The documentation and process conversion measures necessary to comply with this document shall be completed by 30 March 2015.

INCH-POUND
MIL-PRF-19500/241R
30 January 2015
SUPERSEDING
MIL-PRF-19500/241P
30 August 2014

PERFORMANCE SPECIFICATION SHEET

* DIODE, SILICON, LOW LEAKAGE, CONTROLLED FORWARD VOLTAGE, TYPES 1N3595-1, 1N3595UB, 1N3595UB2, 1N3595US, 1N3595UR-1, 1N3595A-1, 1N3595AUS, AND 1N3595AUR-1, JAN, JANTX, JANTXV, JANS, JANHC, AND JANKC

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 silicon, controlled forward voltage diodes. Four levels of product assurance are provided for each device type as specified in MIL-PRF-19500. Four levels of product assurance are provided for each device as specified in MIL-PRF-19500. Two levels of product assurance are provided for unencapsulated devices.

* 1.2 Package outlines and die topography. The device package outlines for the encapsulated device types are as follows: (DO-35) in accordance with figure 1, (UR) in accordance with figure 2, (US) in accordance with figure 3, (UB) in accordance with figure 4, and (UB2) in accordance with figure 5. The dimensions and topography for JANHC and JANKC unencapsulated die are as follows: B version die in accordance with figure 6 and C version die in accordance with figure 7.

1.3 Maximum ratings. T_A = +25°C, unless otherwise specified.

V_{RWM}	I_O (1) (2)	I_{FSM} t_p = 1 s	I_{FSM} t_p = 1 µs	$R_{\theta JL}$ L = .375 inch (9.53 mm)	$R_{\theta JEC}$ L = 0	$R_{\theta JA(PCB)}$	T_J and T_{STG}
V(pk)	mA dc	mA (pk)	A (pk)	°C/W	°C/W	°C/W	°C
125	150	500	4	250	UR 100 UB, UB2 100 US 40	275	-65 to +175

(1) For temperature-current derating curves, see figure 8.
(2) T_A = +75°C for both axial and metal electrode leadless face diodes (MELF) (UR, US) on printed circuit board (PCB), PCB = FR4 - .0625 inch (1.59 mm) 1-layer 1-Oz Cu, horizontal, in still air; pads for (UR, US) = .061 inch (1.55 mm) x.105 inch (2.67 mm); pads for axial = .092 inch (2.34 mm) diameter, strip = .030 inch (0.76 mm) x 1 inch (25.4 mm) long, lead length L ≤ .187 inch (≤ 4.75 mm); $R_{\theta JA}$ with a defined PCB thermal resistance condition included, is measured at I_O = 150 mA dc.

* 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.

1.4 Primary electrical characteristics at T_A = +25°C, unless otherwise indicated and apply to all parts.

Limits	V_{F1} I_F = 200 mA dc	V_{F2} I_F = 100 mA dc	V_{F3} I_F = 50 mA dc	V_{F4} I_F = 10 mA dc	V_{F5} I_F = 5 mA dc	V_{F6} I_F = 1 mA dc
Min	.83 V dc	.79 V dc	.74 V dc	.65 V dc	.60 V dc	.52 V dc
Max	1.00 V dc	.92 V dc	.88 V dc	.80 V dc	.765 V dc	.70 V dc

Types	I_{R1} V_R = 125 V dc	I_{R2} V_R = 125 V dc T_A = +150°C	C V_R = 0 V dc f = 1 MHz	t_{rr} I_F = 10 mA dc V_R = 35 V dc
	Max	Max	Max	Max
1N3595-1	1.0 nA dc	3 µA dc	8.0 pF	3 µs
1N3595A-1	2.0 nA dc	3 µA dc	8.0 pF	3 µs

* 1.5 Part or Identifying Number (PIN). The PIN is in accordance with MIL-PRF-19500, and as specified herein. See 6.5 for PIN construction example and 6.6 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 base quality level "JAN", "JANTX", "JANTXV", and "JANS".

* 1.5.1.2 Quality level designators for unencapsulated devices (die). The quality level designators for unencapsulated devices (die) that are applicable for this specification sheet from the lowest to the highest level are as follows: "JANHC" and "JANKC".

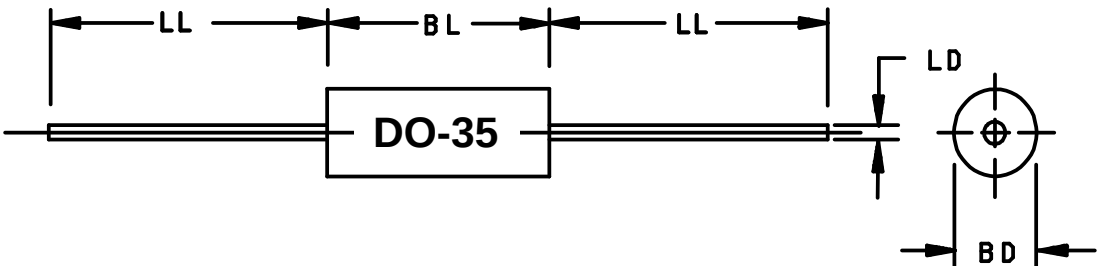
* 1.5.2 Device type. The designation system for the device types of diodes covered by this specification sheet are as follows.

* 1.5.2.1 First number and first letter symbols. The diode of this specification sheet use the first number and letter symbols "1N".

* 1.5.2.2 Second number symbols. The second number symbols for the diodes covered by this specification sheet are as follows: "1N3595-1", "1N3595A-1".

