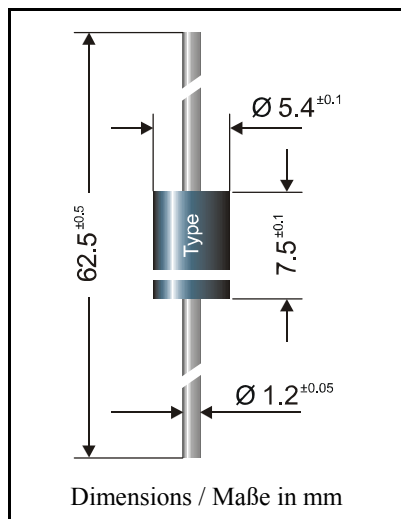


**Unidirectional and bidirectional  
Transient Voltage Suppressor Diodes**
**Unidirektionale und bidirektionale  
Spannungs-Begrenzer-Dioden**


|                                                                                       |                               |
|---------------------------------------------------------------------------------------|-------------------------------|
| Peak pulse power dissipation<br>Impuls-Verlustleistung                                | 1500 W                        |
| Nominal breakdown voltage<br>Nominale Abbruch-Spannung                                | 6.8...440 V                   |
| Plastic case – Kunststoffgehäuse                                                      | Ø 5.4 x 7.5 [mm]              |
| Weight approx. – Gewicht ca.                                                          | 1.1 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    | see page 16<br>siehe Seite 16 |

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

**Maximum ratings and Characteristics**
**Kenn- und Grenzwerte**

|                                                                                                                  |                          |                                                       |                                                          |
|------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------------------------|----------------------------------------------------------|
| Peak pulse power dissipation (10/1000 $\mu$ s waveform)<br>Impuls-Verlustleistung (Strom-Impuls 10/1000 $\mu$ s) | $T_A = 25^\circ\text{C}$ | $P_{PPM}$                                             | 1500 W <sup>1)</sup>                                     |
| Steady state power dissipation<br>Verlustleistung im Dauerbetrieb                                                | $T_A = 25^\circ\text{C}$ | $P_{M(AV)}$                                           | 6.5 W <sup>2)</sup>                                      |
| Peak forward surge current, 60 Hz half sine-wave<br>Stoßstrom für eine 60 Hz Sinus-Halbwellen                    | $T_A = 25^\circ\text{C}$ | $I_{FSM}$                                             | 200 A <sup>3)</sup>                                      |
| Operating junction temperature – Sperrschichttemperatur<br>Storage temperature – Lagerungstemperatur             |                          | $T_j$<br>$T_s$                                        | $-50...+175^\circ\text{C}$<br>$-50...+175^\circ\text{C}$ |
| Max. instantaneous forward voltage<br>Augenblickswert der Durchlaßspannung                                       | $I_F = 100\text{ A}$     | $V_{BR} \leq 200\text{ V}$<br>$V_{BR} > 200\text{ V}$ | $V_F < 3.5\text{ V}^{3)}$<br>$V_F < 5.0\text{ V}^{3)}$   |
| Thermal resistance junction to ambient air<br>Wärmewiderstand Sperrschicht – umgebende Luft                      |                          | $R_{thA}$                                             | $< 23\text{ K/W}^{2)}$                                   |
| Thermal resistance junction to lead<br>Wärmewiderstand Sperrschicht – Anschlußdraht                              |                          | $R_{thL}$                                             | $< 8\text{ K/W}$                                         |

<sup>1)</sup> Non-repetitive current pulse see curve  $I_{PPM} = f(t_r)$

Höchstzulässiger Spitzenwert eines einmaligen Strom-Impulses, siehe Kurve  $I_{PPM} = f(t_r)$

