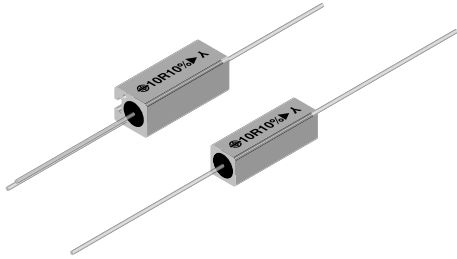


## Wirewound Resistors in Ceramic Case



### FEATURES

- Fiberglass core, ceramic case
- Fireproof inorganic construction
- Axial or radial leaded
- Fusing styles available as style KKE.. Si
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compatible with "Restriction of the use of Hazardous Substances" (RoHS) directive 2002/95/EC (issue 2004)

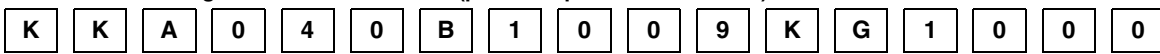


### STANDARD ELECTRICAL SPECIFICATIONS

| GLOBAL MODEL | HISTORICAL MODEL | POWER RATING<br>$P_{40^\circ\text{C}}$<br>W | LIMITING VOLTAGE<br>V | RESISTANCE RANGE E12/E24    |                             |                                  |                           |
|--------------|------------------|---|-----------------------|-----------------------------|-----------------------------|----------------------------------|---------------------------|
|              |                  |   |                       | TOLERANCE $\pm 10\%$        |                             | TOLERANCE $\pm 10\%$ , $\pm 5\%$ |                           |
|              |                  |   |                       | TCR<br>$+ 400 \pm 50$ ppm/K | TCR<br>$+ 400 \pm 50$ ppm/K | TCR<br>$+ 0 \pm 40$ ppm/K        | TCR<br>$+ 0 \pm 10$ ppm/K |
| KKA040       | KKA4             | 4   | 125                   | R056 - R091                 | R10 - R20                   | R22 - 300R                       | 330R - 9K1                |
| KKA050       | KKA5             | 5   | 185                   | R075 - R12                  | R15 - R30                   | R33 - 470R                       | 510R - 15K                |
| KKA070       | KKA7             | 7   | 250                   | R11 - R30                   | R33 - R68                   | R75 - 910R                       | 1K0 - 33K                 |
| KKA090       | KKA9             | 9   | 250                   | R11 - R30                   | R33 - R68                   | R75 - 910R                       | 1K0 - 33K                 |
| KKA110       | KKA11            | 11  | 350                   | R15 - R47                   | R51 - 1R0                   | 1R1 - 1K3                        | 1K5 - 47K                 |
| KKA170       | KKA17            | 17  | 500                   | R27 - R82                   | R91 - 1R6                   | 1R8 - 2K4                        | 2K7 - 82K                 |
| KKE040       | KKE4             | 4   | 125                   | R056 - R091                 | R10 - R20                   | R22 - 300R                       | 330R - 9K1                |
| KKE070       | KKE7             | 7   | 250                   | R075 - R12                  | R15 - R30                   | R33 - 470R                       | 510R - 15K                |
| KKE090       | KKE9             | 9   | 250                   | R11 - R30                   | R33 - R68                   | R75 - 910R                       | 1K0 - 33K                 |
| KKE110       | KKE11            | 11  | 350                   | R15 - R47                   | R51 - 1R0                   | 1R1 - 1K3                        | 1K5 - 47K                 |
| KKE170       | KKE17            | 17  | 500                   | R27 - R82                   | R91 - 1R6                   | 1R8 - 2K4                        | 2K7 - 82K                 |
| KKE07L       | KKE7 Si          | 4   | 165                   | R075 - R13                  |                             | R15 - 12K                        | Only $\pm 5\%$            |
| KKE09L       | KKE9 Si          | 5.5   | 250                   | R11 - R30                   |                             | R33 - 33K                        | Only $\pm 5\%$            |
| KKE11L       | KKE11 Si         | 7   | 350                   | R28 - R47                   |                             | R51 - 47K                        | Only $\pm 5\%$            |
| KKE17L       | KKE17 Si         | 10  | 500                   | R27 - R82                   |                             | R91 - 82K                        | Only $\pm 5\%$            |

