The documentation and process conversion measures necessary to comply with this document shall be completed by 2 May 2021.

INCH-POUND

MIL-PRF-19500/495H
w/AMENDMENT 1
2 February 2021
SUPERSEDING
MIL-PRF-19500/495H
30 July 2015

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, UNITIZED, DUAL-TRANSISTOR, NPN, SILICON TYPES 2N5793, 2N5794, JAN, JANTX, JANTXV, JANS

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 unitized, dual transistors which contains a pair of electrically isolated matched and unmatched NPN, silicon transistors in one package. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500. RHA level designators “M”, “D”, “P“, “L”, “R”, “F”, “G”, and “H” are appended to the device prefix to identify devices, which have passed RHA requirements.

1.2 Package outlines. The device package for the encapsulated device types are as follows: Through hole mount metal can similar to TO-99 in accordance with figure 1, surface mount version U in accordance with figure 2, and surface mount versions UC in accordance with figure 3.

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

P_T (1) T_A = +25°C		I_C	V_{CBO}	V_{CEO}	V_{EBO}	T_{STG} and T_J
One section	Both sections					
mW	mW	mA dc	V dc	V dc	V dc	°C
500	600	600	75	40	6.0	-65 to +200

Types	$R_{\theta JA}$ One section	$R_{\theta JA}$ Both sections	$R_{\theta JSP}$ One section	$R_{\theta JSP}$ Both sections	$R_{\theta JPCB}$ One section	$R_{\theta JPCB}$ Both sections
	°C/W (2)	°C/W (2)	°C/W (2)	°C/W (2)	°C/W (2)	°C/W (2)
2N5793, 2N5794	350	290				
2N5793A, 2N5794A	350	290				
2N5794U, 2N5794UC			110	90	350	290
2N5794AU, 2N5794AUC			110	90	350	290

See notes on next page.

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@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.dla.mil.

AMSC N/A

FSC 5961

1.3 Maximum ratings. Unless otherwise specified, T_A = +25°C – Continued.

(1) For T_A > +25°C, derate linearly 2.86 mW/°C one section, 3.43 mW/°C both sections.
(2) For the thermal resistance see figures 4, 5, and 6.

1.4 Primary electrical characteristics. Unless otherwise specified, T_A = +25°C.

	C_{OBO}	$\lvert hfe \rvert$	Switching	
	V_{CB} = 10 V dc I_E = 0 mA dc 100 kHz ≤ f ≤ 1 MHz	V_{CE} = 20 V dc I_C = 20 mA dc f = 100 MHz	t_{on}	t_{off}
	pF		ns	ns
Minimum		2.0		
Maximum	8.0	10.0	45	310

Limits	h_{FE1}		h_{FE4} (1)		$V_{CE(sat)1}$ (1)	$V_{CE(sat)2}$ (1)	$V_{BE(sat)1}$ (1)	
	V_{CE} = 10 V dc I_C = 100 μA dc		V_{CE} = 10 V dc I_C = 150 mA dc		I_C = 150 mA dc I_B = 15 mA dc	I_C = 300 mA dc I_B = 30 mA dc	I_C = 150 mA dc I_B = 15 mA dc	
	Min	Max	Min	Max	Max	Max	Min	Max
					V dc	V dc	V dc	V dc
2N5793	20		40	120	0.3	0.9	0.6	1.2
2N5794	35		100	300	0.3	0.9	0.6	1.2
2N5794U	35		100	300	0.3	0.9	0.6	1.2
2N5794UC	35		100	300	0.3	0.9	0.6	1.2

(1) Pulsed see 4.5.1.

1.5 Primary electrical matching characteristics of each individual section.

Limit	$\frac{h_{FE2-1}}{h_{FE2-2}}$	$\frac{h_{FE3-1}}{h_{FE3-2}}$	$\lvert V_{BE1} - V_{BE2} \rvert$
2N5793A, 2N5794A, AU, AUC	V_{CE} = 10 V dc; I_C = 1 mA dc (1)	V_{CE} = 10 V dc; I_C = 10 mA dc (1)	V_{CE} = 10 V dc; I_C = 1 mA dc
			mV dc
Min	0.9	0.9	
Max	1.1	1.1	10

(1) The larger number will be replaced in the denominator

1.6 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.4 for PIN construction example and 6.5 for a list of available PINs.

1.6.1 JAN certification mark and quality level.

1.6.1.1 Quality level designators for encapsulated devices. The quality level designators for encapsulated devices that are applicable for this specification sheet from the lowest to the highest level are as follows: "JAN", "JANTX", "JANTXV", and "JANS".

1.6.2 Radiation hardness assurance (RHA) designator. The RHA levels that are applicable for JANS devices in this specification sheet from lowest to highest are as follows: "M", "D", "P", "L", "R", "F", "G", and "H"). The RHA levels that are applicable for JANTXV devices in this specification sheet from lowest to highest are as follows: ("R", and "F").

1.6.3 Device type. The designation system for the device types of semiconductors covered by this specification sheet are as follows.

1.6.3.1 First number and first letter symbols. The semiconductors of this specification sheet use the first number and letter symbols "2N".

1.6.3.2 Second number symbols. The second number symbols for the semiconductors covered by this specification sheet are as follows: "5793", and "5794".

