

# SAW Components

## SAW Duplexer

WCDMA Band II

**Series/type:** B8607  
**Ordering code:** B39202B8607P810

**Date:** November 26, 2013  
**Version:** 2.1

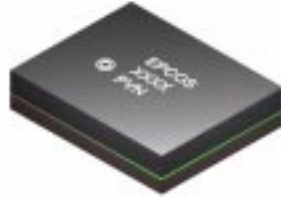
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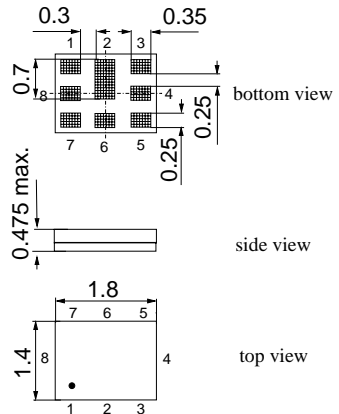
Data sheet


**Application**

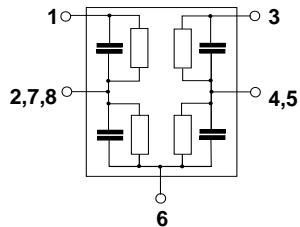
- Low-loss SAW duplexer for mobile telephone WCDMA Band II systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz


**Features**

- Package size 1.8 x 1.4 mm<sup>2</sup>, max. height 0.475 mm
- RoHS compatible
- Approx. weight 0.0035g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- Fully matched by integrated matching network except for RX port matching
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level 3**


**Pin configuration**

- 3 TX input
- 1 RX output
- 6 Antenna
- 2, 4, 5, 7, 8 To be grounded



Data sheet


**Characteristics**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 TX terminating impedance:  $Z_{TX} = 50\ \Omega$   
 ANT terminating impedance:  $Z_{ANT} = 50\ \Omega$   
 RX terminating impedance:  $Z_{RX} = 50\ \Omega \parallel 7.5\text{ nH}$

Characteristics TX - ANT <sup>1)</sup>		B8607			
		min.	typ. @ 25°C	max.	
<b>Center frequency</b>	$f_C$	—	1880	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$				
@ $f_{\text{Carrier}}$ 1852.4 ... 1907.6 MHz	$\alpha_{\text{WCDMA}}^{2)}$	—	1.9	2.4	dB
<b>Error Vector Magnitude</b>					
@ $f_{\text{Carrier}}$ 1852.4 ... 1907.6 MHz	EVM <sup>3)</sup>	—	1.0	3.5	%
<b>Input VSWR (TX port)</b>					
1850.0 ... 1909.0 MHz		—	1.5	2.0	
<b>Output VSWR (ANT port)</b>					
1850.0 ... 1909.0 MHz		—	1.5	2.0	
<b>Attenuation</b>	$\alpha$				
10.0 ... 894.0MHz		37	39	—	dB
1565.4 ... 1605.9MHz		43	51	—	dB
1605.9 ... 1680.0MHz		30	50	—	dB
@ $f_{\text{Carrier}}$ 1932.4 ... 1987.6MHz	$\alpha_{\text{WCDMA}}^{2)}$	44	52	—	dB
2010.0 ... 2025.0MHz		20	45	—	dB
2110.0 ... 2155.0MHz		40	49	—	dB
2400.0 ... 2500.0MHz		25	33	—	dB
3700.0 ... 3820.0MHz		20	26	—	dB
4900.0 ... 5850.0MHz		15	21	—	dB

<sup>1)</sup> Specified min./max. values are valid for a testing power of +10 dBm.

<sup>2)</sup> Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (6).

