nA dc
Collector to base cutoff current	3036	Bias condition D; I_E = 0 mA dc	I_{CBO2}			µA dc
2N3724, L, 2N3724UB		V_{CB} = 50 V dc			10	
2N3725, L, 2N3725UB		V_{CB} = 80 V dc			10	
Forward-current transfer ratio	3076	V_{CE} = 1 V dc; I_C = 100 mA dc	h_{FE1}	60	240	
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 300 mA dc	h_{FE2}			
2N3724, L, 2N3724UB				40		
2N3725, L, 2N3725UB				35		
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 500 mA dc	h_{FE3}			
2N3724, L, 2N3724UB				35		
2N3725, L, 2N3725UB				30		

See footnotes 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} = 5 V dc; I_C = 1 A dc; pulsed (see 4.5.1)	h_{FE4}			
2N3724, L, 2N3724UB				30		
2N3725, L, 2N3725UB				25		
Forward-current transfer ratio	3076	V_{CE} = 1 V dc; I_C = 10 mA dc; pulsed (see 4.5.1)	h_{FE5}	30		
Forward-current transfer ratio	3076	V_{CE} = 2 V dc; I_C = 800 mA dc; pulsed (see 4.5.1)	h_{FE6}			
2N3724, L, 2N3724UB				25		
2N3725, L, 2N3725UB				20		
Collector-emitter saturation voltage	3071	I_C = 10 mA dc; I_B = 1.0 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)1}$			
2N3724, L, 2N3724UB					0.25	V dc
2N3725, L, 2N3725UB					0.25	V dc
Collector-emitter saturation voltage	3071	I_C = 100 mA dc; I_B = 10 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)2}$			
2N3724, L, 2N3724UB					0.2	V dc
2N3725, L, 2N3725UB					0.26	V dc
Collector-emitter saturation voltage	3071	I_C = 300 mA dc; I_B = 30 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)3}$			
2N3724, L, 2N3724UB					0.32	V dc
2N3725, L, 2N3725UB					0.4	V dc
Collector-emitter saturation voltage	3071	I_C = 500 mA dc; I_B = 50 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)4}$			
2N3724, L, 2N3724UB					0.42	V dc
2N3725, L, 2N3725UB					0.52	V dc
Collector-emitter saturation voltage	3071	I_C = 800 mA dc; I_B = 80 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)5}$			
2N3724, L, 2N3724UB					0.65	V dc
2N3725, L, 2N3725UB					0.8	V dc
Collector-emitter saturation voltage	3071	I_C = 1 A dc; I_B = 100 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)6}$			
2N3724, L, 2N3724UB					0.75	V dc
2N3725, L, 2N3725UB					0.95	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 10 mA dc; I_B = 1 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)1}$			
2N3724, L, 2N3724UB					0.76	V dc
2N3725, L, 2N3725UB					0.76	V 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	
Subgroup 2 - Continued						
Base-emitter saturation voltage	3066	Test condition A; I_C = 100 mA dc; I_B = 10 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)2}$			
2N3724, L, 2N3724UB					0.86	V dc
2N3725, L, 2N3725UB					0.86	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 300 mA dc; I_B = 30 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)3}$		1.1	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 500 mA dc; I_B = 50 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)4}$	.8	1.1	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 800 mA dc; I_B = 80 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)5}$		1.5	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 1 A dc; I_B = 100 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)6}$		1.7	V dc
Subgroup 3						
High temperature operation		T_A = +150°C				
Collector to base cutoff current	3036	Bias condition D;	I_{CBO3}			
2N3724, L, 2N3724UB		V_{CB} = 80 V dc for 2N3725			120	µA dc
2N3725, L, 2N3725UB		V_{CB} = 50 V dc for 2N3724			120	µA dc
Low temperature operation		T_A = -55°C				
Forward-current transfer ratio	3076	V_{CE} = 2 V dc; I_C = 800 mA dc	h_{FE7}			
2N3724, L, 2N3724UB				15		
2N3725, L, 2N3725UB				10		
Forward-current transfer ratio	3076	V_{CE} = 5 V dc, I_C = 1 A dc	h_{FE8}			
2N3724, L, 2N3724UB				15		
2N3725, L, 2N3725UB				10		

See footnotes at end of table.

* TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 4						
Magnitude of small-signal short- circuit forward current transfer ratio	3306	V_{CE} = 10 V dc; I_C = 50 mA dc; f = 100 MHz	$\lvert h_{fe} \rvert$	3.0		
Open circuit output capacitance	3236	V_{CB} = 10 V dc; I_E = 0; 100 kHz ≤ f ≤ 1 MHz	C_{obo}		12	pF
Input capacitance (output open- circuited)	3240	V_{EB} = -0.5 V dc; I_C = 0; 100 kHz ≤ f ≤ 1 MHz	C_{ibo}		55	pF
Switching time	3251					
Turn-on delay time		V_{CC} = 30 V dc, I_{CS} = 500 mA dc, I_{B1} = 50 mA dc, $V_{BE\ (off)}$ = -3.8 V dc. See figure 12.				
2N3724, L, 2N3724UB 2N3725, L, 2N3725UB			t_{on}		50	ns
Turn-off time		I_C = 500 mA dc, I_{B1} = 50 mA dc, I_{B2} = -50 mA dc. See figure 13.	t_{off}		60	ns
Subgroup 5		T_A = +25°C				
Safe operating area	3051	tp = 10 ms, (For TO-5 and TO-39 see figures 14 ad 15) (For UB see figures 16 and 17)				
Test 1						
2N3724 2N3724L 2N3725, 2N3725L		Vce = 7V, Ic = .8 A				
2N3724UB and 2N3725UB		Vce = 11V, Ic = .5 A				
Test 2						
2N3724 2N3724L 2N3725, 2N3725L 2N3724UB and 2N3725UB		Vce = 20 V, Ic = .25 A				
Test 3						
2N3724 2N3724L, 2N3724UB		Vce = 30 V, Ic = .11 A				
2N3725, 2N3725L 2N3725UB		Vce = 50 V, Ic = .04 A				

See footnotes at end of table.

* TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 6 Not required						

1/ For sampling plan see MIL-PRF-19500.
2/ For resubmission of failed in table I, subgroup 1, double the sample size of the failed test or sequence of tests. A failure in table I, 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 JANS devices.
5/ Not required for laser marked devices.
6/ This hermetic seal test is an end-point to temp cycling in addition to electrical measurements.
7/ This test required for the following end-point measurements only:
Group B, step 1 of 4.4.2.2 herein (JAN, JANTX, and JANTXV).
Group B, subgroups 3, 4, and 5 (JANS).
Group C, subgroup 2 and 6.
Group E, subgroup 1 and 2.

