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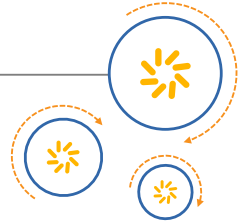
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



## SAW Components

### SAW Duplexer

WCDMA/LTE Band IX

Series/type: B8557  
Ordering code: B39182B8557P810

Date: July 21, 2011  
Version: 2.0

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# SAW Components

## SAW Duplexer

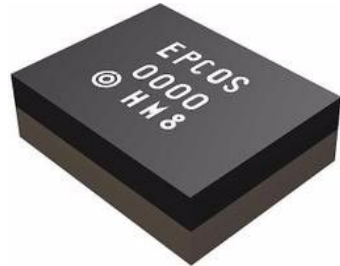
WCDMA/LTE Band IX

**Series/type:** **B8557**  
**Ordering code:** **B39182B8557P810**

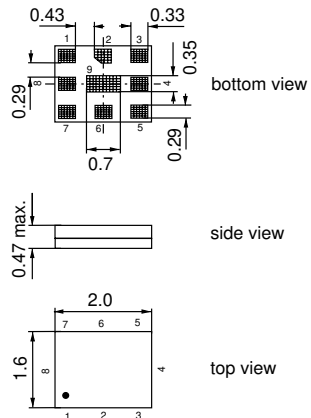
**Date:** July 21, 2011  
**Version:** 2.0


**Application**

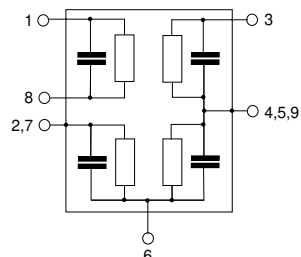
- Low-loss SAW duplexer for mobile telephone WCDMA/LTE Band IX systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path


**Features**

- Package size 2.0 \* 1.6 mm<sup>2</sup>
- Max. height 0.47 mm
- RoHS compatible
- Approximate weight 0.006g
- Package for **Surface Mount Technology (SMT)**
- Ni terminals, Au-plated
- Balanced Rx port, unbalanced Tx port
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level (MSL) 3**


**Pin configuration**

- 3 TX Input
- 1, 8 RX Output (balanced)
- 6 Antenna
- 2, 4, 5 To be grounded
- 7, 9 To be grounded



|                       |                            |
|-----------------------|----------------------------|
| <b>SAW Components</b> | <b>B8557</b>               |
| <b>SAW Duplexer</b>   | <b>1767.4 / 1862.4 MHz</b> |

Data Sheet



**Characteristics**

|                                      |  |
|--------------------------------------|--|
| Temperature range for specification: | T = -30 °C to +85 °C                         |
| Antenna terminating impedance:       | Z <sub>ANT</sub> = 50 Ω    3.6 nH            |
| RX terminating impedance:            | Z <sub>RX</sub> = 100 Ω (balanced)    8.2 nH |
| TX terminating impedance:            | Z <sub>TX</sub> = 50 Ω                       |

| <b>Characterisitcs TX - ANT</b>   | <b>min.</b> | <b>typ.<br/>@ 25 °C</b> | <b>max.</b> |     |
|---|-------------|-------------------------|-------------|-----|
| <b>Center frequency</b> <span style="float: right;">f<sub>C</sub></span>                                      | —           | 1767.4                  | —           | MHz |
| <b>Maximum insertion attenuation</b>  |             |                         |             |     |
| 1749.9 ... 1784.9 MHz   |             | 1.4                     | 1.8         | dB  |
| @f <sub>carrier</sub> 1752.4 ... 1782.4 MHz <span style="float: right;">α<sub>WCDMA</sub><sup>1)</sup></span> |             | 1.4                     | 1.8         | dB  |
| <b>Amplitude ripple(p-p)</b>  |             |                         |             |     |
| 1749.9 ... 1784.9 MHz   |             | 0.4                     | 0.8         | dB  |
| @f <sub>carrier</sub> 1752.4 ... 1782.4 MHz <span style="float: right;">α<sub>WCDMA</sub><sup>3)</sup></span> |             | 0.4                     | 0.8         | dB  |
| <b>Error Vector Magnitude</b>   |             |                         |             |     |
| @f <sub>carrier</sub> 1752.4 ... 1782.4 MHz <span style="float: right;">EVM<sup>2)</sup></span>               |             | 1.3                     | 2.0         | %   |
| <b>Input VSWR (TX port)</b>   |             |                         |             |     |
| 1749.9 ... 1784.9 MHz   |             | 1.4                     | 1.8         |     |
| <b>Output VSWR (ANT port)</b>   |             |                         |             |     |
| 1749.9 ... 1784.9 MHz   |             | 1.5                     | 1.8         |     |

1) Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).  
 2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

**Data Sheet**

**Characteristics**

Temperature range for specification:

 $T = -30^{\circ}\text{C to } +85^{\circ}\text{C}$ 

Antenna terminating impedance:

 $Z_{\text{ANT}} = 50\ \Omega \parallel 3.6\ \text{nH}$ 

RX terminating impedance:

 $Z_{\text{RX}} = 100\ \Omega\ (\text{balanced}) \parallel 8.2\ \text{nH}$ 

TX terminating impedance:

 $Z_{\text{TX}} = 50\ \Omega$ 

| <b>Characteristics TX - ANT</b> |           |     |   | <b>min.</b> | <b>typ.<br/>@ 25 °C</b> | <b>max.</b> |    |
|---------------------------------|-----------|-----|---|-------------|-------------------------|-------------|----|
| <b>Attenuation</b>              |           |     | $\alpha$                                |             |                         |             |    |
|                                 | 10.0      | ... | 95.0 MHz                                | 30          | 80                      |             | dB |
|                                 | 470.0     | ... | 770.0 MHz                               | 30          | 48                      |             | dB |
|                                 | 810.0     | ... | 828.0 MHz                               | 30          | 47                      |             | dB |
|                                 | 860.0     | ... | 895.0 MHz                               | 30          | 46                      |             | dB |
|                                 | 921.0     | ... | 960.0 MHz                               | 30          | 45                      |             | dB |
|                                 | 1475.9    | ... | 1500.9 MHz                              | 30          | 40                      |             | dB |
|                                 | 1500.9    | ... | 1565.42 MHz                             | 30          | 40                      |             | dB |
|                                 | 1565.42   | ... | 1573.374 MHz                            | 40          | 43                      |             | dB |
|                                 | 1573.374  | ... | 1577.466 MHz                            | 40          | 43                      |             | dB |
|                                 | 1577.466  | ... | 1585.42 MHz                             | 40          | 44                      |             | dB |
|                                 | 1597.5515 | ... | 1605.886 MHz                            | 40          | 46                      |             | dB |
|                                 | 1605.886  | ... | 1680.0 MHz                              | 25          | 31                      |             | dB |
|                                 | 1805.0    | ... | 1845.0 MHz                              | 1           | 4                       |             | dB |
|                                 | 1844.9    | ... | 1879.9 MHz                              | 45          | 50                      |             | dB |
| @ $f_{\text{carrier}}$          | 1847.4    | ... | 1877.4 MHz $\alpha_{\text{WCDMA}}^{1)}$ | 45          | 50                      |             | dB |
|                                 | 1884.5    | ... | 1919.6 MHz                              | 40          | 46                      |             | dB |
|                                 | 2110.0    | ... | 2170.0 MHz                              | 27          | 42                      |             | dB |
|                                 | 2400.0    | ... | 2500.0 MHz                              | 35          | 40                      |             | dB |
|                                 | 3500.0    | ... | 3570.0 MHz                              | 20          | 31                      |             | dB |
|                                 | 5150.0    | ... | 5355.0 MHz                              | 20          | 23                      |             | dB |
|                                 | 5725.0    | ... | 5850.0 MHz                              | 18          | 21                      |             | dB |

<sup>1)</sup> Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).

|                       |                            |
|-----------------------|----------------------------|
| <b>SAW Components</b> | <b>B8557</b>               |
| <b>SAW Duplexer</b>   | <b>1767.4 / 1862.4 MHz</b> |

Data Sheet



**Characteristics**

|                                      |  |
|--------------------------------------|--|
| Temperature range for specification: | T = -30 °C to +85 °C                         |
| Antenna terminating impedance:       | Z <sub>ANT</sub> = 50 Ω    3.6 nH            |
| RX terminating impedance:            | Z <sub>RX</sub> = 100 Ω (balanced)    8.2 nH |
| TX terminating impedance:            | Z <sub>TX</sub> = 50 Ω                       |

