Available on commercial versions

Voidless Hermetically Sealed Unidirectional Transient Voltage Suppressors

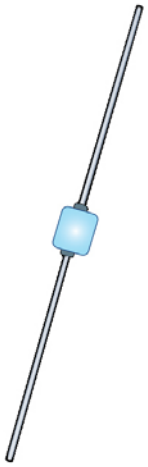
Qualified per MIL-PRF-19500/434

Qualified Levels: JAN, JANTX, and JANTXV

DESCRIPTION

This series of industry recognized voidless hermetically sealed unidirectional Transient Voltage Suppressor (TVS) designs is military qualified and are ideal for high-reliability applications where a failure cannot be tolerated. They provide a Working Peak "Standoff" Voltage selection from 30.5 to 175 volts with 1500 watt ratings. They are very robust in hard-glass construction and also use an internal metallurgical bond identified as *"Category 1"* for high reliability applications. These devices are also available in a surface mount MELF package configuration as a special order. Microsemi also offers numerous other TVS products to meet higher and lower peak pulse power and voltage ratings in both through-hole and surface-mount packages.

Important: For the latest information, visit our website http://www.microsemi.com.



"G" Package

Also available by Special order:

MELF Surface Mount

FEATURES

- High surge current and peak pulse power provides transient voltage protection for sensitive circuits.
- Triple-layer passivation.
- Internal *"Category 1"* metallurgical bonds.
- Voidless hermetically sealed glass package.
- JAN, JANTX, and JANTXV military qualifications available per MIL-PRF-19500/434.
- Further options for screening in accordance with MIL-PRF-19500 for JANS equivalent level by using a "SP" prefix.
- RoHS compliant versions available (commercial grade only).

APPLICATIONS / BENEFITS

- Military and other high reliability transient protection.
- Extremely robust construction.
- Working Peak "Standoff" Voltage (V_{WM}) from 30.5 to 175 V.
- Available as 1500 watt Peak Pulse Power (P_{PP}).
- ESD and EFT protection per IEC61000-4-2 and IEC61000-4-4 respectively.
- Secondary lightning protection per select levels in IEC61000-4-5.
- Flexible axial-leaded mounting terminals.
- Non-sensitive to ESD per MIL-STD-750 method 1020.
- Inherently radiation hard as described in Microsemi "MicroNote 050".

MAXIMUM RATINGS @ T_A = 25 °C unless otherwise noted.

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-55 to +175	°C
Peak Pulse Power @ t_p = 1.0 ms	P_{PP}	1500	W
Rated Forward Surge Current @ t_p = 8.33 ms	I_{FSM}	150	A (pk)
Impulse repetition rate (duty factor)	I_{PP}	0.01	%
Steady-State Power (1) (Figure 4)	P_D	3.0	W
Solder Temperature @ 10 s	T_{SP}	260	°C

Notes: 1. Derate at 20 mW/°C above T_A = +25 °C. Steady-state power ratings with reference to ambient are for PC boards where thermal resistance from mounting point to ambient is sufficiently controlled where $T_{J(MAX)}$ is not exceeded.

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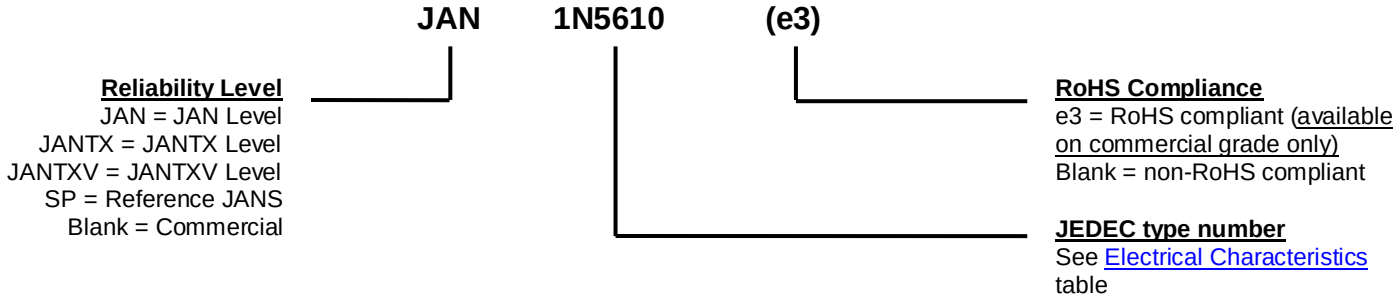
MECHANICAL and PACKAGING

- CASE: Hermetically sealed voidless hard glass with tungsten slugs.
- TERMINATIONS: Axial-leads are tin/lead (Sn/Pb) over copper. RoHS compliant matte-tin available for commercial only.
- MARKING: Body painted and part number.
- POLARITY: Cathode band.
- Tape & Reel option: Standard per EIA-296. Consult factory for quantities.
- Weight: 1270 milligrams.
- See Package Dimensions on last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

