

The documentation and process conversion measures necessary to comply with this revision shall be completed by 22 April 2016.

INCH-POUND

MIL-PRF-19500/515E  
 22 January 2016  
 SUPERSEDING  
 MIL-PRF-19500/515D  
 12 March 2007

PERFORMANCE SPECIFICATION SHEET

\* TRANSISTOR, PNP, SILICON, POWER, THROUGH HOLE, TYPES 2N6378 AND 2N6379, QUALITY LEVELS JAN, JANTX, JANTXV, AND JANHC

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 PNP silicon, through hole power transistors for power applications. Three levels of product assurance (JAN, JANTX, and JANTXV) are provided for each encapsulated device type. One level of product assurance (JANHC) is provided for each unencapsulated device.

\* 1.2 Package outlines. The device package outlines are as follows: TO-3 in accordance with [figure 1](#) for all encapsulated device types. See [figure 2](#) for unencapsulated devices.

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

Types	$P_T$ $T_C = +25^\circ\text{C}$ (1)	$P_T$ $T_C = +100^\circ\text{C}$ (1)	$R_{\theta JC}$	$V_{CBO}$	$V_{CEO}$	$V_{EBO}$	$I_B$	$I_C$	$T_J$ and $T_{STG}$
	<u>W</u>	<u>W</u>	<u>°C/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>
2N6378	250	143	0.7	-120	-100	-6	-20	-50	-65 to +200
2N6379	250	143	0.7	-140	-120	-6	-20	-50	-65 to +200

(1) Between  $T_C = +25^\circ\text{C}$  and  $T_C = +200^\circ\text{C}$ , linear derating factor (average) = 1.43 W/°C.

\* 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>.

AMSC N/A

FSC 5961



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

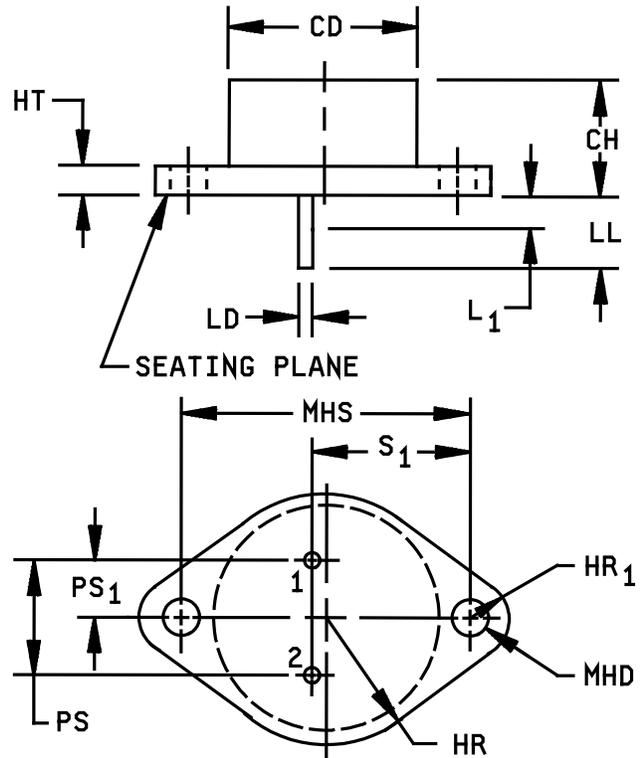
Type	hFE3		hFE2		V <sub>BE(sat)</sub>		V <sub>CE(sat)</sub>	
	V <sub>CE</sub> = -4 V dc I <sub>C</sub> = -50 A dc (1)		V <sub>CE</sub> = -4 V dc I <sub>C</sub> = -20 A dc (1)		I <sub>C</sub> = -20 A dc I <sub>B</sub> = -2 A dc		I <sub>C</sub> = -20 A dc I <sub>B</sub> = -2 A dc	
	Min	Max	Min	Max	V dc		V dc	
2N6378	10		30	120	Min	Max	Min	Max
2N6379	10		30	120		1.8		1.0
						1.8		1.0

Type	C <sub>obo</sub>		h <sub>fe</sub>		Pulse response	
	V <sub>CB</sub> = -10 V dc I <sub>E</sub> = 0 0.1 MHz ≤ f ≤ 1 MHz		V <sub>CE</sub> = -10 V dc I <sub>C</sub> = -1 A dc f = 10 MHz		t <sub>on</sub>	t <sub>off</sub>
	pF		Min	Max	μs Max	μs Max
2N6378	Min	Max	3	12	0.5	1.05
2N6379		1500	3	12	0.5	1.05

(1) Pulsed (see 4.5.1).

