

The documentation and process conversion measures necessary to comply with this document shall be completed by 6 June 2009.

INCH-POUND

MIL-PRF-19500/456E
 6 March 2009
 SUPERSEDING
 MIL-PRF-19500/456D
 29 July 1999

* PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, HIGH-POWER,
 TYPES 2N5302 AND 2N5303, JAN, JANTX, JANTXV, AND 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 NPN, silicon, high-power transistors. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figure 1 (similar to TO-3).

* 1.3 Maximum ratings. Unless otherwise specified, $T_A = +25^\circ\text{C}$.

Type	P_T (1) $T_A = +25^\circ\text{C}$	P_T (1) $T_C = +100^\circ\text{C}$	V_{CBO}	V_{CEO}	V_{EBO}	I_B	I_C	T_J and T_{STG}	$R_{\theta JC}$
	<u>W</u>	<u>W</u>	<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>A dc</u>	<u>A dc</u>	<u>°C</u>	<u>°C/W Max</u>
2N5302	5	115	60	60	5.0	7.5	30	-65 to +200	0.875
2N5303	5	115	80	80	5.0	7.5	20	-65 to +200	0.875

(1) Derate linearly, 1.14 mW/°C above $T_C = +100^\circ\text{C}$.
 Derate linearly, 28.57 mW/°C above $T_A = +25^\circ\text{C}$.

* Comments, suggestions, or questions on this document should be addressed to Defense Supply Center, Columbus, ATTN: DSCC-VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to semiconductor@dsc.dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <http://assist.daps.dla.mil>.

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1.4 Primary electrical characteristics. Unless otherwise specified, $T_A = +25^\circ\text{C}$.

	h_{FE2} (1)	h_{FE2} (1)	$ h_{FE} $	$V_{BE(sat)2}$ (1)		$V_{CE(sat)2}$ (1)		C_{obo}	Pulse response	
	$V_{CE} = 2\text{ V dc}$ $I_C = 15\text{ A dc}$	$V_{CE} = 2\text{ V dc}$ $I_C = 10\text{ A dc}$	$V_{CE} = 10\text{ V dc}$ $I_C = 1\text{ A dc}$ $f = 1\text{ MHz}$	$I_C = 15\text{ A dc}$ $I_B = 1.5\text{ A dc}$	$I_C = 15\text{ A dc}$ $I_B = 1.5\text{ A dc}$	$V_{CB} = 10\text{ V dc}$ $I_E = 0$ $100\text{ kHz} \leq f \leq 1\text{ MHz}$		t_{on}	t_{off}	
	<u>2N5302</u>	<u>2N5303</u>	<u>V dc</u>	<u>2N5302</u> <u>V dc</u>	<u>2N5303</u> <u>V dc</u>	<u>2N5302</u> <u>V dc</u>	<u>2N5303</u> <u>V dc</u>	<u>pF</u>	<u>μs</u>	<u>μs</u>
Min	15	15	2	1.8	2	1	1.5	800	1.1	3.0
Max	60	60	40							

(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

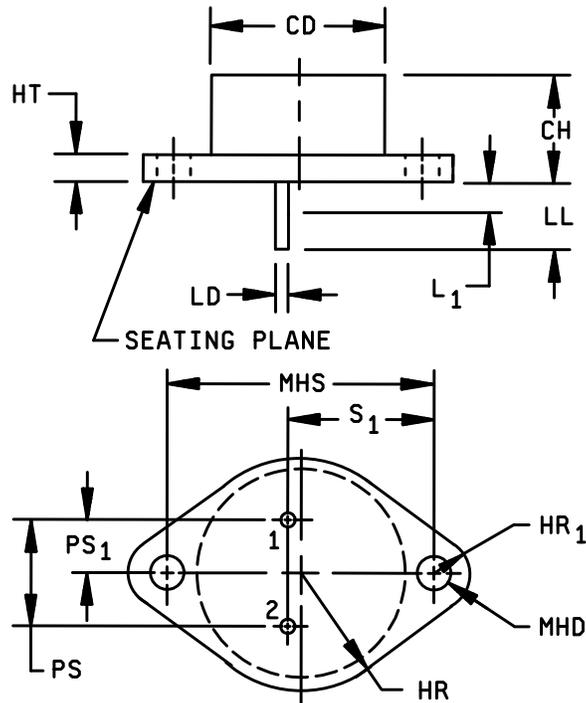
MIL-PRF-19500 - Semiconductor Devices, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

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

* (Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch> or <http://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.