* 1.5.3 Suffix letters. The suffix letter "UR-1 and AUR-1" indicates that the diode is a glass body to mounting surface package in accordance with figure 2. The suffix letter "US and AUS" indicates that the diode is a glass body to mounting surface package in accordance with figure 3. The suffix letter "UB" indicates that the diode is a surface mount package in accordance with figure 4. The suffix letter UB2 indicates that the diode is a surface mount package in accordance with figure 5. The suffix letter "HCB and KCB" indicates that the diode is a surface mount package in accordance with figure 6. The suffix letter “HCC and KCC” indicates that the diode is a surface mount package in accordance with figure 7.

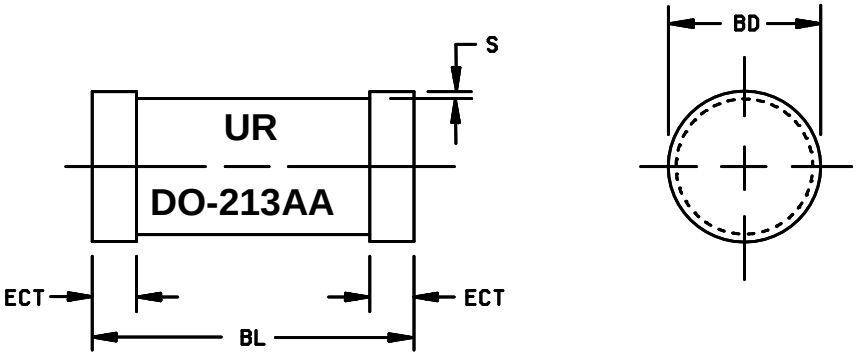
* 1.5.4 Lead finish. The lead finishes applicable to this specification sheet are listed on QML-19500.



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.056	.075	1.42	1.91
BL	.140	.180	3.56	4.57
LD	.018	.022	0.46	0.56
LL	1.000	1.500	25.40	38.10

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

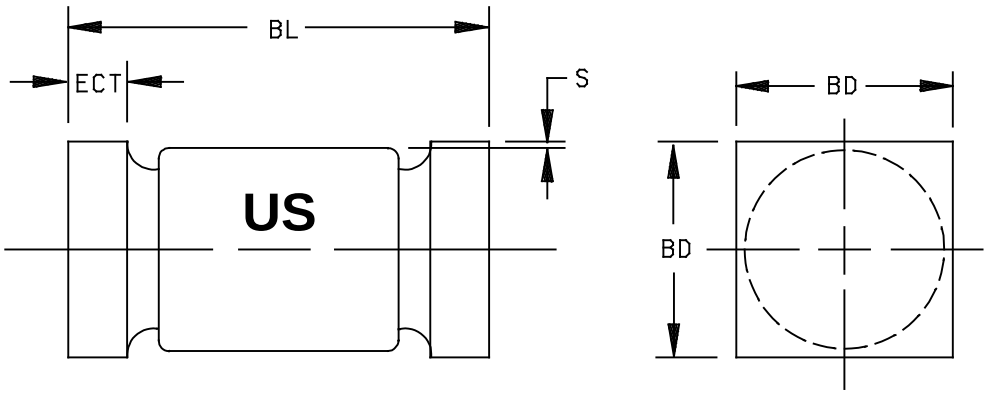
FIGURE 1. Physical dimensions - 1N3595-1, 1N3595A-1 (DO-35).



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.063	.067	1.60	1.70
BL	.130	.146	3.30	3.70
ECT	.016	.022	0.41	0.55
S	.001 min		0.03 min	

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are pre-solder dip.
4. Referencing to dimension S, minimum clearance of glass body to mounting surface on all orientations.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

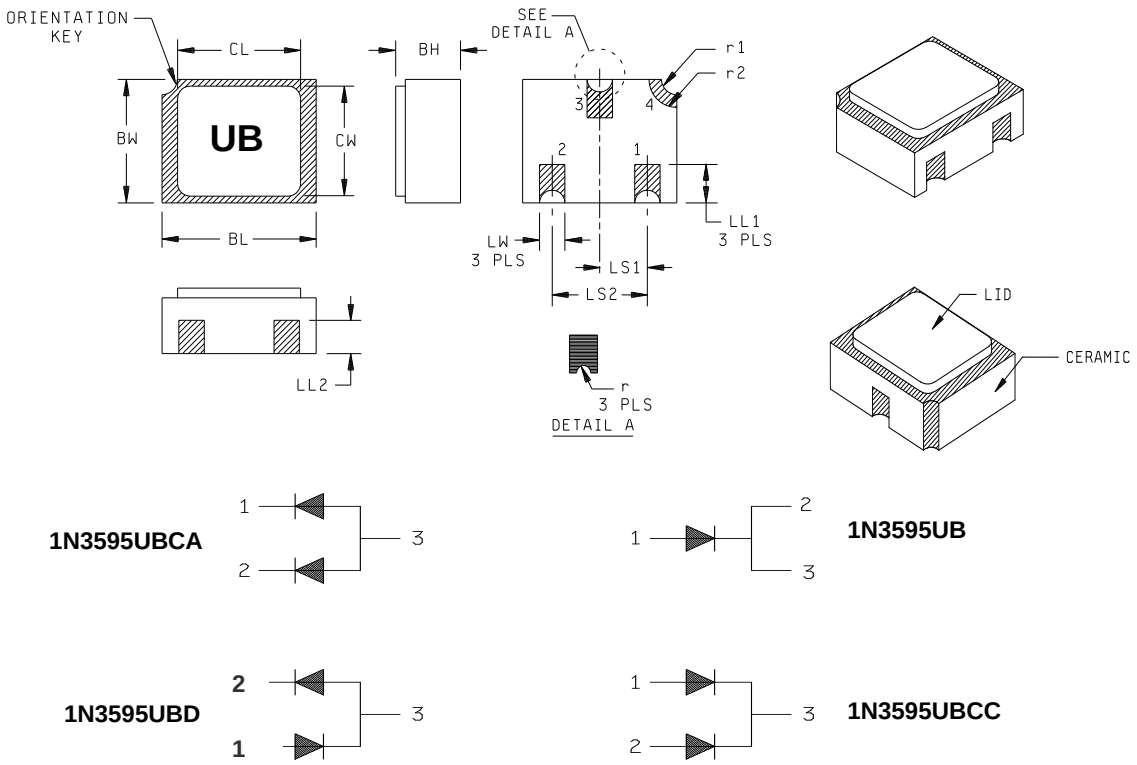
FIGURE 2. Physical dimensions 1N3595UR-1, 1N3595AUR-1 (DO-213AA).



Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
BD	.070	.085	1.78	2.16
BL	.165	.195	4.19	4.95
ECT	.019	.028	0.48	0.71
S	.003		0.08	

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Dimensions are presolder dip.
4. Referencing dimension S, minimum clearance of glass body to mounting surface on all orientations.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 3. Physical dimensions - 1N3595US, 1N3595AUS.

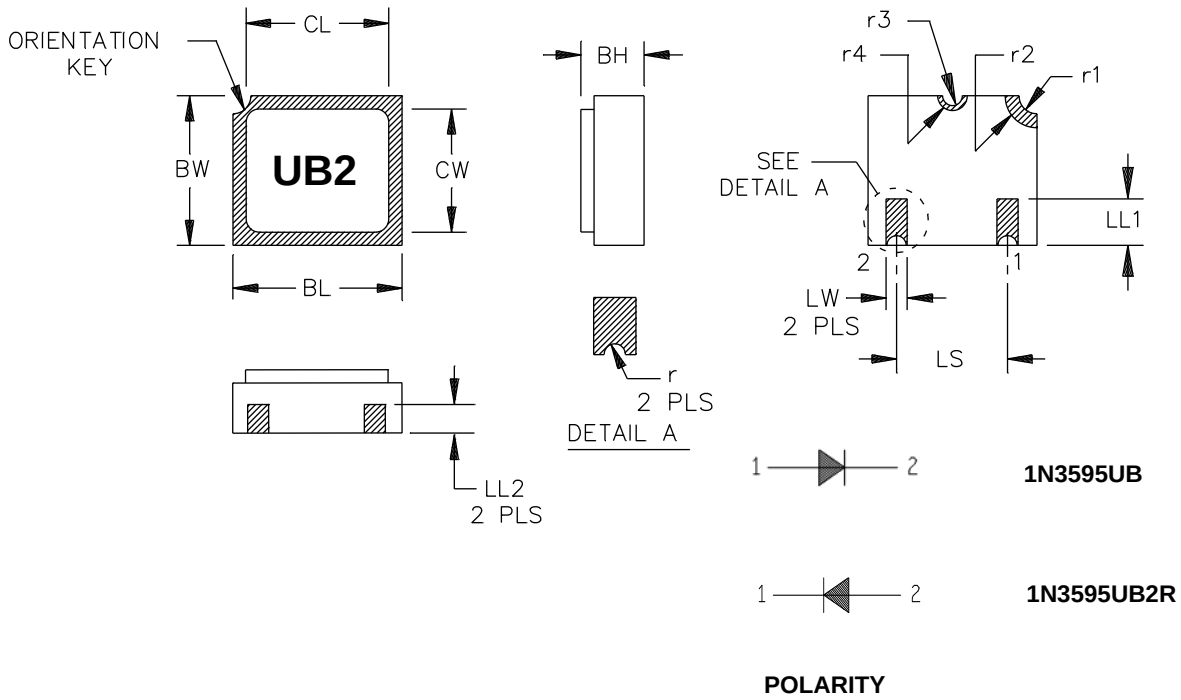


Symbol	Dimensions				Symbol	Dimensions			
	Inches		Millimeters			Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
BH	.046	.056	1.17	1.42	LS1	.035	.039	0.89	0.99
BL	.115	.128	2.92	3.25	LS2	.071	.079	1.80	2.01
BW	.085	.108	2.16	2.74	LW	.016	.024	0.41	0.61
CL		.128		3.25	r		.008		0.20
CW		.108		2.74	r1		.012		0.31
LL1	.022	.038	0.56	0.97	r2		.022		0.56
LL2	.017	.035	0.43	0.89					

NOTES:

1. Dimensions are in inches. Millimeters are given for general information only.
2. Ceramic package only.
3. Hatched areas on package denote metallized areas. Pad 4 = shielding, connected to the lid.
4. Dimensions are pre-solder dip.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

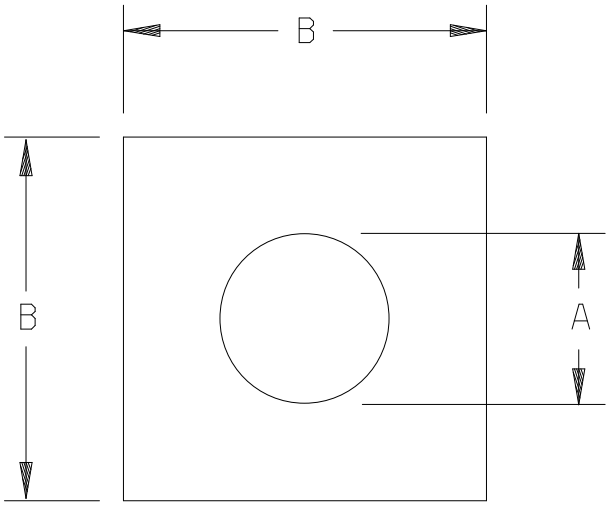
FIGURE 4. Physical dimensions, surface mount (UB version).



