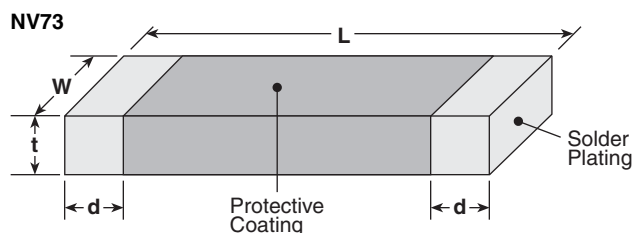
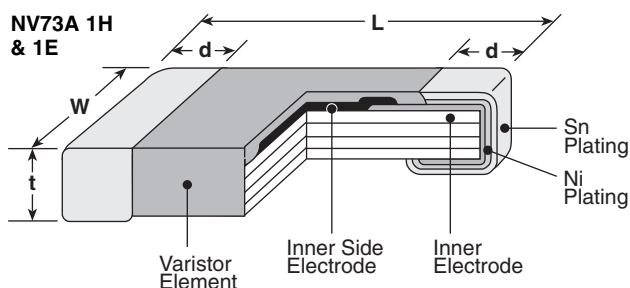




features

- Multilayer structure
- High surge current
- Protector against static electricity, switching and incoming surges
- Marking: Black body color with no marking
- Suitable for both flow and reflow soldering
- Products with lead-free terminations meet EU RoHS requirements. Pb located in glass material, electrode and varistor element is exempt per Annex 1, exemption 5 of EU directive 2005/95/EC

dimensions and construction



Type (Inch Size Code)	Dimensions inches (mm)			
	L	W	t	d
1H (0201)	.024±.001 (0.6±0.03)	.012±.001 (0.3±0.03)	.012±.001 (0.3±0.03)	.004 min. (0.1 min.)
1E (0402)	.023±.004 (1.0±0.1)	.02±.004 (0.5±0.1)	.023 max. (0.6 max.)	.01±.006 (0.25±0.15)
1J (0603)	.063±.006 (1.6±0.15)	.031±.006 (0.8±0.15)	.031±.006 (0.8±0.15)	.016 ^{+0.006} _{-.008} (0.4 ^{+0.15} _{-.02})
2A (0805)	.079±.008 (2.0±0.2)	.049±.008 (1.25±0.2)	.051 max. (1.3 max.)	.02±.010 (0.5±0.25)
2B (1206)	.126±.008 (3.2±0.2)	.063±.008 (1.6±0.2)	.065 max. (1.65 max.)	.02 ^{+0.014} _{-.010} (0.5 ^{+0.35} _{-.025})
2E (1210)	.126±.008 (3.2±0.2)	.098±.008 (2.5±0.2)	.059 max. (1.5 max.)	.020±.008 (0.5±0.2)
2J (1812)	.177±.008 (4.5±0.2)	.126±.008 (3.2±0.2)	.079 max. (2.0 max.)	.020 ^{+0.001} _{-.004} (0.5 ^{+0.3} _{-.01})
2L (2220)	.224±.008 (5.7±0.2)	.197±.008 (5.0±0.2)	.098 max. (2.5 max.)	.020 ^{+0.001} _{-.004} (0.5 ^{+0.3} _{-.01})

ordering information

NV73	A	L	1J	T	TE	8R2
Type	Energy Code	Capacitance Type	Size	Termination Material	Packaging	Varistor Voltage
	A B C	L: Low Capacitance (1E only)	1H: 0201 1E: 0402 1J: 0603 2A: 0805 2B: 1206 2E: 1210 2J: 1812 2L: 2220	T: Sn	TBM: 2mm press paper (1H: 15,000 pieces/reel) TP: 2mm pitch paper (1E: 10,000 pieces/reel) TE: 7" embossed plastic (1J, 2A, 2B: 2,500 pieces/reel; 2J, 2L: 1,000 pieces/reel 2E: 2,000 pieces/reel)	8.2V 8R2 18V 18 "R" indicates decimal on value <10Ω

For further information on packaging, please refer to Appendix A.