Ltr	Dimensions				Notes	Ltr	Dimensions				
	Inches		Millimeters				Inches		Millimeters		
	Min	Max	Min	Max		Min	Max	Min	Max		
CD		.875		22.23							
CH	.270	.380	6.86	8.89		L ₁	.050		1.27		
HR	.495	.525	12.57	13.34	4	MHD	.151	.161	3.84	4.09	4
HR ₁	.131	.188	3.33	4.78	4	MHS	1.177	1.197	29.90	30.40	
HT	.060	.135	1.52	3.43		PS	.420	.440	10.67	11.18	3, 4
LD	.038	.043	0.97	1.09	4, 6	PS ₁	.205	.225	5.21	5.72	3, 4
LL	.312	.500	7.92	12.70		s ₁	.655	.675	16.64	17.15	

NOTES:

1. Dimensions are in inches. Lead 1 is emitter, lead 2 is base, and case is collector.
2. Millimeters are given for general information only.
3. These dimensions should be measured at points .050 inch (1.27 mm) +.005 inch (0.13 mm) -.000 inch (0.00 mm) below seating plane. When gauge is not used, measurement will be made at the seating plane.
4. Two places.
5. The seating plane of the header shall be flat within .001 inch (0.03 mm) concave to .004 inch (0.10 mm) convex inside a .930 inch (23.62 mm) diameter circle on the center of the header and flat within .001 inch (0.03 mm) concave to .006 inch (0.15 mm) convex overall.
6. Lead diameter shall not exceed twice LD within L₁.
7. In accordance with ASME Y14.5M, diameters are equivalent to ϕ x symbology.

FIGURE 1. Physical dimensions - (similar to TO-3).

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.
- * 3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figure 1.
- * 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 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in 1.3, 1.4, and table I.
- 3.6 Electrical test requirements. The electrical test requirements shall be as specified in table I.
- * 3.7 Marking. Marking shall be in accordance with MIL-PRF-19500.
- * 3.8 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).
- 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 II tests, the tests specified in table II herein that were not performed in the prior revision shall be performed on the first inspection lot of this revision to maintain qualification.

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* 4.3 Screening (JANS, JANTX, and JANTXV levels). 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 (see table E-IV of MIL-PRF-19500)	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_{CEX1} and h_{FE2}	Not applicable
11	I_{CEX1} and h_{FE2} $\Delta I_{CEX1} = 100$ percent or $1 \mu A$ whichever is greater; $\Delta h_{FE2} = \pm 20$ percent	I_{CES1} and h_{FE2}
12	See 4.3.1	See 4.3.1
13	Subgroups 2 and 3 of table I herein; $\Delta I_{CEX1} = +100$ percent of initial value or $1 \mu A$, whichever is greater. $\Delta h_{FE2} = \pm 15$ percent of initial value	Subgroup 2 of table I herein; $\Delta I_{CEX1} = +100$ percent of initial value or $1 \mu A$, whichever is greater. $\Delta h_{FE2} = \pm 15$ percent of initial value

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

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

$$T_J = +187.5^\circ C \pm 12.5^\circ C, V_{CE} \geq 10 \text{ V dc}, T_A \leq +35^\circ C.$$

* 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 II, group E, subgroup 4 herein.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-PRF-19500, and table I herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, group A, subgroup 2 herein.

