

The documentation and process conversion measures necessary to comply with this revision shall be completed by 18 January 2013.

INCH-POUND

MIL-PRF-19500/734A  
 16 October 2012  
 SUPERSEDING  
 MIL-PRF-19500/734  
 16 February 2006

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER DARLINGTON  
 TYPES 2N7569, 2N7570, AND 2N7571, 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, power darlington transistors. Four levels of product assurance are provided for each device type as specified in [MIL-PRF-19500](#).

1.2 Physical dimensions. The device package style is TO-204AA (formerly TO-3) in accordance with [figure 1](#).

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

Types	$P_T$		$R_{\theta JC}$ (2)	$V_{CBO}$ and $V_{CEX}$	$V_{CEO}$	$V_{EBO}$	$I_B$	$I_C$	$T_J$ and $T_{STG}$
	$T_A = +25^\circ\text{C}$	$T_C = +25^\circ\text{C}$ (1)							
	W	W	$^\circ\text{C}/\text{W}$	V dc	V dc	V dc	A dc	A dc	$^\circ\text{C}$
2N7569	6	175	1.0	350	300	4.0	2.5	20	-65 to +200
2N7570	6	175	1.0	400	350	4.0	2.5	20	-65 to +200
2N7571	6	175	1.0	450	400	4.0	2.5	20	-65 to +200

(1) See [figure 2](#) for temperature-power derating curves.

(2) See [figure 3](#) (thermal impedance graph).

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](mailto: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>.

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

Limits	$h_{FE1}$ (1) $V_{CE} = 5\text{ V dc}$ $I_C = 10\text{ A dc}$	$h_{FE2}$ (1) $V_{CE} = 5\text{ V dc}$ $I_C = 20\text{ A dc}$	$V_{BE(sat)}$ $I_C = 15\text{ A dc}$ $I_B = 1.2\text{ A dc}$	$V_{CE(sat)1}$ $I_C = 15\text{ A dc}$ $I_B = 1.2\text{ A dc}$	$V_{CE(sat)2}$ $I_C = 20\text{ A dc}$ $I_B = 1.2\text{ A dc}$
Min	75	50	V dc	V dc	V dc
Max	500		2.6	1.5	1.7

Limits	$ h_{fe} $	$C_{obo}$	Pulse response (2)			
	$V_{CE} = 10\text{ V dc}$ $I_C = 1\text{ A dc}$ $f = 1\text{ MHz}$	$V_{CB} = 10\text{ V dc}$ $I_E = 0$ $100\text{ KHz} < f < 1\text{ MHz}$	$t_d$	$t_r$	$t_s$	$t_f$
Min	25	$\mu\text{F}$	$\mu\text{s}$	$\mu\text{s}$	$\mu\text{s}$	$\mu\text{s}$
Max		375	0.1	0.3	1.2	0.3

(1) Pulsed (see 4.5.1).

(2) See figure 4 for pulse response circuits.

## 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

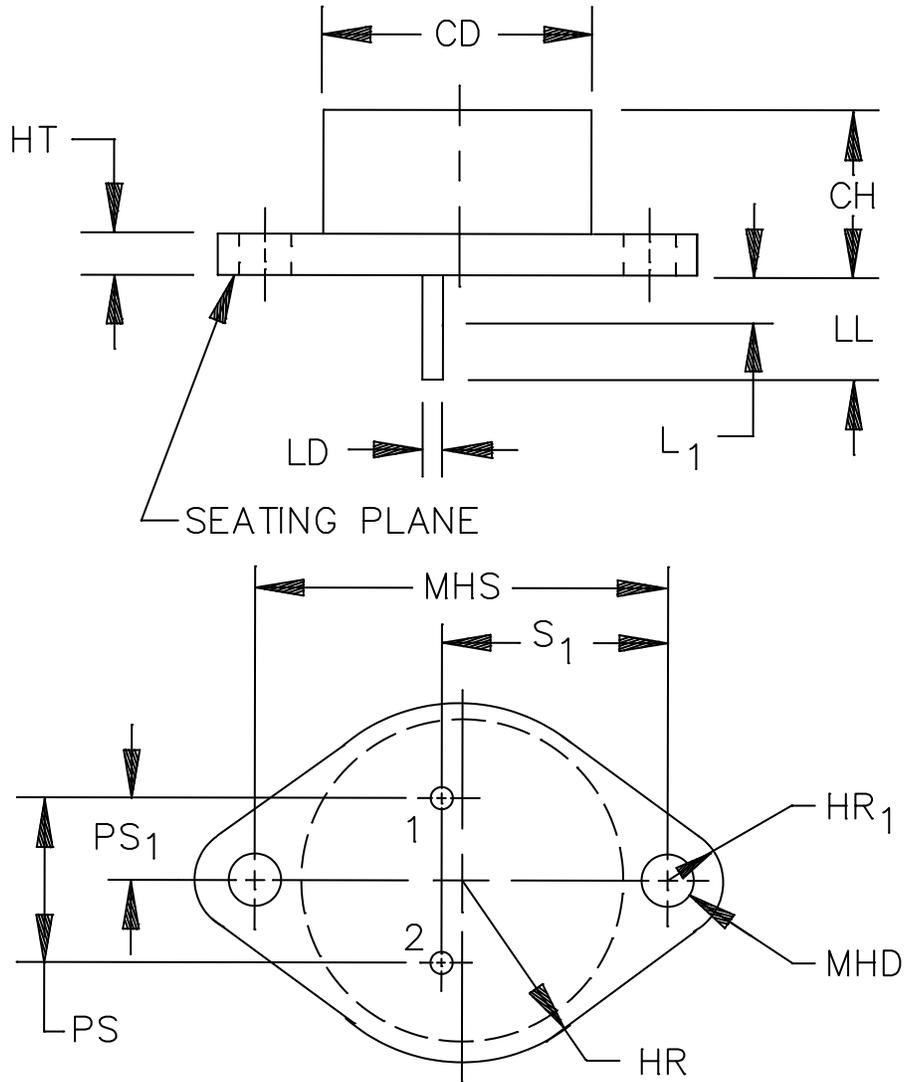
[MIL-PRF-19500](#) – Semiconductor Devices, General Specification for.

#### DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-750](#) – Test Methods for Semiconductor Devices.

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



I

FIGURE 1. Physical dimensions (TO-204AA, formerly TO-3).

Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	2
CH	.250	.450	6.35	11.43	
HR	.495	.525	12.57	13.34	
HR <sub>1</sub>	.131	.188	3.33	4.78	3
HT	.060	.135	1.52	3.43	
L <sub>1</sub>		.050		1.27	4, 5
LD	.038	.043	0.97	1.09	4, 5
LL	.312	.500	7.92	12.70	4
MHD	.151	.161	3.84	4.09	6
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	4, 7, 8
PS <sub>1</sub>	.205	.225	5.21	5.72	4, 7, 8
S <sub>1</sub>	.655	.675	16.64	17.15	7

## NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Body contour is optional within zone defined by dimension CD.
3. At both ends.
4. Both terminals.
5. Dimension LD applies between L<sub>1</sub> and LL. Lead diameter shall not exceed twice dimension LD within dimension L<sub>1</sub>. Diameter is uncontrolled in dimension L<sub>1</sub>.
6. Two holes.
7. These dimensions shall be measured at points .050 inch (1.27 mm) to .055 inch (1.40 mm) below the seating plane. When gauge is not used, measurement shall be made at seating plane.
8. 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.
9. Terminal 1 is the emitter, terminal 2 is base. The collector shall be electrically connected to the case.
10. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi$  symbology.

FIGURE 1. Physical dimensions (TO-204AA, formerly TO-3) – Continued.

### 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 manufacturer's list (QML) before contract award (see [4.2](#) and [6.3](#)).

3.3 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein shall be as specified in [MIL-PRF-19500](#) and as follows:

$I_H$	-	The collector current applied to the device under test during the heating period.
$I_M$	-	The measurement current applied to forward bias the junction for measurement of $V_{BE}$ .
$t_H$	-	The duration of the applied heating power pulse.
$t_{sw}$	-	Sample window time during which final $V_{BE}$ measurement is made.

3.4 Interface requirements and physical dimensions. The Interface requirements and physical dimensions shall be as specified in [MIL-PRF-19500](#) and on [figure 1](#) (TO-204AA, similar to TO-3) herein.

3.4.1 Lead finish. Unless otherwise specified, lead finish shall be solderable in accordance with [MIL-STD-750](#), [MIL-PRF-19500](#), and herein. Where a choice of lead finish or formation is desired, it shall be specified in the acquisition document (see [6.2](#)).

3.4.2 Polarity. The identification of terminals of the device package shall be as shown on [figure 1](#). Terminal 1 shall be connected to the emitter and terminal 2 shall be connected to the base. The collector shall be electrically connected to the case.

3.5 Marking. Marking shall be in accordance with [MIL-PRF-19500](#).

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

3.7 Electrical test requirements. The electrical test requirements shall be as specified in [table I](#).

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](#) 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 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.

