Voidless Hermetically Sealed Unidirectional Transient Voltage Suppressors Data Sheet

1N6461US-1N6468US

Product Overview

This surface mount series of 500 W voidless hermetically sealed unidirectional Transient Voltage Suppressors (TVS) are military qualified per MIL-PRF-19500/551 and are ideal for high-reliability applications where a failure cannot be tolerated. Working peak "standoff" voltages are available from 5.0 V to 51.6 V. They are very robust, using a hard glass casing and internal "Category 1" metallurgical bonds. These devices are also available in axial-leaded packages for through-hole mounting.

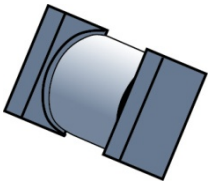
Features

- Surface-mount equivalent of JEDEC registered 1N6461 through 1N6468 series
- Available as 500 W peak pulse power (P_{PP})
- Working peak "standoff" voltage (V_{WM}) from 5.0 V to 51.6 V
- High surge current and peak pulse power provides transient voltage protection for sensitive circuits.
- Double-layer passivation
- Internal "*Category 1*" metallurgical bonds
- Voidless hermetically sealed glass package
- JAN, JANTX, and JANTXV qualifications available per MIL-PRF-19500/551. Other screening in reference to MIL-PRF-19500 is also available.
  (See Part Nomenclature for all available options.)
- RoHS compliant versions available (commercial grade only)

Applications

- Military and other high-reliability applications
- Extremely robust construction
- ESD and EFT protection per IEC61000-4-2 and IEC61000-4-4 respectively
- Protection from secondary effects of lightning per select levels in IEC61000-4-5
- Square-end-cap terminals for easy placement
- Nonsensitive to ESD per MIL-STD-750 method 1020
- Inherently radiation hard as described in Micronote 050

Figure 1. "B" SQ-MELF



1. Maximum Ratings at 25 °C

Parameters/Test Conditions	Symbol	Value	Unit
Junction and storage temperature	T_J and T_{STG}	–55 to +175	°C
Thermal resistance, junction to endcap	$R_{\Theta JEC}$	20	°C /W
Forward surge current at 8.3 ms half-sine	I_{FSM}	80	A
Forward voltage at 1 A	V_F	1.5	V
Peak pulse power at 10/1000 µs	P_{PP}	500	W
Reverse power dissipation[1]	P_R	2.5	W
Solder temperature at 10 seconds	T_{SP}	260	°C

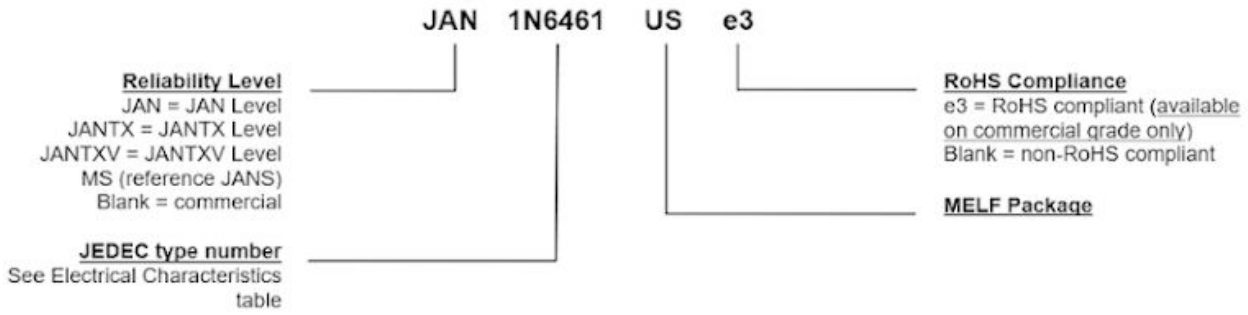
Note:

1. Derate at 50 mW/°C (see Figure 3-4).

1.1 Mechanical and Packaging

- Case: Hermetically sealed voidless hard glass with tungsten slugs
- Terminals: Axial-leads are tin/lead over copper. RoHS compliant matte-tin is available for commercial grade only.
- Marking: Body paint and part number
- Polarity: Cathode band
- Tape and reel option: Standard per EIA-296. Contact factory for quantities.
- Weight: Approximately 750 mg
- See Package Dimensions.

1.2 Part Nomenclature



2. Symbols and Definitions

Symbol	Definition
$\alpha_{V(BR)}$	Temperature coefficient of minimum breakdown voltage: The change in breakdown voltage divided by the change in temperature expressed in %/°C or mV/°C.
$V_{(BR)}$	Breakdown voltage: The voltage across the device at a specified current $I_{(BR)}$ in the breakdown region.
V_{WM}	Rated working standoff voltage: The maximum-rated value of dc or repetitive peak positive cathode-to-anode voltage that may be continuously applied over the standard operating temperature.
I_D	Standby current: The current through the device at rated stand-off voltage.
I_{PP}	Peak impulse current: The maximum rated random recurring peak impulse current or nonrepetitive peak impulse current that may be applied to a device. A random recurring or nonrepetitive transient current is usually due to an external cause, and it is assumed that its effect will have completely disappeared before the next transient arrives.
V_C	Clamping voltage: The voltage across the device in a region of low differential resistance during the application of an impulse current (I_{PP}) for a specified waveform.
P_{PP}	Peak pulse power. The rated random recurring peak impulse power or rated nonrepetitive peak impulse power. The impulse power is the maximum-rated value of the product of I_{PP} and V_C.

