KOA SPEER ELECTRONICS, INC.

spec sheet

SS-237 R3
AHA 5/7/04

NEW

Surface Mount Metal Oxide Varistors

ISO 9001 CERTIFIED

NV73 Type

1. General

- Multilayer structure
- High surge current
- Protector against static electricity, switching and incoming surges

2. Features

- Chip type structure suitable for surface mount
- Compact package with large withstanding surge capability
- Symmetrical V-I characteristics make surge absorption possible in either direction

3. Dimensions

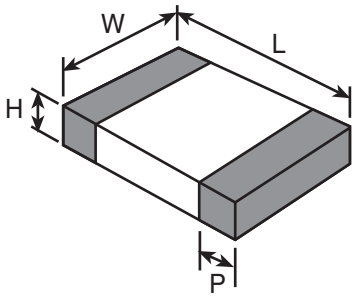

Table 1

Dimensions - inches (mm)				
Part	**L**	**W**	**H**	**P**
1J (0603)	0.063±0.006 (1.60±0.15)	0.031±0.006 (0.80±0.15)	0.031±0.006 (0.80±0.15)	$0.016\pm^{+0.006}_{-0.008}$ ($0.40\pm^{+0.15}_{-0.2}$)
2A (0805)	0.079±0.008 (2.00±0.20)	0.049±0.008 (1.25±0.20)	0.051 Max (1.30 Max)	0.02±0.010 (0.50±0.25)
2B (1206)	0.126±0.008 (3.20±0.20)	0.063±0.008 (1.60±0.20)	0.065 Max (1.65 Max)	$0.02\pm^{+0.014}_{-0.010}$ ($0.50\pm^{+0.35}_{-0.25}$)

4. Ordering and Specifying Information

NV73	A	1J	T	TE	8R2
Type	Energy Code	Size	Termination Material	Packaging	Varistor Voltage
	A B C	1J: 0603 2A: 0805 2B: 1206	T: Sn	TE: 7" Embossed Plastic 2,500 pcs/reel	8.2V 8R2 18V 18 "R" indicates decimal on value <10Ω

