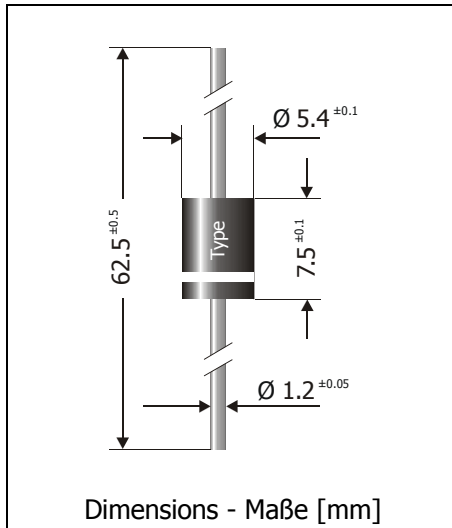


## 1.5KE6.8 ... 1.5KE440CA

### Unidirectional and bidirectional Transient Voltage Suppressor Diodes Unidirectionale und bidirectionale Spannungs-Begrenzer-Dioden

Version 2006-05-10



|   |                  |
|---|------------------|
| Peak pulse power dissipation<br>Maximale Verlustleistung                              | 1500 W           |
| Standard breakdown voltage range<br>Standard Abbruch-Spannungsbereich                 | 6.8...440 V      |
| Plastic case<br>Kunststoffgehäuse   | Ø 5.4 x 7.5 [mm] |
| Weight approx.<br>Gewicht ca.   | 1.0 g            |
| Plastic material has UL classification 94V-0<br>Gehäusematerial UL94V-0 klassifiziert |                  |
| Standard packaging taped in ammo pack<br>Standard Lieferform gegurtet in Ammo-Pack    |                  |



For bidirectional types (suffix "C" or "CA"), electrical characteristics apply in both directions.  
Für bidirektionale Dioden (Suffix "C" oder "CA") gelten die elektrischen Werte in beiden Richtungen.

#### Maximum ratings and Characteristics

#### Grenz- und Kennwerte

|  |                          |   |  |
|--|--------------------------|---|--|
| Peak pulse power dissipation (10/1000 µs waveform)<br>Impuls-Verlustleistung (Strom-Impuls 10/1000 µs) | $T_A = 25^\circ\text{C}$ | $P_{PPM}$   | 1500 W <sup>1)</sup>   |
| Steady state power dissipation<br>Verlustleistung im Dauerbetrieb                                      | $T_A = 75^\circ\text{C}$ | $P_{M(AV)}$   | 6.5 W <sup>2)</sup>  |
| Peak forward surge current, 60 Hz half sine-wave<br>Stoßstrom für eine 60 Hz Sinus-Halbwelle           | $T_A = 25^\circ\text{C}$ | $I_{FSM}$   | 200 A <sup>3)</sup>  |
| Max. instantaneous forward voltage<br>Augenblickswert der Durchlass-Spannung                           | $I_F = 100\text{ A}$     | $V_{BR} \leq 200\text{ V}$<br>$V_{BR} > 200\text{ V}$ | $V_F < 3.5\text{ V}$ <sup>3)</sup><br>$V_F < 5\text{ V}$ <sup>3)</sup> |
| Junction temperature – Sperrschichttemperatur  |                          | $T_j$   | -50...+175°C   |
| Storage temperature – Lagerungstemperatur  |                          | $T_s$   | -50...+175°C   |
| Thermal resistance junction to ambient air<br>Wärmewiderstand Sperrschicht – umgebende Luft            |                          | $R_{thA}$   | < 19 K/W <sup>2)</sup>   |
| Thermal resistance junction to terminal<br>Wärmewiderstand Sperrschicht – Anschluss                    |                          | $R_{thT}$   | < 8 K/W  |

