

PERFORMANCE SPECIFICATION SHEET

SEMICONDUCTOR DEVICE, FIELD EFFECT, RADIATION HARDENED, TRANSISTOR DIE,
N and P-CHANNEL, SILICON
VARIOUS TYPES JANHC, AND JANKC

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 N and P-channel, enhancement-mode, MOSFET, radiation hardened, power transistor die. Two levels of product assurance are provided for each device type as specified in MIL-PRF-19500.

1.2 Physical dimensions. See figures 1 through 4 herein.

1.3 Maximum ratings. See the applicable performance specification sheet from table I herein.

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

2.2 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

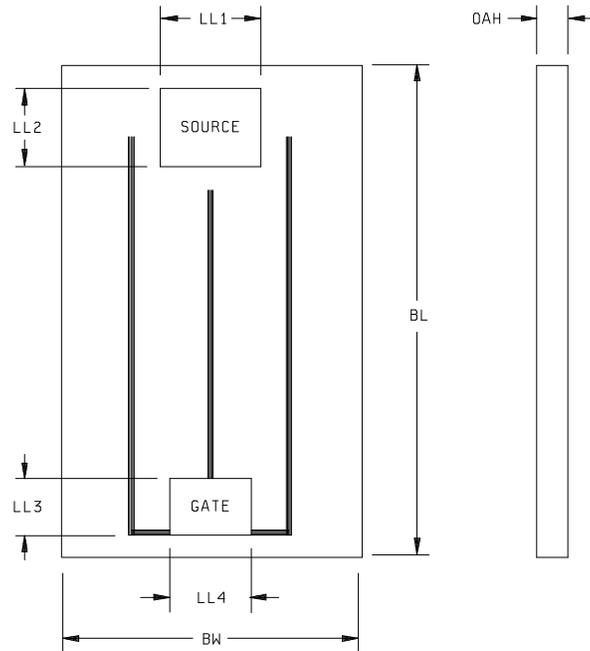
MIL-STD-750 - Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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

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-VAT, 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.

2N7261, 2N7262, 2N7380, 2N7381, 2N7382, 2N7383



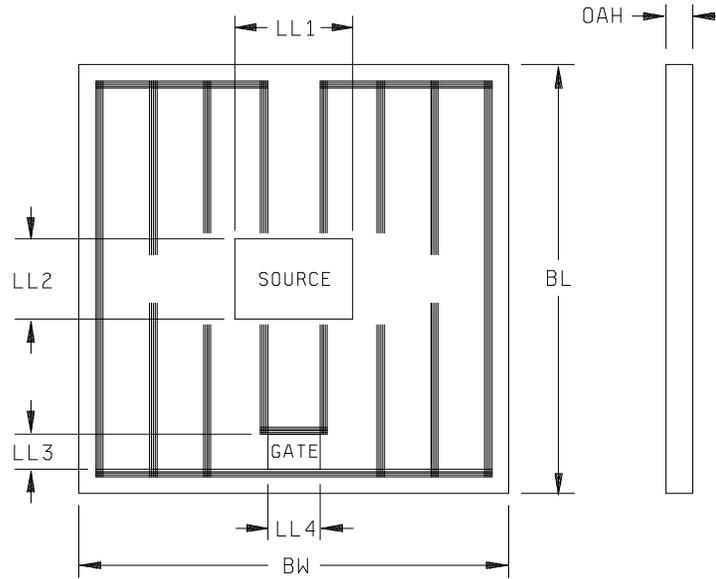
Ltr	Dimensions			
	Inches		Millimeters	
	MIN	MAX	MIN	MAX
BL	0.173	0.189	4.39	4.81
BW	0.108	0.124	2.74	3.15
OAH	0.0145	0.0175	0.368	0.445
LL1	0.042	0.044	1.06	1.12
LL2	0.029	0.031	0.73	0.79
LL3	0.0195	0.0205	0.495	0.521
LL4	0.026	0.028	0.66	0.72

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 1. JANHC and JANKC A-version die dimensions.