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5. Standard Applications

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)	Capacitance Typ. C (1k to 1MHz) (pF)	Maximum Allowable Voltage a.c rms (V)	Maximum Allowable Voltage d.c (V)	Varistor Voltage (V)	Energy (J)	Peak Current (8/20μs) A (2 pulses)	Operating Temp. T_{opt} (°C)	Storage Temp. T_{stg} (°C)
NV73A1J*TE8R2	8.2 (6.8 - 9.8)	21	2A	30	0.1	370	4.2	6.0	8.2 - 27	0.1	30	-40°C to +85°C	-40°C to +125°C
NV73A1J*TE12	12 (10 - 14.4)	29				290	6.1	8.6					
NV73A1J*TE15	15 (12.5 - 18)	35				270	7.6	10.8					
NV73A1J*TE18	18 (16 - 20)	37				230	9.1	12.8					
NV73A1J*TE20	20 (18 - 22)	40				180	10.6	15.0					
NV73A1J*TE22	22 (19 - 24)	42				160	12.0	16.5					
NV73A1J*TE24	24 (21.8 - 26.5)	46				140	14.0	18.0					
NV73A1J*TE27	27 (25 - 32)	49				100	17.0	22.0					
NV73A2A*TE8R2	8.2 (6.8 - 9.8)	16	1A	10	0.01	400 - 80	4.2	6.0	4.2 - 47	0.01 - 0.16	10/20/25		
NV73A2A*TE12	12 (10 - 14.4)	22		20	0.03		6.1	8.6					
NV73A2A*TE15	15 (12.5 - 18)	27			0.04		7.6	10.8					
NV73A2A*TE18	18 (16 - 20)	29					9.1	12.8					
NV73A2A*TE20	20 (18 - 22)	33			0.05		10.6	15.0					
NV73A2A*TE22	22 (19 - 24)	39					12.0	16.5					
NV73A2A*TE24	24 (21.8 - 26.5)	42			0.06		14.0	18.0					
NV73A2A*TE27	27 (25 - 32)	50		20	0.07		17.0	22.0					
NV73A2A*TE33	33 (30 - 39)	60	1A		0.12	400 - 80	20.0	26.0	4.2 - 47	0.01 - 0.16	10/20/25		
NV73A2A*TE39	39 (37 - 47)	72		25	0.14		25.0	31.0					
NV73A2A*TE47	47 (45 - 54)	86			0.16		30.0	38.0					
NV73B2A*TE8R2	8.2 (6.8 - 9.8)	18	2A	20	0.03	1000 - 200	4.2	6.0	4.2 - 33	0.02 - 0.25	20/35/50		
NV73B2A*TE12	12 (10 - 14.4)	22		35	0.05		6.1	8.6					
NV73B2A*TE15	15 (12.5 - 18)	30			0.07		7.6	10.8					
NV73B2A*TE18	18 (16 - 20)	32			0.08		9.1	12.8					
NV73B2A*TE20	20 (18 - 22)	36			0.09		10.6	15.0					
NV73B2A*TE22	22 (19 - 24)	40			0.11		12.0	16.5					
NV73B2A*TE24	24 (21.8 - 26.5)	42			0.12		14.0	18.0					
NV73B2A*TE27	27 (25 - 32)	58			0.24		17.0	22.0					
NV73B2A*TE33	33 (30 - 39)	66		50	0.25		20.0	26.0					
NV73C2A*TE8R2	8.2 (6.8 - 9.8)	16	2A	25	0.04	1000 - 300	4.2	6.0	4.2 - 24	0.02 - 0.18	25/50		
NV73C2A*TE12	12 (10 - 14.4)	22		50	0.09		6.1	8.6					
NV73C2A*TE15	15 (12.5 - 18)	28			0.11		7.6	10.8					
NV73C2A*TE18	18 (16 - 20)	32			0.13		9.1	12.8					
NV73C2A*TE20	20 (18 - 22)	35			0.14		10.6	15.0					
NV73C2A*TE22	22 (19 - 24)	40			0.17		12.0	16.5					
NV73C2A*TE24	24 (21.8 - 26.5)	42			0.18		14.0	18.0					

* Add termination material character (T)

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 ±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 ±10% when a single standard impulse of 8/20μ 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

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5. Standard Applications (continued)

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)	Capacitance Typ. C (1k to 1MHz) (pF)	Maximum Allowable Voltage a.c rms (V)	Maximum Allowable Voltage d.c (V)	Varistor Voltage (V)	Energy (J)	Peak Current (8/20μs) A (2 pulses)	Operating Temp. T_{opt} (°C)	Storage Temp. T_{stg} (°C)
NV73A2B*TE27	27 (25 - 32)	55	2A	40	0.13	500 - 100	17.0	22.0	27 - 56	0.13 - 0.26	40	-40°C to +85°C	-40°C to +125°C
NV73A2B*TE33	33 (30 - 39)	60			0.15		20.0	26.0					
NV73A2B*TE39	39 (37 - 47)	72			0.18		25.0	31.0					
NV73A2B*TE47	47 (45 - 54)	85			0.22		30.0	38.0					
NV73A2B*TE56	56 (52 - 62)	100			0.26		35.0	45.0					
NV73B2B*TE8R2	8.2 (6.8 - 9.8)	16	2A	30	0.03	1000 - 300	4.2	6.0	4.2 - 27	0.02 - 0.16	30/50		
NV73B2B*TE12	12 (10 - 14.4)	22		50	0.07		6.1	8.6					
NV73B2B*TE15	15 (12.5 - 18)	28			0.09		7.6	10.8					
NV73B2B*TE18	18 (16 - 20)	32			0.1		9.1	12.8					
NV73B2B*TE20	20 (18 - 22)	35			0.11		10.6	15.0					
NV73B2B*TE22	22 (19 - 24)	40			0.12		12.0	16.5					
NV73B2B*TE24	24 (21.8 - 26.5)	42			0.14		14.0	18.0					
NV73B2B*TE27	27 (25 - 32)	52			0.16		17.0	22.0					
NV73C2B*TE8R2	8.2 (6.8 - 9.8)	15	2A	40	0.06	2000 - 500	4.2	6.0	4.2 - 27	0.02 - 0.24	40/70		
NV73C2B*TE12	12 (10 - 14.4)	21		70	0.1		6.1	8.6					
NV73C2B*TE15	15 (12.5 - 18)	27			0.13		7.6	10.8					
NV73C2B*TE18	18 (16 - 20)	29			0.15		9.1	12.8					
NV73C2B*TE20	20 (18 - 22)	31			0.17		10.6	15.0					
NV73C2B*TE22	22 (19 - 24)	35			0.19		12.0	16.5					
NV73C2B*TE24	24 (21.8 - 26.5)	38			0.2		14.0	18.0					
NV73C2B*TE27	27 (25 - 32)	48			0.24		17.0	22.0					