4.3 Screening (JANS, JANTXV, and JANTX levels 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 (see table E-IV of MIL-PRF-19500)	Measurement	
	JANS	JANTX and JANTXV
3c (1)	Thermal impedance (see 4.3.1)	Thermal impedance (see 4.3.1)
7	Optional.	Optional.
9	$I_{CEX1}$	$I_{CEX1}$
11	$I_{CEX1}$ and $h_{FE2}$ , $\Delta I_{CEX1}$ = 100 percent of initial value or 100 nA dc, whichever is greater.	$I_{CEX1}$ and $h_{FE2}$ , $\Delta I_{CEX1}$ = 100 percent of initial value or 100 nA dc, whichever is greater.
12	See 4.3.2	See 4.3.2
13	See subgroups 2 and 3 of table I herein. $\Delta I_{CEX1}$ = 100 percent of initial value or 50 nA dc, whichever is greater. $\Delta h_{FE2}$ = $\pm 15$ percent of initial value.	See subgroup 2 of table I herein. $\Delta I_{CEX1}$ = 100 percent of initial value or 100 nA dc, whichever is greater. $\Delta h_{FE2}$ = $\pm 25$ percent of initial value.
14	Required.	Required.

- (1) This test 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 Thermal impedance. The thermal impedance measurements shall be performed in accordance with test method 3131 of MIL-STD-750 using the guidelines in that test method for determining  $I_H$ ,  $I_M$ ,  $t_H$ ,  $t_{SW}$ , (and  $V_H$  where appropriate). Measurement delay time ( $t_{MD}$ ) = 70  $\mu$ s maximum. The thermal impedance limit used in 4.3, screen 3c, and table I, subgroup 2 herein shall be set statistically by the supplier. See group E inspection (table II, subgroup 4) herein.

4.3.2 Power burn-in conditions. Power burn-in conditions shall be as follows:  $T_J$  = +175°C minimum,  $V_{CB}$  greater than or equal to 25 V dc;  $T_A$  = +30°C maximum.

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. Group B inspection in accordance with subgroup 1 of table E-VIB of MIL-PRF-19500 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 table E-V of MIL-PRF-19500 and table I herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 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) or table E-VIB (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable step of 4.6 herein.

4.4.2.1 Product assurance level JANS (table E-VIA of MIL-PRF-19500).

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B4	1037	For solder die attach: 2,000 cycles, $V_{CB}$ greater than or equal to 100 V dc.
B5	1027	For eutectic die attach: $V_{CB}$ greater than or equal to 100 V dc; adjust $P_T$ to achieve $T_J = +175^\circ\text{C}$ minimum; $T_A = +30^\circ\text{C}$ maximum

4.4.2.2 Product assurance levels JAN, JANTX, and JANTXV (table E-VIB of MIL-PRF-19500).

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
B3	1027	For eutectic die attach: $V_{CB}$ greater than or equal to 25 V dc; adjust $P_T$ to achieve $T_J = +175^\circ\text{C}$ minimum; $T_A = +30^\circ\text{C}$ maximum
B3	1037	For solder die attach: 2,000 cycles, $V_{CB}$ greater than or equal to 100 V dc.

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

<u>Subgroup</u>	<u>Method</u>	<u>Conditions</u>
C2	2036	Test condition A; weight = 10 pounds; time = 15 s.
C5	3131	See 4.3.1, $R_{\theta JC} = 1.0^\circ\text{C/W}$ .
C6	1027	For eutectic die attach: $V_{CB}$ greater than or equal to 100 V dc; adjust $P_T$ to achieve $T_J = +175^\circ\text{C}$ minimum; $T_A = +30^\circ\text{C}$ maximum, 1,000 hours minimum.
C6	1037	For solder die attach: 6,000 cycles, $V_{CB}$ greater than or equal to 100 V dc.

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the tests and conditions specified for subgroup testing in appendix E, table E-IX of MIL-PRF-19500 and as specified in table II herein. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta requirements shall be in accordance with the applicable step of 4.6 herein.

4.5 Method of inspection. Methods of inspection shall be as specified in the appropriate tables and as follows.

4.5.1 Pulse response measurements. The conditions for pulse response measurement shall be as specified in section 4 of MIL-STD-750.

4.6 Delta measurements. The requirements for delta measurements for groups B, C, and E shall be as specified below.

Steps	Inspection (1) (2) (3) (4) (5)	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1	Collector to base cutoff current  2N7569 2N7570 2N7571	3036	Bias condition D  $V_{CB} = 350 \text{ V dc}$ $V_{CB} = 400 \text{ V dc}$ $V_{CB} = 450 \text{ V dc}$	$\Delta I_{CBO}$	100 percent of initial value or 100 nA, whichever is greater.		
2	Forward – current transfer ratio	3076	$V_{CE} = 5 \text{ V dc}$ ; $I_C = 20 \text{ A dc}$ ; pulsed (see 4.5.1)	$\Delta h_{FE2}$	±25 percent change from initial reading.		
3	Saturation voltage, collector to emitter	3071	$I_C = 15 \text{ A dc}$ ; $I_B = 1.2 \text{ A dc}$ , pulsed (see 4.5.1)	$\Delta V_{CE(sat)1}$	±200 mV change from previously measured value.		