Symbol	Dimensions				Symbol	Dimensions			
	Inches		Millimeters			Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
BH	.046	.056	1.17	1.42	LS	.071	.079	1.80	2.01
BL	.115	.128	2.92	3.25	LW	.016	.024	0.41	0.61
BW	.085	.108	2.16	2.74	r	.008 TYP		0.20 TYP	
CL		.128		3.25	r1	.012 TYP		0.30 TYP	
CW		.108		2.74	r2	.022 TYP		0.56 TYP	
LL1	.022	.038	0.56	0.96	r3	.008 TYP		0.20 TYP	
LL2	.014	.035	0.36	0.89	r4	.012 TYP		0.30TYP	

NOTES:
1. Dimensions are in inches. Millimeters are given for general information only.
2. Ceramic package only.
3. Hatched areas on package denote metallized areas. Pad 4 = shielding, connected to the lid.
4. Dimensions are pre-solder dip.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

FIGURE 5. Physical dimensions, surface mount (2 pin UB version).

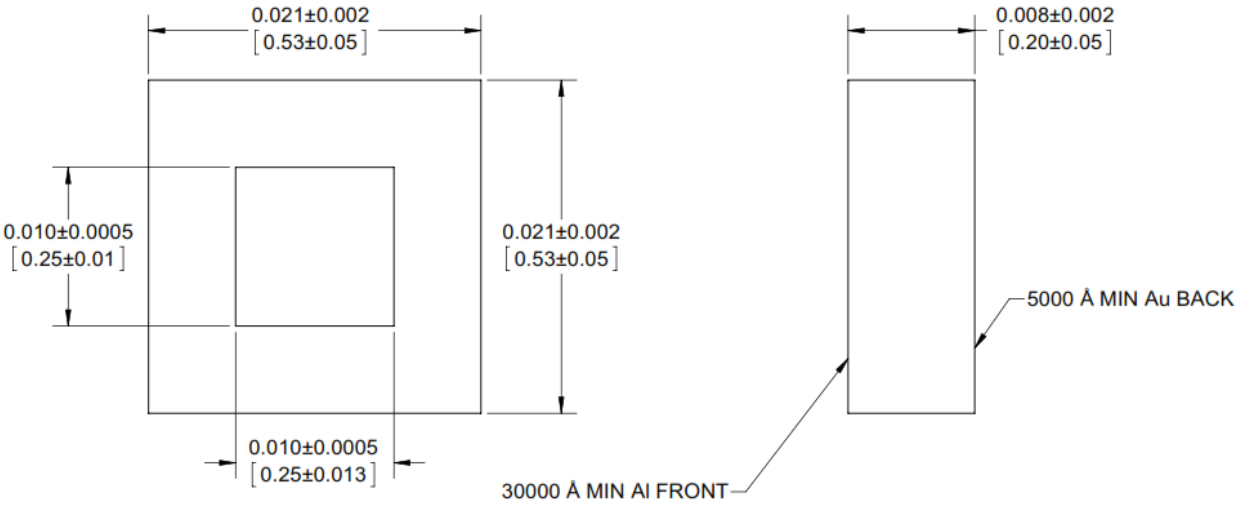


Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	.0079	.0081	0.200	0.206
B	.0145	.0195	0.368	0.495

NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Element evaluation performed utilizing a TO-5 header.
4. The physical characteristics of the die are:

Metallization:
Top (Anode): Aluminum (Al) 25,000 Å minimum.
Back (Cathode): Gold (Au) 4,000 Å minimum.
Die thickness: .009 inch (0.23 mm) ±.002 inch (±0.051 mm).

FIGURE 6. Physical dimensions JANHCB and JANKCB die.



NOTES:
1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Element evaluation performed utilizing a UB header.
4. The physical characteristics of the die are:

Metallization:	
Top (Anode):	Aluminum (Al) 30,000 Å minimum.
Back (Cathode):	Gold (Au) 5,000 Å minimum.
Die thickness:	.008 inch (0.20 mm) ±.002 inch (±0.05 mm).

FIGURE 7. Physical dimensions JANHCC and JANKCC 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 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 as follows.

V_{fr} Forward recovery voltage. Specified maximum forward voltage used to determine forward recovery time.

3.4 Interface and physical dimensions. Interface and physical dimensions shall be as specified in MIL-PRF-19500, and on figures 1 (DO-35), 2 (DO-213AA), 3 (US), 4 (UB), 5 (UB2), 6 (die), and 7 (die).

3.4.1 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 acquisition document (see 6.2).

3.4.2 Diode construction. All devices shall be metallurgically bonded, double plug construction in accordance with the requirements of MIL-PRF-19500. All glass diodes shall be designed with sufficient thermal compensation in the axial direction to optimize tensile and compressive stresses. Dimensional analysis is required of all materials used to achieve axial thermal compensation. Dimensional tolerances and corresponding coefficient of thermal expansion (CTE) shall be documented on the DSCC Design and Construction Form 36D and shall be approved by the qualifying activity to maintain qualification. Dimensional tolerances shall be sufficiently tight enough to prevent excessive stresses due to the inherent CTE mismatch. The UR version shall be structurally identical to the axial leaded versions except for end-cap lead attachment. The 'US' version shall be metallurgically bonded, thermally matched, non-cavity, double-plug construction in accordance with the requirements of category I (see MIL-PRF-19500).

