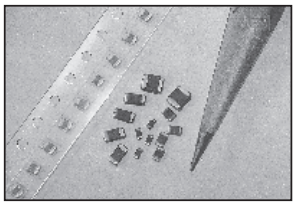
NVS Series

Surface Mount Varistors

ROHS/REACH COMPLIANT HALOGEN FREE

COMPONENTS
Performance Passives By Design

FEATURES



- ZINC OXIDE MULTILAYER CONSTRUCTION
- HIGH ENERGY SURGE VOLTAGE PROTECTION
- EIA SIZES 0603, 0805, 1206 AND 1210
- HIGH CURRENT RATING (UP TO 500A)
- FAST RESPONSE (LESS THAN 1nS)
- -55°C ~ +125°C TEMPERATURE RANGE
- LOW CLAMPING VOLTAGES
- Pb-FREE COMPATIBLE WITH FLOW AND REFLOW SOLDERING

Multilayer zinc oxide chip varistors are ideal for the suppression of voltage transients due to ESD, inductive discharge and electromagnetic energy. The NVS series of chip varistors were designed to provide transient protection to new, low voltage semiconductors and to aid in equipment compliance to CIS/IEC 801 specifications.

CHARACTERISTICS

Specifications	Size			
	0603	0805	1206	1210
Working Voltage Range (@50μA Maximum Leakage Current)	3.3 ~ 30V	3.3 ~ 30V	3.3 ~ 48V	18 ~ 60V
Clamping Voltage Range (Based on 20 - 10 Amp 8/20μS Pulse)	10 ~ 65V	10 ~ 65V	10 ~ 100V	39 ~ 120V
Peak Current Rating (8/20μS Pulse Waveform)	30A	30 ~ 120A	30 ~ 150A	220 ~ 500A
Maximum Transient Energy Dissipated (10/1000μS Pulse Waveform)	0.1J	0.1 ~ 0.3J	0.1 ~ 0.4J	0.9 ~ 1.5J

PART NUMBERING SYSTEM

NVS 0805 F 400 A TR F

- F — RoHS Compliant
- TR — Tape and Reel
- A — Energy
  - A = 0.1J
  - B = 0.3J
  - C = 0.4J
  - D = 0.9J
  - E = 1.2J
  - F = 1.5J
  - G = 2.0J
- 400 — Clamping Voltage
  - 100 = 12V
  - 150 = 15.5V
  - 200 = 20V
  - 250 = 25V
  - 300 = 30V
  - 390 = 39V
  - 400 = 40V
  - 560 = 56V
  - 580 = 58V
  - 620 = 62V
  - 650 = 65V
  - 101 = 100V
  - 121 = 120V
- F — Working Voltage (Vdc), Breakdown Voltage ±10% (Vdc min.@1mA DC)
  - A = 3.3V(5.0V)
  - B = 5.6V(8.5V)
  - C = 9.0V(12.7V)
  - D = 12V (16V)
  - E = 14V(18.5V)
  - F = 18V(25.5V)
  - G = 26V(34.5V)
  - H = 30V(41V)
  - I = 48V(62V)
  - J = 60V(75V)
- 0805 — Case Size
  - 0603
  - 0805
  - 1206
  - 1210
- NVS — Series

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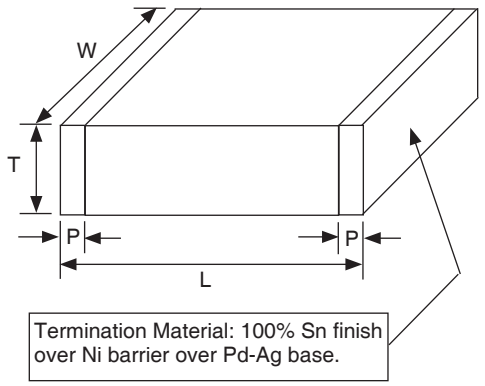
NIC COMPONENTS Performance Passives By Design

