

Multilayer Ceramic Automotive Transient Voltage Suppressors

Description

The *JumboTek* Automotive Multilayer Transient Voltage Suppressors are zinc oxide based ceramic semiconductor devices with non-linear voltage-current characteristics similar to back-to-back zener diodes and it is inherently bi-directional. It offers protection from transients on both the forward and reverse directions. When exposed to high voltage transients, the Automotive Suppressor under-goes non-linear impedance change which is many orders of magnitude, from approximately 10^6 to 10Ω .

The automotive series offers the stable protection from large discharges caused by most common transient condition in an automobile particularly in case of load dump. The Automotive Transient Voltage Suppressors possess the high resistance to thermal shock and afford protection from -55°C to 125°C .

The Automotive Transient Voltage Suppressor is manufactured by *JumboTek* patented processes, providing excellent transient energy absorption in a small package with semiconducting ceramics leadless chip form, eliminating lead inductance and assuring fast speed of response to transient surges. It is compatible with modern reflow and wave soldering procedures.

Features

- Thin layer and high precise techniques
- Leadless SMD formation---surface mount design
- “Zero” lead inductance, fastest speed of response to transient surge
- Variety of energy ratings available
- No temperature derating up to 125°C ambient
- High surge current capability
- Low profile, compact industry standard chip size, compatible with most surface-mounting assembly equipment and mounting techniques
- Stable protection level, minimum leakage current
- Inherent bi-directional clamping
- No plastic or epoxy coating assures better than 94v-0 flammability rating
- Available with Nickel / Tin end terminations

Applications

- Absorption of switching surge from various kinds of relay · trumpet · motors and electro-magnetic valves.
- Electrostatic discharge and spike noise suppression.
- Protect the electronic systems such as antilock brake systems · direct ignition systems · engine control · airbag control systems · wiper motor control and semiconductors of automobile.

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Absolute Maximum Ratings

Continuous:	AUTO SERIES	UNITS
Steady State Applied Voltage:		
DC Voltage Range ($V_{M(DC)}$)	18 & 38	V
Transient:		
Load Dump Energy, (W_{LD})	1 to 30	J
Jump Start Capability (5 minutes), (V_{JUMP})	24.5 to 50	V
Operating Ambient Temperature Range(T_A)	- 55 to 125	°C
Storage Temperature Range (T_{STG})	- 55 to 150	°C
Temperature Coefficient (α) of Clamping Voltage (V_C) at Specified Test Current	<0.01	% /°C

Test Method / Description

Characteristics	Test Method / Description
Standard Test condition	Environmental condition under which every measuring is done without doubt on the measuring results. Unless specially specified temperature, relative humidity are 5 to 35°C, 45 to 85% RH.
Max. Working Voltage ($V_{M(DC)}$)	Maximum steady-state DC operating voltage the device can maintain and typical leakage current at 25°C not exceed 25µA. The operating voltage (working voltage) is always less than the breakdown voltage (nominal voltage) of the device.
Nominal Voltage($V_{N(DC)}$)	With the specified measuring current of 10mA DC applied and has a specified minimum and maximum voltage listed.
Max. Clamping Voltage (V_C)	Maximum peak voltage across the device measured at a specified pulse current (A) and waveform 8/20 µs.
Surge Current (I_{TM})	Maximum peak current may be applied with the specified waveform without device failure.
Surge Shift $\Delta V/V \leq \pm 10\%$	The shift of device voltage after suffering the specified surge current.
Energy Absorption(W_{TM})	Maximum energy may be dissipated with a specified waveform without device failure.
Typical Capacitance(C)	Device Capacitance measured with zero voltage bias 1V _{P-P} and frequency 1MHz
Response Time	The actual response time of a Automotive suppressor is in the 1 to 5 nanosecond range, more than sufficient for the transients which are likely to be encountered in an automotive environment.

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Automotive Series



DEVICE RATINGS AND SPECIFICATIONS

PART NUMBER	Maximum Rating(125°C)			Specifications(25°C)			
	Maximum Continuous Working Voltage	Load Dump Energy (10 pulses)	Jump start Voltage Max. 5minutes	Maximum Clamping Voltage at Specified Current (8/20µs)	Nominal Voltage at 10 mA (DC) Test Current		Typical Capacitance @1 MHz
	$V_{M(DC)}$	W_{LD}	V_{JUMP}	V_C	$V_{N(DC)}$ min.	$V_{N(DC)}$ max.	C
	(V)	(J)	(V)	(V)	(V)	(V)	(pF)
JA0805ML180A□	18	1.0	24.5	40 at 1 A	23.0	32.0	690
JA1206ML180A□	18	1.5	24.5	40 at 1.5 A	23.0	32.0	1030
JA1210ML180A□	18	3.0	24.5	40 at 1.5 A	23.0	32.0	2800
JA1812ML180A□	18	6.0	24.5	40 at 5 A	23.0	32.0	3500
JA2220ML180A□	18	25.0	24.5	40 at 10 A	23.0	32.0	8700
JA2220ML380A□	38	30.0	50.0	77 at 10 A	48.5	56.0	3000