2.1 Electrical Characteristics

Type	Minimum Breakdown Voltage[1] $V_{(BR)}$ at $I_{(BR)}$	Breakdown Current $I_{(BR)}$	Rated Standoff Voltage V_{WM}	Maximum Standby Current I_D at V_{RWM}	Maximum Clamping Voltage[1] V_C at I_{PP}	Maximum Peak Pulse Current[1] I_{PP}		Maximum Temp. Coef. of $V_{(BR)}$ $\alpha_{V(BR)}$
						at 8/20 µs	at 10/1000 µs	
	V	mA	V (pk)	µA	V (pk)	A (pk)	A (pk)	%/°C
1N6461US	5.6	25	5	3000	9.0	315	56	–0.03, +0.045
1N6462US	6.5	2f0	6	2500	11.0	258	46	+0.060
1N6463US	13.6	5	12	500	22.6	125	22	+0.085
1N6464US	16.4	5	15	500	26.5	107	19	+0.085
1N6465US	27.0	2	24	50	41.4	69	12	+0.096
1N6466US	33.0	1	30.5	3	47.5	63	11	+0.098
1N6467US	43.7	1	40.3	2	63.5	45	8	+0.101
1N6468US	54.0	1	51.6	2	78.5	35	6	+0.103

3. Performance Curves

Figure 3-1. Peak Pulse Power vs. Pulse Time

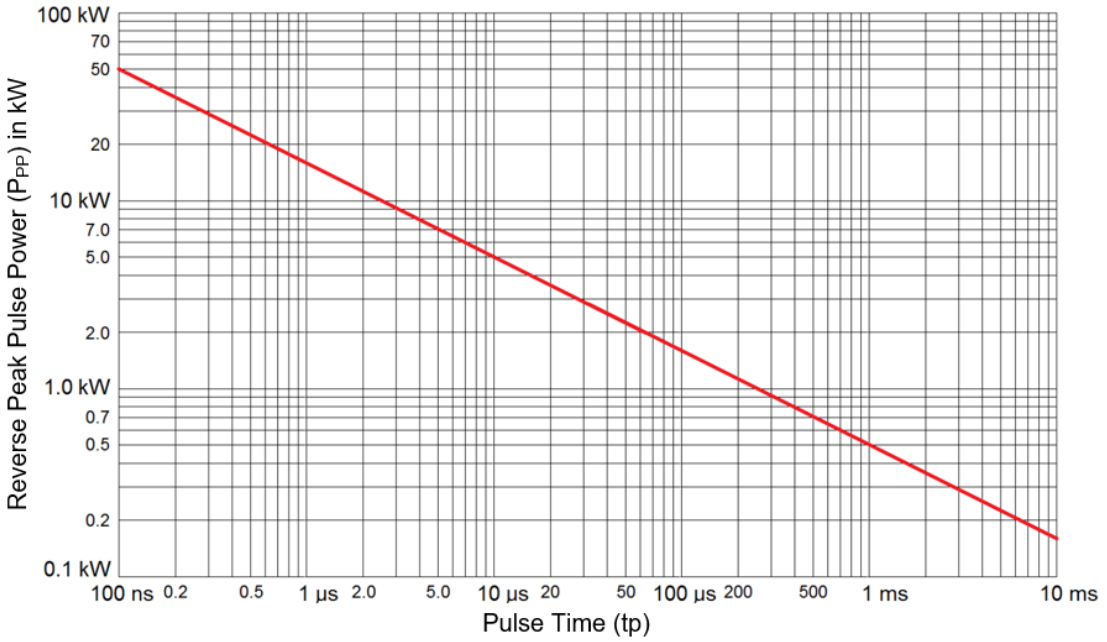


Figure 3-2. 10/1000 µs Current Impulse Waveform

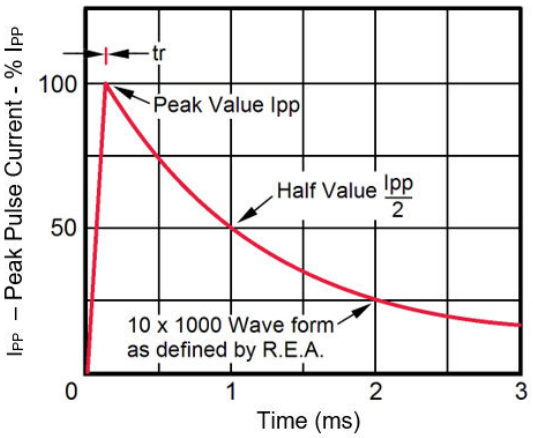


Figure 3-3. 8/20 µs Current Impulse Waveform

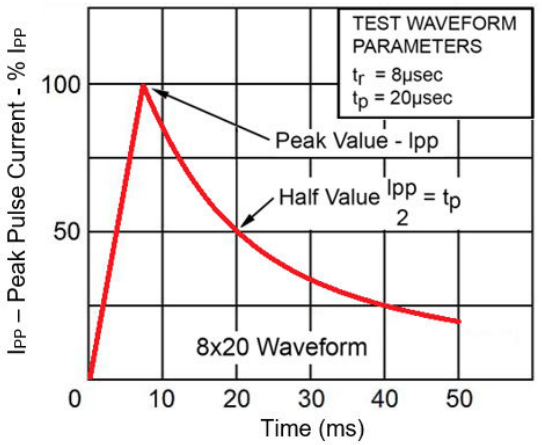
