SAW Components

SAW TX Filter
Cellular / WCDMA band V

Series/type: B9859
Ordering code: B39841B9859P810
Date: June 27, 2012
Version: 2.0

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SAW Components

SAW TX Filter

B9859

836.5 MHz

Data sheet

Application

- Low-loss RF filter for mobile telephone WCDMA
  Band V / Cellular systems, transmit path (TX)
- Useable passband: 25 MHz
- Unbalanced / unbalanced operation
- Impedance 50 Ω input and output
- Suitable for GPRS class 1 to 12

Features

- Package size 1.1 x 0.9 x 0.4 mm³
- RoHS compatible
- Approximate weight: 0.001g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3

Pin configuration

- 1 Input unbalanced
- 4 Output unbalanced
- 2,3,5 To be grounded

Please read cautions and warnings and important notes at the end of this document.
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Characteristics

Temperature range for specification: \( T = -20 \, ^\circ\text{C} \) to \( +85 \, ^\circ\text{C} \)
Terminating source impedance: \( Z_S = 50 \, \Omega \) (unbalanced)
Terminating load impedance: \( Z_L = 50 \, \Omega \) (unbalanced)

<table>
<thead>
<tr>
<th>B9859</th>
<th>min.</th>
<th>typ. @ 25 °C</th>
<th>max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center frequency ( f_C )</td>
<td>—</td>
<td>836.5</td>
<td>—</td>
</tr>
<tr>
<td>Maximum insertion attenuation</td>
<td>—</td>
<td>1.2 1.6</td>
<td>—</td>
</tr>
</tbody>
</table>
\( @f_{\text{Carrier Bd 5 TX}} \) 826.4 ... 846.6 MHz \( \alpha_{\text{WCDMA}} \) | — | 1.2 1.6 | — |
824.0 ... 849.0 MHz \( \alpha_{\text{Cellular}} \) | — | 1.4 1.8 | — |
| Amplitude ripple (p-p) \( 824.0 \ldots 849.0 \, \text{MHz} \) \( \Delta \alpha \) | — | 0.7 1.1 | — |
| Error Vector Magnitude \( 826.4 \ldots 846.6 \, \text{MHz} \) EVM | — | 2.1 3.0 | — |
| Input VSWR | — | 1.9 2.1 | — |
824.0 ... 849.0 MHz | — | 1.9 2.1 | — |
| Output VSWR | — | 1.8 2.1 | — |
824.0 ... 849.0 MHz | — | 1.8 2.1 | — |
| Attenuation | — | 15 23 | — | dB |
871.4 ... 891.6 MHz \( \alpha_{\text{WCDMA}} \) | 28 32 | dB | — |
895.0 ... 1210.0 MHz \( \alpha_{\text{Cellular}} \) | 20 33 | dB | — |
1210.0 ... 1698.0 MHz \( \alpha_{\text{Cellular}} \) | 25 30 | dB | — |
1648.0 ... 1698.0 MHz \( \alpha_{\text{WCDMA}} \) | 28 32 | dB | — |
1698.0 ... 2480.0 MHz \( \alpha_{\text{Cellular}} \) | 25 29 | dB | — |
2480.0 ... 2547.0 MHz \( \alpha_{\text{Cellular}} \) | 20 28 | dB | — |
2547.0 ... 6000.0 MHz \( \alpha_{\text{Cellular}} \) | 15 23 | dB | — |

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (4).
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

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Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", $\alpha_{\text{WCDMA}}$) is determined by

$$\int_{-\infty}^{\infty} |S_{\text{dB21}}(f) H_{\text{RRC}}(f - f_{\text{Carrier}})|^2 \, df$$

$f_{\text{Carrier}}$ according to 3GPP TS 25.101 (e.g. for Passband, $f_{\text{Carrier}}$ ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{-\infty}^{\infty} |H_{\text{RRC}}(f)|^2 \, df = 1$$

Maximum ratings

<table>
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<tr>
<th></th>
<th>T</th>
<th>$-40/+85$</th>
<th>$\degree$C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operable temperature range</td>
<td>$T_{\text{stg}}$</td>
<td>$-40/+85$</td>
<td>$\degree$C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>$T_{\text{DC}}$</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>DC voltage</td>
<td>$V_{\text{ESD}}$</td>
<td>100$^1$</td>
<td>V</td>
</tr>
<tr>
<td>ESD voltage</td>
<td>$P_{\text{IN}}$</td>
<td>15</td>
<td>dBm</td>
</tr>
<tr>
<td>Input power</td>
<td></td>
<td>2000h CW signal @ 55$\degree$C</td>
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$^1$ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.
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Transfer function for WCDMA signals (Power transfer function vs. carrier frequency)

![Graph of transfer function for WCDMA signals](image)

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June 27, 2012
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**References**

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<th><strong>Type</strong></th>
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<tbody>
<tr>
<td><strong>Ordering code</strong></td>
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<td><strong>Date codes</strong></td>
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<td><strong>Soldering profile</strong></td>
<td>S_6001</td>
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<td><strong>Moldability</strong></td>
<td>Before using in overmolding environment, please contact your EPCOS sales office.</td>
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<td><strong>Matching coils</strong></td>
<td>See Inductor pdf-catalog <a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a> and Data Library for circuit simulation <a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a> for a large variety of matching coils.</td>
</tr>
</tbody>
</table>

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