applications and ratings

Part Designation	Reference Varistor Voltage @ 1mA nom. (Range) Vc	Clamping Voltage V _P	I _P	Maximum Peak Current I _P (A) @ 8/20 microsecond (2 pulses)	Maximum Energy E (J)	Maximum Allowable Voltage a.c rms (V)	Maximum Allowable Voltage d.c (V)	Operating Temp. T _{opt} (°C)	Storage Temp. T _{stg} (°C)
NV73A1HTTB12	12 (10 - 15.6)	35	—	1	0.01	—	6.5	-40°C to +85°C	-40°C to +125°C
NV73A1ETTP8	8 (6.4 - 9.6)	20		20	0.05	4.2	5.5		
NV73A1ETTP18	18 (16.2 - 19.8)	35				6.1	14.0		
NV73AL1ETTP12	12 (10 - 14)	30		5	0.03	7.6	5.5		
NV73AL1ETTP21	21 (18 - 24)	50				9.1	14.0		
NV73AL1ETTP28	28 (24 - 32)	65		2	0.005	10.6	18.0		
NV73AL1ETTP120	120 (90 - 150)	350(1C=0.5A)				0.5			
NV73A1JTTE8R2	8.2 (6.8 - 9.8)	21	2A	30		0.1	4.2		
NV73A1JTTE12	12 (10 - 14.4)	29			6.1		8.6		
NV73A1JTTE15	15 (12.5 - 18)	35			7.6		10.8		
NV73A1JTTE18	18 (16 - 20)	37			9.1		12.8		
NV73A1JTTE20	20 (18 - 22)	40			10.6		15.0		
NV73A1JTTE22	22 (19 - 24)	42			12.0		16.5		
NV73A1JTTE24	24 (21.8 - 26.5)	46			14.0		18.0		
NV73A1JTTE27	27 (25 - 32)	49			17.0		22.0		
NV73A2ATTE8R2	8.2 (6.8 - 9.8)	16	1A	10	0.01	4.2	6.0		
NV73A2ATTE12	12 (10 - 14.4)	22			0.03	6.1	8.6		
NV73A2ATTE15	15 (12.5 - 18)	27			0.04	7.6	10.8		
NV73A2ATTE18	18 (16 - 20)	29				9.1	12.8		
NV73A2ATTE20	20 (18 - 22)	33		20	0.05	10.6	15.0		
NV73A2ATTE22	22 (19 - 24)	39			0.06	12.0	16.5		
NV73A2ATTE24	24 (21.8 - 26.5)	42				14.0	18.0		
NV73A2ATTE27	27 (25 - 32)	50			0.07	17.0	22.0		
NV73A2ATTE33	33 (30 - 39)	60			0.12	20.0	26.0		
NV73A2ATTE39	39 (37 - 47)	72		25	0.14	25.0	31.0		
NV73A2ATTE47	47 (45 - 54)	86			0.16	30.0	38.0		
NV73B2ATTE8R2	8.2 (6.8 - 9.8)	18	2A	20	0.03	4.2	6.0		
NV73B2ATTE12	12 (10 - 14.4)	22		35	0.05	6.1	8.6		
NV73B2ATTE15	15 (12.5 - 18)	30			0.07	7.6	10.8		
NV73B2ATTE18	18 (16 - 20)	32			0.08	9.1	12.8		
NV73B2ATTE20	20 (18 - 22)	36			0.09	10.6	15.0		
NV73B2ATTE22	22 (19 - 24)	40			0.11	12.0	16.5		
NV73B2ATTE24	24 (21.8 - 26.5)	42			0.12	14.0	18.0		
NV73B2ATTE27	27 (25 - 32)	58		50	0.24	17.0	22.0		
NV73B2ATTE33	33 (30 - 39)	66			0.25	20.0	26.0		
NV73C2ATTE8R2	8.2 (6.8 - 9.8)	16	2A	25	0.04	4.2	6.0		
NV73C2ATTE12	12 (10 - 14.4)	22		50	0.09	6.1	8.6		
NV73C2ATTE15	15 (12.5 - 18)	28			0.11	7.6	10.8		
NV73C2ATTE18	18 (16 - 20)	32			0.13	9.1	12.8		
NV73C2ATTE20	20 (18 - 22)	35			0.14	10.6	15.0		
NV73C2ATTE22	22 (19 - 24)	40			0.17	12.0	16.5		
NV73C2ATTE24	24 (21.8 - 26.5)	42			0.18	14.0	18.0		
NV73A2BTTE27	27 (25 - 32)	55	2A	40	0.13	17.0	22.0		
NV73A2BTTE33	33 (30 - 39)	60			0.15	20.0	26.0		
NV73A2BTTE39	39 (37 - 47)	72			0.18	25.0	31.0		
NV73A2BTTE47	47 (45 - 54)	85			0.22	30.0	38.0		
NV73A2BTTE56	56 (52 - 62)	100			0.26	35.0	45.0		