<sup>2)</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

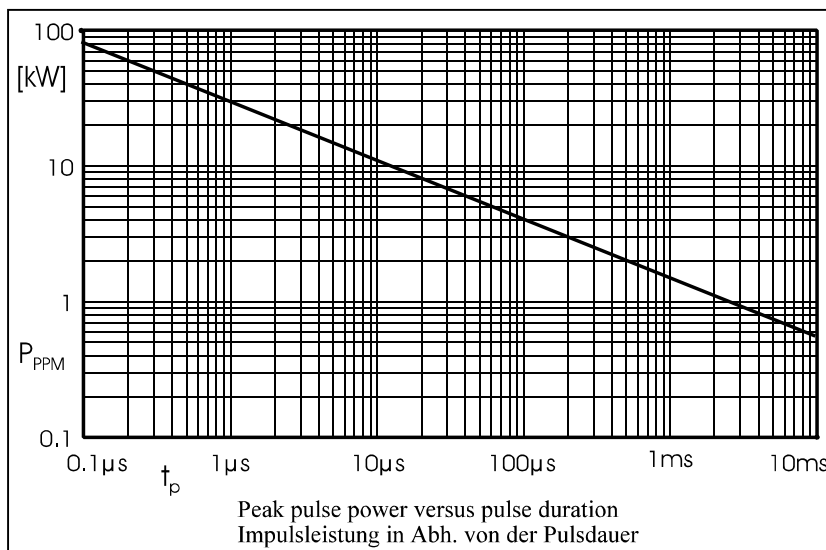
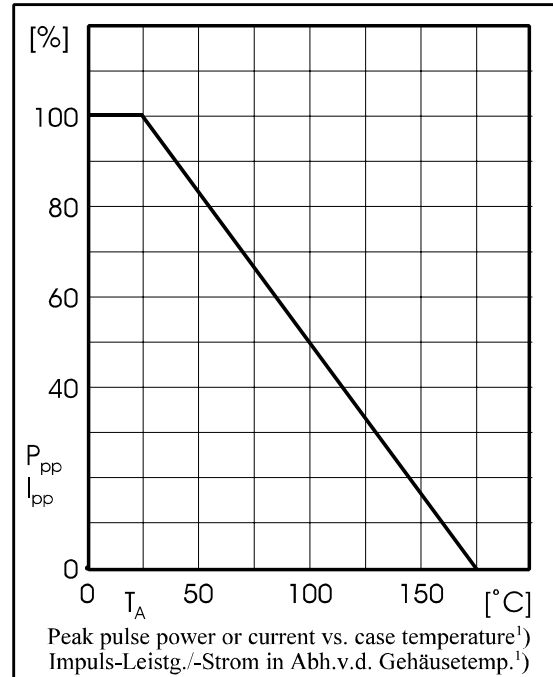
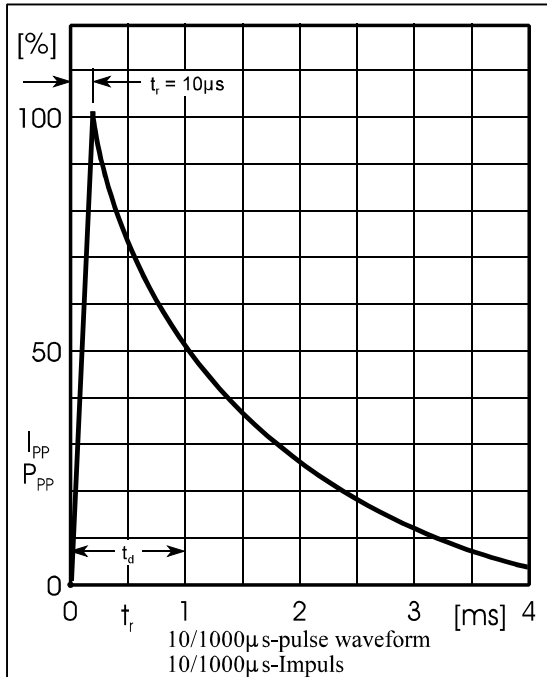
<sup>3)</sup> Unidirectional diodes only – nur für unidirektionale Dioden