* TABLE II. Group D inspection and end-point limits.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Neutron irradiation	1017	Neutron exposure V_{CES} = 0 V				
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 40 Vdc, I_E = 0 mA dc	I_{CBO1}		200	ηA dc
Emitter to base cutoff current	3061	Bias condition D; $V_{(BR)EBO}$ = 4 V dc	I_{EBO}		20	ηA dc
Collector to base cutoff current	3036	Bias condition D; I_E = 0 mA dc	I_{CBO2}			
2N3724, L, 2N3724UB		V_{CB} = 50 Vdc			20	µA dc
2N3725, L, 2N3725UB		V_{CB} = 80 Vdc			20	µA dc
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 100 mA dc	h_{FE1}	[30]	240	
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 300 mA dc	h_{FE2}			
2N3724, L, 2N3724UB				[20]		
2N3725, L, 2N3725UB				[17.5]		
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 500 mA dc	h_{FE3}			
2N3724, L, 2N3724UB				[17.5]		
2N3725, L, 2N3725UB				[15]		
Forward-current transfer ratio	3076	V_{CE} = 5 V dc, I_C = 1.0 A dc; pulsed (see 4.5.1)	h_{FE4}			
2N3724, L, 2N3724UB				[15]		
2N3725, L, 2N3725UB				[12.5]		
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 10 mA dc; pulsed (see 4.5.1)	h_{FE5}	[15]		
Forward-current transfer ratio	3076	V_{CE} = 2 V dc, I_C = 800 mA dc; pulsed (see 4.5.1)	h_{FE6}			
2N3724, L, 2N3724UB				[12.5]		
2N3725, L, 2N3725UB				[10]		
Collector-emitter saturated voltage	3071	I_C = 10 mA dc, I_B = 1.0 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)1}$			
2N3724, L, 2N3724UB					0.29	V dc
2N3725, L, 2N3725UB					0.29	V dc
Collector-emitter saturated voltage	3071	I_C = 100 mA dc, I_B = 10 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)2}$			
2N3724, L, 2N3724UB					0.23	V dc
2N3725, L, 2N3725UB					0.30	V dc

See footnotes at end of table.

* TABLE II. Group D inspection and end-point limits - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1 - Continued.						
Collector-emitter saturated voltage	3071	I_C = 300 mA dc, I_B = 30 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)3}$			
2N3724, L, 2N3724UB					0.37	V dc
2N3725, L, 2N3725UB					0.46	V dc
Collector-emitter saturated voltage	3071	I_C = 500 mA dc, I_B = 50 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)4}$			
2N3724, L, 2N3724UB					0.48	V dc
2N3725, L, 2N3725UB					0.60	V dc
Collector-emitter saturated voltage	3071	I_C = 800 mA dc, I_B = 80 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)5}$			
2N3724, L, 2N3724UB					0.75	V dc
2N3725, L, 2N3725UB					0.92	V dc
Collector-emitter saturated voltage	3071	I_C = 1.0 A dc, I_B = 100 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)6}$			
2N3724, L, 2N3724UB					0.86	V dc
2N3725, L, 2N3725UB					1.09	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 10 mA dc, I_B = 1 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)1}$			
2N3724, L, 2N3724UB					0.87	V dc
2N3725, L, 2N3725UB					0.87	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 100 mA dc, I_B = 10 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)2}$			
2N3724, L, 2N3724UB					0.99	V dc
2N3725, L, 2N3725UB					0.99	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 300 mA dc, I_B = 30 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)3}$		1.27	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 500 mA dc, I_B = 50 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)4}$	0.8	1.27	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 800 mA dc, I_B = 80 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)5}$		1.73	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 1.0 A dc, I_B = 100 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)6}$		1.96	V dc

See footnote at end of table.

* TABLE II. Group D inspection and end-point limits - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 2						
Steady-state total dose irradiation	1019					
2N3724, L, 2N3724UB		Gamma exposure V_{ECS} = 24 V				
2N3725, L, 2N3725UB		Gamma exposure V_{ECS} = 40 V				
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 40 Vdc, I_E = 0 mA dc	I_{CBO1}		200	ηA dc
Emitter to base cutoff current	3061	Bias condition D; $V_{(BR)EBO}$ = 4 V dc	I_{EBO}		20	ηA dc
Collector to base cutoff current	3036	Bias condition D; I_E = 0 mA dc	I_{CBO2}			
2N3724, L, 2N3724UB		V_{CB} = 50 Vdc			20	µA dc
2N3725, L, 2N3725UB		V_{CB} = 80 Vdc			20	µA dc
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 100 mA dc	h_{FE1}	[30]	240	
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 300 mA dc	h_{FE2}			
2N3724, L, 2N3724UB				[20]		
2N3725, L, 2N3725UB				[17.5]		
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 500 mA dc	h_{FE3}			
2N3724, L, 2N3724UB				[17.5]		
2N3725, L, 2N3725UB				[15]		
Forward-current transfer ratio	3076	V_{CE} = 5 V dc, I_C = 1.0 A dc; pulsed (see 4.5.1)	h_{FE4}			
2N3724, L, 2N3724UB				[15]		
2N3725, L, 2N3725UB				[12.5]		
Forward-current transfer ratio	3076	V_{CE} = 1 V dc, I_C = 10 mA dc; pulsed (see 4.5.1)	h_{FE5}	[15]		
Forward-current transfer ratio	3076	V_{CE} = 2 V dc, I_C = 800 mA dc; pulsed (see 4.5.1)	h_{FE6}			
2N3724, L, 2N3724UB				[12.5]		
2N3725, L, 2N3725UB				[10]		
Collector-emitter saturated voltage	3071	I_C = 10 mA dc, I_B = 1.0 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)1}$			
2N3724, L, 2N3724UB					0.29	V dc
2N3725, L, 2N3725UB					0.29	V dc
Collector-emitter saturated voltage	3071	I_C = 100 mA dc, I_B = 10 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)2}$			
2N3724, L, 2N3724UB					0.23	V dc
2N3725, L, 2N3725UB					0.30	V dc

See footnotes at end of table.

