SAW Components

SAW filter
Automotive Telematics

Series/type: B4336
Ordering code: B39931B4336P810
Date: March 07, 2014
Version: 2.0
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SAW Components

SAW filter

B4336

SAW filter

925.15 MHz

Data sheet

Application

- Low-loss RF filter for remote control receivers
- No matching network required for operation at 50 Ω
- Usable passband 5.9 MHz

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.
SAW Components

**SAW filter**

| B4336 | 925.15 MHz |

**Data sheet**

**Characteristics**

Temperature range for specification: \( T = -40 \degree C \) to \( +85 \degree C \)

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. @ 25 (^\circ) C</th>
<th>max.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal frequency</strong> ( f_c )</td>
<td>—</td>
<td>925.15 MHz</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum insertion attenuation</strong> ( \alpha_{\text{max}} )</td>
<td>922.2 ... 928.1 MHz</td>
<td>—</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Amplitude ripple (p-p)</strong> ( \Delta \alpha )</td>
<td>922.2 ... 928.1 MHz</td>
<td>—</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>VSWR</strong></td>
<td>922.2 ... 928.1 MHz</td>
<td>—</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Attenuation</strong> ( \alpha )</td>
<td>50.0 ... 815.0 MHz</td>
<td>56</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>815.0 ... 875.0 MHz</td>
<td>52</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>875.0 ... 900.0 MHz</td>
<td>40</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>900.0 ... 915.0 MHz</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>945.0 ... 960.0 MHz</td>
<td>19(^1)</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>960.0 ... 990.0 MHz</td>
<td>33</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>990.0 ... 1150.0 MHz</td>
<td>46</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>1150.0 ... 1856.0 MHz</td>
<td>43</td>
<td>50</td>
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<tr>
<td></td>
<td>1856.0 ... 2500.0 MHz</td>
<td>37</td>
<td>45</td>
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</table>

\(^1\) 20 dB for reduced temperature range \(-30 \degree C \) to \(+85 \degree C \).
SAW Components
SAW filter
Data sheet

**Maximum ratings**

<table>
<thead>
<tr>
<th>Maximum ratings</th>
<th>T</th>
<th>T&lt;sub&gt;stg&lt;/sub&gt;</th>
<th>V</th>
<th>P&lt;sub&gt;IN&lt;/sub&gt;</th>
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<tr>
<td>Operable temperature range</td>
<td>-40/+85</td>
<td>-40/+85</td>
<td>0</td>
<td>10 dBm</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>°C</td>
<td>°C</td>
<td>V</td>
<td>dBm</td>
</tr>
<tr>
<td>DC voltage</td>
<td>VDC</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input power at</td>
<td>PIN</td>
<td></td>
<td>10</td>
<td></td>
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</table>
Frequency response (narrowband)

![Narrowband Frequency Response Graph]

Frequency response (wideband)

![Wideband Frequency Response Graph]

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

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

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

**Fig. 3 3rd order high-pass structure for basic ESD protection**

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. Click on “Applications Notes”.

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

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<td>Moldability</td>
<td>Before using in overmolding environment, please contact your EPCOS sales office.</td>
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<td>Matching coils</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>
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