

4 Line Chip Array Series Product

Description

This specification is applicable to Chip Metal Oxide Varistor in multilayer technology. The MLVA 0805 Series provides protection from Surge and ESD. The customer designed part number drawing take precedence over this specification.

Features

1. SMD Zinc Oxide based Ceramic Chip
2. Protective Glaze (Glass Coating) on all non-termination area, effectively solve thus as solder flux, humidity and surge spark problems, keep excellent low and stable leakage current
3. No Plastic or Epoxy Parts Assures Better than 94V-0 Flammability Rating
4. Lead free, Tin plated with Nickel barrier termination
5. Quick response time (<1ns)
6. Meet IEC 61000-4-2, 61000-4-4, and 61000-4-5 standard
7. RoHS Compliant

Applications

Applications for Mother Board, Notebook, Cellular Phone, PDA, handheld device, DSC, DV, Scanner, and Set-Top Box etc.

Part Number Code

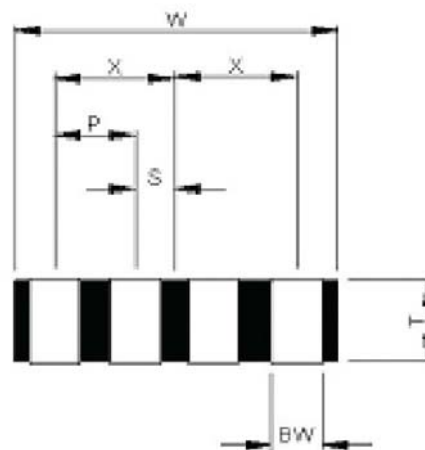
MLV A 0805 M 04 — 330
 ① ② ③ ④ ⑤ ⑥

1. Series Type: MLV — Multilayer Varistor:
2. Elements : A — Array
3. Chip Size: 0805
4. varistor voltage tolerance : M — ±20% ; L— 15%K— ±10%VRMS:
5. AC Working Voltage VRMS
- 6.Capacitance: Value — XX x 10N→XXN
 ex.33pF=33x100→330

Shape and Dimensions

Size	0805
L	1.25±0.20
W	2.00±0.20
T	0.90 MAX
BW	0.20±0.1
BL	0.20±0.1
P	0.50 REF
X	0.75±0.10
S	0.25±0.10

unit : mm



Specifications

Symbol	Working Voltage		Varistor Voltage		Clamping Voltage	Capacitance	Peak Current	Transient Energy
	V_{RMS}	V_{DC}	V_V	ΔV_V	V_c	C_p	i_{max}	W_{max}
Units	Volts	Volts (Max.)	Volts	%	Volts (Max.)	pF(typ.)	Amps (Max.)	Joules (Max.)
Test Condition	< 10 mA		1mA DC		1A 8/20 μ s	1MHz	8/20 μ s	10/1000 μ s
MLVA 0805								
MLVA0805M04-100	4	5.5	12	± 20	34	10	5	0.01
MLVA0805M04-330	4	5.5	12	± 20	28	33	10	0.01
MLVA0805M04-500	4	5.5	12	± 20	27	50	10	0.01
MLVA0805K14-150	14	18	28	± 10	58	15	5	0.01

Environmental Performance

Item	Specifications	Test Condition
Bias Humidity	$\Delta V_V / V_V \leq 10\%$	90%RH, 40°C, Working Voltage, 1000 hr
Thermal Shock		-40°C to 85°C, 30 min. cycle, 5 cycles
Full Load Voltage		Working Voltage, 85°C, 1000 hr
Solder Leach Resistance	1. $\Delta V_V / V_V \leq \pm 10\%$ 2. $I_L \leq 10\mu A$ at Working Voltage	260°C, 10sec.