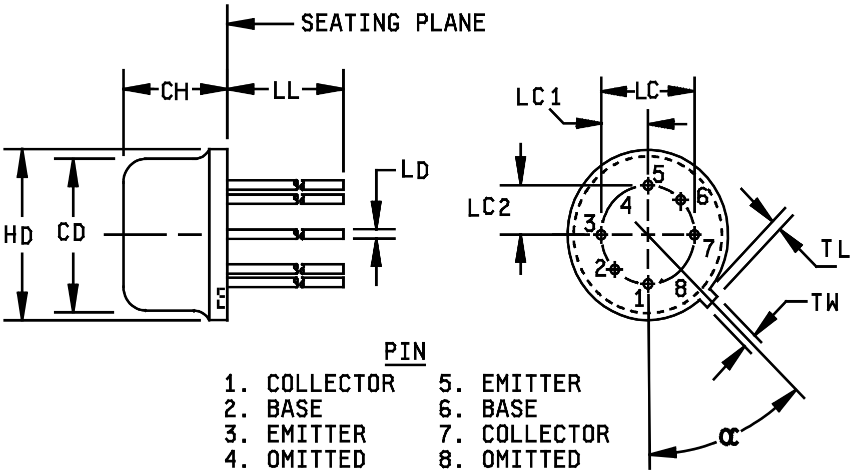
1.6.4 Suffix symbols. The following suffix symbols are incorporated in the PIN as applicable.

1.6.4.1 First suffix symbol. The first suffix letter "A" indicates a matched version of the associated identification number.

1.6.4.2 Following suffix symbols. The following suffix symbols are incorporated in the PIN for this specification sheet:

	A blank second suffix symbol indicates a through-hole mount package similar to a TO-99 metal can (see figure 1).
U	Indicates a 6 pad surface mount package (see figure 2).
UC	Indicates a 6 pad ceramic lid surface mount package (see figure 3).

1.6.5 Lead finish. The lead finishes applicable to this specification sheet are listed on QPDSIS-19500.

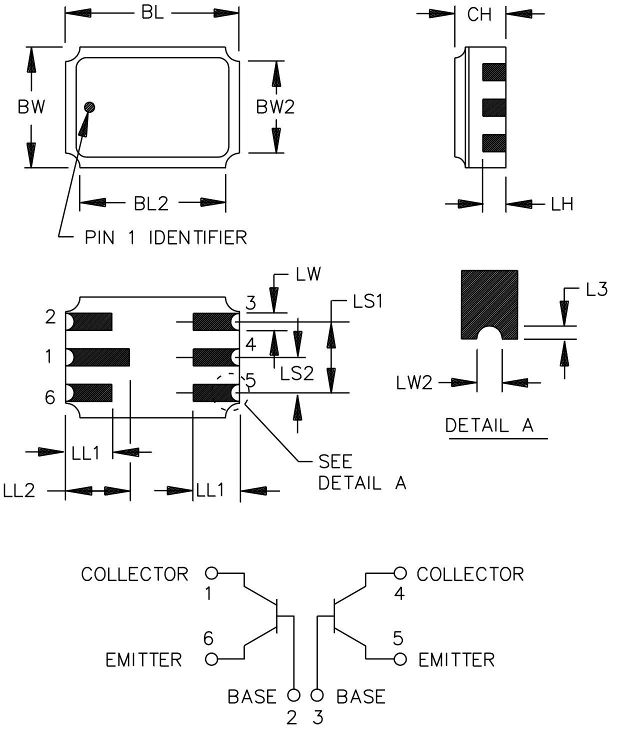


Symbol	Dimensions				Note
	Inches		Millimeters		
	Min	Max	Min	Max	
CD	.305	.335	7.75	8.51	
CH	.150	.185	3.81	4.70	
HD	.335	.370	8.51	9.40	
LD	.016	.021	0.41	0.53	
LL	.500		12.70		
LC	.200 BSC		5.08 BSC		4
LC1	.100 BSC		2.54 BSC		
LC2	.100 BSC		2.54 BSC		
TL	.029	.045	0.74	1.14	3
TW	.028	.034	0.71	0.86	
α	45° TP		45° TP		6

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Measured from maximum diameter of the product.
4. Leads having maximum diameter .019 inch (.483 mm) measured in gaging plan .054 inch (1.37 mm) + .001 inch (.025 mm) - .000 inch (.000 mm) below the seating plane of the product shall be within .007 inch (.178 mm) of their true position relative to a maximum width tab.
5. The product may be measured by direct methods or by gauge.
6. Tab centerline.
7. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 1. Physical dimensions (2N5793 and 2N5794) (similiar to TO-99).



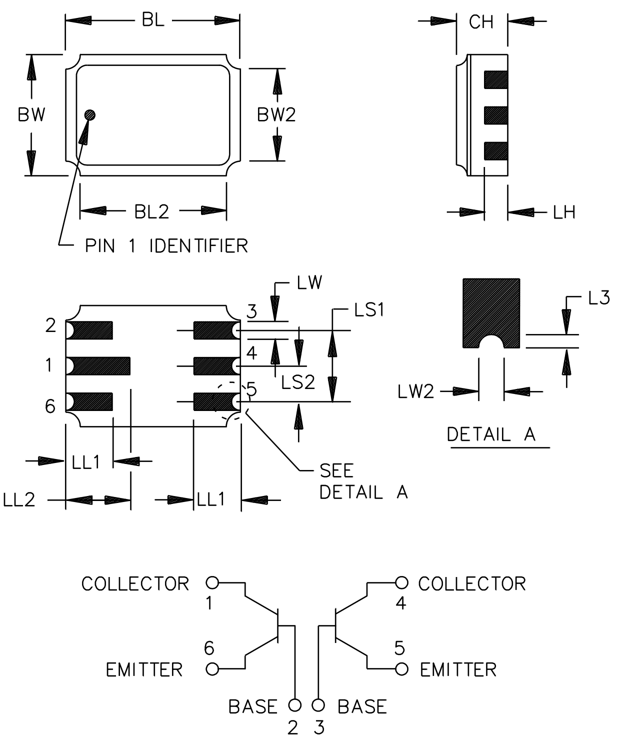
Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.240	.250	6.10	6.35
BL2		.250		6.35
BW	.165	.175	4.19	4.45
BW2		.175		4.45
CH	.058	.100	1.47	2.54
L3	.003	.007	0.08	0.18
LH	.026	.039	0.66	0.99

