# DATA SHEET

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## 5063JD series (space miser)
## 0.25 to 0.40 W; 1% and 5%
## Metal film resistors

Product specification
File under BCcomponents, BC08

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COMPONENTS

# Metal film resistors

# 5063JD series (space miser) 0.25 to 0.40 W; 1% and 5%

## DESCRIPTION

A homogeneous film of metal alloy is deposited on a high grade BALOX ceramic body. After a helical groove has been cut in the resistive layer, tinned connecting wires of electrolytic copper are welded to the end-caps. The resistors are coated with a blue lacquer which provides electrical, mechanical, and climatic protection. The encapsulation is resistant to all cleaning solvents in accordance with *"MIL-STD-202E, method 215"*, and *"IEC 60068-2-45"*.

## QUICK REFERENCE DATA

| DESCRIPTION | VALUE | |
|---|---|---|
| Resistance range | 0.22 Ω to 10 MΩ; see Table 1 | |
| Resistance tolerance and series | ±5%, (E24); ±1%, (E24/E96) | |
| Temperature coefficient | $\pm 100 \times 10^{-6}$/K | |
| Operation mode | **normal** | **long term** |
| Climatic category (LCT/UCT/days) | 55/155/56 | 55/125/56 |
| Max. dissipation, $P_{70}$ | 0.40 W | 0.25 W |
| Thermal resistance, $R_{th}$ | 200 °C/W | |
| Max. continuous operating voltage, $U_{max}$ | 200 V (DC or RMS) | |
| Noise R ≤ 1 MΩ | max. 0.1 V/V | |
| Surface temperature | 155 °C | 125 °C |
| Operating temperature range | −55 °C to +155 °C | −55 °C to +125 °C |
| Max. resistance change at $P_{70}$ for resistance range, $\Delta R/R$ max., after: | | |
| 1000 h | 0.50% | 0.25% |
| 8000 h | 1.0% | 0.50% |
| 225000 h | – | 1.5% |
| Permissible voltage against ambient: | | |
| 1 minute | 300 V | |
| continuous | 75 V | |
| Stability (ΔR/R max.) after: | | |
| load (1000 hours) | ±0.50% + 0.05 Ω | ±0.25% + 0.05 Ω |
| climatic test | ±1.0% + 0.05 Ω | |
| resistance to soldering heat | ±0.25% + 0.05 Ω | |
| short time overload (400 V max.) | ±0.25% + 0.05 Ω | |

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## ORDERING INFORMATION

**Table 1** Ordering code indicating resistor type and packaging

| TYPE | TC ($\times 10^{-6}$/K) | TOL. (%) | RESISTANCE RANGE | PART NUMBER | SPQ (units) |
|---|---|---|---|---|---|
| 5063JD | ±100 | – | jumper[1] | 5063JD0R000J12AFS | 5000; tape & reel |
| | | – | jumper[1] | 5063JD0R000J18AFS | 5000; ammopack |
| | | ±5 | 0.22 to 0.91 Ω | 5063JDxxxxxJ12AFS | 5000; tape & reel |
| | | ±5 | 0.22 to 0.91 Ω | 5063JDxxxxxJ18AFS | 5000; ammopack |
| | | ±1 | 1 Ω to 10 MΩ | 5063JDxxxxxF12AF5 | 5000; tape & reel |
| | | ±1 | 1 Ω to 10 MΩ | 5063JDxxxxxF18AF5 | 5000; ammopack |

**Note**

1. A 0 Ω jumper is available with a maximum resistance $R_{max} \leq 10$ mΩ at 3 A.

**Composition of the clear text code (NAFTA P/N)**

- The resistors have an ordering code starting with 50
- The subsequent digits indicate the resistor type, temperature coefficient, ohmic value, tolerance and packaging; see Table 1
- The ohmic value is represented by 5-digits; see Table 2
- For temperature coefficient and tolerance, see Table 3.