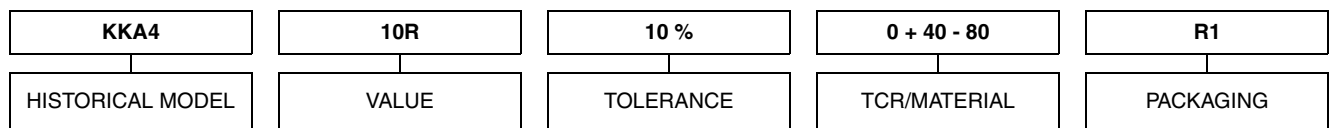
### GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: KKA040B1009K G1000 (preferred part number format)

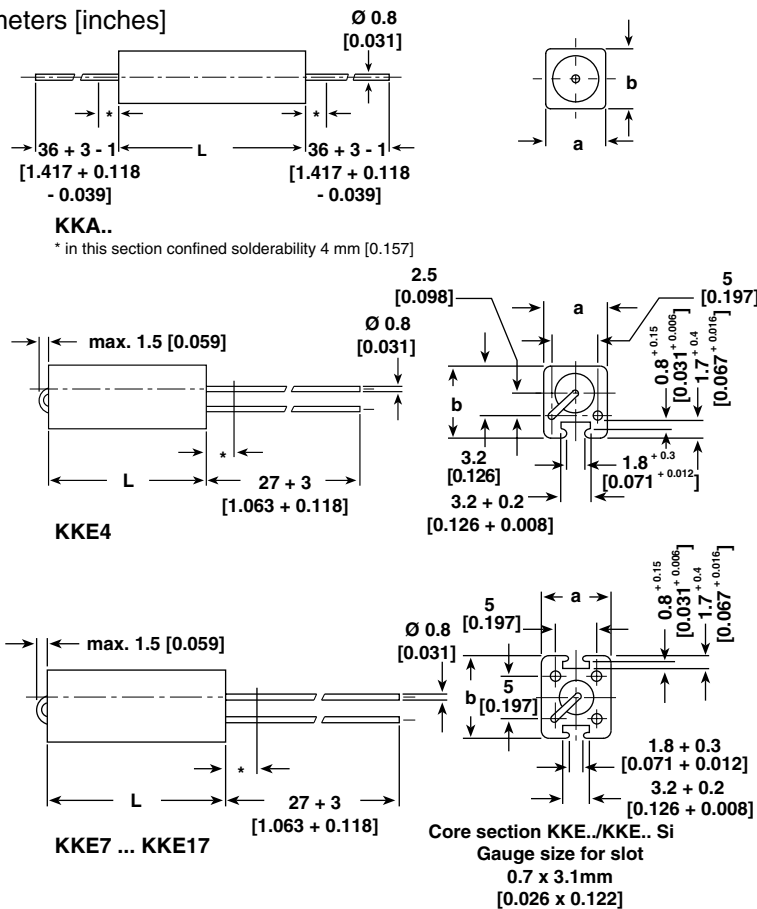


| MODEL      | SIZE   | SPECIAL CHARACTER     | TCR/MATERIAL   | VALUE  | TOLERANCE                           | PACKAGING             | SPECIAL   |
|------------|--|-----------------------|--|--|-------------------------------------|-----------------------|---|
| KKA<br>KKE | 04 = 4<br>05 = 5<br>07 = 7<br>09 = 9<br>11 = 11<br>17 = 17 | 0 = Neutral<br>L = Si | 0 = SWI per BV<br>A = $400 \pm 50$ ppm/K<br>B = $0 + 40 - 80$ pm/K<br>C = $0 \pm 10$ ppm/K<br>D = $+200... + 1200$ ppm/K | 3 digit value<br>1 digit multiplier<br>MULTIPLIER<br>F = $*10^{-4}$<br>7 = $*10^{-3}$<br>8 = $*10^{-2}$<br>9 = $*10^{-1}$<br>0 = $*10^0$<br>1 = $*10^1$<br>2 = $*10^2$ | J = $\pm 5.0\%$<br>K = $\pm 10.0\%$ | (See Packaging table) | The 5 digit BV number will be encoded using a 36 character code. This code contains numbers 0...9 and letters A...Z (36 characters total) and allows to encode at least 46 655 five digit BV numbers.<br>000 = Standard |