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
LL1	.060	.070	1.52	1.78
LL2	.082	.098	2.08	2.49
LS1	.095	.105	2.41	2.67
LS2	.045	.055	1.14	1.40
LW	.022	.028	0.56	0.71
LW2	.006	.022	0.15	0.56

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimension "CH" controls the overall package thickness.
4. The corner shape (square, notch, radius, etc.) may vary at the manufacturer's option from that shown on the drawing.
5. Dimensions "LW2" minimum and "L3" minimum and the appropriate castellation length define an unobstructed three-dimensional space traversing all of the ceramic layers in which a castellation was designed. (Castellations are required on bottom two layers, optional on top ceramic layer.) Dimension "LW2" maximum and "L3" maximum define the maximum width and depth of the castellation at any point on its surface. Measurement of these dimensions may be made prior to solder dipping.
6. Lead 4 = collector.
7. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 2. Physical dimensions, 2N5794U.



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BL	.240	.250	6.10	6.35
BL2		.250		6.35
BW	.165	.175	4.19	4.45
BW2		.175		4.45
CH	.058	.115	1.47	2.92
L3	.003	.007	0.08	0.18
LH	.026	.039	0.66	0.99

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
LL_1	.060	.070	1.52	1.78
LL2	.082	.098	2.08	2.49
LS1	.095	.105	2.41	2.67
LS2	.045	.055	1.14	1.40
LW	.022	.028	0.56	0.71
LW2	.006	.022	0.15	0.56

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimension "CH" controls the overall package thickness where the lid is ceramic.
4. The corner shape (square, notch, radius, etc.) may vary at the manufacturer's option from that shown on the drawing.
5. Dimensions "LW2" minimum and "L3" minimum and the appropriate castellation length define an unobstructed three-dimensional space traversing all of the ceramic layers in which a castellation was designed. (Castellations are required on bottom two layers, optional on top ceramic layer.) Dimension "LW2" maximum and "L3" maximum define the maximum width and depth of the castellation at any point on its surface. Measurement of these dimensions may be made prior to solder dipping.
6. Lead 4 = Collector.
7. In accordance with ASME Y14.5M, diameters are equivalent to ϕx symbology.

FIGURE 3. Physical dimensions, 2N5794UC.

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 of 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 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://quicksearch.dla.mil.)

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.

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.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and figures 1 (similar to TO-99), and 2 and 3 (U and UC) 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 1.3, 1.4, 1.5 and table I.

3.7 Electrical test requirements. Unless otherwise specified herein, the electrical performance characteristics are as specified in paragraphs 1.3, 1.4, 1.5 and table I.

3.8 Marking. Marking shall be in accordance with MIL-PRF-19500. At the option of the manufacturer, marking may be omitted from the body, but shall be retained on the initial container. 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 table I, II, and III).

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

4.2.1 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 (quality levels JANS, JANTX and JANTXV only). Screening shall be in accordance with table E-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	Measurement	
	JANS level	JANTX and JANTXV levels
(1) 3c	Thermal impedance method 3131 of MIL-STD-750 (see 4.3.2)	Thermal impedance method 3131 of MIL-STD-750 (see 4.3.2)
9	I_{CBO2} and h_{FE4}	Not applicable
11	I_{CBO2} and h_{FE4} Subgroup 2 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 5 nA dc, whichever is greater. Δh_{FE4} = ±15 percent of initial value	I_{CBO2} and h_{FE4}
12	See 4.3.1	See 4.3.1
13	Subgroup 2 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 5 nA dc, whichever is greater. Δh_{FE4} = ±15 percent of initial value	Subgroup 2 of table I herein; ΔI_{CBO2} = 100 percent of initial value or 5 nA dc, whichever is greater. Δh_{FE4} = ±15 percent of initial value

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

4.3.1 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 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. Use method 3100 of MIL-STD-750 to measure T_J.

4.3.2 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_{SW} (V_C and V_H where appropriate). See table III, group E, subgroup 4 herein.

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 subgroup 1 and 2, of table I herein, inspection only (table E-VIb, group B, subgroup 1 is not required to be performed since solderability and resistance to solvents testing is performed in table I herein.

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. See 4.4.2.2 for JAN, JANTX, and JANTXV group B testing. Electrical measurements (end-points) 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 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, adjust device current, or power, to achieve a minimum ΔT_J of 100°C.
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, (conformance inspection), 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~~s~~ 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 = +175°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.

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 U and UC devices).
C5	3131	$R_{\theta JA}$ only, as applicable (see 1.3) and in accordance with thermal impedance curves.
C6	1026	1,000 hours at V_{CB} = 10 V dc; power shall be applied to achieve T_J = +150°C minimum and a minimum of P_D = 75 percent of maximum rated P_T as defined in 1.3 n = 45, 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.

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 U and UC devices).
C5	3131	$R_{\theta JA}$ only, as applicable (see 1.3) and in accordance with 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 and JANTXV quality levels 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.

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.

