

High Surge Protection Devices

Super High Network (SN) Series

Features:

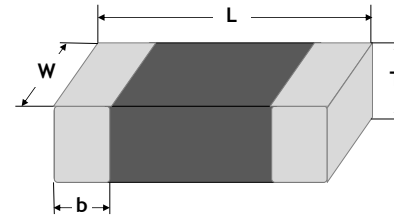
- Bidirectional and symmetrical V/I characteristics
- Meet IEC61000-4-5/K21 standard
- Large withstanding surge voltage capability: 4~6kV (@10/700 μ s)
- Excellent low leakage current <10 μ A
- Multilayer construction provides higher power dissipation

Application Fields:

- Telecom equipment RJ45, LAN connector, Ethernet
- Outdoor/Indoor AP/IAD
- Security system IP CAM
- Low voltage power line DC12V, AC24V, PoE
- ADSL/XDSL telecom equipment
- PoE modules
- HUB switch
- VOIP phones
- Other Networks

Shape and Dimensions:

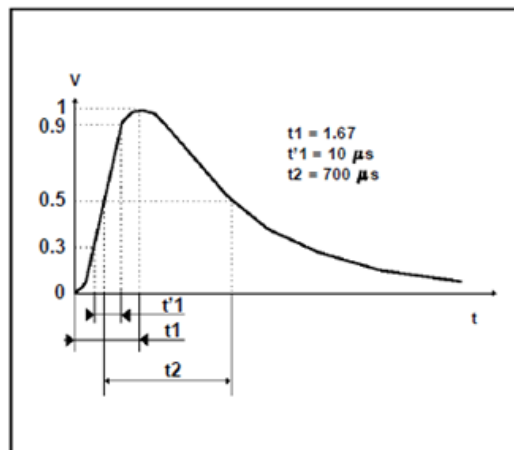
Unit (mm)	1206	1210
Length (L)	3.2 +0.6/-0.2	3.2 +0.6/-0.2
Width (W)	1.6 +0.4/-0.2	2.5 +0.4/-0.2
Thickness (T)	1.90 Max.	2.60 Max.
Termination bandwidth (b)	0.5 \pm 0.20	0.5 \pm 0.25



Product Identification:

HSP	1206	SN	012V	4000
<u>Category Code</u>	<u>Size Code</u>	<u>Application Code</u>	<u>Breakdown Voltage Code</u>	<u>Surge Voltage Code</u>
HSP = High Surge Protection Device	Inch (mm) 1206 (3216) 1210 (3225)	SN = Super High Network	012V = 12V 047V = 47V 075V = 75V	4000 = 4kV 6000 = 6kV

Surge Waveform:



Severity Level	t1 (=1.67t'1)	t2
1	10 μ s	700 μ s

Fig. 1 CCITT 7 10/700 μ s surge definition

High Surge Protection Devices

Super High Network (SN) Series

Electrical Characteristics:

Part Number	Size	Working Voltage		Breakdown Voltage @1mA (V) ¹	Clamping Voltage (V) ²	Surge Current @ 10/700 μ s (A) ³	Surge Voltage (kV)
		VAC	VDC				
HSP1206SN012V4000	1206	6	9	12 (12~20)	< 30	100	4
HSP1206SN012V6000	1206	6	9	12 (12~20)	< 30	150	6
HSP1210SN047V4000	1210	30	38	47 (\pm 10%)	< 75	100	4
HSP1210SN047V6000	1210	30	38	47 (\pm 10%)	<75	150	6
HSP1210SN075V4000	1210	48	60	75 (\pm 10%)	< 100	100	4
HSP1210SN075V6000	1210	48	60	75 (\pm 10%)	< 100	150	6

¹ The breakdown voltage was measured at 1 mA current.

² The clamping voltage was measured at standard current 1206(1A) and 1210 (2.5A).

³ The surge current was tested at 10/700 μ s waveform, Ri=40 Ω . Common-mode testing is to test all data lines while the GND.

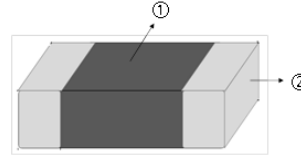
Part Number	Non-linear Coefficient (α)	Leakage Current (μ A)		Capacitance ⁴ @ 1kHz (pF)	Response Time (T _{rise})	Operating Temperature (°C)
		Before Surge Test	After Surge Test			
HSP1206SN012V4000	20	10	80	3200	< 1ns	-55 to +125
HSP1206SN012V6000	20	10	80	3850		
HSP1210SN047V4000	30	10	80	1400		
HSP1210SN047V6000	30	10	80	1670		
HSP1210SN075V4000	30	10	80	1000		
HSP1210SN075V6000	30	10	80	1300		

⁴ The capacitance value only for customer reference, it's not formal specification.