- (1) Devices which exceed the group A limits for this test shall not be acceptable.
- (2) The delta electrical measurements for group B, product assurance level JANS shall be as follows:
  - a. In addition to the measurements specified for subgroup 4 of table E-VIA of MIL-PRF-19500, the measurements of steps 1 and 2 of this table shall also be taken.
  - b. In addition to the measurements specified for subgroup 5 of table E-VIA of MIL-PRF-19500, the measurements of steps 1 and 2 of this table shall also be taken.
- (3) The delta electrical measurements for group B, product assurance levels JAN, JANTX, and JANTXV shall be as follows:
  - a. In addition to the measurements specified for subgroup 3 of table E-VIB of MIL-PRF-19500, the measurements of steps 1 and 2 of this table shall also be taken.
  - b. In addition to the measurements specified for subgroup 6 of table E-VIB of MIL-PRF-19500, the measurements of step 2 of this table shall also be taken.
- (4) The delta electrical measurements for group C, all product assurance levels, shall be as follows:
  - a. In addition to the measurements specified for subgroup 2 of table E-VII of MIL-PRF-19500, the measurements of step 1 of this table shall also be taken.
  - b. In addition to the measurements specified for subgroup 3 of table E-VII of MIL-PRF-19500, the measurements of step 1 of this table shall also be taken.
  - c. In addition to the measurements specified for subgroup 6 of table E-VII of MIL-PRF-19500, the measurements of steps 1, 2, and 3 of this table shall also be taken.
- (5) The delta measurements for group E, all product assurance levels, shall be as follows: In addition to the measurements specified for subgroups 1 and 2 of table E-IX of MIL-PRF-19500, the measurements of steps 1, 2, and 3 of this table shall also be taken.

TABLE I. Group A inspection.

Inspection <u>1</u> /	MIL-STD-750		Symbol	Limit		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 4.3.1	$Z_{\theta JX}$			°C/W
Breakdown voltage, collector to emitter	3011	Bias condition D, $I_C = 200$ mA dc; pulsed (see 4.5.1)	$V_{(BR)CEO}$	300 350 400		V dc V dc V dc
2N7569						
2N7570						
2N7571						
Collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5$ V dc	$I_{CEX1}$			
2N7569		$V_{CE} = 350$ V dc			0.1	mA dc
2N7570		$V_{CE} = 400$ V dc			0.1	mA dc
2N7571		$V_{CE} = 450$ V dc			0.1	mA dc
Collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5$ V dc	$I_{CEO}$			
2N7569		$V_{CE} = 300$ V dc			0.1	mA dc
2N7570		$V_{CE} = 350$ V dc			0.1	mA dc
2N7571		$V_{CE} = 400$ V dc			0.1	mA dc
Collector to base cutoff current	3036	Bias condition D;	$I_{CBO}$			
2N7569		$V_{CBO} = 350$ V dc			0.1	mA dc
2N7570		$V_{CBO} = 400$ V dc			0.1	mA dc
2N7571		$V_{CBO} = 450$ V dc			0.1	mA dc
Emitter to base cutoff current	3061	Bias condition D, $V_{EB} = 4$ V dc	$I_{EBO}$		300	mA dc
Base emitter voltage (saturated)	3066	Test condition A; $I_C = 15$ A dc; pulsed (see 4.5.1); $I_B = 1.2$ A dc	$V_{BE(SAT)}$		2.6	V dc
Saturation voltage; collector to emitter	3071	$I_C = 15$ A dc; pulsed (see 4.5.1) $I_B = 1.2$ A dc	$V_{CE(SAT)1}$		1.5	V dc
Saturation voltage; collector to emitter	3071	$I_C = 20$ A dc; pulsed (see 4.5.1) $I_B = 1.2$ A dc	$V_{CE(SAT)2}$		1.7	V dc
Forward-current transfer ratio	3076	$V_{CE} = 5$ V dc; $I_C = 10$ A dc; pulsed (see 4.5.1)	$h_{FE1}$	75	500	
Forward-current transfer ratio	3076	$V_{CE} = 5$ V dc; $I_C = 20$ A dc; pulsed (see 4.5.1)	$h_{FE2}$	50		

See footnotes at end of table.

