



|                      |                                |
|----------------------|--------------------------------|
| Metal Oxide Varistor | Disc type                      |
| SIOV-Q14K625         | Ordering code: B72214Q0621K101 |

Data sheet

Form: FBLE3K/b

File name: Q14K625\_a

**MODIFICATIONS:**    New data sheet

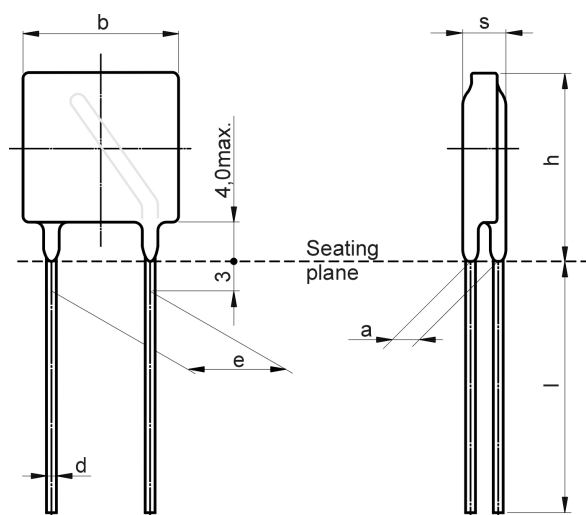
**REMARKS:**

|             |           |         |                        |           |                   |      |     |
|-------------|-----------|---------|------------------------|-----------|-------------------|------|-----|
| Prepared by | Hotwagner | Release | signed: PE / Hotwagner |           | signed: QS / Zödl |      |     |
|             |           |         | signed:                |           | signed:           |      |     |
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## SIOV nomenclature

|     |   |                                        |
|-----|---|----------------------------------------|
| Q   | = | EnergetiQ™ Series                      |
| 14  | = | Rated disk diameter                    |
| K   | = | Tolerance of $V_V$ at 1mA : $\pm 10\%$ |
| 625 | = | Max. AC voltage                        |

**Figure:** Dimensions given in Millimeters (mm)



|                 |   |                |
|-----------------|---|----------------|
| $b_{max}$       | = | 16,5           |
| $h_{max}$       | = | 19,5           |
| $s_{max}$       | = | 9,4            |
| $e$             | = | $10,0 \pm 1,0$ |
| $a$             | = | $5,3 \pm 1,0$  |
| $l_{min}$       | = | 30,0           |
| $\varnothing d$ | = | $1,0 \pm 0,05$ |

## Electrical data:

### Maximum Ratings (85°C):

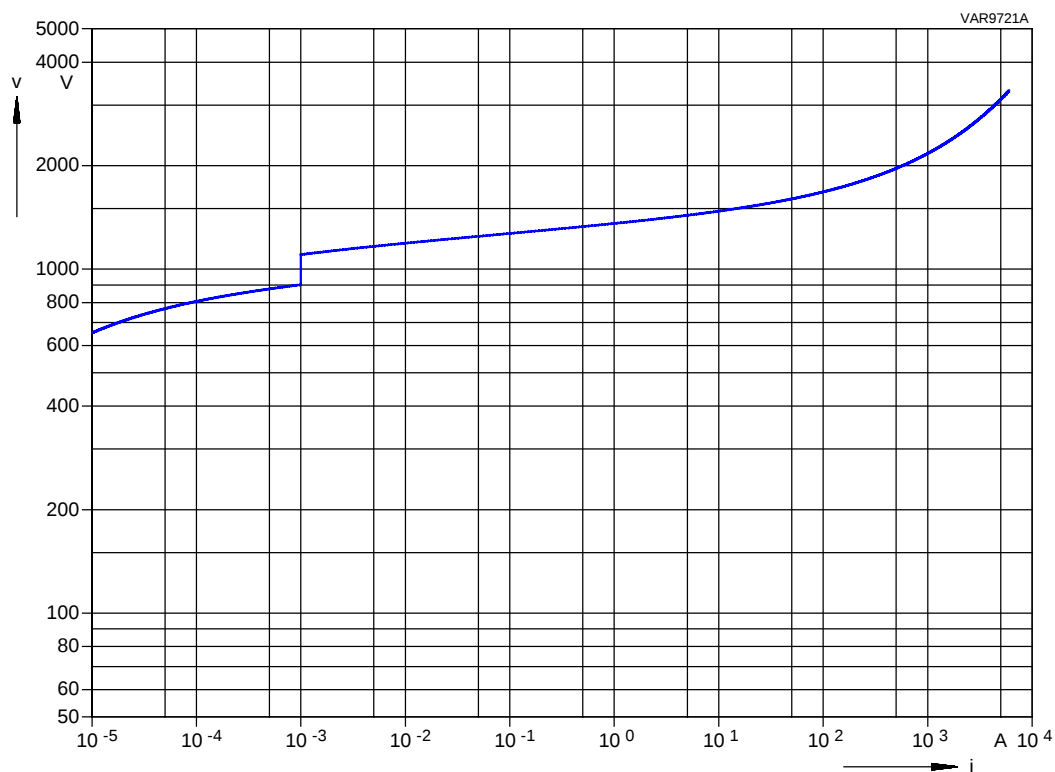
|                                     |           |   |       |
|-------------------------------------|-----------|---|-------|
| Max. operating AC voltage           | $V_{RMS}$ | = | 625V  |
| Max. operating DC voltage           | $V_{DC}$  | = | 825V  |
| Surge current (8/20 $\mu$ s) 1 time | $I_{max}$ | = | 6000A |
| Energy absorption (2ms) 1 time      | $W_{max}$ | = | 290J  |
| Average power dissipation           | $P_{max}$ | = | 0,80W |

