

CMS Power-lines Protection Series (CMS-P)

Descriptions

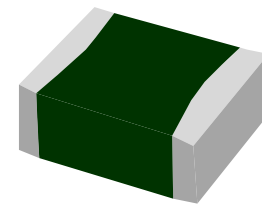
The Ceramic Micro-Surge Protection Device (CMS) is manufactured from semiconducting ceramics which offer rugged protection and excellent transient energy absorption in a small SMD package. These devices are designed to suppress a variety of transient events, including those specified in IEC61000-4-2, IEC61000-4-5 and other standards used for Electromagnetic Compliance (EMC).

These devices are available in ceramic leadless chip form, eliminating lead inductance and assuring fast speed of response to transient surges. In addition, The CMS transient suppressors have temperature independent suppression characteristics, affording protection from -55°C to 125°C, which is much better than suppressors based on silicon semiconductor technology.

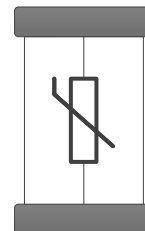
The CMS-P Series is specially designed for power-lines protection applications. It features a very high current protection capability with a very small size, also a very fast response thus a ultra low clamping voltage. These characteristics make CMS-P Series devices the best replacement of TVS and improvement of metal oxide (MOV) in high working voltage applications.

Features

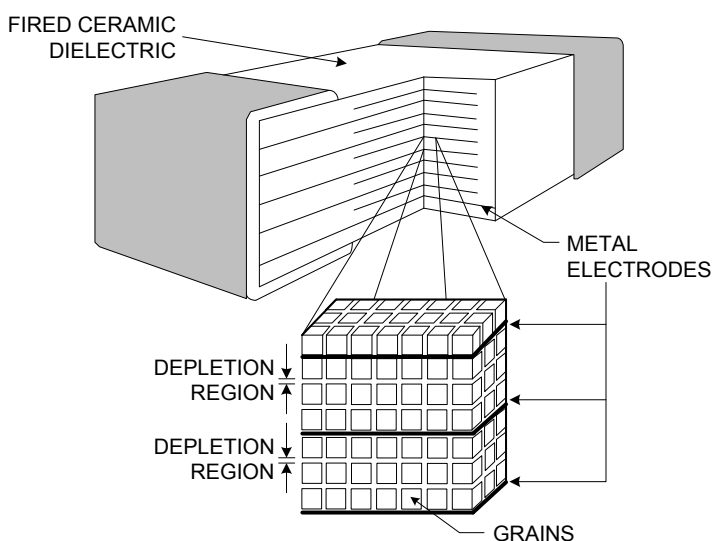
- Multi-Layers Construction Provides Higher Power Dissipation
- Surge Current Capability: 1000A (@8/20μs)
- Better than UL94V-0 Flammability Rating
- No Temperature Derating up to 125°C Ambient
- Reliable ESD Protection up to 30kV acc. to IEC61000-4-2
- Inherent Bi-directional Clamping
- SMD type Body size 1210
- “Zero” Lead Inductance
- Very low Clamping Voltage
- RoHS compliant



Top View (1210)



Circuit diagram



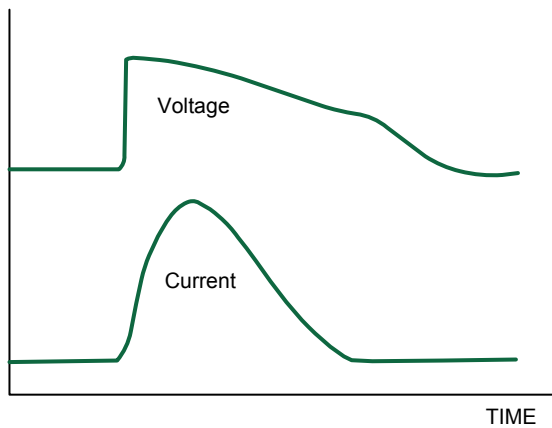
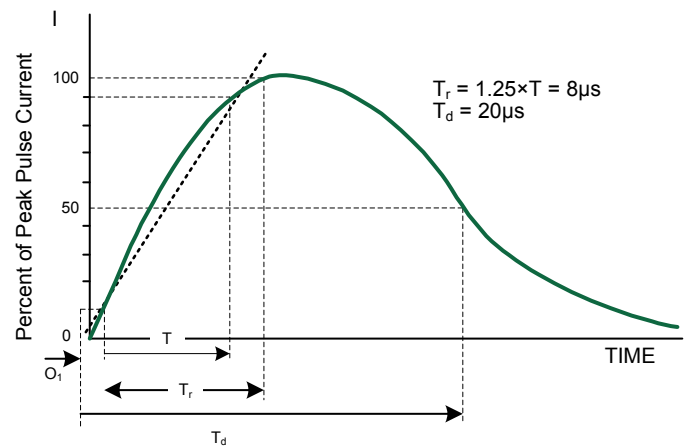
Multilayer Internal Construction