PART NUMBERING SPECIFICATIONS

Case Size	Part Number	Working* Voltage (DC Max.)	Working Voltage (AC Max.)	Breakdown Voltage (V@1mADC)	Clamping Voltage (Max.)	Test Current (A,8x20µS)	Leakage Current (µA)	Peak Current (Max.)	Transient Energy (Max.)	Typical	
										C (nF)	L (nH)
0603	NVS0603A100ATRF	3.3V	2.3V	5.0 ± 20%	12V	1.0	100	30A	0.1J	1.450	<1.0
	NVS0603B150ATRF	5.6V	4.0V	8.5 ± 20%	18V	1.0	35	30A	0.1J	0.750	<1.0
	NVS0603C200ATRF	9.0V	6.4V	12.7 ± 15%	22V	1.0	25	30A	0.1J	0.550	<1.0
	NVS0603E300ATRF	14V	10V	18.5 ± 12%	32V	1.0	15	30A	0.1J	0.350	<1.0
	NVS0603F400ATRF	18V	13V	25.5 ± 10%	42V	1.0	10	30A	0.1J	0.150	<1.0
	NVS0603G580ATRF	26V	18V	34.5 ± 10%	60V	1.0	10	30A	0.1J	0.155	<1.0
	NVS0603H650ATRF	30V	21V	41.0 ± 10%	67V	1.0	10	30A	0.1J	0.125	<1.0
0805	NVS0805A100ATRF	3.3V	2.3V	5.0 ± 20%	12V	1.0	100	40A	0.1J	1.400	<1.5
	NVS0805A100BTRF	3.3V	2.3V	5.0 ± 20%	12V	1.0	100	120A	0.3J	5.000	<1.5
	NVS0805B150ATRF	5.6V	4.0V	8.5 ± 20%	18V	1.0	35	40A	0.1J	1.100	<1.5
	NVS0805B150BTRF	5.6V	4.0V	8.5 ± 20%	18V	1.0	35	120A	0.3J	3.000	<1.5
	NVS0805C200ATRF	9.0V	6.4V	12.7 ± 15%	22V	1.0	25	40A	0.1J	0.750	<1.5
	NVS0805D250ATRF	12V	8.5V	16.0 ± 15%	27V	1.0	25	40A	0.1J	0.525	<1.5
	NVS0805E300ATRF	14V	10V	18.5 ± 12%	32V	1.0	15	40A	0.1J	0.325	<1.5
	NVS0805E300BTRF	14V	10V	18.5 ± 12%	32V	1.0	15	120A	0.3J	0.900	<1.5
	NVS0805F400ATRF	18V	13V	25.5 ± 10%	42V	1.0	10	30A	0.1J	0.225	<1.5
	NVS0805F400BTRF	18V	13V	25.5 ± 10%	42V	1.0	10	100A	0.3J	0.550	<1.5
	NVS0805G580ATRF	26V	18V	34.5 ± 10%	60V	1.0	10	30A	0.1J	0.120	<1.5
	NVS0805G580BTRF	26V	18V	34.5 ± 10%	60V	1.0	10	100A	0.3J	0.250	<1.5
	NVS0805H650ATRF	30V	21V	41.0 ± 10%	67V	1.0	10	30A	0.1J	0.090	<1.5
1206	NVS1206A100ATRF	3.3V	2.3V	5.0 ± 20%	12V	1.0	100	40A	0.1J	1.250	<1.7
	NVS1206A100CTRF	3.3V	2.3V	5.0 ± 20%	12V	1.0	100	150A	0.4J	4.700	<1.7
	NVS1206B150ATRF	5.6V	4.0V	8.5 ± 20%	18V	1.0	35	40A	0.1J	1.200	<1.7
	NVS1206B150CTRF	5.6V	4.0V	8.5 ± 20%	18V	1.0	35	150A	0.4J	3,000	<1.7
	NVS1206E300ATRF	14V	10V	18.5 ± 12%	32V	1.0	15	40A	0.1J	0.600	<1.7
	NVS1206E300CTRF	14V	10V	18.5 ± 12%	32V	1.0	15	150A	0.4J	1.050	<1.7
	NVS1206F400ATRF	18V	13V	25.5 ± 10%	42V	1.0	10	30A	0.1J	0.350	<1.7
	NVS1206F400CTRF	18V	13V	25.5 ± 10%	42V	1.0	10	150A	0.4J	0.900	<1.7
	NVS1206G580CTRF	26V	18V	34.5 ± 10%	60V	1.0	10	120A	0.4J	0.500	<1.7
	NVS1206H650CTRF	30V	21V	41.0 ± 10%	67V	1.0	10	120A	0.4J	0.400	<1.7
	NVS1206I101CTRF	48V	34V	62.0 ± 10%	100V	1.0	10	100A	0.4J	0.225	<1.7
1210	NVS1210F390FTRF	18V	13V	25.5 ± 10%	42V	2.5	10	500A	1.5J	3.100	<2.0
	NVS1210G560ETRF	26V	18V	34.5 ± 10%	60V	5.0	10	300A	1.2J	2.150	<2.0
	NVS1210H620DTRF	30V	21V	41.0 ± 10%	67V	5.0	10	220A	0.9J	1.750	<2.0
	NVS1210H620ETRF	30V	21V	41.0 ± 10%	67V	5.0	10	280A	1.2J	1.850	<2.0
	NVS1210I101DTRF	48V	34V	62.0 ± 10%	100V	5.0	10	220A	0.9J	0.450	<2.0
	NVS1210I101ETRF	48V	34V	62.0 ± 10%	100V	5.0	10	250A	1.2J	0.500	<2.0
	NVS1210J121FTRF	60V	42V	76.0 ± 10%	120V	5.0	10	250A	1.5J	0.400	<2.0