1 Non-repetitive pulse see curve  $I_{pp} = f(t_r)$  /  $P_{pp} = f(t_r)$

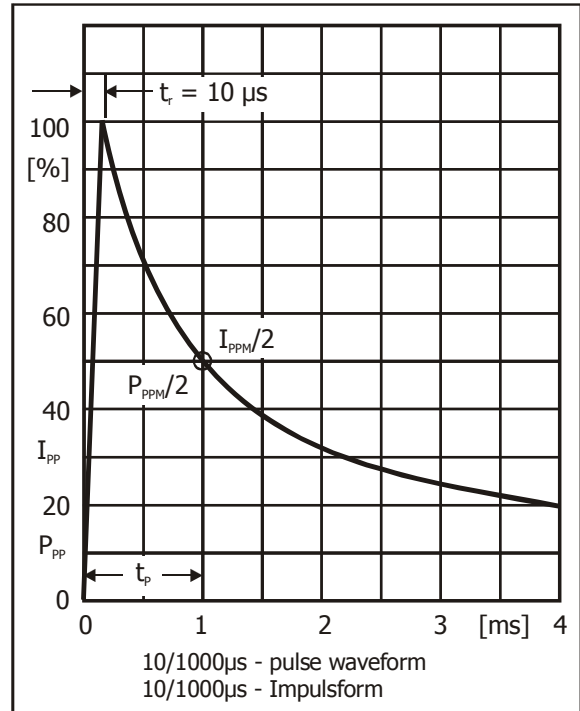
Höchstzulässiger Spitzenwert eines einmaligen Impulses, siehe Kurve  $I_{pp} = f(t_r)$  /  $P_{pp} = f(t_r)$

2 Valid, if leads are kept at ambient temperature at a distance of 10 mm from case  
Gültig, wenn die Anschlussdrähte in 10 mm Abstand von Gehäuse auf Umgebungstemperatur gehalten werden