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4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in tables E-VIa (JANS) and E-VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and 4.4.2.1 and 4.4.2.2 herein. Electrical measurements (end-points) shall be in accordance with the applicable inspections of table I, subgroup 2 herein.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B4	1037	$V_{CB} = 20 \text{ V dc}$; $P_D = 5 \text{ W}$ at $T_A = \text{room ambient}$ as defined in 4.5 of MIL-STD-750; $t_{on} = t_{off} = 3 \text{ minutes}$ minimum for 2,000 cycles. No heat sink or forced air cooling on devices shall be permitted.
B5	1027	$V_{CB} = 20 \text{ V dc}$; $T_A = +125^\circ\text{C} \pm 25^\circ\text{C}$ for 96 hours; $P_T = 5 \text{ W}$ at $T_A = +125^\circ\text{C}$ or adjusted as required by the chosen T_A to give an average lot, $T_J = +275^\circ\text{C}$.

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B3	1037	For solder die attach: $V_{CB} \geq 10 \text{ V dc}$; $T_A \leq 35^\circ\text{C}$, 2,000 cycles. No heat sink or forced air cooling on devices shall be permitted.
B3	1026	For eutectic die attach: $V_{CB} \geq 10 \text{ V dc}$; $T_A \leq 35^\circ\text{C}$, adjust P_T to achieve $T_J = 175^\circ\text{C}$ minimum.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VII of MIL-PRF-19500, and as follows. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein.

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

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C6	1037	For solder die attach: $V_{CB} \geq 10 \text{ V dc}$; $T_A \leq 35^\circ\text{C}$, 6,000 cycles. No heat sink or forced air cooling on devices shall be permitted.
C6	1026	For eutectic die attach: $V_{CB} \geq 10 \text{ V dc}$; $T_A \leq 35^\circ\text{C}$, adjust P_T to achieve $T_J = 175^\circ\text{C}$ minimum.

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.

4.5.2 Thermal resistance. Thermal resistance measurements shall be conducted in accordance with method 3131 of MIL-STD-750. The following details shall apply:

- a. Collector current magnitude during power application shall be 3.14 A dc.
- b. Collector to emitter voltage magnitude shall be 20 V dc.
- c. Reference temperature measuring point shall be the case.
- d. Reference point temperature shall be $+25^{\circ}\text{C} \leq T_R \leq +75^{\circ}\text{C}$ and recorded before the test is started.
- e. Mounting arrangement shall be with heat sink to header.
- f. Maximum limit of $R_{\theta JC}$ shall be 0.875°C/W .

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* TABLE I. Group A inspection.

Inspection <u>1</u> /	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Thermal impedance <u>2</u> /	3131	See 4.3.2	$Z_{\theta JX}$			$^{\circ}C/W$
Collector - emitter breakdown voltage	3011	Bias condition D; $I_C = 200$ mA dc pulsed (see. 4.5.1)	$V_{(BR)CEO}$	60 80		V dc V dc
Collector - emitter cutoff current 2N5302 2N5303	3041	Bias condition D; $V_{CE} = 60$ V dc $V_{CE} = 80$ V dc	I_{CEO}		10.0	μA dc
Emitter - base cutoff current	3061	Bias condition D; $V_{EB} = 5$ V dc	I_{EBO}		5.0	μA dc
Collector - emitter cutoff current 2N5302 2N5303	3041	Bias condition A; $V_{BE} = 1.5$ V dc; $V_{CE} = 60$ V dc $V_{CE} = 80$ V dc	I_{CEX1}		5.0	μA dc
Collector - base cutoff current 2N5302 2N5303	3036	Bias condition D; $V_{CE} = 60$ V dc $V_{CE} = 80$ V dc	I_{CBO}		5.0	μA dc
Base - emitter saturated voltage	3066	Test condition A; $I_C = 10$ A dc; $I_B = 1$ A dc; pulsed (see 4.5.1)	$V_{BE(sat)1}$		1.7	V dc
Base - emitter saturated voltage 2N5302 2N5303	3066	Test condition A; $I_C = 15$ A dc; $I_B = 1.5$ A dc; pulsed (see 4.5.1)	$V_{BE(sat)2}$		1.8 2.0	V dc V dc
Base - emitter saturated voltage 2N5302 2N5303	3066	Test condition A; $I_C = 20$ A dc; pulsed (see 4.5.1); $I_B = 2$ A dc $I_B = 4$ A dc	$V_{BE(sat)3}$		2.5 2.5	V dc V dc

See footnotes at end of table.

