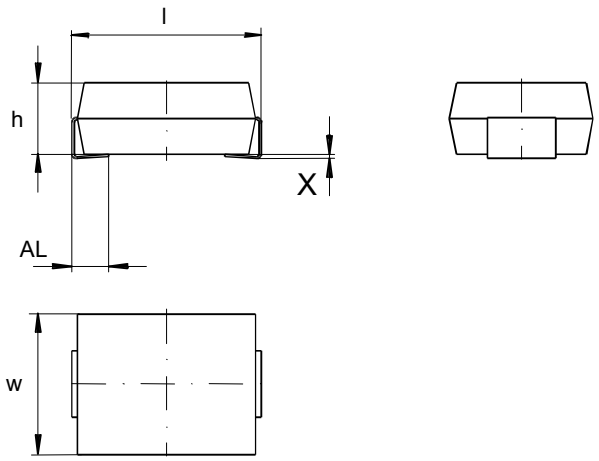
Specification available from: Österreichischer Verband für Elektrotechnik (OVE) A-1010 Wien, Eschenbachgasse 9	**IEC 61051-2-2 AT0004** Issue 3 / 2025-10 *QC 420102 AT0001*
Electronic components of assessed quality in accordance with: IEC 61051-1: 2018-10 IEC 61051-2: 2021-11 *QC 420000*	*IEC 61051-2-2: 1991-01* QC *420102*
Outline drawing CU3225, CU4032 (see 1.2.1) 	**ZINC OXYDE SURGE SUPPRESSION VARISTORS** SMD disk Varistors CU series (chip encapsulated)
	Non insulated
	Assessment level: E

NOTES

1 - The undimensioned details do not affect the performance of the device.
2 - The terminations are suitable for soldering.
3 - The terminations are suitable for printed wiring applications.
4 - The terminations are rigid.

Information on the availability of components qualified to this detail specification is given in the Qualified Products List.

SECTION ONE – GENERAL DATA

1 General data

1.1 Recommended method (s) of mounting

If not specified otherwise, the SMD Varistors shall be reflow-soldered on FR4 test boards (recommend reflow curve profile according to IEC60068-2-58, test Td2, Tpeak = 245°C), standard soldering: Pb-free.

1.2 Dimensions, ratings and characteristics (see table 1)

1.2.1 Dimensions (All dimensions are in millimeters)

- Body length:	l	see below table
- Body width:	w	see below table
- Body thickness:	h	see below table
- Length of termination:	AL	AL = 1.5 ± 0.3mm
- Thickness of terminations:	X	Xmax = 0.3mm

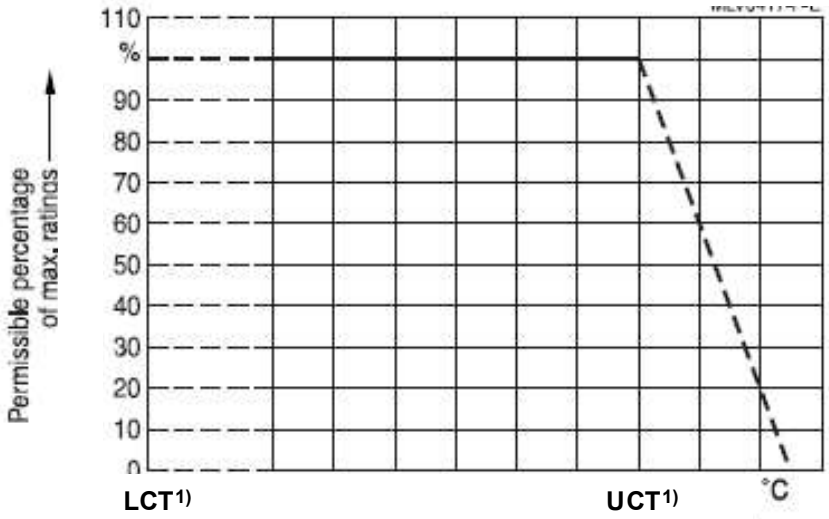
Chip size	Vrms, max (V)	l (mm)	w (mm)	h (mm)
CU3225	11~175	8.0 ± 0.3	6.3 ± 0.3	3.2 ± 0.3
CU3225	210~300	8.0 ± 0.3	6.3 ± 0.3	4.5 ± 0.3
CU4032	11~175	10.2 ± 0.3	8.0 ± 0.3	3.2 ± 0.3
CU4032	210~460	10.2 ± 0.3	8.0 ± 0.3	4.5 ± 0.3
CU4032	480	10.2 ± 0.3	8.0 ± 0.3	6.5 max