| <b>Characterisitcs ANT - RX</b>   | <b>min.</b>      | <b>typ.<br/>@ 25 °C</b> | <b>max.</b> |     |
|---|------------------|-------------------------|-------------|-----|
| <b>Center frequency</b> <span style="float: right;">f<sub>C</sub></span>                                      | —                | 1862.4                  | —           | MHz |
| <b>Maximum insertion attenuation</b>  |                  |                         |             |     |
| 1844.9 ... 1879.9 MHz   |                  | 2.0                     | 2.5         | dB  |
| @f <sub>carrier</sub> 1847.4 ... 1877.4 MHz <span style="float: right;">α<sub>WCDMA</sub><sup>1)</sup></span> |                  | 2.0                     | 2.5         | dB  |
| <b>Amplitude ripple(p-p)</b>  |                  |                         |             |     |
| 1844.9 ... 1879.9 MHz   |                  | 0.4                     | 0.7         | dB  |
| @f <sub>carrier</sub> 1847.4 ... 1877.4 MHz <span style="float: right;">α<sub>WCDMA</sub><sup>3)</sup></span> |                  | 0.3                     | 0.7         | dB  |
| <b>Common Mode Rejection Ratio CMRR</b>   |                  |                         |             |     |
| 1844.9 ... 1879.9 MHz   | 21 <sup>2)</sup> | 26                      |             | dB  |
| <b>Input VSWR (ANT port)</b>  |                  |                         |             |     |
| 1844.9 ... 1879.9 MHz   |                  | 1.4                     | 1.8         |     |
| <b>Output VSWR (RX port)</b>  |                  |                         |             |     |
| 1844.9 ... 1879.9 MHz   |                  | 1.4                     | 1.8         |     |

1) Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).  
 2) A combination of 10° phase balance and 1dB amplitude balance corresponds to 19.6 dB CMRR.



**Data Sheet**

**Characteristics**

|                                      |  |
|--------------------------------------|--|
| Temperature range for specification: | T = -30 °C to +85 °C                         |
| Antenna terminating impedance:       | Z <sub>ANT</sub> = 50 Ω    3.6 nH            |
| RX terminating impedance:            | Z <sub>RX</sub> = 100 Ω (balanced)    8.2 nH |
| TX terminating impedance:            | Z <sub>TX</sub> = 50 Ω                       |

| <b>Characterisitcs ANT - RX</b>                                   |                   |        |                                | <b>min.</b> | <b>typ.<br/>@ 25 °C</b> | <b>max.</b> |     |
|---|-------------------|--------|--------------------------------|-------------|-------------------------|-------------|-----|
| <b>Attenuation</b>  |                   |        | $\alpha$                       |             |                         |             |     |
|   | 10.0 ... 95.0     |        | MHz                            | 70          | 79                      |             | dB  |
|   | 614.9 ... 626.7   |        | MHz                            | 45          | 80                      |             | dB  |
|   | 922.5 ... 940.0   |        | MHz                            | 45          | 72                      |             | dB  |
|   | 1654.9 ... 1689.9 |        | MHz                            | 35          | 60                      |             | dB  |
|   | 1689.9 ... 1750.0 |        | MHz                            | 35          | 56                      |             | dB  |
|   | 1749.9 ... 1784.9 |        | MHz                            | 48          | 58                      |             | dB  |
| @f <sub>carrier</sub>   | 1752.4 ... 1782.4 |        | MHz $\alpha_{\text{WCDMA}}^1)$ | 48          | 58                      |             | dB  |
|   | 1965.0 ... 2400.0 |        | MHz                            | 15          | 52                      |             | dB  |
|   | 2400.0 ... 2497.0 |        | MHz                            | 30          | 57                      |             | dB  |
|   | 3594.8 ... 3664.8 |        | MHz                            | 40          | 59                      |             | dB  |
|   | 3689.8 ... 3759.8 |        | MHz                            | 35          | 58                      |             | dB  |
|   | 5344.7 ... 5449.7 |        | MHz                            | 40          | 51                      |             | dB  |
|   | 5534.7 ... 5639.7 |        | MHz                            | 35          | 51                      |             | dB  |
|   | 5639.7 ... 5650.0 |        | MHz                            | 35          | 51                      |             | dB  |
| <b>IMD Product Level Limits<sup>2)</sup></b>                      |                   |        |                                |             |                         |             |     |
| <b>at f<sub>TX</sub> = 1767.4 MHz f<sub>RX</sub> = 1862.4 MHz</b> |                   |        |                                |             |                         |             |     |
| Blocker 1   |                   | 95.0   | MHz                            |             | -130                    | -105        | dBm |
| Blocker 2   |                   | 1672.4 | MHz                            |             | -111                    | -105        | dBm |
| Blocker 3   |                   | 3629.8 | MHz                            |             | -120                    | -105        | dBm |
| Blocker 4   |                   | 5397.2 | MHz                            |             | -124                    | -105        | dBm |

<sup>1)</sup> Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).

<sup>2)</sup> IMD product level limits for power levels P<sub>TX</sub>=21.5dB (antenna port output power) and P<sub>Block-ER</sub>=-15dBm (antenna port input power).