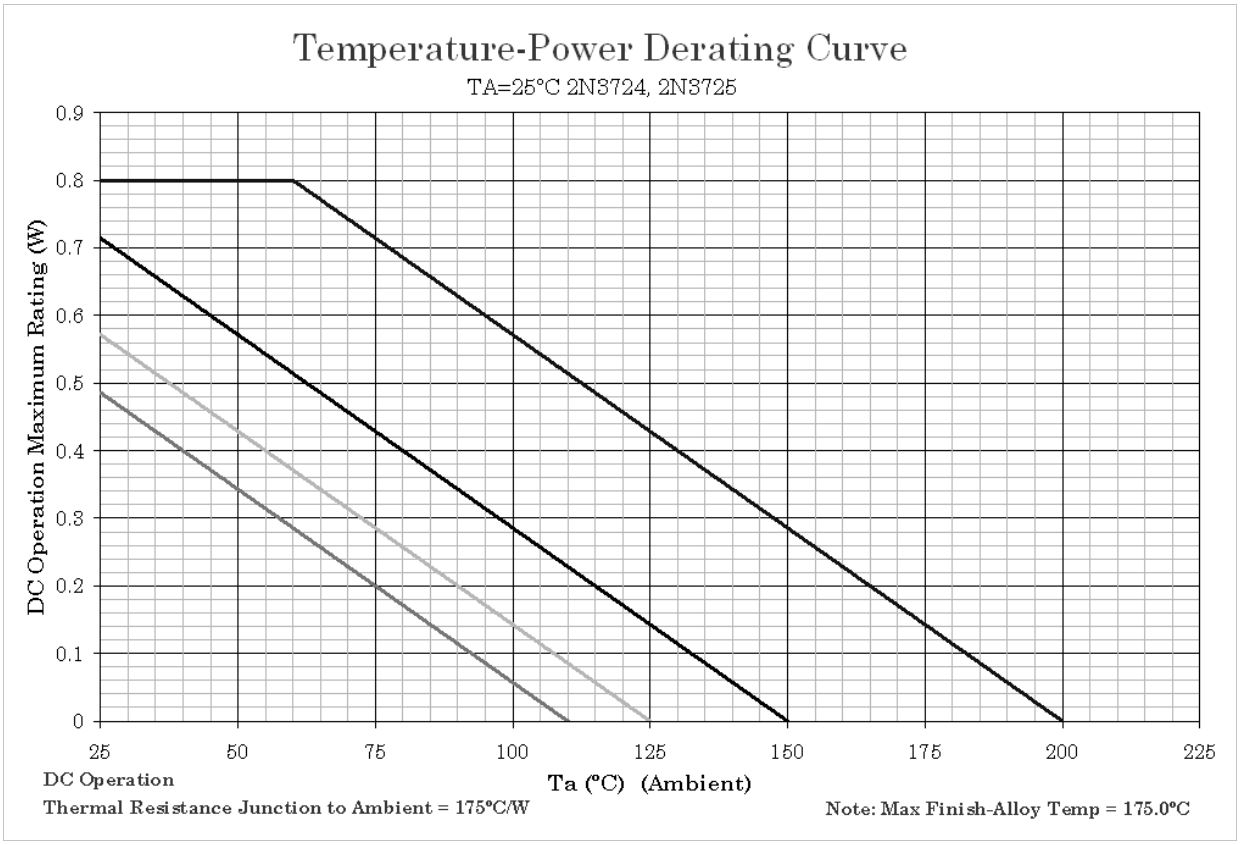
* TABLE II. Group D inspection and end-point limits - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 2 - Continued.						
Collector-emitter saturated voltage	3071	I_C = 300 mA dc, I_B = 30 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)3}$			
2N3724, L, 2N3724UB					0.37	V dc
2N3725, L, 2N3725UB					0.46	V dc
Collector-emitter saturated voltage	3071	I_C = 500 mA dc, I_B = 50 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)4}$			
2N3724, L, 2N3724UB					0.48	V dc
2N3725, L, 2N3725UB					0.60	V dc
Collector-emitter saturated voltage	3071	I_C = 800 mA dc, I_B = 80 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)5}$			
2N3724, L, 2N3724UB					0.75	V dc
2N3725, L, 2N3725UB					0.92	V dc
Collector-emitter saturated voltage	3071	I_C = 1.0 A dc, I_B = 100 mA dc, pulsed (see 4.5.1)	$V_{CE(sat)6}$			
2N3724, L, 2N3724UB					0.86	V dc
2N3725, L, 2N3725UB					1.09	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 10 mA dc, I_B = 1 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)1}$			
2N3724, L, 2N3724UB					0.87	V dc
2N3725, L, 2N3725UB					0.87	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 100 mA dc, I_B = 10 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)2}$			
2N3724, L, 2N3724UB					0.99	V dc
2N3725, L, 2N3725UB					0.99	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 300 mA dc, I_B = 30 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)3}$		1.27	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 500 mA dc, I_B = 50 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)4}$	0.8	1.27	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 800 mA dc, I_B = 80 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)5}$		1.73	V dc
Base-emitter saturated voltage	3066	Test condition A, I_C = 1.0 A dc, I_B = 100 mA dc, pulsed (see 4.5.1)	$V_{BE(sat)6}$		1.96	V dc

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

* TABLE III. Group E inspection (all quality levels) - for qualification or re-qualification only.

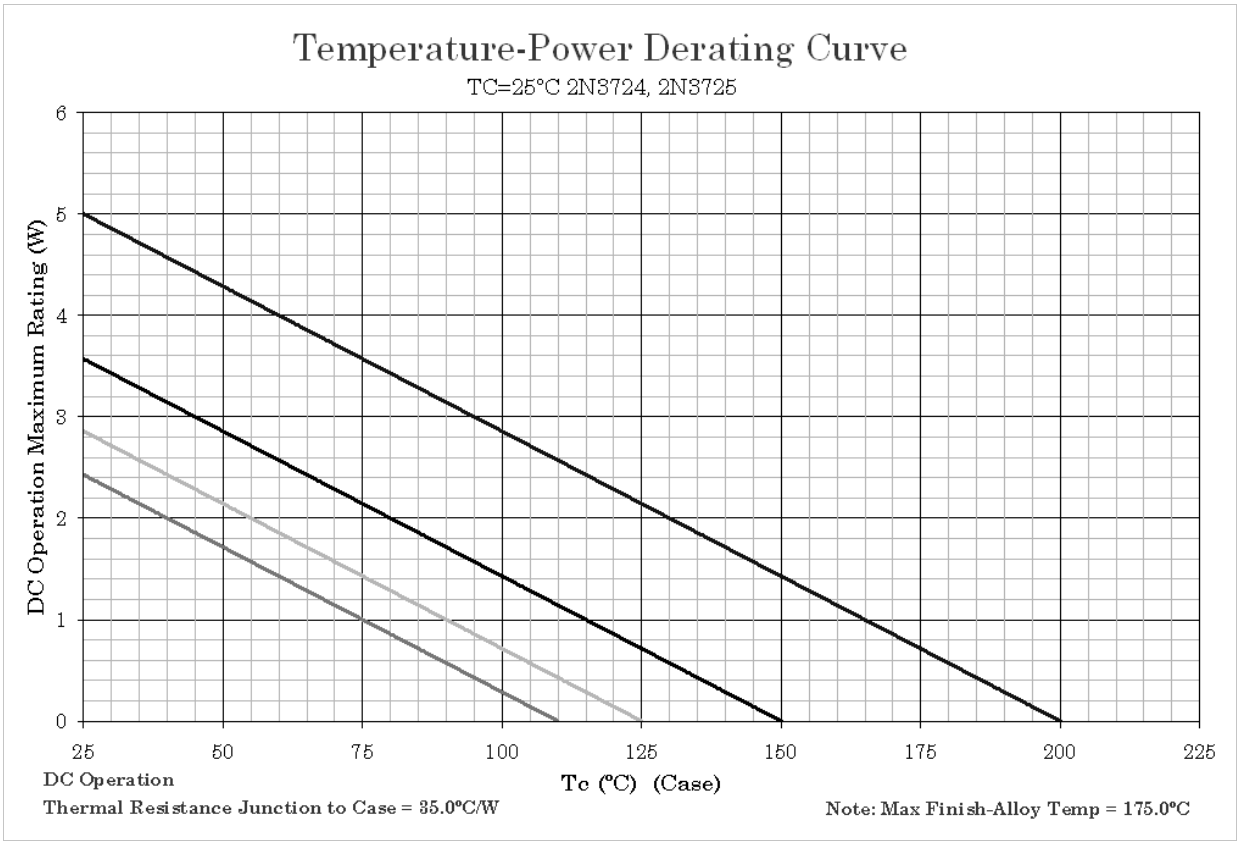
Inspection	MIL-STD-750		Qualification
	Method	Conditions	
Subgroup 1			45 devices c = 0
Temperature cycling (air to air)	1051	Test condition C, 500 cycles	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See table I, subgroup 2 and 4.5.3 herein.	
Subgroup 2			45 devices c = 0
Intermittent life	1037	Intermittent operation life: V_{CB} = 10 V dc, 6,000 cycles. Adjust device current, or power, to achieve a minimum ΔT_J of +100°C.	
Electrical measurements		See table I, subgroup 2 and 4.5.3 herein.	
Subgroup 4			
Thermal resistance	3131	$R_{\theta JSP(IS)}$ can be calculated but shall be measured once in the same package with a similar die size to confirm calculations (may apply to multiple specification sheets). $R_{\theta JA}$, $R_{\theta JC}$ only.	15 devices, c = 0
Thermal impedance curves		See MIL-PRF-19500, table E-IX, group E, subgroup 4.	
Subgroup 5			
Not applicable			
Subgroup 6			3 devices
ESD	1020		
Subgroup 8			45 devices c = 0
Reverse stability	1033	Condition B.	