3.4.3 JANS construction. All JANS devices shall be metallurgically bonded-thermally matched non-cavity double plug constructions utilizing only category I metallurgical bond in accordance with MIL-PRF-19500.

3.5 Marking. Marking shall be in accordance with MIL-PRF-19500. Manufacturer's identification and date code shall be marked on the devices. Initial container package marking shall be in accordance with MIL-PRF-19500. The polarity shall be indicated with a contrasting color band to denote the cathode end. The prefixes JAN, JANTX, and JANTXV can be abbreviated as J, JX, JV, and JS respectively. The part number may be reduced to J3595A, JX3595A, JV3595A, or JS3595A. No color coding shall be permitted for part numbering.

3.5.1 UR and US devices. For 'UR' and 'US' version devices only, all marking, except polarity may be omitted from the body, but shall be retained on the initial container. Polarity marking of 'UR' and 'US' devices shall consist as a minimum, a band or 3 contrasting dots around the periphery of the cathode.

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

3.7 Electrical test requirements. The electrical test requirements shall be as specified in table I herein.

3.8 Workmanship. The diodes covered by this specification sheet 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 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 require 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, JANTX, and JAN levels). Screening shall be in accordance with table E-IV of MIL-PRF-19500 and as specified herein. Specified electrical measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screening (see table E-IV of MIL-PRF-19500)	JANS	JANTXV and JANTX level
1a 1b	Required. Required.	Not required. Required (JANTXV only).
3a	Temperature cycling.	Required.
(1) 3c	Thermal impedance (see 4.3.3).	Thermal impedance (see 4.3.3).
9	I_{R1} and V_{F1}.	Not required.
10	Method 1038 of MIL-STD-750, condition A.	Method 1038 of MIL-STD-750, condition A.
(2) 11	I_{R1}, V_{F1}, $\Delta V_{F1} \leq \pm 50$ mV change from initial value. $\Delta I_{R1} \leq \pm 0.5$ nA dc, or ≤100 percent whichever is greater.	I_{R1}, V_{F1}.
12	See 4.3.2. t = 240 hours minimum.	See 4.3.2.
(3) (4) 13	Subgroups 2 and 3 of table I herein; $\Delta V_{F1} \leq \pm 50$ mV change from initial value. $\Delta I_{R1} \leq \pm 0.5$ nA dc, or ≤100 percent whichever is greater.	Subgroup 2 of table I herein; $\Delta V_{F1} \leq \pm 50$ mV change from initial value. $\Delta I_{R1} \leq \pm 0.5$ nA dc, or ≤100 percent whichever is greater.

(1) Thermal impedance shall be performed any time after sealing provided temperature cycling is performed in accordance with MIL-PRF-19500, screen 3 prior to this thermal test.
* (2) Shall be performed anytime after temperature cycling, screen 3a; JANTX and JANTXV levels do not need to be repeated in screening requirements.
(3) PDA ≤ 5 percent.

* 4.3.1 Screening of unencapsulated die (JANHC and JANKC). Screening of unecapsulated die shall be in accordance with appendix G of MIL-PRF-19500. Burn-in duration for the JANKC level follows JANS requirements; the JANHC follows JANTX requirements.

4.3.1.1 JAN testing. JAN level product which is either category II or III shall have temperature cycling and thermal impedance testing performed in accordance with MIL-PRF-19500, JANTX level screening level requirements. Electrical testing shall be in accordance with table I, subgroup 2 herein.

4.3.2 Power burn-in conditions. Power burn-in conditions are as follows (see 4.5.2): Method 1038 of MIL-STD-750, condition B. V_R = rated V_{RWM}; f = 50-60 Hz; I_O = 150 mA dc or I_F = 150 mA dc minimum. T_A = 75°C maximum. The maximum current density of small die shall be submitted to the qualifying activity for approval. Alternate mounting conditions shall be submitted to the qualifying activity for approval. With approval of the qualifying activity and preparing activity, alternate burn-in criteria (hours, bias conditions, and mounting conditions) may be used. A justification demonstrating equivalence is required. In addition, the manufacturing site's burn-in data and performance history will be essential criteria for burn-in modification approval.

4.3.3 Thermal impedance. The thermal impedance measurements shall be performed in accordance with method 3101 or 4081 of MIL-STD-750 using the guidelines in that method for determining I_M, I_H, t_H, t_{SW} (V_C and V_H where appropriate). Measurement delay time (t_{MD}) = 70 μs max. The thermal impedance limit used in screen 3c and table I, subgroup 2 shall be set statistically by the supplier.

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 table E-V of MIL-PRF-19500, table I herein, and as specified herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in tables E-VIa (JANS) and E-VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500 and 4.4.2.1 and 4.4.2.2 herein. Delta measurements shall be in accordance with table III herein.

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

Subgroup	Method	Condition
B4	1037	V_R = 125 V(pk); T_A = room ambient as defined in the general requirements of MIL-STD-750; I_O = 150 mA dc; t_{on} = t_{off} = 3 minutes minimum for 2,000 cycles.
B5	1027	$V_{(pk)}$ = rated V_{RWM}, I_O = 150 mA (min), adjust T_A or I_O to obtain a minimum T_J of +175°C.
B6	4081	L = .375 inch (9.53 mm); $R_{\theta JL}$ = 250°C/W maximum, $R_{\theta JEC}$ = 40°C/W maximum for US, $R_{\theta JEC}$ = 100°C/W maximum for UR. (See 4.3.3.)

