

SIOV metal oxide varistors

SMD varistors for automotive applications, CU
types

Series/Type: B726*

Date: November 2025

SMD
Type designation system for SMD disk varistor automotive series

CU	4032	K	14	AUTO	G2
Construction: CU \triangleq Encapsulated chip					
Case sizes: 3225 \triangleq 32 x 25 4032 \triangleq 40 x 32					
Varistor voltage tolerance: K \triangleq $\pm 10\%$					
Maximum RMS operating voltage (V_{RMS}): 14 \triangleq 14 V 17 \triangleq 17 V 30 \triangleq 30 V					
Automotive series					
Taping mode: G2 \triangleq Taped, 330-mm reel					



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Construction

- Cylindrical varistor element, encapsulated.
- Encapsulation: thermoplastic, flame-retardant to UL 94 V-0.
- Termination: tinned copper alloy, suitable for lead-free wave and reflow soldering, and compatible with tin/lead solder.

Features

- 12 V and 24 V supply systems
- High energy absorption capability
- SMD plastic package
- No temperature derating up to 85 °C
- RoHS-compatible
- Suitable for lead-free soldering
- PSpice simulation modeling available for different pulses

Approvals

- UL approved

Delivery mode

- Blister tape, 330-mm reel
- Packing unit: 1000 pcs.

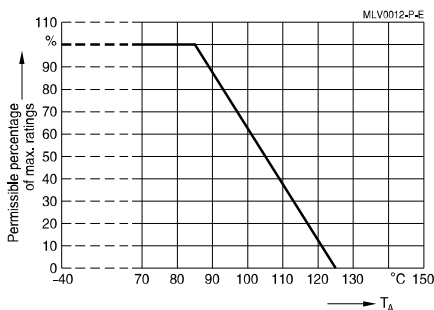
V/I characteristics and derating curves

V/I and derating curves are attached to the data sheet. The curves are sorted by V_{RMS} and then by case size, which is included in the type designation.

General technical data

Maximum RMS operating voltage		V_{RMS}	14 ... 30	V
Maximum DC operating voltage		V_{DC}	16 ... 34	V
Maximum surge current	(8/20 μ s)	i_{max}	100 ... 250	A
Maximum load dump energy	(10 pulses)	W_{LD}	6 ... 12	J
Maximum jump start voltage	(5 min)	V_{jump}	25 ... 50	V
Maximum energy absorption	(2 ms)	W_{max}	400 ... 2000	mJ
Maximum clamping voltage	(8/20 μ s)	$V_{c,max}$	43 ... 93	V
Operating temperature			-40/+85	°C
Storage temperature			-40/+125	°C

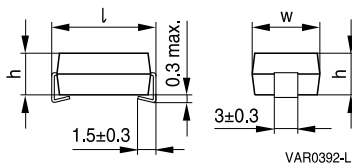

Temperature derating

 Climatic category: $-40/+85\text{ }^{\circ}\text{C}$

Electrical specifications and ordering codes
Maximum ratings ($T_A = 85\text{ }^{\circ}\text{C}$)

Type	Ordering code	V_{RMS} V	V_{DC} V	i_{max} (8/20 μs) A	W_{max} (2 ms) mJ	W_{LD} (10 pulses) J	P_{max} mW
CU3225K14AUTOG2	B72650M1140K072	14	16	100	400	6	10
CU4032K14AUTOG2	B72660M1140K072	14	16	250	900	12	20
CU3225K17AUTOG2	B72650M1170K072	17	20	100	500	6	10
CU4032K17AUTOG2	B72660M1170K072	17	20	250	1100	12	20
CU3225K30AUTOG2	B72650M1300K072	30	34	100	900	6	10
CU4032K30AUTOG2	B72660M1300K072	30	34	250	2000	12	20

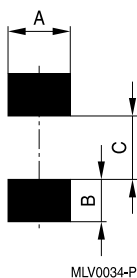
Characteristics ($T_A = 25\text{ }^{\circ}\text{C}$)

Type	V_V (1 mA) V	ΔV_V %	V_{jump} (5 min) V	$V_{\text{c,max}}$ V	I_c (8/20 μs) A	C_{typ} (1 kHz, 1 V) pF
CU3225K14AUTOG2	22	± 10	25	43	1	1400
CU4032K14AUTOG2	22	± 10	25	43	2.5	2300
CU3225K17AUTOG2	27	± 10	30	53	1	1200
CU4032K17AUTOG2	27	± 10	30	53	2.5	1900
CU3225K30AUTOG2	47	± 10	50	93	1	600
CU4032K30AUTOG2	47	± 10	50	93	2.5	1100


