SAW Components

SAW Tx Filter
Automotive Telematics

Series/type: B4311
Ordering code: B39841B4311P810
Date: September 21, 2015
Version: 2.2
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Data sheet

Application

- Low-loss RF filter for mobile telephone WCDMA systems, transmit path (Tx)
- Usable passband 25.0 MHz
- No matching network required for operation at 50 Ω

Features

- Package size 1.4 x 1.1 x 0.4 mm³
- Package code QCS5P
- RoHS compatible
- Approximate weight 0.003 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- AEC-Q200 qualified component family (operable temperature range –40˚C to +85˚C)
- Electrostatic Sensitive Device (ESD)

Pin configuration

- 1 Input
- 4 Output
- 2,3,5 to be grounded
Please read cautions and warnings and important notes at the end of this document.

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836.5 MHz

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**Characteristics**

Temperature range for specification: $T = -40 \, ^\circ C$ to $+85 \, ^\circ C$

Terminating source impedance: $Z_S = 50 \, \Omega$

Terminating load impedance: $Z_L = 50 \, \Omega$

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>min.</th>
<th>typ.</th>
<th>max.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Center frequency</strong> $f_C$</td>
<td>—</td>
<td>836.5</td>
<td>—</td>
</tr>
<tr>
<td><strong>Maximum insertion attenuation</strong> $\alpha_{\text{max}}$</td>
<td>—</td>
<td>1.7</td>
<td>2.6 dB</td>
</tr>
<tr>
<td>824.0 ... 849.0 MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Amplitude ripple (p-p)</strong> $\Delta \alpha$</td>
<td>—</td>
<td>0.9</td>
<td>1.8 dB</td>
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<tr>
<td>824.0 ... 849.0 MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VSWR</strong></td>
<td>—</td>
<td>1.9</td>
<td>2.3</td>
</tr>
<tr>
<td>824.0 ... 849.0 MHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attenuation</strong> $\alpha$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50.0 ... 750.0 MHz</td>
<td>42</td>
<td>47</td>
<td>—    dB</td>
</tr>
<tr>
<td>750.0 ... 804.0 MHz</td>
<td>36</td>
<td>43</td>
<td>—    dB</td>
</tr>
<tr>
<td>869.0 ... 894.0 MHz</td>
<td>34</td>
<td>39</td>
<td>—    dB</td>
</tr>
<tr>
<td>894.0 ... 1570.0 MHz</td>
<td>33</td>
<td>37</td>
<td>—    dB</td>
</tr>
<tr>
<td>1570.0 ... 2200.0 MHz</td>
<td>35</td>
<td>43</td>
<td>—    dB</td>
</tr>
<tr>
<td>2200.0 ... 3400.0 MHz</td>
<td>33</td>
<td>38</td>
<td>—    dB</td>
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### SAW Components

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**SAW Tx Filter**

**836.5 MHz**

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#### Maximum ratings

<table>
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<tr>
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<th>Value</th>
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<td>Operable temperature range</td>
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<tr>
<td>Storage temperature range</td>
<td>$-40/+85$ °C</td>
</tr>
<tr>
<td>DC voltage</td>
<td>0 V</td>
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<tr>
<td>ESD voltage</td>
<td>100 V</td>
</tr>
<tr>
<td>Input Power</td>
<td>15 dBm</td>
</tr>
</tbody>
</table>

1) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

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Please read *cautions and warnings and important notes* at the end of this document.
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ESD protection of SAW filters

SAW filters are Electro Static Discharge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.

In general, “ESD matching” has to be ensured at that filter port, where electrostatic discharge is expected.

Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

Below three figures show recommended “ESD matching” topologies.

For wideband filters the high-pass ESD matching structure needs to be at least of 3rd order to ensure a proper matching for any impedance value of antenna and SAW filter input. The required component values have to be determined from case to case.

![Fig. 1 MLC varistor plus ESD matching](image1)

**Fig. 1 MLC varistor plus ESD matching**

In cases where minor ESD occur, following simplified “ESD matching” topologies can be used alternatively.

![Fig. 2 Suppressor diode plus ESD matching](image2)

**Fig. 2 Suppressor diode plus ESD matching**

In all three figures the shunt inductor Lp2 could be replaced by a shorted microstrip with proper length and width. If this configuration is possible depends on the operating frequency and available pcb space.

Effectiveness of the applied ESD protection has to be checked according to relevant industry standards or customer specific requirements.

For further information, please refer to EPCOS Application report: “ESD protection for SAW filters”. This report can be found under [www.epcos.com/rke](http://www.epcos.com/rke). Click on “Applications Notes”. 

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References

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<td>RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8th, 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment (“Directive”) with due regard to the application of exemptions as per Annex III of the Directive in certain cases.</td>
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<tr>
<td>Moldability</td>
<td>Before using in overmolding environment, please contact your EPCOS sales office.</td>
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Published by EPCOS AG
Systems, Acoustics, Waves Business Group
P.O. Box 80 17 09, 81617 Munich, GERMANY
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