1.2.2 Ratings and characteristics

Climatic category:	40/85/56
LCT/UCT (Lower/Upper category temperature) [1)]	-40°C/85°C
Maximum continuous a.c. voltage:	see table 1
Maximum continuos d.c. voltage:	see table 1
Supply voltage:	see table 1
Voltage at specified current (1 mA):	
- at 25°C	see table 1
- if applicable, at upper category temperature:	-
- if applicable, at ... °C	-
Maximum peak current:	
- for 10 pulses 8/20 µs at 2 per min:	see table 1 and 1.2.3
- for 1 pulses 10/1 000 µs or 2 ms square wave :	see table 1 and 1.2.3
Class current:	see table 1
Voltage at class current (protection level):	see table 1
Capacitance:	see table 1
Maximum temperature coefficient of the voltage at specified current	-(0.09 % / K)max.

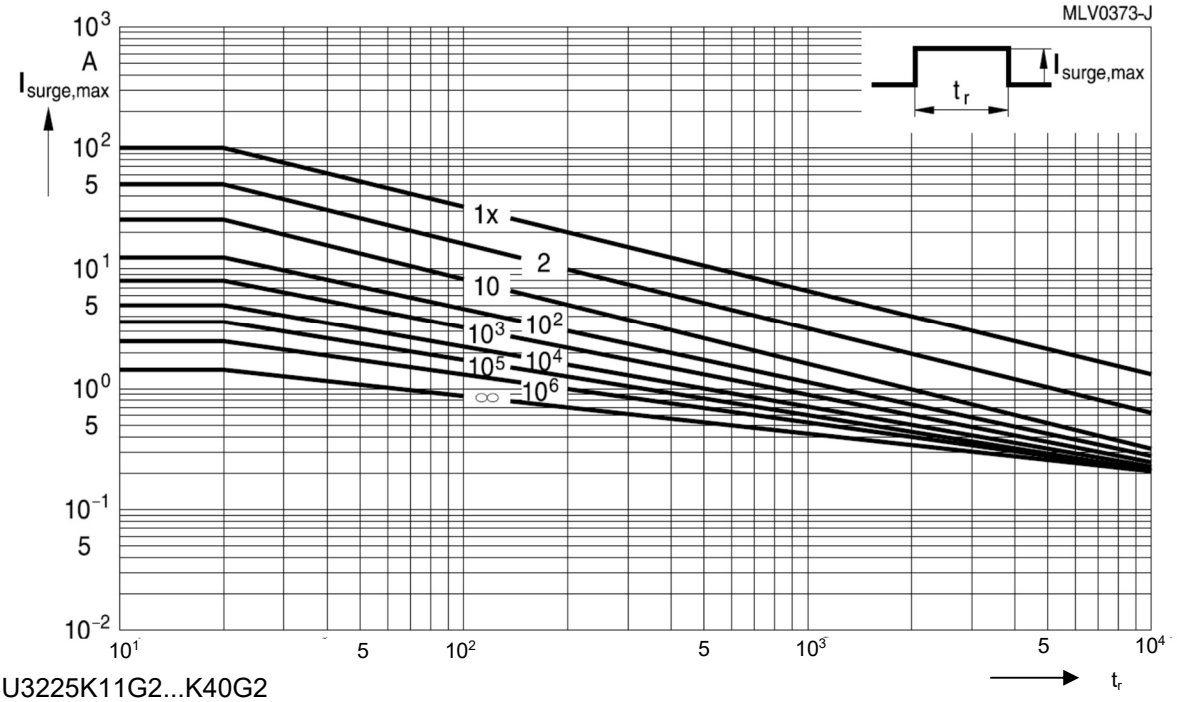
1.2.3 Derating curve

Maximum continuous a.c. or d.c. voltage with temperature.