**Maximum ratings**
**Grenzwerte**

| Type<br>Typ | Breakdown voltage at I <sub>T</sub> = 1 mA<br>Abbruch-Spanng. bei I <sub>T</sub> = 1 mA<br>) at / bei I <sub>T</sub> = 10 mA |                | Stand-off<br>voltage<br>Sperrspg. | Max. rev. current<br>Max. Sperrstrom<br>at / bei V <sub>WM</sub> | Max. clamping voltage<br>Max. Begrenzerspanng.<br>at / bei I <sub>PPM</sub> (10/1000μs) |                     |
|-------------|------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------|
|             | V <sub>BR</sub> [V]                                                                                                          |                |                                   |                                                                  | V <sub>WM</sub> [V]                                                                     | I <sub>D</sub> [μA] |
| 1.5 KE6.8   | 6.8 ± 10%                                                                                                                    | 6.12...7.48 *) | 5.5                               | 1000                                                             | 10.8                                                                                    | 145                 |
| 1.5 KE6.8A  | 6.8 ± 5%                                                                                                                     | 6.45...7.14 *) | 5.8                               | 1000                                                             | 10.5                                                                                    | 150                 |
| 1.5 KE7.5   | 7.5 ± 10%                                                                                                                    | 6.75...8.25 *) | 6.0                               | 500                                                              | 11.7                                                                                    | 134                 |
| 1.5 KE7.5A  | 7.5 ± 5%                                                                                                                     | 7.13...7.88 *) | 6.4                               | 500                                                              | 11.3                                                                                    | 139                 |
| 1.5 KE8.2   | 8.2 ± 10%                                                                                                                    | 7.38...9.02 *) | 6.6                               | 200                                                              | 12.5                                                                                    | 126                 |
| 1.5 KE8.2A  | 8.2 ± 5%                                                                                                                     | 7.79...8.61 *) | 7.0                               | 200                                                              | 12.1                                                                                    | 130                 |
| 1.5 KE9.1   | 9.1 ± 10%                                                                                                                    | 8.19...10.0    | 7.3                               | 50                                                               | 13.8                                                                                    | 114                 |
| 1.5 KE9.1A  | 9.1 ± 5%                                                                                                                     | 8.65...9.55    | 7.7                               | 50                                                               | 13.4                                                                                    | 117                 |
| 1.5 KE10    | 10 ± 10%                                                                                                                     | 9.0...11.0     | 8.1                               | 10                                                               | 15.0                                                                                    | 105                 |
| 1.5 KE10A   | 10 ± 5%                                                                                                                      | 9.5...10.5     | 8.5                               | 10                                                               | 14.5                                                                                    | 108                 |
| 1.5 KE11    | 11 ± 10%                                                                                                                     | 9.9...12.1     | 8.9                               | 5                                                                | 16.2                                                                                    | 97                  |
| 1.5 KE11A   | 11 ± 5%                                                                                                                      | 10.5...11.6    | 9.4                               | 5                                                                | 15.6                                                                                    | 100                 |
| 1.5 KE12    | 12 ± 10%                                                                                                                     | 10.8...13.2    | 9.7                               | 5                                                                | 17.3                                                                                    | 91                  |
| 1.5 KE12A   | 12 ± 5%                                                                                                                      | 11.4...12.6    | 10.2                              | 5                                                                | 16.7                                                                                    | 94                  |
| 1.5 KE13    | 13 ± 10%                                                                                                                     | 11.7...14.3    | 10.5                              | 5                                                                | 19.0                                                                                    | 82                  |
| 1.5 KE13A   | 13 ± 5%                                                                                                                      | 12.4...13.7    | 11.1                              | 5                                                                | 18.2                                                                                    | 86                  |
| 1.5 KE15    | 15 ± 10%                                                                                                                     | 13.5...16.5    | 12.1                              | 5                                                                | 22.0                                                                                    | 71                  |
| 1.5 KE15A   | 15 ± 5%                                                                                                                      | 14.3...15.8    | 12.8                              | 5                                                                | 21.2                                                                                    | 74                  |
| 1.5 KE16    | 16 ± 10%                                                                                                                     | 14.4...17.6    | 12.9                              | 5                                                                | 23.5                                                                                    | 67                  |
| 1.5 KE16A   | 16 ± 5%                                                                                                                      | 15.2...16.8    | 13.6                              | 5                                                                | 22.5                                                                                    | 70                  |
