Metal oxide varistor

EnergetiQ series

Series/Type:	**Q14K510**
Ordering code:	**B72214Q0511K101**
Date:	2007-09-05
Version:	b

Applications

Overvoltage protection

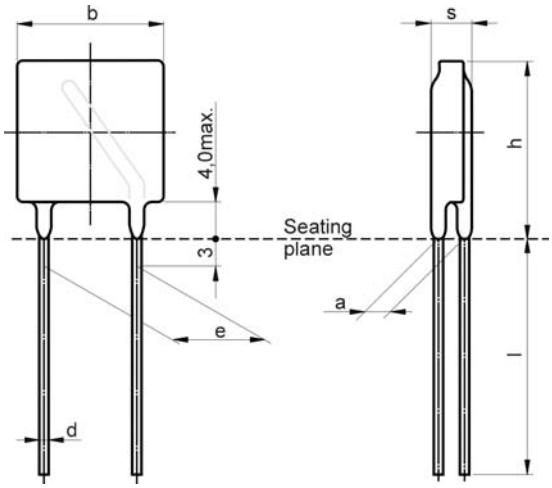
Features

- UL approval to UL1449 (file number E97877)

Nomenclature

Q	=	EnergetiQ™ series
14	=	Rated disk diameter
K	=	Tolerance of V_V at 1 mA : ±10%
510	=	Max. AC voltage

Dimensional drawings in mm



b_{max}	=	16.5
h_{max}	=	19.5
s_{max}	=	8.6
e	=	10.0 ±1.0
a	=	4.6 ±1.0
l_{min}	=	25.0
∅d	=	1.0 ±0.05

[1] seating plane in accordance with IEC 60717

Electrical data

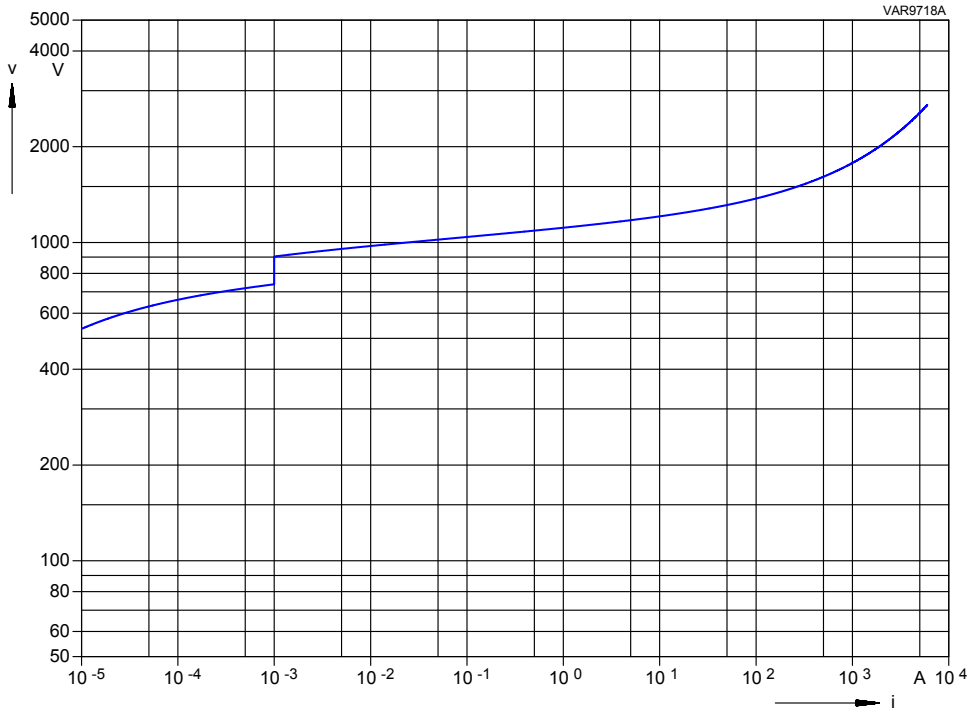
Maximum Ratings (85 °C)

Max. operating AC voltage		V_{RMS}	=	510 V
Max. operating DC voltage		V_{DC}	=	670 V
Surge current (8/20 µs)	1 time	I_{max}	=	6000 A
Energy absorption (2 ms)	1 time	W_{max}	=	240.0 J
Average power dissipation		P_{max}	=	0.80 W

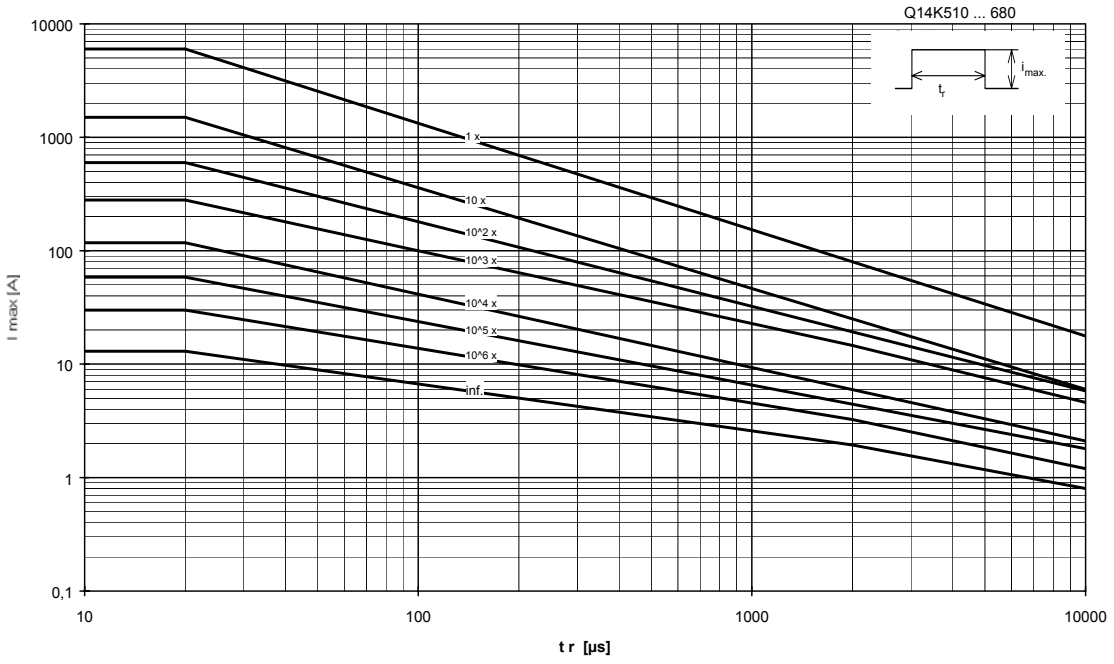
Characteristics (25 °C)