NOTES:

1. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq 200°C$) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at $T_J \leq 150°C$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq$, 125°C, and 110°C to show power rating where most users want to limit T_J in their application.

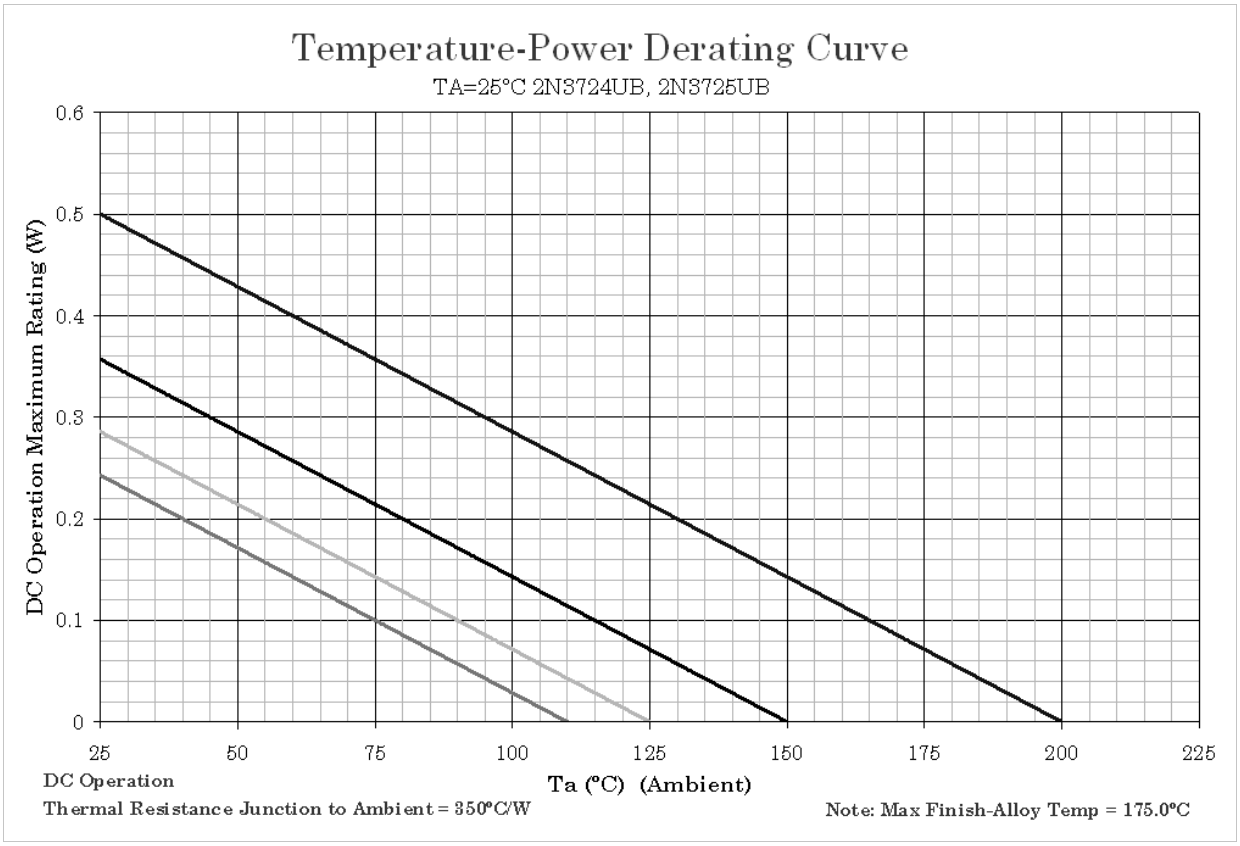
FIGURE 4. Derating for 2N3724 and 2N3725 ($R_{\theta JA}$) .125 inch (3.175 mm) PCB (TO-5 and TO-39).



NOTES:

1. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq 200°C$) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at $T_J \leq 150°C$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq$, 125°C, and 110°C to show power rating where most users want to limit T_J in their application.

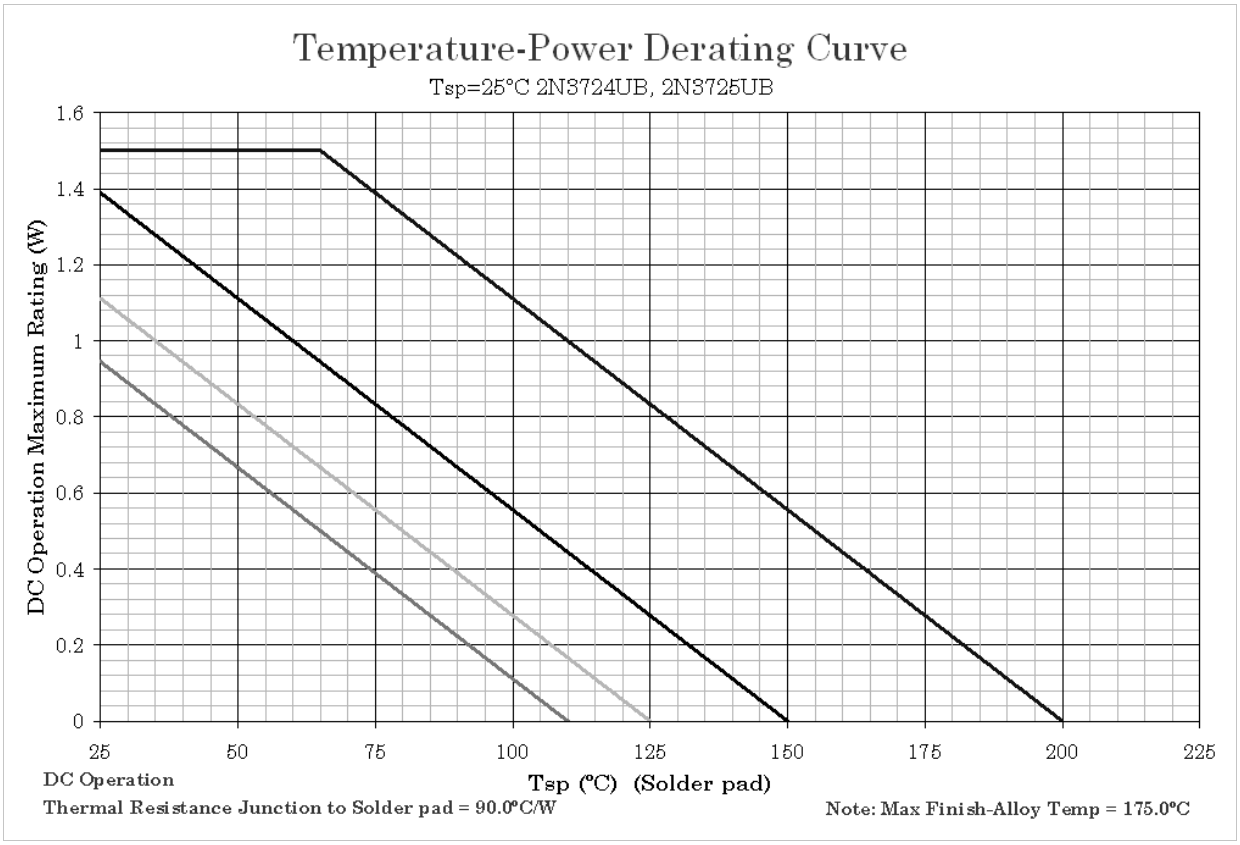
FIGURE 5. Derating for 2N3724 and 2N3725 ($R_{\theta JC}$), (TO-5 and TO-39).



