

The documentation and process conversion measures necessary to comply with this document shall be completed by 26 May 2016.

INCH-POUND

MIL-PRF-19500/467B
 26 February 2016
 SUPERSEDING
 MIL-S-19500/467A
 23 April 2008

PERFORMANCE SPECIFICATION SHEET

* SEMICONDUCTOR DEVICE, DIODE, LIGHT EMITTING,
 TYPE 1N5765 JAN AND JANTX

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 hermetically-sealed, red light emitting diodes. Two levels of product assurance (JAN and JANTX) are provided for each device type as specified in [MIL-PRF-19500](#).

* 1.2 Package outlines. The device package outline for this specification sheet is a DO-7 in accordance with [figure 1](#).

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

BV	I_F (1)	P_T	I_p (2)	T_{OP} and T_{STG}	T_J
<u>V dc</u>	<u>mA dc</u>	<u>mW</u>	<u>A (pk)</u>	<u>°C</u>	<u>°C</u>
4	50	150	3.0	-65 to +100	-65 to +120

(1) Derate 0.67 mAdc/°C for T_A above 25°C.

(2) 1 μs pulse width, 300 pps.

1.4 Characteristics, radiometric (physical), and photometric (visual).

Limits	I_{V1} $I_F = 20 \text{ mA dc}$ $\Theta = 0 \text{ degrees}$	I_{V2} $I_F = 20 \text{ mA dc}$ $\Theta = 30 \text{ degrees}$	V_F $I_F = 20 \text{ mA dc}$	I_R $V_R = 3 \text{ V}$	C $V_R = 0$ $f = 1$ MHz	λ_V (wave length)	Color
	<u>mcd</u>	<u>mcd</u>	<u>V dc</u>	<u>$\mu\text{A dc}$</u>	<u>pF</u>	<u>nm</u>	
Min	0.5	0.3	---	1	---	630	Red
Max	3.0		2.0		300	700	

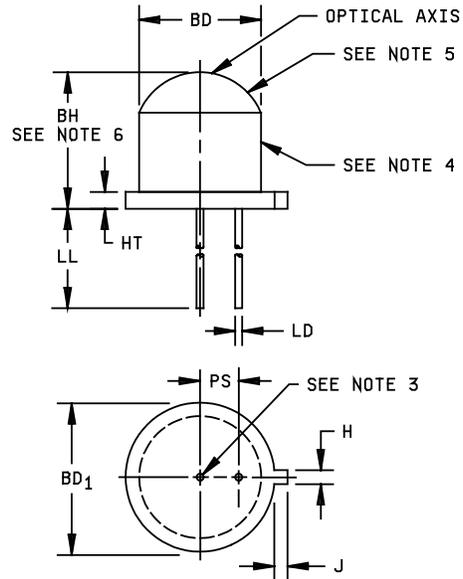
* Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAC, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Semiconductor@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.



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- * 1.5 Part or Identifying Number (PIN). The PIN is in accordance with [MIL-PRF-19500](#), and as specified herein. See [6.7](#) for PIN construction example and [6.8](#) for a list of available PINs.
- * 1.5.1 JAN certification mark and quality level.
- * 1.5.1.1 Quality level designators 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: The quality level JAN and JANTX.
- * 1.5.2 Device type. The designation system for the device types covered by this specification sheet are as follows.
- * 1.5.3.1 First number and first letter symbols. The diodes of this specification sheet use the first number and letter symbols "1N".
- * 1.5.3.2 Second number symbols. The second number symbols for the diodes covered by this specification sheet are as follows: 5765.
- * 1.5.4 Suffix symbols. Suffix symbols are not applicable for this specification sheet.
- * 1.5.5 Lead finish. The lead finishes applicable to this specification sheet are listed on [QML-19500](#).

