

The documentation and process conversion measures necessary to comply with this revision shall be completed by 25 October 1999.

INCH-POUND

MIL-PRF-19500/509C  
25 July 1999  
SUPERSEDING  
MIL-S-19500/509B  
25 June 1993

# PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER  
TYPES 2N6338 AND 2N6341  
JAN, JANTX, JANTXV AND JANS

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

## 1. SCOPE

1.1 Scope. This specification covers the performance requirements for NPN, silicon 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 - 204AA formally TO - 3).

1.3 Maximum ratings.

Types	$P_T$ 1/ 2/ $T_A = +25^\circ\text{C}$	$P_T$ $T_C = +100^\circ\text{C}$	$V_{CBO}$	$V_{CEO}$	$V_{EBO}$	$I_C$	$I_B$	$T_{STG}$ and $T_{OP}$
	<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>
2N6338	200	112	120	100	6.0	25	10	-65 to +200
2N6341	200	112	180	150	6.0	25	10	-65 to +200

1/ Between  $T_C = +25^\circ\text{C}$  and  $T_C = +200^\circ\text{C}$ , linear derating factor (average) = 1.14 W/°C.

2/ Maintain voltage and current according to the safe operating area shown in figure 4.

1.4 Primary electrical characteristics at  $T_A = 25^\circ\text{C}$ .

Limit	$h_{FE1}$ 1/		$V_{BE(SAT)}$	$V_{CE(SAT)}$		$C_{obo}$
	$I_C = 25\text{ A dc}$ $V_{CE} = 2.0\text{ V dc}$	$I_C = 10\text{ A dc}$ $V_{CE} = 2.0\text{ V dc}$	$I_C = 10\text{ A dc}$ $I_B = 1.0\text{ V dc}$	$I_C = 25\text{ A dc}$ $I_B = 2.5\text{ A dc}$	$I_C = 10\text{ A dc}$ $I_B = 1.0\text{ A dc}$	1 MHz $\leq f \leq$ 1 MHz $V_{CB} = 10\text{ V dc}$ $I_E = 0$
			<u>V dc</u>	<u>V dc</u>	<u>V dc</u>	<u>pF</u>
Min	12	30	---	---	---	---
Max	---	120	1.8	1.8	1.0	450

1/ Pulsed, (see 4.5.1).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Defense Supply Center Columbus, ATTN: DSCC-VAC, 3990 East Broad St., Columbus, OH 43216-5000, by using the addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5961

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

1.4 Primary electrical characteristics at  $T_A = 25^\circ\text{C}$  - Continued.

Limit	$ h_{FE} $	Pulse response		$R_{\theta JC}$
	f = 10 MHz $I_C = 1.0$ A dc $V_{CE} = 10$ V dc	$t_{on}$	$t_{off}$	
		$\mu\text{s}$	$\mu\text{s}$	$^\circ\text{C/W}$
Minimum	4	---	---	---
Maximum	12	0.5	1.25	.875

## 2. APPLICABLE DOCUMENTS

2.1 Government 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 documents cited in section 3 and 4 of this specification, whether or not they are listed.

2.1.1 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATION

## DEPARTMENT OF DEFENSE

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

## STANDARD

## MILITARY

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Defense Automated Printing Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Associated specification. The individual item requirements shall be in accordance with MIL-PRF-19500, and as specified herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-PRF-19500.

3.3 Interface requirements and physical dimensions. The Interface requirements and physical dimensions shall be as specified in MIL-PRF-19500 and figure 1 (similar to TO – 204AA formally TO - 3) herein.

