



## ISA-WELD® // PRECISION RESISTORS

### BRS // Size 3812



#### Features

- 2 W power rating at 120 °C
- Constant current up to 32 A (2 mOhm)
- Copper connectors
- Solid metal precision resistance materials
- Excellent long-term stability
- Ideal suited for mounting on DBC / IMS substrate
- Max. solder temperature up to 350 °C / 30 sec or 250 °C / 10 min
- Mounting: Reflow-soldering
- AEC-Q200 qualified
- RoHS 2011/65/EU compliant



#### Applications

- Current sensor for power hybrid applications
- Frequency converters
- Power modules
- High current applications for the automotive market

#### Technical data

|  |              |                                 |
|--|--------------|---------------------------------|
| Resistance values                              | <b>mOhm</b>  | 2 / 3 / 10 / 25 *               |
| Tolerance                                      | <b>%</b>     | 1 / 2 / 3 / 5 *                 |
| Temperature coefficient (tcr)                  | <b>ppm/K</b> | from 100 **                     |
| Applicable temperature range                   | <b>°C</b>    | -55 to +170                     |
| Power rating                                   | <b>W</b>     | 2                               |
| Internal heat resistance (R <sub>thi</sub> )   | <b>K/W</b>   | from 25 **                      |
| Inductance                                     | <b>nH</b>    | <10                             |
| Stability (Nominal load) deviation after 2000h |              | <1.0 % (T <sub>k</sub> =90 °C)  |
| T <sub>k</sub> = Terminal temperature          |              | <2.0 % (T <sub>k</sub> =120 °C) |

\* See all standard values and tolerances on page 2

\*\* See table on page 2



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**Tape and reel information**

|                  |             |                |
|------------------|-------------|----------------|
| Specification    |             | DIN EN 60286-3 |
| Tape width       | <b>mm</b>   | 16             |
| Reel size        | <b>inch</b> | 13             |
| Parts per reel   | <b>pcs</b>  | 2500           |
| Packaging weight | <b>g</b>    | 447            |

**Recommended solder profile**

|                          |            |      |     |     |
|--------------------------|------------|------|-----|-----|
| Reflow- and IR-soldering |            |      |     |     |
| Temperature              | <b>°C</b>  | 260  | 255 | 217 |
| Time                     | <b>sec</b> | peak | 40  | 90  |

**Available standard resistance values and tolerances\***

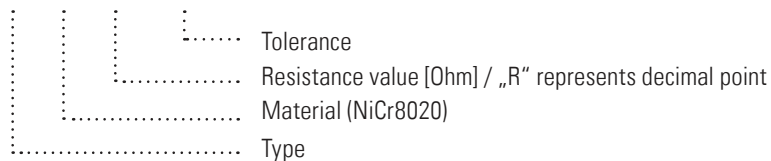
| Resistance values | Tolerance |     |     |     |
|-------------------|-----------|-----|-----|-----|
|                   | 1.0       | 2.0 | 3.0 | 5.0 |
| R002              | ✓         |     |     |     |
| R003              | ✓         |     |     |     |
| R010              | ✓         | ✓   | ✓   | ✓   |
| R025              |           | ✓   |     |     |

\* Further values and tolerances on request  
 ✓ = available

| Type       | Value [mΩ] | Thickness [mm] | R <sub>thi</sub> [K/W] | TC [ppm/K] | P [W] |
|------------|------------|----------------|------------------------|------------|-------|
| BRS-Z-R002 | 2          | 0.50           | 25                     | <130       | 2     |
| BRS-M-R003 | 3          | 0.50           | 35                     | <100       | 2     |
| BRS-N-R010 | 10         | 0.40           | 70                     | <100       | 2     |
| BRS-A-R025 | 25         | 0.24           | 170                    | <100       | 1     |