- \* 1.5 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.
- \* 1.5.1 JAN certification mark and quality level 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", and "JANTXV".
- \* 1.5.2 JAN certification mark and quality level for unencapsulated devices (die). The quality level designators for unencapsulated devices (die) that are applicable for this specification sheet is: "JANHC".
- \* 1.5.3 Device type. The designation system for the device types of transistors covered by this specification sheet are as follows.
  - \* 1.5.3.1 First number and first letter symbols. The transistors of this specification sheet use the first number and letter symbols "2N".
  - \* 1.5.3.2 Second number symbols. The second number symbols for the transistors covered by this specification sheet are as follows: "6378" and "6379".
- \* 1.5.4 Die identifiers for unencapsulated devices (manufacturers and critical interface identifiers). The manufacturer die identifiers that are applicable for this specification sheet is "A" (see [figure 2](#) and 6.5.2).
- \* 1.5.5 Lead finish. The lead finishes applicable to this specification sheet are listed on [QPDSIS-19500](#).

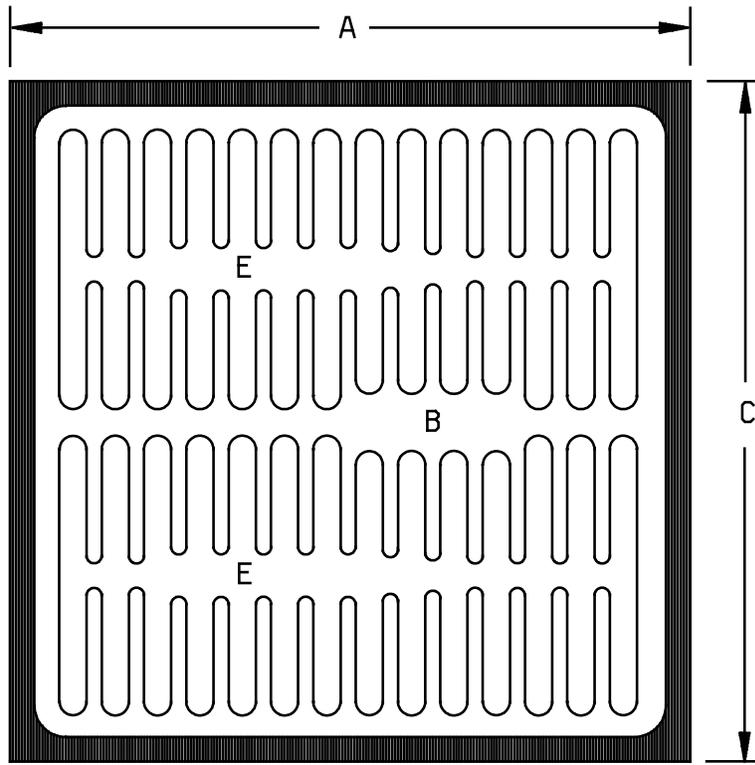
Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		.875		22.23	3
CH	.270	.380	6.86	9.65	
HR	.495	.525	12.57	13.34	
HR1	.131	.188	3.33	4.78	
HT	.060	.135	1.52	3.43	
L1		.050		1.27	5, 9
LD	.057	.063	1.45	1.60	5, 9
LL	.312	.500	7.92	12.70	5
MHD	.151	.161	3.84	4.09	7
MHS	1.177	1.197	29.90	30.40	
PS	.420	.440	10.67	11.18	4
PS1	.205	.225	5.21	5.72	4, 5
S1	.655	.675	16.64	17.15	4



## NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Body contour is optional within zone defined by CD
4. These dimensions shall be measured at points .050 (1.27 mm) to .055 (1.40 mm) below seating plane. When gauge is not used, measurement shall be made at seating plane.
5. Both terminals.
6. At both ends.
7. Two holes.
8. Terminal 1 is the emitter, terminal 2 is base. The collector shall be electrically connected to the case.
9. LD applies between L1 and LL. Lead diameter shall not exceed twice LD within L1.
10. In accordance with ASME Y14.5M, diameters are equivalent to  $\phi x$  symbology.

FIGURE 1. Physical dimensions (TO-3).



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.231	.235	5.87	5.97
C	.231	.235	5.87	5.97

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Unless otherwise specified, tolerance is  $\pm 0.005$  inches (0.13 mm).
4. The physical characteristics of the die are:  
 Thickness: .008 inch (0.20 mm) to .012 inch (0.30 mm).  
 Top metal: Aluminum 40,000 Å minimum, 50,000 Å nominal.  
 Back metal: Gold 2,500 Å minimum, 3,000 Å nominal.  
 Back side: Collector.  
 Bonding pad: B = .016 inch (0.41 mm) x .060 inch (1.52 mm).  
 E = .016 inch (0.41 mm) x .070 inch (1.78 mm).

FIGURE 2 Physical dimensions JANHC die.