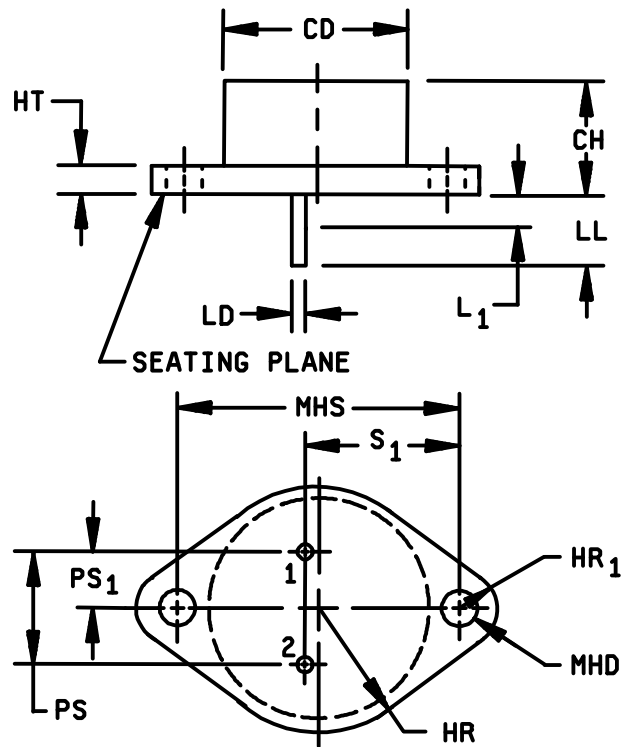


FIGURE 1. Physical dimensions. (similar to TO – 204AA formally TO - 3)

Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
CD		0.875		22.23	
CH	0.250	0.360	6.35	9.14	
HR	0.495	0.525	12.57	13.33	4
HR <sub>1</sub>	0.131	0.188	3.33	4.78	4
HT	0.060	0.135	1.52	3.43	
LD	0.038	0.043	0.97	1.09	4, 6
LL	0.312	0.500	7.92	12.7	
L <sub>1</sub>		0.050		1.27	6
MHD	0.151	1.65	3.83	41.91	4
MHS	1.177	1.197	29.90	30.40	
PS	0.420	0.440	10.67	11.18	3
PS <sub>1</sub>	0.205	0.225	5.21	5.72	3
S <sub>1</sub>	0.655	0.675	16.64	17.15	
Notes	1, 2, 5, 7		1, 2, 5, 7		

## NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. These dimensions should be measured at points 0.050 inch (1.27 mm) + 0.005 inch (0.13 mm) - 0.000 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 0.001 inch (0.03 mm) concave to 0.004 inch (0.10 mm) convex inside a 0.930 inch (23.62 mm) diameter circle on the center of the header and flat within 0.001 inch (0.03 mm) concave to 0.006 inch (0.15 mm) convex overall.
6. Lead diameter shall not exceed twice LD within L<sub>1</sub>.
7. Lead designation, shall be as follows:

Lead Number	
1	Emitter
2	Base
Case	Collector

FIGURE 1. Physical dimensions (similar to TO – 204AA formally TO - 3) - Continued.

3.3.1 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 contract or purchase order (see 6.2).

3.4 Marking. Marking shall be in accordance with MIL-PRF-19500.

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

3.6 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table I herein.

3.7 Qualification. Devices furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified manufacturer's list before contract award (see 4.2 and 6.3 ).

#### 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.

4.3 Screening. Screening shall be in accordance with table 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 IV of MIL-PRF-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
9	$I_{CEX1}$ and $h_{FE2}$	Not applicable
11	$I_{CEX1}$ = 100 percent of initial value or 3 $\mu$ A dc, whichever is greater; $\Delta h_{FE2}$ = $\pm 25$ percent of initial value.	$I_{CEX1}$ 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 3 $\mu$ A dc, whichever is greater; $\Delta h_{FE2}$ = $\pm 25$ percent of initial value.	Subgroup 2 of table I herein; $\Delta I_{CEX1}$ = 100 percent of initial value or 3 $\mu$ A dc, whichever is greater; $\Delta h_{FE2}$ = $\pm 25$ percent of initial value.

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

$$V_{CB} \geq 20 \text{ V dc minimum; } T_J = +187.5^\circ\text{C} \pm 12.5^\circ\text{C}$$

The selected  $I_C$  and  $V_{CE}$  values used for burn-in should fall within the safe operating area outlined in figure 4.

4.4 Conformance inspection. Conformance inspection shall be in accordance with MIL-PRF-19500 and as specified herein. Group A inspection shall be performed on each subplot.

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 table I, subgroup 2 herein.

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

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

Subgroup	Method	Condition
B3	2037	Test condition A, all internal leads for each device shall be pulled separately.
B4	1037	$V_{CE} = 20 \text{ V dc}$ , 2,000 cycles.
B5	1027	$V_{CE} = 20 \text{ V dc}$ minimum; $T_J = +275^\circ\text{C}$ minimum; $t = 96$ hours.