| 1.5 KE18    | 18 ± 10%                                                                                                                     | 16.2...19.8    | 14.5                              | 5                                                                | 26.5                                                                                    | 59                  |
| 1.5 KE18A   | 18 ± 5%                                                                                                                      | 17.1...18.9    | 15.3                              | 5                                                                | 25.5                                                                                    | 60                  |
| 1.5 KE20    | 20 ± 10%                                                                                                                     | 18.0...22.0    | 16.2                              | 5                                                                | 29.1                                                                                    | 54                  |
| 1.5 KE20A   | 20 ± 5%                                                                                                                      | 19.0...21.0    | 17.1                              | 5                                                                | 27.7                                                                                    | 56                  |
| 1.5 KE22    | 22 ± 10%                                                                                                                     | 19.8...24.2    | 17.8                              | 5                                                                | 31.9                                                                                    | 49                  |
| 1.5 KE22A   | 22 ± 5%                                                                                                                      | 20.9...23.1    | 18.8                              | 5                                                                | 30.6                                                                                    | 51                  |
| 1.5 KE24    | 24 ± 10%                                                                                                                     | 21.6...26.4    | 19.4                              | 5                                                                | 34.7                                                                                    | 45                  |
| 1.5 KE24A   | 24 ± 5%                                                                                                                      | 22.8...25.2    | 20.5                              | 5                                                                | 33.2                                                                                    | 47                  |
| 1.5 KE27    | 27 ± 10%                                                                                                                     | 24.3...29.7    | 21.8                              | 5                                                                | 39.1                                                                                    | 40                  |
| 1.5 KE27A   | 27 ± 5%                                                                                                                      | 25.7...28.4    | 23.1                              | 5                                                                | 37.5                                                                                    | 42                  |
| 1.5 KE30    | 30 ± 10%                                                                                                                     | 27.0...33.0    | 24.3                              | 5                                                                | 43.5                                                                                    | 36                  |
| 1.5 KE30A   | 30 ± 5%                                                                                                                      | 28.5...31.5    | 25.6                              | 5                                                                | 41.4                                                                                    | 38                  |
| 1.5 KE33    | 33 ± 10%                                                                                                                     | 29.7...36.3    | 26.8                              | 5                                                                | 47.7                                                                                    | 33                  |
| 1.5 KE33A   | 33 ± 5%                                                                                                                      | 31.4...34.7    | 28.2                              | 5                                                                | 45.7                                                                                    | 34                  |
| 1.5 KE36    | 36 ± 10%                                                                                                                     | 32.4...39.6    | 29.1                              | 5                                                                | 52.0                                                                                    | 30                  |
| 1.5 KE36A   | 36 ± 5%                                                                                                                      | 34.2...37.8    | 30.8                              | 5                                                                | 49.9                                                                                    | 31                  |
| 1.5 KE39    | 39 ± 10%                                                                                                                     | 35.1...42.9    | 31.6                              | 5                                                                | 56.4                                                                                    | 27                  |
| 1.5 KE39A   | 39 ± 5%                                                                                                                      | 37.1...41.0    | 33.3                              | 5                                                                | 53.9                                                                                    | 29                  |
| 1.5 KE43    | 43 ± 10%                                                                                                                     | 38.7...47.3    | 34.8                              | 5                                                                | 61.9                                                                                    | 25                  |
| 1.5 KE43A   | 43 ± 5%                                                                                                                      | 40.9...45.2    | 36.8                              | 5                                                                | 59.3                                                                                    | 26                  |
| 1.5 KE47    | 47 ± 10%                                                                                                                     | 42.3...51.7    | 38.1                              | 5                                                                | 67.8                                                                                    | 23                  |
| 1.5 KE47A   | 47 ± 5%                                                                                                                      | 44.7...49.4    | 40.2                              | 5                                                                | 64.8                                                                                    | 24                  |
| 1.5 KE51    | 51 ± 10%                                                                                                                     | 45.9...56.1    | 41.3                              | 5                                                                | 73.5                                                                                    | 21                  |

