DW9255
35.42MHz SAW Filter for GPS Receivers

The DW9255 SAW filter is no longer made by Zarlink Semiconductor.

DW9255 can now be obtained from Dynex Semiconductor (http://www.dynexsemi.com).

It is believed that the Dynex device conforms to this datasheet, although Zarlink Semiconductor cannot accept responsibility for any differences.

Zarlink now recommends that GPS customers use a Murata SAW Filter, the SAFJA35M4WC0Z00. This device is available from Murata (http://www.murata.com).

Information on how to use the Murata device with the GP2015 can be obtain from the Zarlink Semiconductor website (www.zarlink.com) by downloading Application Brief AB5202 "Using the Murata SAW Filter".
The DW9255 is a Surface Acoustic Wave (SAW) bandpass filter for use with the GP2000 Global Positioning System (GPS) receiver chip-set, available from Mitel Semiconductor. It is pre-tuned to the exact 2nd IF filter requirements of the GP2010 & GP2015 RF front-end devices, with a centre-frequency of 35.42MHz. The response is tuned for a flat passband, steep stopband and uniform passband group-delay with 3 external inductors. The device is realised on a Lithium Tantalate substrate and housed in a small leadless ceramic Surface Mount package.

The DW9255 gives significant improvement in correlated GPS Signal-to-Noise Ratio (SNR) performance compared to conventional LC bandpass filter schemes. This aids satellite signal acquisition and tracking capability from the GP2000 GPS chip-set. This device effectively filters out-of-band (unwanted) noise in the GPS signal. The Automatic Gain Control (AGC) within the GP2010 and GP2015 RF Front-end devices will then operate only on in-band noise for optimum gain and superior correlated GPS signal strength.

FEATURES

- Centre Frequency of 35.42MHz
- Insertion Loss of 17dB ±1dB (typical)
- 1dB Bandwidth 1.9MHz (typical)
- Passband Ripple 0.8dB (typical)
- Low Profile Ceramic Surface Mount Package
- Operating Temperature Range -40° to +85°C

APPLICATION

- Commercial Global Positioning

RELATED PRODUCTS AND PUBLICATIONS

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<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Data Reference</th>
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<tr>
<td>GP2010</td>
<td>GPS receiver RF Front-end</td>
<td>DS4056</td>
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<tr>
<td>GP2015</td>
<td>Miniature GPS receiver</td>
<td>DS4374</td>
</tr>
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</table>
<pre><code>                               | RF Front-end             |                |
</code></pre>

![Fig.1 Pinout](image-url)
**ELECTRICAL CHARACTERISTICS (Typ. @ 25°C)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
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<td>Centre Frequency</td>
<td>-</td>
<td>35.42</td>
<td>-</td>
<td>MHz</td>
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<tr>
<td>1dB Bandwidth</td>
<td>1.6</td>
<td>1.9</td>
<td>-</td>
<td>MHz</td>
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<tr>
<td>Insertion Loss</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>dB</td>
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<tr>
<td>Amplitude Ripple</td>
<td>-</td>
<td>0.8</td>
<td>1.6</td>
<td>dB (pk to pk)</td>
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<tr>
<td>(34.62 to 36.22MHz)</td>
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<tr>
<td>Relative Attenuation</td>
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<td>35</td>
<td>40</td>
<td>dB</td>
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<tr>
<td>(relative to insertion loss)</td>
<td>&lt;31MHz</td>
<td>30</td>
<td>35</td>
<td>dB</td>
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<tr>
<td>&lt;33.5MHz</td>
<td>21</td>
<td>25</td>
<td>-</td>
<td>dB</td>
</tr>
<tr>
<td>&gt;37.5MHz</td>
<td>21</td>
<td>25</td>
<td>-</td>
<td>dB</td>
</tr>
<tr>
<td>&gt;40MHz</td>
<td>25</td>
<td>30</td>
<td>-</td>
<td>dB</td>
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<tr>
<td>&gt;50MHz</td>
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<td>-</td>
<td>dB</td>
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<tr>
<td>&gt;63MHz</td>
<td>28</td>
<td>35</td>
<td>-</td>
<td>dB</td>
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<td>&gt;73 - 110MHz</td>
<td>40</td>
<td>45</td>
<td>-</td>
<td>dB</td>
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<td>Group Delay Ripple</td>
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<td>190</td>
<td>300</td>
<td>ns</td>
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<td>(34.62 to 36.22MHz)</td>
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<tr>
<td>Maximum Group Delay</td>
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<td>1.7</td>
<td>µs</td>
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<tr>
<td>Operating Temperature Range</td>
<td>-40</td>
<td>-</td>
<td>+85</td>
<td>°C</td>
</tr>
</tbody>
</table>

*Fig. 2 DW9255 used with GPS chipset*
DW9255 used as 2nd IF filter for GP2010/15

Centre Frequency 35.42MHz
Pass Band ±1.0MHz (within ±1.0dB)
Insertion loss 14-18dB
3rd IF Image frequency at 2nd IF 26.8MHz
Source Impedance 500Ω typical
Load Impedance 1000Ω typical

The second external IF filter is connected between the output of Stage 2 and input of Stage 3. It is required to define the bandwidth of the RF section of the GPS receiver, hence it is critical to the receiver performance. The filter should be flat across the 2MHz bandwidth of the GPS Coarse-Acquisition (C/A) code signal. It should also have high rejection (greater than 20dB) beyond this bandwidth, and so should have a brick-wall type response at these extremes. The DW9255 SAW filter provides a 1dB Bandwidth of typically 1.9MHz centred on 35.42MHz, with a typical pass band ripple of 0.8dB, when the SAW input and output capacitance is resonantly matched with inductors of optimum value. The out-of-band signal rejection is better than 21dB at ±2.0MHz, and better than 35dB at ±7.5MHz.

The frequency response of the DW9255 SAW filter with matching components is shown in Fig. 3. The matching components used with the GP2010/15 device are shown in Fig. 4.

Fig.3 Typical frequency response of DW9255 SAW filter used as 2nd IF filter
SOURCE IMPEDANCE = 500Ω

LOAD IMPEDANCE = 1KΩ

GP2010 or GP2015

L1, L2 = 560nH COILCRAFT 1008

Fig.4 Typical matching components when used with GP2010 or GP2015 GPS Front-end IC

680nH COILCRAFT 1008

15pF VITRAMON (VJ0805A150JXA)

Pin 1 = IP-
Pin 2 = IP+
Pin 7 = OP+
Pin 8 = OP-

910nF COILCRAFT 1008

Fig.5 50Ω Matching network
PACKAGE DETAILS
Dimensions are shown thus: mm (in). For further package information, please contact your local Customer Service Centre.

NOTES
1. Controlling dimensions are millimetres.
2. This package outline diagram is for guidance only. Please contact your Mitel Semiconductor Customer Service Centre for further information.

12-PAD LEADLESS CHIP CARRIER (SEAM SEAL) - LCS12/1
PACKAGE DETAILS
Dimensions are shown thus: mm (in). For further package information, please contact your local Customer Service Centre.

12-PAD LEADLESS CHIP CARRIER (SLAM) - LCS12/4

NOTES
1. Controlling dimensions are millimetres.
2. This package outline diagram is for guidance only. Please contact your Mitel Semiconductor Customer Service Centre for further information.

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