## 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 <http://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 manufacturer's list (QML) 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. The Interface and physical dimensions shall be as specified in [MIL-PRF-19500](#), [figure 1](#) (TO-3); and [figure 2](#) (JANHC) herein.

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

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

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

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

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 table II herein).

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-PRF-19500.

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 (JANTX and JANTXV 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)	Measurements
	JANTX, JANTXV levels
(1) 3c	Thermal impedance (see 4.3.3).
11	$I_{CEX1}$ and $h_{FE2}$
12	See 4.3.2, method 1039 of MIL-STD-750, test condition B.
13	Subgroup 2 of table I herein; $\Delta I_{CEX1}$ = 100 percent of initial value or -2 $\mu$ A dc, whichever is greater. $\Delta h_{FE2}$ = $\pm$ 25 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 Screening (JANHC) die. Screening of JANHC die shall be in accordance with appendix G of MIL-PRF-19500. As a minimum, die shall be 100 percent probed to insure the assembled chips will meet the requirements of table I, subgroup 2.

4.3.2 Power burn-in conditions. Power burn-in conditions are  $T_J = +187.5\text{ }^\circ\text{C}, \pm 12.5\text{ }^\circ\text{C}$ ;  $V_{CB} \geq -20\text{ V dc}$ ;  $T_A \leq +35\text{ }^\circ\text{C}$ .  $T_J$  measurement shall be in accordance with method 3100 of MIL-STD-750.

4.3.3 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3131 of MIL-STD-750 using the guidelines in that method for determining  $I_M$ ,  $I_H$ ,  $t_H$ ,  $t_{SW}$ , (and  $V_H$  where appropriate). Measurement delay time ( $t_{MD}$ ) = 70  $\mu$ s max. 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.

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 subgroup 2 of [table I](#) herein.

- \* 4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table E-VIB (JAN, JANTX, and JANTXV) of [MIL-PRF-19500](#), and as follows. Delta measurements shall be in accordance with [table II](#) herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
B3	1037	For solder die attach: $V_{CE} \geq -20$ V dc.
B3	1027	For eutectic die attach: $V_{CE} \geq -20$ V dc 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. Delta measurements shall be in accordance with [table II](#) herein.

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
C2	2036	Test condition E, weight = 10 pounds; time = 15 s.
C5	3131	See <a href="#">4.3.3</a> , $R_{\theta JC} = 0.7^\circ\text{C/W}$ .
C6	1037	For solder die attach: $V_{CE} \geq -20$ V dc.
C6	1026	For eutectic die attach: $V_{CE} \geq -20$ V dc adjust $P_T$ to achieve $T_J = +175^\circ\text{C}$ minimum.

- \* 4.4.4 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. Delta measurements shall be in accordance with [table II](#) herein.

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

4.5.1 Pulse measurements. Conditions for pulse measurement shall be as specified in section 4 of [MIL-STD-750](#).

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 4.3.3	$Z_{\theta JX}$			$^{\circ}\text{C/W}$
Collector to emitter breakdown voltage	3011	Bias condition D, $I_C = -50$ mA dc; pulsed (see 4.5.1)	$V_{(BR)CEO}$	-100 -120		V dc V dc
Collector to emitter cutoff current	3041	Bias condition D $V_{CE} = -50$ V dc $V_{CE} = -70$ V dc	$I_{CEO}$		-50	$\mu\text{A dc}$
Collector to emitter cutoff current	3041	Bias condition A; $V_{BE} = +1.5$ V dc $V_{CE} = -120$ V dc $V_{CE} = -140$ V dc	$I_{CEX1}$		-10	$\mu\text{A dc}$
Emitter-base cutoff current	3061	Bias condition D, $V_{EB} = -6$ V dc	$I_{EBO}$		-100	$\mu\text{A dc}$
Collector to base cutoff current	3036	Bias condition D, $V_{CB} = -120$ V dc $V_{CB} = -140$ V dc	$I_{CBO}$		-10	$\mu\text{A dc}$
Forward-current transfer ratio	3076	$V_{CE} = -4$ V dc; $I_C = -1$ A dc; pulsed (see 4.5.1)	$h_{FE1}$	50		
Forward-current transfer ratio	3076	$V_{CE} = -4$ V dc; $I_C = -20$ A dc; pulsed (see 4.5.1)	$h_{FE2}$	30	120	
Forward-current transfer ratio	3076	$V_{CE} = -4$ V dc; $I_C = -50$ A dc; pulsed (see 4.5.1)	$h_{FE3}$	10		
Collector to emitter saturated voltage	3071	$I_C = -20$ A dc; pulsed (see 4.5.1) $I_B = -2.0$ A dc	$V_{CE(sat)1}$		1.0	V dc
Collector to emitter saturated voltage	3071	$I_C = -50$ A dc; $I_B = -10$ A dc; pulsed (see 4.5.1)	$V_{CE(sat)2}$		3.0	V dc
Base -emitter saturated voltage	3066	Test condition A; $I_C = -20$ A dc; $I_B = -2.0$ A dc; pulsed (see 4.5.1)	$V_{BE(sat)}$		1.8	V dc