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

Subgroup	Method	Condition
B3	2037	Test condition A, all internal leads for each device shall be pulled separately.
B3	1037	For solder die attach: $V_{CE} \geq 20 \text{ V dc}$ , 2,000 cycles.
B3	1027	For eutectic die attach: $V_{CE} \geq 20 \text{ V dc}$ 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 VII of MIL-PRF- and as follows. Electrical measurements (end-points) shall be in accordance with table I, subgroup 2 herein. Delta measurements shall be in accordance with table II herein.

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

Subgroup	Method	Condition
C2	2036	Test condition A; weight = 10lbs.; time = 15 s.
C6	1037	For solder die attach: $V_{CE} \geq 20 \text{ V dc}$ , 6,000 cycles.
C3	1027	For eutectic die attach: $V_{CE} \geq 20 \text{ V dc}$ 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 measurement shall be conducted in accordance with test method 3131 of MIL-STD-750. The following details shall apply:

- Collector current magnitude during power applications shall be 3.0 A dc.
- Collector to emitter voltage magnitude shall be 10 V dc.
- Reference temperature measuring point shall be the case.
- Reference point temperature shall be  $25^\circ\text{C} \leq t_r \leq 75^\circ\text{C}$  and recorded before the test is started.
- Mounting arrangement shall be with heat sink to header.
- Maximum limit for  $R_{\theta JC}$  shall be  $0.875^\circ\text{C/W}$ .

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Breakdown voltage, collector to emitter	3011	Bias condition D, $I_C = 50$ mA dc Pulsed (see 4.5.1)	$V_{(BR)CEO}$	100 150		V dc V dc
2N6338 2N6341						
Collector to emitter cutoff current	3041	Bias condition D,  $V_{CE} = 50$ V dc $V_{CE} = 75$ V dc	$I_{CEO}$		50	$\mu$ A dc
2N6338 2N6341						
Emitter to base cutoff current	3061	Bias condition D, $V_{EB} = 6$ V dc	$I_{EBO}$		100	$\mu$ A dc
collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5$ V dc	$I_{CEX1}$			
2N6338 2N6341		$V_{CB} = 100$ V dc $V_{CB} = 150$ V dc			10 10	$\mu$ A dc $\mu$ A dc
Collector to base cutoff current	3036	Bias condition D  $V_{CB} = 120$ V dc $V_{CB} = 180$ V dc	$I_{CBO}$			
2N6338 2N6341					10 10	$\mu$ A dc $\mu$ A dc
Base to emitter saturation voltage	3066	Test condition A; $I_B = 1.0$ A dc; $I_C = 10$ A dc; pulsed (see 4.5.1)	$V_{BE(SAT)}$		1.8	V dc
Collector to emitter saturation voltage	3071	$I_B = 1.0$ A dc; $I_C = 10$ A dc; pulsed (see 4.5.1)	$V_{CE(SAT)1}$		1.0	V dc
Collector to emitter saturation voltage	3071	$I_B = 2.5$ A dc; $I_C = 25$ A dc; pulsed (see 4.5.1)	$V_{CE(SAT)2}$		1.8	V dc
Forward-current transfer ratio	3076	$V_{CE} = 2$ V dc; $I_C = 0.5$ A dc; pulsed (see 4.5.1)	$h_{FE1}$	40		
Forward-current transfer ratio	3076	$V_{CE} = 2$ V dc; $I_C = 10$ A dc; pulsed (see 4.5.1)	$h_{FE2}$	30	120	

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1</u> /	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued						
Forward-current transfer ratio	3076	$V_{CE} = 2 \text{ V dc}; I_C = 25 \text{ A dc};$ pulsed (see 4.5.1)	$h_{FE3}$	12		
<u>Subgroup 3</u> <u>2</u> /						
High temperature operation:		$T_A = +150^\circ\text{C}$				
Collector to emitter cutoff current	3041	Bias condition A, $V_{BE} = -1.5 \text{ V dc}$	$I_{CEX2}$			
2N6338		$V_{CE} = 100 \text{ V dc}$			1.0	mA dc
2N6341		$V_{CE} = 150 \text{ V dc}$			1.0	mA dc
Low temperature operation:		$T_A = -55^\circ\text{C}$				
Forward-current transfer ratio	3076	$V_{CE} = 2.0 \text{ V dc}; I_C = 10 \text{ A dc};$ 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 2.				
Turn-on time		$V_{CC} \approx 80 \text{ V}; I_C = 10 \text{ A dc}$ $I_{B1} = 1.0 \text{ A dc}$	$t_{on}$		0.5	$\mu\text{s}$
Turn-off time		$V_{CC} \approx 80 \text{ V}; I_C = 10 \text{ A dc}$ $I_{B1} = I_{B2} = 1.0 \text{ A dc}$	$t_{off}$		1.25	$\mu\text{s}$
Storage time		$V_{CC} \approx 80 \text{ V}; I_C = 10 \text{ A dc}$ $I_{B1} = I_{B2} = 1.0 \text{ A dc}$	$t_s$		1.0	$\mu\text{s}$
Magnitude of common emitter, small-signal short-circuit, forward-current transfer ratio	3306	$V_{CE} = 10 \text{ V dc}; I_C = 1.0 \text{ A dc};$ $f = 10 \text{ MHz}$	$ h_{FE} $	4.0	12	
Open capacitance open circuit	3236	$V_{CB} = 10 \text{ V dc}; I_E = 0;$ $0.1 \text{ MHz} \leq f \leq 1 \text{ MHz}$	$C_{obo}$		450	pF

