Multilayer Band Pass Filters (Balance Output Type)
For 2.4GHz W-LAN/Bluetooth

DEA Series

Type: 
- DEA202450BT-7171A1 (2.0×1.25×0.6mm max.)
- DEA202450BT-7190A1 (2.0×1.25×0.6mm max.)
- DEA202450BT-7099A1 (2.0×1.25×0.8mm max.)
- DEA202450BT-7100C1 (2.0×1.25×0.8mm max.)
- DEA202350BT-7196A1 (2.0×1.25×0.9mm)
- DEA202450BT-7077A1 (2.0×1.25×0.95mm)
- DEA202450BT-7089C3 (2.0×1.25×1.0mm max.)
- DEA202450BT-7112B1 (2.0×1.25×1.0mm max.)
- DEA202450BT-7112E1 (2.0×1.25×1.0mm max.)

Issue date: December 2010

- All specifications are subject to change without notice.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
Multilayer Chip Band Pass Filters (Balance Output Type)  Conformity to RoHS Directive  
For Bluetooth & 2.4GHz W-LAN

DEA Series  DEA202450BT-7171A1

FEATURES
- Miniature balanced band pass filter.
- Matched to 34+j60Ω.
- Package size: 2.0×1.25mm.
- Low profile: 0.6mm max. height.

SHAPES AND DIMENSIONS

RECOMMENDED PC BOARD PATTERNS

EVALUATION SETUP

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
- All specifications are subject to change without notice.
ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Frequency Range</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>[2402 to 2480MHz]</td>
<td>3.0dB max.</td>
</tr>
<tr>
<td>Single ended port characteristic impedance</td>
<td>—</td>
<td>50Ω (Nominal)</td>
</tr>
<tr>
<td>Balanced ports impedance, nominal value</td>
<td>—</td>
<td>34 + j60Ω</td>
</tr>
<tr>
<td>VSWR: Unbalanced port</td>
<td>[2402 to 2480MHz]</td>
<td>2 max.</td>
</tr>
<tr>
<td>VSWR: Balanced port (with respect to nominal balanced impedance)</td>
<td>[2402 to 2480MHz]</td>
<td>2 max.</td>
</tr>
<tr>
<td>SDS21 ATTENUATION</td>
<td>[880 to 960MHz]</td>
<td>35dB min.</td>
</tr>
<tr>
<td></td>
<td>[1710 to 1860MHz]</td>
<td>22dB min.</td>
</tr>
<tr>
<td></td>
<td>[1880 to 1910MHz]</td>
<td>20dB min.</td>
</tr>
<tr>
<td></td>
<td>[2110 to 2170MHz]</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>[4804 to 4960MHz]</td>
<td>18dB min.</td>
</tr>
<tr>
<td>Phase difference at balanced port</td>
<td>[2402 to 2480MHz]</td>
<td>180±10.0°</td>
</tr>
<tr>
<td>Amplitude imbalance at balanced port</td>
<td>[2402 to 2480MHz]</td>
<td>0±2dB</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Operating</td>
<td>–40 to +85°C</td>
</tr>
<tr>
<td></td>
<td>Storage</td>
<td>–40 to +85°C</td>
</tr>
</tbody>
</table>

FREQUENCY CHARACTERISTICS

SDS21 INSERTION LOSS

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>Insertion Loss (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.400GHz</td>
<td>–2.16dB</td>
</tr>
<tr>
<td>2.440GHz</td>
<td>–2.09dB</td>
</tr>
<tr>
<td>2.480GHz</td>
<td>–2.04dB</td>
</tr>
</tbody>
</table>

AMPLITUDE IMBALANCE

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>Amplitude Imbalance (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.400GHz</td>
<td>0.74dB</td>
</tr>
<tr>
<td>2.440GHz</td>
<td>0.70dB</td>
</tr>
<tr>
<td>2.480GHz</td>
<td>0.70dB</td>
</tr>
</tbody>
</table>

