

heynen 

Heynen works for innovators



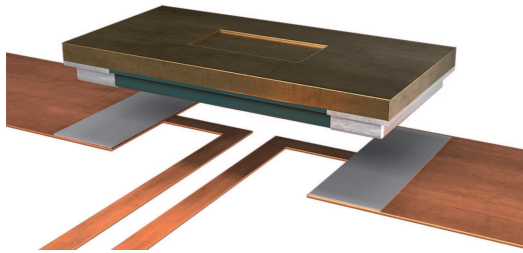
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## ISA-PLAN® // PRECISION RESISTORS

## FMK // Size 1206



## Features

- Power rating up to 4 W at 70°C (1.5 mOhm)
- Constant current up to 50 A (1.5 mOhm)
- Small size (1206)
- High pulse power rating
- Excellent long-term stability
- Mounting: Reflow- and IR-soldering
- AEC-Q200 qualification in preparation
- RoHS 2011/65/EU compliant



## Applications

- Current sensor for power hybrid applications
- Control systems for the automotive market
- Power modules
- Frequency converters
- Switch mode power supplies

## Preliminary technical data

|   |                |   |
|---|----------------|---|
| Resistance values   | <b>mOhm</b>    | 1.5 / 2 / 3 / 4 / 5 / 6                   |
| Tolerance   | <b>%</b>       | 1 / 5                                     |
| Temperature coefficient (20-60 °C)  | <b>ppm/K</b>   | <50                                       |
| Applicable temperature range  | <b>°C</b>      | -65 to +170                               |
| Power rating  | <b>W</b>       | up to 4                                   |
| Dielectric withstanding voltage   | <b>V AC/DC</b> | 200                                       |
| Inductance  | <b>nH</b>      | <3  |
| Stability (at rated power) deviation after 2000h, T <sub>k</sub> = Terminal temperature |                | < 0.5 % (TK=80 °C)<br>< 1.0 % (TK=110 °C) |

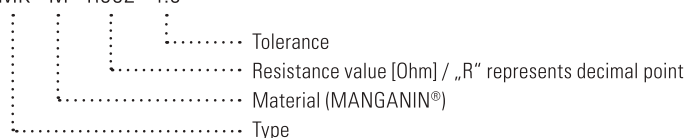
| Type         | Value [mΩ] | R <sub>thi</sub> [K/W] | TCR [ppm/K] | P <sub>70°C</sub><br>[W] | P <sub>110°C</sub><br>[W] |
|--------------|------------|------------------------|-------------|--------------------------|---------------------------|
| FMK-Z-R0015* | 1.5        | 20                     | <50         | 4                        | 3                         |
| FMK-M-R002*  | 2          | 25                     | <50         | 3.5                      | 2                         |
| FMK-M-R003*  | 3          | 40                     | <50         | 2.5                      | 1.5                       |
| FMK-V-R004*  | 4          | 50                     | <50         | 2                        | 1                         |
| FMK-V-R005   | 5          | 60                     | <50         | 1.5                      | 1                         |
| FMK-V-R006   | 6          | 65                     | <50         | 1.5                      | 1                         |

Abbreviation type M=MANGANIN®, V=NOVENTIN®, Z=ZERANIN®30

\* values in preparation

## Ordering code

FMK - M - R002 - 1.0



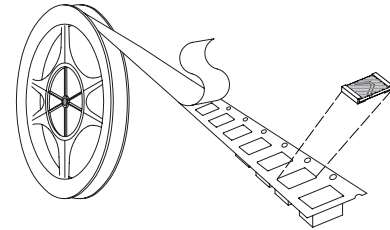


**FMK // Size 1206**

**Recommended solder profile**

Reflow- and IR-soldering

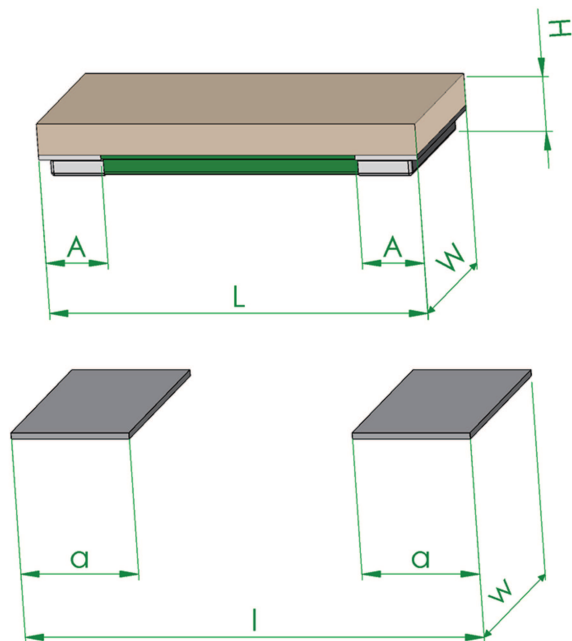
|             |     |      |     |     |
|-------------|-----|------|-----|-----|
| Temperature | °C  | 260  | 255 | 217 |
| Time        | sec | peak | 40  | 90  |



