CMS Surge Series (CMS-P)

Descriptions

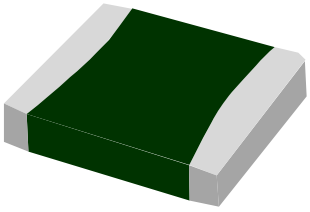
The Ceramic Micro-Surge Protection Device (CMS) is manufactured from semiconducting ceramics which offer rugged protection and excellent transient energy absorption in a small SMD package. These devices are designed to suppress a variety of transient events, including those speified in IEC61000-4-2, 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℃ to 125℃, which is much better than suppressors based on silicon semiconductor technology.

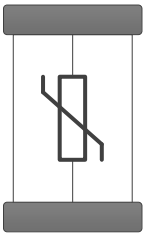
The CMS-P Series are typically applied to protect integrated circuits and other components at the circuit board level. The wide operating voltage and energy range make the CMS-P Series suitable for numerous applications on power supply, control and signal lines. The requiring of space and land pads of CMS-P Series is significantly smaller than those of Silicon TVS diodes and TH-MOV, offering greater circuit board layout flexibility for the designer, thus which will be well suited to replace larger surface mount TVS diodes in many applications.

Features

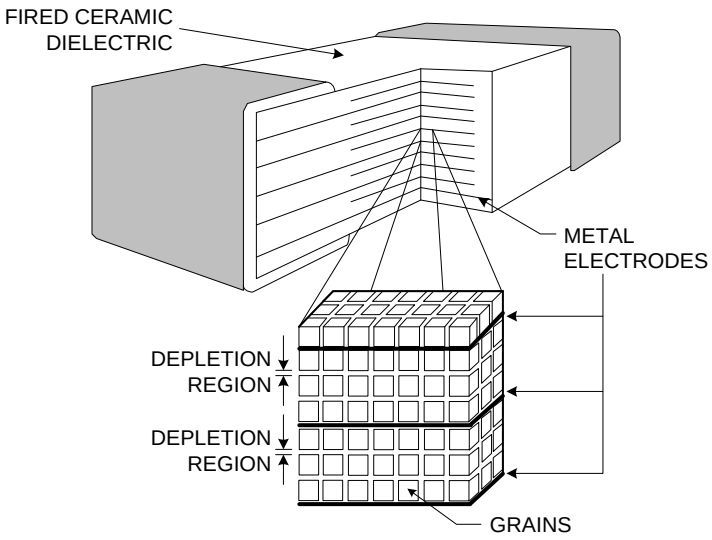
- Multi-Layers Construction Provides Higher Power Dissipation
- Better than UL94V-0 Flammability Rating
- No Temperature Derating up to 125ºC Ambient
- Excellent low leakage current <20μA
- Reliable ESD Protection up to 30kV acc. to IEC61000-4-2
- Inherent Bi-directional Clamping
- SMD type Body size: 0805, 1206, 1210, 1812, 2220
- “Zero” Lead Inductance
- Ultra-low Camping Voltage
- RoHS compliant



Top View



Circuit diagram



Multilayer Internal Construction

Applications

- Replace TVS diodes and MOV in many applications
- Provides on-board transient voltage protection for ICS and transistors
- Surge protection for IEC 61000-4-5
- EFT protection for IEC 61000-4-4 (Level 4)
- ESD protection for IEC 61000-4-2 (Level 4)

General Characteristics

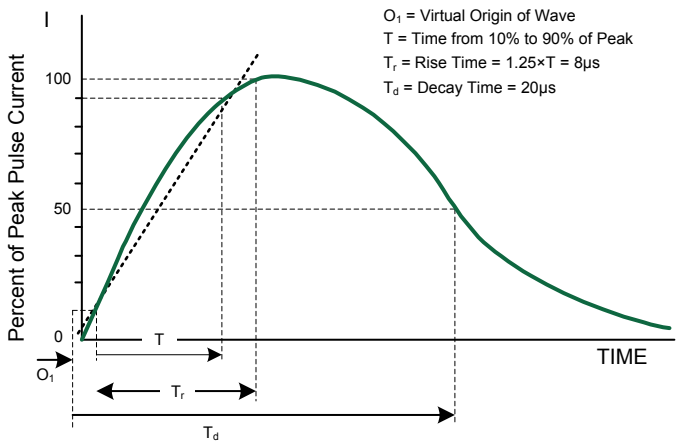
Parameter	Value
Operating temperature range	-55°C to +125°C
Storage temperature	-55°C to +150°C
Non-linear coefficient	>20
Response time	<1ns