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Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.176	.190	4.47	4.83
BD ₁	.200	.220	5.08	5.59
BH	.180	.225	4.57	5.72
H	.035	.045	0.89	1.14
HT	.013	.024	0.33	0.61
J	.032	.042	0.81	1.07
LD	.016	.019	0.41	0.48
LL	.970	1.030	24.64	26.16
PS	.045	.055	1.14	1.40

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Glass/metal hermetic can.
4. Cathode lead; both leads isolated from case.
5. Red colored glass lens.
6. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

FIGURE 1. Physical dimensions for types JAN1N5765 and JANTX1N5765.

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.

[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. 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 manufacturers 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](#) and herein.

I_P Peak operating forward pulse current.

I_{ptr} Peak transient forward current.

I_V Luminous intensity (the subscript V is used to designate a photometric or visual quantity to differentiate from I as used herein for current).

λ_V Peak radiometric wavelength of diode light emission.

mcd Milli-candela; the candela is a unit of luminous intensity defined such that the luminance of a blackbody radiator at the temperature of solidification of platinum is 60 candelas per square centimeter.

Θ The angle at or off the axis of symmetry of a light source at which luminous intensity is measured.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in [MIL-PRF-19500](#), and on [figure 1](#).

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

3.4.2 Terminal lead length. Terminal lead lengths other than that specified on figures 1 and 2 may be furnished when so stipulated in the acquisition document (see 6.2) where the devices covered herein are required directly for particular equipment-circuit installation or for automatic-assembly-technique programs.

3.5 Marking. Devices shall be marked as specified in 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 the subgroups specified in 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).

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

* 4.3 Screening (JANTX level 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	Measurements
	JANTX level
2	As given, except condition shall be 24 hours minimum at maximum rated storage temperature.
3a	$T_{upper\ extreme} = 100^{\circ}C, +0^{\circ}C, -3^{\circ}C$.
7	As given, except for the fine leak test, condition G, testing 2 hours after pressurization is acceptable and for the gross leak test, the device temperature shall be maintained at $100^{\circ}C \pm 5^{\circ}C$.
9 and 10	Not applicable.
11	I_{V1}, V_F
12	$I_F = 50\text{ mA dc}; T_A = +25^{\circ}C, t = 96\text{ hours}$.
13	Subgroup 2 of table I herein; $\Delta I_{V1} = -20\text{ percent of initial readings}$. $\Delta V_F = \pm 50\text{ mV dc}$.

4.4 Conformance inspection. Conformance inspection shall be in accordance with [MIL-PRF-19500](#) and as follows.

- a. If the manufacturer chooses the following option(s) for testing, the sample units that are to be used in group C inspection shall be designated as such, prior to conducting the referenced group B tests. Moreover, the number of failed diodes to be counted for lot acceptance or rejected as a result of group C test shall be equal to all failed diodes of the test in group B inspection, which were pre-designated for use in group C inspection, plus any additional failures occurring group C testing. For each life test in group C inspection, the manufacturer has the option of using all, or a portion of, the sample already subjected to 340 hours of group B life testing for an additional 660 hours of testing to meet the 1,000 hour requirement.

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.

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 of [MIL-PRF-19500](#) and herein. Electrical measurements (end-points) shall be in accordance with the inspections of [table I](#), subgroup 2 herein.

4.4.2.1 Group B inspection, table E-VIb of [MIL-PRF-19500](#).

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
2	1051	Test condition A, except $T_{(high)} = +100^{\circ}C$ (25 cycles); time at temperature extremes 10 minutes minimum.
2	1071	Fine leak: Test condition G or H (for condition H, leak testing 2 hours after pressurization is acceptable). Gross leak: Test condition A, C, D, E, J, or K except that leak indicator fluid shall be maintained at $+100^{\circ}C \pm 5^{\circ}C$.
3	1027	$I_F = 50$ mA dc; $T_A = +25^{\circ}C$; $t = 340$ hours + 72, - 24 hours (see 4.4.a).