### Characteristics (25°C):

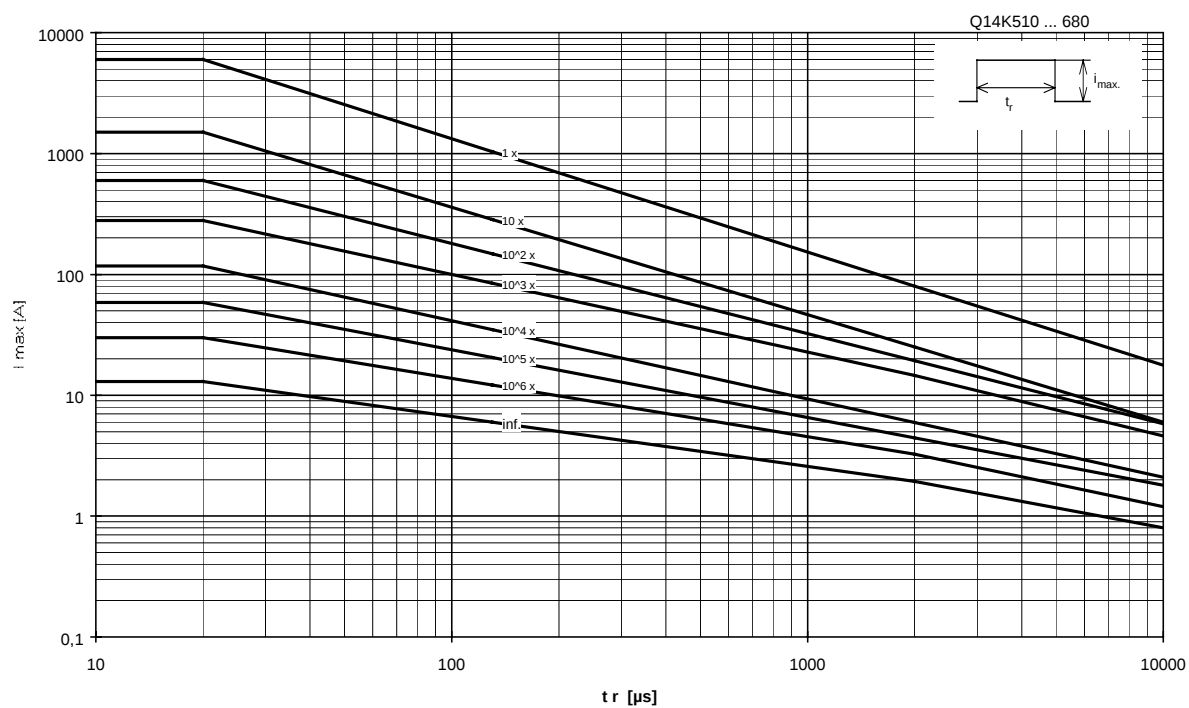
|                                        |             |   |                  |
|----------------------------------------|-------------|---|------------------|
| Varistor voltage at 1mA                | $V_V$       | = | $1000V \pm 10\%$ |
| Clamping voltage at 65A (8/20 $\mu$ s) | $V_{C,max}$ | = | 1650V            |
| Typ. capacitance at 1 kHz              | $C$         | = | 220pF            |

|            |          |       |   |           |           |      |     |
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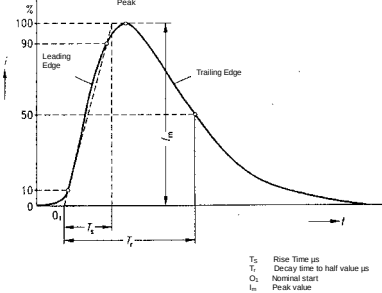
## V/I Characteristic:



## Derating:



## Reliability Data:

|                                                | Characteristics                 | Test Methods/Description                                                                                                                                                                                            | Specifications                                                                                         |
|------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| E<br>L<br>E<br>C<br>T<br>R<br>I<br>C<br>A<br>L | Varistor Voltage                | The voltage between two terminals with the specified measuring current applied is called $V_V$ (1 mA <sub>DC</sub> @ 0.2 - 2 s).                                                                                    | To meet the specified value.                                                                           |
|                                                | Clamping Voltage                | The maximum voltage between two terminals with the specified standard impulse current (8/20µs) illustrated below applied.<br><br> | 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                                                                                                          | $ \Delta V/V (1 \text{ mA})  \leq 10 \%$ (measured in direction of surge current)<br>No visible damage |
|                                                | Surge current derating, 2 ms    | 100 surge currents (2ms), unipolar, interval 120s, amplitude corresponding to derating curve for 2ms                                                                                                                | $ \Delta V/V (1 \text{ mA})  \leq 10 \%$ (measured in direction of surge current)<br>No visible damage |

|                                                                                    | Characteristics                                                                                                                                                                                                                                                                                                                                                       | Test Methods/Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Specifications           |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------|--------------------|-----------|---------------|--------|-----------|-----------------------------------------------------|--------|------|---------------------------------------------------------------------------|
| M<br><br>E<br><br>C<br><br>H<br><br>A<br><br>N<br><br>I<br><br>C<br><br>A<br><br>L | Tensile strength                                                                                                                                                                                                                                                                                                                                                      | <p>After gradually applying the force specified below and keeping the unit fixed for 10 seconds, the terminal shall be visually examined for any damage.</p> <table><tr><td><u>Terminal diameter</u></td><td><u>Force</u></td></tr><tr><td>0.5 mm</td><td>5 N</td></tr><tr><td>0.6 mm</td><td>10 N</td></tr><tr><td>0.8 mm</td><td>10 N</td></tr><tr><td>1.0 mm</td><td>20 N</td></tr></table>                                           | <u>Terminal diameter</u> | <u>Force</u> | 0.5 mm             | 5 N       | 0.6 mm        | 10 N   | 0.8 mm    | 10 N                                                | 1.0 mm | 20 N | <p>  Δ V/V (1 mA)   ≤ 5 %<br/>No break of solder joint, no wire break</p> |
|                                                                                    | <u>Terminal diameter</u>                                                                                                                                                                                                                                                                                                                                              | <u>Force</u>                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
|                                                                                    | 0.5 mm                                                                                                                                                                                                                                                                                                                                                                | 5 N                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
|                                                                                    | 0.6 mm                                                                                                                                                                                                                                                                                                                                                                | 10 N                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
|                                                                                    | 0.8 mm                                                                                                                                                                                                                                                                                                                                                                | 10 N                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
| 1.0 mm                                                                             | 20 N                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
| Vibration                                                                          | <p>After repeatedly applying a single harmonic vibration according to the table below. Thereafter, the unit shall be visually examined.</p> <table><tr><td>frequency range:</td><td>10 .... 55 Hz</td></tr><tr><td>amplitude:</td><td>0.75 mm or 98 m/s²</td></tr><tr><td>duration:</td><td>6 h (3 x 2 h)</td></tr><tr><td>pulse:</td><td>sine wave</td></tr></table> | frequency range:                                                                                                                                                                                                                                                                                                                                                                                                                         | 10 .... 55 Hz            | amplitude:   | 0.75 mm or 98 m/s² | duration: | 6 h (3 x 2 h) | pulse: | sine wave | <p>  Δ V/V (1 mA)   ≤ 5 %<br/>No visible damage</p> |        |      |                                                                           |
| frequency range:                                                                   | 10 .... 55 Hz                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
| amplitude:                                                                         | 0.75 mm or 98 m/s²                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
| duration:                                                                          | 6 h (3 x 2 h)                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
| pulse:                                                                             | sine wave                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |
| Solderability                                                                      | <p>After dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 235°C for 5 seconds, the terminals shall be visually examined.</p>                                                                                                                                                                                               | <p>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.</p> |                          |              |                    |           |               |        |           |                                                     |        |      |                                                                           |