4.4.2.2 Group B inspection, table E-VIb (JAN, JANTX, and JANTXV) of MIL-PRF-19500. Leaded samples from the same lot may be used in lieu of 'UR' or 'US' suffix sample for life test.

Subgroup	Method	Conditions
B2	1056	0°C to +100°C, 10 cycles.
B2	1051	-55°C to +175°C, 45 cycles, including screening.
B2	2005	I_F = 100 mA, axial tensile stress = 8 lbs, T_A = +150ºC; (not applicable to 'UR' 'US', UB, and UB2 packages).
B3	1026	V(pk) = rated V_{RWM}; f = 50 - 60 Hz; I_O = 150 mA dc minimum; adjust T_A or I_O to obtain a minimum T_J of +150°C. (See 4.5.2.)
B5	4081	L = .375 inch (9.53 mm); $R_{\theta JL}$ = 250°C/W maximum, $R_{\theta JEC}$ = 40°C/W maximum for US, $R_{\theta JEC}$ = 100°C/W maximum for UR. (See 4.3.3.)
B6	1032	T_A = +175°C.

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 III herein.

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

	Subgroup	Method	Conditions
	C2	1056	0°C to + 100°C, 10 cycles.
	C2	1051	-55°C to + 175°C, 45 cycles including screening.
*	C2	2036	Axial devices - Tension: Condition A, 10 pounds (6 lb for hard glass), t = 15 s. Lead fatigue: Condition E.
*	C2	2038	US devices - Tension: Condition B, 10 pounds (6 lb for hard glass), t = 15 s.
	C5		Not applicable.
	C6	1026	1,000 hours minimum, V(pk) = rated V_{RWM}; f = 50 - 60 Hz; I_O = 150 mA dc minimum; adjust T_A or I_O to obtain a minimum T_J of +150°C. (See 4.5.2.)

4.4.4 Group E inspection. Group E inspection shall be conducted in accordance with the tests and conditions specified for subgroup testing in table E-IX of MIL-PRF-19500, and table II herein.

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 measurements shall be as specified in section 4 of MIL-STD-750.

4.5.2 Free air power burn-in and life tests. The use of a current limiting or ballast resistor is permitted provided that each device under test still sees the full P_t (minimum) and that the minimum applied voltage, where applicable, is maintained throughout the burn-in period. Method 3100 of MIL-STD-750 shall be used to measure T_J.

TABLE I. Group A inspection.

Inspection 1/ 2/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 1						
Visual and mechanical examination	2071					
Subgroup 2						
Thermal impedance	3101	See 4.3.3	$Z_{\theta JX}$		70	°C /W
* Forward voltage	4011	Condition B , I_F = 200 mA dc (pulsed see 4.5.1)	V_{F1}	.83	1.00	V dc
* Forward voltage	4011	Condition B , I_F = 100 mA dc (pulsed see 4.5.1)	V_{F2}	.79	.92	V dc
* Forward voltage	4011	Condition B ,I_F = 50 mA dc (pulsed see 4.5.1)	V_{F3}	.74	.88	V dc
* Forward voltage	4011	Condition B ,I_F = 10 mA dc (pulsed see 4.5.1)	V_{F4}	.65	.80	V dc
* Forward voltage	4011	Condition B ,I_F = 5 mA dc (pulsed see 4.5.1)	V_{F5}	.60	.765	V dc
* Forward voltage	4011	Condition B ,I_F = 1 mA dc (pulsed see 4.5.1)	V_{F6}	.52	.70	V dc
Reverse current	4016	DC method, V_R = 125 V dc	I_{R1}			
1N3595					1.0	nA dc
1N3595A					2.0	nA dc
Subgroup 3						
High temperature operation		T_A = +150°C				
Reverse current	4016	DC method; V_R = 125 V dc	I_{R2}		3.0	µA dc
Low temperature operation		T_A = -55°C				
Breakdown voltage	4021	I_R = 100 µA dc	$V_{(BR)}$	150		V dc

See footnotes at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/ 2/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
Subgroup 4						
Capacitance	4001	V_R = 0 V dc, f = 1 MHz	C		8.0	pF
Reverse recovery time	4031	Condition A, I_F = 10 mA dc, V_R = 35 V dc, R = 1,000 Ω, .6 uF (for test setup only, recover to 100 kΩ)	t_{rr}		3	µs
Subgroup 5						
Not applicable						
Subgroup 6						
Surge current	4066	Condition A, I_O = 150 mA dc, I_{FSM} = 0.50 A, ten 1 second surges, one surge per minute				
Electrical measurements		See table I, group A, subgroup 2 herein				
Subgroup 7						
Not applicable						

1/ For sampling plan, see MIL-PRF-19500.
2/ Electrical characteristics for all surface mount versions are identical to the corresponding axial leaded versions unless otherwise specified.

TABLE II. Group E inspection (all quality levels) for qualification and requalification only.