applications and ratings (continued)

Part Designation	Reference Varistor Voltage @ 1mA nom. (Range) V _c	Clamping Voltage V _P	I _P	Maximum Peak Current I _P (A) @ 8/20 microsecond (2 pulses)	Maximum Energy E (J)	Maximum Allowable Voltage a.c rms (V)	Maximum Allowable Voltage d.c (V)	Operating Temp. T _{opt} (°C)	Storage Temp. T _{stg} (°C)
NV73B2BTTE8R2	8.2 (6.8 - 9.8)	16	2A	30	0.03	4.2	6.0	-40°C to +85°C	-40°C to +125°C
NV73B2BTTE12	12 (10 - 14.4)	22		50	0.07	6.1	8.6		
NV73B2BTTE15	15 (12.5 - 18)	28			0.09	7.6	10.8		
NV73B2BTTE18	18 (16 - 20)	32			0.1	9.1	12.8		
NV73B2BTTE20	20 (18 - 22)	35			0.11	10.6	15.0		
NV73B2BTTE22	22 (19 - 24)	40			0.12	12.0	16.5		
NV73B2BTTE24	24 (21.8 - 26.5)	42			0.14	14.0	18.0		
NV73B2BTTE27	27 (25 - 32)	52			0.16	17.0	22.0		
NV73C2BTTE8R2	8.2 (6.8 - 9.8)	15	2A	40	0.06	4.2	6.0	-40°C to +85°C	-40°C to +125°C
NV73C2BTTE12	12 (10 - 14.4)	21		70	0.1	6.1	8.6		
NV73C2BTTE15	15 (12.5 - 18)	27			0.13	7.6	10.8		
NV73C2BTTE18	18 (16 - 20)	29			0.15	9.1	12.8		
NV73C2BTTE20	20 (18 - 22)	31			0.17	10.6	15.0		
NV73C2BTTE22	22 (19 - 24)	35			0.19	12.0	16.5		
NV73C2BTTE24	24 (21.8 - 26.5)	38			0.2	14.0	18.0		
NV73C2BTTE27	27 (25 - 32)	48			0.24	17.0	22.0		
NV73A2ETTE15	15 (12.8 - 17.3)	30	—	400	1.0	8.0	11.0	-50°C to +125°C	-50°C to +150°C
NV73A2ETTE18	18 (15.3 - 20.7)	34			1.2	11.0	14.0		
NV73A2ETTE22	22 (19.8 - 24.2)	39			1.4	12.0	16.5		
NV73A2ETTE24	24 (21.6 - 26.4)	39			1.4	14.0	18.0		
NV73A2ETTE27	27 (24.3 - 29.7)	44			1.7	17.0	22.0		
NV73A2ETTE33	33 (29.7 - 36.3)	54			1.9	20.0	26.0		
NV73A2ETTE39	39 (35.1 - 42.9)	65			1.7	25.0	30.0		
NV73A2ETTE47	47 (42.3 - 51.7)	77			2.0	30.0	38.0		
NV73A2ETTE56	56 (50.4 - 61.6)	90			2.0	35.0	45.0		
NV73A2ETTE82	82 (73.8 - 90.2)	135		250	1.2	50.0	65.0		
NV73A2ETTE100	100 (90.0 - 110.0)	165		200	1.4	60.0	85.0		
NV73A2ETTE110	110 (99.0 - 121.0)	180			1.4	70.0	90.0		
NV73A2JTTE12	12 (10.2 - 13.8)	27		500	0.9	6.0	9.0		
NV73A2JTTE15	15 (12.8 - 17.3)	32			1.2	8.0	11.0		
NV73A2JTTE18	18 (16.2 - 19.8)	35			1.4	11.0	14.0		
NV73A2JTTE22	22 (19.8 - 24.2)	41			1.6	12.0	16.5		
NV73A2JTTE24	24 (21.6 - 26.4)	44			1.7	14.0	18.0		
NV73A2JTTE27	27 (24.3 - 29.7)	49			2.0	17.0	22.0		
NV73A2JTTE33	33 (29.7 - 36.3)	54			2.5	20.0	26.0		
NV73A2JTTE39	39 (35.1 - 42.9)	65			2.9	25.0	30.0		
NV73A2JTTE47	47 (42.3 - 51.7)	77			3.5	30.0	38.0		
NV73A2JTTE56	56 (50.4 - 61.6)	90			4.2	35.0	45.0		
NV73A2JTTE68	68 (61.2 - 74.8)	110			4.8	40.0	56.0		
NV73A2JTTE82	82 (73.8 - 90.2)	135			4.5	50.0	65.0		
NV73A2JTTE100	100 (90 - 110)	165		400	5.8	60.0	85.0		
NV73A2JTTE110	110 (99 - 121)	180			5.8	70.0	90.0		
NV73A2JTTE150	150 (135 - 165)	248		300	5.8	95.0	127.0		
NV73B2JTTE15	15 (12.8 - 17.3)	32		800	1.8	8.0	11.0		
NV73B2JTTE18	18 (15.3 - 20.7)	35			1.9	11.0	14.0		
NV73B2JTTE22	22 (19.8 - 24.2)	41			2.3	12.0	16.5		
NV73B2JTTE24	24 (21.6 - 26.4)	44			2.3	14.0	18.0		
NV73B2JTTE27	27 (24.3 - 29.7)	49			2.7	17.0	22.0		
NV73B2JTTE33	33 (29.7 - 36.3)	54			3.0	20.0	26.0		