**Data Sheet**

**Characteristics**

Temperature range for specification:

$$T = -30\text{ °C to }+85\text{ °C}$$

Antenna terminating impedance:

$$Z_{ANT} = 50\ \Omega \parallel 3.6\text{ nH}$$

RX terminating impedance:

$$Z_{RX} = 100\ \Omega\ (\text{balanced}) \parallel 8.2\text{ nH}$$

TX terminating impedance:

$$Z_{TX} = 50\ \Omega$$

| <b>Characteristics TX - RX</b>     |                   |     |                       | <b>min.</b> | <b>typ.</b>    | <b>max.</b> |    |
|------------------------------------|-------------------|-----|-----------------------|-------------|----------------|-------------|----|
|                                    |                   |     |                       |             | <b>@ 25 °C</b> |             |    |
| <b>Differential Mode Isolation</b> |                   |     |                       |             |                |             |    |
|                                    |                   |     | $\alpha$              |             |                |             |    |
|                                    | 1749.9 ... 1784.9 | MHz |                       | 55          | 58             |             | dB |
| @ $f_{carrier}$                    | 1752.4 ... 1782.4 | MHz | $\alpha_{WCDMA}^{1)}$ | 55          | 58             |             | dB |
|                                    | 1844.9 ... 1879.9 | MHz |                       | 50          | 56             |             | dB |
| @ $f_{carrier}$                    | 1847.4 ... 1877.4 | MHz | $\alpha_{WCDMA}^{3)}$ | 50          | 57             |             | dB |
| <b>Common mode Isolation</b>       |                   |     |                       |             |                |             |    |
|                                    |                   |     | $\alpha$              |             |                |             |    |
|                                    | 1749.9 ... 1784.9 | MHz |                       | 53          | 56             |             | dB |
| @ $f_{carrier}$                    | 1752.4 ... 1782.4 | MHz | $\alpha_{WCDMA}^{3)}$ | 53          | 56             |             | dB |

1) Attenuation of WCDMA signal("Powertransferfunction").Please refer to annotation on page (8).


**Maximum ratings**

|   |                  |                  |     |  |
|---|------------------|------------------|-----|--|
| Storage temperature range               | T <sub>stg</sub> | -40/+85          | °C  | machine model, 10 pulses<br>source and load impedance 50 Ω<br>} continuous wave<br>T = 50°C, 5.000 h |
| DC voltage                              | V <sub>DC</sub>  | 5                | V   |  |
| ESD voltage                             | V <sub>ESD</sub> | 50 <sup>1)</sup> | V   |  |
| Input power at<br>1749.9 ... 1784.9 MHz | P <sub>IN</sub>  | 29               | dBm |  |
| elsewhere                               |                  | 10               | dBm |  |

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

**Annotation for characteristics section**

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

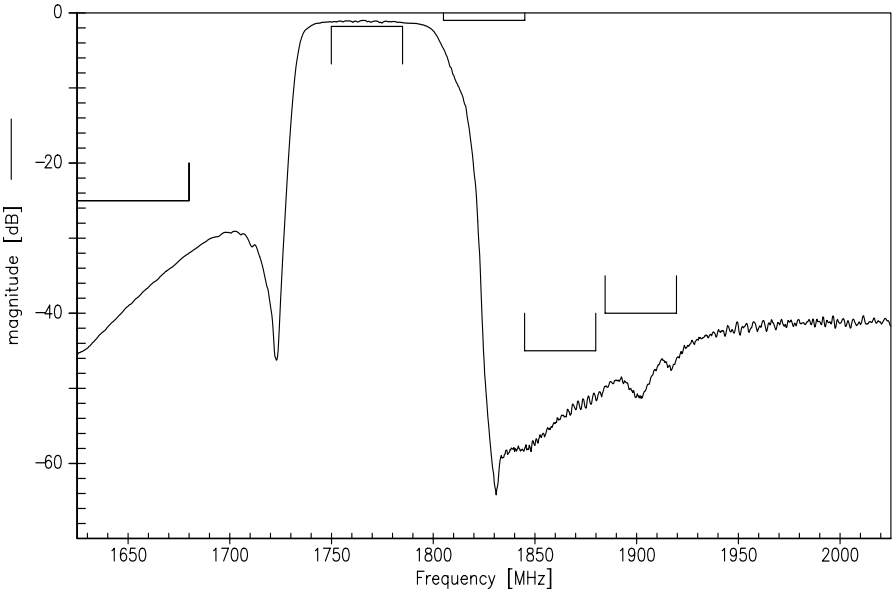
$$\int_{-\infty}^{\infty} |S_{\text{ds21}}(f) H_{\text{RRC}}(f - f_{\text{Carrier}})|^2 df$$