* Add termination material character (T)

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 ±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 ±10% when a single standard impulse of 8/20μ 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

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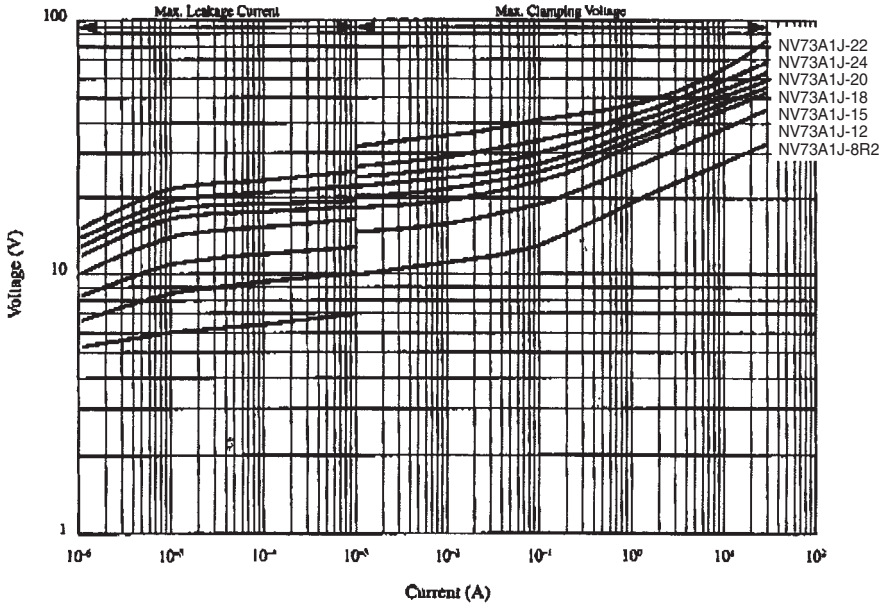
6. Rating Table

Terms	Symbol	Description
Maximum Allowable Voltage	–	The maximum sinusoidal RMS voltage or maximum DC voltage which can be applied continuously
Maximum Energy	E	The maximum energy within the varistor voltage change of ±10% when a single impulse of 2m sec. is applied
Maximum Peak Current	I_P	The maximum peak current within the varistor voltage change of ±10% when a single standard impulse of 8/20μ sec. is applied in two times with an interval of 5 min.
Operating Temperature	Topt	Ambient temperature range while the device is operating
Storage Temperature	Tstg	Temperature range without causing the device any failure