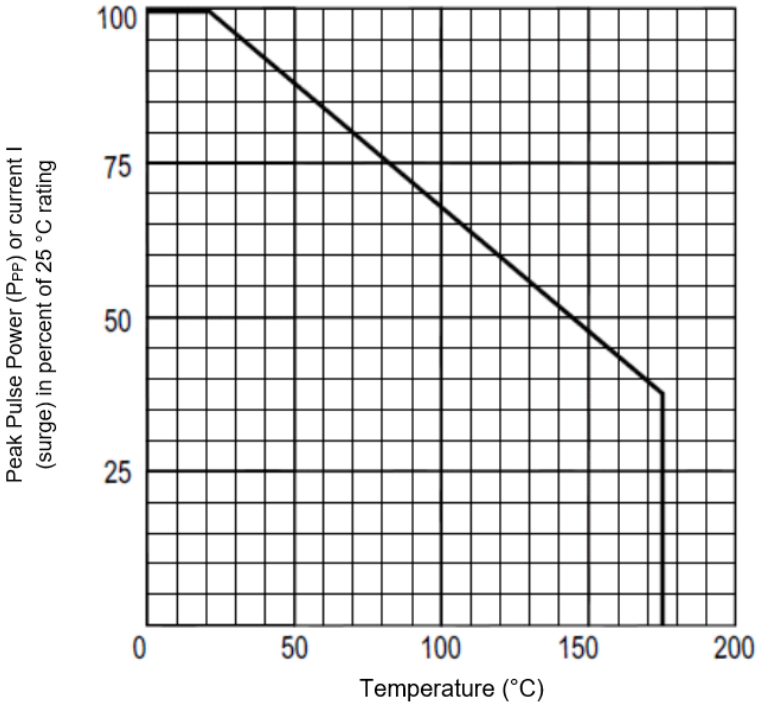
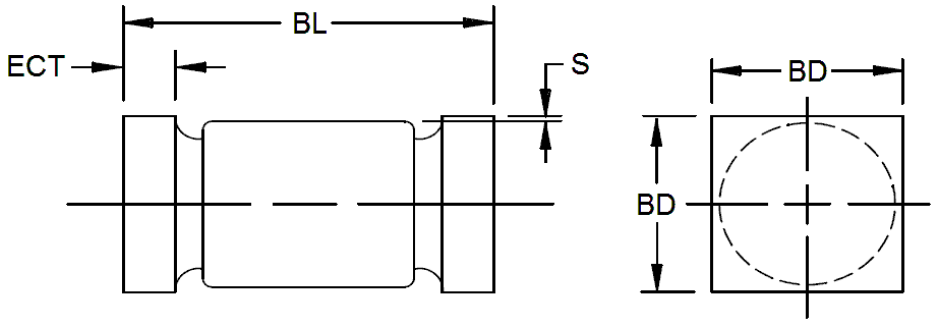


Figure 3-4. Derating Curve



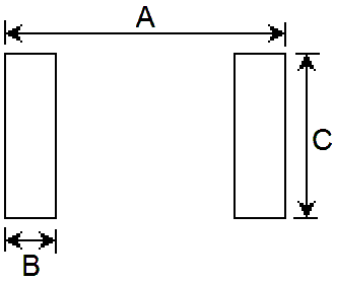
4. Package Dimensions

Dimensions are in inches. Millimeter equivalents are given for information only. Referencing to dimension S, minimum clearance of glass body to mounting surface on all orientations. Dimensions are pre-solider dip. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.



	Inch		Millimeters	
	Min	Max	Min	Max
BD	0.137	0.148	3.48	3.76
BL	0.200	0.225	5.08	5.72
ECT	0.019	0.028	0.48	0.71
S	0.003	---	0.08	---

4.1 Pad Layout



	Inch	Millimeters
A	0.288	7.32
B	0.070	1.78
C	0.155	3.94

If mounting requires adhesive separate from the solder, an additional 0.080 inch diameter contact may be placed in the center between the pads as an optional spot for cement.

5. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
A	06/2023	Converted document to Microchip template.

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