<sup>3)</sup> Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Data sheet


**Characteristics**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 TX terminating impedance:  $Z_{TX} = 50\ \Omega$   
 ANT terminating impedance:  $Z_{ANT} = 50\ \Omega$   
 RX terminating impedance:  $Z_{RX} = 50\ \Omega \parallel 7.5\text{ nH}$

Characteristics ANT - RX <sup>1)</sup>		B8607			
		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	1960	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{max}$				
@ $f_{Carrier}$ 1932.4 ... 1987.6 MHz	$\alpha_{WCDMA}^{2)}$	—	2.3	3.4	dB
<b>Error Vector Magnitude</b>					
@ $f_{Carrier}$ 1932.4 ... 1987.6 MHz	EVM <sup>3)</sup>	—	1.3	4.0	%
@ $f_{Carrier}$ 1932.4 ... 1987.6 MHz	EVM <sup>3)</sup>	—	1.3	3.5 <sup>4)</sup>	%
<b>Input VSWR (ANT port)</b>					
1930.0 ... 1989.0 MHz		—	1.5	2.0	
<b>Output VSWR (RX port)</b>					
1930.0 ... 1989.0 MHz		—	1.4	2.0	
<b>Attenuation</b>	$\alpha$				
1.0 ... 800.0MHz		40	43	—	dB
80.0MHz		50	80	—	dB
800.0 ... 1850.0MHz		32	35	—	dB
@ $f_{Carrier}$ 1852.4 ... 1907.6MHz	$\alpha_{WCDMA}^{2)}$	45	57	—	dB
2005.0 ... 2050.0MHz		5	12	—	dB
2050.0 ... 2075.0MHz		25	40	—	dB
2075.0 ... 2400.0MHz		25	31	—	dB
2400.0 ... 2550.0MHz		25	30	—	dB
2550.0 ... 3000.0MHz		33	38	—	dB
3000.0 ... 6000.0MHz		40	45	—	dB

1) Specified min./max. values are valid for a testing power of +10 dBm.

2) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (6).

3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

4) Valid for room temperature 25 °C

Data sheet


**Characteristics**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 TX terminating impedance:  $Z_{TX} = 50\ \Omega$   
 ANT terminating impedance:  $Z_{ANT} = 50\ \Omega$   
 RX terminating impedance:  $Z_{RX} = 50\ \Omega \parallel 7.5\text{ nH}$

Characteristics TX - RX <sup>1)</sup>				B8607			
				min.	typ. @ 25 °C	max.	
<b>Isolation</b>							
	1574.0 ... 1577.0 MHz			40	59	—	dB
@f <sub>Carrier</sub>	1852.4 ... 1907.6 MHz	$\alpha_{\text{WCDMA}}^{2)}$		51	54	—	dB
@f <sub>Carrier</sub>	1932.4 ... 1987.6 MHz	$\alpha_{\text{WCDMA}}^{2)}$		50	54	—	dB
	3700.0 ... 3820.0 MHz			20	58	—	dB
	5550.0 ... 5850.0 MHz			20	47	—	dB

<sup>1)</sup> Specified min./max. values are valid for a testing power of +10 dBm.

<sup>2)</sup> Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (6).

Linearity				B8607			
				min.	typ. @ 25 °C	max.	
<b>IMD product levels<sup>1)</sup></b>							
IMD2, Blocker 1	80.0 MHz			—	103	—	dBm
IMD2, Blocker 2	3780.0 ... 3900.0 MHz			—	115	—	dBm
IMD3, Blocker 3	1770.0 ... 1830.0 MHz			—	105	—	dBm
IMD3, Blocker 4	5630.0 ... 5810.0 MHz			—	110	—	dBm

<sup>1)</sup> @  $f_{TX}=[1850 \dots 1910\text{ MHz}]$ ,  $f_{RX}=[1930 \dots 1990\text{ MHz}]$ ,  $f_{RX} - f_{TX}=80\text{ MHz}$ , IMD product levels for power levels  $P_{TX}=21\text{ dBm}$  (antenna port output power) and  $P_{Blocker}=-15\text{ dBm}$  (antenna port input power)