Symbol	Definition
$I_{(BR)}$	Breakdown Current: The current used for measuring Breakdown Voltage $V_{(BR)}$.
I_D	Maximum Standoff Current: The maximum current that will flow at the specified voltage and temperature.
I_{PP}	Peak Pulse Current: The peak current during the impulse.
P_{PP}	Peak Pulse Power: The peak power dissipation resulting from the peak impulse current I_{PP}.
T_{SP}	Temperature Solder Pad: The maximum solder temperature that can be safely applied to the terminal.
$\alpha_{V(BR)}$	Temperature Coefficient of Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current temperature.
$V_{(BR)}$	Minimum Breakdown Voltage: The minimum voltage the device will exhibit at a specified current.
V_C	Maximum clamping voltage at specified I_{PP} (Peak Pulse Current) at the specified pulse conditions.
V_{WM}	Working Peak Voltage: The maximum peak voltage that can be applied over the operating temperature range. This is also referred to as Standoff Voltage.

ELECTRICAL CHARACTERISTICS

TYPE	MINIMUM BREAK DOWN VOLTAGE $V_{(BR)}$ @ 1.0 mA	BREAKDOWN CURRENT MAXIMUM dc CURRENT T_A = +25 °C $I_{(BR)}$	WORKING PEAK REVERSE VOLTAGE V_{WM}	MAX STANDOFF CURRENT I_D @ V_{WM}	MAXIMUM CLAMPING VOLTAGE V_C @ 10/1000 µs	MAXIMUM PEAK PULSE CURRENT I_{PP}		MAXIMUM TEMP. COEF. OF $V_{(BR)}$ $\alpha_{V(BR)}$
						@8/20 µs	@10/1000 µs	
	Volts	mA	V (pk)	µA	V (pk)	A (pk)	A (pk)	% / °C
1N5610	33.0	75.0	30.5	5	47.6	193	32.0	.093
1N5611	43.7	53.0	40.3	5	63.5	136	24.0	.094
1N5612	54.0	43.0	49.0	5	78.5	116	19.0	.096
1N5613	191	12.5	175	5	265	33	5.7	.100

GRAPHS

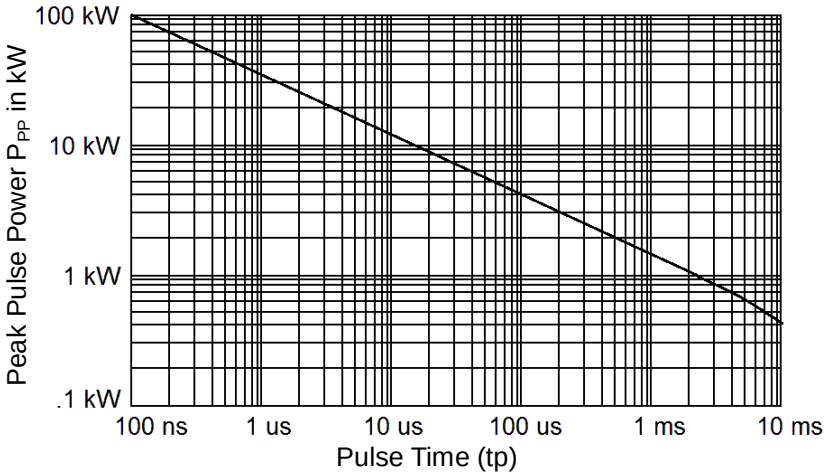


FIG. 1 – Non-repetitive peak pulse power rating curve

NOTE: Peak power defined as peak voltage times peak current.