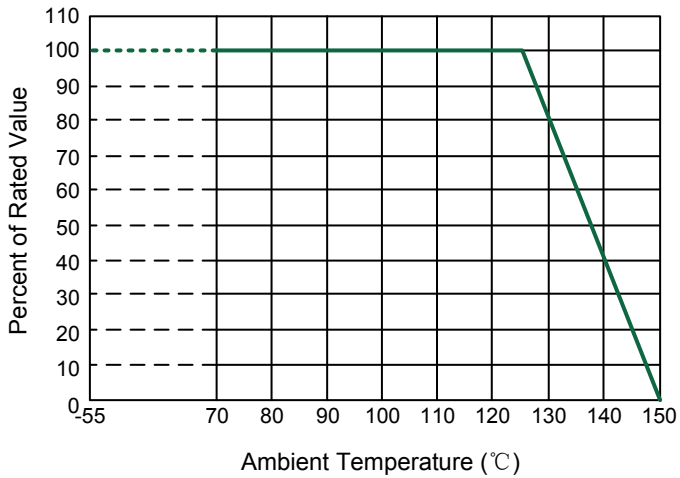
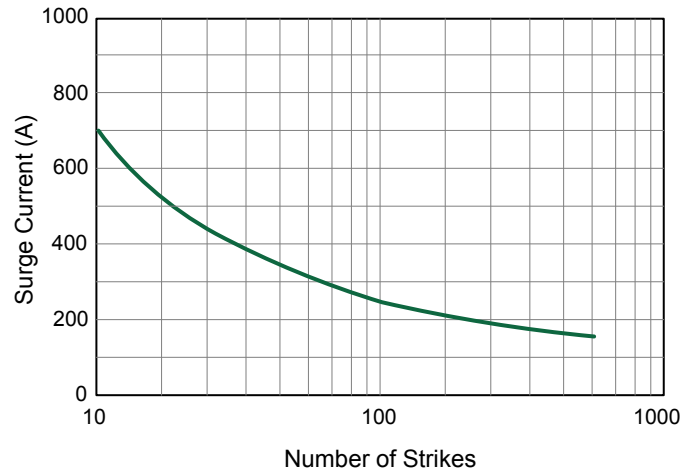
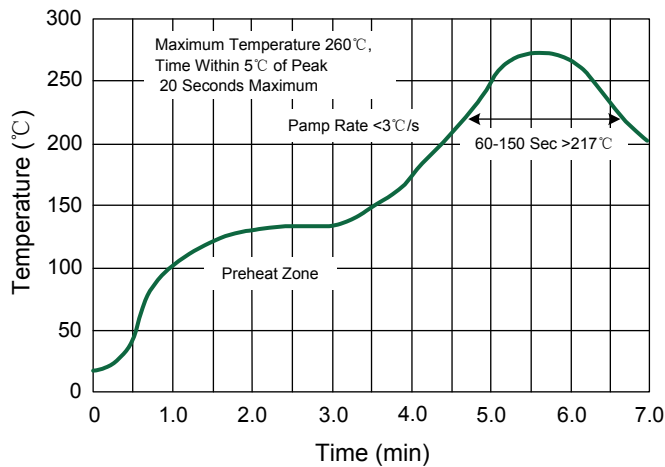
Applications

- LED
- Surge protection for IEC/EN 61547
- Surge protection for IEC61000-4-5
- EFT protection for IEC 61000-4-4 (Level 4)
- ESD protection for IEC 61000-4-2 (Level 4)

Device Ratings and Specifications

Parameter	Symbol	Condition	Value	Unit
Maximum Allowable Continuous AC Voltage	$V_{M(AC)}$		60	V
Maximum Allowable Continuous DC Voltage	$V_{M(DC)}$		85	V
Nominal Varistor Voltage	V_V	1mA	100(±10%)	V
Maximum Clamping Voltage (8/20μs)	V_{CLAMP}	2.5A	180	V
Maximum Peak Current (8/20μs)	I_{Peak}		1000	A
Non-linear Coefficient	α		>15	
Response Time	T		<1	ns
Operating Ambient Temperature			-55 ~ +125	°C
Storage Temperature			-55 ~ +150	°C

Surge Response - 8/20μs waveform

Pulse Waveform - 8/20μs waveform


Current, Energy and Power Derating Curve

Repetitive Pulse Capability

Lead-free Re-flow Solder Profile

Hand Soldering

Resistance to soldering heat-high temperature resistance: 260°C, 10sec and 3 times.