4.5 Methods 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.

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					
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 4.3.2	$Z_{\theta JX}$		72	°C/W
Collector to base cutoff current	3036	Bias condition D, V_{CB} = 75 V dc	I_{CBO1}		10	µA dc
Breakdown voltage, collector to emitter	3011	Bias condition D; I_C = 10 mA dc; pulsed (see 4.5.1)	$V_{(BR)CEO}$	40		V dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 6 V dc	I_{EBO1}		10	µA dc
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 50 V dc	I_{CBO2}		10	nA dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 4 V dc	I_{EBO2}		10	nA dc
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 0.1 mA dc	h_{FE1}			
2N5793, A.				20		
2N5794, A, U, UC, AU, AUC.				35		
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 1.0 mA dc	h_{FE2}			
2N5793, A.				25		
2N5794, A, U, UC, AU, AUC.				50		

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} = 10 V dc; I_C = 10 mA dc; pulsed (see 4.5.1)	h_{FE3}			
2N5793, A.				35		
2N5794, A, U, UC, AU, AUC.				75		
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 150 mA dc; pulsed (see 4.5.1)	h_{FE4}			
2N5793, A.				40	120	
2N5794, A, U, UC, AU, AUC.				100	300	
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 300 mA dc; pulsed (see 4.5.1)	h_{FE5}			
2N5793, A.				25		
2N5794, A, U, UC, AU, AUC.				40		
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 150 mA dc; pulsed (see 4.5.1)	h_{FE6}			
2N5793, A.				20		
2N5794, A, U, UC, AU, AUC.				50		
Collector-emitter saturation voltage	3071	I_C = 150 mA dc; I_B = 15 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)1}$		0.3	V dc
Collector-emitter saturation voltage	3071	I_C = 300 mA dc; I_B = 30 mA dc; pulsed (see 4.5.1)	$V_{CE(sat)2}$		0.9	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 150 mA dc; I_B = 15 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)1}$	0.6	1.2	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)	$V_{BE(sat)2}$		1.8	V dc
Forward-current transfer ratio (gain ratio) 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3076	V_{CE} = 10 V dc; I_C = 1 mA dc; pulsed (see 4.5.1)	$\frac{h_{FE2-1}}{h_{FE2-2}}$	0.9	1.11	
Forward-current transfer ratio (gain ratio) 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3076	V_{CE} = 10 V dc; I_C = 10 mA dc; pulsed (see 4.5.1)	$\frac{h_{FE3-1}}{h_{FE3-2}}$	0.9	1.11	
Absolute value of base emitter-voltage differential 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3066	Test condition B; V_{CE} = 10 V dc; I_C = 1 mA dc	$\lvert V_{BE1} - V_{BE2} \rvert$		10	mV 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 3						
High temperature operation		$T_A = +150°C$				
Collector to base cutoff current	3036	Bias condition D; $V_{CB} = 50$ V dc	I_{CBO3}		10	μA dc
Low temperature operation		$T_A = -55°C$				
Forward-current transfer ratio	3076	$V_{CE} = 10$ V dc; $I_C = 150$ mA dc	h_{FE7}			
2N5793, A. 2N5794, A, U, UC, AU, AUC				16 40		
Subgroup 4						
Magnitude of small-signal short- circuit forward current transfer ratio	3306	$V_{CE} = 20$ V dc; $I_C = 20$ mA dc; f = 100 MHz	$\|h_{fe}\|$	2	10	
Open circuit output capacitance	3236	$V_{CB} = 10$ V dc; $I_E = 0$; 100 kHz $\leq$ f $\leq$ 1 MHz	C_{obo}		8	pF
Input capacitance (output open- circuited)	3240	$V_{EB} = 0.5$ V dc; $I_C = 0$; 100 kHz $\leq$ f $\leq$ 1 MHz	C_{ibo}		33	pF
Pulse response	3251	Test condition A, (see figure 7)				
Saturated turn-on time		$V_{CC} = 30$ V dc; $I_C = 150$ mA dc; $I_{B1} = 15$ mA dc, $V_{BE(OFF)} = 0.5$ V dc	t_{on}		45	ns
Saturated turn-off time		$V_{CC} = 30$ V dc; $I_C = 150$ mA dc; $I_{B1} = I_{B2} = 15$ mA dc	t_{off}		310	ns
Subgroups 5 and 6						
Not required						

1/ For sampling plan see MIL-PRF-19500.
2/ For resubmission of failed test in subgroup 1 of table I, 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, subgroups 3, 4 and 5 (JANS).
Group B, step 1(JAN, JANTX, JANTXV).
Group C, subgroups 2 and 6.
Group E, subgroup 1.

TABLE II. Group D inspection.