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COMPONENT DIMENSIONS (mm)

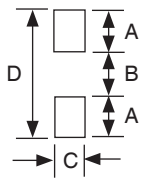
Case Size	Length (L)	Width (W)	Thickness (T)	Overlap (P)
0603	1.6 ± 0.15	0.8 ± 0.15	0.9 max.	0.5 max.
0805	2.0 ± 0.20	1.2 ± 0.20	1.0 max.	0.8 max.
1206	3.2 ± 0.20	1.6 ± 0.20	1.0 max.	0.8 max.
1210	3.2 ± 0.20	2.5 ± 0.20	1.0 max.	0.8 max.

NOTES:

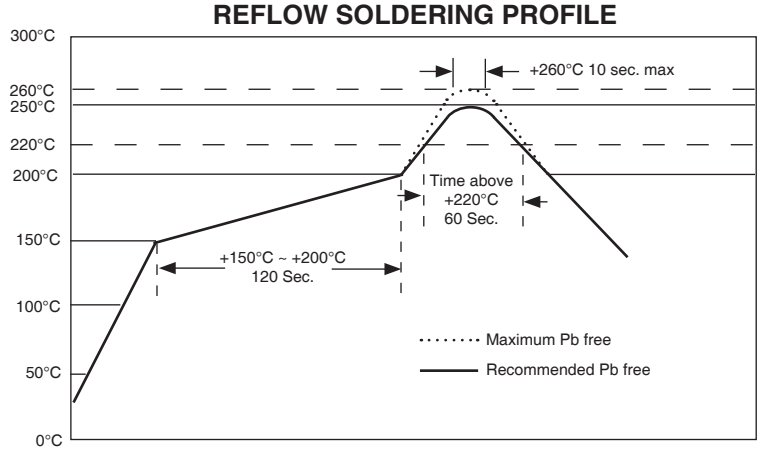
1. *Working voltage is a maximum recommended working voltage and is specified for operation at leakage current less than 50μA..
2. Peak current and clamping voltage is specified under 8/20uS test conditions.
3. Transient energy specified under 10/1000uS test condition.
4. Storage Temperature/Humidity: +5°C ~ +35°C, RH 40% ~ 75%