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/ 	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u>  Safe operating area (dc operation)  <u>Test 1</u>  (Both device types)  <u>Test 2</u>  (Both device types)  <u>Test 3</u>  2N6338  2N6341  Safe operating area (switching)	3051	T <sub>C</sub> = +25°C; t = 1 s; 1 cycle (see figure 3)				
		I <sub>C</sub> = 25 A dc; V <sub>CE</sub> = 8 V dc				
		I <sub>C</sub> = 14 A dc; V <sub>CE</sub> = 14 V dc				
		I <sub>C</sub> = 100 mA dc; V <sub>CE</sub> = 100 V dc				
	3053	I <sub>C</sub> = 66 mA dc; V <sub>CE</sub> = 150 V dc				
		Load condition C; (unclamped inductive load) see figure 4				
		T <sub>C</sub> = +25°C; duty cycle ≤ 10 percent; R <sub>S</sub> = 0.1Ω; t <sub>r</sub> = t <sub>f</sub> ≤ 500 ns				
		t <sub>p</sub> ≈ 5 ms (vary to obtain I <sub>C</sub> ); R <sub>BB1</sub> = 10 Ω; V <sub>BB1</sub> = 20 V dc; R <sub>BB2</sub> = ∞; V <sub>BB2</sub> = 0; V <sub>CC</sub> = 50 V dc; I <sub>C</sub> = 20 A dc L = 3 μH				
<u>Test 2</u>		t <sub>p</sub> ≈ 5 ms (vary to obtain I <sub>C</sub> ); R <sub>BB1</sub> = 100 Ω; V <sub>BB1</sub> = 10 V dc; R <sub>BB2</sub> = ∞; V <sub>BB2</sub> = 0; V <sub>CC</sub> = 50 V dc; I <sub>C</sub> = 200 mA dc L = 10 mH				

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 5</u> - Continued  Safe operating area (switching)   2N6338 2N6341  Electrical measurements	3053	Clamped inductive load; $T_A = +25^{\circ}\text{C}$ ; duty cycle $\leq 5$ percent; $t_p \approx 1.5$ ms (vary to obtain $I_C$ ); $V_{CC} \approx 50$ V dc; $I_C \approx 25$ A dc; (see figure 5)  Clamped voltage = 100 V dc Clamped voltage = 150 V dc  See table I, subgroup 2 herein.				

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

2/ The sample units subjected to the high-temperature operation test shall be permitted to return to and be stabilized at room ambient temperature prior to their being subjected to the low-temperature operation test.

TABLE II. Groups B and C delta electrical measurements. 1/ 2/ 3/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1.	Collector to emitter cutoff current  2N6338 2N6341	3041	Bias condition A; $V_{BE} = -1.5$ V dc  $V_{CE} = 100$ V dc $V_{CE} = 150$ V dc	$\Delta I_{CEX1}$	100 percent of initial value or 2 mA dc; whichever is greater.		
2.	Forward-current transfer ratio	3076	$V_{CE} = 2$ V dc; $I_C = 0.5$ A dc; pulsed (see 4.5.1)	$\Delta h_{FE1}$	$\pm 25$ percent change from previously measured value.		

1/ The delta electrical measurements for table VIa (JANS) of MIL-PRF-19500 are as follows:

- a. Subgroups 3, 4, and 5, .see table II herein, steps 1 and 2.