7. Voltage-Current Characteristics

NV73A1J (Ta = +25°C) **Voltage-Current Characteristics**



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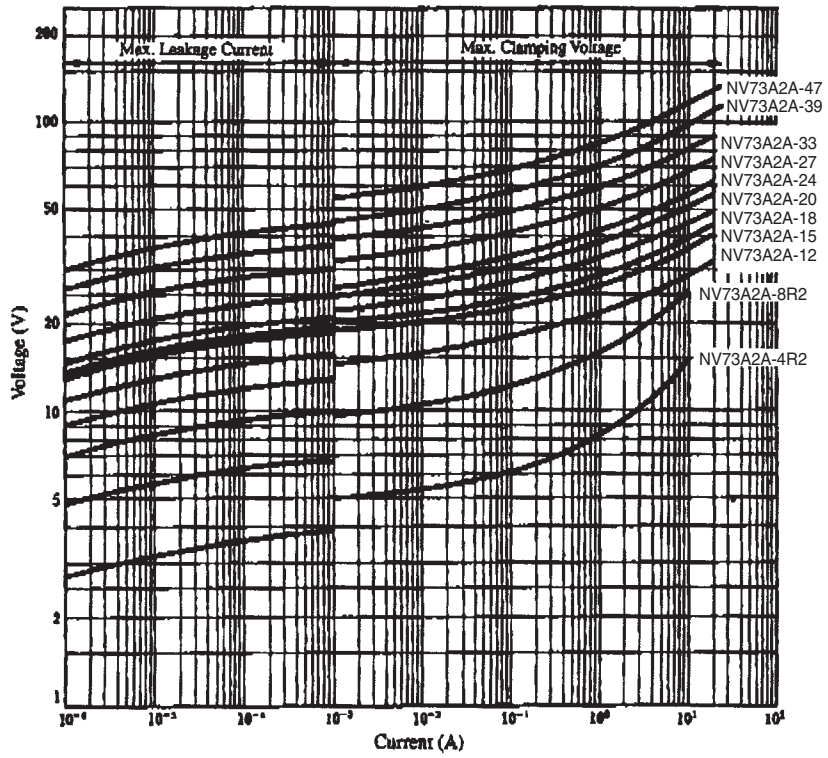
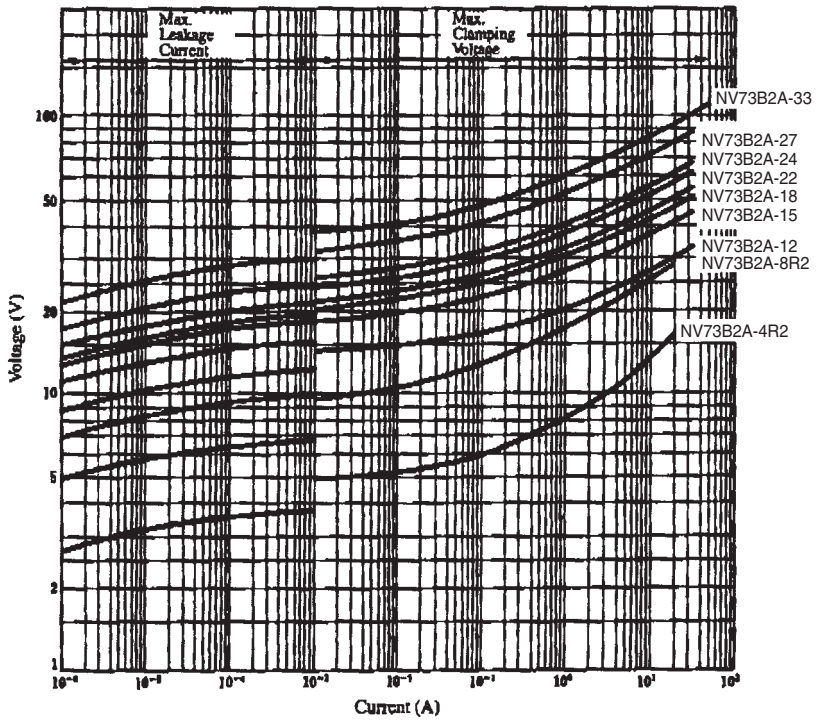
7. Voltage-Current Characteristics (continued)