Device Ratings and Specifications

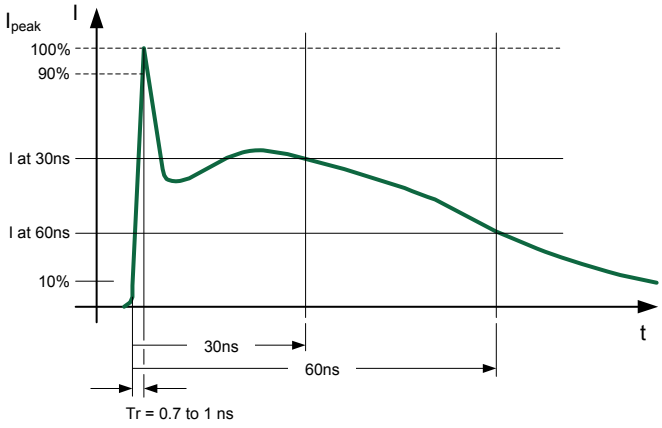
Part Number	Maximum Continuous Voltage (V)		Maximum Leakage Current (μA)	Nominal Varistor Voltage @1mA (V)	Clamping Voltage (Max. V)	Class Current (Max. A)	Maximum Peak Current (A)
	AC	DC	I_L	V_N	V_C	8/20μs I_C	8/20μs 10 times
CMS0805V120P201	4	5.5	20	12	18	1	200
CMS1206V120P501					18	1	500
CMS1210V120P102					22	2.5	1000
CMS1812V120P202					24	5	2000
CMS2220V120P502					26	10	5000
CMS0805V180P201	11	14	20	18	30	1	200
CMS1206V180P501					30	1	500
CMS1210V180P102					32	2.5	1000
CMS1812V180P202					36	5	2000
CMS2220V180P502					38	10	5000
CMS0805V240P201	14	18	20	24	38	1	200
CMS1206V240P501					38	1	500
CMS1210V240P102					45	2.5	1000
CMS1812V240P202					48	5	2000
CMS2220V240P502					50	10	5000
CMS2220V240P103					50	10	10000
CMS0805V330P201	20	26	20	33	54	1	200
CMS1206V330P501					54	1	500
CMS1210V330P102					62	2.5	1000
CMS1812V330P202					64	5	2000
CMS2220V330P502					68	10	5000
CMS0805V470P201	30	38	20	47	75	1	200
CMS1206V470P501					75	1	500
CMS1210V470P102					88	2.5	1000
CMS1812V470P202					90	5	2000
CMS2220V470P302					96	10	3000
CMS2220V470P502					96	10	5000
CMS2220V470P802					96	10	8000

Part Number	Maximum Continuous Voltage (V)		Maximum Leakage Current (μA)	Nominal Varistor Voltage @1mA (V)	Clamping Voltage (Max. V)	Class Current (Max. A)	Maximum Peak Current (A)
	AC	DC	I_L	V_N	V_C	8/20μs I_C	8/20μs 10 times
CMS0805V560P201	35	45	20	56	86	1	200
CMS1206V560P501					86	1	500
CMS1210V560P102					102	2.5	1000
CMS1812V560P202					108	5	2000
CMS2220V560P502					114	10	5000
CMS0805V680P201	40	56	20	68	105	1	200
CMS1206V680P501					105	1	500
CMS1210V680P102					120	2.5	1000
CMS1812V680P202					130	5	2000
CMS2220V680P502					136	10	5000
CMS2220V680P502					136	10	8000
CMS0805V750P201	45	60	20	75	115	1	200
CMS1206V750P501					115	1	500
CMS1210V750P102					135	2.5	1000
CMS1812V750P202					144	5	2000
CMS2220V750P502					150	10	5000
CMS0805V820P201	50	65	20	82	124	1	200
CMS1206V820P501					124	1	500
CMS1210V820P102					148	2.5	1000
CMS1812V820P202					156	5	2000
CMS2220V820P502					164	10	5000
CMS0805V101P201	60	85	20	100	150	1	200
CMS1206V101P501					150	1	500
CMS1210V101P102					180	2.5	1000
CMS1812V101P202					190	5	2000
CMS2220V101P502					200	10	5000