2/ The delta electrical measurements for table VIb (JAN, JANTX and JANTXV) of MIL-PRF-19500 are as follows:

- a. Subgroups 3 and 6, see table II herein, step 2.

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

- a. Subgroup 6, .see table II herein, step 1.

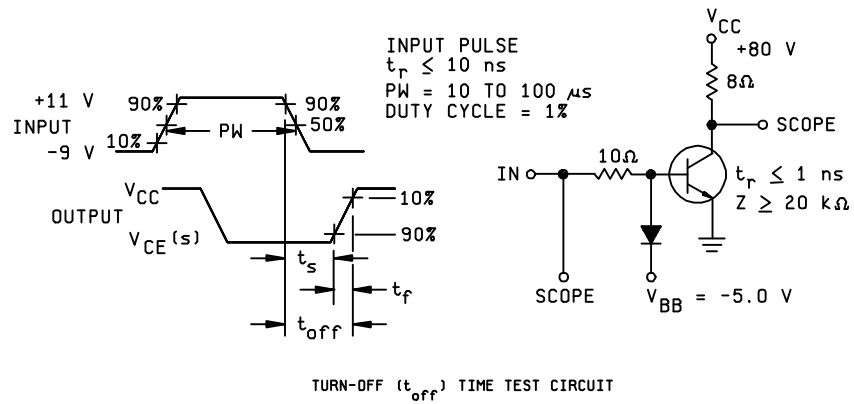
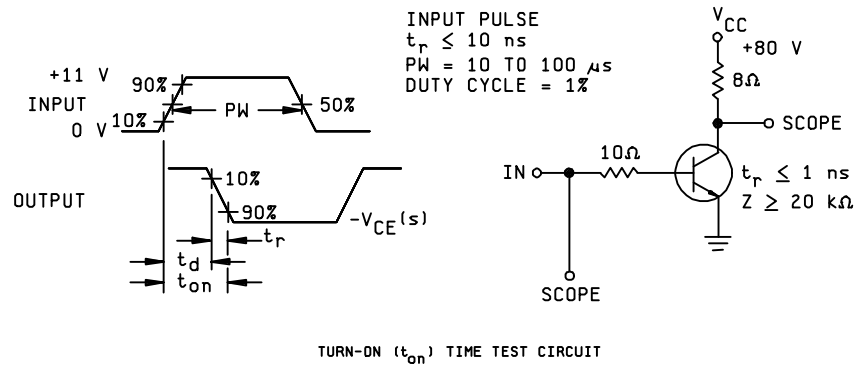


FIGURE 2. Switching time test circuits.

