

# POWER ZENERS

## Transient Suppressor Diodes

JAN, JANTX, JANTXV 1N5610-1N5613

### FEATURES

- 1500 Watts for 1ms Pulse Power Capability
- Small Physical Size
- Designed to be Used in Mil-Std-704A Applications

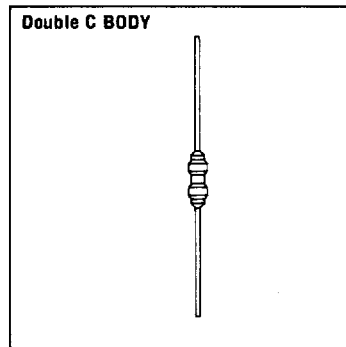
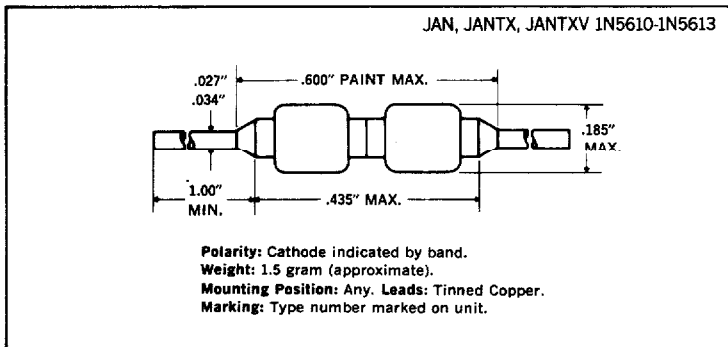
### DESCRIPTION

Zener diodes with high surge capability qualified to MIL-S-19500/434.

4

### ABSOLUTE MAXIMUM RATINGS (at 25°C except where otherwise noted)

	1N5610	1N5611	1N5612	1N5613
Zener Voltage		See Electrical Specifications		
Forward Surge Current	200A	200A	200A	200A
Zener Surge Current, at 25°C	32.0A	24.0A	19.0A	5.7A
Surge Current, at 150°C	5.5A	4.8A	3.2A	1.0A
Surge Power		See Graph		
Storage and Operating Temperature		-65°C to +175°C		



**Microsemi Corp.**  
**Watertown**  
*The diode experts*

**ELECTRICAL SPECIFICATIONS (at 25°C unless noted)**

Type	Min. Zener Voltage § Vz @ Is	Max. Zener Voltage†		Max. Reverse Leakage Current Ik @ Vr		Max. Forward Voltage‡ @ 100 Amps	Typical Temperature Coefficient
		Volts	Amps	µA	Volts		
1N5610*	33.0	47.5	32.0	5.0	30.5	4.8	.093
1N5611*	43.7	63.5	24.0	5.0	40.3	4.8	.094
1N5612*	54.0	78.5	19.0	5.0	49.0	4.8	.096
1N5613*	191.0	265.0	5.7	5.0	175.0	4.8	.100

Notes: \* Available as JAN, JANTX and JANTXV.  
 § Duration of applied current ≤ 300ms, duty cycle ≤ 2%.  
 † Utilizing a pulse which decays exponentially to 50% of the peak value in 1ms. See graph entitled "Pulse Waveform".  
 ‡ Peak Sinusoidal surge current of 8.3ms duration, non-repetitive.

**APPLICATIONS**

Voltage transients can be suppressed with series elements, shunt elements, or a combination of both. These elements may be passive or active. For low and medium power applications, a series resistor and zener clamp offer several attractive features:

1. Simplicity of design
2. High reliability
3. Fast response time

The 1N5610 series of surge suppressors will suppress the following transients defined by MIL-S-704A without the use of any series limiting resistance beyond that provided by the source:

1. All 600V transients (category #1 on chart below)
2. All 80V transients except those generated by the main voltage regulator (category #2 on chart below)
3. The overvoltage transients generated by the *main voltage regulator* (category #3 on chart below) will also be suppressed by the 1N5610 series if:
  - a. A 20 ohm series limiting resistor is used, or
  - b. No series resistance is used but the zener is protected within 500 µs by using, for example, an SCR crowbar

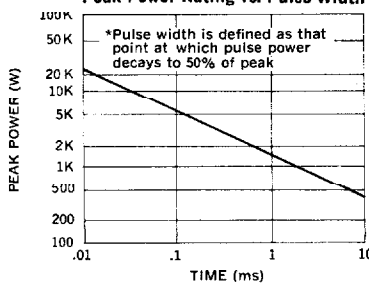
The above statements are based on the source impedances and dv/dt characteristics as given in ARINC\* Specification #413. This report entitled "Guidance for Aircraft Electrical Power Utilization and Transient Protection" serves to further define MIL-STD-704A for large aircraft electrical systems.

Category	Source of Transient	Maximum Amplitude	Duration	Min. Source Impedance	dv/dt
1.	Inductive Switching	600 V	≤ 10 µs	50 ohms	
2.	BUS Switching	80 V	≤ 10 ms	15 ohms	
3.	Main Voltage Regulator	80 V	≥ 10 ms	0.2 ohms	50V/ms

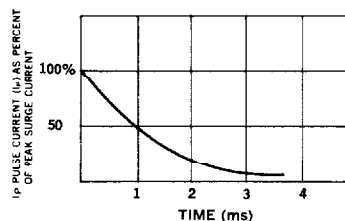
These Surge Suppressors are useful in a variety of other applications where semiconductor devices must function reliably in an environment subject to extremely high but short term surges.

\* ARINC stands for Aeronautical Radio, Inc. (Annapolis, Maryland 21401)

**Peak Power Rating vs. Pulse Width\***



**Pulse Waveform**



**Peak Power Rating\* vs. Ambient Temperature**