See footnote 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; $V_{BE} = +1.5\text{ V dc}$	$I_{CEX2}$		1.0	mA dc
2N6378		$V_{CE} = -120\text{ V dc}$				
2N6379		$V_{CE} = -140\text{ V dc}$				
Low-temperature operation:		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = -4.0\text{ V dc}$ ; $I_C = -20\text{ A dc}$ ; pulsed (see 4.5.1)	$h_{FE4}$	10		
<u>Subgroup 4</u>						
Pulse response:	3251	Test condition A, except test circuit and pulse requirements in accordance with figure 3 herein.				
Turn-on time		$V_{CC} = \text{approximately } -80\text{ V dc}$ ; $I_C = -20\text{ A dc}$ ; $I_B = -2.0\text{ A dc}$ ;	$t_{on}$		0.5	$\mu\text{s}$
Turn-off time		$V_{CC} = \text{approximately } 80\text{ V dc}$ ; $I_C = 20\text{ A dc}$ ; $I_{B1} = I_{B2} = 2.0\text{ A dc}$	$t_{off}$		1.05	$\mu\text{s}$
Magnitude of common emitter small-signal short-circuit forward-current transfer ratio	3306	$V_{CE} = -10\text{ V dc}$ ; $I_C = -1\text{ A dc}$ ; $f = 10\text{ MHz}$	$ h_{fe} $	3	12	
Open capacitance (open circuit)	3236	$V_{CB} = -10\text{ V dc}$ ; $I_E = 0$ ; $0.1\text{ MHz} \leq f \leq 1.0\text{ MHz}$	$C_{obo}$		1500	pF
<u>Subgroup 5</u>						
Safe operating area (dc operation)	3051	$T_C = +25^\circ\text{C}$ $t = 1\text{ s}$ ; 1 cycle; (See figure 4)				
<u>Test 1</u> (Both device types)		$V_{CE} = -5\text{ V dc}$ ; $I_C = -50\text{ A dc}$				
<u>Test 1</u> (Both device types)		$V_{CE} = -8.6\text{ V dc}$ ; $I_C = -29\text{ A dc}$				

See footnote 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 3</u> 2N6378 2N6379		$V_{CE} = -80 \text{ V dc}; I_C = 165 \text{ mA dc}$ $V_{CE} = -100 \text{ V dc}; I_C = 130 \text{ mA dc}$				
Safe operating area (switching)	3053	Load condition C, (unclamped inductive load) (see <a href="#">figure 5</a> ) $T_C = +25^\circ\text{C}$ ; duty cycle $\leq 10$ percent; $R_s = 0.1 \text{ ohms}$ ; $t_r = t_f \leq 500 \text{ ns}$				
<u>Test 1</u>		$t_p$ approximately 5 ms (vary to obtain $I_C$ ); $R_{BB1} = 2 \text{ ohms}$ ; $V_{BB1} = -12 \text{ V dc}$ ; $R_{BB2} = \infty$ ; $V_{BB2} = 0 \text{ V}$ ; $I_C = 40 \text{ A dc}$ ; $V_{CC} = -50 \text{ V dc}$ ; $L = 100 \mu\text{H}$ ; (4 each Miller type 7827 in parallel, 40 A), 0.04 ohm, or equivalent)				
<u>Test 2</u>		$t_p$ approximately 5 ms (vary to obtain $I_C$ ); $R_{BB1} = 120 \text{ ohms}$ ; $V_{BB1} = 12 \text{ V dc}$ ; $R_{BB2} = \infty$ ; $V_{BB2} = 0 \text{ V}$ ; $V_{CC} = -50 \text{ V dc}$ ; $I_C = 850 \text{ mA dc}$ ; $L = 100 \mu\text{H}$ ; (- 80 + 20 mH 2 each Triad Transformer C-48u, in series), 0.713 ohm, or equivalent.				
Safe operating area (switching)	3053	Clamped inductive load $T_A = +25^\circ\text{C}$ ; duty cycle $\leq 5$ percent; $t_p$ approximately 1.5 ms (vary to obtain $I_C$ ) $V_{CC} = -50 \text{ V dc}$ ; $I_C = 50 \text{ A dc}$ ; $V_{BB1} = -12 \text{ V dc}$ ; $V_{BB2} = -1.5 \text{ V}$ ; $R_{BB1} = 2 \text{ ohms}$ ; $R_{BB2} = 100 \text{ ohms}$ ; $R_s \leq 0.1 \text{ ohms}$ ; $L = 370 \mu\text{H}$ (Miller 7827 or equivalent)				
2N6378		Clamp voltage = -100 V dc				
2N6379		Clamp voltage = -120 V dc				
Electrical measurements		<a href="#">Table I</a> , subgroup 2 herein.				
<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 2 and 3 (JAN, JANTX, and JANTXV).