Historical Part Number Example: KKA4 10R 10% 0 + 40 - 80 R1 (will continue to be accepted)

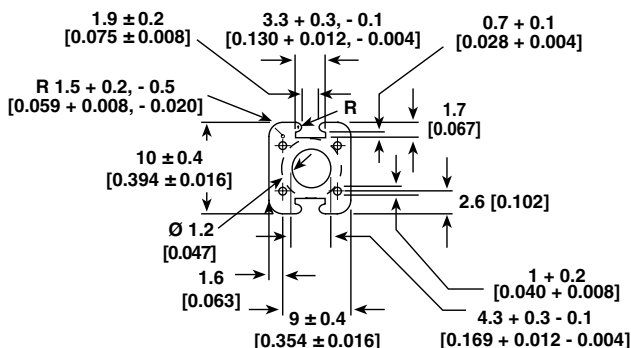
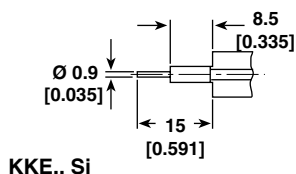
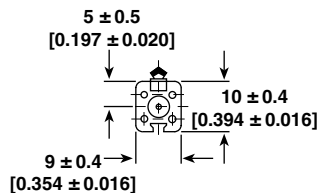
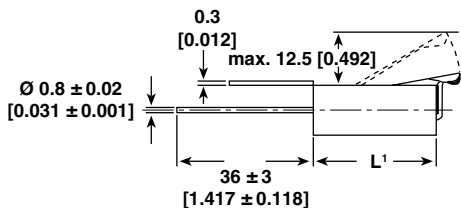


| PACKAGING TABLE |             |                                       |   |
|-----------------|-------------|---------------------------------------|---|
| SAP             | DALE LEGACY | DESCRIPTION                           | TYPE                                      |
| G1              | R1          | reel pack tape 80 mm, 1000 pieces     | KKA4, KKA5                                |
| LA              | B12         | loose pack, 100 pieces                | KKA9, KKA11, KKE17                        |
| LJ              | B12         | loose pack, 200 pieces                | KKA4, KKA5, KKA7, KKE4, KKE7, KKE9, KKE11 |
| LJ              | B12         | loose pack, 200 pieces                | KKE7 SI, KKE9 SI                          |
| LX              | B14         | loose pack, without quantity          | all                                       |
| ZX              | S51         | special pack (BV #), without quantity | all                                       |
| 51              | A1          | Ammo pack tape 80 mm, 1000 pieces     | KKA4, KKA5                                |

**DIMENSIONS** in millimeters [inches]


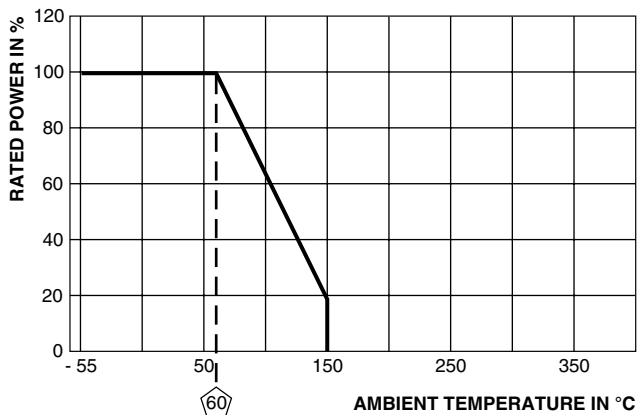
| MODEL | DIMENSIONS in millimeters [inches] |              |              | WEIGHT (g) |
|-------|------------------------------------|--------------|--------------|------------|
|       | a                                  | b            | L            |            |
| KKA4  | 6.4 [0.256]                        | 6.4 [0.256]  | 20 [0.787]   | 1.8        |
| KKA5  | 6.4 [0.256]                        | 6.4 [0.256]  | 25 [0.984]   | 5.5        |
| KKA7  | 6.4 [0.256]                        | 6.4 [0.256]  | 38 [1.496]   | 3.2        |
| KKA9  | 9 [0.354]                          | 9 [0.354]    | 38 [1.496]   | 7          |
| KKA11 | 9 [0.354]                          | 9 [0.354]    | 50 [1.969]   | 9          |
| KKA17 | 9 [0.354]                          | 9 [0.354]    | 75 [2.953]   | 13         |
| KKE4  | 7 [0.276]                          | 7.8 [0.307]  | 19.5 [0.768] | 2          |
| KKE7  | 9 [0.354]                          | 10.5 [0.413] | 25 [0.984]   | 4          |
| KKE9  | 9 [0.354]                          | 10.5 [0.413] | 38 [1.496]   | 7.5        |
| KKE11 | 9 [0.354]                          | 10.5 [0.413] | 50 [1.969]   | 9.5        |
| KKE17 | 9 [0.354]                          | 10.5 [0.413] | 75 [2.953]   | 13.5       |