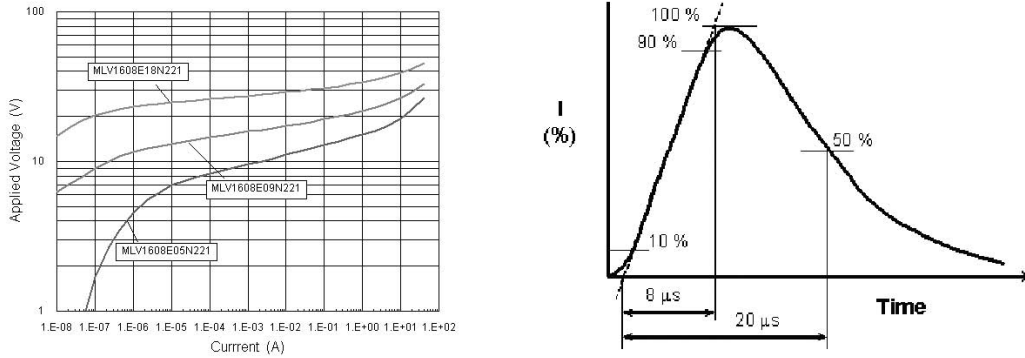
General Technical Data

Operating Temperature	-40 ... +85°C
Storage Temperature	-40 ... +85°C
Response Time	<1 ns
Solderability	230°C, 3sec.
Solder Leach Resistance	260°C, 10sec.

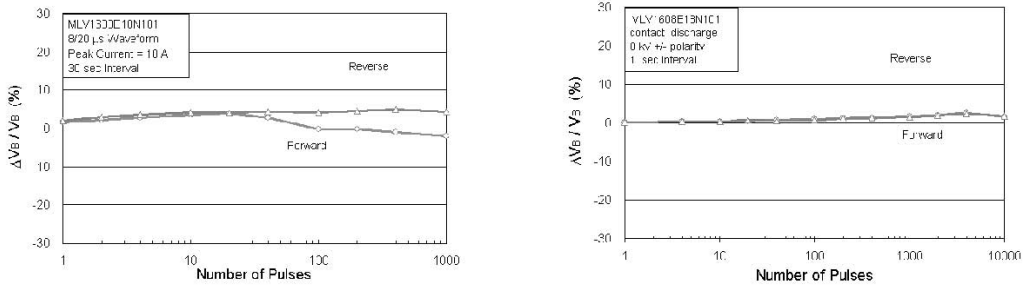
Package

Size	0805
Standard Packing Quantity (pcs / Reel)	4,000pcs

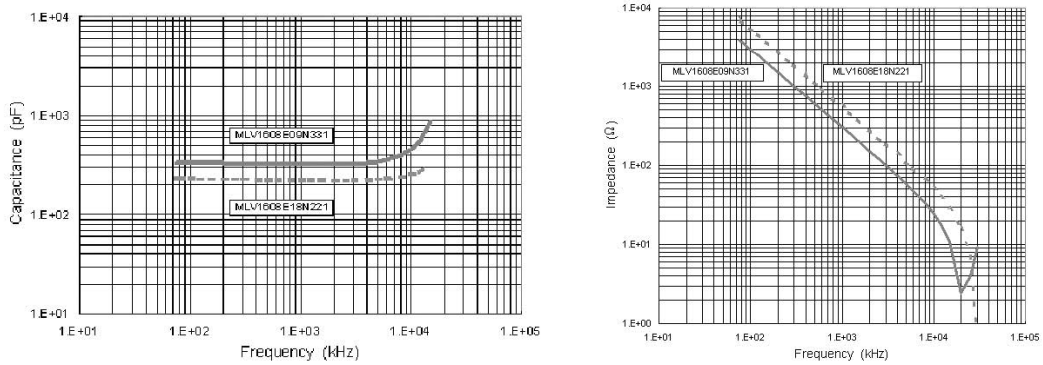
Typical Voltage—Current Characteristics 8/20 us Surge Waveform



Maximum Surge Current Rating ESD Rating



Dielectric Properties



Product Description

This specification is applied to protect sensitive electronic circuits from the treat of electrostatic discharge (ESD). The function meets with the requirement of IEC61000-4-2 specification. The technology of the EGA is using thick film and material technology.