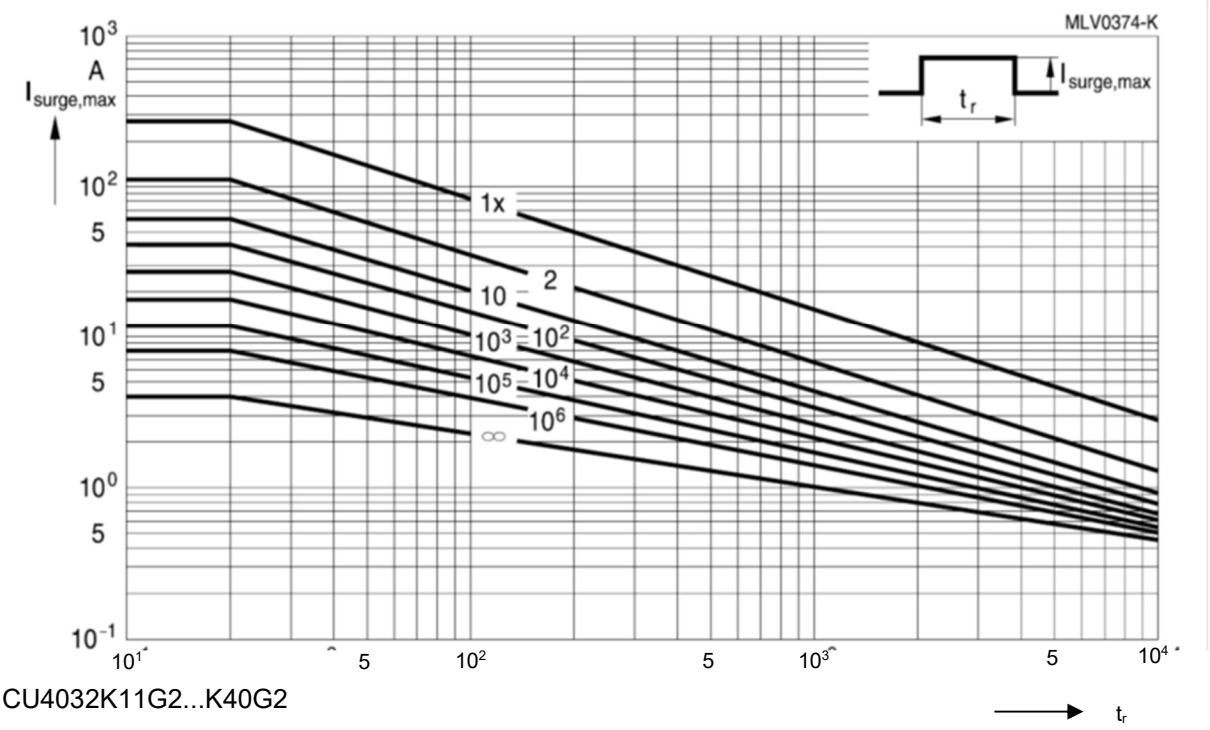


[1)] LCT/UCT: Lower/Upper category temperature = Operating temperature range.

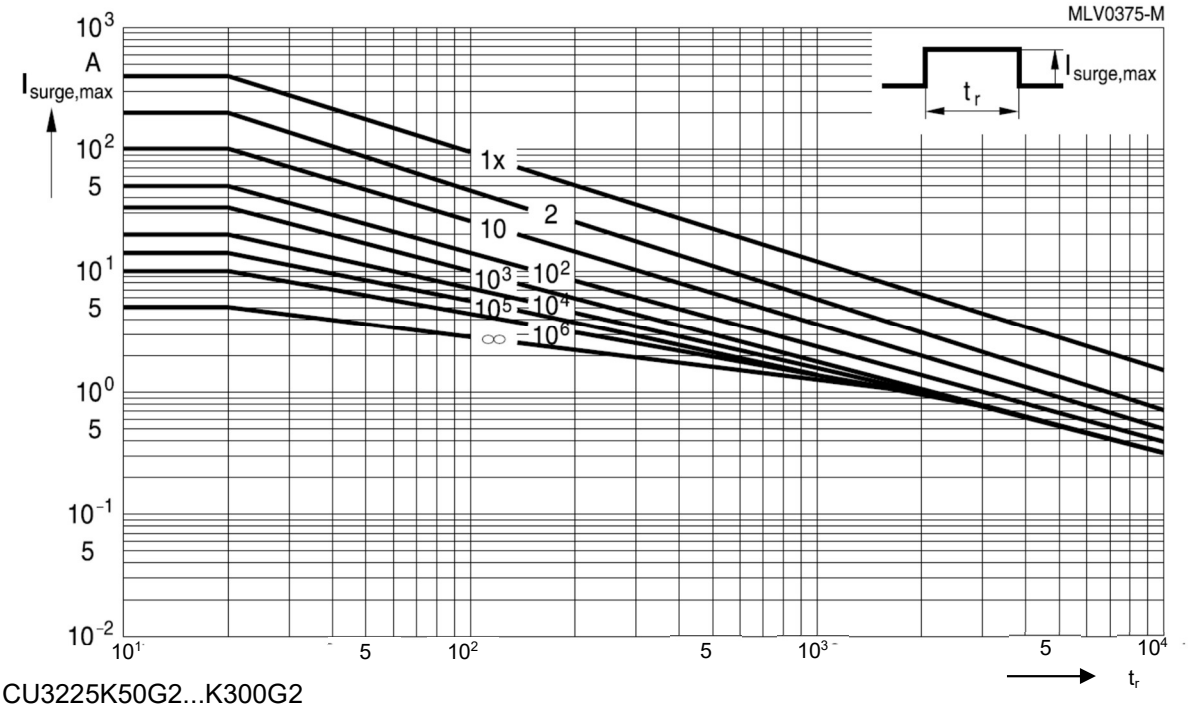
Reduction factor of maximum peak current for various numbers of pulses versus pulse duration