SSS11 VSWR

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>VSWR (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.400GHz</td>
<td>1.24dB</td>
</tr>
<tr>
<td>2.440GHz</td>
<td>1.45dB</td>
</tr>
<tr>
<td>2.480GHz</td>
<td>1.47dB</td>
</tr>
</tbody>
</table>

SMITH CHARTS

SSS11

SDD22

• All specifications are subject to change without notice.
PACKAGING STYLES

REEL DIMENSIONS

Standard package quantities: 2000pcs/reel
Dimensions in mm

TAPE DIMENSIONS

Dimensions in mm

All specifications are subject to change without notice.
Multilayer Chip Band Pass Filters (Balance Output Type) For Bluetooth & 2.4GHz W-LAN

DEA Series DEA202450BT-7190A1

FEATURES
- Miniature balanced band pass filter.
- Matched to 34+j60Ω.
- Package size: 2.0×1.25mm.
- Low profile: 0.6mm max. height.

SHAPE AND DIMENSIONS

RECOMMENDED PC BOARD PATTERNS

EVALUATION SETUP

Note 1: Pin 2 of the filter provides a DC feed connection to the balanced ports. In the event that this function is used, pin 2 should be connected to ground using a de-coupling capacitor.
Note 2: In the event that the pin 2 function is not used, the pin should be left unconnected.

Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

All specifications are subject to change without notice.
**ELECTRICAL CHARACTERISTICS**

- **Insertion Loss**
  - Frequency range: 2402 to 2480 MHz
  - Maximum: 3.0 dB

- **Single ended port characteristic impedance**
  - Nominal: 50 Ω

- **Balanced ports impedance, nominal value**
  - Nominal value: 34 + 60 Ω

- **VSWR: Unbalanced port**
  - Frequency range: 2402 to 2480 MHz
  - Maximum: 2

- **VSWR: Balanced port (with respect to nominal balanced impedance)**
  - Frequency range: 2402 to 2480 MHz
  - Maximum: 2

- **Attenuation**
  - Frequency ranges:
    - [880 to 960 MHz]: Minimum 35 dB
    - [1710 to 1880 MHz]: Minimum 22 dB
    - [1880 to 1910 MHz]: Minimum 20 dB
    - [2110 to 2170 MHz]: Minimum 0 dB
    - [4804 to 4960 MHz]: Minimum 18 dB

- **Phase difference at balanced port**
  - Frequency range: 2402 to 2480 MHz
  - Maximum: ±10°

- **Amplitude imbalance at balanced port**
  - Frequency range: 2402 to 2480 MHz
  - Maximum: ±2 dB

- **Temperature range**
  - Operating: -40 to +85°C
  - Storage: -40 to +85°C

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**FREQUENCY CHARACTERISTICS**

**SDS21 INSERTION LOSS**

- Frequency: 2.400 GHz
  - Insertion loss: -2.16 dB
- Frequency: 2.440 GHz
  - Insertion loss: -2.09 dB
- Frequency: 2.480 GHz
  - Insertion loss: -2.04 dB

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**AMPLITUDE IMBALANCE**

- Frequency: 2.400 GHz
  - Amplitude imbalance: -0.74 dB
- Frequency: 2.440 GHz
  - Amplitude imbalance: -0.70 dB
- Frequency: 2.480 GHz
  - Amplitude imbalance: -0.70 dB

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**SSS11 VSWR**

- Frequency: 2.400 GHz
  - VSWR: 1.42 dB
- Frequency: 2.440 GHz
  - VSWR: 1.48 dB
- Frequency: 2.480 GHz
  - VSWR: 1.47 dB

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**SMITH CHARTS**

- **SSS11**
- **SDD22**

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*All specifications are subject to change without notice.*
PACKAGING STYLES

REEL DIMENSIONS

Standard package quantities: 2000pcs/reel
Dimensions in mm

TAPE DIMENSIONS

Dimensions in mm

All specifications are subject to change without notice.
Multilayer Chip Band Pass Filters (Balance Output Type)
For Bluetooth & 2.4GHz W-LAN

DEA Series DEA202450BT-7099A1

FEATURES
- Miniature balanced band pass filter.
- Matched to 24+j48.8Ω.
- Package size: 2.0×1.25mm.
- Low profile: 0.8mm max. height.

