NiCr Thin Film, Top-Contact Resistor

The QFN series nichrome on quartz resistor chips offer a combination of nichrome stability, excellent frequency response and small size.

The QFNs are manufactured using Vishay Electro-Films (EFI) sophisticated thin film equipment and manufacturing technology. The QFNs are 100% electrically tested and visually inspected to MIL-STD-883, method 2032 class H or K.

**FEATURES**
- Wire bondable
- Chip size: 0.020 inches square
- Case: 0202
- Resistance range: 1 Ω to 510 kΩ
- Resistor material: Nichrome
- Quartz substrate: < 0.1 pF shunt capacitance
- Power: 25 mW

**APPLICATIONS**
Vishay EFI QFN top-contact resistor chips are widely used in hybrid packages where space is limited. Designed with capacity to handle substantial power loads, they also have the benefit of nichrome stability.
Recommended for hermetic environments where die is not exposed to moisture.

### TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Resistance Range</td>
<td>1 to 510K</td>
<td>Ω</td>
</tr>
<tr>
<td>Standard Tolerances</td>
<td>± 0.1, ± 0.5, ± 1</td>
<td>%</td>
</tr>
<tr>
<td>TCR</td>
<td>± 25, ± 50, ± 100, ± 250</td>
<td>ppm/°C</td>
</tr>
</tbody>
</table>

**Tightest Standard Tolerance Available**

- ± 1 %
- ± 0.5 %
- ± 0.1 %

### STANDARD ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise, MIL-STD-202, Method 308</td>
<td>-35 typ.</td>
<td>dB</td>
</tr>
<tr>
<td>100 Ω to 250 kΩ</td>
<td>-20 typ.</td>
<td>dB</td>
</tr>
<tr>
<td>&lt; 100 Ω or &gt; 251 kΩ</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Stability, 1000 h, +125 °C, 12.5 mW</td>
<td>± 0.1 % max.</td>
<td>%</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>± 0.1 % max.</td>
<td>%</td>
</tr>
<tr>
<td>-55 to +125</td>
<td>± 0.25 % max.</td>
<td>%</td>
</tr>
<tr>
<td>Thermal Shock, MIL-STD-202, Method 107, Test Condition F</td>
<td>± 0.5 % max.</td>
<td>%</td>
</tr>
<tr>
<td>High Temperature Exposure, +150 °C, 100 h</td>
<td>± 0.25 % max.</td>
<td>%</td>
</tr>
<tr>
<td>Dielectric Voltage Breakdown</td>
<td>200</td>
<td>V</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>10¹² min.</td>
<td>Ω</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>100 max.</td>
<td>V</td>
</tr>
<tr>
<td>DC Power Rating at +70 °C (Derated to zero at +175 °C)</td>
<td>0.025</td>
<td>W</td>
</tr>
<tr>
<td>5x Rated Power Short-Time Overload, +25 °C, 5 s</td>
<td>± 0.25 % max.</td>
<td>%</td>
</tr>
</tbody>
</table>
CONFIGURATIONS in inches

SCHEMATIC

MECHANICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chip Size</td>
<td>0.020&quot; x 0.020&quot; ± 0.003&quot; (0.51 mm x 0.51 mm ± 0.076 mm)</td>
</tr>
<tr>
<td>Chip Thickness</td>
<td>0.010&quot; ± 0.002&quot; (0.254 mm ± 0.05 mm)</td>
</tr>
<tr>
<td>Chip Substrate Material</td>
<td>Quartz</td>
</tr>
<tr>
<td>Resistor Material</td>
<td>Nichrome (passivation optional)</td>
</tr>
<tr>
<td>Bonding Pad size</td>
<td>0.004&quot; x 0.004&quot; (0.10 mm x 0.10 mm)</td>
</tr>
<tr>
<td>Number of Pads</td>
<td>2</td>
</tr>
<tr>
<td>Pad Material</td>
<td>15 kΩ minimum gold (Al optional)</td>
</tr>
<tr>
<td>Backing</td>
<td>None, lapped quartz (Au optional)</td>
</tr>
</tbody>
</table>

GLOBAL PART NUMBER INFORMATION

Global Part Number: QFN50000FKANHWS

Global Part Number Description: QFN 5K 1 % 100 ppm/°C Al None H WS

- **Q**
- **F**
- **N**
- **5**
- **0**
- **0**
- **0**
- **F**
- **K**
- **A**
- **N**
- **H**
- **W**
- **S**

- **MODEL**
- **RESISTANCE**
- **RESISTANCE MULTIPLIER CODE**
- **TOLERANCE CODE (%)**
- **TCR (ppm/°C)**
- **TERMINATION**
- **BACK METAL**
- **VISUAL CLASS**
- **PACKAGING CODE**

- **QFN 20 x 20 size NiCr on quartz**
- First 4 digits are significant figures of resistance
- **C = 0.001**
- **B = 0.01**
- **A = 0.1**
- **0 = 1**
- **1 = 10**
- **2 = 100**
- **3 = 1000**
- **E = ± 25**
- **G = gold**
- **H = class H**
- **WS = waffle pack**

- **F**
- **K**
- **A = aluminum**
- **N = none**
- **K = class K**
- **100 min., 1 mult**
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