**Maximum ratings**

Operable temperature range	T	-30/+85	°C	human body model, 1 pulse charged device model, 3 pulses source and load impedance 50 Ω } continuous wave T = 50°C, >5.000 h
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	0 <sup>1)</sup>	V	
ESD voltage	V <sub>ESD</sub>	300 <sup>2)</sup>	V	
		600 <sup>3)</sup>	V	
Input power at	P <sub>IN</sub>			
@f <sub>Carrier</sub> 1852.4 ... 1907.6 MHz		>28	dBm	
elsewhere		10	dBm	

- 1) DC resistance at RX output might be less than 100MΩ at elevated temperatures. Hence, we recommend usage of blocking capacitors.
- 2) acc. to JESD22-A114F (human body model), 1 negative & 1 positive pulse.
- 3) acc. to JESD22-C101C (charged device model), 3 negative & 3 positive pulses.

**Annotation for characteristics section**

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

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

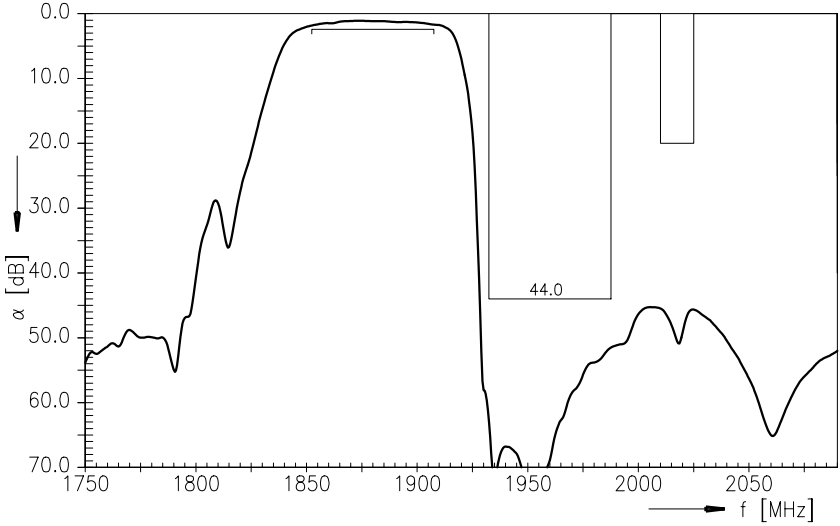
f<sub>Carrier</sub> according to 3GPP TS 25.101 (e.g. for WCDMA Band 2 Passband, f<sub>Carrier</sub> ranges from 1852.4 MHz (lowest Tx channel) to 1907.6 MHz (highest Tx channel)). H<sub>RRC</sub>(f) is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

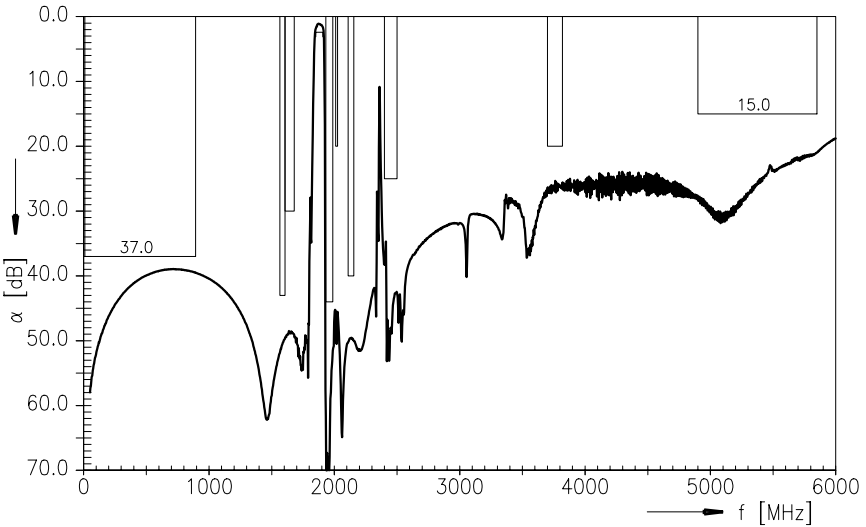
Data sheet



Frequency response TX - ANT (PTF)