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* TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued						
Base - emitter voltage (nonsaturated)	3066	Test condition B; $V_{CE} = 2$ V dc; pulsed (see 4.5.1);	V_{BE1}			
2N5302		$I_C = 15$ A dc			1.8	V dc
2N5303		$I_C = 10$ A dc			1.5	V dc
Base - emitter voltage (unsaturated)	3066	Test condition B; $V_{CE} = 4$ V dc, pulsed (4.5.1)	V_{BE2}			
2N5302		$I_C = 30$ A dc			3.0	V dc
2N5303		$I_C = 20$ A dc			2.5	V dc
Collector - emitter saturated voltage	3071	$I_C = 10$ A dc; $I_B = 1$ A dc; pulsed (see 4.5.1)	$V_{CE(sat)1}$			
2N5302					0.75	V dc
2N5303					1.0	V dc
Collector - emitter saturated voltage	3071	$I_C = 15$ A dc; $I_B = 1.5$ A dc; pulsed (see 4.5.1)	$V_{CE(sat)2}$			
2N5302					1.0	V dc
2N5303					1.5	V dc
Collector - emitter saturated voltage	3071	$I_C = 20$ A dc; pulsed (see 4.5.1);	$V_{CE(sat)3}$			
2N5302		$I_B = 2$ A dc			2.0	V dc
2N5303		$I_B = 4$ A dc			2.0	V dc
Collector - emitter saturated voltage 2N5302 (only)	3071	$I_C = 30$ A dc; pulsed (see 4.5.1); $I_B = 6$ A dc	$V_{CE(sat)4}$		3.0	V dc
Forward-current transfer ratio	3076	$V_{CE} = 2$ V dc; $I_C = 1$ A dc; pulsed (see 4.5.1)	h_{FE1}	40		
Forward-current transfer ratio	3076	$V_{CE} = 2$ V dc; pulsed (see 4.5.1);	h_{FE2}			
2N5302		$I_C = 15$ A dc			15	60
2N5303		$I_C = 10$ A dc			15	60
Forward-current transfer ratio	3076	$V_{CE} = 4$ V dc; pulsed (see 4.5.1);	h_{FE3}			
2N5302		$I_C = 30$ A dc			5	
2N5303		$I_C = 20$ A dc			5	

See footnotes at end of table.

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* TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u>						
High-temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current 2N5302 2N5303	3041	Bias condition A; $V_{BE} = 1.5\text{ V dc}$; $V_{CE} = 60\text{ V dc}$ $V_{CE} = 80\text{ V dc}$	I_{CEX2}		50	$\mu\text{A dc}$
Low-temperature operation:		$T_A = -55^\circ\text{C}$				
Forward current transfer ratio 2N5302 2N5303	3076	$V_{CE} = 2\text{ V dc}$; pulsed (see 4.5.1); $I_C = 15\text{ A dc}$ $I_C = 10\text{ A dc}$	h_{FE4}	7 7		
<u>Subgroup 4</u>						
Small-signal short-circuit forward-current transfer ratio	3206	$V_{CE} = 10\text{ V dc}$; $I_C = 1\text{ A dc}$; $f = 1\text{ kHz}$	h_{fe}	40	240	
Magnitude of small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = 10\text{ V dc}$; $I_C = 1\text{ A dc}$; $f = 1\text{ MHz}$	$ h_{fe} $	2	40	
Open circuit output capacitance	3236	$V_{CB} = 10\text{ V dc}$; $I_E = 0$; $100\text{ kHz} < f \leq 1\text{ MHz}$	C_{obo}		800	μF
Switching parameters:						
Pulse delay time		See figure 2	t_d		0.2	μs
Pulse rise time		See figure 2	t_r		0.9	μs
Pulse storage time		See figure 2	t_s		2.0	μs
Pulse fall time		See figure 2	t_f		1.0	μs
<u>Subgroup 5</u>						
Safe operating area (continuous dc)	3051	$T_C = 25^\circ\text{C}$; power application time $\geq 1\text{ sec}$, 1 cycle (see figures 3 and 4)				
<u>Test 1</u>						
2N5302		$V_{CE} = 6.67\text{ V dc}$; $I_C = 30\text{ A dc}$				
2N5303		$V_{CE} = 10\text{ V dc}$; $I_C = 20\text{ A dc}$				