3 Unidirectional diodes only – Nur für unidirektionale Dioden

| Maximum ratings |   |                | Grenzwerte                         |   |  |               |
|-----------------|---|----------------|------------------------------------|---|--|---------------|
| Type<br>Typ     | Breakdown voltage at $I_T = 1$ mA<br>Abbruch-Spannung bei $I_T = 1$ mA<br>*) at / bei $I_T = 10$ mA |                | Stand-off voltage<br>Sperrspannung | Max. rev. current<br>Max. Sperrstrom<br>at / bei $V_{WM}$ | Max. clamping voltage<br>Max. Begrenzer-Spannung<br>at / bei $I_{PPM}$ (10/1000 $\mu$ s) |               |
|                 | $V_{BR}$ [V]  |                | $V_{WM}$ [V]                       | $I_D$ [ $\mu$ A]  | $V_C$ [V]  | $I_{PPM}$ [A] |
| 1.5KE6.8        | 6.8 $\pm$ 10%   | 6.12...7.48 *) | 5.5                                | 1000  | 10.8   | 145           |
| 1.5KE6.8A       | 6.8 $\pm$ 5%  | 6.45...7.14 *) | 5.8                                | 1000  | 10.5   | 150           |
| 1.5KE7.5        | 7.5 $\pm$ 10%   | 6.75...8.25 *) | 6.0                                | 500   | 11.7   | 134           |
| 1.5KE7.5A       | 7.5 $\pm$ 5%  | 7.13...7.88 *) | 6.4                                | 500   | 11.3   | 139           |
| 1.5KE8.2        | 8.2 $\pm$ 10%   | 7.38...9.02 *) | 6.6                                | 200   | 12.5   | 126           |
| 1.5KE8.2A       | 8.2 $\pm$ 5%  | 7.79...8.61 *) | 7.0                                | 200   | 12.1   | 130           |
| 1.5KE9.1        | 9.1 $\pm$ 10%   | 8.19...10.0    | 7.3                                | 50  | 13.8   | 114           |
| 1.5KE9.1A       | 9.1 $\pm$ 5%  | 8.65...9.55    | 7.7                                | 50  | 13.4   | 117           |
| 1.5KE10         | 10 $\pm$ 10%  | 9.0...11.0     | 8.1                                | 10  | 15.0   | 105           |
| 1.5KE10A        | 10 $\pm$ 5%   | 9.5...10.5     | 8.5                                | 10  | 14.5   | 108           |
| 1.5KE11         | 11 $\pm$ 10%  | 9.9...12.1     | 8.9                                | 5   | 16.2   | 97            |
| 1.5KE11A        | 11 $\pm$ 5%   | 10.5...11.6    | 9.4                                | 5   | 15.6   | 100           |
| 1.5KE12         | 12 $\pm$ 10%  | 10.8...13.2    | 9.7                                | 5   | 17.3   | 91            |
| 1.5KE12A        | 12 $\pm$ 5%   | 11.4...12.6    | 10.2                               | 5   | 16.7   | 94            |
| 1.5KE13         | 13 $\pm$ 10%  | 11.7...14.3    | 10.5                               | 5   | 19.0   | 82            |
| 1.5KE13A        | 13 $\pm$ 5%   | 12.4...13.7    | 11.1                               | 5   | 18.2   | 86            |
| 1.5KE15         | 15 $\pm$ 10%  | 13.5...16.5    | 12.1                               | 5   | 22.0   | 71            |
| 1.5KE15A        | 15 $\pm$ 5%   | 14.3...15.8    | 12.8                               | 5   | 21.2   | 74            |
| 1.5KE16         | 16 $\pm$ 10%  | 14.4...17.6    | 12.9                               | 5   | 23.5   | 67            |
| 1.5KE16A        | 16 $\pm$ 5%   | 15.2...16.8    | 13.6                               | 5   | 22.5   | 70            |
| 1.5KE18         | 18 $\pm$ 10%  | 16.2...19.8    | 14.5                               | 5   | 26.5   | 59            |
| 1.5KE18A        | 18 $\pm$ 5%   | 17.1...18.9    | 15.3                               | 5   | 25.2   | 60            |
| 1.5KE20         | 20 $\pm$ 10%  | 18.0...22.0    | 16.2                               | 5   | 29.1   | 54            |
| 1.5KE20A        | 20 $\pm$ 5%   | 19.0...21.0    | 17.1                               | 5   | 27.7   | 56            |
| 1.5KE22         | 22 $\pm$ 10%  | 19.8...24.2    | 17.8                               | 5   | 31.9   | 49            |
| 1.5KE22A        | 22 $\pm$ 5%   | 20.9...23.1    | 18.8                               | 5   | 30.6   | 51            |
| 1.5KE24         | 24 $\pm$ 10%  | 21.6...26.4    | 19.4                               | 5   | 34.7   | 45            |
| 1.5KE24A        | 24 $\pm$ 5%   | 22.8...25.2    | 20.5                               | 5   | 33.2   | 47            |
| 1.5KE27         | 27 $\pm$ 10%  | 24.3...29.7    | 21.8                               | 5   | 39.1   | 40            |
| 1.5KE27A        | 27 $\pm$ 5%   | 25.7...28.4    | 23.1                               | 5   | 37.5   | 42            |
| 1.5KE30         | 30 $\pm$ 10%  | 27.0...30.0    | 24.3                               | 5   | 43.5   | 36            |
| 1.5KE30A        | 30 $\pm$ 5%   | 28.5...31.5    | 25.6                               | 5   | 41.4   | 38            |
| 1.5KE33         | 33 $\pm$ 10%  | 29.7...36.3    | 26.8                               | 5   | 47.7   | 33            |
| 1.5KE33A        | 33 $\pm$ 5%   | 31.4...34.7    | 28.2                               | 5   | 45.7   | 34            |
| 1.5KE36         | 36 $\pm$ 10%  | 32.4...39.6    | 29.1                               | 5   | 52.0   | 30            |
| 1.5KE36A        | 36 $\pm$ 5%   | 34.2...37.8    | 30.8                               | 5   | 49.9   | 31            |
| 1.5KE39         | 39 $\pm$ 10%  | 35.1...42.9    | 31.6                               | 5   | 56.4   | 27            |
| 1.5KE39A        | 39 $\pm$ 5%   | 37.1...41.0    | 33.3                               | 5   | 53.9   | 29            |
| 1.5KE43         | 43 $\pm$ 10%  | 38.7...47.3    | 34.8                               | 5   | 61.9   | 25            |
| 1.5KE43A        | 43 $\pm$ 5%   | 40.9...45.2    | 36.8                               | 5   | 59.3   | 26            |
| 1.5KE47         | 47 $\pm$ 10%  | 42.3...51.7    | 38.1                               | 5   | 67.8   | 23            |
| 1.5KE47A        | 47 $\pm$ 5%   | 44.7...49.4    | 40.2                               | 5   | 64.8   | 24            |
| 1.5KE51         | 51 $\pm$ 10%  | 45.9...56.1    | 41.3                               | 5   | 73.5   | 21            |
| 1.5KE51A        | 51 $\pm$ 5%   | 48.5...53.6    | 43.6                               | 5   | 70.1   | 22            |