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Dimensional drawing


Dimensions in mm

Chip size EIA in mm	$V_{RMS,max}$	l	w	h
3225	14, 17, 30	8.0 ± 0.3	6.3 ± 0.3	3.2 ± 0.3
4032	14, 17, 30	10.2 ± 0.3	8.0 ± 0.3	3.2 ± 0.3

Recommended solder pad layout


Dimensions in mm

Chip size EIA in mm	A	B	C
3225	3.50	2.80	4.50
4032	3.50	2.80	6.50

Delivery mode

EIA case size	Taping	Reel size mm	Packing unit pcs.	Type	Ordering code
3225	Blister	330	1000	CU3225K14AUTOG2	B72650M1140K072
3225	Blister	330	1000	CU3225K17AUTOG2	B72650M1170K072
3225	Blister	330	1000	CU3225K30AUTOG2	B72650M1300K072
4032	Blister	330	1000	CU4032K14AUTOG2	B72660M1140K072
4032	Blister	330	1000	CU4032K17AUTOG2	B72660M1170K072
4032	Blister	330	1000	CU4032K30AUTOG2	B72660M1300K072


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Reliability data

Test	Test methods/conditions	Requirement
Varistor voltage	The voltage between two terminals with the specified measuring current applied is called V_V (1 mA _{DC} @ 0.2 ... 2 s).	To meet the specified value
Clamping voltage	The maximum voltage between two terminals with the specified standard impulse current (8/20 μs) applied.	To meet the specified value
Endurance at upper category temperature	100 h at UCT After having continuously applied the maximum allowable AC voltage at UCT ±2 °C for 1000 h, the specimen shall be stored at room temperature and normal humidity for 1 to 2 h. Thereafter, the change of V_V shall be measured.	$ \Delta V/V$ (1 mA) ≤10%
Load dump	ISO 7637-2 Number of pulses: 10 Pulse interval: 60 s Pulse duration: 500 ms	$ \Delta V/V$ (1 mA) ≥-15% No visible damage
Jump start	$V_{DC, load} = V_{jump}$; 5 min duration 14 V (S...K14AUTO...); $V_{jump} = 25$ V 17 V (S...K17AUTO...); $V_{jump} = 30$ V 30 V (S...K30AUTO...); $V_{jump} = 45$ V	$ \Delta V/V$ (1 mA) ≥-15% No visible damage
Fast temperature cycling	IEC 60068-2-14, test Na, LCT/UCT, dwell time 15 min, 100 cycles	$ \Delta V/V$ (1 mA) ≤5% No visible damage
Damp heat	IEC 60068-2-67, test Cy, 85 °C, 85% r. H., V_{DC} , 1000 h	$ \Delta V/V$ (1 mA) ≤10% No visible damage
Substrate bending test	IEC 60068-2-21, test Ue1 Deflection = 2 mm t = 60 s	$ \Delta V/V$ (1 mA) ≤10% No visible damage
Shear test	IEC 60068-2-21, test Ue3 Force = 5 N t = 10 ±1 s	$ \Delta V/V$ (1 mA) ≤10% No visible damage

Note:

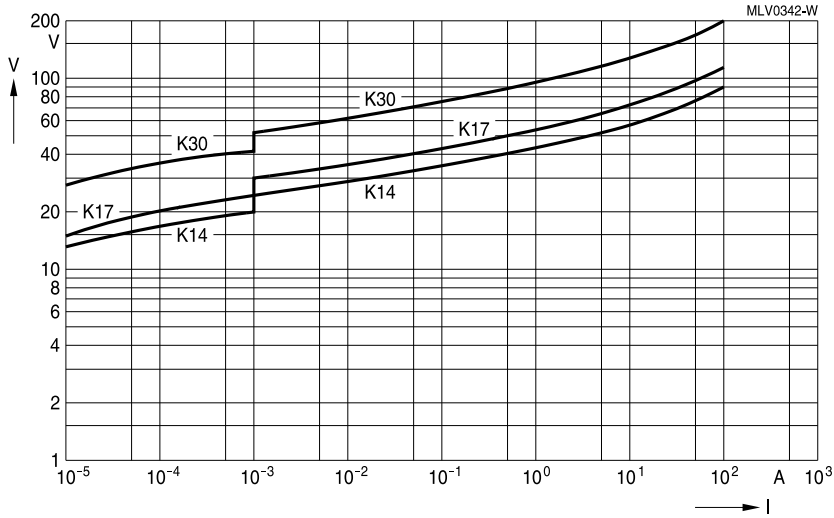
UCT = Upper category temperature

LCT = Lower category temperature

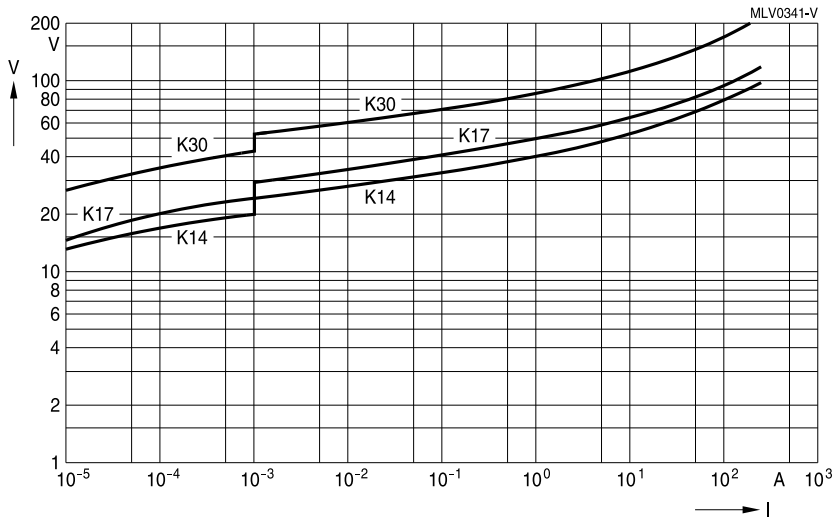


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V/I characteristics



CU3225 ... AUTOG2



CU4032 ... AUTOG2

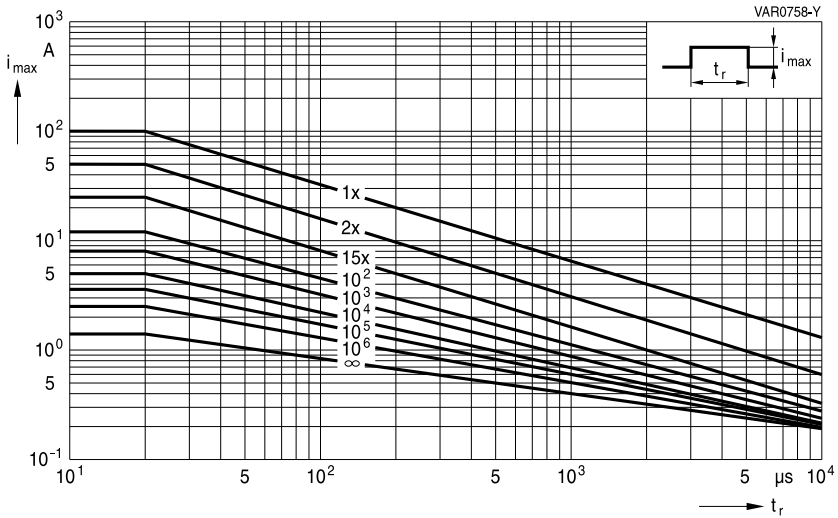


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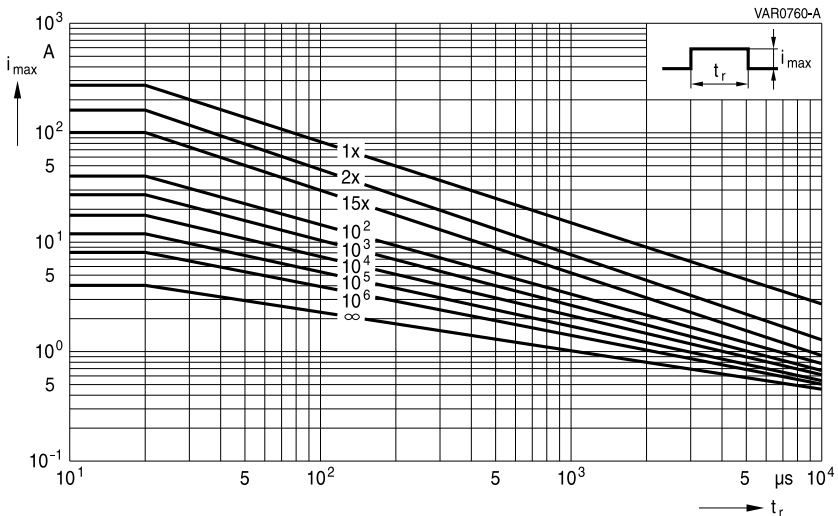
Derating curves