See footnotes at end of table.

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* TABLE I. Group A inspection - Continued.

Inspection ^{1/}	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u> - Continued						
<u>Test 2</u>						
2N5302, 2N5303		$V_{CE} = 20 \text{ V dc}; I_C = 10 \text{ A dc}$				
<u>Test 3</u>						
2N5302, 2N5303		$V_{CE} = 40 \text{ V dc}; I_C = 3 \text{ A dc}$				
<u>Test 4</u>						
2N5302		$V_{CE} = 50 \text{ V dc}; I_C = 600 \text{ mA dc}$				
2N5303		$V_{CE} = 60 \text{ V dc}; I_C = 600 \text{ mA dc}$				
Safe operating area (clamped switching)		$T_A = 25^\circ\text{C};$ $V_{CE} = 15 \text{ V dc};$ (see figures 5 and 6)				
2N5302		Clamp voltage = 60 V dc; $I_C = 30 \text{ A dc}$				
2N5303		Clamp voltage = 80 V dc; $I_C = 20 \text{ A dc}$				
Electrical measurements		See table I, group A, subgroup 2				
<u>Subgroups 6 and 7</u>						
Not applicable						

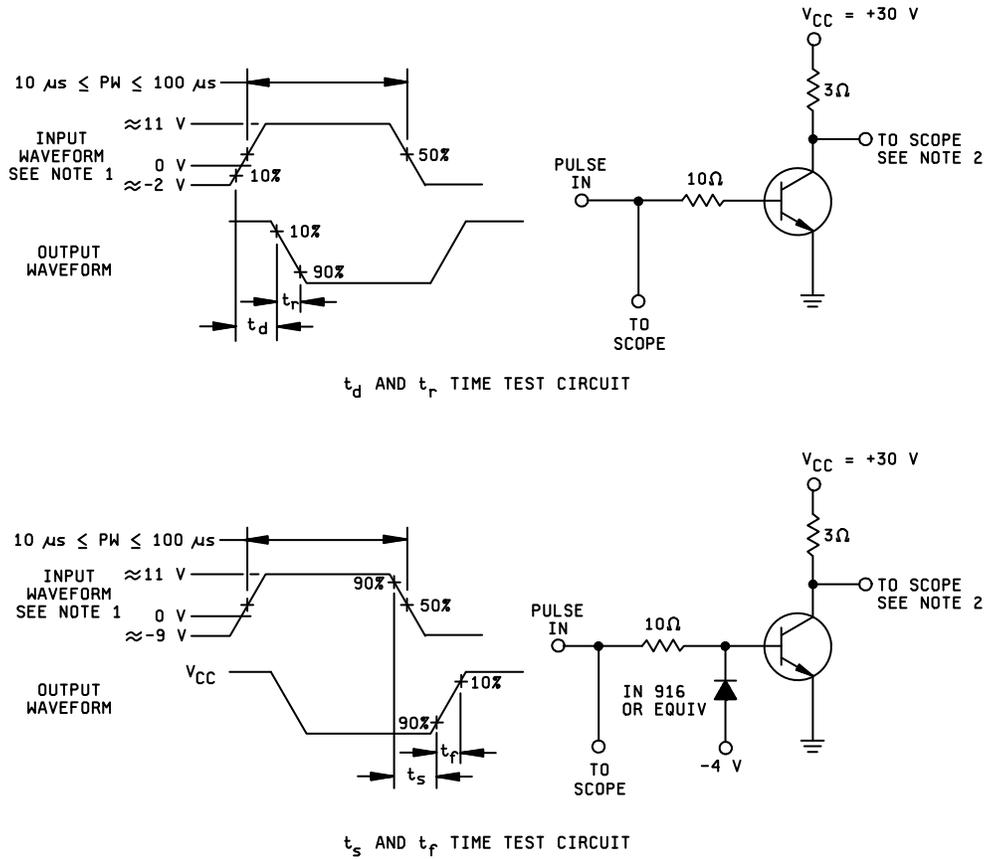
^{1/} For sampling plan see MIL-PRF-19500.