NOTES:

1. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq 200°C$) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at $T_J \leq 150°C$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq$, 125°C, and 110°C to show power rating where most users want to limit T_J in their application.

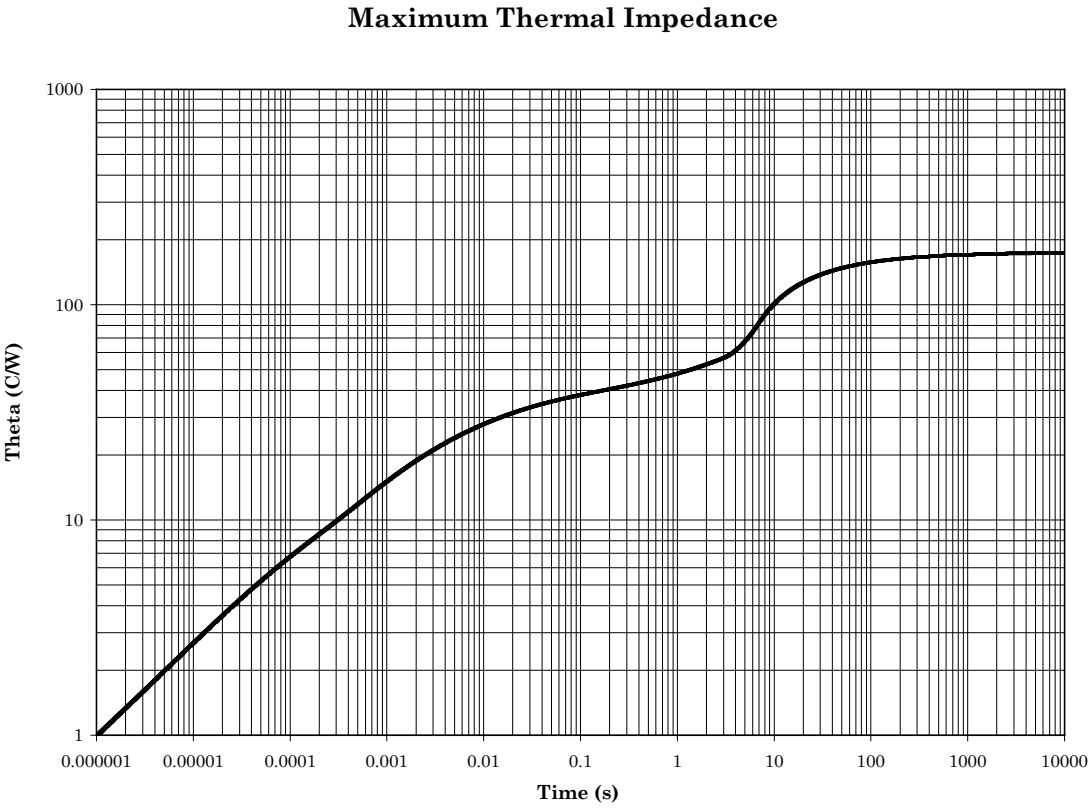
FIGURE 6. Derating for 2N3724UB and 2N3725UB ($R_{\theta JP(IS)}$).



NOTES:

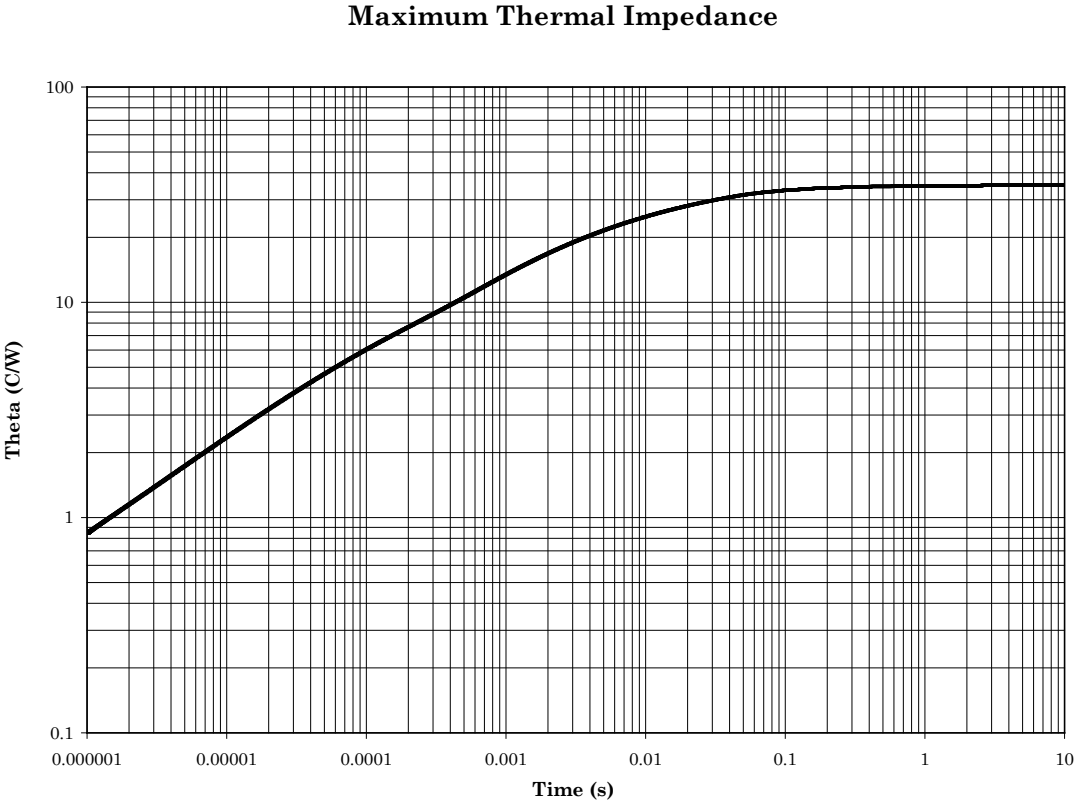
1. All devices are capable of operating at $\leq T_J$ specified on this curve. Any parallel line to this curve will intersect the appropriate power for the desired maximum T_J allowed.
2. Derate design curve constrained by the maximum junction temperature ($T_J \leq 200°C$) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at $T_J \leq 150°C$, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at $T_J \leq$, 125°C, and 110°C to show power rating where most users want to limit T_J in their application.