$f_{\text{Carrier}}$  according to 3GPP TS 25.101 (e.g. for WCDMA Band 9-Passband,  $f_{\text{Carrier}}$  ranges from 1752.4 MHz (lowest Tx channel) to 1782.4 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:

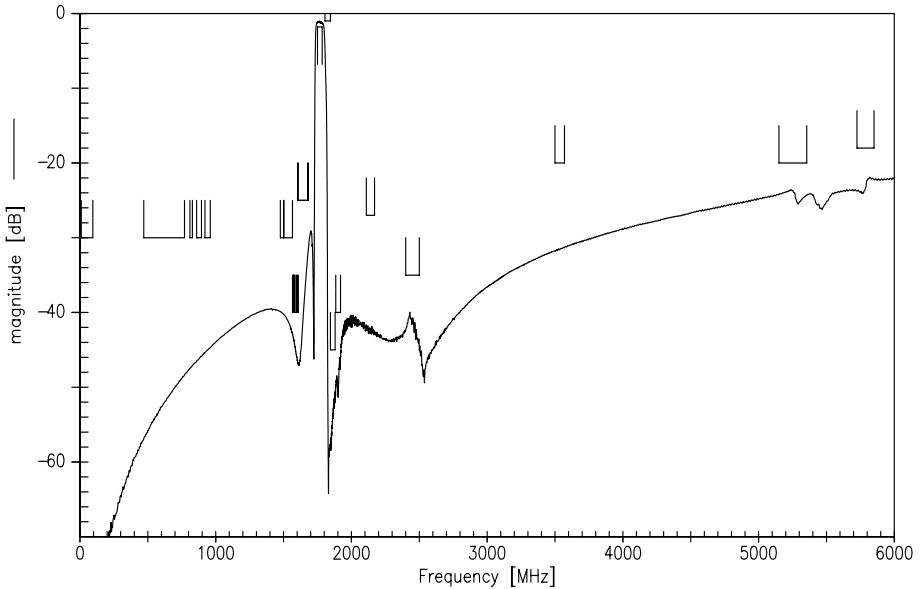
$$\int_{-\infty}^{\infty} |H_{\text{RRC}}(f)|^2 df = 1$$