* ^{2/} This test required for the following end-points measurements only:
 Group B, subgroups 2 and 3 (JAN, JANTX, AND JANTXV).
 Group C, subgroups 2 and 6.
 Group E, subgroup 1.

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

Inspection	MIL-STD-750		Sample plan
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling	1051	Test condition C, 500 cycles.	
Hermetic seal	1071	Test conditions G or H.	
Fine leak		Test conditions C or D.	
Gross leak			
Electrical measurements		See table I, subgroup 2 herein.	
<u>Subgroup 2</u>			45 devices c = 0
Blocking life	1048	Test temperature = +125°C; V _{CB} = 30 V dc; T = 1,000 hours.	
Electrical measurements		See table I, subgroup 2 herein.	
<u>Subgroup 4</u>			
Thermal impedance curves		See table E-IX of MIL-PRF-19500, group E, subgroup 4.	
<u>Subgroup 6</u>			3 devices
ESD	1020		
<u>Subgroup 8</u>			45 devices c = 0
Reverse stability	1033	Condition B.	



NOTES:

1. The rise time (t_r) of the applied pulse shall be ≤ 2 ns; duty cycle ≤ 2 percent; generator source impedance shall be 50Ω .
2. Output sampling oscilloscope: $Z_{IN} \geq 100$ k Ω ; $C_{IN} \leq 12$ pF; rise time ≤ 0.2 ns.

FIGURE 2. Pulse response test circuit.