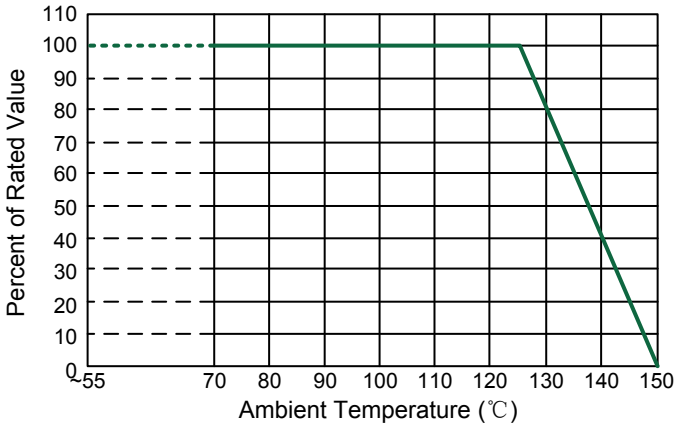
Pulse Waveform - 8/20μs waveform



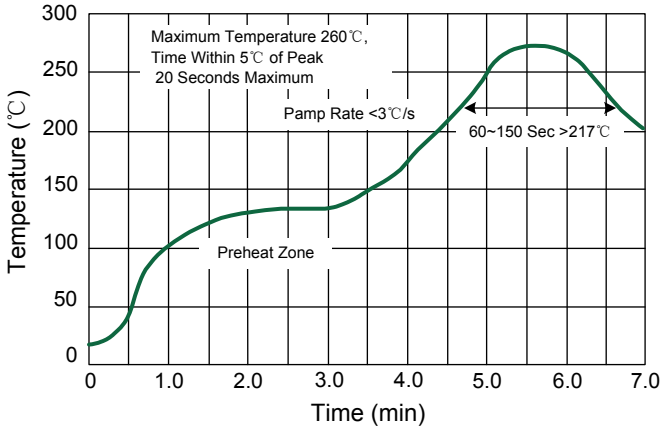
Pulse Waveform - ESD



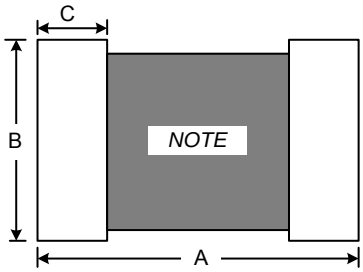
Current, Energy and Power Derating Curve