Maximum surge current $I_{surge,max} = f(t_r, \text{pulse train})$

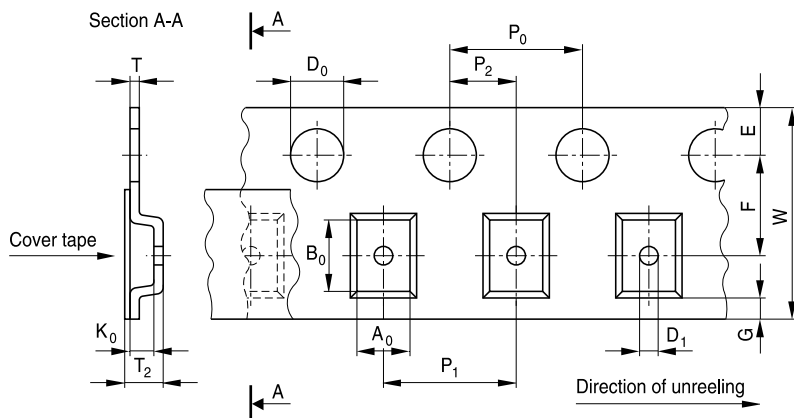
For explanation of the derating curves refer to "General technical information", chapter 2.7.2



CU3225K14AUTOG2 ... K30AUTOG2



CU4032K14AUTOG2 ... K30AUTOG2


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Taping and packing for CU varistors
Blister tape (taping to IEC 60286-3)


KKE0053-C-E

Dimensions in mm

	Symbol	Case size		Tolerance
		3225	4032	
Compartment width	A_0	7.0	8.6	± 0.20
Compartment length	B_0	8.70	10.6	± 0.20
Thickness cover tape	K_0	5.00		max.
Overall thickness	T_2	5.50		max.
Thickness tape	T	0.30		max.
Sprocket hole diameter	D_0	1.50		$+0.10/-0$
Sprocket hole diameter	D_1	1.50		min.
Sprocket hole pitch	P_0	4.00		$\pm 0.10^{1)}$
Distance center hole to center compartment	P_2	2.00		± 0.05
Pitch of the component compartments	P_1	12.00		± 0.10
Tape width	W	16.00		± 0.30
Distance edge to center of hole	E	1.75		± 0.10
Distance center hole to center compartment	F	7.50		± 0.05
Distance compartment to edge	G	0.75		min.

 1) ≤ 0.2 mm over 10 sprocket holes



SMD varistors (CU types)

B726*

Automotive series

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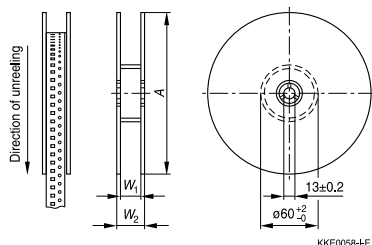
Additional taping information

Reel material	Polystyrol (PS)
Tape material	Polystyrol (PS) or Polycarbonat (PC), PVC or PET
Tape break force	min. 10 N
Top cover tape strength	min. 10 N
Tape peel angle	Angle between top cover tape and the direction of feed during peel off: 165° to 180°
Cavity play	Each part rests in the cavity so that the angle between the part and cavity center line is no more than 20°

Reel packing

Packing material: Plastic

Dimensions in mm

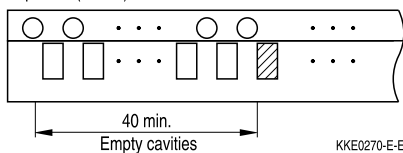


		Dimension	Tolerance
Reel diameter	A	330	+0/-2.0
Reel width (inside)	W ₁	16.4	+1.5/-0
Reel width (outside)	W ₂	22.4	max.

