A45-1 / SMA45-1

Cascadable Amplifier
1000 to 4000 MHz

Rev. V3

Features
- WIDE BANDWIDTH
- HIGH GAIN 17.5 dB (TYP.)
- LOW NOISE: 4.1 dB (TYP.)
- GaAs FET DESIGN

Description
The A45-1 RF amplifier is a discrete hybrid design, which uses thin film manufacturing processes for accurate performance and high reliability. This single stage GaAs FET feedback amplifier design displays impressive performance characteristics over a broadband frequency range. An RF choke is used for DC power supply decoupling. Both TO-8 and Surface Mount packages are hermetically sealed, and MIL-STD-883 environmental screening is available.

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>A45-1</td>
<td>TO-8</td>
</tr>
<tr>
<td>SMA45-1</td>
<td>Surface Mount</td>
</tr>
<tr>
<td>CA45-1 **</td>
<td>SMA Connectorized</td>
</tr>
</tbody>
</table>

** The connectorized version is not RoHS compliant.

Electrical Specifications: \( Z_0 = 50 \Omega, V_{CC} = +5 \, V_{DC} \)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Typical</th>
<th>Guaranteed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>25°C</td>
<td>0°C to 50°C</td>
</tr>
<tr>
<td>Frequency</td>
<td>MHz</td>
<td>80-4200</td>
<td>1000-4000</td>
</tr>
<tr>
<td>Small Signal Gain (min)</td>
<td>dB</td>
<td>17.5</td>
<td>16.5</td>
</tr>
<tr>
<td>Gain Flatness (max)</td>
<td>dB</td>
<td>±0.6</td>
<td>±0.8</td>
</tr>
<tr>
<td>Reverse Isolation</td>
<td>dB</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Noise Figure (max)</td>
<td>dB</td>
<td>4.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Power Output @ 1 dB comp. (min)</td>
<td>dBm</td>
<td>13.0</td>
<td>12.5</td>
</tr>
<tr>
<td>IP3</td>
<td>dBm</td>
<td>+26</td>
<td></td>
</tr>
<tr>
<td>IP2</td>
<td>dBm</td>
<td>+33</td>
<td></td>
</tr>
<tr>
<td>Second Order Harmonic IP</td>
<td>dBm</td>
<td>+40</td>
<td></td>
</tr>
<tr>
<td>VSWR Input / Output (max)</td>
<td></td>
<td>1.8:1 / 1.8:1</td>
<td>1.9:1 / 1.9:1</td>
</tr>
<tr>
<td>DC Current @ 5 Volts (max)</td>
<td>mA</td>
<td>65</td>
<td>75</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Absolute Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>-62°C to +125°C</td>
</tr>
<tr>
<td>Case Temperature</td>
<td>125°C</td>
</tr>
<tr>
<td>DC Voltage</td>
<td>+6 V</td>
</tr>
<tr>
<td>Continuous Input Power (1 minute max.)</td>
<td>100 mW</td>
</tr>
<tr>
<td>Short Term Input Power</td>
<td>+13 dBm</td>
</tr>
<tr>
<td>Peak Power (3 µsec max.)</td>
<td>0.25 W</td>
</tr>
<tr>
<td>“S” Series Burn-In Temperature (case)</td>
<td>125°C</td>
</tr>
</tbody>
</table>

Thermal Data: \( V_{CC} = +5 \, V_{DC} \)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Resistance ( \theta_c )</td>
<td>132°C/W</td>
</tr>
<tr>
<td>Transistor Power Dissipation ( P_d )</td>
<td>0.171 W</td>
</tr>
<tr>
<td>Junction Temperature Rise Above Case ( T_{jc} )</td>
<td>23°C</td>
</tr>
</tbody>
</table>

1 Over temperature performance limits for part number CA45-1, guaranteed from 0°C to +50°C only.

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Typical Performance Curves at +25°C

### Gain

<table>
<thead>
<tr>
<th>Gain (dB)</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>1000</td>
</tr>
<tr>
<td>20</td>
<td>1500</td>
</tr>
<tr>
<td>19</td>
<td>2000</td>
</tr>
<tr>
<td>18</td>
<td>2500</td>
</tr>
<tr>
<td>17</td>
<td>3000</td>
</tr>
</tbody>
</table>

### Noise Figure

<table>
<thead>
<tr>
<th>Noise Figure</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1000</td>
</tr>
<tr>
<td>4</td>
<td>2000</td>
</tr>
<tr>
<td>3</td>
<td>3000</td>
</tr>
<tr>
<td>2</td>
<td>4000</td>
</tr>
</tbody>
</table>

### Power Output *

<table>
<thead>
<tr>
<th>Power Output (dBm)</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>1000</td>
</tr>
<tr>
<td>14</td>
<td>1500</td>
</tr>
<tr>
<td>13</td>
<td>2000</td>
</tr>
<tr>
<td>12</td>
<td>2500</td>
</tr>
</tbody>
</table>

* at 1 dB Gain Compression

### Intercept Point

### VSWR

<table>
<thead>
<tr>
<th>VSWR</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>1000</td>
</tr>
<tr>
<td>2.0</td>
<td>1500</td>
</tr>
<tr>
<td>1.0</td>
<td>2000</td>
</tr>
</tbody>
</table>

* Dimensions are inches (millimeters) ±0.015 (0.38) unless otherwise specified.

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