Data Sheet **EMD**

**Frequency Response Tx-ANT (passband)**

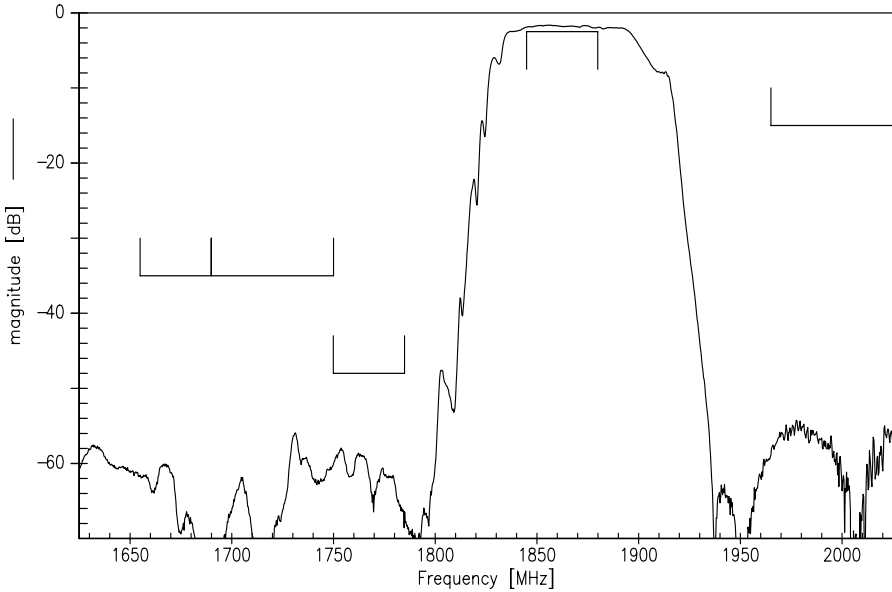


**Frequency Response Tx-ANT (wideband)**

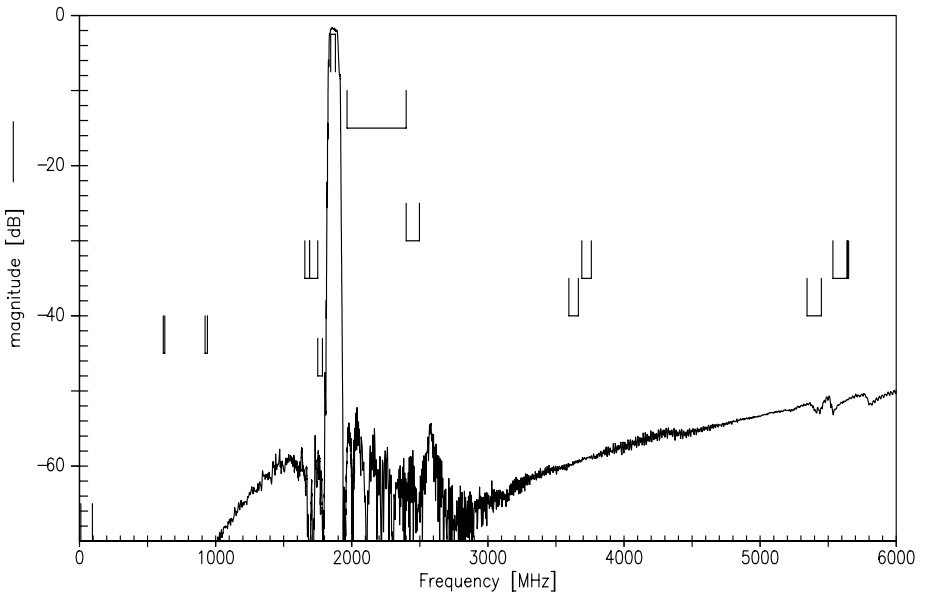




Frequency Response ANT-Rx (passband)



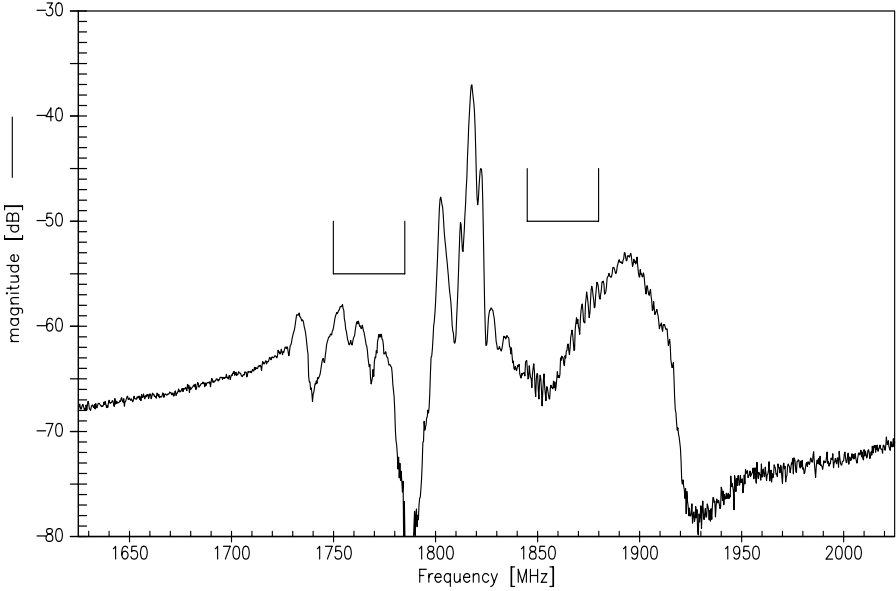
Frequency Response ANT-Rx (wideband)