Features

1. Protection against high ESD voltages and currents
2. Compact size for EIA 0402, 0603 and 1206
3. Extremely Quick Response Time (<1ns)
4. Extremely Low Capacitance(<1pF)
5. Very Low Current Leakage(0402 : 0.05μA , 0603 : 0.01μA, 1206 : 0.01μA)
6. Zero Signal Distortion
7. Bi-directional

Applications

1. EGA10402V05AH is applied to High Speed Data line, USB, DVI, I/O PORT, HDMI, HDTV...etc.
2. EGA10402V05A2 is only designed to protect the RF switch IC against ESD transients which come form Antenna front end.
3. EGA10603 Series and EGA Array are applied to<designed for> RF module, Antenna circuit, IEEE-1394, USB2.0 PORT, and high speed protocols...etc.

Part Number Code

EGA Series

EGA **1** **0603** **V05** **A** **1** **B**
 ① ② ③ ④ ⑤ ⑥ ⑦

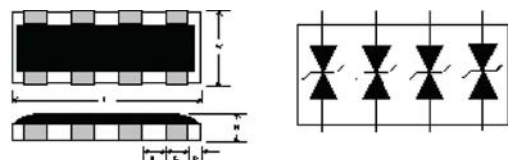
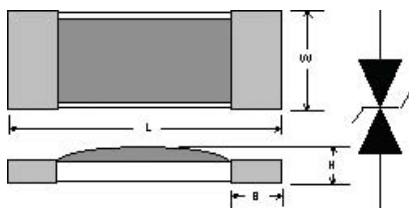
1. Series Type : ESD Guard Series
2. Elements Type
3. Chip Size:0402 / 0603
4. Continuous Operating Voltage, VDC
5. Type A is suitable for IEC61000-4-2 Level 4
6. Clamping Voltage : "1" Typical Clamping Voltage 30V "2" Typical Clamping Voltage, 17V
7. "B" for black encapsulate

EGA Array

EGA **4** **1206** **V12** **A** **□**
 ① ② ③ ④ ⑤ ⑥

- ① Series Type: ESD Guard Series
- ② Elements Per Chip
- ③ Chip Size :1206
- ④ Continuous Operating Voltage, 12VDC
- ⑤ Type A is suitable for IEC61000-4-2 Level 4
- ⑥ Suffix for Special Code

Shape and Dimensions



Size	0402	0603
L	1.00±0.1	1.60±0.1
W	0.50±0.1	0.80±0.1
H	0.38±0.1	0.50±0.1
B	0.20±0.1	0.30±0.2

Size(EIA)	1206
L	3.20±0.2
W	1.60±0.2
H	0.50±0.1
B	0.40±0.2
C	0.40±0.2
D	0.20±0.1

Specifications

Part Number	EGA10402V05A2	EGA10402V05AH	EGA10603V05A1-B	EGA10603V12-B	EGA41206V12A
Maximum Operating Voltage (V)	5V	5V	5V	12V	12V
Leakage Current (I _L)	0.05μA	0.05μA	0.01μA	0.01μA	0.01μA
Capacitance, @1MHz(C _p)	0.2pF	0.2pF	0.2pF	0.2pF	0.2pF
Trigger Voltage (V _t)	100V	150V	150V	150V	150V
Clamping Voltage (V _c)	17V	30V	30V	30V	30V
ESD Voltage Capability, Contact Discharge Mode(KV)	8KV	8KV	8KV	8KV	8KV
ESD Voltage Capability, Air Discharge Mode(KV)	15KV	15KV	15KV	15KV	15KV
Minimum ESD Pulse Withstand	100	100	100	100	100

V_c – Per IEC 61000-4-2, 30A@8kV, level 4, clamp measurement made 30 ns after initiation of pulse, all test in contact discharge mode

C_p – Device capacitance measured with 1V_{rms}

I_L – Leakage current at maximum operating voltage, the maximum leakage current was measured at reliability test

Environmental Performance

Item	Specifications	Test Condition
Bias Humidity	I _L ≤ 10 μA	90%RH, 40°C, Rated Voltage, 1000 hrs
Thermal Shock		-40°C to 85°C, 30 min. cycle, 5 cycles
Full Load Voltage		Rated Voltage, 85°C, 1000 hrs
Solder Leach Resistance		260°C, 10sec.

I_L – Leakage current at rated voltage, the maximum leakage current was measured after reliability test.