**DIMENSIONS** in millimeters [inches] (continued)

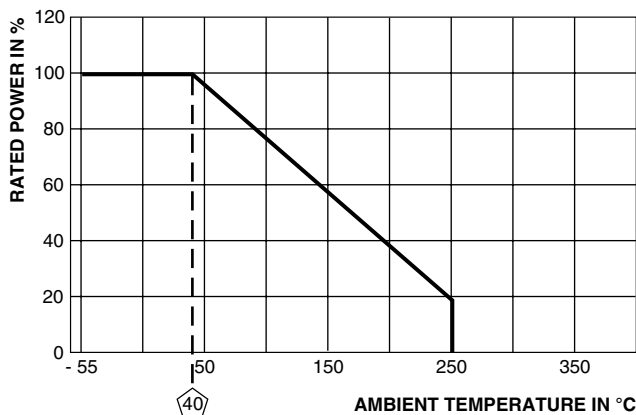


Profile dimensions

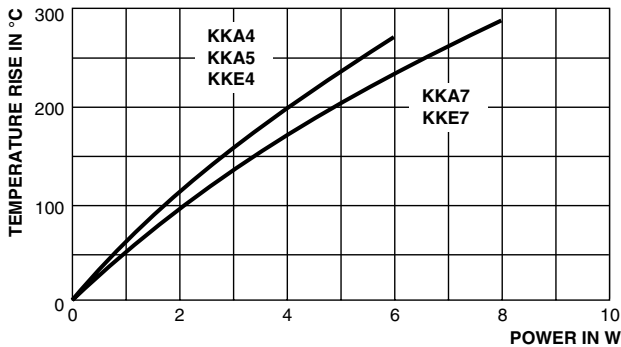
| MODEL    | DIMENSIONS in millimeters [inches] |              |            |            |
|----------|------------------------------------|--------------|------------|------------|
|          | a                                  | b            | L          | WEIGHT (g) |
| KKE7 Si  | 9 [0.354]                          | 10.5 [0.413] | 25 [0.984] | 5.5        |
| KKE9 Si  | 9 [0.354]                          | 10.5 [0.413] | 38 [1.496] | 8          |
| KKE11 Si | 9 [0.354]                          | 10.5 [0.413] | 50 [1.969] | 9.8        |
| KKE17 Si | 9 [0.354]                          | 10.5 [0.413] | 75 [2.953] | 13.7       |