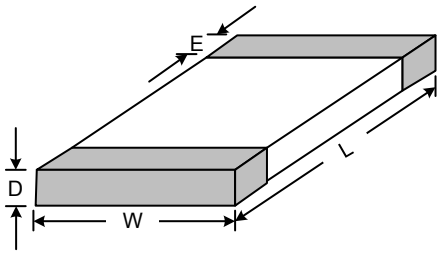
Lead–free Re-flow Solder Profile



Product Dimensions

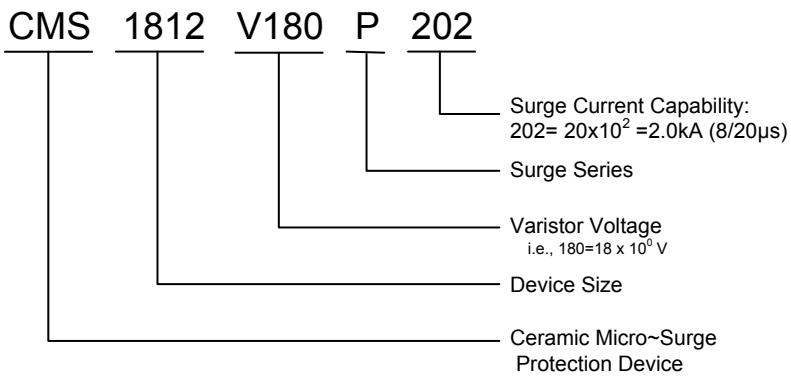


NOTE: Avoid metal runs in this area



Dimension	0805 Size		1206 Size		1210 Size		1812 Size		2220 Size	
	Inch	Millimeter	Inch	Millimeter	Inch	Millimeter	Inch	Millimeter	Inch	Millimeter
A	0.087 ~ 0.130	2.20 ~ 3.30	0.165 ~ 0.240	4.20 ~ 6.10	0.173 ~ 0.256	4.40 ~ 6.50	0.201 ~ 0.303	5.10 ~ 7.70	0.252 ~ 0.354	6.40 ~ 9.00
B	0.055 ~ 0.063	1.40 ~ 1.60	0.059 ~ 0.079	1.50 ~ 2.00	0.087 ~ 0.118	2.20 ~ 3.00	0.110 ~ 0.142	2.80 ~ 3.60	0.189 ~ 0.217	4.80 ~ 5.50
C	0.024 ~ 0.035	0.60 ~ 0.90	0.047 ~ 0.071	1.20 ~ 1.80	0.051 ~ 0.079	1.30 ~ 2.00	0.051 ~ 0.087	1.30 ~ 2.20	0.051 ~ 0.087	1.30 ~ 2.20
D(max.)	0.051	1.30	0.075	1.90	0.102	2.60	0.102	2.60	0.142	3.60
E	0.010 ±0.004	0.25 ±0.10	0.020 ±0.010	0.50 ±0.25	0.020 ±0.010	0.50 ±0.25	0.020 ±0.010	0.50 ±0.25	0.020 ±0.010	0.50 ±0.25
L	0.094 ±0.008	2.40 ±0.20	0.126 +0.024/-0.008	3.20 +0.60/-0.20	0.126 +0.024/-0.008	3.20 +0.60/-0.20	0.177 +0.024/-0.008	4.50 +0.60/-0.20	0.240 +0.028/-0.012	6.00 +0.70/-0.30
W	0.049 ±0.006	1.25 ±0.15	0.063 +0.016/-0.008	1.60 +0.40/-0.20	0.098 +0.016/-0.008	2.50 +0.40/-0.20	0.126 +0.016/-0.008	3.20 +0.40/-0.20	0.209 +0.020/-0.012	5.30 +0.50/-0.30

Part Numbering System



Order Information

Device Size	Quantity	Reel Size
0805	2000 pcs	7 Inch (178mm)
1206	2000 pcs	7 Inch (178mm)
1210	1500 pcs	7 Inch (178mm)
1812	500 pcs	7 Inch (178mm)
1812	3000 pcs	13 Inch (330mm)
2220	500 pcs	7 Inch (178mm)
2220	2000 pcs	13 Inch (330mm)
3220	500 pcs	7 Inch (178mm)
3220	2000 pcs	13 Inch (330mm)

Environmental Reliability Test

Item	Requirment	Test Condition
High Temperature Storage	• Breakdown voltage change: within ±10% • No mechanical damage	• Temperature: 150 ± 2℃ • Time: 1000 ± 2 hours • Test after placing in ambient temperature for 24 hours
Low Temperature Storage	• Breakdown voltage change: within ±10% • No mechanical damage	• Temperature: -55± 2℃ • Time: 1000 ± 2 hours • Test after placing in ambient temperature for 24 hours
Temperature Cycle	• Breakdown voltage change: within ±10% • No mechanical damage	• Step 1: -40 ± 3℃; time: 30 ± 3min • Step 2: 25℃; time: 1 hour • Step 3: 125 ± 3℃; time: 30 ± 3min • Step 4: 25℃; time: 1 hour • Number of cycle: 5 times • Test after placing in ambient temperature for 24 hours
High Temperature Load	• Breakdown voltage change: within ±10% • No mechanical damage	• Temperature: 125 ± 2℃ • Rated working voltage applied • Time: 1000 ± 2 hours • Test after placing in ambient temperature for 24 hours
Damp Heat Load / Humidity Load	• Breakdown voltage change: within ±10% • No mechanical damage	• Temperature: 60 ± 2℃ • 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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