

## *Data Sheet*

Customer: \_\_\_\_\_

Product: Multilayer Chip Varistor. A series High Surge Absorption

Size : 1206/1210/1812/2220

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### Record of change

Date	Ver.	Description	Page
1-Sep.-2017	1		

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1-Sep.-2017	1-Sep.-2017	1-Sep.-2017	
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## ● A Series High Surge Absorption

Hitano Part no.	Working Voltage (MAX)		Breakdown Voltage	Peak Current	Clamping Voltage (MAX)	
	AC (V <sub>RMS</sub> )	DC (V)			1mA (V)	8/20 $\mu$ s (A)
1206ML050A	2.4	3.3	5(4.0~6.0)	200	1	12
1206ML080A	4	5.5	8(6.6~9.9)	200	1	18
1206ML120A	7	9	12(10.2~13.8)	200	1	24
1206ML150A	8	11	15(12.75~17.25)	200	1	25
1206ML180A	11	14	18(15.3~20.7)	200	1	30
1206ML220A	12	16	22(19.8~24.2)	200	1	36
1206ML240A	14	18	24(21.6~26.4)	200	1	38
1206ML270A	17	22	27(24.3~29.7)	200	1	44
1206ML300A	18	24	30(27.0~33.0)	200	1	48
1206ML330A	20	26	33(29.7~36.3)	200	1	54
1206ML360A	22	28	36(32.7~39.6)	200	1	59
1206ML390A	25	30	39(35.1~42.9)	200	1	65
1206ML420A	26	33	42(38.1~46.2)	200	1	72
1206ML470A	30	38	47(42.3~51.7)	200	1	77
1206ML560A	35	45	56(50.4~61.6)	200	1	90
1206ML680A	40	56	68(61.2~74.8)	200	1	110
1206ML760A	45	60	76(69.1~83.6)	200	1	126
1206ML820A	50	65	82(73.8~90.2)	200	1	135
1206ML101A	60	85	100(90~100)	200	1	165

TO BE CONTINUED

## ● A Series High Surge Absorption

Hitano Part no.	Working Voltage (MAX)		Breakdown Voltage	Peak Current	Clamping Voltage (MAX)	
	AC (V <sub>RMS</sub> )	DC (V)			1mA (V)	8/20 $\mu$ s (A)
1210ML050A	2.4	3.3	5(4.0~6.0)	400	1	12
1210ML080A	4	5.5	8(6.6~9.9)	400	1	18
1210ML120A	7	9	12(10.2~13.8)	400	1	24
1210ML150A	8	11	15(12.75~17.25)	400	1	25
1210ML180A	11	14	18(15.3~20.7)	400	1	30
1210ML220A	12	16	22(19.8~24.2)	400	1	36
1210ML240A	14	18	24(21.6~26.4)	400	1	38
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1210ML470A	30	38	47(42.3~51.7)	400	1	77
1210ML560A	35	45	56(50.4~61.6)	400	1	90
1210ML680A	40	56	68(61.2~74.8)	400	1	110
1210ML760A	45	60	76(69.1~83.6)	400	1	126
1210ML820A	50	65	82(73.8~90.2)	400	1	135
1210ML101A	60	85	100(90~100)	400	1	165

TO BE CONTINUED

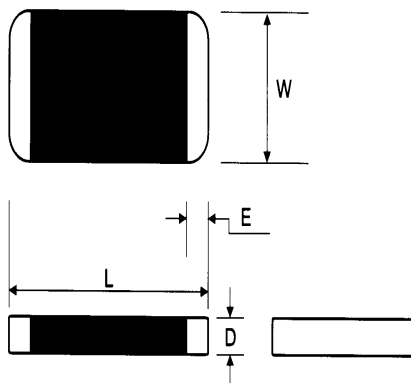
## ● A Series High Surge Absorption

Hitano Part no.	Working Voltage (MAX)		Breakdown Voltage	Peak Current	Clamping Voltage (MAX)	
	AC (V <sub>RMS</sub> )	DC (V)			1Ma (V)	8/20 $\mu$ s (A)
1812ML080A	4	5.5	8(6.6~9.9)	800	1	18
1812ML120A	7	9	12(10.2~13.8)	800	1	24
1812ML150A	8	11	15(12.75~17.25)	800	1	25
1812ML180A	11	14	18(15.3~20.7)	800	1	30
1812ML220A	12	16	22(19.8~24.2)	800	1	36
1812ML240A	14	18	24(21.6~26.4)	800	1	38
1812ML270A	17	22	27(24.3~29.7)	800	1	44
1812ML300A	18	24	30(27.0~33.0)	800	1	48
1812ML330A	20	26	33(29.7~36.3)	800	1	54
1812ML360A	22	28	36(32.7~39.6)	800	1	59
1812ML390A	25	30	39(35.1~42.9)	800	1	65
1812ML420A	26	33	42(38.1~46.2)	800	1	72
1812ML470A	30	38	47(42.3~51.7)	800	1	77
1812ML560A	35	45	56(50.4~61.6)	800	1	90
1812ML680A	40	56	68(61.2~74.8)	800	1	110
1812ML760A	45	60	76(69.1~83.6)	800	1	126
1812ML820A	50	65	82(73.8~90.2)	800	1	135
1812ML101A	60	85	100(90~100)	800	1	165
1812ML121A	75	100	120(108~1032)	800	1	200