SHAPES AND DIMENSIONS

The identification marking in figure refer to prototype components only. A different component mark is used for mass production.

RECOMMENDED PC BOARD PATTERNS

- Pin 2 of the filter provides a DC feed connection to the balanced ports.
- In the event that this function is used pin 2 should be connected to ground using a de-coupling capacitor.
ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss</td>
<td>[2402 to 2480MHz] 2.3dB typ.</td>
</tr>
<tr>
<td>Single ended port characteristic impedance</td>
<td>— 50Ω (Nominal)</td>
</tr>
<tr>
<td>Balanced ports impedance, nominal value</td>
<td>— 24 + j48.8Ω</td>
</tr>
<tr>
<td>Return loss: Unbalanced port</td>
<td>[2402 to 2480MHz] 11.9dB typ.</td>
</tr>
<tr>
<td>Return loss: Balanced port</td>
<td>(with respect to nominal balanced impedance) 11dB typ.</td>
</tr>
<tr>
<td>Attenuation</td>
<td></td>
</tr>
<tr>
<td>[880 to 960MHz]</td>
<td>47dB typ.</td>
</tr>
<tr>
<td>[1710 to 1880MHz]</td>
<td>29dB typ.</td>
</tr>
<tr>
<td>[1880 to 1910MHz]</td>
<td>27dB typ.</td>
</tr>
<tr>
<td>[2110 to 2170MHz]</td>
<td>10dB typ.</td>
</tr>
<tr>
<td>[4804 to 4960MHz]</td>
<td>36dB typ.</td>
</tr>
<tr>
<td>Phase difference at balanced port</td>
<td>[2402 to 2480MHz] 176deg typ.</td>
</tr>
<tr>
<td>Amplitude imbalance at balanced port</td>
<td>[2402 to 2480MHz] 0.9dB typ.</td>
</tr>
<tr>
<td>Temperature range</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>−40 to +85°C</td>
</tr>
<tr>
<td>Storage</td>
<td>−40 to +85°C</td>
</tr>
</tbody>
</table>

FREQUENCY CHARACTERISTICS

INSERTION LOSS/ATTENUATION

RETURN LOSS(Unbalance)

RETURN LOSS(Balance)

AMPLITUDE IMBALANCE

PHASE DIFFERENCE

COMMON MODE

All specifications are subject to change without notice.
Multilayer Chip Band Pass Filters (Balance Output Type)  
For Bluetooth & 2.4GHz W-LAN  

DEA Series  DEA202450BT-7100C1

**SHAPES AND DIMENSIONS**

```
1  2  3  4  5  6  7  8
1.25±0.15

0.8max.

0.25±0.2

0.25±0.15

0.25±0.2

0.3±0.2

0.3±0.15

Dimensions in mm
```

**Terminal functions**

1. Unbalanced port  
2. GND  
3. NC  
4. GND  
5. GND  
6. Balanced port1  
7. Balanced port2  
8. GND

**RECOMMENDED PC BOARD PATTERN**

```
0.35

1.95

0.2

0.35

6.5

2.6

Dimensions in mm
```

**EVALUATION BOARD**

Port extension value
Port1 = 139.56[sec]  
Port2 = 143.16[sec]  
Port3 = 139.56[sec]

