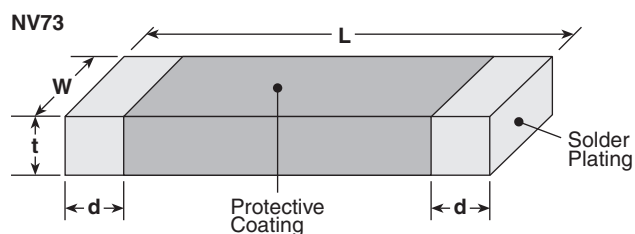
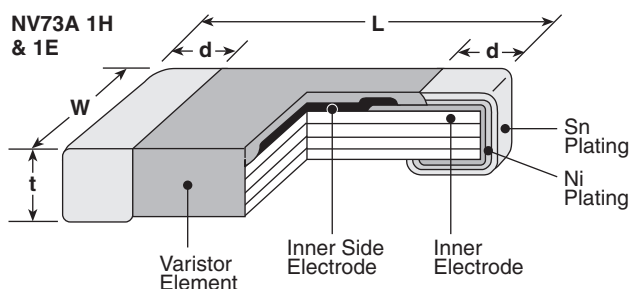


features

- Multilayer structure
- High surge current
- Protector against static electricity, switching and incoming surges
- Marking: Black body color with no marking
- 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	Dimensions inches (mm)			
	(Inch Size Code)	L	W	t	d
NEW	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 +.006 -.008 (0.4 +.015 -.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)
NEW	2B (1206)	.126±.008 (3.2±0.2)	.063±.008 (1.6±0.2)	.065 max. (1.65 max.)	.02 +.014 -.010 (0.5 +.035 -.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 +.001 -.004 (0.5 +.03 -.01)
	2L (2220)	.224±.008 (5.7±0.2)	.197±.008 (5.0±0.2)	.098 max. (2.5 max.)	.020 +.001 -.004 (0.5 +.03 -.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

circuits
protection

Part Designation	Reference Varistor Voltage @ 1mA nom. (Range) Vc	Clamping Voltage VP	IP	Maximum Peak Current IP (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. Topt (°C)	Storage Temp. Tstg (°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				12.0		
NV73A1JTTE8R2	8.2 (6.8 - 9.8)	21	2A	30	0.1	4.2	6.0					
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	0.05	10.6	15.0							
NV73A2ATTE22	22 (19 - 24)	39		12.0	16.5							
NV73A2ATTE24	24 (21.8 - 26.5)	42	0.06	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		0.14	25.0		31.0					
NV73A2ATTE47	47 (45 - 54)	86	25	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				0.24	17.0			22.0		
NV73B2ATTE33	33 (30 - 39)	66	50	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		400	4.5	50.0	65.0		
NV73A2JTTE100	100 (90 - 110)	165			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)

circuit
protection

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	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	1000	1000	1.9	6.0	9.0		
NV73A2LTTE15	15 (12.8 - 17.3)	33			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	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			7.7	35.0	45.0		
NV73B2LTTE82	82 (73.8 - 90.2)	135	1000	1000	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	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**;
Rapid Change of Temperature	$\pm 10\%$	260°C $\pm$ 5°C, 4 seconds $\pm$ 1 second***
Maximum Peak Current	$\pm 10\%$	-40°C (30 minutes), +125°C (30 minutes), 30 cycles; 5 cycles***
Maximum Energy	$\pm 10\%$	A single standard impulse of 8/20 μ seconds, positive/negative applied once each; A single standard impulse of 8/20 μ seconds, 100pulse, 30 second interval***
High Temperature Life with d.c. Bias	$\pm 10\%$	A single standard impulse of 10/1000 μ s, once*; A single standard impulse of 2ms, once**;
Low Temperature Life with d.c. Bias***	$\pm 10\%$	A single standard impulse of 10/1000 μ s, 100pulse, 90 second interval***
High Temperature Life with a.c. Bias**	$\pm 10\%$	85°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (d.c.);
High Temperature & High Humidity Life with d.c. Bias	$\pm 10\%$	125°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (d.c.)***
Capacitance*	Typical	-50°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (d.c.)
High Temperature Storage Life	$\pm 10\%$	85°C $\pm$ 5°C, 1000h, Load: Maximum allowable circuit voltage (V _{a.c.r.m.s.})
Low Temperature Storage Life	$\pm 10\%$	40°C $\pm$ 5°C, 95% RH, 500h, Load: Maximum allowable voltage (d.c.)
		1kHz: Others, 1MHz: Varistor voltage 120V
		125°C $\pm$ 5°C, 1000h; 150°C $\pm$ 5°C, 1000h***
		-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 Terms & Definitions. 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.

1/07/09