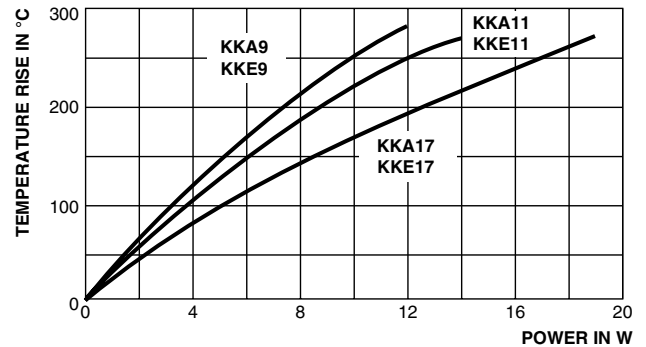
**Derating KKA, KKE**



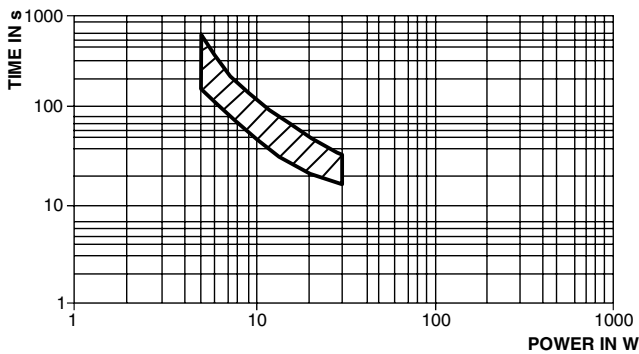
**Derating KKE.. Si**



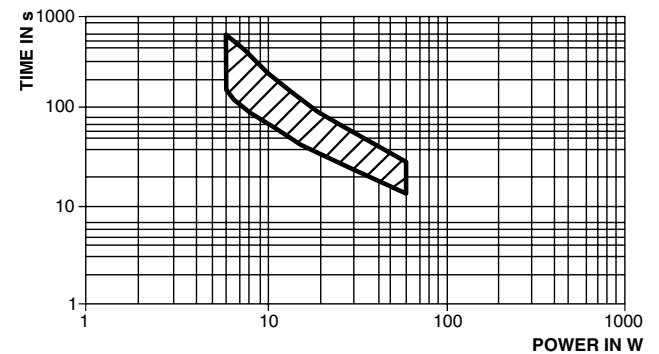
Temperature Rise



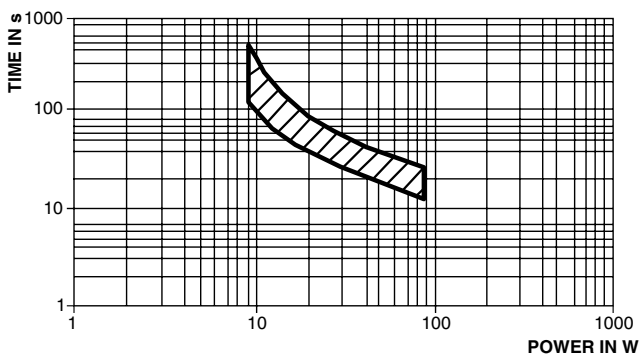
Temperature Rise



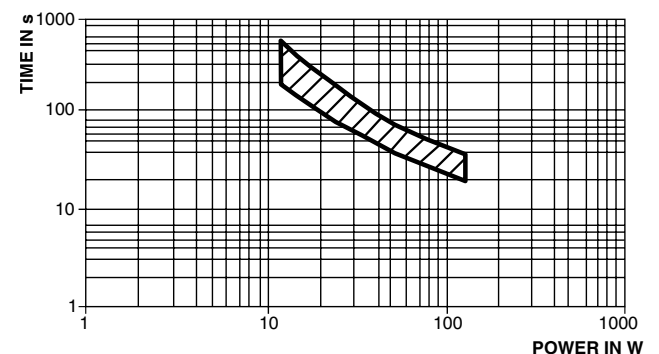
Fusing Characteristics KKE7 Si



Fusing Characteristics KKE9 Si



Fusing Characteristics KKE11 Si



Fusing Characteristics KKE17 Si

| PERFORMANCE   |                                   |
|---|-----------------------------------|
| TEST  | TEST RESULTS                      |
| Load Life ( $P_{70}$ , 70 °C, 1000 h)               | $\leq \pm 3.0\% \Delta R$ average |
| Climatic Sequence                                   | $\leq \pm 2.0\% \Delta R$         |
| Damp Heat, Steady State (40 °C, 93 % r.h., 56 days) | $\leq \pm 2.0\% \Delta R$         |
| Resistance to Solder Heat (260 °C, 10 s)            | $\leq \pm 0.2\% \Delta R$ typical |



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.