High Surge Protection Devices

Construction and Materials:

Body ①	Termination ②
Nano special ceramic	Ag/Ni/Sn



Packaging:

Chip Size	Parts on 7 inch (178mm) Reel
0806	2,000
1206	2,000
1210	1,500
1812	500
2220	500
3220	500

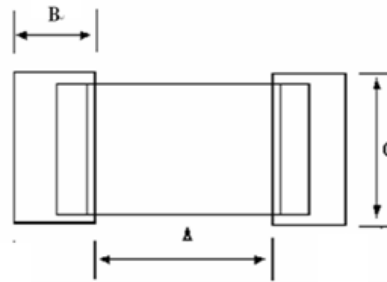
Environmental Test:

Test item	Test condition	Requirement
High Temperature Storage	*Temperature : 125±2°C * Time : 1000±2 hours *Test after placing in ambient temperature for 24 hours	* Breakdown voltage change : within ±10% * No mechanical damage
Low Temperature Storage	*Temperature : -40±2°C * Time : 1000±2 hours *Test after placing in ambient temperature for 24 hours	* Breakdown voltage change : within ±10% * No mechanical damage
Temperature Cycle	* Step 1 : -40±3°C for 30±3min * Step 2 : 25°C for 1 hour * Step 3 : 125±3°C for 30±3min * Step 4 : 25°C for 1 hour * Number of cycle : 5 times *Test after placing in ambient temperature for 24 hours	* Breakdown voltage change : within ±10% * No mechanical damage
High Temperature Load	*Temperature : 85±2°C * Rated working voltage applied * Time : 1000±2 hours *Test after placing in ambient temperature for 24 hours	* Breakdown voltage change : within ±10% * No mechanical damage
Damp Heat Load/Humidity Load	*Temperature : 40±2°C * Humidity : 90~95% RH * Rated working voltage applied * Time : 500±2 hours *Test after placing in ambient temperature for 24 hours	* Breakdown voltage change : within ±10% * No mechanical damage

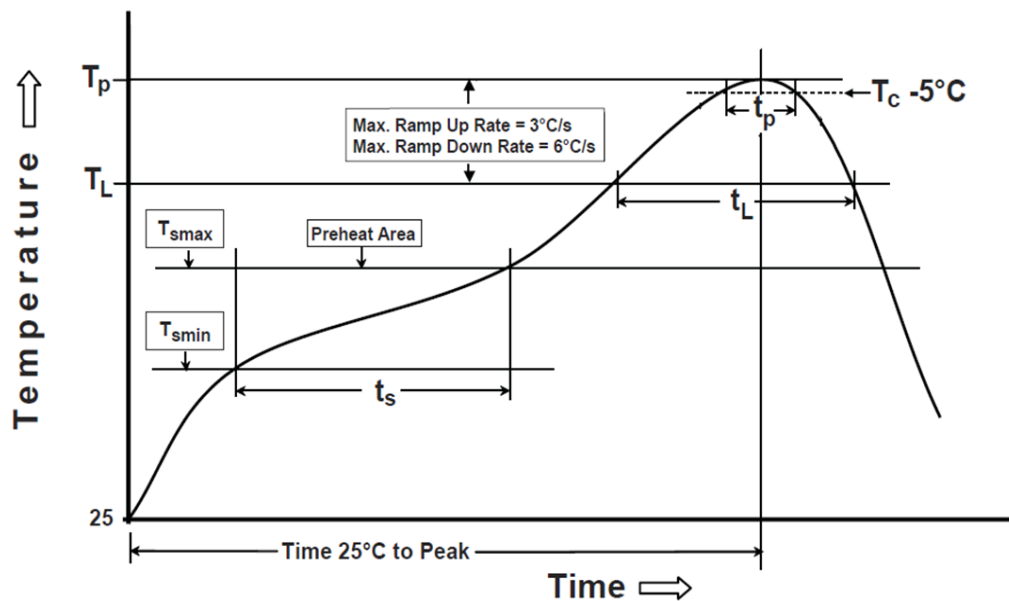
High Surge Protection Devices

Recommended Foot Print Dimensions:

Size	A (mm)	B (mm)	C (mm)
0806	1.2~1.6	0.8~1.2	1.6~2.2
1206	1.8~2.5	1.2~1.8	1.5~2.0
1210	1.8~2.5	1.3~2.0	2.2~3.0
1812	2.5~2.9	1.6~2.0	3.2~3.6
2220	3.8~4.6	1.3~2.2	4.8~5.5
3220	6.2~7.0	1.6~2.6	4.8~5.8



Recommended Reflow Soldering Profile:



Profile Feature	Pb-Free Assembly
Preheat/Soak Temperature Min (T_{smin}) Temperature Max (T_{smax}) Time (t_s) from (T_{smin} to T_{smax})	150°C 200°C 60~120 seconds
Ramp-up rate (T_L to T_p)	3°C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217°C 60~150 seconds
Peak package body temperature (T_p)	260°C
Time (t_p)*within 5°C of the specified classification temperature (T_c)	30 seconds *
Ramp-down rate (T_p to T_L)	6°C/second max.
Time 25°C to peak temperature	8 minutes max.
* Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum	

Disclaimer

Specifications are subject to change without notice. AEM products are designed for specific applications and should not be used for any purpose (including, without limitation, automotive, aerospace, medical, life-saving applications, or any other application which requires especially high reliability for the prevention of such defect as may directly cause damage to the third party's life, body or property) not expressly set forth in applicable AEM product documentation. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Warranties granted by AEM shall be deemed void for products used for any purpose not expressly set forth in applicable AEM product documentation. AEM shall not be liable for any claims or damages arising out of products used in applications not expressly intended by AEM as set forth in applicable AEM product documentation. The sale and use of AEM products is subject to AEM terms and conditions of sale. Please refer