| Maximum ratings |   |             |                                    | Grenzwerte  |  |               |
|-----------------|---|-------------|------------------------------------|---|--|---------------|
| Type<br>Typ     | Breakdown voltage at $I_T = 1$ mA<br>Abbruch-Spannung bei $I_T = 1$ mA<br>*) at / bei $I_T = 10$ mA |             | Stand-off voltage<br>Sperrspannung | Max. rev. current<br>Max. Sperrstrom<br>at / bei $V_{WM}$ | Max. clamping voltage<br>Max. Begrenzer-Spannung<br>at / bei $I_{PPM}$ (10/1000 $\mu$ s) |               |
|                 | $V_{BR}$ [V]  |             | $V_{WM}$ [V]                       | $I_D$ [ $\mu$ A]  | $V_C$ [V]  | $I_{PPM}$ [A] |
| 1.5KE56         | 56 $\pm$ 10%  | 50.4...61.6 | 45.4                               | 5   | 81   | 19            |
| 1.5KE56A        | 56 $\pm$ 5%   | 53.2...58.8 | 47.8                               | 5   | 77   | 20            |
| 1.5KE62         | 62 $\pm$ 10%  | 55.8...68.8 | 50.2                               | 5   | 89   | 17            |
| 1.5KE62A        | 62 $\pm$ 5%   | 58.9...65.1 | 53.0                               | 5   | 85   | 18            |
| 1.5KE68         | 68 $\pm$ 10%  | 61.2...74.8 | 55.1                               | 5   | 98   | 16.0          |
| 1.5KE68A        | 68 $\pm$ 5%   | 64.6...71.4 | 58.1                               | 5   | 92   | 17.0          |
| 1.5KE75         | 75 $\pm$ 10%  | 67.5...82.5 | 60.7                               | 5   | 108  | 14.0          |
| 1.5KE75A        | 75 $\pm$ 5%   | 71.3...78.8 | 64.1                               | 5   | 103  | 15.0          |
| 1.5KE82         | 82 $\pm$ 10%  | 73.8...90.2 | 66.4                               | 5   | 118  | 13.0          |
| 1.5KE82A        | 82 $\pm$ 5%   | 77.9...86.1 | 70.1                               | 5   | 113  | 13.9          |
| 1.5KE91         | 91 $\pm$ 10%  | 81.9...100  | 73.7                               | 5   | 131  | 12.0          |
| 1.5KE91A        | 91 $\pm$ 5%   | 86.5...95.5 | 77.8                               | 5   | 125  | 12.6          |
| 1.5KE100        | 100 $\pm$ 10%   | 90.0...110  | 81.0                               | 5   | 144  | 10.9          |
| 1.5KE100A       | 100 $\pm$ 5%  | 95.0...105  | 85.5                               | 5   | 137  | 11.4          |
| 1.5KE110        | 110 $\pm$ 10%   | 99.0...121  | 89.2                               | 5   | 158  | 9.9           |
| 1.5KE110A       | 110 $\pm$ 5%  | 105...116   | 94.0                               | 5   | 152  | 10.3          |
| 1.5KE120        | 120 $\pm$ 10%   | 108...132   | 97.2                               | 5   | 173  | 9.1           |
| 1.5KE120A       | 120 $\pm$ 5%  | 114...126   | 102                                | 5   | 165  | 9.5           |
| 1.5KE130        | 130 $\pm$ 10%   | 117...143   | 105                                | 5   | 187  | 8.4           |
| 1.5KE130A       | 130 $\pm$ 5%  | 124...137   | 111                                | 5   | 179  | 8.7           |
| 1.5KE150        | 150 $\pm$ 10%   | 135...165   | 121                                | 5   | 215  | 7.3           |
| 1.5KE150A       | 150 $\pm$ 5%  | 143...158   | 128                                | 5   | 207  | 7.6           |
| 1.5KE160        | 160 $\pm$ 10%   | 144...176   | 130                                | 5   | 230  | 6.8           |
| 1.5KE160A       | 160 $\pm$ 5%  | 152...168   | 136                                | 5   | 219  | 7.1           |
| 1.5KE170        | 170 $\pm$ 10%   | 153...187   | 138                                | 5   | 244  | 6.4           |
| 1.5KE170A       | 170 $\pm$ 5%  | 162...179   | 145                                | 5   | 234  | 6.7           |
| 1.5KE180        | 180 $\pm$ 10%   | 162...198   | 146                                | 5   | 258  | 6.1           |
| 1.5KE180A       | 180 $\pm$ 5%  | 171...189   | 154                                | 5   | 246  | 6.4           |
| 1.5KE200        | 200 $\pm$ 10%   | 180...220   | 162                                | 5   | 287  | 5.4           |
| 1.5KE200A       | 200 $\pm$ 5%  | 190...210   | 171                                | 5   | 274  | 5.7           |
| 1.5KE220        | 220 $\pm$ 10%   | 198...242   | 175                                | 5   | 344  | 4.5           |
| 1.5KE220A       | 220 $\pm$ 5%  | 209...231   | 185                                | 5   | 328  | 4.8           |
| 1.5KE250        | 250 $\pm$ 10%   | 225...275   | 202                                | 5   | 360  | 4.3           |
| 1.5KE250A       | 250 $\pm$ 5%  | 237...263   | 214                                | 5   | 344  | 4.5           |
| 1.5KE300        | 300 $\pm$ 10%   | 270...330   | 243                                | 5   | 430  | 3.6           |
| 1.5KE300A       | 300 $\pm$ 5%  | 285...315   | 256                                | 5   | 414  | 3.8           |
| 1.5KE350        | 335 $\pm$ 10%   | 315...385   | 284                                | 5   | 504  | 3.1           |
| 1.5KE350A       | 350 $\pm$ 5%  | 332...368   | 300                                | 5   | 482  | 3.2           |
| 1.5KE400        | 400 $\pm$ 10%   | 360...440   | 324                                | 5   | 574  | 2.7           |
| 1.5KE400A       | 400 $\pm$ 5%  | 380...420   | 342                                | 5   | 548  | 2.8           |
| 1.5KE440        | 440 $\pm$ 10%   | 396...484   | 356                                | 5   | 631  | 2.4           |
| 1.5KE440A       | 440 $\pm$ 5%  | 418...462   | 376                                | 5   | 602  | 2.6           |



