### Measurement condition
- Ambient temperature: 23 °C
- Input power level: 0 dBm
- Terminating impedance:
  - Input: 50 Ω
  - Output: 50 Ω

### Characteristics
**Remark:**
The maximum attenuation in the pass band is defined as the insertion loss $a_e$. The nominal frequency $f_N$ is fixed at 1504.5 MHz without any tolerance or limit. The values of absolute attenuation $a_{abs}$ are guaranteed over the whole operating temperature range. The frequency shift of the filter within the operating temperature range is included in the production tolerance scheme.

#### Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>typ. value</th>
<th>tolerance / limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion loss in PB $a_e$</td>
<td>2.3 dB</td>
<td>max. 2.75 dB</td>
</tr>
<tr>
<td>Nominal frequency $f_N$</td>
<td>-</td>
<td>1504.5 MHz</td>
</tr>
<tr>
<td>Passband $PB$</td>
<td>-</td>
<td>$f_N \pm 12.5$ MHz</td>
</tr>
<tr>
<td>Passband variation</td>
<td>1.0 dB</td>
<td>max. 1.5 dB</td>
</tr>
<tr>
<td>Absolute attenuation $a_{abs}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.3 MHz ... 1442 MHz</td>
<td>39 dB</td>
<td>min. 30 dB</td>
</tr>
<tr>
<td>1442 MHz ... 1467 MHz</td>
<td>28 dB</td>
<td>min. 20 dB</td>
</tr>
<tr>
<td>1542 MHz ... 1567 MHz</td>
<td>40 dB</td>
<td>min. 20 dB</td>
</tr>
<tr>
<td>1567 MHz ... 3500 MHz</td>
<td>33 dB</td>
<td>min. 30 dB</td>
</tr>
<tr>
<td>Group delay ripple within PB</td>
<td>17 ns</td>
<td>max. 30 ns</td>
</tr>
<tr>
<td>VSWR within PB</td>
<td>1.6 : 1</td>
<td>max. 2 : 1</td>
</tr>
<tr>
<td>Input power level in PB</td>
<td>-</td>
<td>max. 10 dBm</td>
</tr>
<tr>
<td>Operating temperature range $OTR$</td>
<td>-</td>
<td>-30 °C ... +85 °C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-</td>
<td>-40 °C ... +85 °C</td>
</tr>
<tr>
<td>Temperature coefficient of frequency $TC_f$</td>
<td>-46 ppm/K</td>
<td>-</td>
</tr>
</tbody>
</table>

* 1dB in each 3MHz segment within PB
** 12ns in each 3MHz segment within PB
*** $\Delta f_c (Hz) = TC_f (ppm/K) \times (T - T_o) \times f_{CTR} (MHz)$

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Generated:

Checked / Approved:

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Filter characteristic

Construction and pin connection

(All dimensions in mm)

1  Ground
2  Input
3  Ground
4  Ground
5  Output
6  Ground

Date code: Year + week
E  2014
F  2015
G  2016
...

50 Ω Test circuit

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Stability characteristics, reliability

After the following tests the filter shall meet the whole specification:

1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;
   for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

This filter is RoHS compliant (2011/65/EU)

Packing

Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius; tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel: 3000
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

The minimum bending radius is 45 mm.

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### Air reflow temperature conditions

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average ramp-up rate (30°C to 217°C)</td>
<td>less than 3°C/second</td>
</tr>
<tr>
<td>&gt; 100°C</td>
<td>between 300 and 600 seconds</td>
</tr>
<tr>
<td>&gt; 150°C</td>
<td>between 240 and 500 seconds</td>
</tr>
<tr>
<td>&gt; 217°C</td>
<td>between 30 and 150 seconds</td>
</tr>
<tr>
<td>Peak temperature</td>
<td>max. 260°C</td>
</tr>
<tr>
<td>Time within 5°C of actual peak temperature</td>
<td>between 10 and 30 seconds</td>
</tr>
<tr>
<td>Cool-down rate (Peak to 50°C)</td>
<td>less than 6°C/second</td>
</tr>
<tr>
<td>Time from 30°C to Peak temperature</td>
<td>no greater than 300 seconds</td>
</tr>
</tbody>
</table>

#### Chip-mount air reflow profile

- **Temperature / °C**:
  - Max. 260°C
  - 217°C

- **Time / s**:
  - Max. 300 s
  - 10 ... 30 s
  - 30 ... 150 s

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## History

<table>
<thead>
<tr>
<th>Version</th>
<th>Reason of Changes</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Generation of development specification.</td>
<td>Schönbein</td>
<td>26.06.2014</td>
</tr>
<tr>
<td>2.0</td>
<td>Generation of filter specification.</td>
<td>Schönbein</td>
<td>01.09.2014</td>
</tr>
</tbody>
</table>