Packing unit: 1000 pcs./ reel

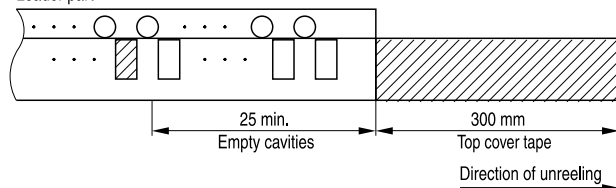
Leader, trailer

Tape end (Trailer)



KKE0270-E-E

Leader part



KKE0289-Q-E



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Cautions and warnings

General

1. TDK metal oxide varistors are designed for specific applications and should not be used for purposes not identified in our specifications, application notes and data books unless otherwise agreed with TDK Electronics during the design-in-phase.
2. Ensure suitability of SIOVs through reliability testing during the design-in phase. SIOVs should be evaluated taking into consideration worst-case conditions.
3. For applications of SIOVs in line-to-ground circuits based on various international and local standards there are restrictions existing or additional safety measures required.

Storage

1. Store SIOVs only in original packaging. Do not open the package prior to processing.
2. Recommended storage conditions in original packaging:
 Storage temperature: $-25\text{ }^{\circ}\text{C} \dots +45\text{ }^{\circ}\text{C}$,
 Relative humidity: $<75\%$ annual average,
 $<95\%$ on maximum 30 days a year.
 Dew precipitation: is to be avoided.
3. Avoid contamination of an SIOV's during storage, handling and processing.
4. Avoid storage of SIOVs in harmful environments that can affect the function during long-term operation (examples given under operation precautions).
5. The SIOV type series should be soldered after shipment from TDK Electronics within the time specified:

SIOV-S, -Q, -LS, -B, -SNF	24 months
ETFV/ T series, -CU	12 months.

Handling

1. SIOVs must not be dropped.
2. Components must not be touched with bare hands. Gloves are recommended.
3. Avoid contamination of the surface of SIOV electrodes during handling, be careful of the sharp edge of SIOV electrodes.

Soldering (where applicable)

1. Use rosin-type flux or non-activated flux.
2. Insufficient preheating may cause ceramic cracks.
3. Rapid cooling by dipping in solvent is not recommended.
4. Complete removal of flux is recommended.
5. Temperatures of all preheat stages and the solder bath must be strictly controlled especially for T series (T14 and T20).



SMD varistors (CU types)

B726*

Automotive series

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Mounting

1. Potting, sealing or adhesive compounds can produce chemical reactions in the SIOV ceramic that will degrade the component's electrical characteristics.
2. Overloading SIOVs may result in ruptured packages and expulsion of hot materials. For this reason SIOVs should be physically shielded from adjacent components.

Operation

1. Use SIOVs only within the specified temperature operating range.
2. Use SIOVs only within the specified voltage and current ranges.
3. Environmental conditions must not harm SIOVs. Use SIOVs only in normal atmospheric conditions. Avoid use in deoxidizing gases (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas etc), corrosive agents, humid or salty conditions. Contact with any liquids and solvents should be prevented.

Display of ordering codes for TDK Electronics products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under www.tdk-electronics.tdk.com/orderingcodes.


SMD
Symbols and terms

Symbol	Term
C	Capacitance
C_{typ}	Typical capacitance
i	Current
i_c	Current at which $V_{c, max}$ is measured
I_{leak}	Leakage current
i_{max}	Maximum surge current (also termed peak current)
I_{max}	Maximum discharge current
I_n	Nominal discharge current to UL 1449
LCT	Lower category temperature
L_{typ}	Typical inductance
P_{max}	Maximum average power dissipation
R_{ins}	Insulation resistance
R_{min}	Minimum resistance
T_A	Ambient temperature
t_r	Duration of equivalent rectangular wave
UCT	Upper category temperature
v	Voltage
V_{clamp}	Clamping voltage
$V_{c, max}$	Maximum clamping voltage at specified current i_c
V_{DC}	DC operating voltage
V_{jump}	Maximum jump start voltage
V_{max}	Maximum voltage
V_{op}	Operating voltage
V_{RMS}	AC operating voltage, root-mean-square value
$V_{RMS, op, max}$	Root-mean-square value of max. DC operating voltage incl. ripple current
V_{surge}	Super imposed surge voltage
V_V	Varistor voltage
ΔV_V	Tolerance of varistor voltage
W_{LD}	Maximum load dump
W_{max}	Maximum energy absorption
e	Lead spacing

All dimensions are given in mm.

The commas used in numerical values denote decimal points.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.tdk-electronics.tdk.com/material). Should you have any more detailed questions, please contact our sales offices.
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6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.

Important notes

7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard.**
The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements (“CSR”) TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System.** For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
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Release 2024-02