



THIN FILM CHIP RESISTORS

PFRR



ESCC (ⓔ) 4001/023 Qualified R Failure Rate High Precision (10 ppm/°C, 0.05 %) Thin Film Chip Resistors

KEY BENEFITS

- ESA qualified
- R Failure rate SMD chip resistor
- TCR to 10ppm [-55 °C; +155 °C]
- Tolerances down to 0.05 %
- Load life stability: less than 0.25 % at Pn at 70 °C after 2000 hours
- Resistance range: 100R to 3M01

ESCC (e) (4001/023 Qualified R Failure Rate High Precision (10 ppm/°C, 0.05 %) Thin Film Chip Resistors



- FEATURES**
- Load life stability at $\pm 70^\circ\text{C}$ for 2000 h: 0.25 % under P_n
 - Temperature coefficient to: 10 ppm/°C
 - Very low noise (< 35 dB) and voltage coefficient (< 0.01 ppm/V)
 - Resistance range: 100 Ω to 3.01 M Ω (depending on size)
 - Tolerances down to 0.05 %
 - SnPb terminations over nickel barrier
 - ESCC 4001 (generic spec)
 - ESCC 4001/023 (detailed spec)
 - ESCC qualified
 - R failure rate (0.01 % per 1000 h)
 - SMD wraparound chip resistor
 - Halogen-free according to IEC 61249-2-21

Vishay Sfernice Thin Film division holds ESCC QML qualification (ESCC technology flow qualification). These Hf/Pt components are ideal for low noise and precision applications, superior stability, low temperature coefficient of resistance, and low voltage coefficient. VISHAY SFERNICE's precision thin film wraparound resistors exceed requirements of MIL-PRF-55342G characteristics Y (± 10 ppm/°C).

DIMENSIONS



| CASE SIZE | DIMENSIONS in millimeters | | | | |
|-----------|---|---|---|-----------------------------------|------|
| | A MAX. TOL. +0.04 MIN. TOL. -0.13 | B MAX. TOL. +0.26 MIN. TOL. -0.13 | C MAX. TOL. +0.64 MIN. TOL. -0.13 | DE L. -0.13 MIN. TOL. -0.13 | |
| 0603 | 1.52 | 0.75 | 0.38 | 0.38 | 0.38 |
| 0805 | 1.91 | 1.27 | 0.38 | 0.38 | 0.38 |
| 1206 | 3.00 | 1.60 | 0.38 | 0.38 | 0.38 |
| 2010 | 5.08 | 2.54 | 0.38 | 0.38 | 0.58 |

GLOBAL PART NUMBER INFORMATION

ESCC Code: **4 0 0 1 0 2 3 R 1 0 0 3 B 1**

| | | | | |
|-----------------------------|--------------------------|--|--|--|
| ESCC SPEC 4001023 | FAILURE RATE R | OHMIC VALUE The first three digits are significant figures and the last digit specifies the number of zero to follow. 3901 = 3900 Ω 1004 = 1 M Ω | TOLERANCE W = $\pm 0.05\%$ B = $\pm 0.10\%$ | TCR 1 = ± 10 ppm/°C 2 = ± 25 ppm/°C |
|-----------------------------|--------------------------|--|--|--|

Vishay/Sfernice thin film is the first passive manufacturer to hold the ESCC Technology Flow Qualification, official certificate is available on ESCC's web site <https://escclab.org/ReadArticle?articleId=722>.

This qualification opens the door to a new concept at ESA: The Failure Rate option (similar to the one offered in the MIL system), for instance R failure rate: 0.01 % per 1000 h.

New specifications describing this new concept have been released by the ESA:

2544001: Requirements for the Technology Flow Qualification of Film Resistors <https://escclab.org/escclab/specifications/2544001.pdf>

26000: Failure Rate Level Sampling Plans and Procedures <https://escclab.org/escclab/specifications/26000.pdf>

21700: General Requirements for the Marking of the ESCC Components <https://escclab.org/escclab/specifications/21700.pdf>

4001: Generic Specification Resistors Fixed Film <https://escclab.org/escclab/specifications/4001.pdf>

4001023: Resistors, Fixed, Chip, Thin Film, Type PFR and PFRR <https://escclab.org/escclab/specifications/4001023.pdf>

Parts are delivered with space C.O.C.

Parts undergo 100 % overload at end of production process.

LAND PATTERN in millimeters

| CHIP SIZE | Z _{max} | G _{min} | X _{max} |
|-----------|------------------|------------------|------------------|
| 0603 | 2.37 | 0.35 | 0.98 |
| 0705/0805 | 2.76 | 0.74 | 1.40 |
| 1206 | 3.91 | 1.85 | 1.73 |
| 2010 | 5.93 | 3.71 | 2.67 |

Note
• Suggested land pattern: According to IPC-7351

STANDARD ELECTRICAL SPECIFICATIONS

| VISHAY SFERNICE DESIGNATION | PFRR 0805 | PFRR 1206 | PFRR 2010 |
|--|--|---|---|
| Variant number | 09 | 10 | 11 |
| Power rating at +70 °C (P _n) | 0.1 W | 0.125 W | 0.50 W |
| Limiting element voltage (UL) | 50 V | 100 V | 150 V |
| Ohmic value range | Min. 100 Ω Max. 301 k Ω | Min. 100 Ω Max. 3.01 M Ω | Min. 100 Ω Max. 3.01 M Ω |
| Insulation voltage (UI) | 100 V | 200 V | 300 V |
| Temperature coefficient | ± 10 ppm/°C; ± 25 ppm/°C | | |
| Tolerance | $\pm 0.05\%$; $\pm 0.1\%$ | | |
| Temperature range | -55 °C to +155 °C | | |
| Soldering temperature (T _{so}) | 260 °C, immersion 10 s | | |

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