NV73A2A (Ta = +25°C) Voltage-Current Characteristics



NV73B2A (Ta = +25°C) Voltage-Current Characteristics



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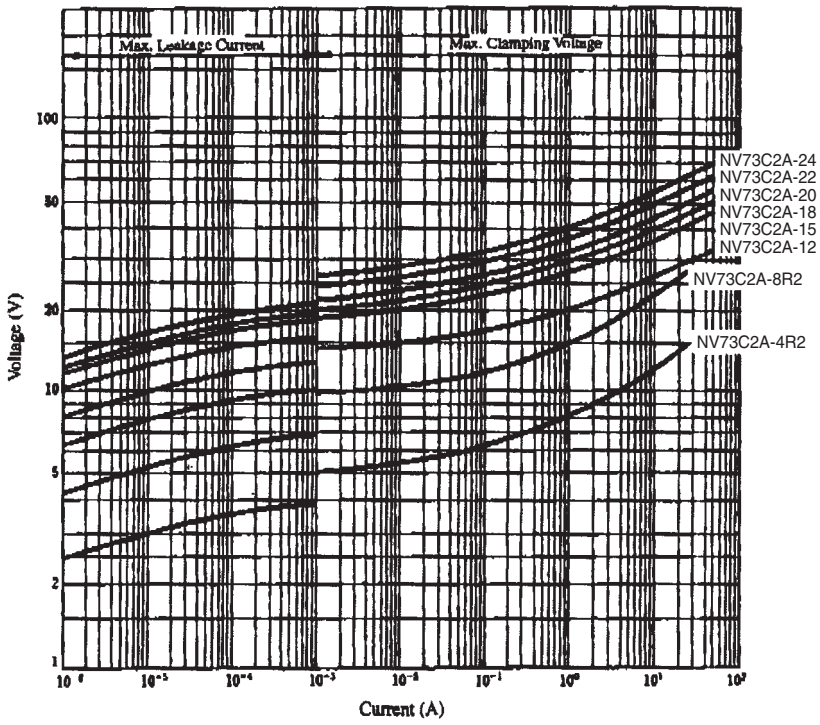
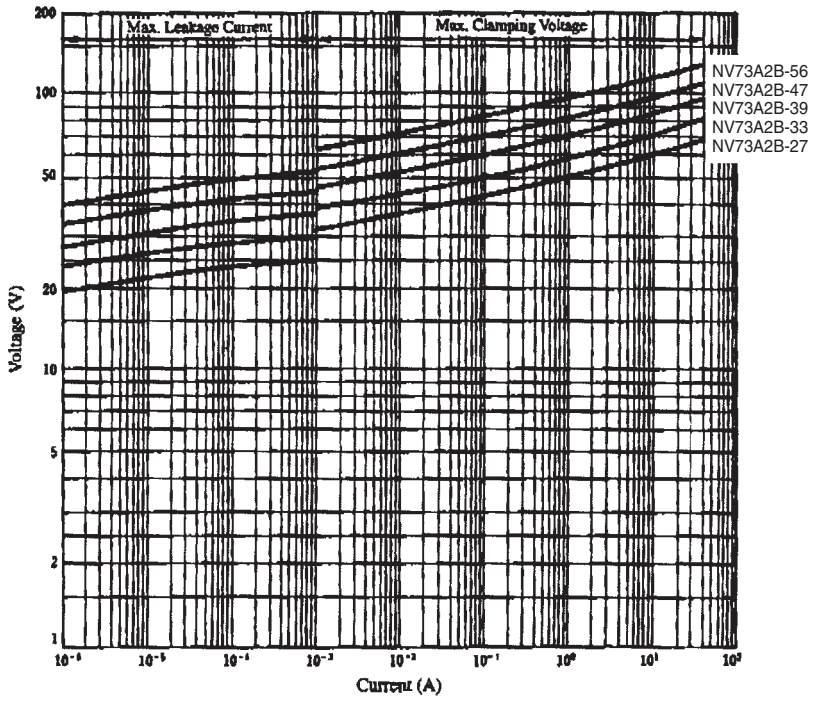
7. Voltage-Current Characteristics (continued)