2N7268, 2N7269, 2N7394



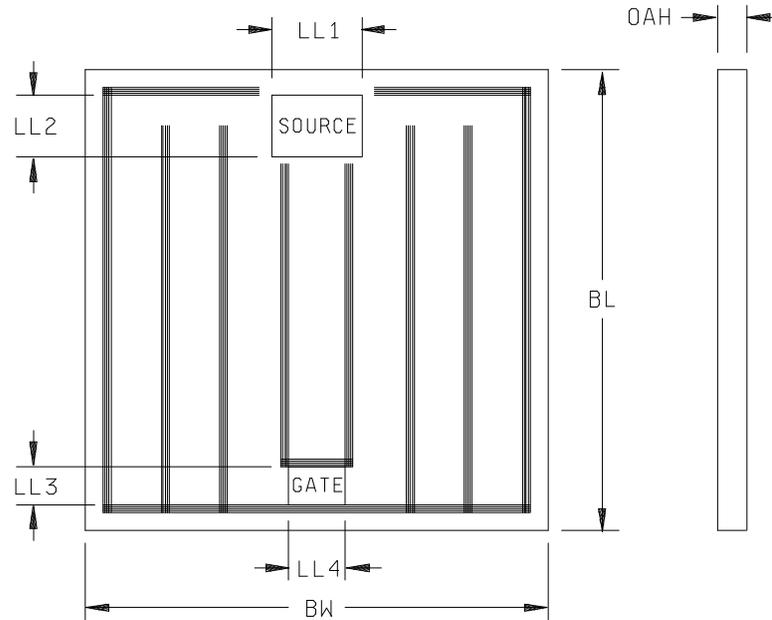
Ltr	Dimensions			
	Inches		Millimeters	
	MIN	MAX	MIN	MAX
BL	0.249	0.265	6.32	6.74
BW	0.249	0.265	6.32	6.74
OAH	0.0145	0.0175	0.368	0.445
LL1	0.069	0.071	1.75	1.81
LL2	0.047	0.049	1.19	1.25
LL3	0.0205	0.0215	0.520	0.550
LL4	0.03	0.032	0.76	0.82

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 2. JANHC and JANKC A-version die dimensions.

2N7270



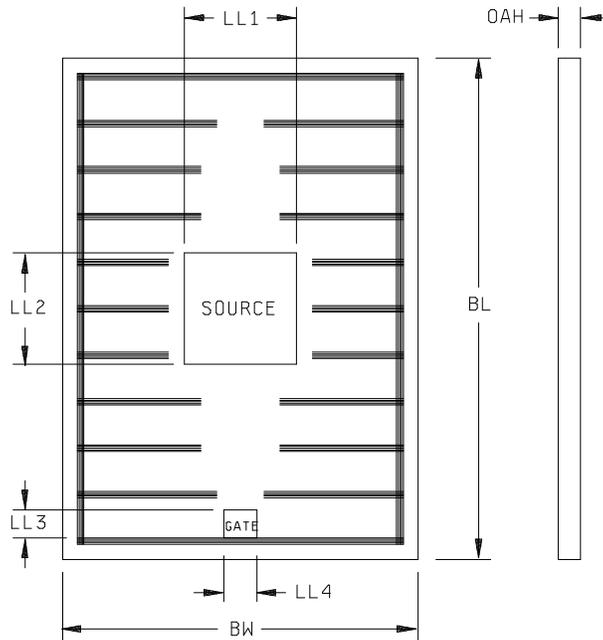
Ltr	Dimensions			
	Inches		Millimeters	
	MIN	MAX	MIN	MAX
BL	0.249	0.265	6.32	6.74
BW	0.249	0.265	6.32	6.74
OAH	0.0155	0.0185	0.393	0.470
LL1	0.048	0.050	1.21	1.27
LL2	0.033	0.035	0.83	0.89
LL3	0.0205	0.0215	0.520	0.550
LL4	0.03	0.032	0.76	0.82

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 3. JANHC and JANKC A-version die dimensions.

2N7424, 2N7425, 2N7426



Ltr	Dimensions			
	Inches		Millimeters	
	MIN	MAX	MIN	MAX
BL	0.352	0.368	8.94	9.35
BW	0.249	0.265	6.32	6.74
OAH	0.0145	0.0175	0.368	0.445
LL1	0.079	0.081	2.00	2.06
LL2	0.079	0.081	2.00	2.06
LL3	0.0195	0.0205	0.495	0.521
LL4	0.0231	0.0241	0.586	0.613

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 4. JANHC and JANKC A-version die dimensions.