|                                                    | Characteristics              | Test Methods/Description                                                                                                                                                                                                                                                                                                                 | Specifications                                               |
|----------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| M<br>E<br>C<br>H<br>A<br><br>N<br>I<br>C<br>A<br>L | Resistance to soldering heat | Each lead shall be dipped into a solder bath having a temperature of $260 \pm 5^{\circ}\text{C}$ to a point 2.0 to 2.5 mm from the body of the unit, be held there for $10 \pm 1$ s and then be stored at room temperature and normal humidity for 1 to 2 hours. The change of $V_v$ and mechanical damages shall be examined.           | $ \Delta V/V (1 \text{ mA})  \leq 5 \%$<br>No visible damage |
|                                                    | Electric strength            | 2500 $V_{\text{RMS}}$ , 10 s<br>The varistor is placed in a container holding 1.6 $\pm 0.2$ 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                                                 |

|               | Characteristics                    | Test Methods/Description                                                                                                                                                                                                                                                                                                                                                                                                              | Specifications                                               |                                    |               |   |             |            |   |                 |                  |   |            |            |
|---------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------|---------------|---|-------------|------------|---|-----------------|------------------|---|------------|------------|
| ENVIRONMENTAL | Max. AC operating voltage          | After being continuously applied the maximum allowable voltage at $85 \pm 2^{\circ}\text{C}$ 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.                                                                                                                                                                                | $ \Delta V/V (1 \text{ mA})  \leq 10 \%$                     |                                    |               |   |             |            |   |                 |                  |   |            |            |
|               | Damp heat, steady state            | The specimen shall be subjected to $40 \pm 2^{\circ}\text{C}$ , 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.                                                                                                                                                                                                 | $ \Delta V/V (1 \text{ mA})  \leq 10 \%$                     |                                    |               |   |             |            |   |                 |                  |   |            |            |
|               | Climatic sequence                  | The specimen shall be subjected to:<br>a) dry heat at $+85^{\circ}\text{C}$ , 16 h<br>b) damp heat, 1st cycle: $55^{\circ}\text{C}$ , 93 % r.H., 24 h<br>c) cold, $-40^{\circ}\text{C}$ , 2 h<br>d) damp heat, additional<br>5 cycles: $55^{\circ}\text{C}$ , 93 % r.H., 24 h/cycle<br>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. | $ \Delta V/V (1 \text{ mA})  \leq 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.                                                                                                                                                                                                                 | $ \Delta V/V (1 \text{ mA})  \leq 5 \%$<br>No visible damage |                                    |               |   |             |            |   |                 |                  |   |            |            |
|               |                                    | <table><tr><th>Step</th><th>Temperature (<math>^{\circ}\text{C}</math>)</th><th>Period (min.)</th></tr><tr><td>1</td><td><math>-40 \pm 3</math></td><td><math>30 \pm 3</math></td></tr><tr><td>2</td><td>transition time</td><td><math>&lt; 10 \text{ s}</math></td></tr><tr><td>3</td><td><math>85 \pm 2</math></td><td><math>30 \pm 3</math></td></tr></table>                                                                      | Step                                                         | Temperature ( $^{\circ}\text{C}$ ) | Period (min.) | 1 | $-40 \pm 3$ | $30 \pm 3$ | 2 | transition time | $< 10 \text{ s}$ | 3 | $85 \pm 2$ | $30 \pm 3$ |
| Step          | Temperature ( $^{\circ}\text{C}$ ) | Period (min.)                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                              |                                    |               |   |             |            |   |                 |                  |   |            |            |
| 1             | $-40 \pm 3$                        | $30 \pm 3$                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |                                    |               |   |             |            |   |                 |                  |   |            |            |
| 2             | transition time                    | $< 10 \text{ s}$                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |                                    |               |   |             |            |   |                 |                  |   |            |            |
| 3             | $85 \pm 2$                         | $30 \pm 3$                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |                                    |               |   |             |            |   |                 |                  |   |            |            |

**Note:** More details can be found in the data book 'SIOV Metal Oxide Varistors', Ordering No. EPC: 62002-7600

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