NV73C2A (Ta = +25°C) Voltage-Current Characteristics



NV73A2B (Ta = +25°C) Voltage-Current Characteristics



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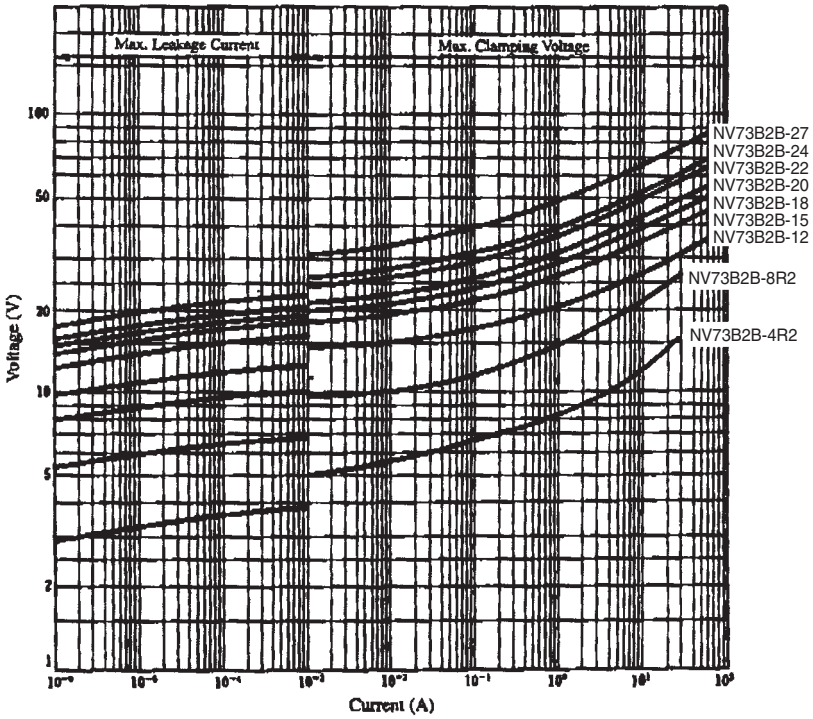
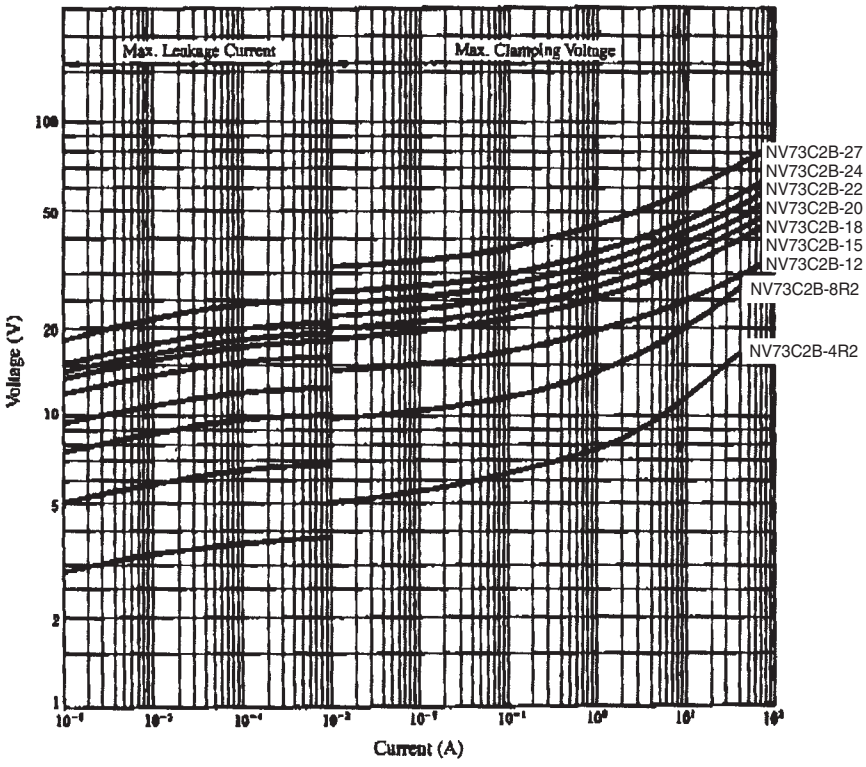
7. Voltage-Current Characteristics (continued)