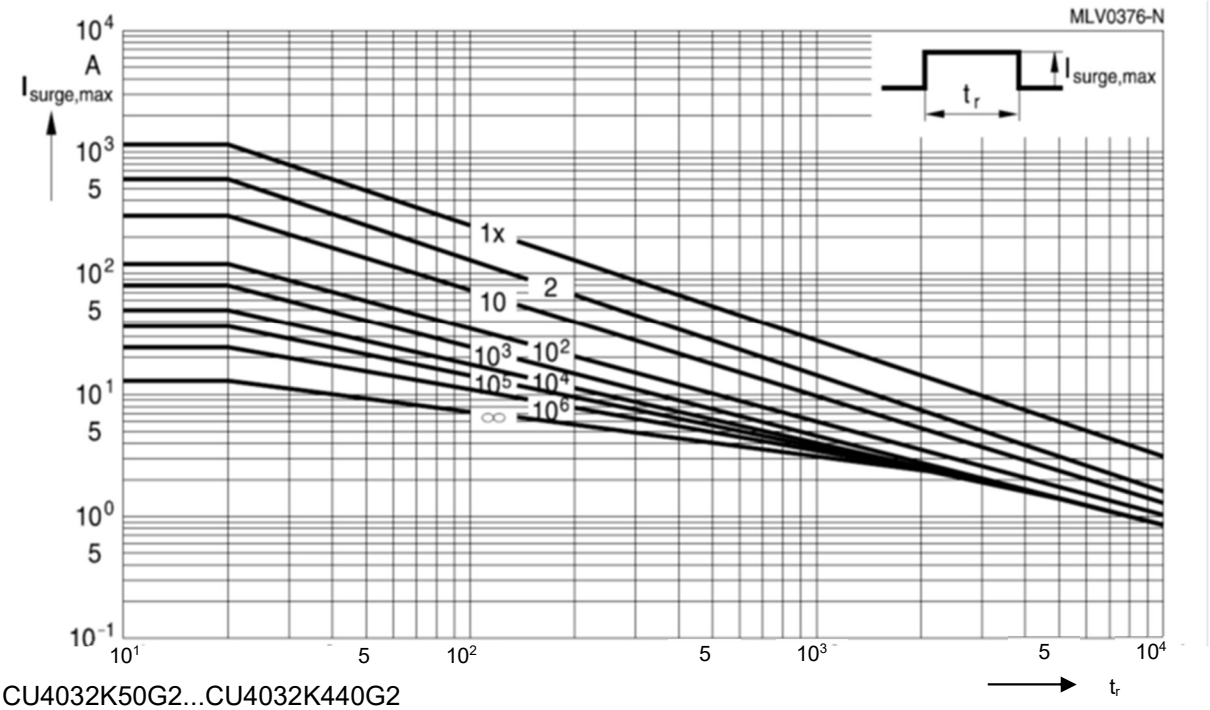
CU3225K11G2...K40G2



CU4032K11G2...K40G2



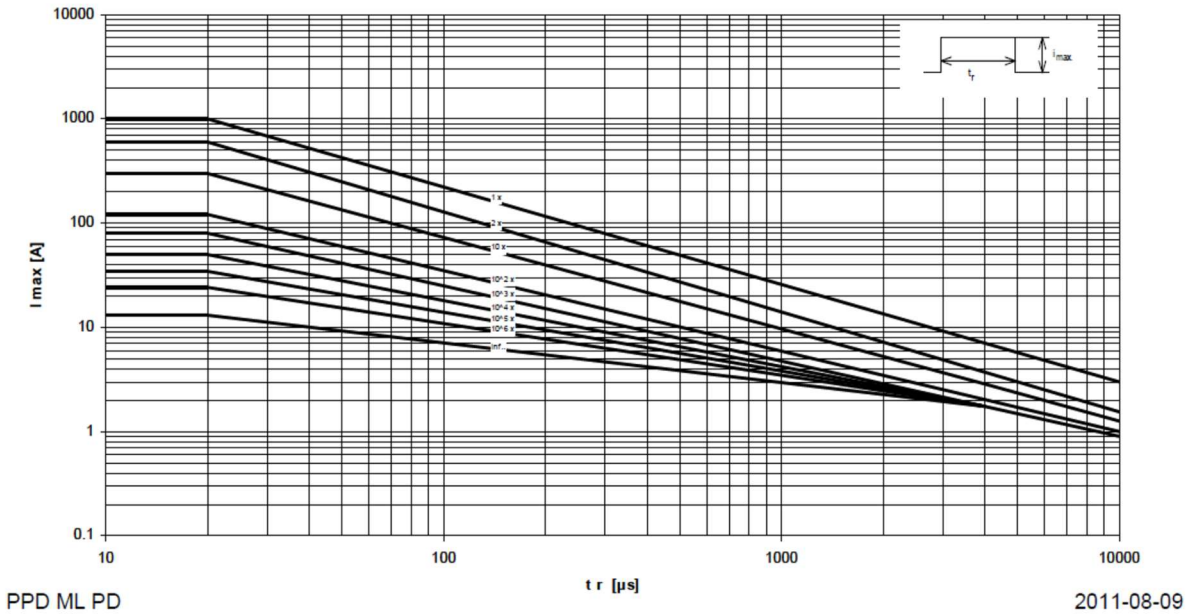
CU3225K50G2...K300G2



CU4032K50G2...CU4032K440G2

CU4032K460G2 & CU4032K480G2:

Derating curves



1.3 Related documents

Generic specification:	IEC Publication 61051-1: Varistors for Use in Electronic Equipment. Part 1: Generic Specification.
Sectional specification:	IEC Publication 61051-2: Varistors for Use in Electronic Equipment. Part 2: Sectional Specification for Surge Suppression Varistors.

Table 1 (1 of 2)

Style (1)	Maximum continuous voltage		Voltage at 1 mA	Voltage at class current (8/20µs)		Max. peak current (8/20µs, 1 time)	Energy surge rating (2 ms, 1 time)	Maximum capacitance
CU3225	r.m.s. (V)	d.c. (V)	(V)	Class current(A)	Max. volt (V)	(A)	(J)	(pF)
CU3225K11	11	14	18	1,0	36	100	0,3	3000
CU3225K14	14	18	22	1,0	43	100	0,4	2500