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**Table 2** Examples of the ohmic value

| OHMIC VALUE | 5-DIGIT VALUE |
|---|---|
| 0.22 Ω | 0R220 |
| 1 Ω | 1R000 |
| 10 Ω | 10R00 |
| 100 Ω | 100R0 |
| 1 kΩ | 1K000 |
| 10 kΩ | 10K00 |
| 100 kΩ | 100K0 |
| 1 MΩ | 1M000 |

**Table 3** Letter coding for temperature coefficient and tolerance

| TC ($\times 10^{-6}$/K) | LETTER CODE | TOL. (%) | LETTER CODE |
|---|---|---|---|
| 100 | D | ±5 | J |
| – | – | ±1 | F |

ORDERING EXAMPLE: CLEAR TEXT CODE

The ordering code of a 5063JD resistor, value 5600 Ω ±1%, taped on a bandolier of 5000 units in tape on reel is: 5063JD5K600F12AF5.

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## FUNCTIONAL DESCRIPTION

### Product characterization

Standard values of nominal resistance are taken from the E24 or E96 series for resistors with a tolerance of ±5% or ±1%.
The values of the E24 series are in accordance with *"IEC publication 60063"*.

### Limiting values

| TYPE | LIMITING VOLTAGE(1) (V) | LIMITING POWER (W) |
|---|---|---|
| 5063JD | 200 | 0.40 |

**Note**

1. The maximum voltage that may be continuously applied to the resistor element, see "IEC publication 60115-1".

DERATING

The power that the resistor can dissipate depends on the operating temperature; see Figs 1 and 2.

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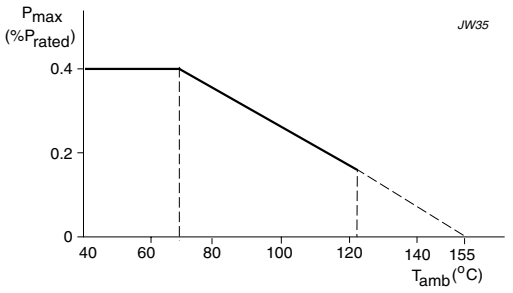


Fig.1 Derating curve, normal operation.

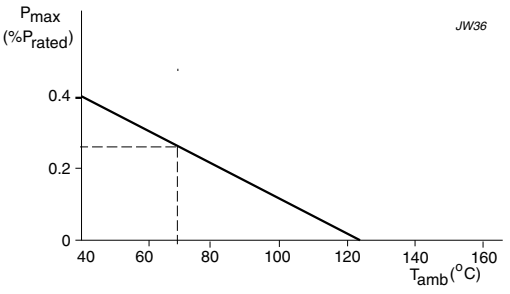


Fig.2 Derating curve, long term operation.

NOISE

The current noise is measured in accordance with *"DIN 44049 Part 1 and IEC 600195"*. Maximum values are for 99.8% of all resistors; see Fig 3.

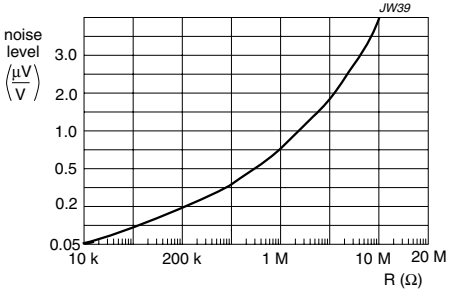


Fig.3 Current noise.