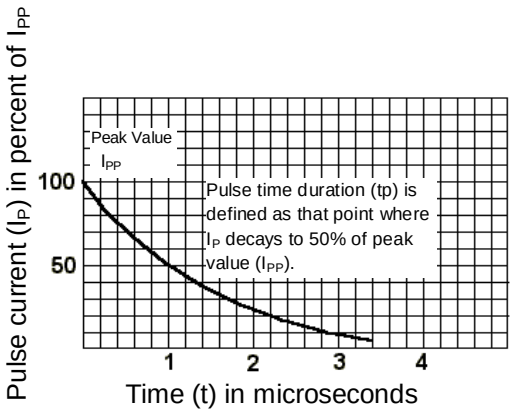


FIG. 2 Pulse wave form for exponential surge for 10/1000 µs

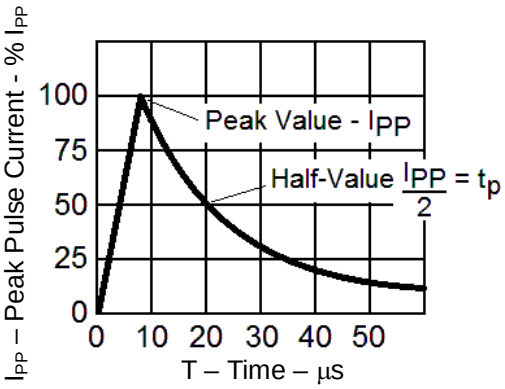


FIGURE 3

8/20 µs CURRENT IMPULSE WAVEFORM

TEST WAVEFORM PARAMETERS: t_r = 8µsec

t_p = 20µsec

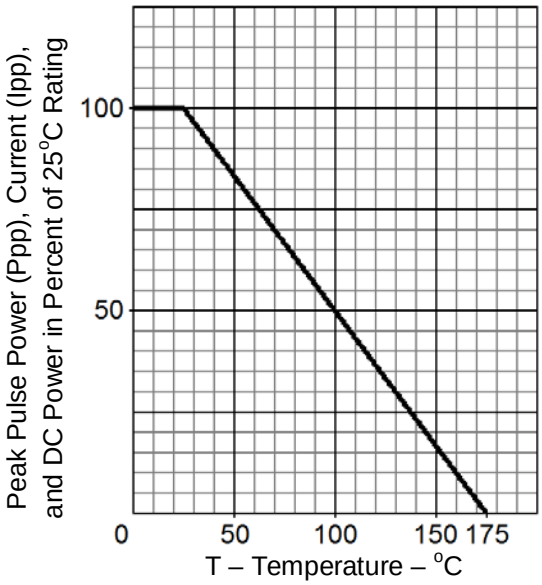
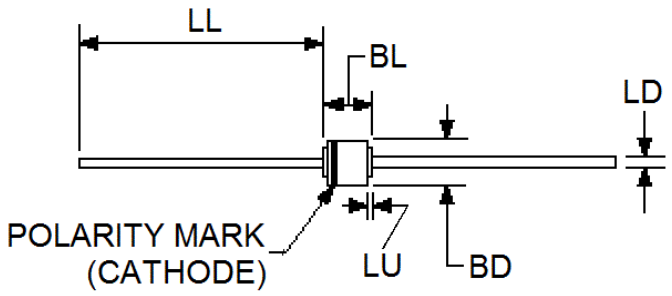


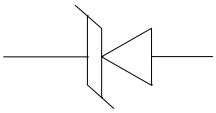
FIGURE 4

DERATING CURVE

PACKAGE DIMENSIONS



Ltr	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
BD	.150	.185	3.81	4.70	3
BL	.160	.375	4.06	9.53	3
LD	.037	.042	0.94	1.07	
LL	.900	1.300	22.86	33.02	
LU		.050		1.27	4



Schematic Symbol

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Package contour optional within BD and length BL.
4. Within this zone lead diameter may vary to allow for lead finishes and irregularities other than heat slugs.
5. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

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MPT-12C MPT-36 MPT-12 MPT-8C MPT-45C MPT-45 MPT-8 MPT-36C MPT-5 1N5610e3 MXP5KE120CAe3 MXP5KE14CA M15KP58A MSMCJ85CAe3 MXLP5KE40CA MXLP5KE110Ae3 M15KP85CAe3 MSMCJ36CAe3 MXP5KE20A MSMCJ15CA MXLP5KE8.5A MXP5KE5.0Ae3 MXP5KE11A MXLP5KE9.0CA MXP5KE18CA M15KP64CAe3 MXLSMBJSAC36 MXP5KE13CA MXLP5KE17CA MXLP5KE58Ae3 EPS24 MXLP5KE54CA SM1624/TR13 MSMCJ110CAe3 MSMCJ15Ae3 M15KP100A MXLP5KE58CA MXLSMBJSAC26 MXP5KE120A MXLSMBJSAC22 M15KP28Ae3 MXLP5KE22CAe3 MPT-18C MXLP5KE43CA MXP5KE45A MXLP5KE11Ae3 MSMCJ78Ae3 MXLP5KE54CAe3 EPS28 MSMCJ33Ae3 MXLP5KE6.5Ae3 MXLSMBJSAC50 MXLP5KE5.0A MXLP5KE12A MXP5KE8.5CA MXP5KE90CA M15KP48A EPS24SM MXLP5KE100CA MSMCJ6.0Ae3 MASMCJ18Ae3 MXLP5KE14Ae3 MXLP5KE64CA MXLP5KE10Ae3 MSMCJ5.0CAe3 MSMCJ7.0CAe3 MXLSMBJSAC18e3 MXP5KE13CAe3 MSMCJ36Ae3 MASMCJ20CAe3 M15KP45Ae3 MXP5KE58A MXP5KE11CAe3 MXP5KE5.0A MXLP5KE160CAe3 MXP5KE17CAe3 MXLP5KE54Ae3 MXLP5KE6.0A MXLP5KE40CAe3 MXLP5KE28A MPT-15 MXLP5KE9.0A MXLP5KE11A MXLSMCJ8.0CAe3 MXLSMCJ9.0CAe3 M15KP200A MXLP5KE17A M15KP48CAe3 MXP5KE30CA MXP5KE15CA MXP5KE170A MXLSMBJSAC75 MXP5KE26Ae3 MXLP5KE26CAe3 MSMCG5.0Ae3 MXP5KE8.0Ae3 MXP5KE85CAe3 MASMBJSAC45 MXLP5KE100CAe3 MSMCJ48CAe3