TO BE CONTINUED

● **A Series High Surge Absorption**

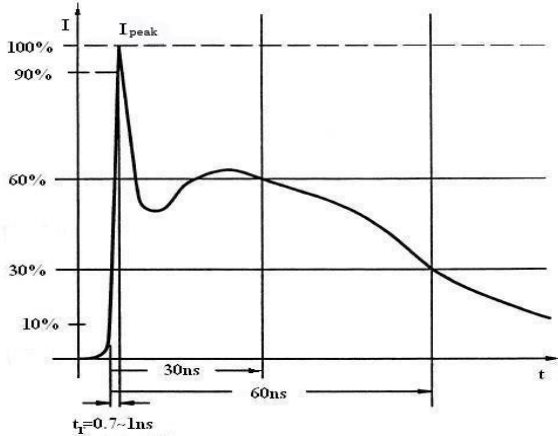
Hitano Part no.	Working Voltage (MAX)		Breakdown Voltage 1Ma (V)	Peak Current 8/20 $\mu$ s (A)	Clamping Voltage (MAX)	
	AC (V <sub>RMS</sub> )	DC (V)			(A)	(V)
2220ML240A	14	18	24(21.6~26.4)	1200	1	38
2220ML270A	17	22	27(24.3~29.7)	1200	1	44
2220ML300A	18	24	30(27.0~33.0)	1200	1	48
2220ML330A	20	26	33(29.7~36.3)	1200	1	54
2220ML360A	22	28	36(32.7~39.6)	1200	1	59
2220ML390A	25	30	39(35.1~42.9)	1200	1	65
2220ML420A	26	33	42(38.1~46.2)	1200	1	72
2220ML470A	30	38	47(42.3~51.7)	1200	1	77
2220ML560A	35	45	56(50.4~61.6)	1200	1	90
2220ML680A	40	56	68(61.2~74.8)	1200	1	110
2220ML760A	45	60	76(69.1~83.6)	1200	1	126
2220ML820A	50	65	82(73.8~90.2)	1200	1	135
2220ML101A	60	85	100(90~100)	1200	1	165



Type	L (mm)	W (mm)	D (mm)	E (mm)
1206	3.20±0.20	1.60±0.15	1.2max.	0.50±0.20
1210	3.20±0.20	2.50±0.20	1.5max.	0.50±0.20
1812	4.50±0.20	3.20±0.20	2.0max.	0.5+0.3/-0.1
2220	5.70±0.20	5.00±0.20	3.0max.	0.5+0.3/-0.1