TABLE I. Group A inspection – Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u>						
High-temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current	3041	Bias condition A; $V_{BE} = -1.5\text{ V dc}$	$I_{CEX2}$			
2N7569		$V_{CE} = 350\text{ V dc}$			5.0	mA dc
2N7570		$V_{CE} = 400\text{ V dc}$			5.0	mA dc
2N7571		$V_{CE} = 400\text{ V dc}$			5.0	mA dc
Low-temperature operation:		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = 5\text{ V dc}$ ; $I_C = 10\text{ A dc}$ ; pulsed (see 4.5.1)	$h_{FE3}$	20		
<u>Subgroup 4</u>						
Magnitude of common emitter 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} $	25		
Open circuit output capacitance	3236	$V_{CB} = 10\text{ V dc}$ ; $I_E = 0$ ; $100\text{ kHz} \leq f \leq 1.0\text{ MHz}$	$C_{obo}$	150	375	pF
Pulse response	3251	Test condition A except test circuit and pulse requirements in accordance with figure 4, $T_A = +25^\circ\text{C}$ , $V_{CC} = 300\text{V}$ , $I_C = 10\text{A}$ , $I_{B1} = 0.5\text{A}$ , $V_{BE(off)} = -5\text{V}$ , $t_p = 50\text{ }\mu\text{s}$				
Pulse delay time			$t_d$		0.1	$\mu\text{s}$
Pulse rise time			$t_r$		0.3	$\mu\text{s}$
Pulse storage time			$t_s$		1.2	$\mu\text{s}$
Pulse fall time			$t_f$		0.3	$\mu\text{s}$
<u>Subgroup 5</u>		$T_C = +25^\circ\text{C}$				
Safe operating area (continuous dc)	3051	$t = 1\text{ s}$ ; 1 cycle; see figure 5				
<u>Test 1</u>						
All device types		$V_{CE} = 8.0\text{ V dc}$ ; $I_C = 20\text{ A dc}$				

See footnotes at end of table.

TABLE I. Group A inspection – Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limit		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u> – Continued.						
<u>Test 2</u>						
All device types		$V_{CE} = 30 \text{ V dc}; I_C = 3.0 \text{ A dc}$				
<u>Test 3</u>						
All device types		$V_{CE} = 100 \text{ V dc}; I_C = 0.17 \text{ A dc}$				
<u>Test 4</u>						
2N7569		$V_{CE} = 300 \text{ V dc}; I_C = 20 \text{ mA dc}$				
2N7570		$V_{CE} = 350 \text{ V dc}; I_C = 20 \text{ mA dc}$				
2N7571		$V_{CE} = 400 \text{ V dc}; I_C = 20 \text{ mA dc}$				
Safe operating area (switching); inductive collector to emitter sustaining voltage. (clamped at rated $V_{CE0}$ )	3053	$T_A = +25^\circ\text{C}, I_C = 2\text{A}, I_{B1} = 0.1\text{A},$ $I_{B2} = 0\text{A}, L = 1\text{mH}$	$V_{CE0(sus)}$			
2N7569		Clamp voltage = 300 V dc		300		V dc
2N7570		Clamp voltage = 350 V dc		350		V dc
2N7571		Clamp voltage = 400 V dc		400		V dc
Safe operating area (switching); inductive collector to emitter sustaining voltage. (clamped at rated $V_{CE0}$ )	3053	$T_A = +25^\circ\text{C}, I_C = 2 \text{ A}, I_{B1} = 0.5 \text{ A},$ $V_{BE(off)} = 1\text{V}, L = 1 \text{ mH}$	$V_{CEX(sus)}$			
2N7569		Clamp voltage = 300 V dc		300		V dc
2N7570		Clamp voltage = 350 V dc		350		V dc
2N7571		Clamp voltage = 400 V dc		400		V dc
<u>Subgroups 6 and 7</u>						
Not applicable						

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

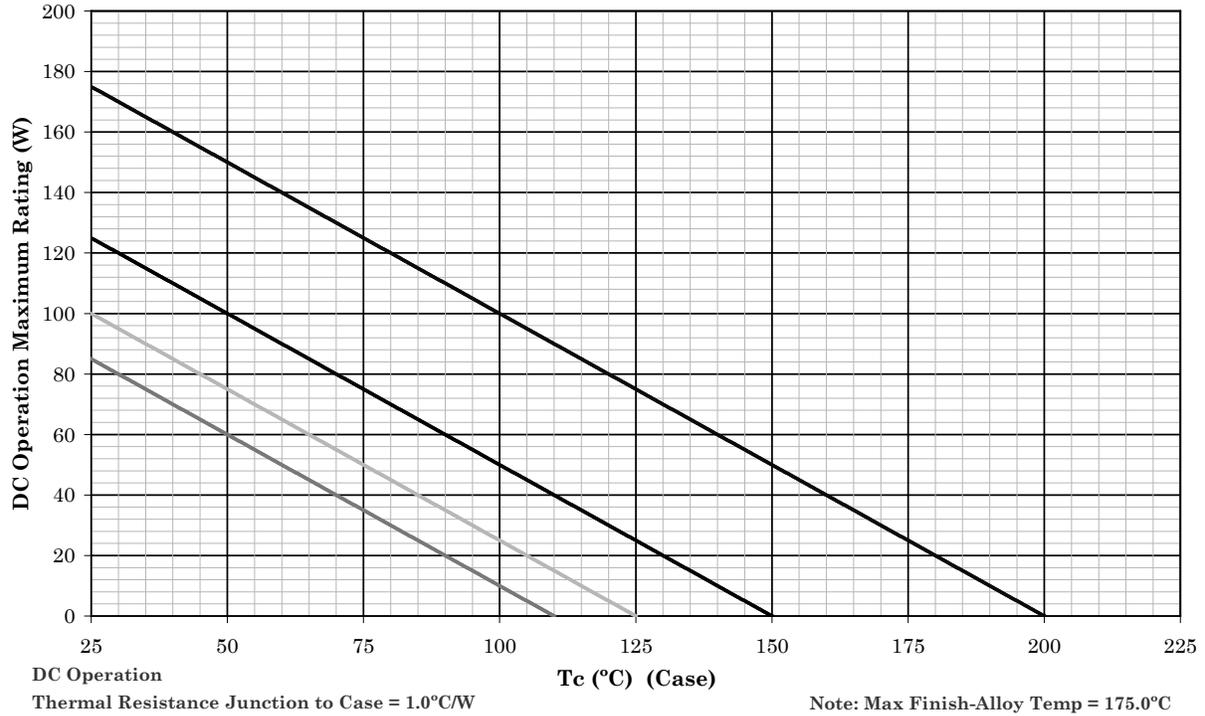
2/ This test required for the following end-point measurements only:  
 Group B, subgroups 3, 4, and 5 (JANS).  
 Group B, subgroups 2 and 3 (JAN, JANTX, and JANTXV).  
 Group C, subgroups 2 and 6.  
 Group E, subgroup 1.