**Tape and reel information**

|                      |                |       |  |
|----------------------|----------------|-------|--|
| Specification        | DIN EN 60286-3 |       |  |
| Tape width           | mm             | 8     |  |
| Reel size            | inch           | 13    |  |
| Parts per reel       | pcs            | 12500 |  |
| Packaging weight net | g              | 454   |  |

**Mechanical dimensions and pcb-layout proposal (Reflow-soldering) [mm] / Drawing Z-YL-258**



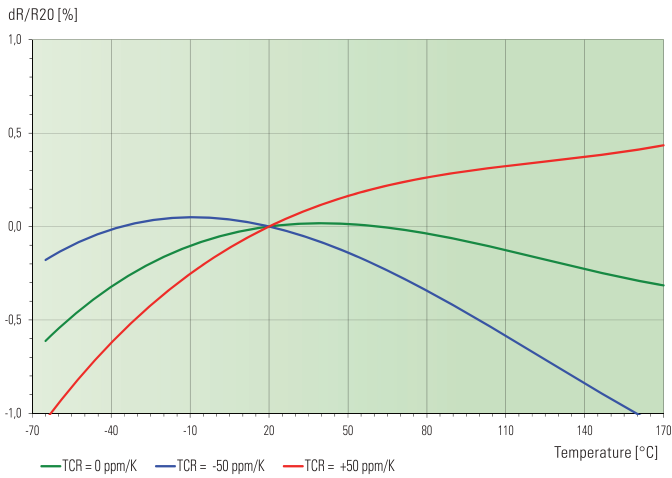
| type: | L         | W         | H        | A        |
|-------|-----------|-----------|----------|----------|
| FMK   | 3.05 ±0.2 | 1.52 ±0.2 | 0.4 ±0.2 | 0.5 ±0.2 |

| solder pad type: | l   | w   | a    |
|------------------|-----|-----|------|
| FMK              | 3.7 | 1.9 | 0.95 |

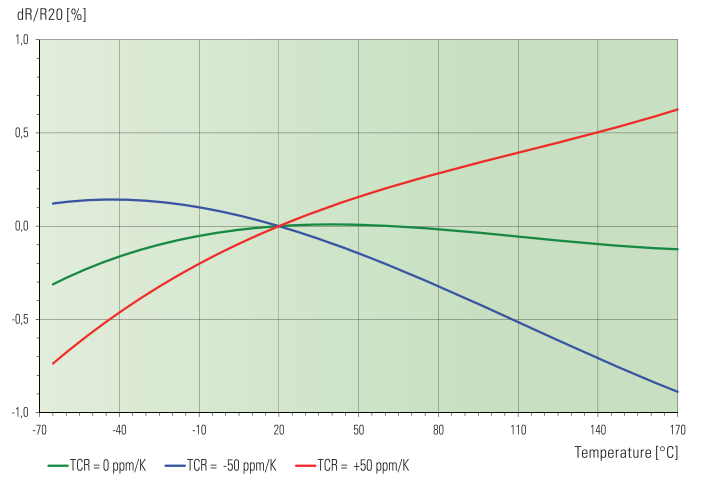


**FMK // Size 1206**

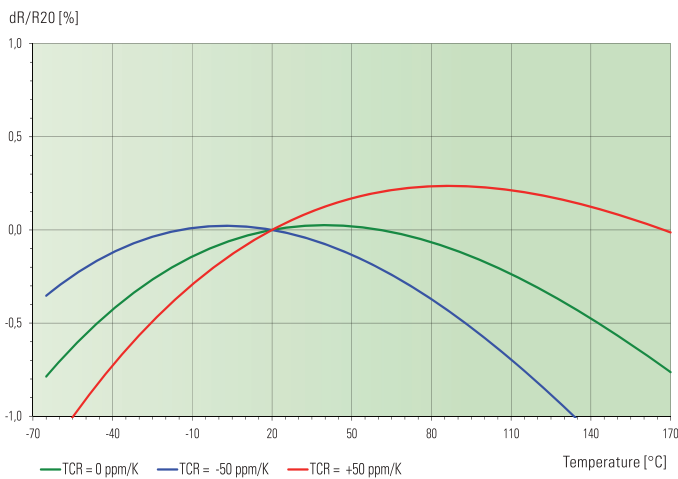
**Temperature dependence of the electrical resistance of MANGANIN® resistors**