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

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

<u>Subgroup</u>	<u>Method</u>	<u>Condition</u>
2	1056	Test condition A.
2	2036	Test condition E.
2	1071	Fine leak: Test condition G or H (for condition H, leak testing 2 hours after pressurization is acceptable). Gross leak: Test condition A, C, D, E, J, or K except that leak indicator fluid shall be maintained at $+100^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
3	2016	Nonoperating; 1,500 G's; $t = 0.5$ ms; 5 blows in each orientation: X1, Y1, and Y2.
3	2056	Nonoperating.
3	2006	Nonoperating; 20,000 G's; X1, Y1, and Y2, one minute in each orientation.
6	1026	$I_F = 50$ mA dc; $T_A = +25^{\circ}\text{C}$, 1,000 hours.
7		Peak forward pulse current (transient); $t_p = 1$ μs , pps = 300, total test time = 5 s, $I_{prt} = 1.0$ A (pk)
8		$t_p = 0.5$ ms, $P_{FM} \leq 150$ mW, $T_A = +25^{\circ}\text{C}$, $I_p = 60$ mA, 500 hours.

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

4.5.1 Axial luminous intensity. This measurement is made with a photometer.

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TABLE I. Group A inspection.

Inspection <u>1/</u>	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical inspection	2071					
<u>Subgroup 2</u>						
Luminous intensity		$\Theta = 0$ degrees (see 4.5.1) $I_F = 20$ mA dc	I_{V1}	0.5	3.0	mcd
Luminous intensity		$\Theta = 30$ degrees; $I_F = 20$ mA dc	I_{V2}	0.3		mcd
Reverse current	4016	DC method; $V_R = 3$ V dc	I_R		1.0	μ A dc
Forward voltage	4011	DC method, $I_F = 20$ mA dc	V_F		2.0	V dc
<u>Subgroup 3</u>						
High temperature:		$T_A = +100^\circ\text{C}$				
Luminous intensity		$\Theta = 0$ degrees, $I_F = 20$ mA dc	I_{V1}	0.45	3.0	mcd
<u>Subgroup 4</u>						
Capacitance	4001	$V_R = 0$; $f = 1$ MHz	C		300	pF

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

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 Part or Identifying Number (PIN), see title and section 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 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. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.dla.mil>.

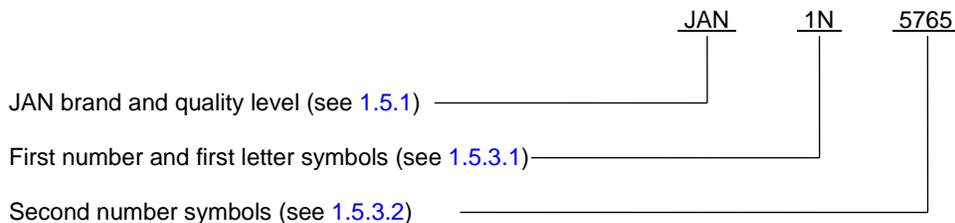
6.4 Applications. These light emitting diodes are primarily intended for use as visible indicators (ON or OFF) of status. The modulation rate capability can be high enough to accommodate video signals. Diodes may be operated in either direct current or pulsed mode depending upon current availability. Pulsed operation is desirable as a means of linear control of average intensity or of improving the average efficiency (ratio of average intensity to average current).

6.5 Operating considerations. Under normal ambient light conditions (300 to 1,000 lux), a typical forward current of 6 mA is required to produce an adequate on-state luminous intensity. This current level is directly compatible with TTL devices, and only simple buffering is needed when operating from LSTTL, LTTL, CMOS. No consideration of inrush current or keep-alive voltage is necessary.

6.6 Reliability considerations. There is a correlation between LED luminous intensity degradation and operating current levels. To lengthen the useful life of this device, drive current should be held to a minimum consistent with use conditions: Luminous intensity would have to change by more than 50 percent before becoming apparent to the causal observer.

* 6.7 PIN construction example.

* 6.7.1 PIN construction example. The PINs for encapsulated devices are constructed using the following form.



* 6.8 List of PINs. The following is a list of possible PINs available on this specification sheet.

PINs for types1N5767
JAN1N5767
JANTX1N5767

* 6.9 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 previous issue.

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

Preparing activity:
 DLA - CC
 (Project 5961-2016-024)

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