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

Inspection	MIL-STD-750		Qualification sample plan
	Method	Conditions	
<u>Subgroup 1</u>			45 devices c = 0
Temperature cycling (air to air)	1051	500 cycles.	
Hermetic seal	1071		
Fine leak Gross leak			
Electrical measurements		See <a href="#">table I</a> , subgroup 2 and <a href="#">4.6</a> herein.	
<u>Subgroup 2</u>			45 devices c = 0
Blocking life	1048	Test temperature = +125°C; V <sub>CB</sub> = 80 percent rated; T = 1,000 hours.	
Electrical measurements		See <a href="#">table I</a> , subgroup 2 and <a href="#">4.6</a> herein.	
<u>Subgroup 4</u>			Sample size N/A
Thermal impedance curves		See <a href="#">MIL-PRF-19500</a> .	
<u>Subgroup 5</u>			15 devices c = 0
Barometric pressure (reduced)	1001	Test condition C. See <a href="#">1.3</a> .	
<u>Subgroup 6</u>			11 devices
Electrostatic discharge sensitivity classification	1020		
<u>Subgroup 8</u>			45 devices c = 0
Reverse voltage leakage stability	1033	Condition A for all devices.	

### Temperature-Power Derating Curve

2N7569, 2N7570, 2N7571

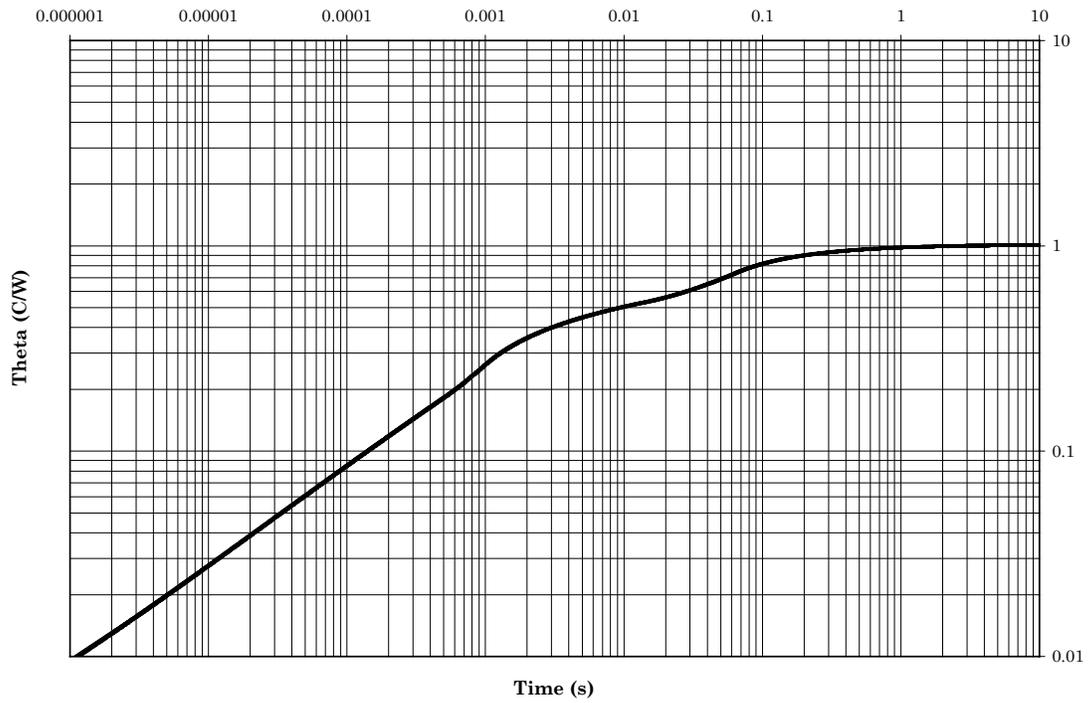


NOTES:

