KOA SPEER ELECTRONICS, INC.

# MF, MFS, RK

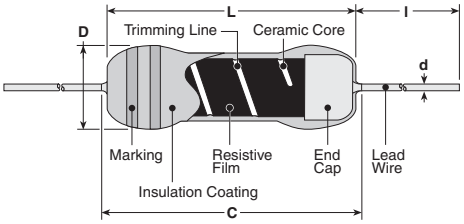
## general purpose metal film leaded resistor

EU RoHS COMPLIANT

## features

- Semi-precision metal film resistors
- The discharge path resistor is recognized by UL 1676 and c-UL (CAS-C22.2 No.1-M94). (File No. E159326) (RK only)
- Meets requirements of MIL-R-22684
- Suitable for automatic machine insertion
- MFS two times the power rating of the standard body type
- Marking: Blue-gray body color with color-coded bands
- Products with lead-free terminations meet EU RoHS and China RoHS requirements
- AEC-Q200 Qualified: MF1/4, MFS1/4, MFS1/2

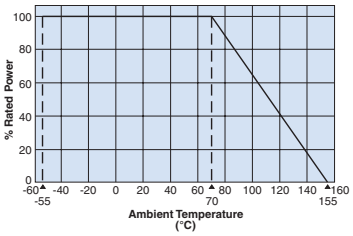
## dimensions and construction



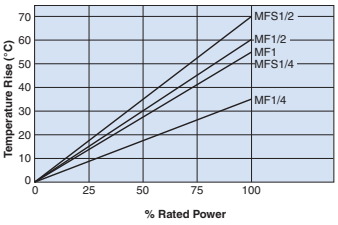

| Type | Dimensions inches (mm) L (ref.) | C (max.) | D | d (nom.) | l* |
|---|---|---|---|---|---|
| MFS1/4 | .126±.008 (3.2±0.2) | .133 (3.4) | .066 $^{+.007}_{-.004}$ (1.7 $^{+0.2}_{-0.1}$) | .018 (0.45) | 1.10±.118 (28.0±3.0) |
| MF1/4 | .248±.02 (6.3±0.5) | .280 (7.1) | .091±.012 (2.3±0.3) | .024 (0.6) | |
| MFS1/2 | .248±.02 (6.3±0.5) | .280 (7.1) | .091±.012 (2.3±0.3) | .024 (0.6) | |
| MF1/2 | .354±0.4 (9.0±1.0) | .437 (11.1) | .138±.016 (3.5±0.4) | .024 (0.6) | |
| MF1 | .610±.02 (15.5±0.5) | .721 (18.3) | .217±.02 (5.5±0.5) | .031 (0.8) | 1.50±.118 (38.0±3.0) |
| RK1/4 | .248±.02 (6.3±0.5) | .280 (7.1) | .091±.012 (2.3±0.3) | .024 (0.6) | 0.94 min. (24.0 min.) |
| RK1/2 | .374±.04 (9.5±1.0) | .437 (11.1) | .138±.016 (3.5±0.4) | .024 (0.6) | |
| RK1 | .610±.04 (15.5±1.0) | .720 (18.3) | .217±.02 (5.5±0.5) | .031 (0.8) | 1.50±.118 (38.0±3.0) |

* Lead length changes depending on taping and forming.

### Derating Curve




### Surface Temperature Rise




## ordering information

New Part # | MF | 1/4 | L | C | T52 | R | R20 | J

| Type | Power Rating | T.C.R. | Termination Material | Taping and Forming | Packaging | Nominal Resistance | Tolerance |
|---|---|---|---|---|---|---|---|
| MF | 1/4: 0.25W | E: ±25 | C: SnCu | 1/4: T26, T52, VT, VTP, VTE, MT, M, U, M10, M12.5 | A: Ammo | +2%: 2 significant figures + 1 multiplier | B: ±0.1% |
| MFS | 1/2: 0.50W | C: ±50 | | 1/2: T26, T52, VTP, VTE, M12.5, M15 | R: Reel | +0.5%,+1%: 3 significant figures + 1 multiplier | C: ±0.25% |
| RK | 1: 1W | D: ±100 | | 1: T521 | | "R" indicates decimal on value <100Ω | D: ±0.5% |
| | | L: ±200 | | | | | F: ±1% |
| | | G: ±250 | | | | | G: ±2% |
| | | B: ±350 | | | | | J: ±5% |

For further information on packaging, please refer to Appendix C.

## applications and ratings

| Part Designation | Power Rating @ 70°C | Minimum Dielectric Withstanding Voltage | T.C.R. (ppm/°C) | Resistance Range (Ω) (B±0.1%) E-96 | (C±0.25%) E-96 | (D±0.5%) E-24 E-192 | (F±1.0%) E-24 E-96 | (G±2.0%) E-24 | (J±5.0%) E-24 | Absolute Maximum Working Voltage | Absolute Maximum Overload Voltage | Operating Temperature Range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MFS1/4C | 0.25W | 300V | C: ±50 | — | — | 49.9 - 562k | 10 - 1M | — | — | 250V | 300V | -55°C to +155°C |
| MFS1/4D | | | D: ±100 | | | | | | | | | |

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use. 12/18/12

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## applications and ratings (continued)