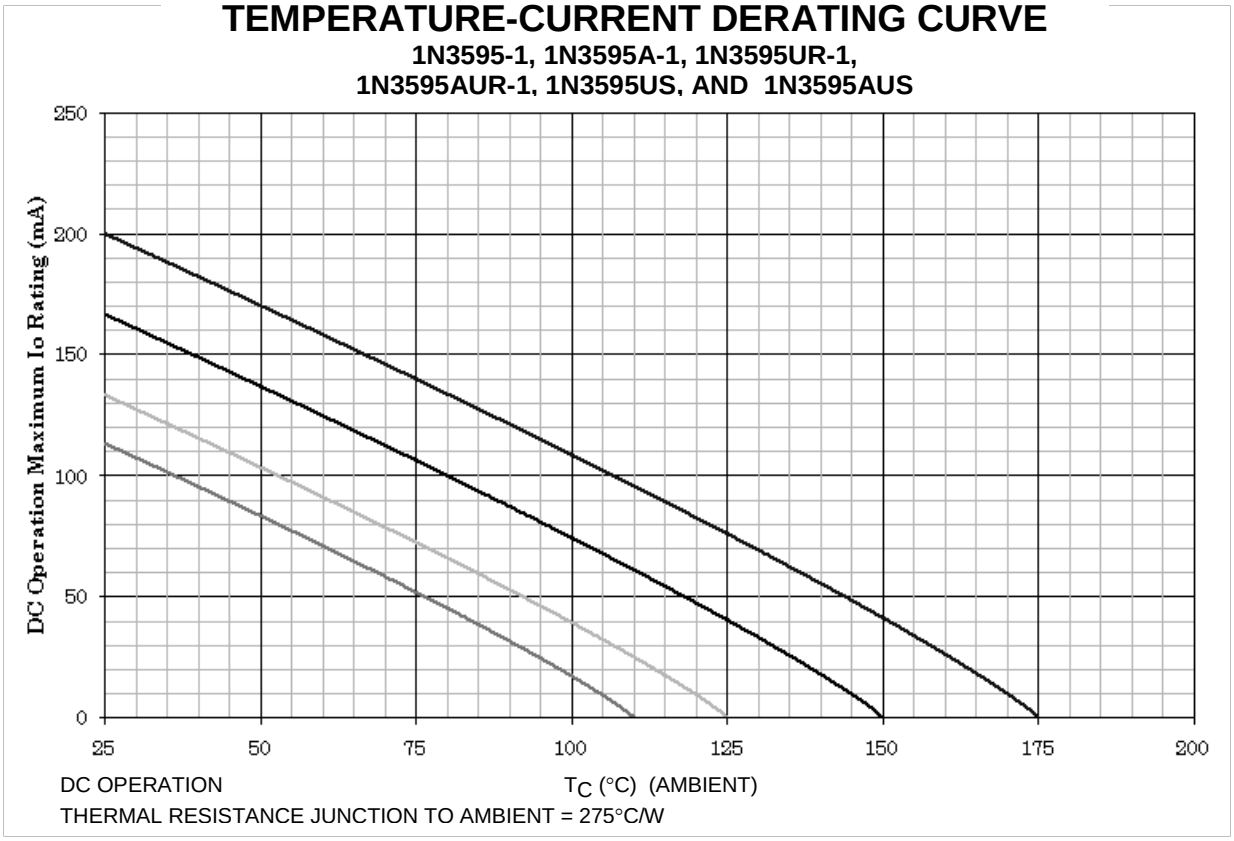
Inspection	MIL-STD-750		Qualification inspection
	Method	Conditions	
Subgroup 1			n = 45, c = 0
Thermal shock (glass strain)	1056	100 cycles 0°C to 100°C.	
Temperature cycling	1051	500 cycles, -65°C to +175°C.	
Hermetic seal	1071	Fine and gross leak required for UB suffix devices. Gross leak only for non-UB devices.	
Electrical measurements		See table I, subgroup 2.	
Subgroup 2			
Intermittent operating life	1037	10,000 cycles; $I_F = I_O$ = 150 mA dc, $T_{on} = T_{off}$ = 1 minute	
Electrical measurements		See table I, subgroup 2.	
Subgroup 4			
Thermal impedance curves		See MIL-PRF-19500.	
Subgroup 5			
Not applicable			
Subgroup 6			
ESD	1020		
Subgroup 8			
Resistance to glass cracking	1057	Test condition B. Test until failure occurs or to a maximum of 25 cycles, whichever comes first.	n = 45
Subgroup 9			
Monitored mission temperature cycling	1055		n = 22, c = 0
Electrical measurements		See table I, subgroup 2.	

* TABLE III. Groups B and C delta measurements. 1/ 2/

Step	Inspection 1/	MIL-STD-750		Symbol	Limits	
		Method	Conditions		Min	Max
* 1.	Forward voltage	4011	Condition B , I_F = 200 mA dc	ΔV_{F1}	≤ 50 mV change from initial value.	
2	Reverse current	4016	DC method; V_R = 125 V dc	ΔI_{R1}	≤ 100 percent of initial value or 0.1 nA dc, whichever is greater.	

1/ The delta measurements for table E-VIa (JANS) of MIL-PRF-19500 are as follows:
   a. Subgroup 4, see table III herein, steps 1 and 2.
   b. Subgroup 5, see table III herein, steps 1 and 2.

2/ The delta measurements for table E-VII of MIL-PRF-19500 are as follows: Subgroup 6, see table III herein, steps 1 and 2 (JANS only).



NOTES:

1. This is the true inverse of the worst case thermal resistance value. All devices are capable of operating at ≤ 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 ≤ 175°C) and power/current rating specified. (See 1.3 herein.)
3. Derate design curve chosen at T_J ≤ 150°C, where the maximum temperature of electrical test is performed.
4. Derate design curves chosen at T_J ≤ 125°C, and 110°C to show power/current rating where most users want to limit T_J in their application.

FIGURE 8. Temperature-current derating 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. The complete Part or Identifying Number (PIN), see 1.2.

e. Destructive physical analysis when requested.

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 Suppliers of JANHC die. The qualified JANHC suppliers with the applicable letter version (example JANHCB1N3595) will be identified on the QML.