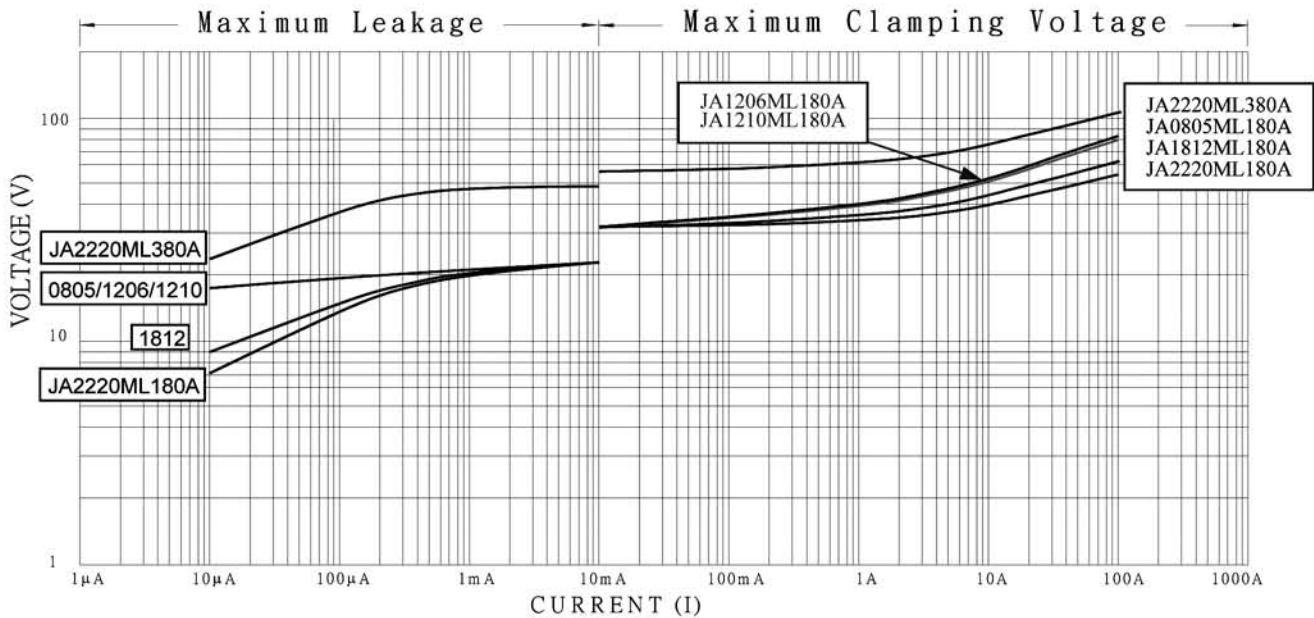
NOTES:

- Average power dissipation not to exceed 0.1w 、 0.1w 、 0.15w 、 0.3w and 1w for chip size 0805 、 1206 、 1210 、 1812 and 2220 respectively.
- If the maximum loads specified for load dump or jump-start is fully utilized, subsequent polarity reversal of Auto TVS is inadmissible.
- If the load remains under the maximum ratings, polarity reversal may be admissible.
- Thermal shock capability per MIL- STD- 750, Method 1051:-55°C to 125°C, 5 minutes at 25°C, 25 cycle: 15 minutes at each extreme.
- For application specific requirement, please contact **JumboTek** for availability.

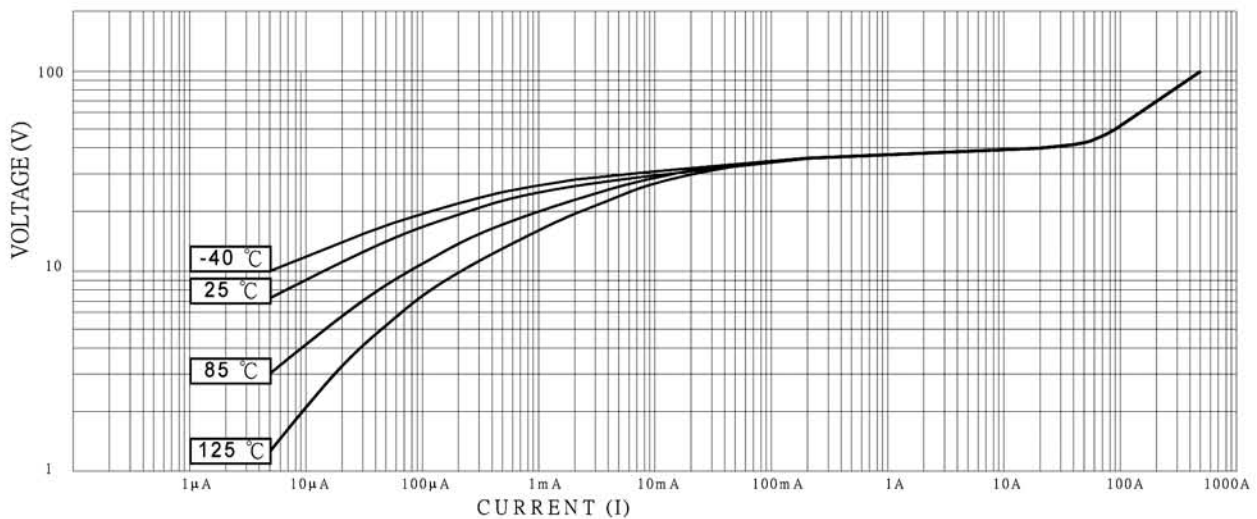
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V/I Characteristics Curves



Maximum Leakage Current/Clamping Voltage Curve for Automotive Series at 25 °C



Typical V-I Characteristics of The JA2220ML180A at -40 °C, 25 °C, 85 °C and 125 °C



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information ?*

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