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**Pulse-load behaviour**

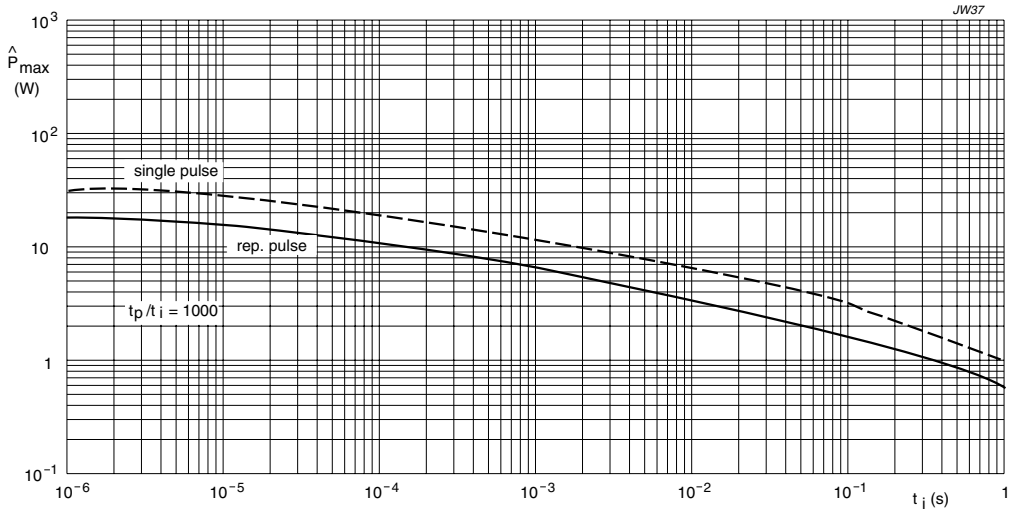


Fig.4 Pulse on a regular basis; maximum permissible peak pulse power ($\hat{P}_{max}$) as a function of pulse duration ($t_i$).

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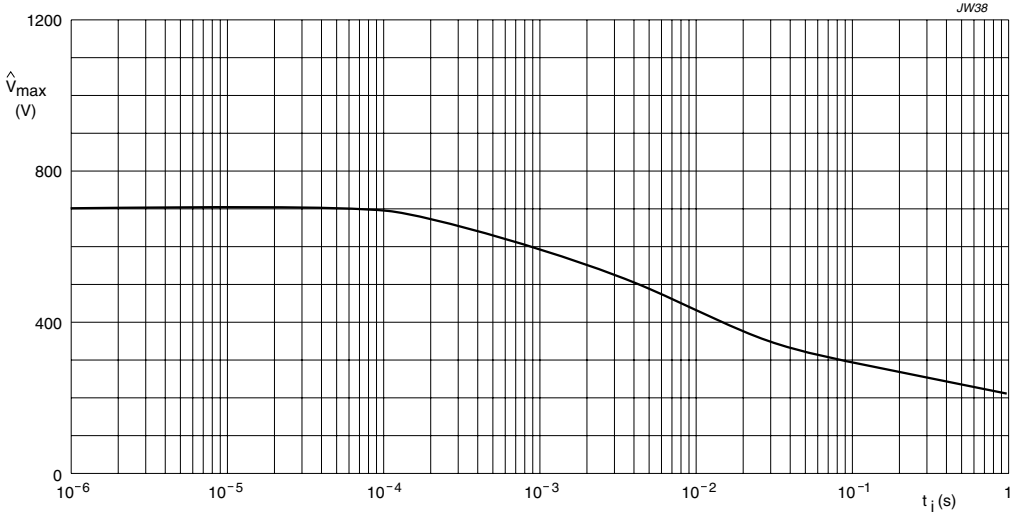


Fig.5 Pulse on a regular basis; maximum permissible peak pulse voltage ($\hat{V}_{max}$) as a function of pulse duration ($t_i$).

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**Definition of symbols** (see Figs 4, 5, 6 and 7)

| SYMBOL | DESCRIPTION |
|---|---|
| $\hat{P}$ | applied peak pulse power |
| $\hat{P}_{max}$ | maximum permissible peak pulse power; see Fig.4 |
| $\hat{V}_i$ | applied peak pulse voltage; see Fig 6 |
| $\hat{V}_{max}$ | maximum permissible peak pulse voltage; see Fig.5 |
| V(t) | pulse voltage |
| R | nominal resistance value |
| $P_U$ | rated dissipation at ambient temperature |
| $R_{nom}$ | nominal resistance value |
| $t_i$ | pulse duration (rectangular pulses) |
| $t_p$ | pulse repetition time |

**Pulses**

The permissible pulse-load is determined by the resistance change as given for the endurance test after 8000 hours.