FIGURE 7. Derating for 2N3724UB and 2N3725UB ($R_{\theta JSP}$).



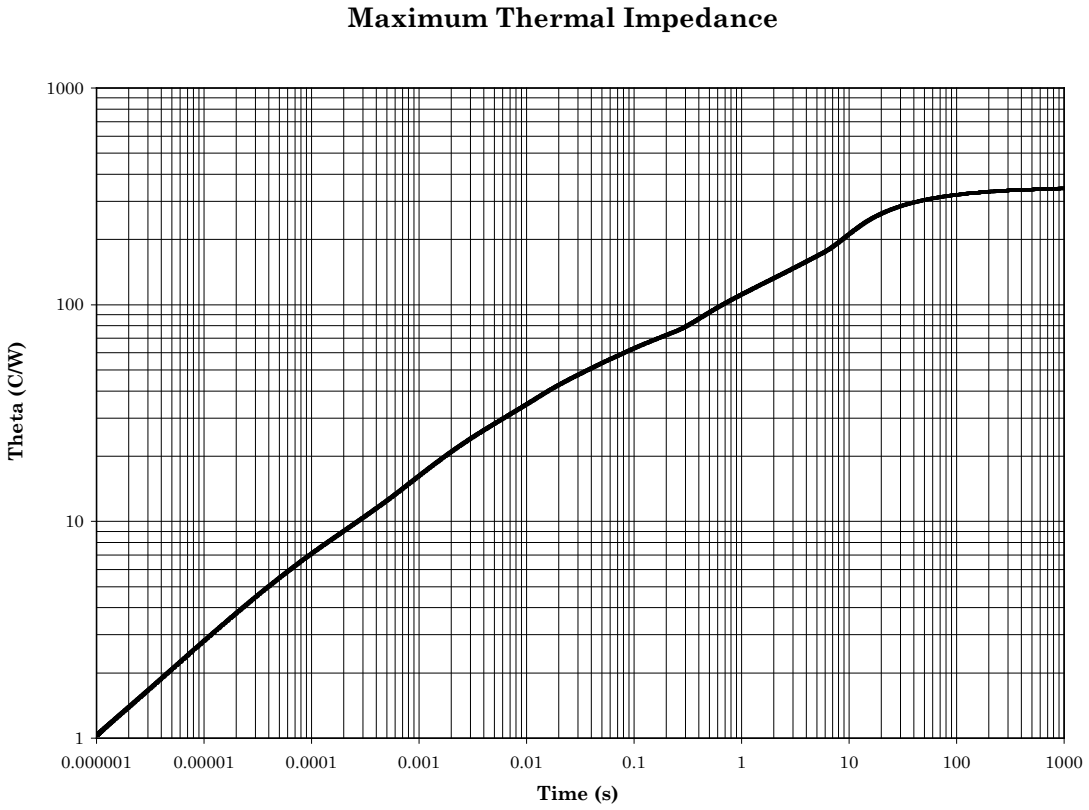
Ambient free air cooled T_A = +25°C, 800mW, Thermal Resistance $R_{\theta JA}$ = 175°C/W.

FIGURE 8. Thermal impedance graph ($R_{\theta JA}$) for 2N3724 and 2N3725 (TO-5 and TO-39).



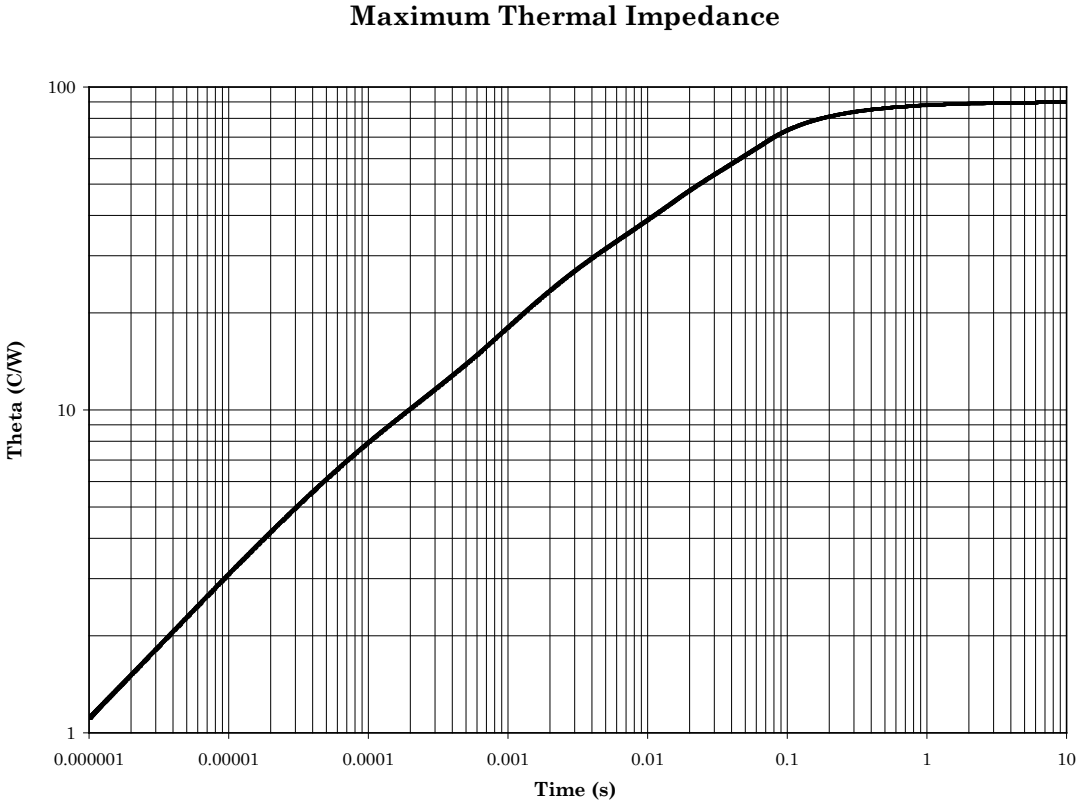
Ambient Case Mounted T_C = +25°C, Thermal resistance $R_{\theta JC}$ = 35°C/W.

FIGURE 9. Thermal impedance graph ($R_{\theta JC}$) for 2N3724 and 2N3725 (TO-5 and TO-39).