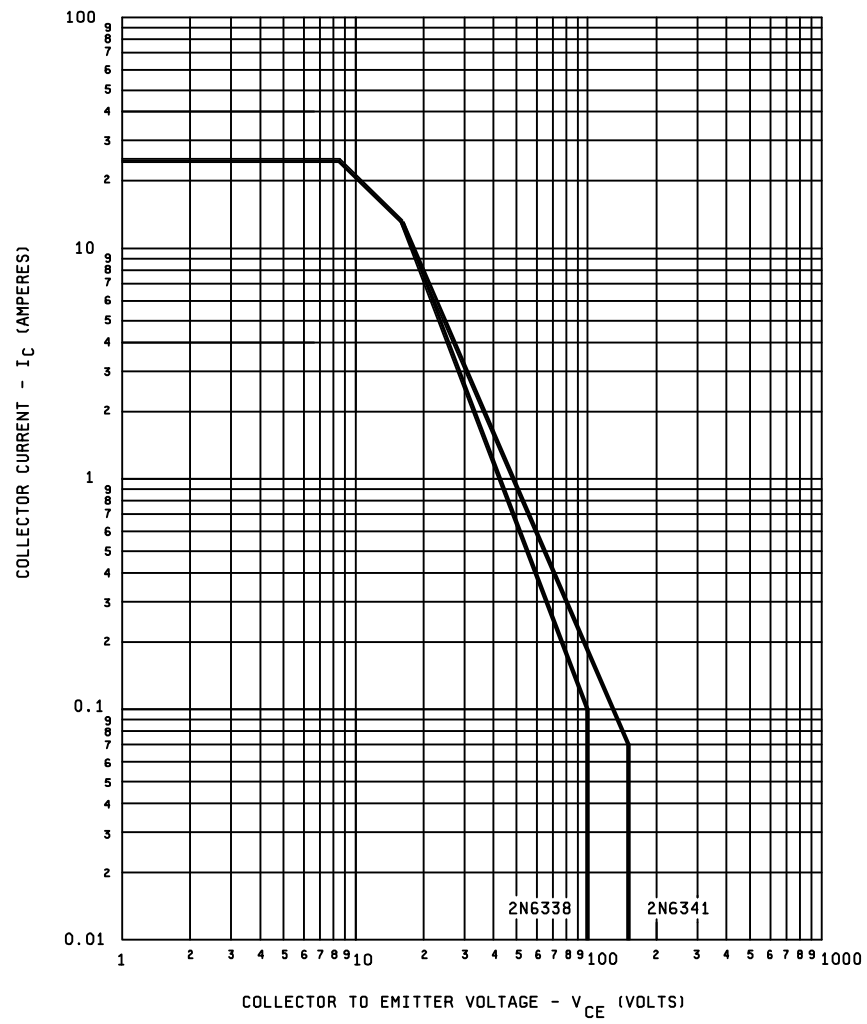


FIGURE 3. Maximum safe operating area graph (continuous dc) for types 2N6338 and 2N6341.

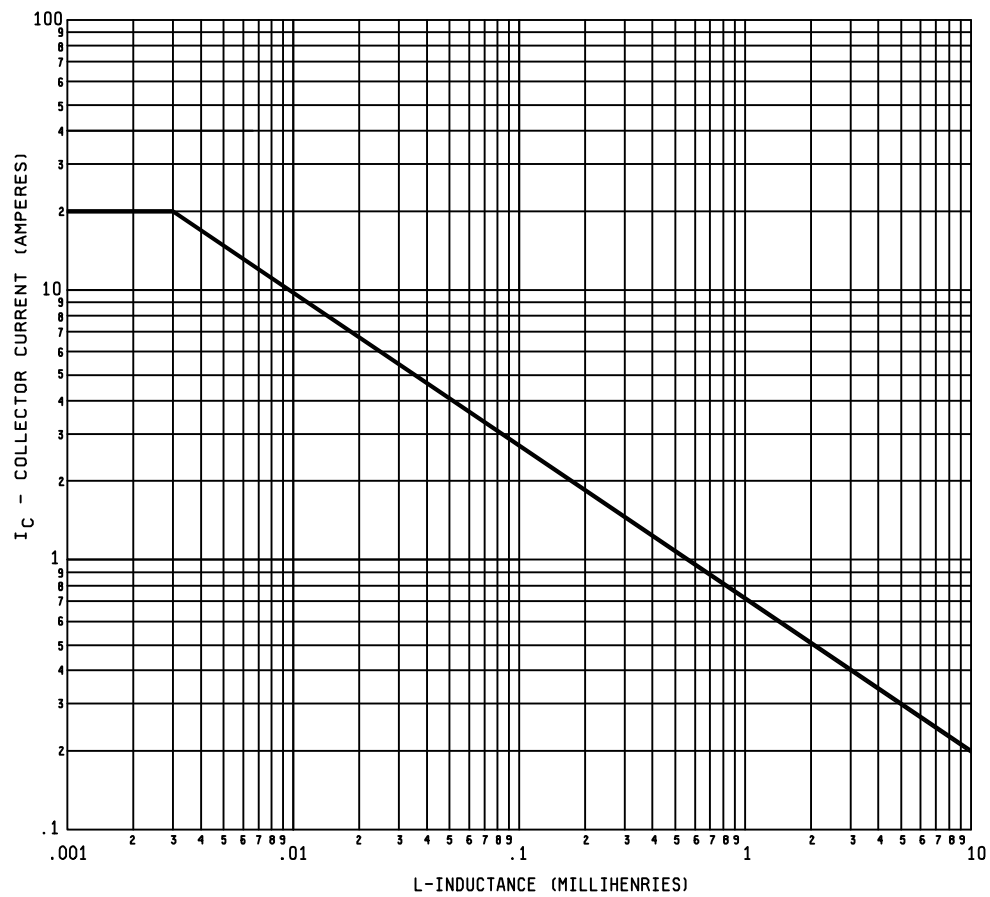
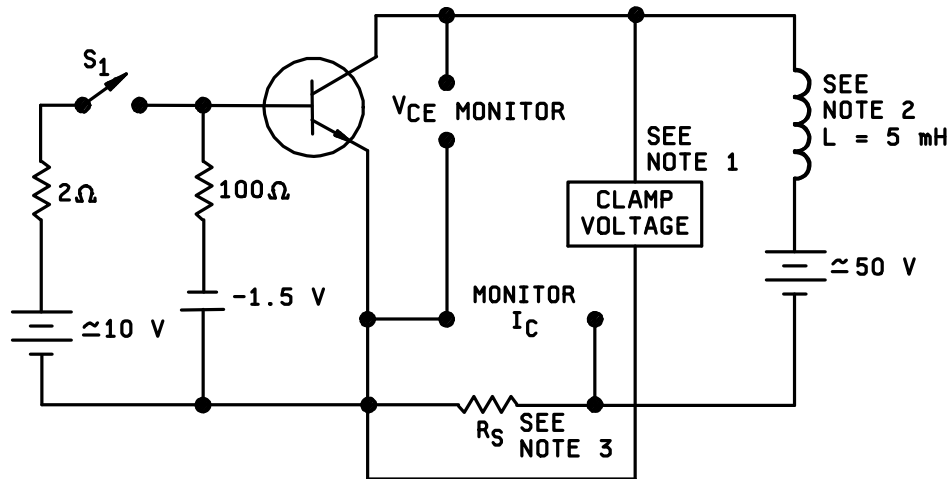