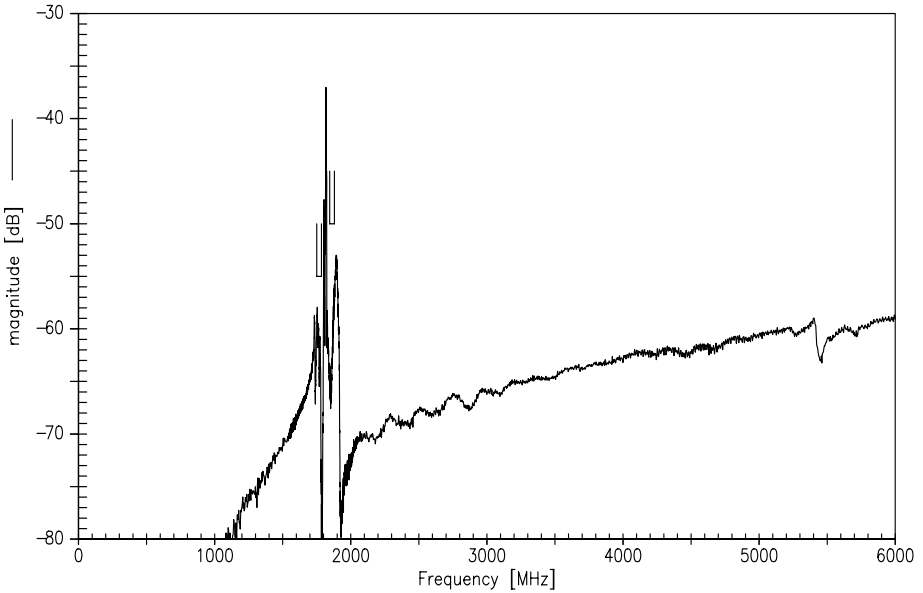
Data Sheet



**Frequency Response Tx-Rx (passband) / Differential Mode**



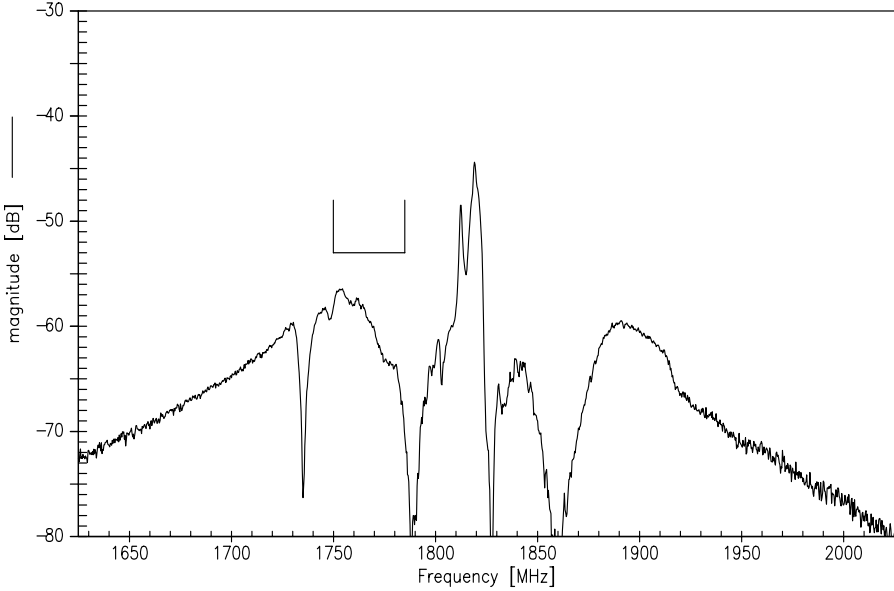
**Frequency Response Tx-Rx (wideband) / Differential Mode**