NV73B2B (Ta = +25°C) **Voltage-Current Characteristics**



NV73C2B (Ta = +25°C) **Voltage-Current Characteristics**



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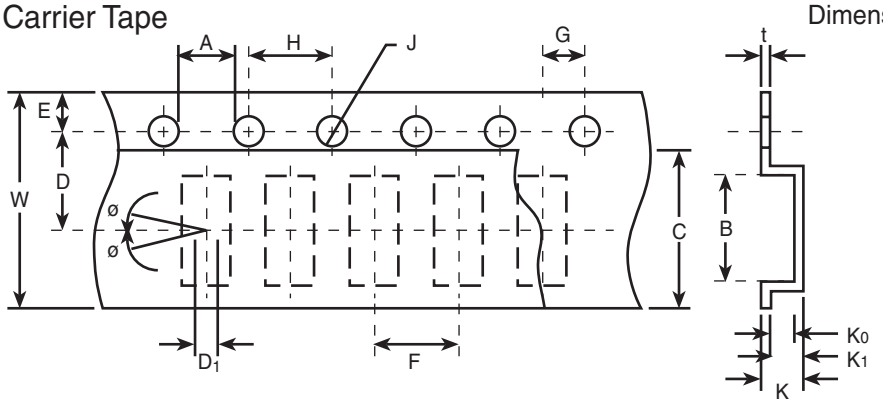
8. Packaging

(1) Dimensions of Carrier Tape

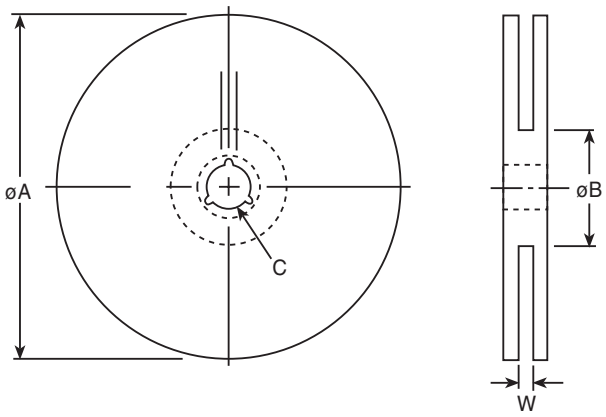
Dimensions in inches (mm)



Tape	A	B	Ko	F	J	H	E	G	D
NV73-1J	0.047±0.004 (1.2±0.1)	0.075±0.004 (1.9±0.1)	0.051 Max. (1.3 Max.)	0.157±0.004 (4.0±0.1)	0.059±0.004 (1.5+0.1/-0.0)	0.157±0.004 (4.0±0.1)	0.069±0.004 (1.75±0.10)	0.079±0.002 (2.0±0.05)	0.138±0.002 (3.5±0.05)
NV73-2A	0.063±0.004 (1.6±0.1)	0.094±0.004 (2.4±0.1)	0.063 Max. (1.6 Max.)						
NV73-2B	0.079±0.004 (2.0±0.1)	0.142±0.004 (3.6±0.1)							

Tape	W	C	t	K_1	ø	K
NV73-1J	0.315±0.008 (8.0±0.2)	0.209±0.004 (5.3±0.1)	0.008+0.004 /-0.002 (0.2+0.1/-.05)	0.067 Max. (1.7 Max.)	30° Max.	0.069 Max. (1.75 Max.)
NV73-2A						
NV73-2B						

(2) Reel dimensions



Dimensions in inches (mm)

	A	B	C	W (min)	W (max)
Series	$7.09 \pm {}^{+0}_{-0.118}$ ($ø180 \pm {}^{+0}_{-3}$)	$2.36 \pm {}^{+0.004}_{0}$ ($ø60 \pm {}^{+0.1}_{0}$)	0.512 ± 0.008 (13.0 ± 0.2)	0.354 ± 0.012 (9.0 ± 0.3)	0.449 ± 0.039 (11.4 ± 1.0)

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