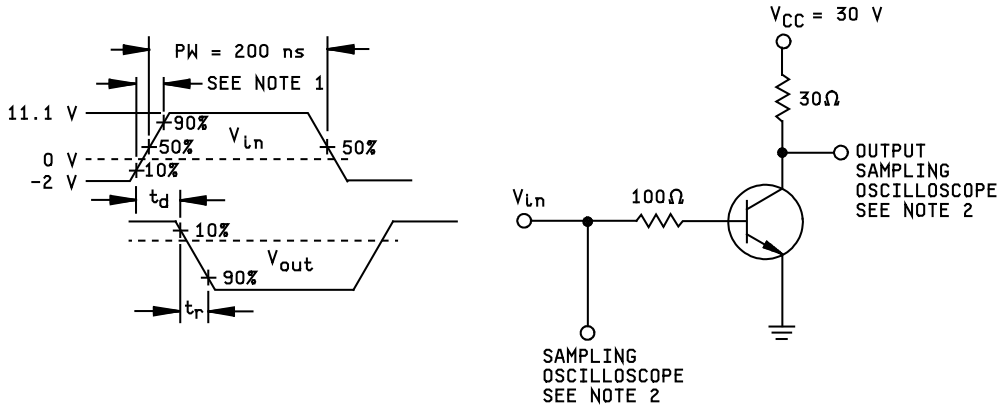
Mounted to minimal copper clad PCB at T_A = +25°C (no heat sinking except air). Thermal resistance $R_{\theta JA}$ = 350°C/W

FIGURE 10. Thermal impedance graph ($R_{\theta JA}$) for 2N3724UB and 2N3725UB (UB).



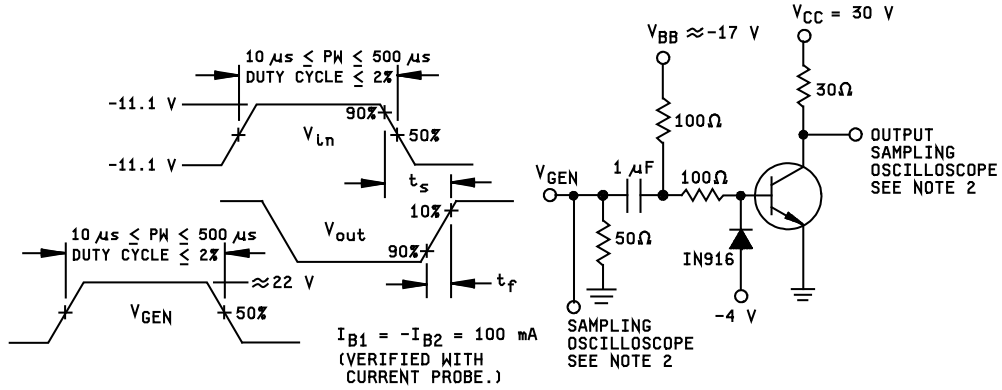
Solder mounted to very heavy copper clad PCB at $T_{\theta JSP(IS)}$ = +25°C. Thermal Resistance $R_{\theta JSP(IS)}$ = 90°C/W

FIGURE 11. Thermal impedance graph ($R_{\theta JSP(IS)}$) for 2N3724UB and 2N3725UB (UB).



NOTES:
1. The rise time (t_r) of the applied pulse shall be ≤ 0.1 ns, duty cycle ≤ 2 percent, and the generator source impedance shall be 50 Ω.
2. Sampling oscilloscope: Z_{in} ≥ 100 kΩ, C_{in} ≤ 12 pF, rise time ≤ 5 ns.

FIGURE 12. Test circuit and waveforms for measuring turn-on.



NOTES:
1. The rise time (t_r) of the applied pulse shall be ≤ 0.1 ns, duty cycle ≤ 2 percent, and the generator source impedance shall be 50 Ω.
2. Sampling oscilloscope: Z_{in} ≥ 100 kΩ, C_{in} ≤ 12 pF, rise time ≤ 5 ns.

FIGURE 13. Test circuit and waveforms for measuring turn-off.

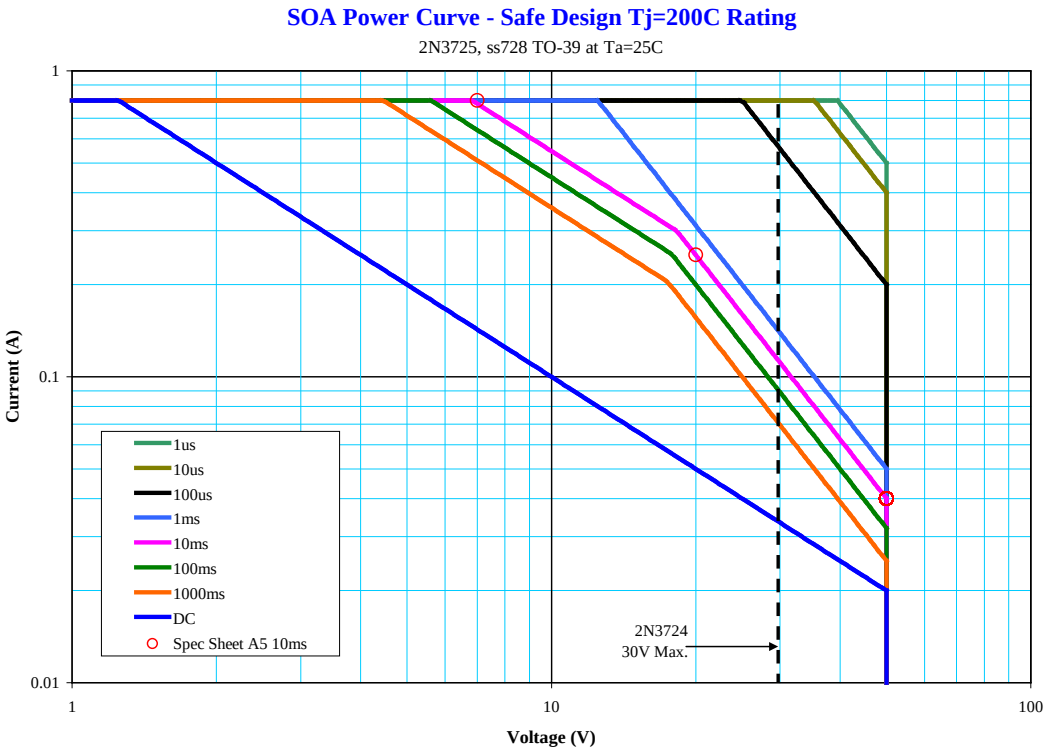


FIGURE 14. Maximum safe operating area.