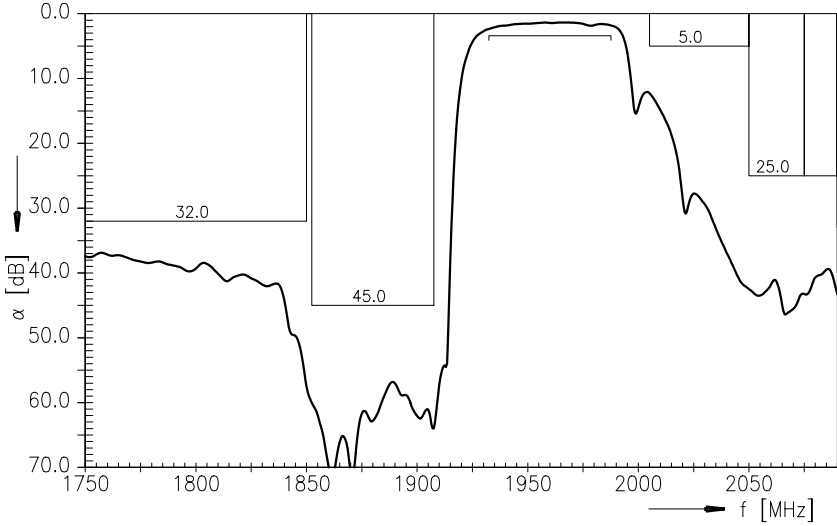
Frequency response TX - ANT (wideband)