circuit protection

applications and ratings (continued)

Part Designation	Reference Varistor Voltage @ 1mA nom. (Range) V _c	Clamping Voltage V _P	I _P	Maximum Peak Current I _P (A) @ 8/20 microsecond (2 pulses)	Maximum Energy E (J)	Maximum Allowable Voltage a.c rms (V)	Maximum Allowable Voltage d.c (V)	Operating Temp. T _{opt} (°C)	Storage Temp. T _{stg} (°C)
NV73B2JTTE39	39 (35.1 - 42.9)	65	—	800	3.7	25.0	30.0	-50°C to +125°C	-50°C to +150°C
NV73B2JTTE47	47 (42.3 - 51.7)	77			4.2	30.0	38.0		
NV73B2JTTE56	56 (50.4 - 61.6)	90			4.2	35.0	45.0		
NV73A2LTTE12	12 (10.2 - 13.8)	28			1.9	6.0	9.0		
NV73A2LTTE15	15 (12.8 - 17.3)	33		1000	2.3	8.0	11.0		
NV73A2LTTE18	18 (16.2 - 19.8)	36			2.7	11.0	14.0		
NV73A2LTTE22	22 (19.8 - 24.2)	41			2.9	12.0	16.5		
NV73A2LTTE24	24 (21.6 - 26.4)	45			3.1	14.0	18.0		
NV73A2LTTE27	27 (24.3 - 29.7)	48			3.8	17.0	22.0		
NV73A2LTTE33	33 (29.7 - 36.3)	57			4.3	20.0	26.0		
NV73A2LTTE39	39 (35.1 - 42.9)	65			5.5	25.0	30.0		
NV73A2LTTE47	47 (42.3 - 51.7)	77			6.3	30.0	38.0		
NV73A2LTTE56	56 (50.4 - 61.6)	90			7.7	35.0	45.0		
NV73A2LTTE68	68 (61.2 - 74.8)	110			8.8	40.0	56.0		
NV73A2LTTE100	100 (90 - 110)	165			6.8	60.0	85.0		
NV73A2LTTE110	110 (99 - 121)	180			6.8	70.0	90.0		
NV73B2LTTE15	15 (12.8 - 17.3)	33		1200	4.2	8.0	11.0		
NV73B2LTTE18	18 (15.3 - 20.7)	36			5.4	11.0	14.0		
NV73B2LTTE22	22 (19.8 - 24.2)	41			5.8	12.0	16.5		
NV73B2LTTE24	24 (21.6 - 26.4)	45			5.8	14.0	18.0		
NV73B2LTTE27	27 (24.3 - 29.7)	48			7.2	17.0	22.0		
NV73B2LTTE33	33 (29.7 - 36.3)	57			7.8	20.0	26.0		
NV73B2LTTE39	39 (35.1 - 42.9)	65			9.6	25.0	30.0		
NV73B2LTTE47	47 (42.3 - 51.7)	77			12.0	30.0	38.0		
NV73B2LTTE56	56 (50.4 - 61.6)	90		1000	7.7	35.0	45.0		
NV73B2LTTE82	82 (73.8 - 90.2)	135			5.6	50.0	65.0		