FIGURE 4. Safe operating area for switching between saturation and cutoff - unclamped inductive load.



Procedure:

1. With switch  $S_1$  closed, set the specified test conditions.
2. Open  $S_1$ . Device fails if clamp voltage not reached and maintained until the current returns to zero.
3. Perform specified end-point tests.

NOTES:

1. Either a clamping circuit or clamping diode may be used.
2. The coil used shall provide a minimum inductance of 5 mH at 25 A with a maximum dc resistance of  $.1\Omega$ . For reference only: 4 Triad C-48U; (20 mH windings in parallel) or equivalent.
3.  $R_S \leq .1\Omega$ , 12 W, 1 percent tolerance maximum (noninductive).

FIGURE 5. Clamped inductive sweep test circuit.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements should be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Points' packaging activity within the Military Department or Defense Agency, or within the Military Departments' System Command. Packaging data retrieval is available from the managing Military Departments' 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.)

6.1 Notes. The notes specified in MIL-PRF-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Issue of DODISS to be cited in the solicitation (see 2.1.1).
- b. The lead finish as specified (see 3.3.1).
- c. Type designation and quality assurance level.
- d. Packaging requirements (see 5.1).

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 Manufacturer's 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 purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Supply Center Columbus, DSCC-VQE, Columbus, OH 43216.

6.4 Design and application guidance. The following PNP type transistors are complementary to the NPN devices listed herein.

<u>Transistor (NPN)</u>	<u>Complementary (PNP) transistor types</u>
2N6338	2N6437
2N6341	2N6438

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:  
 Army - CR  
 Air Force - 11  
 NASA - NA  
 DLA - CC

Preparing activity:  
 DLA - CC  
 (Project 5961-2070)

Review activities:  
 Air Force - 80, 99

**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL****INSTRUCTIONS**

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of Requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

**I RECOMMEND A CHANGE:**

**1. DOCUMENT NUMBER**  
MIL-PRF-19500/509C

**2. DOCUMENT DATE (YYMMDD)**  
990725

**3. DOCUMENT TITLE**

SEMICONDUCTOR DEVICE, TRANSISTOR, NPN, SILICON, POWER TYPES 2N6338 AND 2N6341 JAN, JANTX, JANTXV AND JANS

**4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)****5. REASON FOR RECOMMENDATION****6. SUBMITTER**

a. NAME (Last, First, Middle initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)  
Commercial  
DSN  
FAX  
EMAIL

7. DATE SUBMITTED  
(YYMMDD)

**8. PREPARING ACTIVITY**

a. Point of contact: Alan Barone,

b. TELEPHONE  
Commercial      DSN      FAX      EMAIL  
614-692-0510    850-0510    614-692-6939    [alan\\_barone@dsccl.dla.mil](mailto:alan_barone@dsccl.dla.mil)

c. ADDRESS : Defense Supply Center  
Columbus, ATTN: DSCC-VAC, 3990 East  
Broad Street, Columbus, OH 43216-5000

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Defense Standardization Program Office (DLSC-LM)  
8725 John J. Kingman, Suite 2533, Fort Belvoir, VA 22060-6221  
Telephone (703) 767-6888    DSN 427-68880