Inspection 1/ 2/ 3/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 1 4/						
Neutron irradiation	1017	Neutron exposure V_{CES} = 0 V				
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 75 V dc	I_{CBO1}		20	µA dc
Breakdown voltage, collector to emitter	3011	Bias condition D; I_C = 10 mA dc; pulsed (see 4.5.1)	$V_{(BR)CEO}$	40		V dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 6 V dc	I_{EBO1}		20	µA dc
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 50 V dc	I_{CBO2}		20	nA dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 4 V dc	I_{EBO2}		20	nA dc
Forward-current transfer ratio 2N5793 2N5794, 2N5794U	3076	V_{CE} = 10 V dc; I_C = 0.1 mA dc	$[h_{FE1}]$ 5/	 [10] [17.5]		
Forward-current transfer ratio 2N5793 2N5794, 2N5794U, 2N5794UC	3076	V_{CE} = 10 V dc; I_C = 1.0 mA dc	$[h_{FE2}]$ 5/	 [12.5] [25]		
Forward-current transfer ratio 2N5793 2N5794, 2N5794U, 2N5794UC	3076	V_{CE} = 10 V dc; I_C = 10 mA dc	$[h_{FE3}]$ 5/	 [17.5] [37.5]		
Forward-current transfer ratio 2N5793 2N5794, 2N5794U, 2N5794UC	3076	V_{CE} = 10 V dc; I_C = 150 mA dc	$[h_{FE4}]$ 5/	 [20] [50]	 120 300	
Forward-current transfer ratio 2N5793 2N5794, 2N5794U, 2N5794UC	3076	V_{CE} = 10 V dc; I_C = 300 mA dc	$[h_{FE5}]$ 5/	 [12.5] [20]		
Forward-current transfer ratio 2N5793 2N5794, 2N5794U, 2N5794UC	3076	V_{CE} = 1.0 V dc; I_C = 150 mA dc	$[h_{FE6}]$ 5/	 [10] [25]		
Collector-emitter saturation voltage	3071	I_C = 150 mA dc; I_B = 15 mA dc	$V_{CE(sat)1}$		.35	V dc
Collector-emitter saturation voltage	3071	I_C = 300 mA dc; I_B = 30 mA dc	$V_{CE(sat)2}$		1.04	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 150 mA dc; I_B = 15 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)1}$	0.6	1.38	V dc

See footnotes at end of table.

TABLE II. Group D inspection - Continued.

Inspection 1/ 2/ 3/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 1 - Continued 4/						
Base-emitter saturation voltage	3066	Test condition A; I_C = 300 mA dc; I_B = 30 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)2}$		2.07	V dc
Forward-current transfer ratio (gain ratio) 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3076	V_{CE} = 10 V dc; I_C = 1 mA dc; pulsed (see 4.5.1)	$\frac{h_{FE2-1}}{h_{FE2-2}}$	0.8	1.25	
Forward-current transfer ratio (gain ratio) 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3076	V_{CE} = 10 V dc; I_C = 10 mA dc; pulsed (see 4.5.1)	$\frac{h_{FE3-1}}{h_{FE3-2}}$	0.8	1.25	
Absolute value of base emitter-voltage differential 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3066	Test condition B; V_{CE} = 10 V dc; I_C = 1 mA dc	$\lvert V_{BE1} - V_{BE2} \rvert$		20	mV dc
Subgroup 2						
Total dose irradiation	1019	Gamma exposure V_{CES} = 40 V, condition A				
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 75 V dc	I_{CBO1}		20	µA dc
Breakdown voltage, collector to emitter	3011	Bias condition D; I_C = 10 mA dc; pulsed (see 4.5.1)	$V_{(BR)CEO}$	40		V dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 6 V dc	I_{EBO1}		20	µA dc
Collector to base cutoff current	3036	Bias condition D; V_{CB} = 50 V dc	I_{CBO2}		20	nA dc
Emitter to base cutoff current	3061	Bias condition D; V_{EB} = 4 V dc	I_{EBO2}		20	nA dc
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 0.1 mA dc	$[h_{FE1}]$ 5/			
2N5793				[10]		
2N5794, 2N5794U, 2N5794UC				[17.5]		
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 1.0 mA dc	$[h_{FE2}]$ 5/			
2N5793				[12.5]		
2N5794, 2N5794U, 2N5794UC				[25]		
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 10 mA dc	$[h_{FE3}]$ 5/			
2N5793				[17.5]		
2N5794, 2N5794U, 2N5794UC				[37.5]		

See footnotes at end of table.

TABLE II. Group D inspection - Continued.

Inspection 1/ 2/ 3/	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
Subgroup 2 - Continued						
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 150 mA dc	[h_{FE4}] 5/			
2N5793				[20]	120	
2N5794, 2N5794U, 2N5794UC				[50]	300	
Forward-current transfer ratio	3076	V_{CE} = 10 V dc; I_C = 300 mA dc	[h_{FE5}] 5/			
2N5793				[12.5]		
2N5794, 2N5794U, 2N5794UC				[20]		
Forward-current transfer ratio	3076	V_{CE} = 1.0 V dc; I_C = 150 mA dc	[h_{FE6}] 5/			
2N5793				[10]		
2N5794, 2N5794U, 2N5794UC				[25]		
Collector-emitter saturation voltage	3071	I_C = 150 mA dc; I_B = 15 mA dc	$V_{CE(sat)1}$		.35	V dc
Collector-emitter saturation voltage	3071	I_C = 300 mA dc; I_B = 30 mA dc	$V_{CE(sat)2}$		1.04	V dc
Base-emitter saturation voltage	3066	Test condition A; I_C = 150 mA dc; I_B = 15 mA dc; pulsed (see 4.5.1)	$V_{BE(sat)1}$	0.6	1.38	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)	$V_{BE(sat)2}$		2.07	V dc
Forward-current transfer ratio (gain ratio) 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3076	V_{CE} = 10 V dc; I_C = 1 mA dc; pulsed (see 4.5.1)	$\frac{h_{FE2-1}}{h_{FE2-2}}$	0.8	1.25	
Forward-current transfer ratio (gain ratio) 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3076	V_{CE} = 10 V dc; I_C = 10 mA dc; pulsed (see 4.5.1)	$\frac{h_{FE3-1}}{h_{FE3-2}}$	0.8	1.25	
Absolute value of base emitter-voltage differential 2N5793A, 2N5794A, 2N5794AU, 2N5794AUC	3066	Test condition B; V_{CE} = 10 V dc; I_C = 1 mA dc	$\lvert V_{BE1} - V_{BE2} \rvert$		20	mV dc

1/ Tests to be performed on all devices receiving radiation exposure.
2/ For sampling plan, see MIL-PRF-19500.
3/ Electrical characteristics apply to the corresponding U and UC suffix versions unless otherwise noted.
4/ See 6.2.e herein.
5/ See method 1019 of MIL-STD-750 for how to determine [h_{FE}] by first calculating the delta (1/h_{FE}) from the pre- and post-radiation h_{FE}. Notice the [h_{FE}] is not the same as h_{FE} and cannot be measured directly. The [h_{FE}] value can never exceed the pre-radiation minimum h_{FE} that it is based upon.