LAND PATTERN DIMENSIONS (mm)

Case Size	A	B	C	D
0603	0.89	0.76	0.76	2.54
0805	1.02	1.02	1.27	3.05
1206	1.02	2.03	1.65	4.06
1210	1.02	2.03	2.54	4.06



REFLOW SOLDERING PROFILE

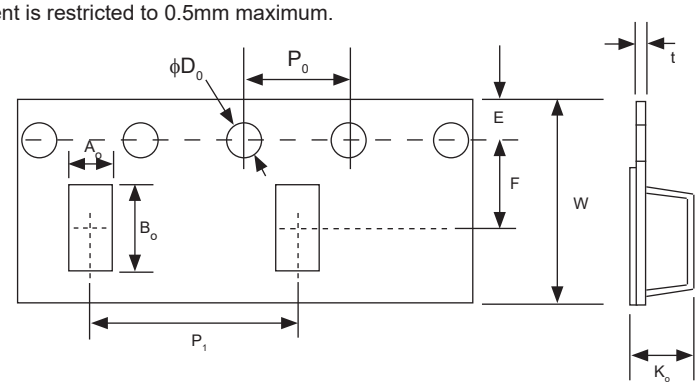


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EMBOSSED PLASTIC CARRIER DIMENSIONS (mm)

A_o	B_o	ϕD_0	E	F	P_0	P_1	t	K_o	W
Note 1	Note 1	$1.50\ ^{+1.0}/_{-0.0}$	1.75 ±0.10	3.50 ±0.05	4.00 ±0.10	4.00 ±0.10	0.6 max.	Note 1	8.0 ±0.30

Notes:
1. The cavity dimensions A_o, B_o and K_o shall be configured to provide the clearances:
   a. the components will not protrude beyond the selaing plane of the cover tape.
   b. the components can be revoved from the cavity in a vertical direction without mechanical restriction after the cover tape has been removed.
   c. rotation of the component in the pocket will be limited to 20° maximum.
   d. lateral movement of the component is restricted to 0.5mm maximum.

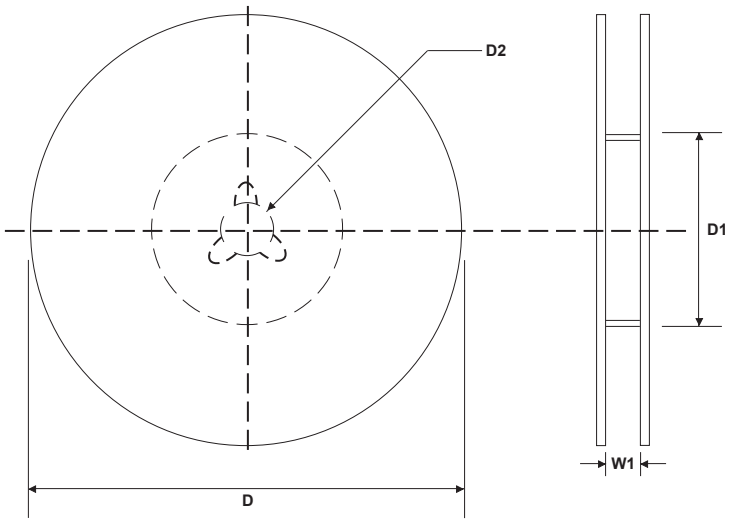


REEL DIMENSIONS (mm)

D	D1	D2	W1	Qty
ϕ330 max.	ϕ50 min.	$13.0\ ^{+0.5}/_{-0.2}$	$8.4\ ^{+1.5}/_{-0.0}$	2,000

REEL QUANTITIES

Case Size	178mm (7")	254mm (10")
0603	1,000 or 4,000	10,000
0805	1,000 or 4,000	10,000
1206	1,000 or 4,000	10,000
1210	1,000 or 4,000	10,000



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