Varistor voltage at 1 mA	V_V	=	820 V ±10%
Clamping voltage at 65 A (8/20 µs)	$V_{C,max}$	=	1355 V
Typ. capacitance at 1 kHz	C	=	260 pF

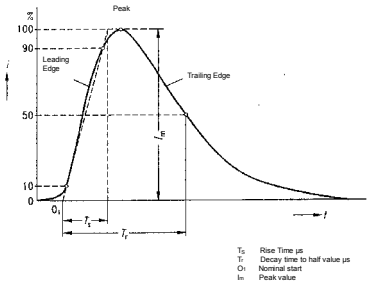
v/i characteristic



Derating



Reliability data, electrical

Characteristics	Test Methods/Description	Specifications
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) illustrated below applied. 	To meet the specified value.
Surge current derating, 8/20 µs	100 surge currents (8/20 µs), unipolar, interval 30 s, amplitude corresponding to derating curve for 20 µs	| Δ V/V (1 mA) | ≤ 10% (measured in direction of surge current) No visible damage
Surge current derating, 2 ms	100 surge currents (2ms), unipolar, interval 120 s, amplitude corresponding to derating curve for 2 ms	| Δ V/V (1 mA) | ≤ 10% (measured in direction of surge current) No visible damage

Reliability data, mechanical

Characteristics	Test Methods/Description	Specifications
Tensile strength	After gradually applying the force specified below and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage. Terminal diameter — Force 0.5 mm — 5 N 0.6 mm — 10 N 0.8 mm — 10 N 1.0 mm — 20 N	| Δ V/V (1 mA) | ≤ 5% No break of solder joint, no wire break
Vibration	After repeatedly applying a single harmonic vibration according to the table below. Thereafter, the unit shall be visually examined. frequency range: 10 ... 55 Hz amplitude: 0.75 mm or 98 m/s² duration: 6 h (3 x 2 h) pulse: sine wave	| Δ V/V (1 mA) | ≤ 5% No visible damage
Solderability	After dipping the terminals to a depth of approximately 3 mm from the body in a lead-free soldering bath at 245 °C for 5 seconds, the terminals shall be visually examined.	The inspection shall be carried out under adequate light with normal eyesight or with the assistance of a magnifier capable of giving a magnification of 4 times to 10 times. The dipped surface shall be covered with a smooth and bright solder coating with no more than small amounts of scattered imperfections such as pinholes or un-wetted or de-wetted areas. These imperfections shall not be concentrated in one area.

Characteristics	Test Methods/Description	Specifications
Resistance to soldering heat	Each lead shall be dipped into a solder bath having a temperature of 260 ± 5 °C to a point 2.0 to 2.5 mm from the body of the unit, be held there for 10 ±1 s and then be stored at room temperature and normal humidity for 1 to 2 hours. The change of V_v and mechanical damage shall be examined.	| Δ V/V (1 mA) | ≤ 5% No visible damage
Electric strength	2500 V_{RMS}, 10 s The varistor is placed in a container holding 1.6 ±0.2 mm diameter metal balls such that only the terminations of the varistor are protruding. The specified voltage shall be applied between both terminals of the specimen connected together and the electrode inserted between the metal balls.	No breakdown

Reliability data, environmental

Characteristics	Test Methods/Description	Specifications
Max. AC operating voltage	After being continuously applied the maximum allowable voltage at 85 ±2 °C for 1000 hours, the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_v shall be measured.	| Δ V/V (1 mA) | ≤ 10%
Damp heat, steady state	The specimen shall be subjected to 40 ±2 °C, 90 to 95 % r.H. for 56 days without load and then stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_v shall be measured.	| Δ V/V (1 mA) | ≤ 10%
Climatic sequence	The specimen shall be subjected to: a) dry heat at +85°C, 16 h b) damp heat, 1st cycle: 55 °C, 93% r.H., 24 h c) cold, -40 °C, 2 h d) damp heat, additional 5 cycles: 55 °C, 93% r.H., 24 h/cycle Then the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. Thereafter, the change of V_v shall be measured.	| Δ V/V (1 mA) | ≤ 10%
Fast temperature cycling	The temperature cycle shown below shall be repeated 5 times. Then the specimen shall be stored at room temperature and normal humidity for 1 to 2 hours. The change of V_v and mechanical damage shall be examined. Step / Temperature (°C) / Period (min.) 1 / -40 ±3 / 30 ±3 2 / transition time / <10 s 3 / 85 ±2 / 30 ±3	| Δ V/V (1 mA) | ≤ 5% No visible damage

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