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 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 herein.	
Subgroup 4			
Thermal impedance curves		See table E-IX of MIL-PRF-19500, group E, subgroup 4.	
Subgroup 5			
Not applicable			
Subgroup 8			45 devices c = 0
Reverse stability	1033	Condition B.	

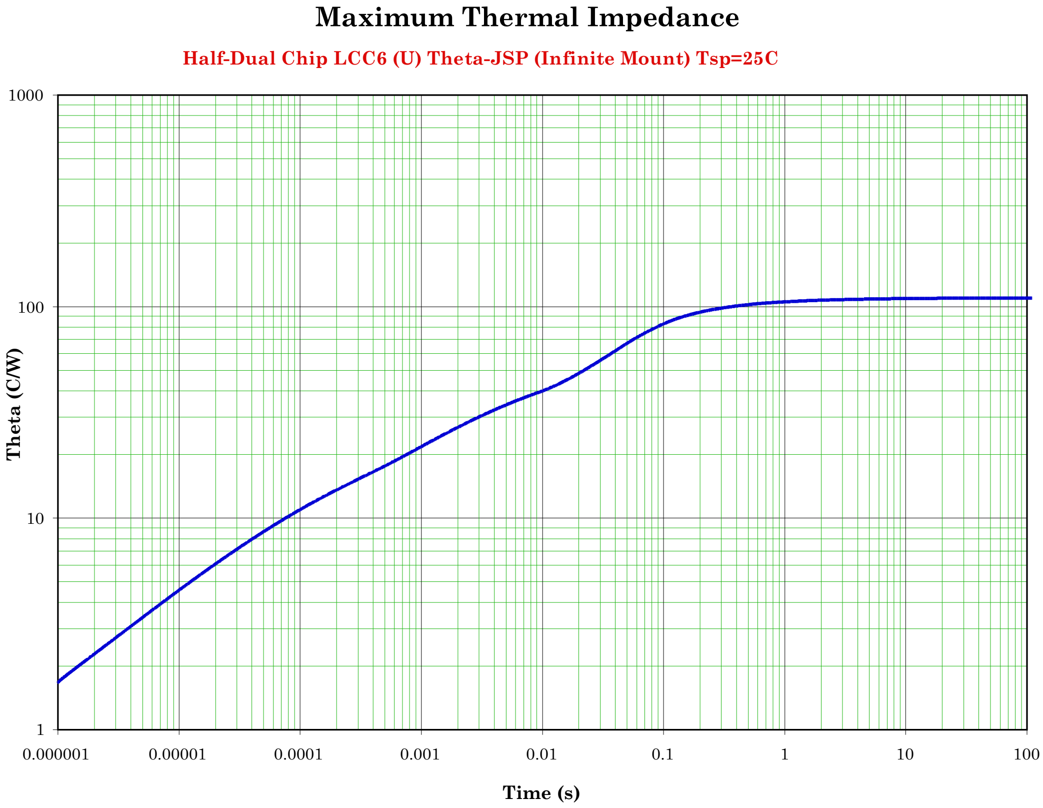


FIGURE 4. Thermal impedance graph ($R_{\theta JSP}$) for 2N5794U, 2N5794UC, 2N5794AU, and 2N5794AUC (U and UC).