Maximum allowable voltage - the maximum sinusoidal RMS voltage or maximum DC voltage which can be applied continuously
E: Maximum energy - the maximum energy within the varistor voltage change of $\pm 10\%$ when a single impulse of 2m sec. is applied
I_P: Maximum peak current - the maximum peak current within the varistor voltage change of $\pm 10\%$ when a single standard impulse of 8/20 μ sec. is applied two times with an interval of 5 min.
T_{opt}: Operating temperature - Ambient temperature range when the device is operating
T_{stg}: Storage temperature - Temperature range without causing the device any failure

environmental applications

Performance Characteristics

Parameter	Requirement $\Delta V \pm \%$	Test Method
Varistor Voltage	Within specified tolerance	Voltage between terminals when 1mA is flowed
Solderability	95% coverage minimum	230°C $\pm$ 5°C, 4 seconds $\pm$ 1 second; 235°C $\pm$ 5°C, 4 seconds $\pm$ 1 second***
Resistance to Solder Heat	$\pm 10\%$	260°C $\pm$ 5°C, 10 seconds $\pm$ 0.5 second*; 270°C $\pm$ 5°C, 3 seconds $\pm$ 0.5 second**; 260°C $\pm$ 5°C, 4 seconds $\pm$ 1 second***
Rapid Change of Temperature	$\pm 10\%$	-40°C (30 minutes), +125°C (30 minutes), 30 cycles; 5 cycles***
Maximum Peak Current	$\pm 10\%$	A single standard impulse of 8/20 μ seconds, positive/negative applied once each; A single standard impulse of 8/20 μ seconds, 100 pulse, 30 second interval***
Maximum Energy	$\pm 10\%$	A single standard impulse of 10/1000 μ s, once*; A single standard impulse of 2ms, once**; A single standard impulse of 10/1000 μ s, 100pulse, 90 second interval***
High Temperature Life with d.c. Bias	$\pm 10\%$	85°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (d.c.); 125°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (d.c.)***
Low Temperature Life with d.c. Bias***	$\pm 10\%$	-50°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (d.c.)
High Temperature Life with a.c. Bias**	$\pm 10\%$	85°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (V _{a.c.r.m.s.})
High Temperature & High Humidity Life with d.c. Bias	$\pm 10\%$	40°C $\pm$ 5°C, 95% RH, 500h, Load: Maximum allowable voltage (d.c.)
Capacitance*	Typical	1kHz: Others, 1MHz: Varistor voltage 120V
High Temperature Storage Life	$\pm 10\%$	125°C $\pm$ 5°C, 1000h; 150°C $\pm$ 5°C, 1000h***
Low Temperature Storage Life	$\pm 10\%$	-40°C $\pm$ 5°C, 1000h; -50°C $\pm$ 5°C, 1000h***

* 1H, 1E ** 1J, 2A, 2B *** 2E, 2J, 2L

For Voltage Current Curves Graphs see Environmental Applications. Additional environmental applications can also be found at www.koaspeer.com
Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use. 1/05/11