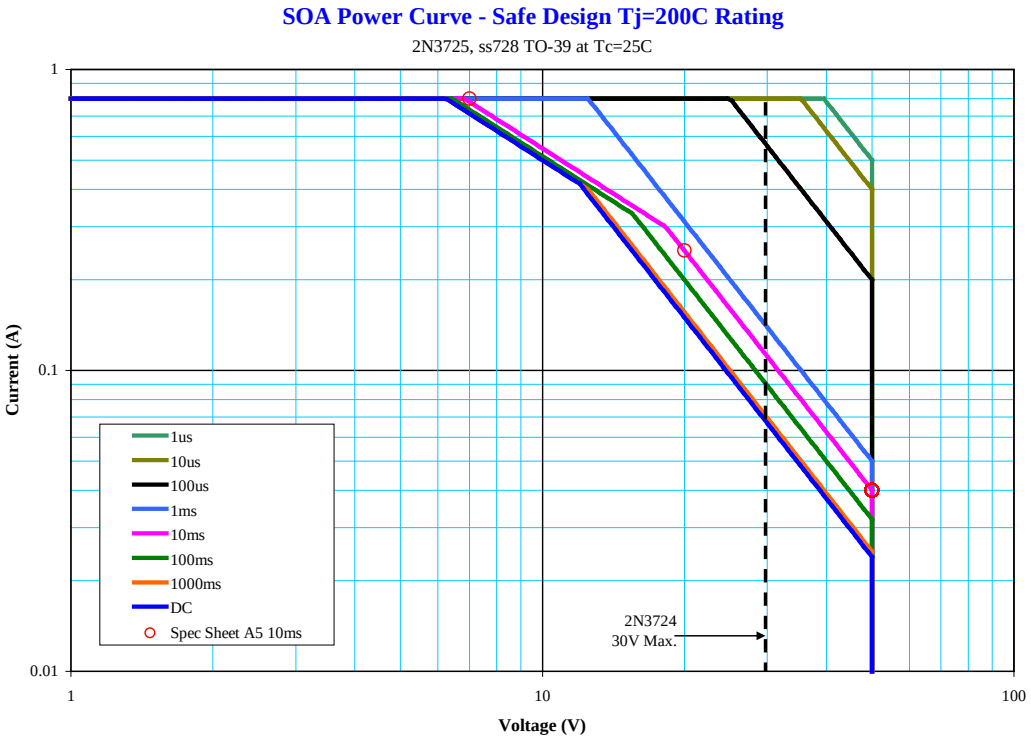


FIGURE 15. Maximum safe operating area.

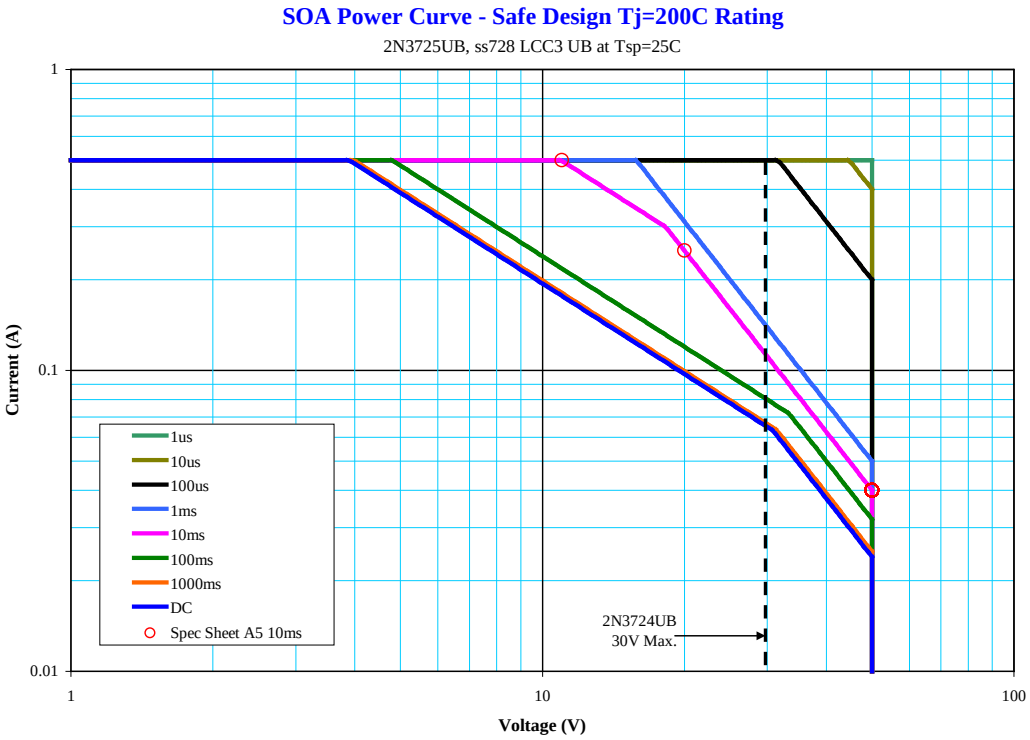


FIGURE 16. Maximum safe operating area.

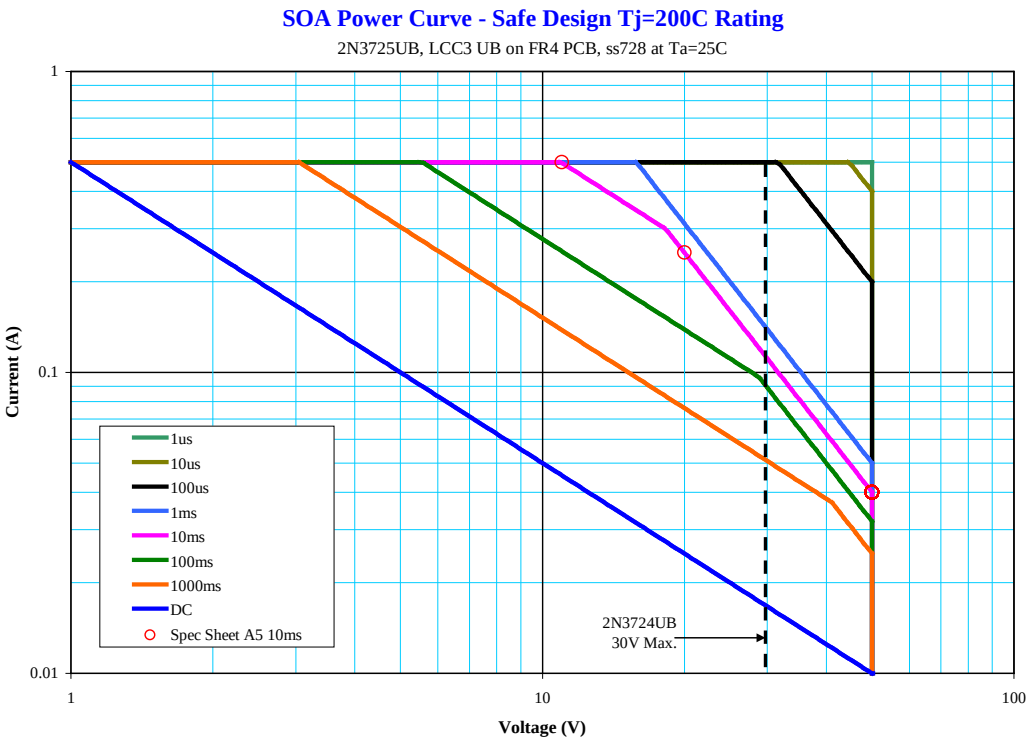


FIGURE 17. Maximum safe operating area.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the Military Service's system commands. 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. The notes specified in MIL-PRF-19500 are applicable to this specification.)

6.1 Intended use. Semiconductors conforming to this specification are intended for original equipment design applications and logistic support of existing equipment.

* 6.2 Acquisition requirements. Acquisition documents should specify the following:

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

b. Packaging requirements (see 5.1).

c. Lead finish (see 3.4.1).

d. Product assurance level and type designator.

* e. For acquisition of RHA designed devices, Table II, subgroup 1 testing of Group D is optional. If subgroup 1 testing is desired, it should be specified in the contract.

* 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 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 orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from DLA Land and Maritime, ATTN: VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail vqe.chief@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at https://assist.daps.dla.mil .

6.4 Changes from previous issue. The margins of this specification are marked with asterisks 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 - 85
NASA - NA
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2010-047)

* NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.daps.dla.mil.