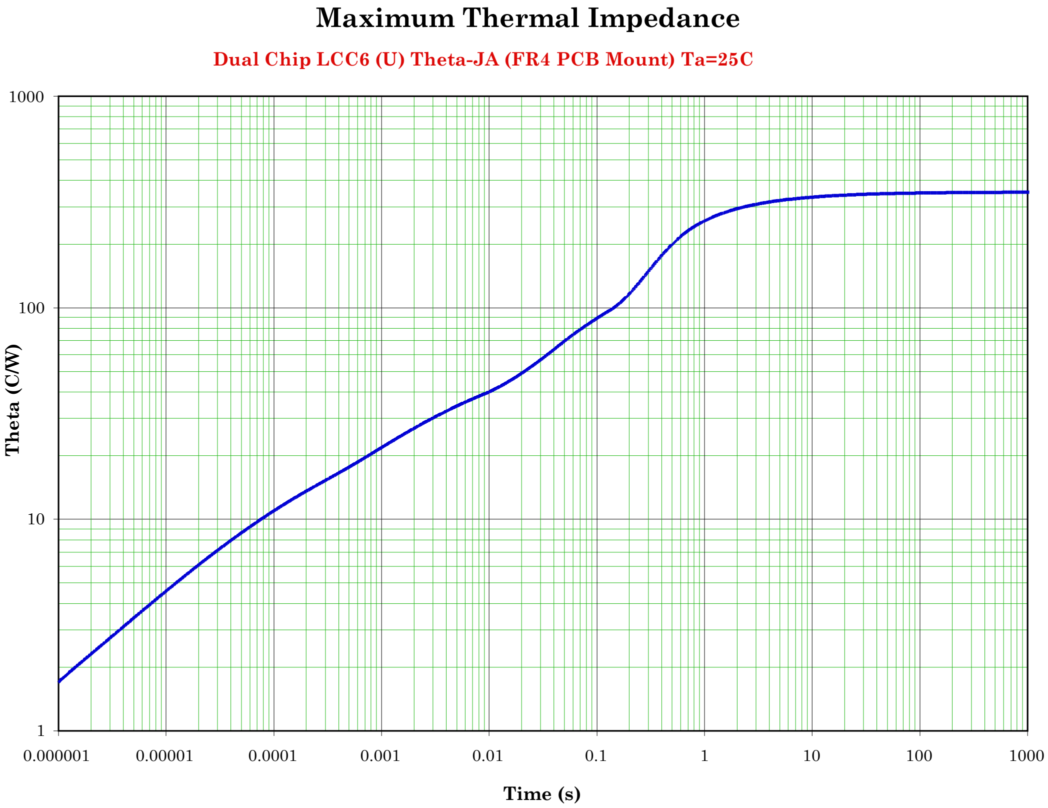
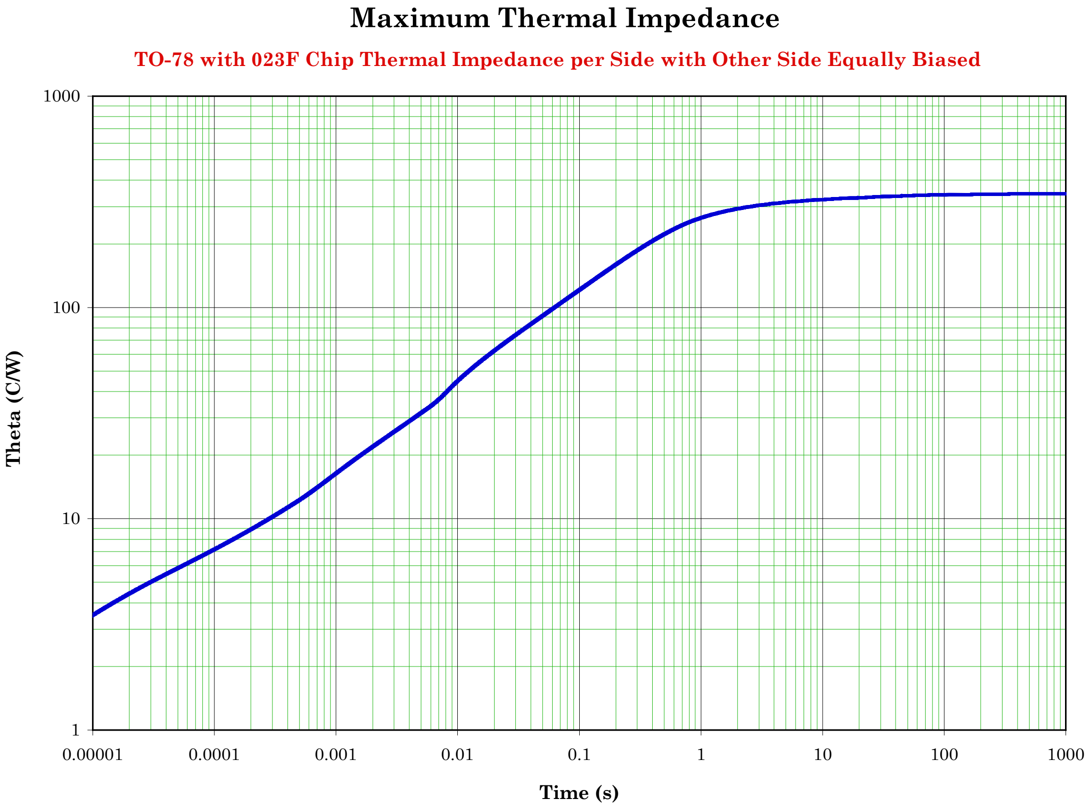
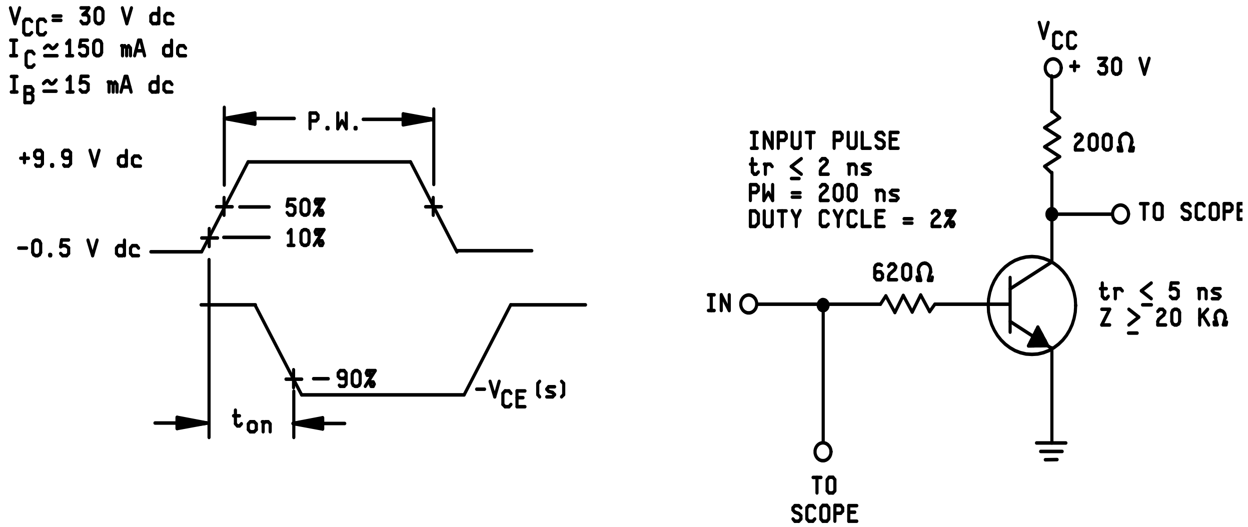


FIGURE 5. Thermal impedance graph ($R_{\theta JPCB}$) for 2N5794U, 2N5794UC, 2N5794AU, and 2N5794AUC (U and UC).