1. All devices are capable of operating at less than or equal to  $T_J$  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 ( $T_J \leq +200^\circ\text{C}$ ) and power rating specified. (See 1.3 herein.)
3. Derate design curve chosen at  $T_J \leq +150^\circ\text{C}$ , where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at  $T_J \leq +125^\circ\text{C}$ , and  $+110^\circ\text{C}$  to show power rating where most users want to limit  $T_J$  in their application.

FIGURE 2. Temperature-power derating graph.

**Maximum Thermal Impedance**  
**TO-204AA Package (formerly TO-3)**  
 $T_C = +25^\circ\text{C}$



$R_{\theta JC} = 1.0^\circ\text{C/W max.}$

FIGURE 3. Thermal impedance graph.

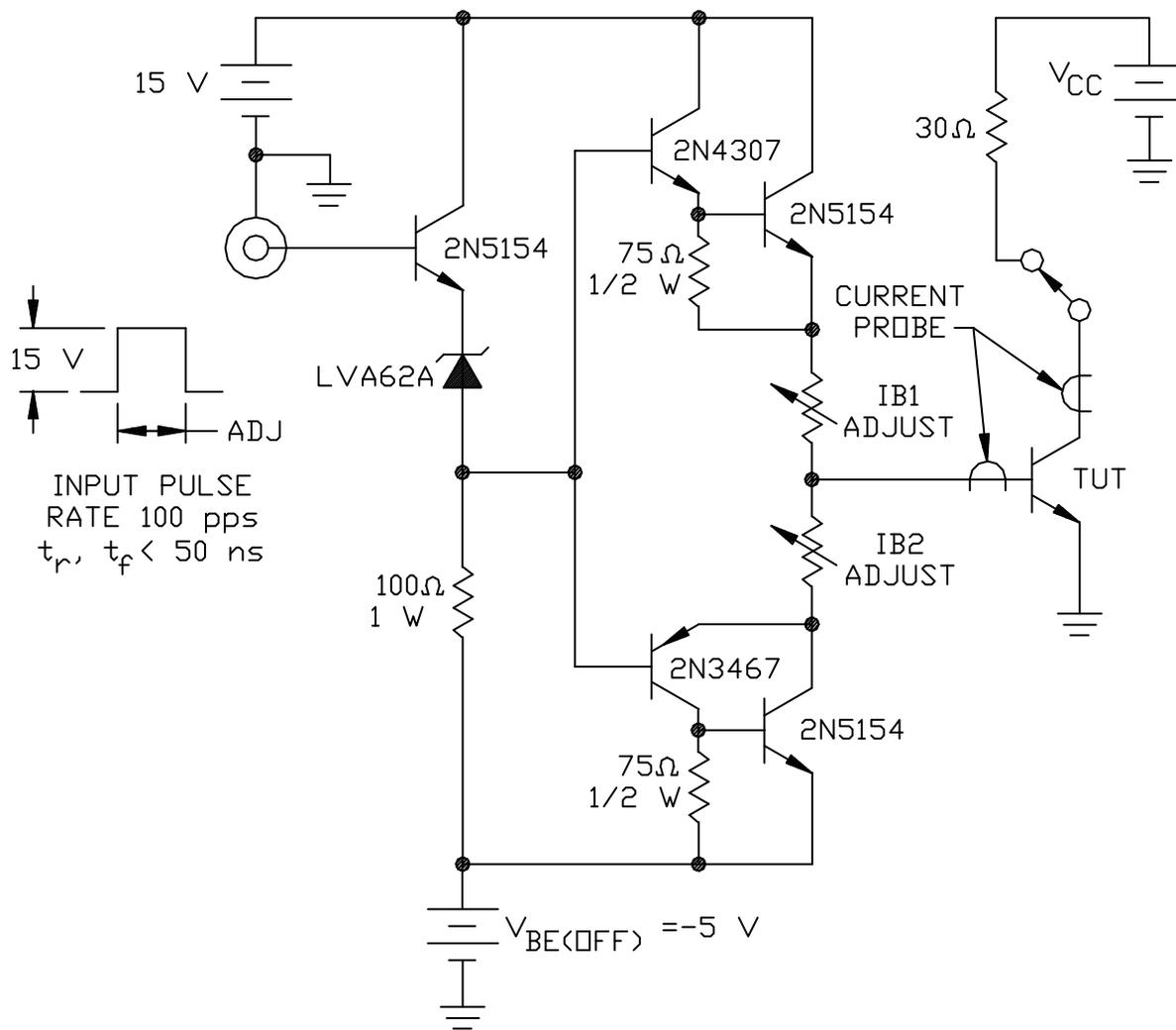


FIGURE 4. Pulse response test circuit.