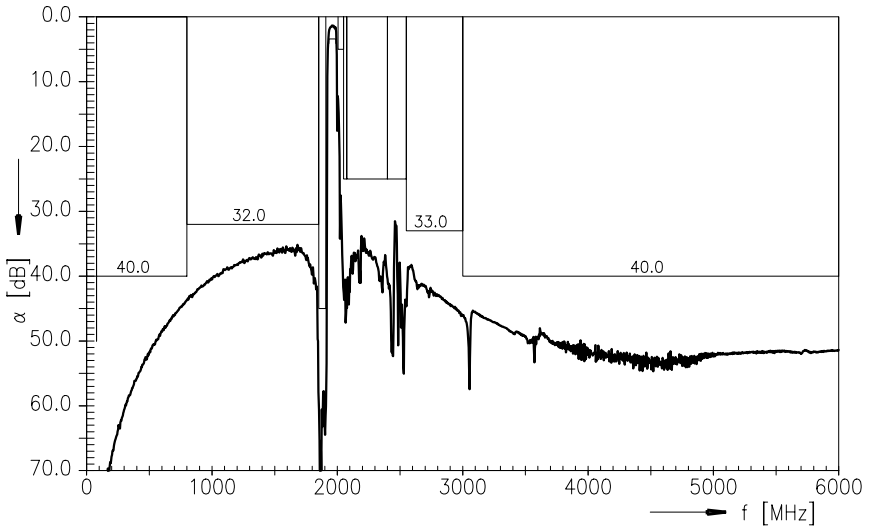
Data sheet



**Frequency response ANT - RX (PTF)**



**Frequency response ANT - RX (wideband)**

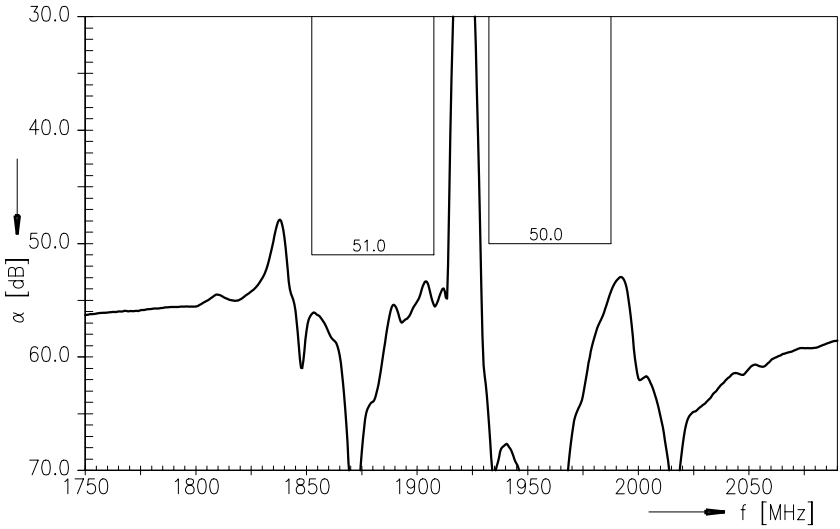




Data sheet



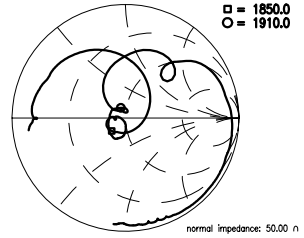
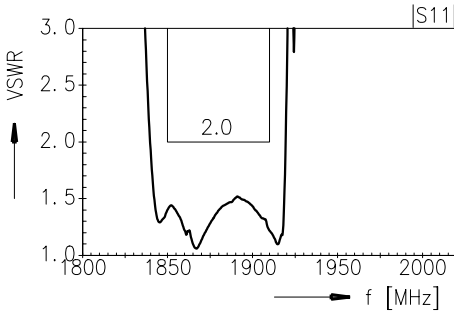
**Frequency response TX - RX isolation (PTF)**



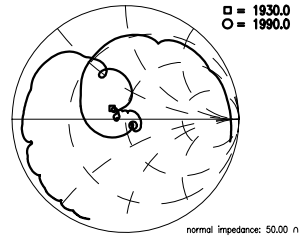
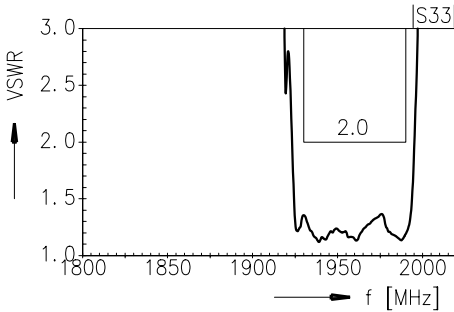
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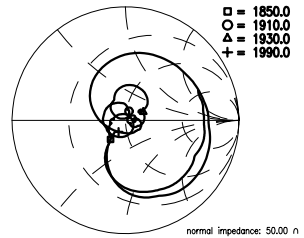
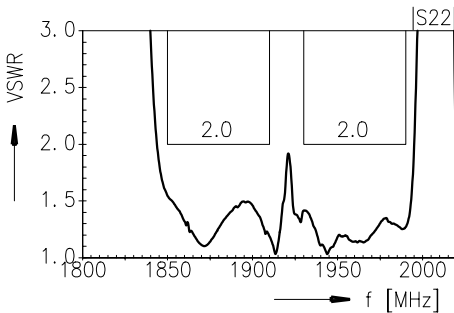
Return loss  $S_{11}$  TX-port



Return loss  $S_{33}$  RX-port



Return loss  $S_{22}$  ANT-port



<b>SAW Components</b>	<b>B8607</b>
<b>SAW Duplexer</b>	<b>1880.0 / 1960.0 MHz</b>

Data sheet



## References

<b>Type</b>	B8607
<b>Ordering code</b>	B39202B8607P810
<b>Marking and package</b>	C61157-A8-A87
<b>Packaging</b>	F61074-V8259-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B8607_NB_UN.s4p (unmatched, narrow band) B8607_WB_UN.s4p (unmatched, wide band) 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: "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."
<b>Moldability</b>	Before using in overmolding environment, please contact your EPCOS sales office.
<b>Matching coils</b>	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.

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