* FIGURE 6. Thermal impedance graph ($R_{\theta JA}$) for 2N5793, 2N5794, 2N5793A, and 2N5794A.



TURN-ON (t_{on}) TIME TEST CIRCUIT

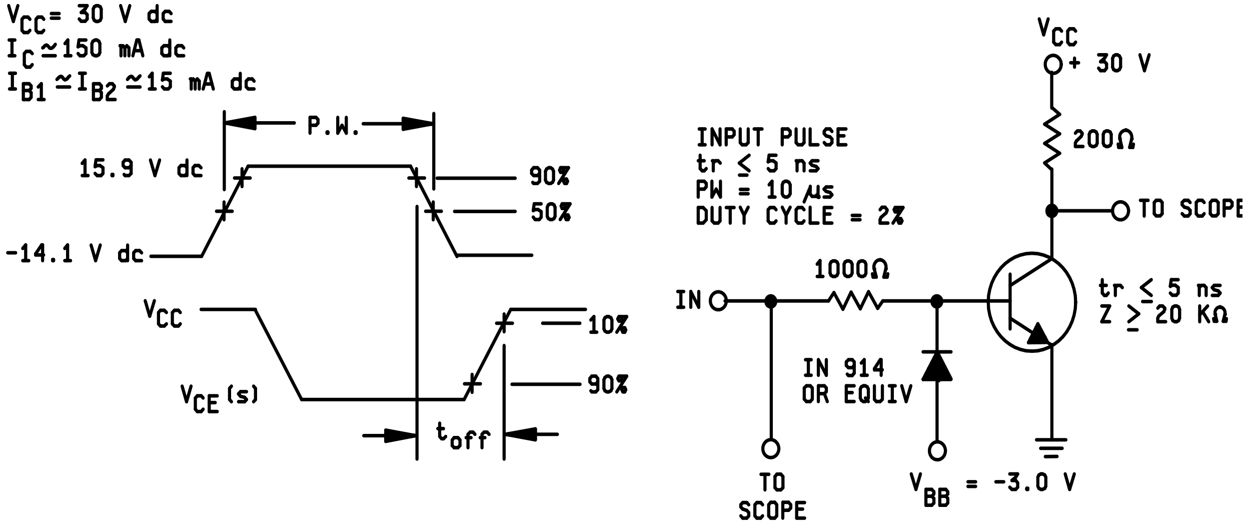


FIGURE 7. Turn-off time test circuits.

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. The complete Part or Identifying Number (PIN), see 1.6 and 6.4.

f. 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.dla.mil.

6.4 PIN construction example.

6.4.1 Encapsulated devices. The PINs for encapsulated devices are constructed using the following form.

JANS P 2N 5793 A U

JAN certification mark and quality level (see 1.6.1)

RHA designator (see 1.6.2)

First number and first letter symbols (see 1.6.3.1)

Second number symbols (see 1.6.3.2)

First suffix symbol (see 1.6.4.1)

Following suffix symbol(s) (see 1.6.4.2)

6.5 List of PINs.

6.5.1 PINs for encapsulated devices. The following is a list of possible PINs for encapsulated devices available on this specification sheet.

PINs for types 2N5793 (1)	PINs for types 2N5794 (1)	
JAN2N5793	JAN2N5794	JANTXV#2N5794
JAN2N5793A	JAN2N5794A	JANTXV#2N5794A
JANTX2N5793	JAN2N5794U	JANTXV#2N5794U
JANTX2N5793A	JAN2N5794AU	JANTXV#2N5794AU
JANTXV2N5793	JAN2N5794UC	JANTXV#2N5794UC
JANTXV2N5793A	JAN2N5794AUC	JANTXV#2N5794AUC
JANTXV#2N5793	JANTX2N5794	JANS2N5794
JANTXV#2N5793A	JANTX2N5794A	JANS2N5794A
JANS2N5793	JANTX2N5794U	JANS2N5794U
JANS2N5793A	JANTX2N5794AU	JANS2N5794AU
JANS#2N5793	JANTX2N5794UC	JANS2N5794UC
JANS2#N5793A	JANTX2N5794AUC	JANS2N5794AUC
	JANTXV2N5794	JANS#2N5794
	JANTXV2N5794A	JANS#2N5794A
	JANTXV2N5794U	JANS#2N5794U
	JANTXV2N5794AU	JANS#2N5794AU
	JANTXV2N5794UC	JANS#2N5794UC
	JANTXV2N5794AUC	JANS#2N5794AUC

(1) The number sign (#) represents one of eight RHA designators available for the JANS quality level (M, D, P, L, R, F, G, or H), and one of two RHA designators available for the JANTXV quality level (R or F).

6.6 Amendment notations. The margins of this specification are marked with asterisks to indicate modifications generated by this amendment. 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

Custodians:
Army - CR
* Navy - SH
Air Force - 85
NASA - NA
DLA - CC

Preparing activity:
DLA - CC

(Project 5961-2020-096)

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

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.dla.mil.