**Conformity to RoHS Directive:** This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

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### ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum value</th>
<th>Typical value</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unbalanced port characteristics impedance</td>
<td>(Ω)</td>
<td>50[Nominal]</td>
<td></td>
</tr>
<tr>
<td>Balanced port characteristics impedance</td>
<td>(Ω)</td>
<td>25+30[Nominal]</td>
<td></td>
</tr>
<tr>
<td>Differential mode insertion loss</td>
<td>[2402 to 2480MHz] (dB)</td>
<td>—</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>[65 to 108MHz] (dB)</td>
<td>35</td>
<td>70</td>
</tr>
<tr>
<td>Differential mode attenuation</td>
<td>[824 to 960MHz] (dB)</td>
<td>35</td>
<td>46</td>
</tr>
<tr>
<td>[100Ω reference]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[25Ω reference]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common mode attenuation</td>
<td>[1570 to 1990MHz] (dB)</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>In/out return loss</td>
<td>(dB)</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Phase difference at balanced port</td>
<td>(deg.)</td>
<td>180±10</td>
<td>174</td>
</tr>
<tr>
<td>Amplitude imbalance at balanced port</td>
<td>(dB)</td>
<td>0±2.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Temperature range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating (°C)</td>
<td>—</td>
<td>—</td>
<td>+85</td>
</tr>
<tr>
<td>Storage (°C)</td>
<td>—</td>
<td>—</td>
<td>+85</td>
</tr>
</tbody>
</table>

- Ta: +25°C

### FREQUENCY CHARACTERISTICS

**Unbalance 50Ω/Balance 25+30Ω**

**SDS21 INSERTION LOSS**

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>2.402GHz</th>
<th>2.441GHz</th>
<th>2.480GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion loss</td>
<td>-2.99dB</td>
<td>-2.79dB</td>
<td>-2.59dB</td>
</tr>
</tbody>
</table>

**AMPLITUDE BALANCE**

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>2.402GHz</th>
<th>2.441GHz</th>
<th>2.480GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude balance (dB)</td>
<td>-1.67dB</td>
<td>-1.33dB</td>
<td>-0.91dB</td>
</tr>
</tbody>
</table>

**PHASE BALANCE**

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>2.402GHz</th>
<th>2.441GHz</th>
<th>2.480GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase balance (deg.)</td>
<td>176.6deg.</td>
<td>175.4deg.</td>
<td>174.2deg.</td>
</tr>
</tbody>
</table>

**SDS21 ATTENUATION** [100Ω REFERENCE]

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>0.056GHz</th>
<th>0.108GHz</th>
<th>0.170GHz</th>
<th>0.224GHz</th>
<th>0.324GHz</th>
<th>0.570GHz</th>
<th>0.700GHz</th>
<th>0.824GHz</th>
<th>0.960GHz</th>
<th>1.570GHz</th>
<th>1.580GHz</th>
<th>1.710GHz</th>
<th>1.990GHz</th>
<th>2.170GHz</th>
<th>2.402GHz</th>
<th>2.441GHz</th>
<th>2.480GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attenuation (dB)</td>
<td>-76.79dB</td>
<td>-70.17dB</td>
<td>-48.41dB</td>
<td>-46.93dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
<td>-31.70dB</td>
<td>-31.70dB</td>
<td>-31.70dB</td>
<td>-31.70dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
<td>-43.81dB</td>
</tr>
</tbody>
</table>

**SSS11 UNBALANCE RETURN LOSS**

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>2.402GHz</th>
<th>2.441GHz</th>
<th>2.480GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss (dB)</td>
<td>-14.56dB</td>
<td>-14.42dB</td>
<td>-18.12dB</td>
</tr>
</tbody>
</table>

**SDD22 BALANCE RETURN LOSS**

<table>
<thead>
<tr>
<th>Frequency (GHz)</th>
<th>2.402GHz</th>
<th>2.441GHz</th>
<th>2.480GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss (dB)</td>
<td>-13.72dB</td>
<td>-13.33dB</td>
<td>-14.45dB</td>
</tr>
</tbody>
</table>

- All specifications are subject to change without notice.