Group C, subgroup 2 and 6.

Group E, subgroup 1.

\* TABLE II. Groups B, C, and E delta measurements. 1/ 2/ 3/ 4/ 5/

Steps	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector to emitter cutoff current  2N6378 2N6379	3041	Bias condition A; $V_{BE} = +1.5$ V dc  $V_{CE} = -120$ V dc $V_{CE} = 140$ V dc	$\Delta I_{CEX1}$	100 percent of initial value or 2 $\mu$ A, whichever is greater.		
2.	Forward - current transfer ratio	3076	$V_{CE} = -4$ V dc; $I_C = -20$ A dc; pulsed (see 4.5.1)	$\Delta h_{FE2}$	$\pm 25$ percent change from initial reading.		
3.	Collector to emitter voltage (saturated)	3071	$I_C = -2.0$ A dc; $I_B = -20$ A dc, pulsed (see 4.5.1)	$\Delta V_{CE(sat)1}$	$\pm 50$ mV change from previously measured value.		

1/ See MIL-PRF-19500 for sampling plan.

2/ Devices which exceed the group A limits for this test shall not be acceptable.

3/ The delta measurements for table E-VIB (JAN, JANTX and JANTXV) of MIL-PRF-19500 are subgroup 6, see table II herein, steps 1 and 2.

4/ The delta measurements for table E-VII of MIL-PRF-19500 are as follows:

a. Subgroup 2 and 3, see table II herein, step 1.

b. Subgroup 6, see table II herein, steps 2 and 3.

5/ The delta measurements for table E-IX of MIL-PRF-19500 are subgroups 1 and 2, see table II herein, all steps.

TABLE III. 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	-55°C to +150°C, 500 cycles	
Hermetic seal	1071		
Fine leak			
Gross leak			
Electrical measurements		<a href="#">Table I</a> , subgroup 2 and <a href="#">table II</a> herein.	
<u>Subgroup 2</u>			45 devices c = 0
Blocking life	1048	Test temperature = +125°C; $V_{CB}$ = 80 percent of rated; T = 1,000 hours.	
Electrical measurements		<a href="#">Table I</a> , subgroup 2 and <a href="#">table II</a> herein.	
<u>Subgroup 4</u>			N/A
Thermal impedance curves		See <a href="#">MIL-PRF-19500</a> .	
<u>Subgroup 8</u>			45 devices c = 0
Reverse stability	1033	Condition B.	