● **A Series High Surge Absorption**

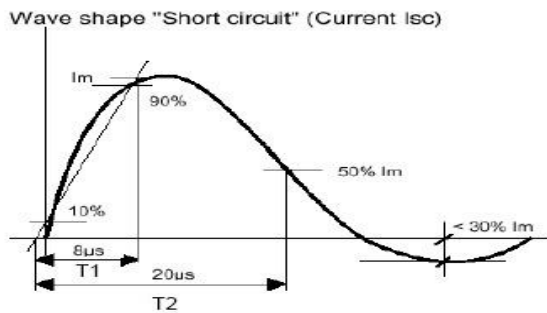
**ESD Wave Form**



SEVERITY LEVEL	AIRDIRCHARGE	DIRECT ISCHARGE
1	2 kV	2 kV
2	4 kV	4 kV
3	8 kV	6 kV
4	15 kV	8 kV

IEC61000-4-2 Compliant ESD Current Pulse Waveform

**Surge Wave Form**



SEVERITY LEVEL	T1	T2
1	8 µS	20 µS

IEC61000-4-5 Standards

### ● A Series High Surge Absorption

- Environmental Characteristics

Characteristic	Test method and description			
High Temperature Storage	The specimen shall be subjected to 125°C for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. The change of varistor voltage shall be within 10%.			
Temperature Cycle	The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and humidity for one two hours. The change of varistor voltage shall be within 10% and mechanical damage shall be examined.	Step	Temperature	Period
		1	-40±3°C	30min±3
		2	Room Temperature	1~2hours
		3	125±2°C	30min±3
4	Room Temperature	1~2hours		
High Temperature Load	After being continuously applied the maximum allowable voltage at 85°C for 1000hours, the specimen shall be stored at room temperature and humidity for one or hours, the change of varistor voltage shall be within 10%.			
Damp Heat Load/ Humidity Load	The specimen should be subjected to 40°C,90 to 95%RH environment, and the maximum allowable voltage applied for 1000 hours, then stored at room temperature and humidity for one or two hours. The change of varistor voltage shall be within 10%.			
Low Temperature Storage	The specimen should be subjected to -40°C, without load for 1000 hours and then stored at room temperature for one two hours. The change of varistor voltage shall be within 10%.			

● **A Series High Surge Absorption**

**Soldering Recommendation**

The principal techniques used for the soldering of components in surface mount technology are infrared reflow and wave soldering.

**Wave Soldering**

When wave soldering, the MLCV is attached to the circuit board by means of an adhesive. The assembly is then placed on a conveyor and run through the soldering process to contact the wave. Wave soldering is the most strenuous of the processes. To avoid the possibility of generating stresses due to thermal shock, a preheat stage in the soldering process is recommended, and the peak temperature of the solder process should be rigidly controlled. The following is the typical profiles.

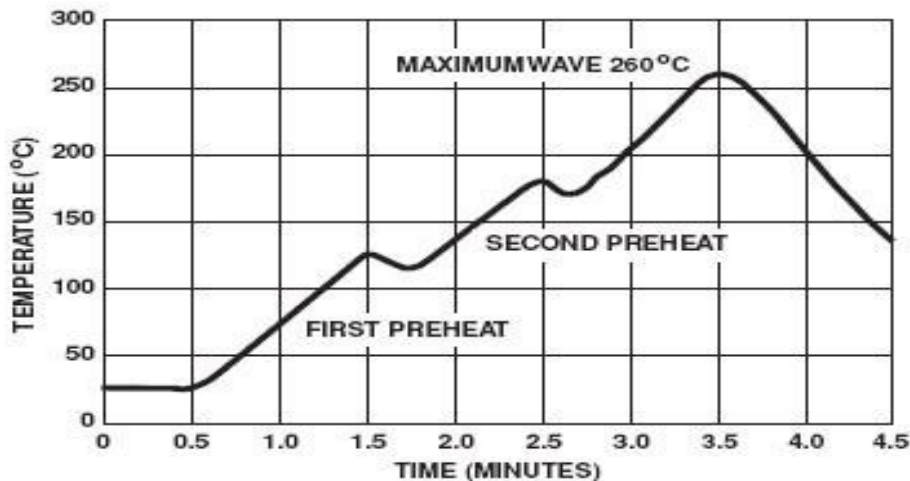


FIGURE 6. WAVE SOLDER PROFILE



## ● A Series High Surge Absorption

### Reflow Soldering

When reflow soldering, the device is placed a solder paste on the substrate ,as the solder paste is heated, it re-flows and solders the unite to board. When using a reflow process ,care should be taken to ensure that the MLCV is not subjected to an thermal gradient steeper than 4 degrees per second; the ideal gradient being 2degrees per second. During the soldering process, preheating to within 100 degrees of the soldier's peak temperature is essential to minimize thermal shock. The following is typical profile.