**Ordering code**

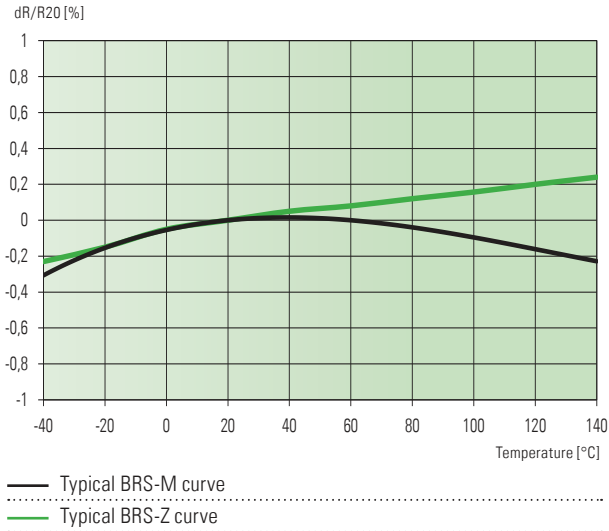
BRS - N - R010 - 2.0



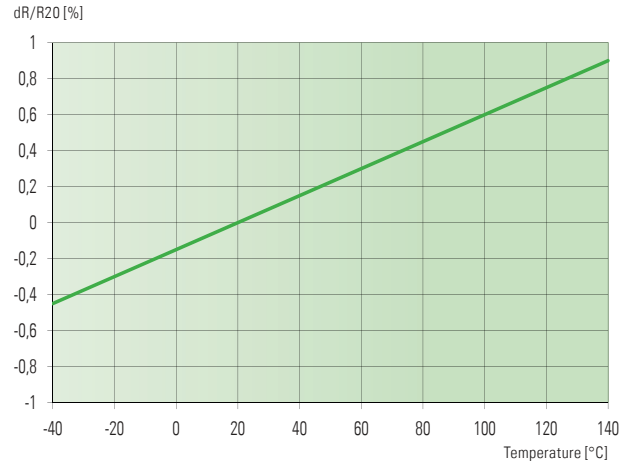


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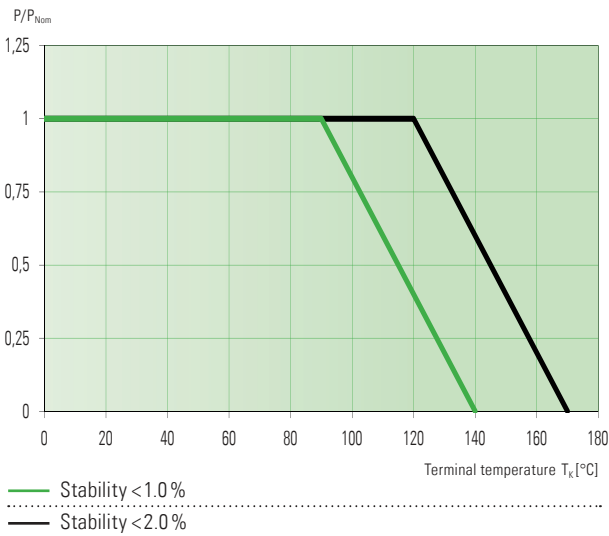
**Temperature dependence of the electrical resistance of BRS-M and BRS-Z resistors**



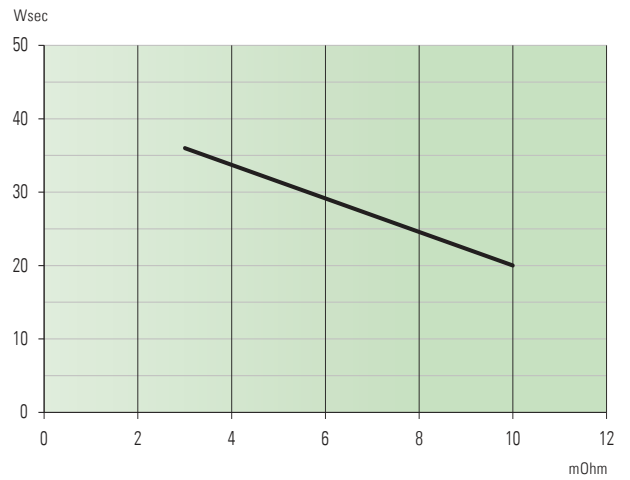
**Temperature dependence of the electrical resistance of BRS-N resistors**



**Power derating curve (2 mOhm)**



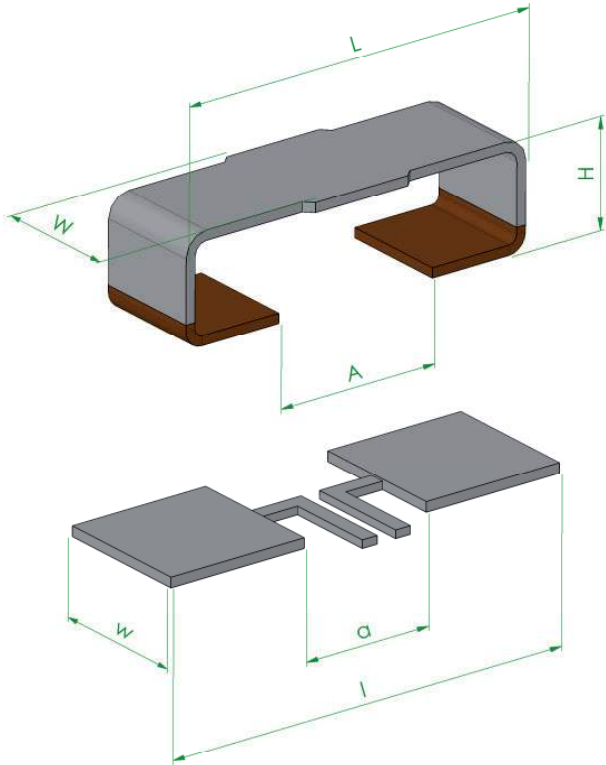
**Single pulse surge curve < 10 ms**





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Mechanical dimensions and Pcb-layout proposal, (Reflow-soldering) [mm] // Drawing no. Z-YX-288a