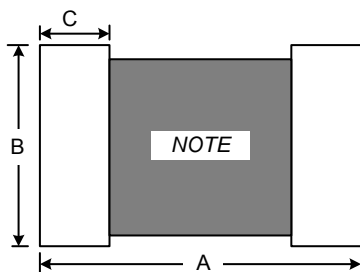
In hand soldering of the CMS Devices. Large temperature gradient between preheated the CMS Devices and the tip of soldering iron may cause electrical failures and mechanical damages such as crackings or breaking of the devices. The soldering shall be carefully controlled and carried out so that the temperature gradient is kept minimum with following recommended conditions for hand soldering.

Recommended Soldering Condition 1

- **Solder:** 0.12~0.18mm Thread solder (Sn96.5:Ag3.5) with soldering flux in the core. Rosin-based and non-activated flux is recommended.
- **Preheating:** The CMS Devices shall be preheated so that Temperature Gradient between the devices and the tip of soldering iron is 150°C or below.
- **Soldering Iron:** Rated Power of 20w max with 3mm soldering tip in diameter. Temperature of soldering iron tip 380°C max, 3-5sec (The required amount of solder shall be melted in advance on the soldering tip.)
- **Cooling:** After soldering. The CMS Devices shall be cooled gradually at room ambient temperature.

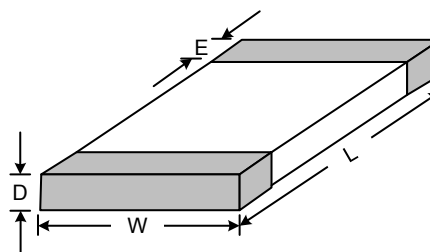
Recommended Soldering Condition 2 (Without preheating)

- Solder iron tip shall not directly touch to ceramic dielectrics.
- Solder iron tip shall be fully preheated before soldering while soldering iron tip to the external electrode of CMS Devices.