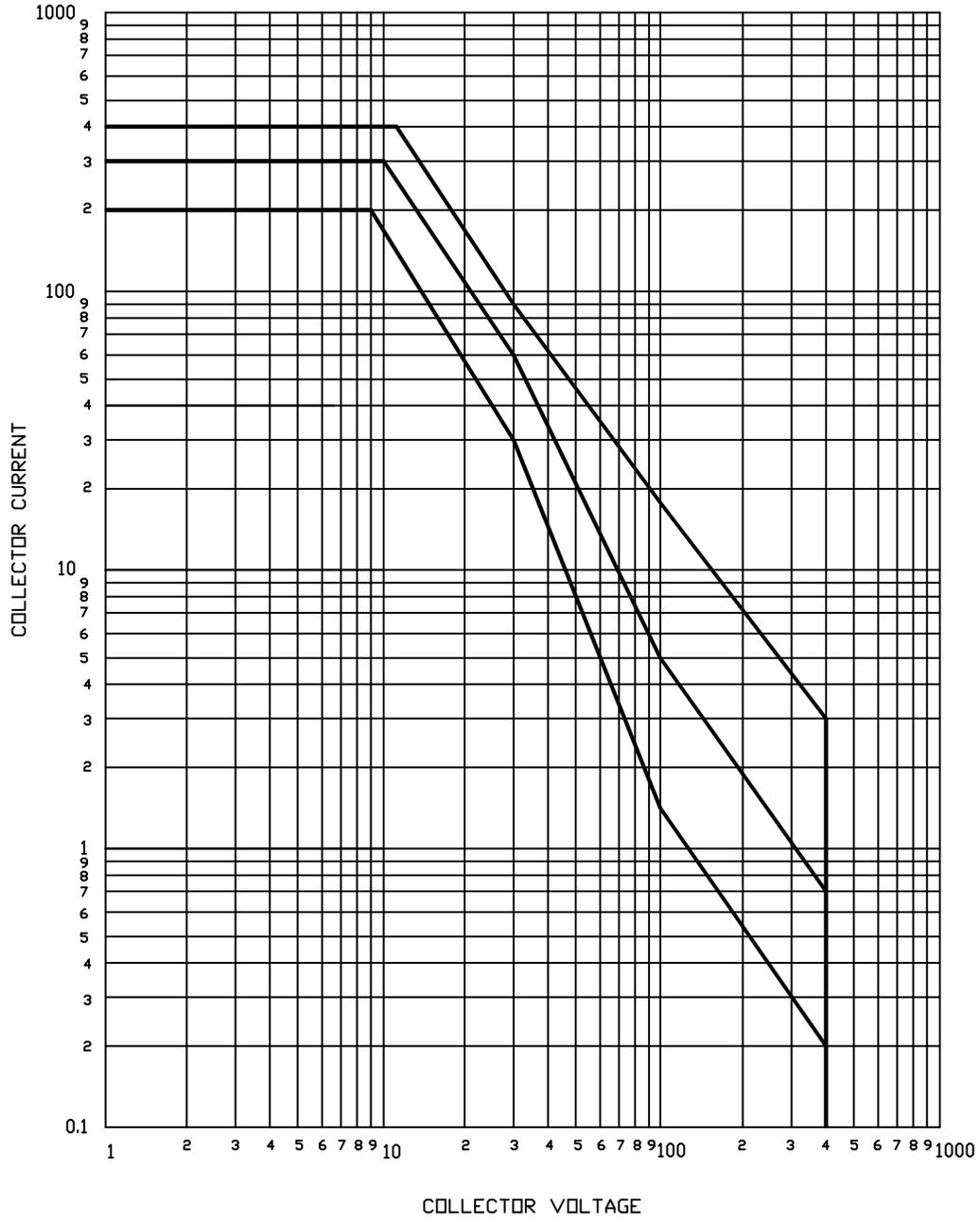


FIGURE 5. Maximum safe operating area graph.

## 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. Quality 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 DLA Land and Maritime, ATTN: VQE, P.O. Box 3990, Columbus, OH 43218-3990 or e-mail [vqe.chief@dla.mil](mailto: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 Changes from previous issue. The margins of this specification are marked with vertical lines 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 5961-2012-005)

Review activities:  
Army – MI  
Air Force – 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 <https://assist.dla.mil>.