| Resistor type | L         | W         | H         | A          |
|---------------|-----------|-----------|-----------|------------|
| BRS-Z-R002    | 9.7 ±0.3  | 3.15 ±0.5 | 3.1 ±0.3  | 4.15 ±0.25 |
| BRS-M-R003    | 9.67 ±0.3 | 3.15 ±0.5 | 3.09 ±0.3 | 4.15 ±0.25 |
| BRS-N-R010    | 9.5 ±0.3  | 3.15 ±0.5 | 3.8 ±0.3  | 4.15 ±0.25 |
| BRS-A-R025    | 9.18 ±0.3 | 3.15 ±0.5 | 2.68 ±0.3 | 4.15 ±0.25 |

| Solder pad type | l     | w   | a   |
|-----------------|-------|-----|-----|
| BRS-Z-R002      | 10.5  | 3.5 | 3.7 |
| BRS-M-R003      | 10.47 | 3.5 | 3.7 |
| BRS-N-R010      | 10.3  | 3.5 | 3.7 |
| BRS-A-R025      | 9.88  | 3.5 | 3.7 |

4 W type broaden layout upon request

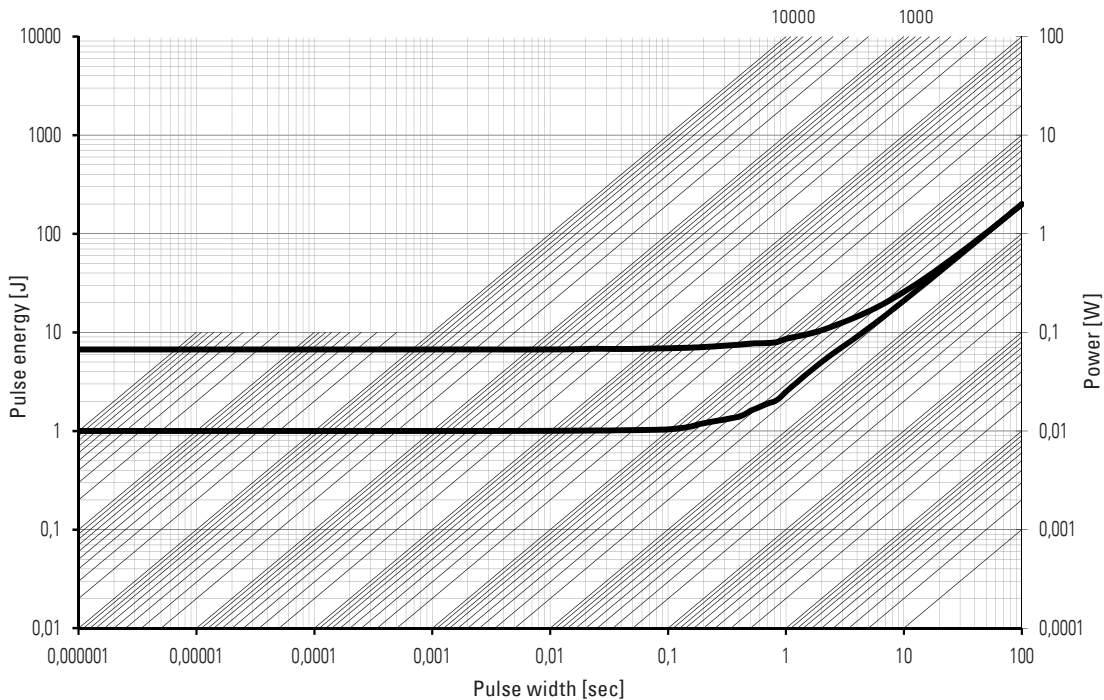
Specification

| Parameters                            | Test conditions                    | Specified values                 |
|---------------------------------------|------------------------------------|----------------------------------|
| Temperature Cycling                   | 2000 cycles (-55 °C to +150 °C)    | ±1.0 %                           |
| Low Temperature Storage and Operation | -65 °C for 24 h                    | ±0.2 %                           |
| Resistance to Soldering Heat          | 260 °C for 10 sec / 8h steam aging | n.a.                             |
| Moisture Resistance                   | MIL-STD-202 method 106             | ±0.2 %                           |
| Mechanical Shock                      | 100 g, 6 ms half sine              | ±0.5 %                           |
| Vibration, High Frequency             | 20 g, 10-2000 Hz                   | ±0.5 %                           |
| Operational Life                      | 2000 h, TK max at nominal load     | ±2.0 % (T <sub>K</sub> = 120 °C) |
| High Temperature Exposure             | 2000 h / 170 °C                    | ±2.0 %                           |
| Bias Humidity                         | +85 °C, 85 r.F., 1000 h            | ±0.5 %                           |



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**Maximum pulse energy respectively pulse power for permanent operation. Max. average power  $P_{Nominal}$**



This curve is only valid for the min. and max. resistance value. The shape of the curve in the range below 0.1 sec will be different for resistance values inbetween. Therefore a separate qualification should be made for pulse power close to the above curve.

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