PIN	JANC ordering information	
	Manufacturer - 43611	Manufacturer - 34156
1N3595	JANHCB1N3595	JANHCC1N3595
1N3595	JANKCB1N3595	JANKCC1N3595

6.4.1 Substitutability. The following shows the direct substitutability.

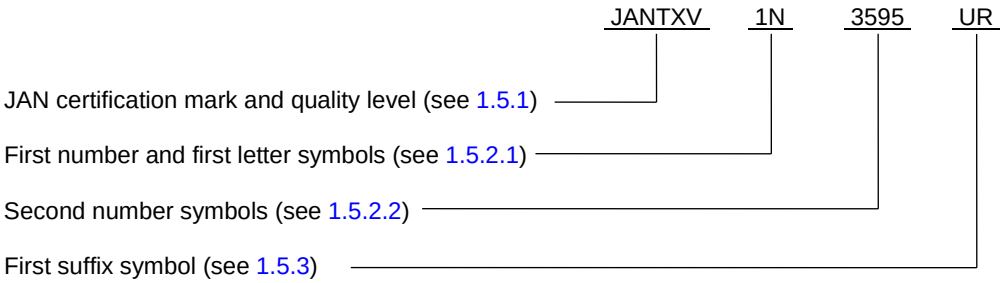
Superseded part number	Superseding part number
1N3595	1N3595-1
1N3595US-1	1N3595US

6.4.2 Substitutability for “A-suffix” parts. “Non-A-suffix” devices are optionally a direct substitute for “A-suffix” devices. The following shows the direct substitutability.

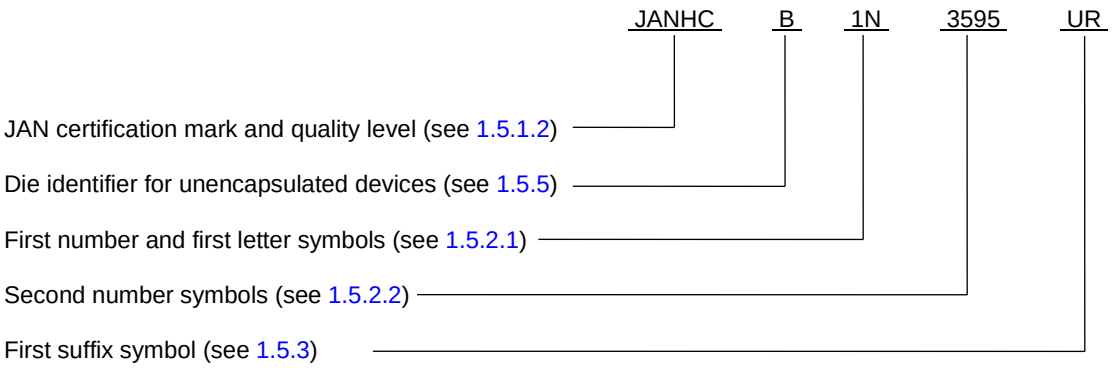
A-version Part Number	Substitute Part Number
1N3595A-1	1N3595-1
1N3595AUR-1	1N3595UR-1
1N3595AUS	1N3595US

* 6.5 PIN construction example.

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



* 6.5.2 Un-encapsulated devices. The PINs for un-encapsulated devices are constructed using the following form.



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

PINs for types1N3595			
JAN1N3595-1	JANTX1N3595-1	JANTXV1N3595-1	JANS1N3595-1
JAN1N3595UB	JANTX1N3595UB	JANTXV1N3595UB	JANS1N3595UB
JAN1N3595UBCA	JANTX1N3595UBCA	JANTXV1N3595UBCA	JANS1N3595UBCA
JAN1N3595UBD	JANTX1N3595UBD	JANTXV1N3595UBD	JANS1N3595UBD
JAN1N3595UBCC	JANTX1N3595UBCC	JANTXV1N3595UBCC	JANS1N3595UBCC
JAN1N3595UB2	JANTX1N3595UB2	JANTXV1N3595UB2	JANS1N3595UB2
JAN1N3595UB2R	JANTX1N3595UB2R	JANTXV1N3595UB2R	JANS1N3595UB2R
JAN1N3595UBR	JANTX1N3595UBR	JANTXV1N3595UBR	JANS1N3595UBR
JAN1N3595US	JANTX1N3595US	JANTXV1N3595US	JANS1N3595US
JAN1N3595UR-1	JANTX1N3595UR-1	JANTXV1N3595UR-1	JANS1N3595UR-1
JAN1N3595A-1	JANTX1N3595A-1	JANTXV1N3595A-1	JANS1N3595A-1
JAN1N3595AUS	JANTX1N3595AUS	JANTXV1N3595AUS	JANS1N3595AUS
JAN1N3595AUR-1	JANTX1N3595AUR-1	JANTXV1N3595AUR-1	JANS1N3595AUR-1
JANHC1N3595-1	JANHC1N3595UBR	JANKC1N3595-1	JANKC1N3595UBR
JANHC1N3595UB	JANHC1N3595US	JANKC1N3595UB	JANKC1N3595US
JANHC1N3595UBCA	JANHC1N3595UR-1	JANKC1N3595UBCA	JANKC1N3595UR-1
JANHC1N3595UBD	JANHC1N3595A-1	JANKC1N3595UBD	JANKC1N3595A-1
JANHC1N3595UBCC	JANHC1N3595AUS	JANKC1N3595UBCC	JANKC1N3595AUS
JANHC1N3595UB2	JANHC1N3595AUR-1	JANKC1N3595UB2	JANKC1N3595AUR-1
JANHC1N3595UB2R		JANKC1N3595UB2R	

* 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 previous issue.

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Review activities:
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Preparing activity:
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