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MF1/4C | 0.25W | 500V | C: ±50 | — | — | 10- 2.21M | 10 - 2.21M | — | — | 250V | 500V | -55°C to +155°C |
| MF1/4D | | | D: ±100 | — | — | | | | | | | |
| MF1/4L | | | L: ±200 | — | — | — | 1.0 - 10 | 0.51 - 10 | | | | |
| MFS1/2C | 0.50W | 500V | C: ±50 | — | — | 10 - 1M | 10 - 2.21M | 10 - 2.2M | — | 350V | 700V | |
| MFS1/2D | | | D: ±100 | | | | | | | | | |
| MF1/2C | 0.50W | 700V | C: ±50 | — | — | 10 - 5.05M | 10 - 4.99M | — | — | 350V | 700V | |
| MF1/2D | | | D: ±100 | — | — | | 10 - 5.11M | | | | | |
| MF1/2L | | | L: ±200 | — | — | — | 1.0 - 10 | 0.51 - 10Ω | | | | |
| MF1C | 1W | 700V | C: ±50 | 47.5 - 1.0M | 47.5 - 2.49M | 10 - 5.11M | 1.0 - 6.81M | — | — | 350V | 700V | |
| MF1D | | | D: ±100 | — | — | | | | | | | |
| MF1E | | | E: ±25 | 47.5 - 1.0M | 47.5 - 2.49M | 47.5 - 4.64M | 47.5 - 5.11M | — | — | | | |
| RK1/4D | 0.25W | 500V | D: ±100 | — | — | — | 3.09M - 25M | — | — | 500V | 700V | |
| RK1/4L | | | L: ±200 | — | — | — | — | 3.3M - 33M | 3.3M - 33M | | | |
| RK1/4B | | | B: ±350 | — | — | — | 100k - 25M | 100k - 33M | 100k - 33M | | | |
| RK1/2D | 0.50W | 700V | D: ±100 | — | — | — | 5.11M - 33M | — | — | 700V | 1000V | |
| RK1/2L | | | L: ±200 | — | — | — | — | 6.2M - 33M | 6.2M - 33M | | | |
| RK1/2B | | | B: ±350 | — | — | — | 100k - 35M | 100k - 51M | 100k - 51M | | | |
| RK1BC | 1W | 1000V | B: ±350 | — | — | — | 100k - 51M | 100k - 100M | 100k - 100M | 1000V | 1500V | |
| RK1/2G* | 0.50W | 700V | G: ±250 | — | — | — | — | — | 1M - 12M | 350V | 700V | |

* Discharge path resistor

## environmental applications

### Performance Characteristics

| Parameter | Requirement Δ R ±(% + 0.05Ω) Limit | Typical | Test Method |
|---|---|---|---|
| Resistance | Within specified tolerance | — | 25°C |
| T.C.R. | Within specified T.C.R. | — | Room temperature, +100°C |
| Overload (Short Time) | RK: ±1%, RK1/2G: ±2.5% MF: ±0.5% | RK: ±0.6%, RK1/2G: ±1% MF: ±0.3% | Rated voltage x 2.5 or max. overload voltage for 5 seconds, whichever is less; MFS1/2: Rated voltage x 2 or max. overload voltage for 5 seconds, whichever is less |
| Resistance to Solder Heat | RK: ±1%; RK1/2G: ±5%; MFS: ±0.75%; MF1/4, MFS1/2, MF1/2: ±0.5%, | RK: ±0.5%; RK1/2G: ±1% MFS1/4: ±0.4%; MF1/4, MFS1/2, MF1/2: ±0.25% | 260°C ± 5°C, 10 seconds ± 1 second or 350°C ± 10°C, 3.5 seconds ± 0.5 second |
| Dielectric Withstanding Voltage | No breakdown | — | 1 minute |
| Insulation Resistance | Not less than 10,000MΩ | — | 100V, 1 minute |
| Rapid Change of Temperature | RK,MF: ±1%; RK1/2G: ±5% | MF: ±0.3%; RK: ±0.5%, RK1/2G: ±1% | -55°C (30 minutes), +155°C (30 minutes), 5 cycles |
| Moisture Resistance | RK: ±5%; RK1/2G: ±10%; MFS1/4: ±1.5%; MF1/4, MFS1/2, MF1/2: ±1% | RK: ±2%; RK1/2G: ±5%; MFS1/4: ±1%; MF1/4, MFS1/2, MF1/2: ±0.75% | 40°C ± 2°C, 90 - 95% RH, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle |
| Endurance at 70°C | RK: ±5%; RK1/2G: ±10%; MFS1/4: ±1.5%; MF1/4, MFS1/2, MF1/2: ±1% | RK: ±2%; RK1/2G: ±5%; MFS1/4: ±1%; MF1/4, MFS1/2, MF1/2: ±0.75% | 70°C ± 2°C, 1000 hours, 1.5 hr ON, 0.5 hr OFF cycle |
| Resistance to Solvent | No abnormality in appearance. Marking shall be easily legible | — | The resistor shall be immersed for 5 seconds in IPA |
| Impulse | No such abnormalities as short-circuit, burnout, breakdown, etc. | — | Discharge from 1000pF capacitor 50 pulses. Internal 2.5 seconds. Charge voltage: 1.25kV (RK1/4), 2.5kV (RK1/2) and 6kV (RK1) |

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**Телефон:** +7 812 627 14 35

**Электронная почта:** sales@st-electron.ru

**Адрес:** 198099, Санкт-Петербург, Промышленная ул, дом № 19, литера Н, помещение 100-Н Офис 331