General Technical Data

Operating Temperature	-40 ... +85°C
Storage Temperature	-40 ... +85°C
Response Time	<1 ns
Solderability	230°C, 3sec.
Solder Leach Resistance	260°C, 10sec.

Package

Size	0402	0603	1206
Standard Packing Quantity (pcs / Reel)	10,000pcs	5,000pcs	5,000pcs

Terminology

Term	Symol	Definition
1 Rated AC Voltage	V_{rms}	Maximum continuous sinusoidal RMS voltage (<5% total harmonic distortion) which may be applied to the component under continuous operating conditions at 25°C
2 Rated DC Voltage	V_{DC}	Maximum continuous DC voltage (<5% ripple) which may be applied to the component under continuous operating conditions at 25°C
3 Breakdown Voltage (Varistor Voltage)	$V_B (V_{1mA})$	Voltage across the varistor measured at 1 mA DC current
4 Leakage Current	I_L	Current measured with rated DC operating voltage,
5 Clamping Voltage	V_C	Maximum peak voltage across the varistor measured at a specified pulse current and waveform, e.g. 10A - 8/20µs
6 Voltage Clamping Ratio	V_C / V_{app}	A figure of merit measure of the varistor clamping effectiveness as defined by the symbols V_C/V_{app} , where V_{app} either V_B or V_{DC}
7 Maximum Surge Energy	W_S	Maximum energy which may be dissipated with a single 10/1000µs impulse, without causing device failure
8 Maximum Surge Current	I_S	Maximum peak current which may be applied with a single 8/20µs impulse, without causing device failure
9 Rated Transient Average Power Dissipation	$P C \alpha n$	Maximum average which may be dissipated due to a group of pulses occurring within a specified isolated time period, without causing device failure at 25°C
10 Capacitance		Device capacitance measured with zero volt bias 0.5 V_{rms} and 1 kHz or 1MHz
11 Nonlinearity Coefficient		A measure of varistor nonlinearity between two given operating currents, I_1 and I_2 , as described by $I=kV^\alpha$ where k is a device constant, and $\alpha=\log(I_1/I_2) / \log(V_1/V_2)$ where V_1 the voltage measured at I_1 and V_2 the voltage measured at I_2 , e.g. $I_1=1mA$ and $I_2=0.1mA$ then $\alpha=1 / \log(V_{1mA} / V_{0.1mA})$.
12 Response Time		The time lag between application of a surge and varistor's 'turn-on' conduction action
13 Varistor Voltage Temperature Coefficient		$\{(V_B \text{ at } 85^\circ\text{C} - V_B \text{ at } 25^\circ\text{C}) / [(V_B \text{ at } 25^\circ\text{C}) \times 60^\circ\text{C}]\} \times 100$

Electrical Characteristics

Item		Test condition	Specification
1	Breakdown Voltage	Terminal voltage measured at 1mA DC current	Within the specified list
2	Leakage Current	The current measured with V_{DC} applied	1. < 50 μ A at ambient temperature 2. < 100 μ A for 3.3 V_{DC}
3			
4	Clamping Voltage	The peak voltage when measured at the specified current and wave form (8/20 μ s) _s	3. Smaller than the specified list
	Capacitance	At 1MHz, 0.5V	See specification table
5	Maximum Surge Current (I_P)	1. At room temperature and humidity 2. 8/20 μ s waveform 3. Impulse of + / - polarity 4. Measure the variation of V_B	$\Delta V_B / V_B \leq \pm 10\%$
6	Maximum Surge Energy (W_s)	1. On standard circumstance 2. Impulse the 10/1000 μ s specified current wave 1 time 3. Measure the variation of V_B	$\Delta V_B / V_B \leq \pm 10\%$
7	ESD Test	1. ESD life (Contact discharge) -- IEC 1000-4-2 8 kV (Level 4) + / - polarity 10000 times, 10 sec interval 2. ESD test (Air discharge -(Special level) 15kV) --10 times, 10 sec interval Measure the variation of V_B	$\Delta V_B / V_B \leq \pm 10\%$
8	.Operating Temperature Range	Temperature: -55°C to +125°C	