Microwave Precision
Fixed Attenuator
RCAT-SERIES
50Ω 2W DC to 20 GHz

The Big Deal
- Exceptional power handling of 2W
- Wide band width DC to 20 GHz
- Miniature size 2.25 mm x 2.25 mm x 1.1 mm Ceramic package
- Highly reliable and repeatable performance

Product Overview
RCAT attenuators are fixed value absorptive attenuators. The highly precision and repeatable monolithic attenuator chip is processed using the most advanced semiconductor processing techniques. The Cu filled through-die via’s and Cu metallization on the backside provides a very low thermal resistance path to dissipate the attenuated power. The attenuator chip is packaged in an LTCC hermetic package utilizing fully automated and highly reliable manufacturing processes.

Key Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max power input 2W</td>
<td>Thermally optimized design can operate reliably at much higher input power as compared to similar devices</td>
</tr>
<tr>
<td>Band width DC to 20 GHz</td>
<td>Supports a broad band of applications with predictable and repeatable performance, excellent choice to buffer cascaded reflective components.</td>
</tr>
<tr>
<td>Ceramic Hermetic package</td>
<td>Highly reliable hermetic package provides predictable and repeatable performance in military applications including ground, air, and ship requirements</td>
</tr>
<tr>
<td>Very Small Size</td>
<td>Miniature 2.25 mm x 2.25 mm and very low profile of 1.1 mm.</td>
</tr>
</tbody>
</table>

Notes
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Microwave Precision
Fixed Attenuator

RCAT-03+

50Ω 2W 3dB DC to 20 GHz

Product Features
- fixed value, absorptive device
- wide bandwidth, DC-20 GHz
- excellent attenuation accuracy & flatness
- miniature size 2.25 mm x 2.25 mm x 1.1 mm
- ceramic, hermetic, nitrogen filled
- aqueous washable

Typical Applications
- cellular
- PCS
- communications
- radar
- wideband military
- test and measurement equipment

General Description
RCAT-03+ (RoHS compliant) is a wideband fixed attenuator with excellent attenuation accuracy and flatness. It can handle up to 2W. The integrated circuits comprising of thin film resistors is bonded in an optimized multi-layer integrated LTCC substrate, and then hermetically sealed under a controlled nitrogen atmosphere with gold-plated covers and eutectic AuSn solder. These attenuators have been tested to MIL requirements for gross leak, fine leak, thermal shock, vibration, acceleration, mechanical shock, and HTOL.

Pad Description

<table>
<thead>
<tr>
<th>Function</th>
<th>Pad Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF IN / RF-OUT</td>
<td>1</td>
<td>RF input / output pad</td>
</tr>
<tr>
<td>RF-OUT / RF IN</td>
<td>3</td>
<td>RF output / input pad</td>
</tr>
<tr>
<td>GND</td>
<td>2,4</td>
<td>Connected to circuit ground</td>
</tr>
</tbody>
</table>

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+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

50Ω 2W 3dB DC to 20 GHz

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**Fixed Attenuator**

**RCAT-03+**

### Electrical Specifications¹ at 25°C, 50Ω

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Condition (GHz)</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range</td>
<td>DC</td>
<td></td>
<td></td>
<td>20</td>
<td>GHz</td>
</tr>
<tr>
<td>Attenuation</td>
<td>1</td>
<td>2.5</td>
<td>3.04</td>
<td>3.5</td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>2.9</td>
<td>3.37</td>
<td>3.9</td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>3.1</td>
<td>3.94</td>
<td>4.7</td>
<td>dB</td>
</tr>
<tr>
<td>Return Loss</td>
<td>1</td>
<td></td>
<td>31</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
<td>20</td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
<td>14</td>
<td></td>
<td>dB</td>
</tr>
</tbody>
</table>

### Typical Performance Data at 25°C

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>Attenuation (dB)</th>
<th>Return Loss (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>3.02</td>
<td>35.53</td>
</tr>
<tr>
<td>2.00</td>
<td>3.07</td>
<td>25.77</td>
</tr>
<tr>
<td>5.00</td>
<td>3.19</td>
<td>19.28</td>
</tr>
<tr>
<td>8.00</td>
<td>3.31</td>
<td>18.22</td>
</tr>
<tr>
<td>10.00</td>
<td>3.37</td>
<td>19.79</td>
</tr>
<tr>
<td>12.00</td>
<td>3.42</td>
<td>19.97</td>
</tr>
<tr>
<td>15.00</td>
<td>3.55</td>
<td>22.31</td>
</tr>
<tr>
<td>17.00</td>
<td>3.73</td>
<td>16.41</td>
</tr>
<tr>
<td>19.00</td>
<td>3.83</td>
<td>14.00</td>
</tr>
<tr>
<td>20.00</td>
<td>3.94</td>
<td>13.61</td>
</tr>
</tbody>
</table>

### Absolute Maximum Ratings²

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Case Temperature³</td>
<td>-55°C to 125°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65°C to 150°C</td>
</tr>
<tr>
<td>RF Input Power⁴</td>
<td>2W at 25°C</td>
</tr>
</tbody>
</table>

1. Tested using characterization test circuit as defined in Figure 1. See graphs and data above for performances at all other frequencies.
2. Permanent damage may occur if any of these limits are exceeded.
3. Case is defined as ground lead.
4. RF Power at 25°C case temperature: 2W. Derate linearly to 0.33W at 125°C.

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Product Marking

MCL
RCAT-03+

Additional Detailed Technical Information

<table>
<thead>
<tr>
<th>Performance Data</th>
<th>Data Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swept Graphs</td>
<td></td>
</tr>
<tr>
<td>Case Style</td>
<td>LZ1737 Ceramic package, Terminal finish: Ni-Pd-Au</td>
</tr>
<tr>
<td>Tape &amp; Reel</td>
<td>F108</td>
</tr>
<tr>
<td>Standard quantities available on reel</td>
<td>7” reels with 20, 50, 100, 200, 500, 1K or 2K devices.</td>
</tr>
<tr>
<td>Suggested Layout for PCB Design</td>
<td>click here</td>
</tr>
<tr>
<td>Evaluation Board</td>
<td>TB-668-03+</td>
</tr>
<tr>
<td>Environmental Ratings</td>
<td>ENV-71</td>
</tr>
</tbody>
</table>

ESD Rating
Human Body Model (HBM): 250V, Class 1A (JESD22-A114)

Machine Model (MM): 200V, Class B (JESD22-A115)

MSL Rating
Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D