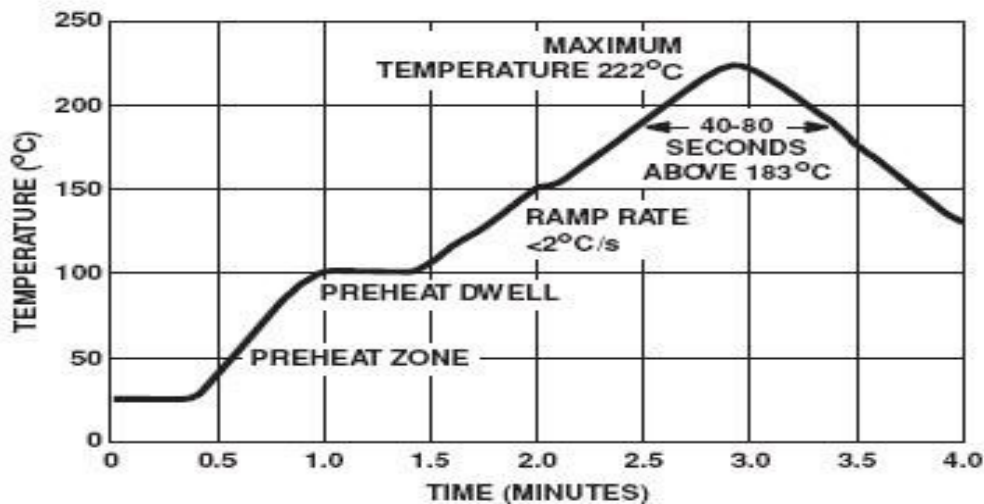
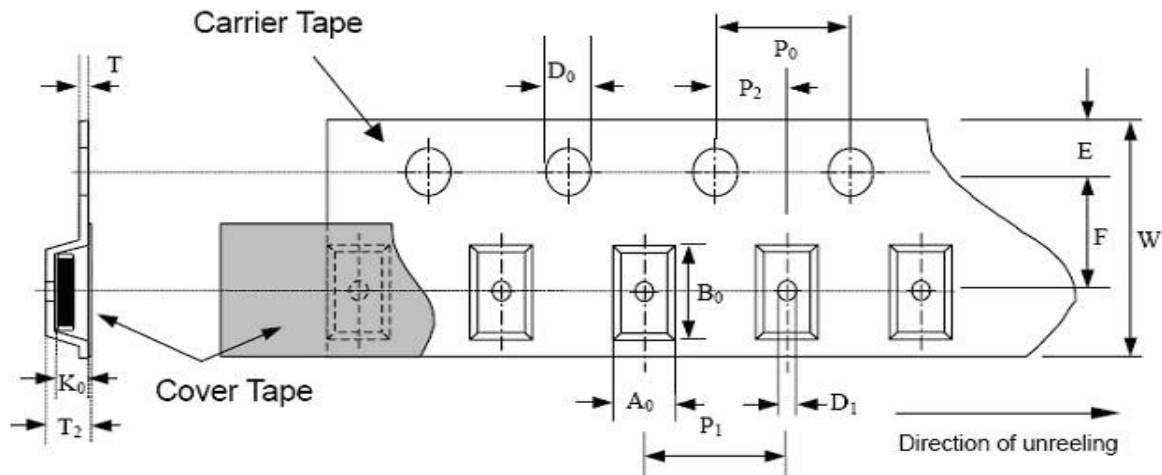


FIGURE 5. REFLOW SOLDER PROFILE

### Packaging Specification

1. Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.
2. The adhesion of the heat-sealed cover tape shall be  $40 + 20 / - 15$ grams.
3. Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator handle.

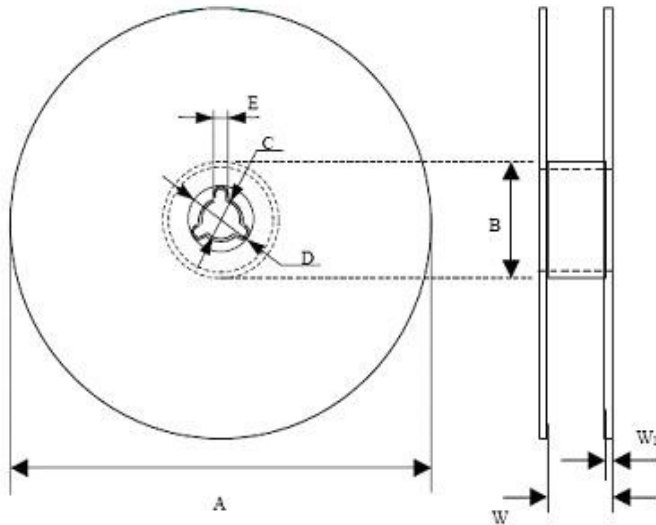
● **A Series High Surge Absorption**



Size	A0	B0	K0	T	T2	D0	D1	P1	P2	P0	W	E	F
	±0.10	±0.10	±0.10	±0.05	±0.05	+0.1-0	±0.05	±0.10	±0.05	±0.05	±0.20	±0.10	±0.05
1206	1.88	3.50	1.27	0.20	1.49	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1210	2.18	3.46	1.45	0.22	1.77	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1812	3.66	4.95	1.74	0.25	1.99	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
2220	5.10	5.97	2.80	0.25	3.05	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50

● **A Series High Surge Absorption**

**Reel Dimension**



Size	A	B	C	D	E	W	W1
1206	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1210	178.0±1.0	60.0±0.5	13.0±0.2	21.0±0.2	2.0±0.5	9.0±0.50	1.5±0.15
1812	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15
2220	178.0±1.0	60.0±0.5	13.5±0.1	21.0±0.2	2.0±0.5	13.6±0.2	1.5±0.15

Size		1206	1210	1812	2220
quantity	paper	-	-	-	-
	plastiA	3000	3000	500/1000	500/1000
Minimum ordering		3000	3000	500/1000	500/1000