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FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 25+j30Ω

SCS21 ATTENUATION [25Ω REFERENCE]

SCC22 ANGLE [25Ω REFERENCE]

SCC22 MAGNITUDE [25Ω REFERENCE]

SMITH CHARTS

S11

SDD22

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Multilayer Chip Band Pass Filters (Balance Output Type) For Bluetooth & 2.4GHz W-LAN

DEA Series  DEA202350BT-7196A1

**SHAPES AND DIMENSIONS**

Top view

- Terminal functions:
  - 1: Unbalanced port
  - 2: NC
  - 3: NC
  - 4: GND
  - 5: Balanced port
  - 6: GND
  - 7: Balanced port
  - 8: GND

- Dimensions in mm:
  - 1.25±0.15 (1.25±0.15)
  - 0.9±0.1 (0.9±0.1)
  - 0.3±0.2 (0.3±0.2)
  - 0.25±0.2 (0.25±0.2)

**RECOMMENDED PC BOARD PATTERNS**

- Dimensions in mm:
  - 0.60
  - 0.35

**EVALUATION BOARD**

Port extension value is 139.56ps for all port.

**ELECTRICAL CHARACTERISTICS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Typical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range (Pass band)</td>
<td>2300 to 2400MHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td>2.2dB max. 1.76dB</td>
</tr>
<tr>
<td>Attenuation</td>
<td>34dB min. 44.3dB</td>
</tr>
<tr>
<td>Single ended port characteristic impedance</td>
<td>50Ω (Nominal)</td>
</tr>
<tr>
<td>Balanced port differential characteristics impedance</td>
<td>100dB</td>
</tr>
<tr>
<td>Attenuation</td>
<td>34dB min. 44.3dB</td>
</tr>
<tr>
<td>Single ended return loss</td>
<td>17dB</td>
</tr>
<tr>
<td>Phase difference at balanced port</td>
<td>185.1deg.</td>
</tr>
<tr>
<td>Amplitude imbalance at balanced port</td>
<td>0.13dB</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Operating -40 to +85°C</td>
</tr>
<tr>
<td></td>
<td>Storage -40 to +85°C</td>
</tr>
</tbody>
</table>

- Ta: -25°C

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

- All specifications are subject to change without notice.
FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 100Ω

SDS21 INSERTION LOSS

SDS21 ATTENUATION

AMPLITUDE BALANCE

PHASE BALANCE

S11 UNBALANCE RETURN LOSS

SDD22 BALANCE RETURN LOSS

SCS21

SMITH CHARTS

S11

SDD22

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Multilayer Chip Band Pass Filters (Balance Output Type)  
For Bluetooth & 2.4GHz W-LAN

DEA Series  DEA202450BT-7077A1

SHAPES AND DIMENSIONS

Top view

Bottom view

Terminal functions

1. Unbalanced port
2. DC feed + RF GND or GND
3. NC
4. GND
5. Balanced port
6. GND
7. Balanced port
8. GND

Dimensions in mm

RECOMMENDED PC BOARD PATTERN

Dimensions in mm

- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

- All specifications are subject to change without notice.
ELECTRICAL CHARACTERISTICS

Frequency range (Pass band) 2400MHz 2500MHz

Insertion loss
[+25°C] — 3.5dB max.
(−40 to +85°C) — 3.8dB max.

Single ended port characteristic impedance 50Ω (Nominal) —
Balanced port differential characteristic impedance
[880 to 960MHz] 40dB —
[1710 to 1880MHz] 38dB —
[1880 to 1990MHz] 35dB —
[2110 to 2170MHz] 17dB —
[4800 to 5000MHz] 25dB —
[7200 to 7500MHz] 27dB —

Unbalance 50Ω/Balance 34+j72Ω (Nominal) —

SDS21 INSERTION LOSS

S11 UNBALANCE RETURN LOSS

Amplitude balance

SCS21 CMRR

• All specifications are subject to change without notice.

FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 34+j72Ω

SDS21 ATTENUATION

SDD22 BALANCE RETURN LOSS

Phase balance

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SMITH CHARTS
S11
SDD22

- All specifications are subject to change without notice.
Multilayer Chip Band Pass Filters (Balance Output Type)  
For Bluetooth & 2.4GHz W-LAN

DEA Series  DEA202450BT-7089C3

SHAPES AND DIMENSIONS

Terminal functions
1. Unbalanced port
2. NC
3. NC
4. GND
5. Balanced port
6. GND
7. Balanced port
8. GND

Dimensions in mm

Top view
Bottom view

RECOMMENDED PC BOARD PATTERNS

Dimensions in mm

ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Item</th>
<th>Typical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range (Pass band)</td>
<td>2400 to 2500MHz</td>
</tr>
<tr>
<td>Insertion loss</td>
<td></td>
</tr>
<tr>
<td>[+25°C]</td>
<td>3.4dB max. 2.95dB</td>
</tr>
<tr>
<td>[–40 to +85°C]</td>
<td>3.7dB max. —</td>
</tr>
<tr>
<td>Single ended port characteristic impedance</td>
<td>50Ω (Nominal) —</td>
</tr>
<tr>
<td>Balanced port differential characteristics impedance</td>
<td>55+j50Ω (Nominal) —</td>
</tr>
<tr>
<td>Attenuation</td>
<td></td>
</tr>
<tr>
<td>[10 to 915MHz]</td>
<td>40dB min. 46dB</td>
</tr>
<tr>
<td>[925 to 960MHz]</td>
<td>39dB min. 45dB</td>
</tr>
<tr>
<td>[1570 to 1580MHz]</td>
<td>30dB min. 44dB</td>
</tr>
<tr>
<td>[1710 to 1785MHz]</td>
<td>39dB min. 47dB</td>
</tr>
<tr>
<td>[1805 to 1860MHz]</td>
<td>25dB min. 55dB</td>
</tr>
<tr>
<td>[1850 to 1910MHz]</td>
<td>38dB min. 51dB</td>
</tr>
<tr>
<td>[1920 to 1990MHz]</td>
<td>33dB min. 48dB</td>
</tr>
<tr>
<td>[2112 to 2168MHz]</td>
<td>20dB min. 31dB</td>
</tr>
<tr>
<td>[4800 to 5000MHz]</td>
<td>26dB min. 38dB</td>
</tr>
<tr>
<td>[7200 to 7500MHz]</td>
<td>26dB min. 35dB</td>
</tr>
<tr>
<td>Single ended return loss</td>
<td>8.5dB min. 13dB</td>
</tr>
<tr>
<td>Balanced return loss</td>
<td>8.5dB min. 14dB</td>
</tr>
<tr>
<td>Phase difference at balanced port</td>
<td>180±10deg. 183deg.</td>
</tr>
<tr>
<td>Amplitude imbalance at balanced port</td>
<td>0.2dB 0.5dB</td>
</tr>
<tr>
<td>Temperature range</td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>–40 to +85°C</td>
</tr>
<tr>
<td>Storage</td>
<td>–40 to +85°C</td>
</tr>
</tbody>
</table>

Ta:+25°C

Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

All specifications are subject to change without notice.
FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 55+j50Ω

SDS21 INSERTION LOSS

SDS21 ATTENUATION

S11 UNBALANCE RETURN LOSS

SDD22 BALANCE RETURN LOSS

AMPLITUDE BALANCE

PHASE BALANCE

SCS21 CMRR

SMITH CHARTS

S11

SDD22

All specifications are subject to change without notice.
Multilayer Chip Band Pass Filters (Balance Output Type) for Bluetooth & 2.4GHz W-LAN

DEA Series  DEA202450BT-7112B1

SHAPES AND DIMENSIONS

Terminal functions
1. Unbalanced port
2. NC
3. NC
4. GND
5. Balanced port
6. GND
7. Balanced port
8. GND

Dimensions in mm

RECOMMENDED PC BOARD PATTERN

Dimensions in mm

EVALUATION BOARD

Port extension value is 139.56ps for all port.