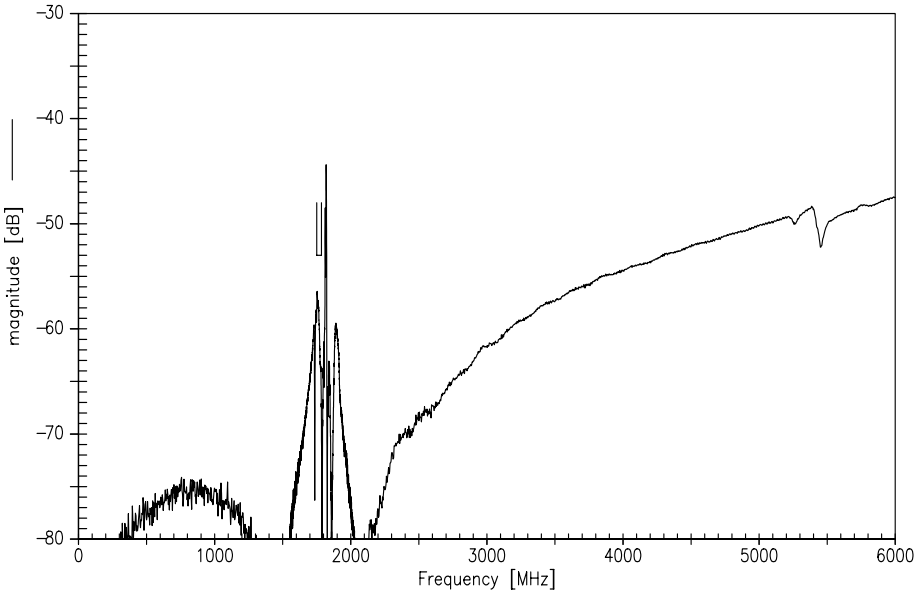
Data Sheet



**Frequency Response Tx-Rx (passband) / Common Mode**



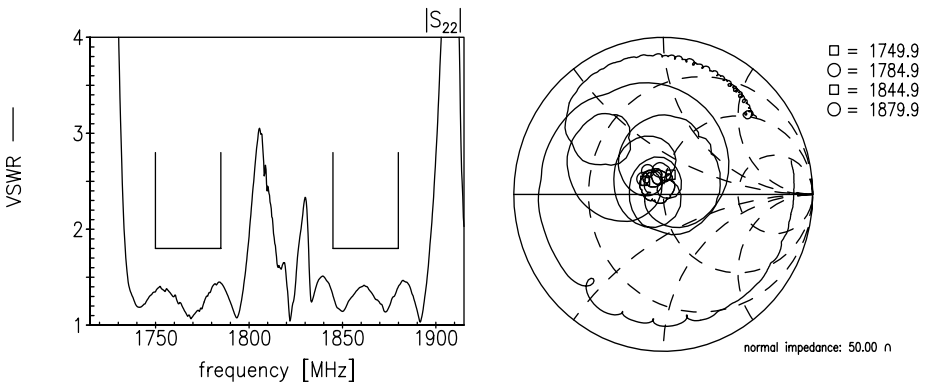
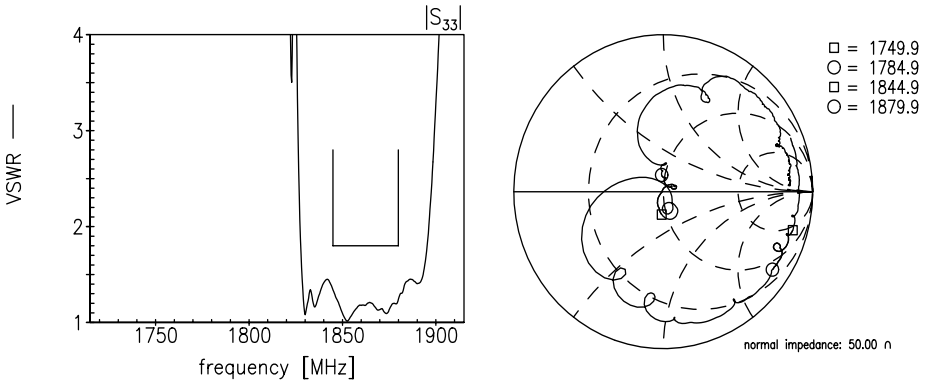
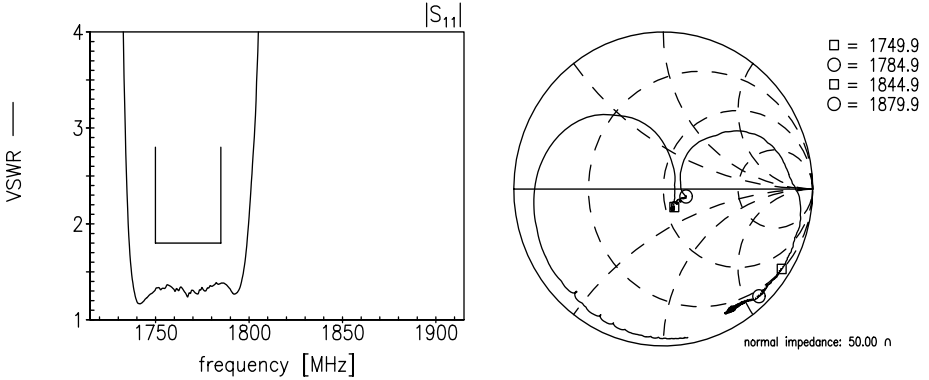
**Frequency Response Tx-Rx (wideband) / Common Mode**



**SAW Components** **B8557**  
**SAW Duplexer** **1767.4 / 1862.4 MHz**

Data Sheet

**Return Loss  $S_{11}$  Tx - port  $S_{22}$  ANT - port  $S_{33}$  Rx - port**





|                       |                            |
|-----------------------|----------------------------|
| <b>SAW Components</b> | <b>B8557</b>               |
| <b>SAW Duplexer</b>   | <b>1767.4 / 1862.4 MHz</b> |

Data Sheet



**References**

|                            |  |
|----------------------------|--|
| <b>Type</b>                | B8557  |
| <b>Ordering code</b>       | B39182B8557P810  |
| <b>Marking and package</b> | C61157-A8-A38  |
| <b>Packaging</b>           | F61074-V8247-Z000  |
| <b>Date codes</b>          | L_1126   |
| <b>S-parameters</b>        | B8557_NB.s4p, B8557_WB.s4p<br>See file header for port/pin assignment table.   |
| <b>Soldering profile</b>   | S_6001   |
| <b>RoHS compatible</b>     | defined as compatible with the following documents:<br>"DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment." |
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| <b>Matching coils</b>      | See Inductor pdf-catalog<br><a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a><br>and Data Library for circuit simulation<br><a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a>  |

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