CU3225K17	17	22	27	1,0	53	100	0,5	2000
CU3225K20	20	26	33	1,0	65	100	0,6	1800
CU3225K25	25	31	39	1,0	77	100	0,7	1000
CU3225K30	30	38	47	1,0	93	100	0,9	1500
CU3225K35	35	45	56	1,0	110	100	1,1	1250
CU3225K40	40	56	68	1,0	135	100	1,3	1200
CU3225K50	50	65	82	5,0	135	400	1,8	900
CU3225K60	60	85	100	5,0	165	400	2,2	600
CU3225K75	75	100	120	5,0	200	400	2,5	420
CU3225K95	95	125	150	5,0	250	400	3,4	350
CU3225K115	115	150	180	5,0	300	400	3,6	300
CU3225K130	130	170	205	5,0	340	400	4,2	240
CU3225K140	140	180	220	5,0	360	400	4,5	220
CU3225K150	150	200	240	5,0	395	400	4,9	200
CU3225K175	175	225	270	5,0	455	400	5,6	170
CU3225K210	210	270	330	5,0	550	400	7,0	155
CU3225K230	230	300	360	5,0	595	400	7,2	140
CU3225K250	250	320	390	5,0	650	400	8,2	120
CU3225K275	275	350	430	5,0	710	400	8,6	120
CU3225K300	300	385	470	5,0	775	400	9,6	110

(1) For explanation of style reference number, see clause 1.5.