The range of type numbers is graded to the international E 24 standard. The standard tolerance of the breakdown voltage for each type is  $\pm 10\%$ . Suffix "A" denotes a tolerance of  $\pm 5\%$  for the breakdown voltage.

e.g.: 1.5KE51C = bidirectional diode,  $V_{BR} = 51 \text{ V}$  ( $\pm 10\%$ ),  $V_{WM} \geq 41.3 \text{ V}$  at  $I_D = 5 \mu\text{A}$   
1.5KE9.1A = unidirectional diode,  $V_{BR} = 9.1 \text{ V}$  ( $\pm 5\%$ ),  $V_{WM} \geq 7.7 \text{ V}$  at  $I_D = 50 \mu\text{A}$

Die Abstufung der Typen innerhalb der Reihe entspricht dem internationalen E 24-Standard. Die Toleranz der Abbruchspannung jedes einzelnen Typs beträgt in der Standardausführung  $\pm 10\%$ . Suffix "A" kennzeichnet eine Toleranz der Abbruchspannung von  $\pm 5\%$ .

<sup>1</sup> Valid, if leads are kept at ambient temperature at a distance of 10 mm from case  
Gültig, wenn die Anschlussdrähte in 10 mm Abstand von Gehäuse auf Umgebungstemperatur gehalten werden