3. REQUIREMENTS

3.1 Associated specification. The individual item requirements shall be in accordance with MIL-PRF-19500, the applicable performance specification sheet (see table I herein), 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 figures 1 through 4 herein.

3.4 Marking. The individual die are not required to be marked. The die container (waffle pack) shall be marked in accordance with MIL-PRF-19500.

3.5 Electrostatic discharge protection. The devices covered by this specification require electrostatic protection.

3.5.1 Handling. MOS devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. However, the following handling practices are recommended (see 3.5).

- a. Devices should be handled on benches with conductive handling devices.
- b. Ground test equipment, tools, and personnel handling devices.
- c. Do not handle devices by the leads.
- d. Store devices in conductive foam or carriers.
- e. Avoid use of plastic, rubber, or silk in MOS areas.
- f. Maintain relative humidity above 50 percent if practical.
- g. Care should be exercised during test and troubleshooting to apply not more than maximum rated voltage to any lead.
- h. Gate must be terminated to source, $R \leq 100$ k, whenever bias voltage is to be applied drain to source.

3.6 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in the applicable performance specification sheet listed in table I herein.

TABLE I. Applicable Performance Specification Sheets

Type	Performance specification sheet	Reference data			Figure
		Voltage (V dc)	Channel	Size	
2N7261	MIL-PRF-19500/601	100	N	3	1
2N7262	MIL-PRF-19500/601	200	N	3	1
2N7394	MIL-PRF-19500/603	60	N	5	2
2N7268	MIL-PRF-19500/603	100	N	5	2
2N7269	MIL-PRF-19500/603	200	N	5	2
2N7270	MIL-PRF-19500/603	500	N	5	3
2N7380	MIL-PRF-19500/614	100	N	3	1
2N7381	MIL-PRF-19500/614	200	N	3	1
2N7382	MIL-PRF-19500/615	100	P	3	1
2N7383	MIL-PRF-19500/615	200	P	3	1
2N7389	MIL-PRF-19500/630	100	P	3	1
2N7390	MIL-PRF-19500/630	200	P	3	1
2N7424	MIL-PRF-19500/655	60	P	6	4
2N7425	MIL-PRF-19500/655	100	P	6	4
2N7426	MIL-PRF-19500/655	200	P	6	4

3.7 Qualification. Devices furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.2).

4. VERIFICATION

4.1 Classification of Inspections. The inspection requirements specified herein are classified as follows:

- a. Element evaluation (see 4.2).
- b. Conformance inspection (see 4.3)

4.2 Element evaluation. Element evaluation inspection shall be in accordance with MIL-PRF-19500, appendix G, and the applicable performance specification sheet from table I herein.

4.3 Conformance inspection (group D). Conformance inspection (Group D) shall be conducted in accordance with VIII of MIL-PRF-19500 and the applicable performance specification sheet from table I herein.

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

4.4.1 Pulse measurements. Conditions for pulse measurement shall be as specified in section 4 of MIL-STD-750.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall 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.

5.2 Marking. Unless otherwise specified (see 6.2) marking shall be in accordance with MIL-STD-129.

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 should specify the following:

- a. Issue of DODISS to be cited in the solicitation (see 2.1.1 and 2.2).
- b. Specify the JANHC or JANKC letter version (see figures 1, 2, 3, and 4).
- c. 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 Products List QPL-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 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.5 Cross reference list. The following table shows the generic P/N and its' associated military P/N (without the JAN or RHA prefix). Multiple military part number indicates that the same die type is used on more than one performance specification sheet.

Military P/N	Generic P/N
2N7261 and 2N7380	IRHCX130 1/
2N7262 and 2N7381	IRHCX230 1/
2N7382 and 2N7389	IRHC9Y130 2/
2N7383 and 2N7390	IRHC9Y230 2/
2N7394	IRHCX054 1/
2N7268	IRHCX150 1/
2N7269	IRHCX250 1/
2N7270	IRHCX450 1/
2N7424	IRHC9Y064 2/
2N7425	IRHC9Y160 2/
2N7426	IRHC9Y260 2/

1/ Replace X with number indicating qualified Rad Hardness as follows:

7 = 100K Rad (Si) equivalent to RHA designator R
 3 = 300K Rad (Si) equivalent to RHA designator F
 4 = 600K Rad (Si) equivalent to RHA designator G
 8 = 1000K Rad (Si) equivalent to RHA designator H

2/ Replace Y with number indicating qualified Rad Hardness as follows:

Blank = 100K Rad (Si) equivalent to RHA designator R
 3 = 300K Rad (Si) equivalent to RHA designator F

6.6 Suppliers of JANHC and JANKC die. The qualified die suppliers with the applicable letter version (example, JANHCA2N7261) will be identified on the QPL.