Table 2 (2 of 2)

Style (1)	Maximum continuous voltage		Voltage at 1 mA	Voltage at class current (8/20µs)		Max. peak current (8/20µs, 1 time)	Energy surge rating (2 ms, 1 time)	Maximum capacitance
CU4032	r.m.s. (V)	d.c. (V)	(V)	Class current(A)	Max. volt (V)	(A)	(J)	(pF)
CU4032K11	11	14	18	2,5	36	250	0,8	7000
CU4032K14	14	18	22	2,5	43	250	0,9	5500
CU4032K17	17	22	27	2,5	53	250	1,1	4000
CU4032K20	20	26	33	2,5	65	250	1,3	3000
CU4032K25	25	31	39	2,5	77	250	1,6	2500
CU4032K30	30	38	47	2,5	93	250	2,0	3000
CU4032K35	35	45	56	2,5	110	250	2,5	2300
CU4032K40	40	56	68	2,5	135	250	3,0	1900
CU4032K50	50	65	82	10,0	135	1200	4,2	1800
CU4032K60	60	85	100	10,0	165	1200	4,8	1000
CU4032K75	75	100	120	10,0	200	1200	5,9	790
CU4032K95	95	125	150	10,0	250	1200	7,6	700
CU4032K115	115	150	180	10,0	300	1200	8,4	640
CU4032K130	130	170	205	10,0	340	1200	9,5	580
CU4032K140	140	180	220	10,0	360	1200	10,0	550
CU4032K150	150	200	240	10,0	395	1200	11,0	520
CU4032K175	175	225	270	10,0	455	1200	13,0	380
CU4032K210	210	270	330	10,0	550	1200	15,0	340
CU4032K230	230	300	360	10,0	595	1200	17,0	300
CU4032K250	250	320	390	10,0	650	1200	19,0	240
CU4032K275	275	350	430	10,0	710	1200	21,0	210
CU4032K300	300	385	470	10,0	775	1200	23,0	170
CU4032K320	320	420	510	25,0	845	1200	25,0	155
CU4032K350	350	460	560	10,0	910	1200	24,0	75
CU4032K385	385	505	620	10,0	1025	1200	28,0	150
CU4032K420	420	560	680	10,0	1120	1200	32,0	140
CU4032K440	440	585	715	10,0	1180	1200	34,0	130
CU4032K460	460	615	750	10,0	1240	1000	36,0	120
CU4032K480	480	640	780	10,0	1300	1000	40,0	160

(1) For explanation of style reference number, see clause 1.5.

1.4 Marking

The varistors are marked with their:

- style reference (includes style – 3225 and 4032 without CU, tolerance, max. continuous r.m.s. voltage.)

3225	4032
K275	K275

- Manufacturer's code or trade mark
- Mark of certification (optional)
- Date of manufacture

1.5 Ordering information

Orders for varistors covered by this specification shall contain, in clear or in coded form, the following minimum information

Example CU 3225 K 275 A (B,C) G* K*

CU	Style – SMD.
3225	Disc size (3225: 8.0x6.3mm; 4032: 10.0x8.0mm)
K	Varistor voltage tolerance at 1 mA: K: ± 10 % (J: ± 5 %; L: ± 15 %; M: ± 20 %; S: special tolerance)
275	Max. continuous r.m.s. voltage
A (B,C)	designation for special types
G*	Taping, packing options (not effecting IEC specifications). * = numbers 0~9 or letter X, stands for different packing styles. G2 = Standard packing, reel diameter, 330mm
K*	Customer specific options (not effecting IEC specifications): Optional * = numbers 0~9
SIOV	May be prefixed

Special varistor types with costumer specific tolerances (tolerance designation S in combination with the letters A, B or C) and varistors with special specifications designated by K* are available on request.

1.6 Certified records or released lots

Not required.

1.7 Additional information (not for inspection purposes)

The voltage indicated on the component is the maximum allowable steady state sinusoidal voltage at 50 - 60 Hz. When use is made of a supply voltage, the maximum continuous a.c. r.m.s. voltage = 1.1 x supply voltage. Should the varistor be subjected to voltage above the indicated voltage, it may fail by package rupture or expulsion material, causing a major problem in the equipment.