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ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Frequency range (Pass band)</th>
<th>2400MHz</th>
<th>2500MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion loss (+25°C)</td>
<td>—</td>
<td>2.5dB max.</td>
</tr>
<tr>
<td>Single ended port characteristic impedance</td>
<td>50Ω (Nominal)</td>
<td>—</td>
</tr>
<tr>
<td>Balanced port differential characteristic impedance</td>
<td>50+j40Ω (Nominal)</td>
<td>—</td>
</tr>
<tr>
<td>[10 to 915MHz] 41dB</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>[925 to 960MHz]</td>
<td>34dB</td>
<td>—</td>
</tr>
<tr>
<td>[1570 to 1586MHz]</td>
<td>30dB</td>
<td>—</td>
</tr>
<tr>
<td>[1710 to 1785MHz]</td>
<td>40dB</td>
<td>—</td>
</tr>
<tr>
<td>[1805 to 1880MHz]</td>
<td>26dB</td>
<td>—</td>
</tr>
<tr>
<td>[1850 to 1910MHz]</td>
<td>40dB</td>
<td>—</td>
</tr>
<tr>
<td>[1920 to 1990MHz]</td>
<td>31dB</td>
<td>—</td>
</tr>
<tr>
<td>[4800 to 5000MHz]</td>
<td>25dB</td>
<td>—</td>
</tr>
<tr>
<td>[7200 to 7500MHz]</td>
<td>20dB</td>
<td>—</td>
</tr>
<tr>
<td>SDS21 INSERTION LOSS SDS22 ATTENUATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude balance</td>
<td>1: 2.400GHz -0.3dB</td>
<td></td>
</tr>
<tr>
<td>2: 2.450GHz -0.43dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3: 2.500GHz -0.50dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1: 2.400GHz 184.1deg.</td>
<td></td>
</tr>
<tr>
<td>2: 2.450GHz 183.7deg.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3: 2.500GHz 183.0deg.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase balance</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Common mode attenuation</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Common mode impedance</td>
<td>Magnitude 0.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Angle —</td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>Operating —40 to +85°C</td>
<td></td>
</tr>
<tr>
<td>Storage —40 to +85°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 50+j40Ω

SCS21

SCC22 MAGNITUDE

SCC22 ANGLE

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Multilayer Chip Band Pass Filters (Balance Output Type)  
For Bluetooth & 2.4GHz W-LAN

DEA Series  DEA202450BT-7112E1

**SHAPES AND DIMENSIONS**

![Dimension Diagram]

**RECOMMENDED PC BOARD PATTERN**

![PC Board Pattern Diagram]

**EVALUATION BOARD**

![Evaluation Board Diagram]

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ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum value</th>
<th>Typical value</th>
<th>Maximum value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range (Pass band)</td>
<td>(MHz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion loss [+25°C]</td>
<td>(dB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[–40 to +85°C]</td>
<td>(dB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single ended port characteristic impedance</td>
<td>(Ω)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balanced port differential characteristics impedance</td>
<td>(Ω)</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Attenuation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single ended return loss [2400 to 2500MHz]</td>
<td>(dB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balanced return loss [2400 to 2500MHz]</td>
<td>(dB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase difference at balanced port [88 to 108MHz]</td>
<td>(deg.)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Amplitude imbalance at balanced port [4900MHz]</td>
<td>(dB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common mode attenuation [88 to 108MHz]</td>
<td>(dB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common mode impedance [4900MHz]</td>
<td>(Ω)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power capacity (mW)</td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Temperature range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>(°C)</td>
<td>–40</td>
<td>+85</td>
</tr>
<tr>
<td>Storage</td>
<td>(°C)</td>
<td>–40</td>
<td>+85</td>
</tr>
</tbody>
</table>

- Ta: +25°C

FREQUENCY CHARACTERISTICS

Unbalance 50Ω/Balance 50+j50Ω

SDS21 INSERTION LOSS

SDS21 ATTENUATION

AMPLITUDE BALANCE

PHASE BALANCE

S11 UNBALANCE RETURN LOSS

SDD22 BALANCE RETURN LOSS

- All specifications are subject to change without notice.
FREQUENCY CHARACTERISTICS
Unbalance 50Ω/Balance 50+j40Ω

SCS21 ATTENUATION

SCC22 ANGLE

SCC22 MAGNITUDE

SMITH CHARTS
S11   SDD22

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