PULSE VOLTAGE LIMIT

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The maximum permissible impulse voltage $\hat{V}_{max}$ is the voltage pulse short overload depending on the impulse time $t_i$. High ohmic values are protected by the interdependence of voltage limit and impulse time. this function is given by the equation: $\hat{V}_{max} = \frac{2.5 \cdot V_{max}}{1 + t_i \cdot K} + V_{max}$

$V_{max}$ = maximum permissible continuous voltage;
ti = pulse time;
K = 100 $s^{-1}$.

MAXIMUM PULSE-LOAD

The average load $\bar{P}$ must not exceed the rated dissipation. For resistance values above the critical resistance the rated dissipation is given by the resistance value and the limiting element voltage $V_{max}$: $\bar{P} = \frac{1}{t_p R}\int_{t1}^{t2} U^2(t)dt \leq P\upsilon$

CONTINUOUS AND SINGLE PULSE-LOAD

There is a difference between repetitive pulse-load $\left(\bar{P} = \frac{t_i}{t_p} \cdot \underline{P} \text{ with } \underline{P} = \text{power at the pulse time } t_i\right)$ or single pulse load (e.g. switching events $\bar{P} > 0$).

A higher pulse-load $P_{max}$ is accepted in the latter case.

PULSE SHAPES

Figure 6 shows the maximum pulse-load for a rectangular pulse shape: $\bar{P} = \frac{t_i \cdot \hat{V}^2}{t_p \cdot R}$

Other pulses should be converted into rectangular pulse shapes (see Fig.7), having the same energy at a given peak voltage. The following equation shows the calculation for exponential pulses:

$\bar{P} = \frac{\tau_e}{2 \cdot t_p} \cdot \frac{\hat{V}^2}{R}$ with $\tau_e = R \cdot C$ or $\tau_e = \frac{L}{R}$

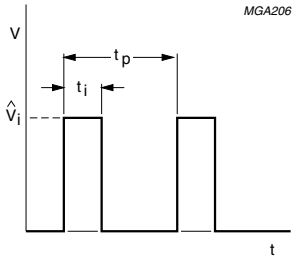


Fig.6 Rectangular pulses.

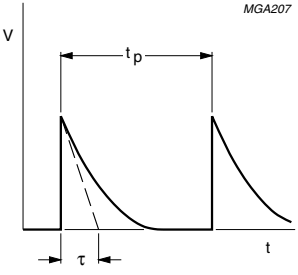


Fig.7 Exponential pulses.

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## MECHANICAL DATA

### Mass per 100 units

13 g

### Marking

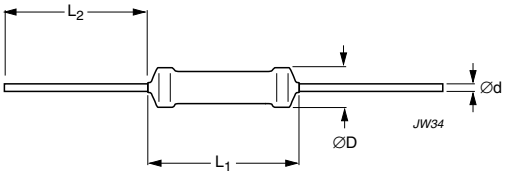
The nominal resistance and tolerance are marked on the resistor using four or five coloured bands in accordance with IEC publication 60062 *"Colour codes for fixed resistors"*.

### Mounting

The resistors are suitable for processing on automatic insertion equipment in addition to cutting and bending machines.The minimum bending is 5 mm (.200 inch).

### Outlines

The length of the body ($L_1$) is measured by inserting the leads into holes of two identical gauge plates and moving these plates parallel to each other until the resistor body is clamped without deformation *("IEC publication 60294")*.




For dimensions see Table 4.

Fig.8 Outline.

**Table 4** Resistor type and physical dimensions; see Fig.8

| TYPE | ØD MAX. (mm) | $L_1$ MAX. (mm) | $L_2$ MAX. (mm) | Ød (mm) |
|---|---|---|---|---|
| **Dimensions in inches** | | | | |
| 5063JD | 0.063 | .142 | 1.14 | .020 |
| **Dimensions in millimetres** | | | | |
| 5063JD | 1.6 | 3.6 | 29 | 0.5 |

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Стандарт Электрон Связь

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