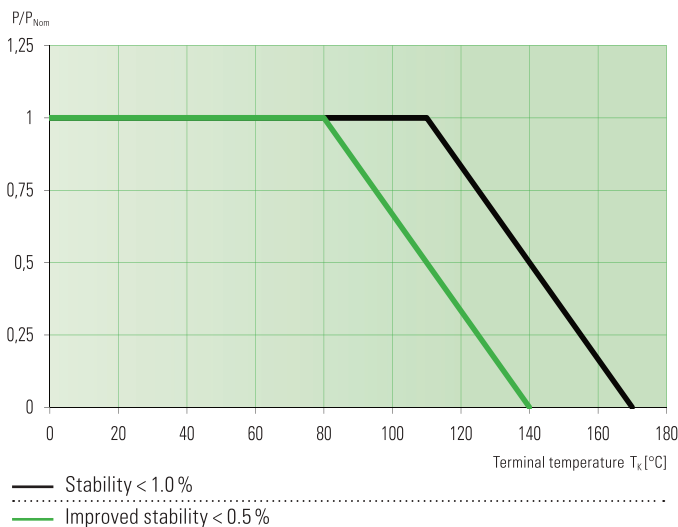
**Temperature dependence of the electrical resistance of ZERANIN® resistors**



**Temperature dependence of the electrical resistance of NOVENTIN® resistors**



**Power derating curve**

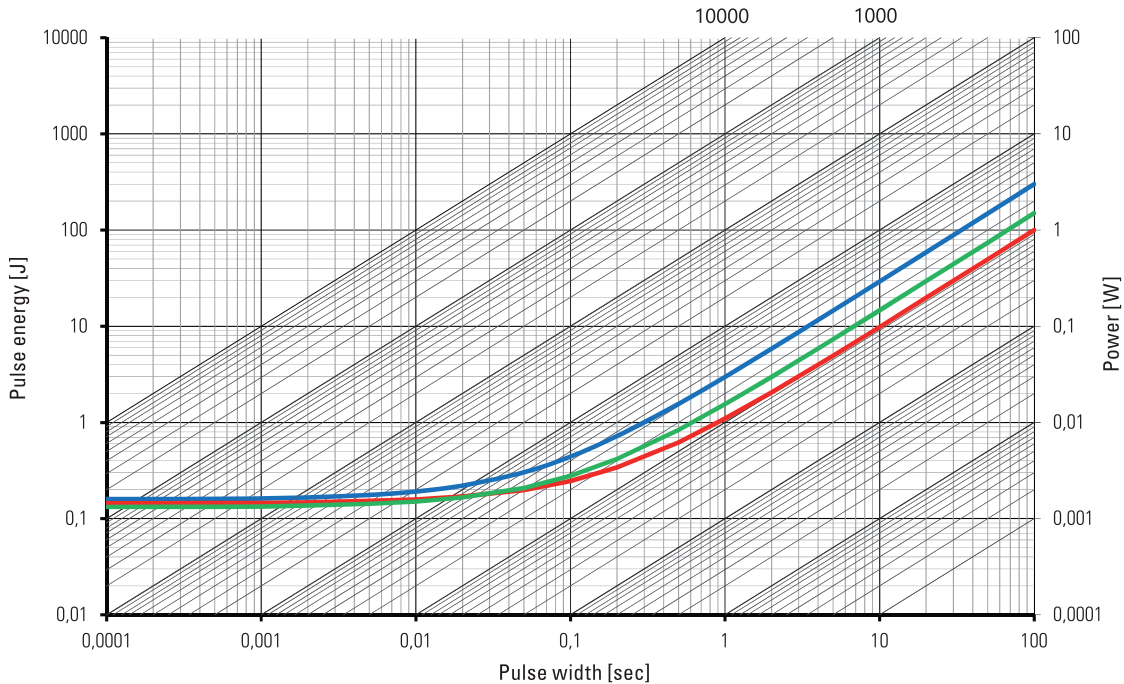




**FMK // Size 1206**

**Maximum pulse energy respectively pulse power for permanent operation**

**FMK-Z-R0015; FMK-M-R003; FMK-V-R006**  
Maximum pulse energy / power continuous operation



**Specification**

| Parameters                | Test conditions                           | Specified values             |
|---------------------------|---|------------------------------|
| Temperature Cycling       | 2000 cycles (-55 °C to +150 °C)           | ±0.5%                        |
| Low Temperature Storage   | -65 °C for 250 h                          | ±0.1%                        |
| Moisture Resistance       | MIL-STD-202 method 106                    | ±0.5%                        |
| Mechanical Shock          | 100 g, 6 ms half sine                     | ±0.2%                        |
| Vibration, High Frequency | 10 g, 10-2000 Hz, 24 h each axis          | ±0.2%                        |
| Operational Life          | 2000 h, T <sub>K</sub> max at rated power | ±1.0%, T <sub>K</sub> =110°C |
| High Temperature Exposure | 2000 h / 170 °C                           | ±1.0%                        |
| Bias Humidity             | +85 °C, 85 r.F., 1000 h, powered          | ±0.5%                        |

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