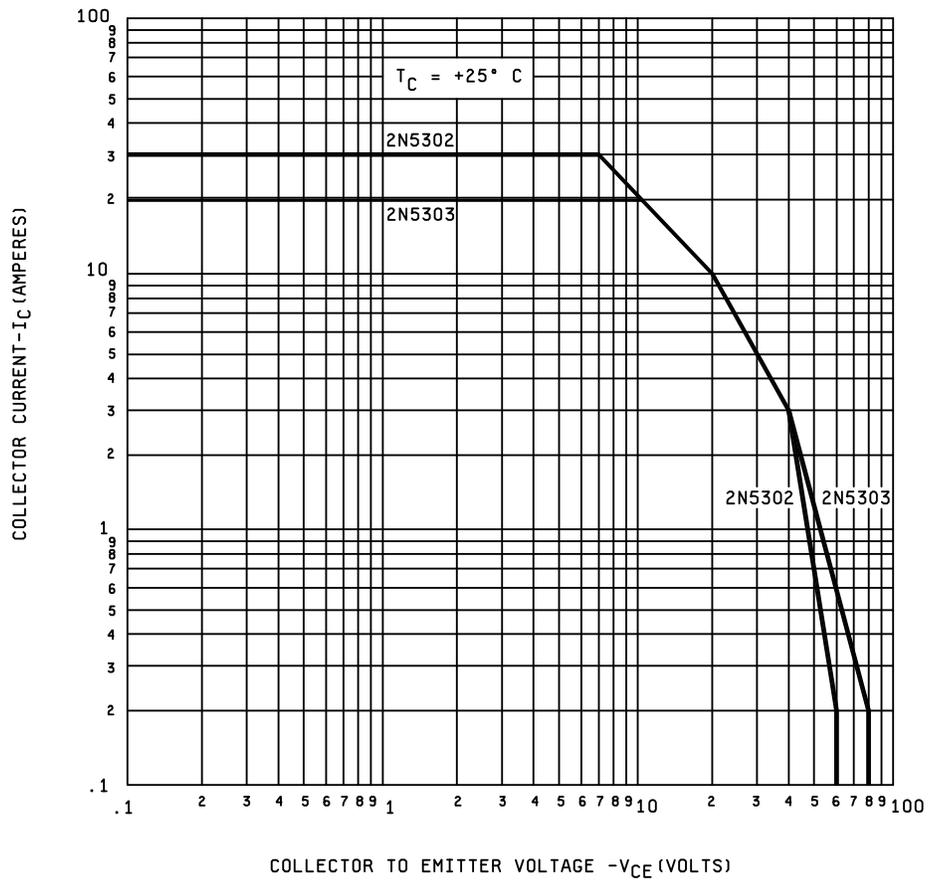


FIGURE 3. Maximum safe operating area graph dc.

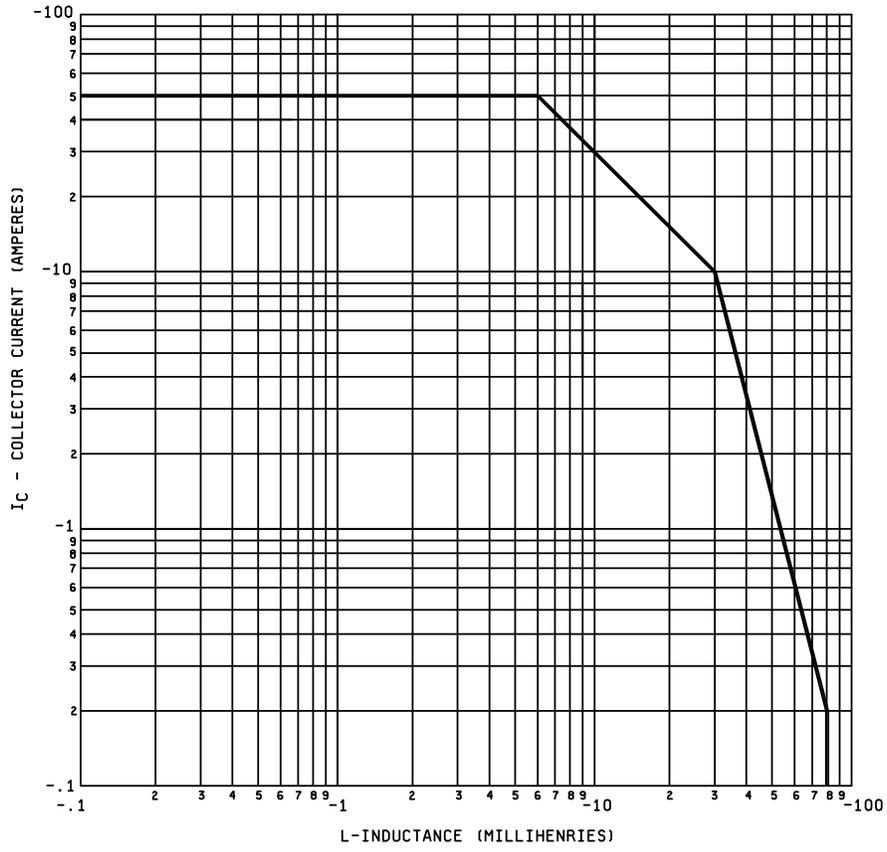
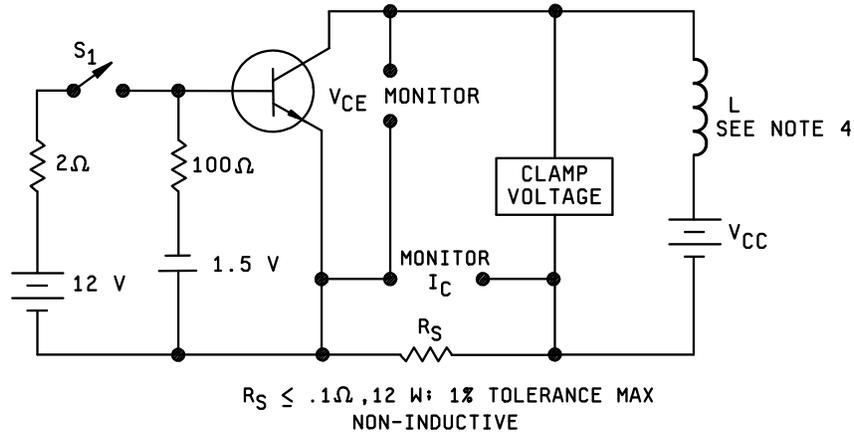