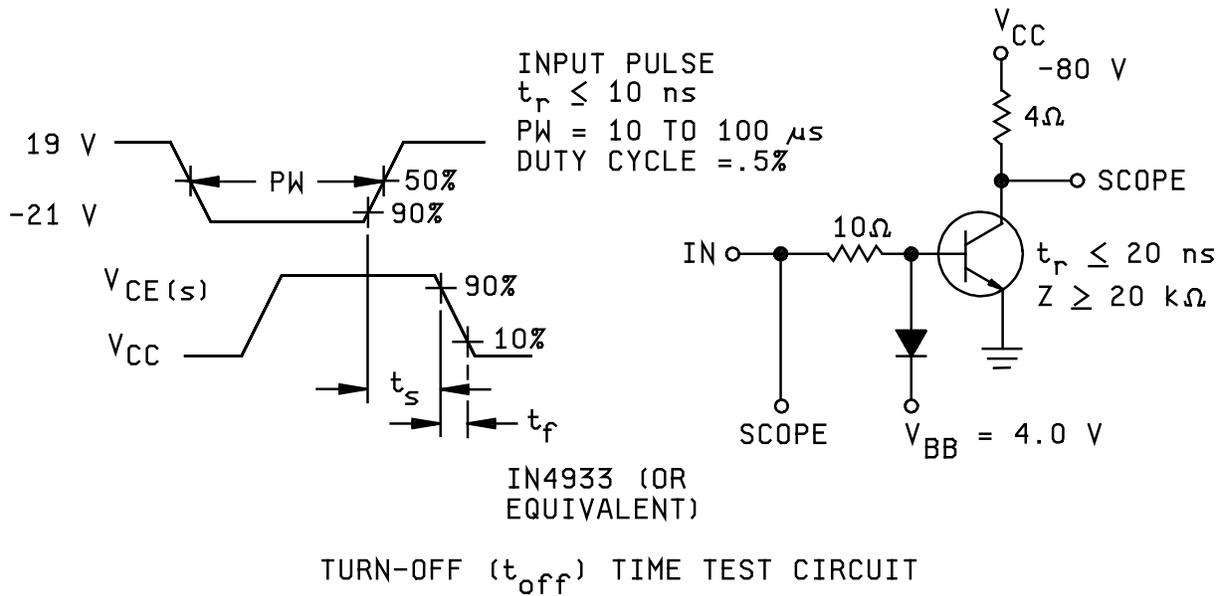
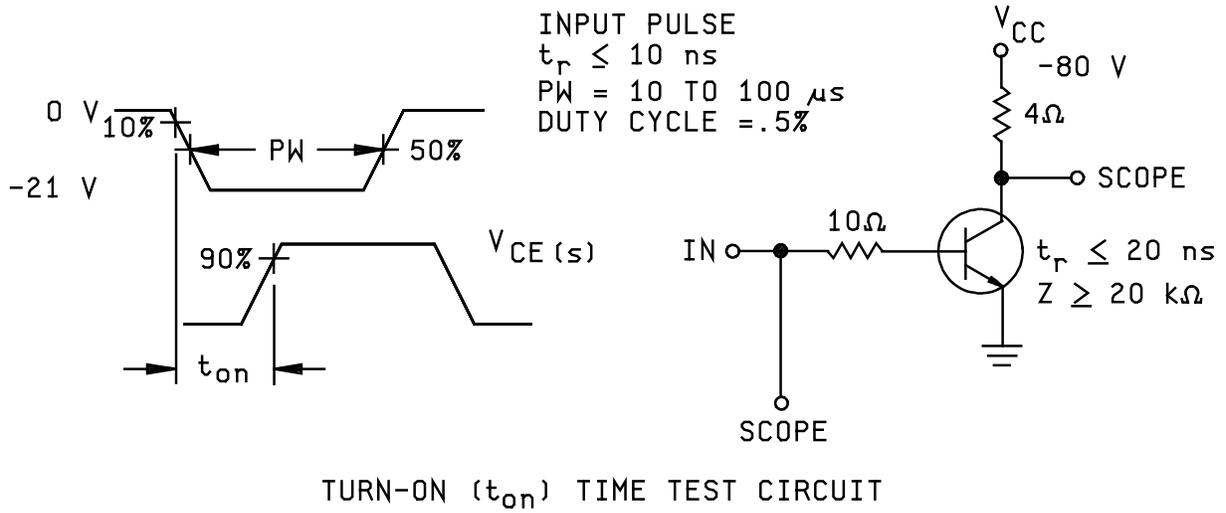


FIGURE 3. Pulse response test circuit.