**Maximum ratings****Grenzwerte**

| Type<br>Typ | Breakdown voltage at I <sub>T</sub> = 1 mA<br>Abbruch-Spanng. bei I <sub>T</sub> = 1 mA<br>) at / bei I <sub>T</sub> = 10 mA |             | Stand-off<br>voltage<br>Sperrspg. | Max. rev. current<br>Max. Sperrstrom<br>at / bei V <sub>WM</sub> | Max. clamping voltage<br>Max. Begrenzerspanng.<br>at / bei I <sub>PPM</sub> (10/1000μs) |                     |
|-------------|------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------|
|             | V <sub>BR</sub> [V]                                                                                                          |             |                                   |                                                                  | V <sub>WM</sub> [V]                                                                     | I <sub>D</sub> [μA] |
| 1.5 KE51A   | 51 ± 5%                                                                                                                      | 48.5...53.6 | 43.6                              | 5                                                                | 70.1                                                                                    | 22                  |
| 1.5 KE56    | 56 ± 10%                                                                                                                     | 50.4...61.6 | 45.4                              | 5                                                                | 80.5                                                                                    | 19                  |
| 1.5 KE56A   | 56 ± 5%                                                                                                                      | 53.2...58.8 | 47.8                              | 5                                                                | 77.0                                                                                    | 20                  |
| 1.5 KE62    | 62 ± 10%                                                                                                                     | 55.8...68.8 | 50.2                              | 5                                                                | 89.0                                                                                    | 17                  |
| 1.5 KE62A   | 62 ± 5%                                                                                                                      | 58.9...65.1 | 53.0                              | 5                                                                | 85.0                                                                                    | 18                  |
| 1.5 KE68    | 68 ± 10%                                                                                                                     | 61.2...74.8 | 55.1                              | 5                                                                | 98.0                                                                                    | 16.0                |
| 1.5 KE68A   | 68 ± 5%                                                                                                                      | 64.6...71.4 | 58.1                              | 5                                                                | 92.0                                                                                    | 17.0                |
| 1.5 KE75    | 75 ± 10%                                                                                                                     | 67.5...82.5 | 60.7                              | 5                                                                | 108                                                                                     | 14.0                |
| 1.5 KE75A   | 75 ± 5%                                                                                                                      | 71.3...78.8 | 64.1                              | 5                                                                | 103                                                                                     | 15.0                |
| 1.5 KE82    | 82 ± 10%                                                                                                                     | 73.8...90.2 | 66.4                              | 5                                                                | 118                                                                                     | 13.0                |
| 1.5 KE82A   | 82 ± 5%                                                                                                                      | 77.9...86.1 | 70.1                              | 5                                                                | 113                                                                                     | 13.9                |
| 1.5 KE91    | 91 ± 10%                                                                                                                     | 81.9...100  | 73.7                              | 5                                                                | 131                                                                                     | 12.0                |
| 1.5 KE91A   | 91 ± 5%                                                                                                                      | 86.5...95.5 | 77.8                              | 5                                                                | 125                                                                                     | 12.6                |
| 1.5 KE100   | 100 ± 10%                                                                                                                    | 90.0...110  | 81.0                              | 5                                                                | 144                                                                                     | 10.9                |
| 1.5 KE100A  | 100 ± 5%                                                                                                                     | 95.0...105  | 85.5                              | 5                                                                | 137                                                                                     | 11.4                |
| 1.5 KE110   | 110 ± 10%                                                                                                                    | 99.0...121  | 89.2                              | 5                                                                | 158                                                                                     | 9.9                 |
| 1.5 KE110A  | 110 ± 5%                                                                                                                     | 105...116   | 94.0                              | 5                                                                | 152                                                                                     | 10.3                |
| 1.5 KE120   | 120 ± 10%                                                                                                                    | 108...132   | 97.2                              | 5                                                                | 173                                                                                     | 9.1                 |
| 1.5 KE120A  | 120 ± 5%                                                                                                                     | 114...126   | 102                               | 5                                                                | 165                                                                                     | 9.5                 |
| 1.5 KE130   | 130 ± 10%                                                                                                                    | 117...143   | 105                               | 5                                                                | 187                                                                                     | 8.4                 |
| 1.5 KE130A  | 130 ± 5%                                                                                                                     | 124...137   | 111                               | 5                                                                | 179                                                                                     | 8.7                 |