Coating information:

Material: Polyphenylene Sulfide
Ref. No.: 1140A7
Supplier: POLYPLASTICS

Material: Polyphenylene Sulfide
Ref. No.: Kingtron Z
Supplier: KINGFA

1.8 Additional or increased severities or requirements to those specified in the generic and/or sectional specification

None.

SECTION TWO – INSPECTION REQUIREMENTS

2 Inspection requirements

2.1 Procedures

2.1.1 For Qualification Approval the procedure shall be in accordance with the Sectional Specification, IEC Publication 61051-2, Sub-clause 3.2.

2.1.2 For Quality Conformance Inspection the test schedule (Table II) includes sampling, periodicity, severities and requirements. The formation of inspection lots is covered by Sub-clause 3.3.1 of the Sectional Specification.

TABLE II

Notes

1. - Sub-clause numbers of tests and performance requirements refer to the Generic Specification, IEC Publication 61051-1.
2. - Inspection Levels and AQL's are selected from IEC Publication 60410 (or ISO 2859-1) Sampling Plans and Procedures for Inspection by Attributes.
3. - In this table:
   - p = periodicity (in months)
   - n = sample size
   - c = acceptance criterion (permitted number of defectives)
   - D = destructive
   - ND = non-destructive
   - IL = inspection level
   - AQL = acceptable quality level

   } IEC 60410 (or ISO 2859-1)
4. - The bump test and shock test are considered to be alternative. The detail specification shall indicate which test is to be performed.
5. - Where d.c. has been applied to the varistor, the reference voltage shall be measured in the same direction.
7. - The manufacturer shall only be required to perform one of these tests.

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	IL (see Note 2)	AQL	Performance requirements (see Note 1)
GROUP A INSPECTION (lot-by-lot)					
Sub-group A1	ND		II	1,0%	
6.4.1 Visual examination					As in 4.3.1
6.4.2 Marking					Legible marking and as specified in 1.4 of this specification
Sub-group A2	ND		II	0,65%	
6.6 Voltage		Voltage at specified current			As specified in 1.2.2 of this specification
Sub-group A3	ND		S-4	1,0%	
6.4.3 Dimensions (gauging)		Note: Gauging not applicable. Measuring dimensions: l, w, h			As specified in 1.2.1 of this specification
GROUP B INSPECTION (lot-by-lot)					
Sub-group B1	D		S-3	2,5%	
6.17.2 Robustness of terminations –		Substrate bending test IEC 60068-2-21,Test Ue1 d = 2 mm, t = 60 s Visual examination Voltage at specified current Shear test IEC 60068-2-21,Test Ue3 Force F = 5 N, t = 10±1s. Visual examination Voltage at specified current			No visible damage $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$ No visible damage $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$
6.19 Solderability		IEC 60068-2-58, test Td1 (Method1: Solder bath, Sn96,5Ag3Cu,5) T = 245 -/+3°C, t = 3s			The terminations shall be uniformly tinned.
6.27 Solvent resistance of the marking		Visual examination IEC 60068-2-45,Test XA (3.1.1, Method 1): T = 23±5°C, t = 5±0,5 min Solvent mixture (70±5% Diethylenglycoldibutylether, 30±5% 2-propanol). Rubbing material: Cotton wool F = 5±0,5 N, 10 strokes. Visual examination			Legible marking

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	IL (see Note 2)	AQL	Performance requirements (see Note 1)
Sub-group B2 6.11 Clamping voltage 6.9 Voltage proof	D	At class current: See table 1. Not applicable.	S-2	1,0%	As specified in the detail specification

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
GROUP C INSPECTION (periodic) Sub-group C1 6.13 Maximum peak current	D	Pulse current 10 pulses 8/20 µs at 2 per min in one direction (current according table 1 and 1.2.3) Visual examination Voltage at specified current	6	13	1	No visible damage $\left\lvert\frac{\Delta U}{U}\right\rvert \leq 10\%$
Sub-group C2 6.15 Rated Energy	D	Single current pulse with 2 ms rectangular wave shape or 10 µs /1 000 µs wave shape Visual examination Voltage at specified current	12	13	1	No visible damage $\left\lvert\frac{\Delta U}{U}\right\rvert \leq 10\%$