JANC Ordering information	
Type	manufacturer
	59993
2N7261	JANHCAR2N7261, JANKCAR2N7261 JANHCAF2N7261, JANKCAF2N7261 JANHCAG2N7261, JANKCAG2N7261 JANHCAH2N7261, JANKCAH2N7261
2N7262	JANHCAR2N7262, JANKCAR2N7262 JANHCAF2N7262, JANKCAF2N7262 JANHCAG2N7262, JANKCAG2N7262 JANHCAH2N7262, JANKCAH2N7262
2N7394	JANHCAR2N7394, JANKCAR2N7394 JANHCAF2N7394, JANKCAF2N7394 JANHCAG2N7394, JANKCAG2N7394 JANHCAH2N7394, JANKCAH2N7394
2N7268	JANHCAR2N7268, JANKCAR2N7268 JANHCAF2N7268, JANKCAF2N7268 JANHCAG2N7268, JANKCAG2N7268 JANHCAH2N7268, JANKCAH2N7268
2N7269	JANHCAR2N7269, JANKCAR2N7269 JANHCAF2N7269, JANKCAF2N7269 JANHCAG2N7269, JANKCAG2N7269 JANHCAH2N7269, JANKCAH2N7269
2N7270	JANHCAR2N7270, JANKCAR2N7270 JANHCAF2N7270, JANKCAF2N7270 JANHCAG2N7270, JANKCAG2N7270 JANHCAH2N7270, JANKCAH2N7270
2N7380	JANHCAR2N7380, JANKCAR2N7380 JANHCAF2N7380, JANKCAF2N7380 JANHCAG2N7380, JANKCAG2N7380 JANHCAH2N7380, JANKCAH2N7380
2N7381	JANHCAR2N7381, JANKCAR2N7381 JANHCAF2N7381, JANKCAF2N7381 JANHCAG2N7381, JANKCAG2N7381 JANHCAH2N7381, JANKCAH2N7381
2N7382	JANHCAR2N7382, JANKCAR2N7382 JANHCAF2N7382, JANKCAF2N7382
2N7383	JANHCAR2N7383, JANKCAR2N7383 JANHCAF2N7383, JANKCAF2N7383
2N7389	JANHCAR2N7389, JANKCAR2N7389 JANHCAF2N7389, JANKCAF2N7389
2N7390	JANHCAR2N7390, JANKCAR2N7390 JANHCAF2N7390, JANKCAF2N7390
2N7424	JANHCAR2N7424, JANKCAR2N7424 JANHCAF2N7424, JANKCAF2N7424
2N7425	JANHCAR2N7425, JANKCAR2N7425 JANHCAF2N7425, JANKCAF2N7425
2N7426	JANHCAR2N7426, JANKCAR2N7426 JANHCAF2N7426, JANKCAF2N7426

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - EC
Air Force - 17
NASA - NA

Preparing activity:
DLA - CC

(Project 5961-1991)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL		
<u>INSTRUCTIONS</u>		
<p>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.</p> <p>2. The submitter of this form must complete blocks 4, 5, 6, and 7.</p> <p>3. The preparing activity must provide a reply within 30 days from receipt of the form.</p> <p>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.</p>		
I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-19500/657	2. DOCUMENT DATE 23 December 1997
3. DOCUMENT TITLE SEMICONDUCTOR DEVICE, FIELD EFFECT, RADIATION HARDENED, TRANSISTOR DIE, N and P-CHANNEL, SILICON VARIOUS TYPES JANHC, AND JANKC		
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
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@dscclia.mil	
c. ADDRESS Defense Supply Center Columbus ATTN: DSCC-VAT Columbus, OH 43216-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	