FIGURE 4. Safe operating area for switching between saturation and cutoff (unclamped inductive load).



*L = 2.0 mH (2 each 1 mH, 50 A, .001 Ω, Sanford Miller CK-50, or equivalent).

Procedure:

1. With switch S₁ closed, set the specified test conditions.
2. Open S₁. Device fails if the clamp voltage is not reached.
3. Perform specified endpoints tests.

FIGURE 5. Clamped inductive sweep test circuit.

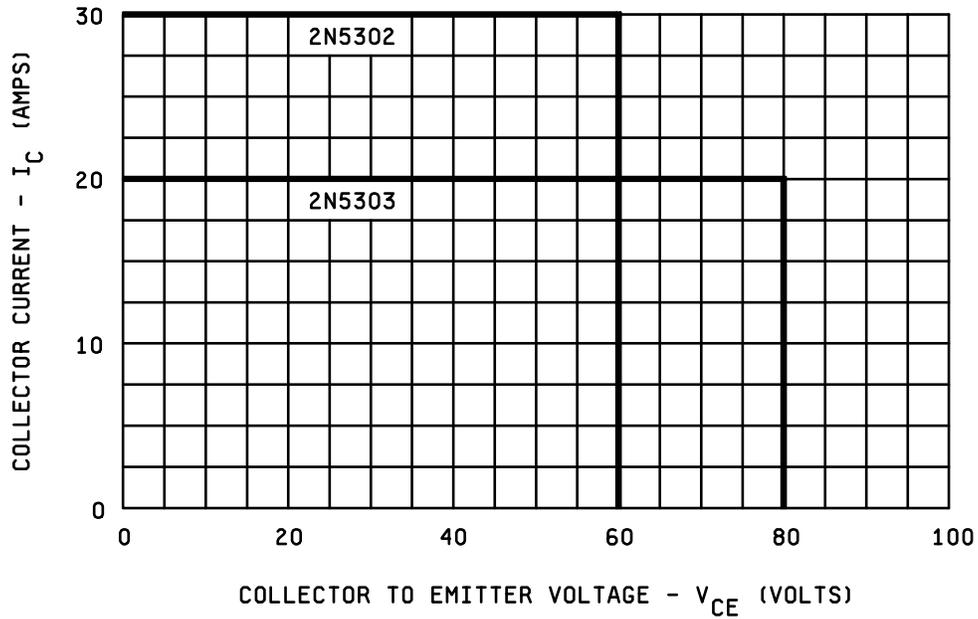


FIGURE 6. Safe operating area for switching between saturation and cutoff (clamped inductive load).

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.

* 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 Defense Supply Center, Columbus, ATTN: DSCC/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 <http://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.

MIL-PRF-19500/456E

Custodians:

Army - CR
Navy - EC
Air Force - 85
NASA - NA
DLA - CC

Preparing activity:

DLA - CC

(Project 5961-2008-119)

Review activities:

Army - AR, MI, SM
Navy - EC
Air Force - 19, 71, 99

* 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 <http://assist.daps.dla.mil>.