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
Sub-group C3A Part of sample of Sub-group C3	D		12	7		
6.8 Capacitance		f = 1 kHz Signal level ≤ 1V Zero bias				As specified in 1.2.2 of this specification
6.18 Resistance to soldering heat		IEC 60068-2-58, test Td2, Method1: Solder bath, Sn96,5Ag3Cu,5 T = 260±5°C, d = 10±1s				No visible damage Legible marking
		Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$
6.28 Component solvent resistance		IEC 60068-2-45,Test XA (3.1.1, Method 2): T = 23±5°C t = 5±0,5 min Solvent mixture: 70±5% Diethylenglycoldibutylether, 30±5% 2-propanol. Recovery: 48h				
		Visual examination				No visible damage Legible marking
		Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$
6.20 Rapid change of temperature		IEC 60068-2-14,Test Na N = 5 cycles, d = 30 min θ_A = -40±3°C θ_B = 85±2°C Visual examination				
		Voltage at specified current				No visible damage Legible marking
						$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
<u>Sub-group C3B</u> Other part of sample of Sub-group C3			12	6		
6.21 Shock (or bump, see Note 4)		Not specified.				
6.21 Repetitive Shock		IEC 60068-2-27, Ea Pulse shape: half sine. a = 400 m/s², d = 6 ms N = 6 x 5000 shocks.				
		Visual examination				No visible damage Legible marking
		Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$
6.22 Vibration		IEC 60068-2-6,Test Fc, Method B4 Frequency range: 10 Hz to 55 Hz a = 0,75 mm or 98 m/s^2 (whichever is the less) d = 3x2 h				
		Visual examination				No visible damage Legible marking
		Voltage at specified current				$\left\|\frac{\Delta U}{U}\right\| \leq 5\%$

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
<u>Sub-group C3</u> Combined sample of specimens of Sub-groups C3A and C3B 6.23 Climatic sequence - Dry heat - Damp heat, cyclic, Test Db, first cycle - Cold - Damp heat, cyclic, Test Db, remaining cycles - Final measurement	D	 (Low air pressure test not applicable) IEC 60068-2-2,Test Ba 16±2h, T = 85±2°C; IEC 60068-2-30,Test Db 24h, T = 55±2°C; IEC 60068-2-1,Test Aa 2h, T = -40±3°C; IEC 60068-2-30,Test Db 24h, T = 55±2°C; Visual examination Voltage at specified current	12	13	1	 No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$
<u>Sub-group C4</u> 6.26 Endurance at upper category temperature	D	 T = 85±2°C, Duration: 1000 h V = Max. continuous a.c. voltage. See table 1 (rms). Examination at 48 h, 500 h and 1000 h: Visual examination Voltage at specified current Examination at 1000 h: Voltage at class current	12	13	1	 No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$ 1,1 x the initial limit

Sub-clause number and Test (see Note 1)	D or ND	Conditions of test (see Note 1)	Sample size & criterion of acceptability (see Note 3) p	n	c	Performance requirements (see Note 1)
GROUP D INSPECTION						
Sub-group D1	D		24	8	1	
6.24 Damp heat, steady state		IEC 60068-2-78, Test Ca T = 40±2°C, RH = 93(+2/-3)%, 56d 4 specimens: No voltage applied Other 4 specimens: Applied voltage: 10% of the max. d.c. voltage Visual examination Voltage at specified current				No visible damage Legible marking $\left\|\frac{\Delta U}{U}\right\| \leq 10\%$
Sub-group D2	ND		24	8	1	
6.4.4 Dimensions (detail)		Measuring dimensions: l, w, h, AL, X				As specified in 1.2.1 of this specification
6.6 Temperature coefficient of the Varistor Voltage (if applicable)		At specified current At following temperatures: 25°C; -40 (LCT) (+3/-0°C); 25°C; and 85 (UCT) (+0/-3°C)				As specified in 1.2.2 of this specification $\frac{U_{25°C} - U_{LCT}}{\Delta T} \cdot \frac{100\%}{U_{25°C}} \leq 0{,}09\%K^{-1}$ $\frac{U_{25°C} - U_{UCT}}{\Delta T} \cdot \frac{100\%}{U_{25°C}} \leq 0{,}09\%K^{-1}$
Sub-group D3	D		24	5	0	
6.25 Fire hazard (Needle flame test)		IEC 60695-11-5 Severity: Vertical 10 s				Duration of burning: 5 s max.