| 1.5 KE150   | 150 ± 10%                                                                                                                    | 135...165   | 121                               | 5                                                                | 215                                                                                     | 7.3                 |
| 1.5 KE150A  | 150 ± 5%                                                                                                                     | 143...158   | 128                               | 5                                                                | 207                                                                                     | 7.6                 |
| 1.5 KE160   | 160 ± 10%                                                                                                                    | 144...176   | 130                               | 5                                                                | 230                                                                                     | 6.8                 |
| 1.5 KE160A  | 160 ± 5%                                                                                                                     | 152...168   | 136                               | 5                                                                | 219                                                                                     | 7.1                 |
| 1.5 KE170   | 170 ± 10%                                                                                                                    | 153...187   | 138                               | 5                                                                | 244                                                                                     | 6.4                 |
| 1.5 KE170A  | 170 ± 5%                                                                                                                     | 162...179   | 145                               | 5                                                                | 234                                                                                     | 6.7                 |
| 1.5 KE180   | 180 ± 10%                                                                                                                    | 162...198   | 146                               | 5                                                                | 258                                                                                     | 6.1                 |
| 1.5 KE180A  | 180 ± 5%                                                                                                                     | 171...189   | 154                               | 5                                                                | 246                                                                                     | 6.4                 |
| 1.5 KE200   | 200 ± 10%                                                                                                                    | 180...220   | 162                               | 5                                                                | 287                                                                                     | 5.4                 |
| 1.5 KE200A  | 200 ± 5%                                                                                                                     | 190...210   | 171                               | 5                                                                | 274                                                                                     | 5.7                 |
| 1.5 KE220   | 220 ± 10%                                                                                                                    | 198...242   | 175                               | 5                                                                | 344                                                                                     | 4.5                 |
| 1.5 KE220A  | 220 ± 5%                                                                                                                     | 209...231   | 185                               | 5                                                                | 328                                                                                     | 4.8                 |
| 1.5 KE250   | 250 ± 10%                                                                                                                    | 225...275   | 202                               | 5                                                                | 360                                                                                     | 4.3                 |
| 1.5 KE250A  | 250 ± 5%                                                                                                                     | 237...263   | 214                               | 5                                                                | 344                                                                                     | 4.5                 |
| 1.5 KE300   | 300 ± 10%                                                                                                                    | 270...330   | 243                               | 5                                                                | 430                                                                                     | 3.6                 |
| 1.5 KE300A  | 300 ± 5%                                                                                                                     | 285...315   | 256                               | 5                                                                | 414                                                                                     | 3.8                 |
| 1.5 KE350   | 350 ± 10%                                                                                                                    | 315...385   | 284                               | 5                                                                | 504                                                                                     | 3.1                 |
| 1.5 KE350A  | 350 ± 5%                                                                                                                     | 332...368   | 300                               | 5                                                                | 482                                                                                     | 3.2                 |
| 1.5 KE400   | 400 ± 10%                                                                                                                    | 360...440   | 324                               | 5                                                                | 574                                                                                     | 2.7                 |
| 1.5 KE400A  | 400 ± 5%                                                                                                                     | 380...420   | 342                               | 5                                                                | 548                                                                                     | 2.8                 |
| 1.5 KE440   | 440 ± 10%                                                                                                                    | 396...484   | 356                               | 5                                                                | 631                                                                                     | 2.4                 |
| 1.5 KE440A  | 440 ± 5%                                                                                                                     | 418...462   | 376                               | 5                                                                | 602                                                                                     | 2.6                 |



The order 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  $\pm 5\%$ .

e.g.: 1.5KE160CA = bidirectional diode,  $V_{BR} = 160 \text{ V } (\pm 5\%)$ ,  $V_{WM} \geq 136 \text{ V}$  at  $I_D = 5 \mu\text{A}$   
1.5KE7.5A = unidirectional diode,  $V_{BR} = 7.5 \text{ V } (\pm 5\%)$ ,  $V_{WM} \geq 6.4 \text{ V}$  at  $I_D = 500 \mu\text{A}$

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

z.B.: 1.5KE160CA = bidirektionale Diode,  $V_{BR} = 160 \text{ V } (\pm 5\%)$ ,  $V_{WM} \geq 136 \text{ V}$  at  $I_D = 5 \mu\text{A}$   
1.5KE7.5A = unidirektionale Diode,  $V_{BR} = 7.5 \text{ V } (\pm 5\%)$ ,  $V_{WM} \geq 6.4 \text{ V}$  at  $I_D = 500 \mu\text{A}$

<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