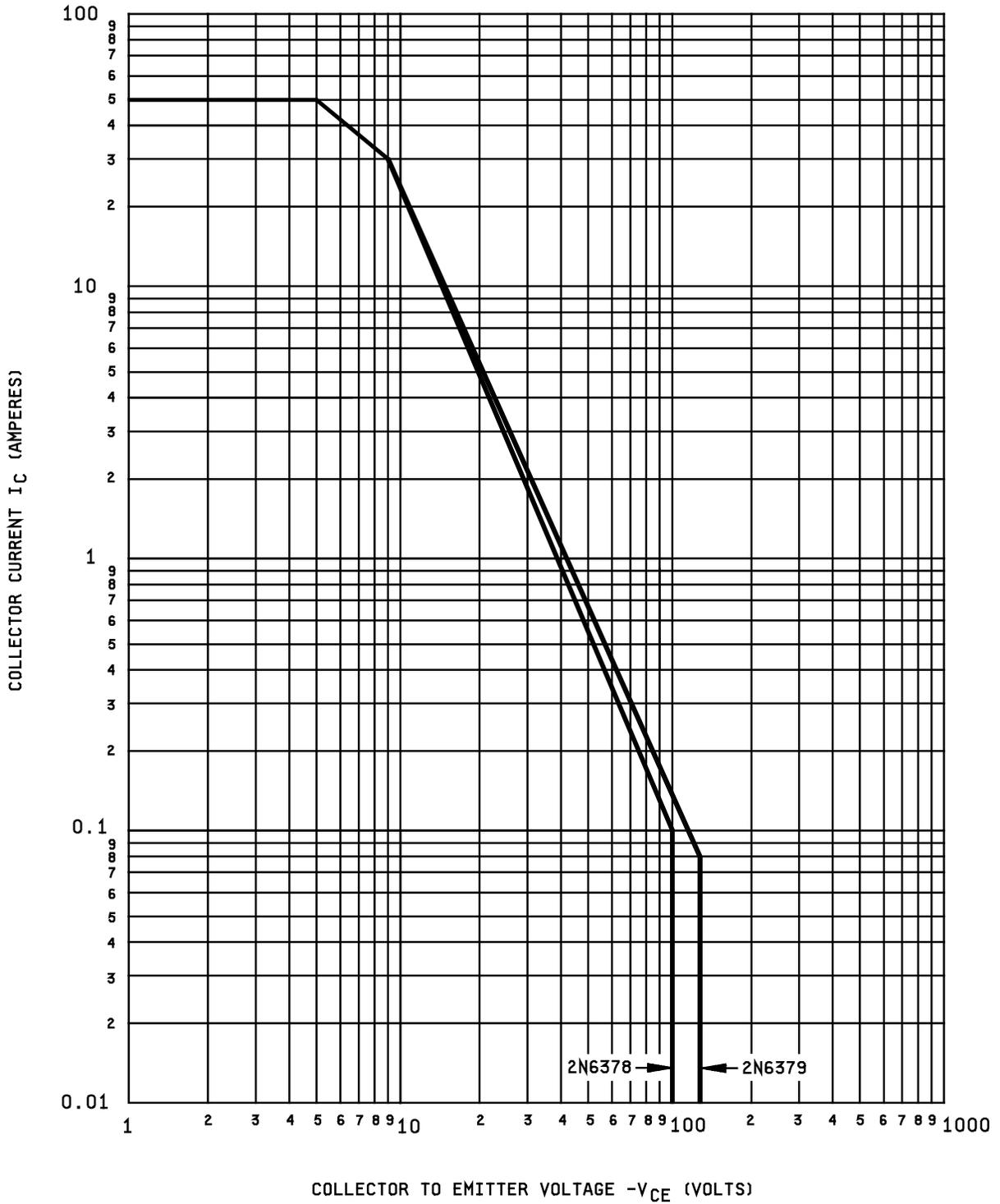


FIGURE 4. Maximum safe operating graph (continuous dc).

