

Surface Mount Multilayer Varistors

NA Series (Normal Surge Protection, 0402 ~ 1812 Size)

Features:

- Fast Response < 0.5 ns
- Low Capacitance
- Low Clamping Voltage and High Energy Absorption

Applications:

- Telecommunications
- Data Systems
- Automotive Systems
- Power Supplies

Product Identification:

MLV 0402 NA 009V 0020

(1) (2) (3) (4) (5)

(1) **Series Code:** Surface Mount Multilayer Varistors

(2) **Size Code:** L x W (inch), the first two digits - L (length), the last two digits - W (width)

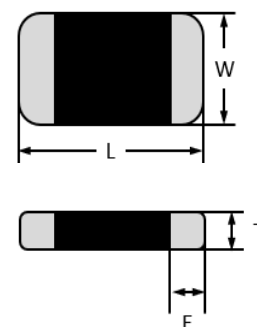
(3) **Characteristic Code:** NA - Normal Surge Protection

(4) **Working Voltage Code:** 009V - 9V DC

(5) **Surge Current Code:** 0020 - 20A

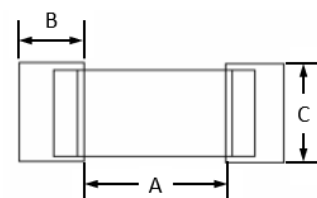
Shape and Dimensions:

Unit (mm)	0402	0603	0805	1210	1812
L	1.00 ± 0.10	1.60 ± 0.15	2.00 ± 0.20	3.20 ± 0.20	4.50 ± 0.20
W	0.50 ± 0.10	0.80 ± 0.15	1.25 ± 0.15	2.50 ± 0.20	3.20 ± 0.20
T	0.50 ± 0.10	0.90 max.	1.00 max.	1.50 max.	2.00 max.
B	0.25 ± 0.10	0.30 ± 0.10	0.30 ± 0.10	0.50 ± 0.20	0.60 ± 0.20



Recommended Land Patterns:

Unit (mm)	0402	0603	0805	1210	1812
A	0.4~0.6	0.9~1.2	1.0~1.5	1.8~2.5	2.5~3.3
C	0.5~0.6	0.6~1.0	1.2~1.5	2.2~3.0	2.8~3.6
B	0.5~0.7	0.8~1.2	1.0~1.4	1.0~1.4	1.2~1.8



Packaging:

Chip Size	Parts on 7 inch (178 mm) Reel
0402	10,000
0603	4,000
0805	3,000
1210	2,000
1812	1,000

Operating Temperatures:

- -55°C to +85°C for size 0603 or smaller
- -55°C to +125°C for size 0805 or larger

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Ordering Information:

Part Number	Working Voltage (max)		Breakdown Voltage	Clamping Voltage (max)	Surge Current (max)	Typical Capacitance Ref.
	AC (V _{RMS})	DC (V)	1 mA (V)	(V)	8/20 μ s (A)	1 kHz (pF)
MLV0402NA006V0020	4	5.5	8 (7.5~10.5)	20	20	200
MLV0402NA009V0020	6	9	12 (10.2~13.8)	24	20	135
MLV0402NA011V0020	6	9	12 (10.2~13.8)	24	20	135
MLV0402NA014V0020	11	14	18 (15.3~20.7)	35	20	50
MLV0402NA018V0020	14	18	24 (21.6~26.4)	44	20	45
MLV0603NA006V0030	4	5.5	8 (7.5~10.5)	20	30	650
MLV0603NA009V0030	6	9	12 (10.2~13.8)	24	30	300
MLV0603NA014V0030	11	14	18 (15.3~20.7)	30	30	210
MLV0603NA018V0030	14	18	24 (21.6~26.4)	39	30	160
MLV0603NA022V0030	17	22	27 (24.3~29.7)	44	30	145
MLV0603NA030V0030	25	30	39 (35.1~42.9)	65	30	110
MLV0603NA038V0030	30	38	47 (42.3~51.7)	77	30	90
MLV0805NA006V0080	4	5.5	8 (7.5~10.5)	20	80	1400
MLV0805NA009V0080	6	9	12 (10.2~13.8)	24	80	650
MLV0805NA011V0100	6	9	12 (10.2~13.8)	24	80	650
MLV0805NA014V0100	11	14	18 (15.3~20.7)	30	100	350
MLV0805NA018V0100	14	18	24 (21.6~26.4)	39	100	300
MLV0805NA022V0100	17	22	27 (24.3~29.7)	44	100	250
MLV0805NA026V0100	20	26	33 (29.7~36.3)	54	100	220
MLV0805NA030V0100	25	30	39 (35.1~42.9)	65	100	200
MLV0805NA038V0100	30	38	47 (42.3~51.7)	77	100	150
MLV0805NA045V0080	35	45	56 (50.4~61.6)	90	80	110
MLV1210NA018V0250	14	18	24 (21.6~26.4)	39	250	1150
MLV1812NA045V0500	35	45	56 (50.4~61.6)	90	500	1000

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Reliability Tests:

No.	Item	Requirement	Condition	Criteria
1	Soldering heat resistance	BDV change $\leq \pm 10\%$ No mechanical damage	One dip at 260°C for 5 sec.	MIL-STD-202 Method 210 IEC 60068-2-20
2	Solderability	New solder coverage $\geq 80\%$	One dip at 255°C for 5 sec. Non-active flux	MIL-STD-202 Method 208 IEC 60068-2-20
3	Maximum surge current	BDV change $\leq \pm 10\%$ No mechanical damage	100 pulses of 8/20 μ s with maximum surge current and 30 sec. interval at 25°C and 30 ~ 65% RH	CECC 42000 IEC 1051-1 Test 4.5
4	Maximum surge energy	BDV change $\leq \pm 10\%$ No mechanical damage	100 pulses of 10/1000 μ s with maximum surge current and 90 sec. interval at 25°C and 30 ~ 65% RH	CECC 42000
5	Thermal cycling	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	5 cycles between -40°C and 125°C with 30 min. dwell time at the temperature extremes and 60 min. dwell time at 25°C	CECC 42000 IEC 60068-2-14
6	Low temperature resistance	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	1000 hr at -50°C	IEC 60068-2-1
7	Low temperature load resistance	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	1000 hr at -50°C with working voltage applied	IEC 60068-2-1
8	High temperature resistance	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	1000 hr at 150°C	MIL-STD-202 Method 108 CECC 42000
9	High temperature load resistance	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	1000 hr at 85°C with working voltage applied	CECC 42000
10	Humidity resistance	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	500 hr at 40°C and 90 ~ 95% RH	MIL-STD-202 Method 103 IEC 60068-2-3 CECC 42000;
11	Humidity load resistance	BDV change $\leq \pm 10\%$ No mechanical damage Leakage current $\leq 200 \mu$ A	500 hr at 40°C and 90 ~ 95% RH with working voltage applied	MIL-STD-202 Method 103 IEC 60068-2-3 CECC 42000
12	ESD contact test*	Varistor voltage change $> 115\%$ working voltage	Contact electrostatic discharge 100 times with 1 second intervals at 8 KV (Level 4) and polarity: +,-	IEC 61000-4-2
13	ESD air test*	Varistor voltage change $> 115\%$ working voltage	Air contact electrostatic discharge 100 times with 1 second intervals at 15 KV (Level 4) and polarity: +,-	IEC 61000-4-2

* For ES series only.

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 to AEM's website for updated catalog and terms and conditions of sale.



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