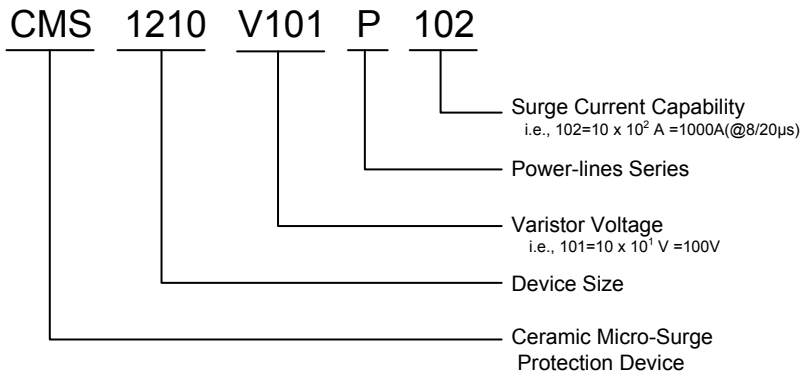
Product Dimensions


NOTE: Avoid metal runs in this area

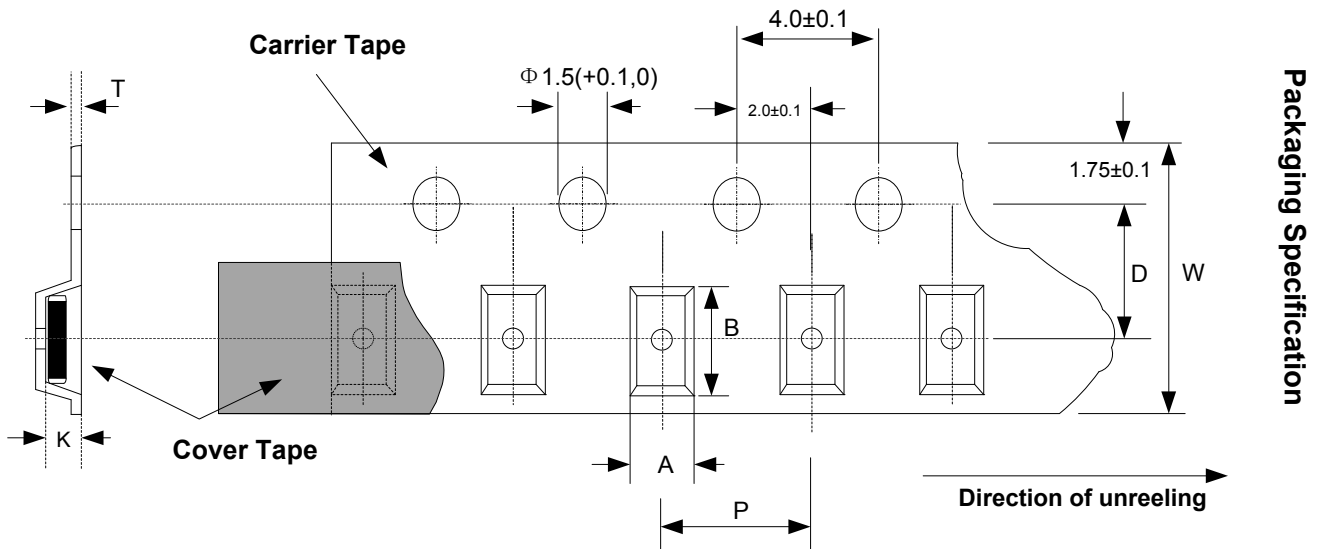
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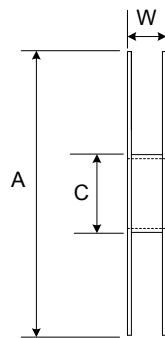
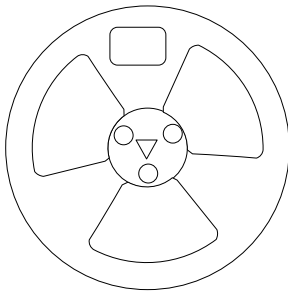
Symbol	A	B	C	D(max.)	E	L	W
Inch	0.173 ~ 0.256	0.087 ~ 0.118	0.051 ~ 0.079	0.102	0.010 ~ 0.030	0.132 ±0.012	0.100 ± 0.010
Millimeter	4.40 ~ 6.50	2.20 ~ 3.00	1.30 ~ 2.00	2.60	0.25~ 0.75	3.30 ±0.30	2.50 ± 0.25

Part Numbering System

Order Information

Device	Quantity	Reel Size
CMS1210 Series	1500 pcs	13 Inch (330mm)

Tape and Reel Specifications


Type	W	A	B	D	P	K max	T max
CMS1210 Series	12.0	2.85	3.50	5.50	8.0	2.85	0.30

Reel Dimension


Type	Spec.	Dimensions(mm)		
		A	W	C
CMS1210 Series	13"×12mm	330	12.4+2.0/-0.0	100

Environmental Reliability Test

Item	Requirement	Test Condition
High Temperature Storage	<ul style="list-style-type: none"> Breakdown voltage change: within $\pm 10\%$ No mechanical damage 	<ul style="list-style-type: none"> Temperature: $150 \pm 2^\circ\text{C}$ Time: 1000 ± 2 hours Test after placing in ambient temperature for 24 hours
Low Temperature Storage	<ul style="list-style-type: none"> Breakdown voltage change: within $\pm 10\%$ No mechanical damage 	<ul style="list-style-type: none"> Temperature: $-55 \pm 2^\circ\text{C}$ Time: 1000 ± 2 hours Test after placing in ambient temperature for 24 hours
Temperature Cycle	<ul style="list-style-type: none"> Breakdown voltage change: within $\pm 10\%$ No mechanical damage 	<ul style="list-style-type: none"> Step 1: $-40 \pm 3^\circ\text{C}$; time: $30 \pm 3\text{min}$ Step 2: 25°C; time: 1 hour Step 3: $125 \pm 3^\circ\text{C}$; time: $30 \pm 3\text{min}$ Step 4: 25°C; time: 1 hour Number of cycle: 5 times Test after placing in ambient temperature for 24 hours
High Temperature Load	<ul style="list-style-type: none"> Breakdown voltage change: within $\pm 10\%$ No mechanical damage 	<ul style="list-style-type: none"> Temperature: $125 \pm 2^\circ\text{C}$ Rated working voltage applied Time: 1000 ± 2 hours Test after placing in ambient temperature for 24 hours
Damp Heat Load / Humidity Load	<ul style="list-style-type: none"> Breakdown voltage change: within $\pm 10\%$ No mechanical damage 	<ul style="list-style-type: none"> Temperature: $60 \pm 2^\circ\text{C}$ Humidity: 90-95% RH Rated working voltage applied Time: 1000 ± 2 hours Test after placing in ambient temperature for 24 hours

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Specifications are subject to change without notice.

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