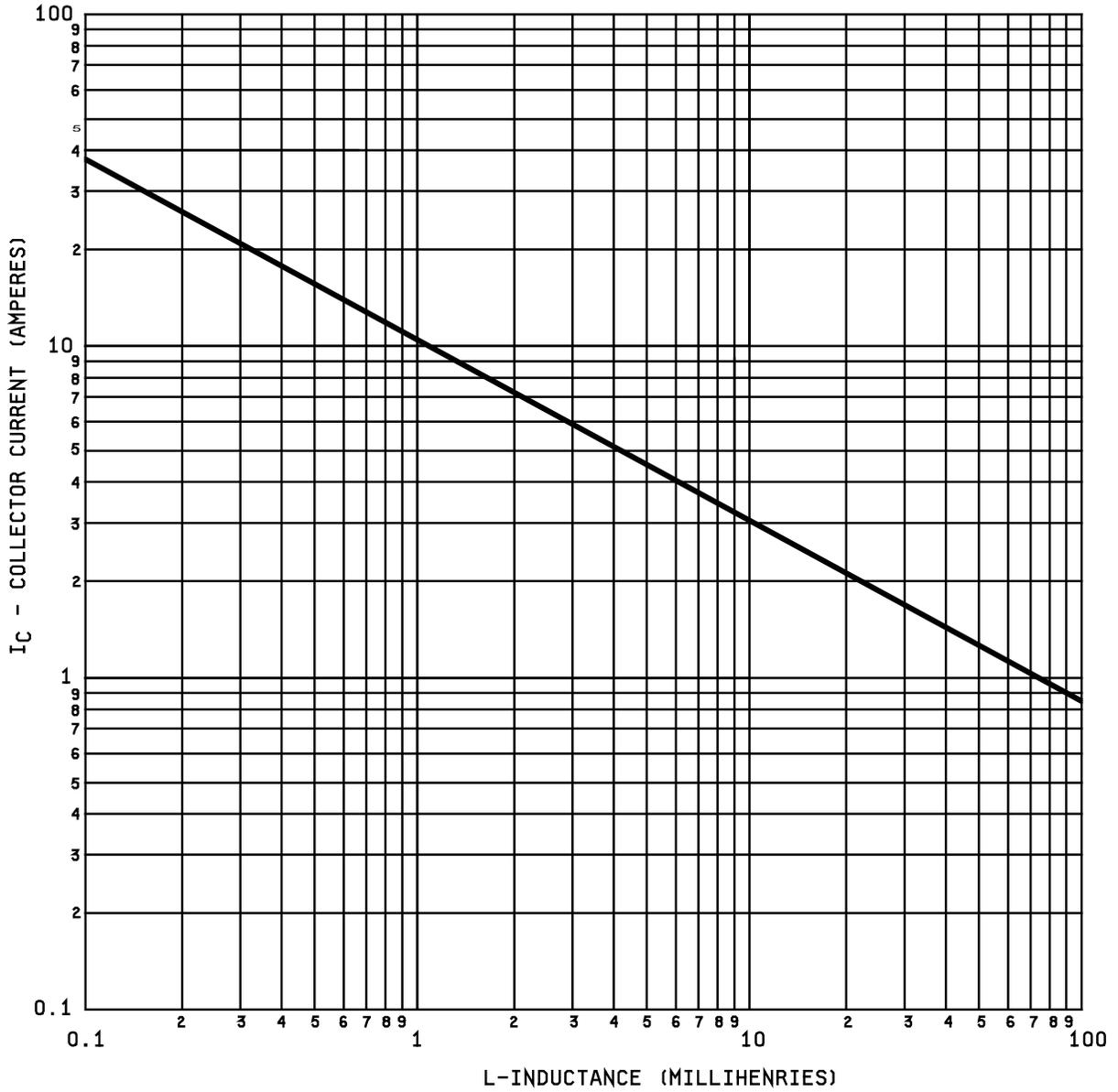


FIGURE 5. Safe operating area for switching between saturation and cutoff (unclamped inductive load).

## 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.

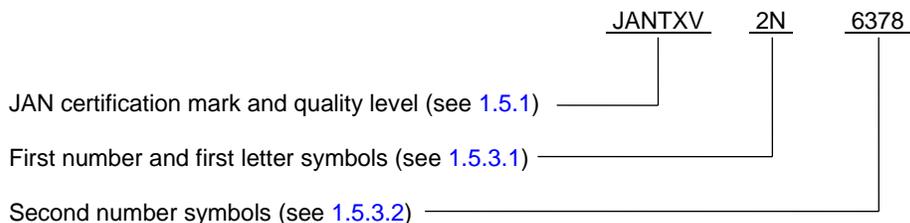
6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Packaging requirements (see 5.1).
- c. Lead finish (see 3.4.1).
- \* d. The complete PIN, see 1.5 and 6.4.
- e. For die acquisition, the letter version shall be specified (see figure 2 and 6.5.2).

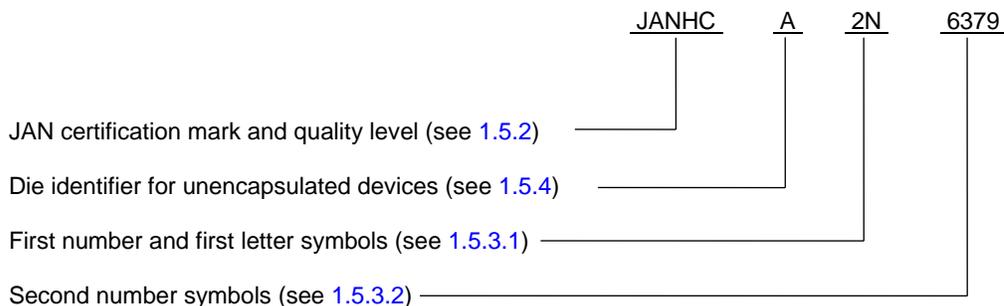
6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Manufacturers List (QML 19500) whether or not such products have actually been so listed by that date. The attention 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](mailto:vqe.chief@dla.mil).

\* 6.4 PIN construction example.

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



- \* 6.4.2 Unencapsulated devices. The PINs for un-encapsulated devices are constructed using the following form.



- \* 6.5 List of PINs.

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

PINs for devices of the base quality level	PINs for devices of the "TX" quality level	PINs for devices of the "TXV" quality level
JAN2N6378	JANTX2N6378	JANTXV2N6378
JAN2N6379	JANTX2N6379	JANTXV2N6379

- \* 6.5.2 List of PINs for unencapsulated devices. The following is a list of possible PINs available on this specification sheet. The qualified die suppliers with the applicable letter version (e.g., JANHCA2N6378) will be identified on the QML.

JANC or JANHC ordering information		
PIN	Manufacturer	
	33178	
2N6378 2N6379	JANHCA2N6378 JANHCA2N6379	

- \* 6.6 Request for new types and configurations. Requests for new device types or configurations for inclusions in this specification sheet should be submitted to: DLA Land and Maritime, ATTN: VAC, Post Office Box 3990, Columbus, OH 43218-3990 or by electronic mail at [Semiconductor@dla.mil](mailto:Semiconductor@dla.mil) or by facsimile (614) 693-1642 or DSN 850-6939.

6.7 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

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

Preparing activity:

DLA - CC

(Project 5961-2016-014)

Review activities:

Army - MI, SM  
Navy - AS, MC, SH  
Air Force - 19, 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>.