



SAW Components

BAW/SAW Duplexer

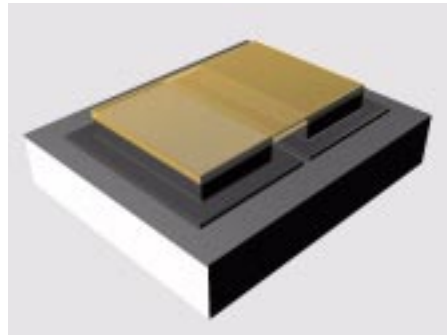
WCDMA Band II (PCS)

Series/type:	B7955
Ordering code:	B39202B7955P810
Date:	February 1, 2010
Version:	2.0



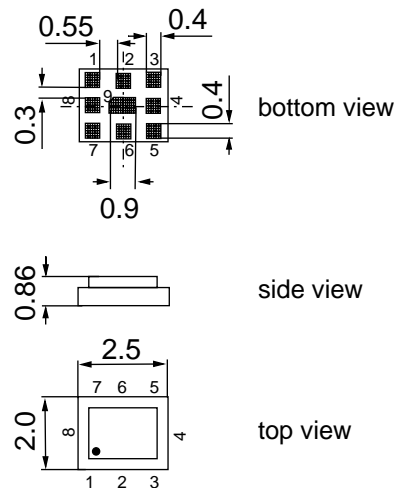
Application

- Low-loss BAW/SAW duplexer for mobile telephone WCDMA Band II (PCS) systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path



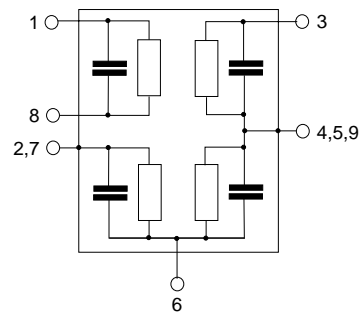
Features

- Package size 2.5 x 2.0 mm², max. height 0.94 mm
- RoHS compatible
- Approx. weight 0.020 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Fully matched by integrated matching network
- **E**lectrostatic **S**ensitive **D**evice (ESD)
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

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





Data sheet



Characteristics

Temperature range for specification: T = -10 °C to +85 °C
 ANT terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 100 Ω (balanced) || 15 nH
 TX terminating impedance: Z_{TX} = 50 Ω

Characteristics TX - ANT		min.	typ. @ 25°C	max.	
Center frequency	f _C	—	—	—	MHz
Maximum insertion attenuation					
@f _{Carrier}	1852.4 ... 1907.6 MHz α _{WCDMA} ¹⁾	—	2.3	3.0	dB
@f _{Carrier}	1852.4 ... 1907.6 MHz α _{WCDMA} ¹⁾	—	2.3	2.7 ²⁾	dB
Amplitude ripple (p-p)					
@f _{Carrier}	1852.4 ... 1907.6 MHz α _{WCDMA} ¹⁾	—	1.3	1.8	dB
Error Vector Magnitude					
@f _{Carrier}	1852.4 ... 1907.6 MHz EVM ³⁾	—	1.3	4.0	%
@f _{Carrier}	1852.4 ... 1907.6 MHz EVM ³⁾	—	1.3	3.0 ⁴⁾	%
Input VSWR (TX port)					
	1850.0 ... 1910.0 MHz	—	1.8	2.3	
Output VSWR (ANT port)					
	1850.0 ... 1910.0 MHz	—	1.8	2.2	
Attenuation					
	470.0 ... 750.0 MHz α	30	39	—	dB
	1450.0 ... 1480.0 MHz	30	35	—	dB
	1570.0 ... 1580.0 MHz	35	38	—	dB
	1670.0 ... 1675.0 MHz	30	41	—	dB
	1770.0 ... 1824.0 MHz	18	22	—	dB
	1824.0 ... 1830.0 MHz	10	22	—	dB
@f _{Carrier}	1932.4 ... 1987.6 MHz α _{WCDMA} ¹⁾	45	49	—	dB
	2400.0 ... 2500.0 MHz	24	29	—	dB
	3700.0 ... 3820.0 MHz	15	20	—	dB
	3820.0 ... 5150.0 MHz	9	15	—	dB
	5150.0 ... 5550.0 MHz	7	13	—	dB
	5550.0 ... 5730.0 MHz	7	12	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (6).
 2) Valid for reduced temperature range +10 °C to +40 °C.
 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
 4) Valid for reduced temperature range +10 °C to +85 °C.



Data sheet



Characteristics

Temperature range for specification: T = -10 °C to +85 °C
 ANT terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 100 Ω (balanced) || 15 nH
 TX terminating impedance: Z_{TX} = 50 Ω

Characteristics ANT- RX	min.	typ. @ 25°C	max.	
Center frequency f _C	—	—	—	MHz
Maximum insertion attenuation				
@f _{Carrier} 1932.4 ... 1987.6MHz α _{WCDMA} ¹⁾	—	2.6	3.7	dB
1930.0 ... 1935.0MHz	—	2.7	4.5	dB
1935.0 ... 1990.0MHz	—	2.7	3.5	dB
Amplitude ripple (p-p)				
@f _{Carrier} 1932.4 ... 1987.6MHz α _{WCDMA} ¹⁾	—	1.0	2.0	dB
Error Vector Magnitude				
@f _{Carrier} 1932.4 ... 1987.6MHz EVM ²⁾	—	1.7	4.1	%
@f _{Carrier} 1932.4 ... 1987.6MHz EVM ²⁾	—	1.7	2.8 ³⁾	%
Input VSWR (ANT port)				
1930.0 ... 1990.0MHz	—	1.7	2.0	
Output VSWR (RX port)				
1930.0 ... 1990.0MHz	—	1.8	2.3	
Attenuation α				
0.3 ... 1770.0MHz	35	61	—	dB
1770.0 ... 1850.0MHz	38	57	—	dB
@f _{Carrier} 1852.4 ... 1907.6MHz α _{WCDMA} ¹⁾	50	56	—	dB
1910.0 ... 1915.0MHz	9	49	—	dB
2010.0 ... 2070.0MHz	5	14	—	dB
2070.0 ... 2500.0MHz	30	55	—	dB
2500.0 ... 3780.0MHz	35	58	—	dB
3780.0 ... 3980.0MHz	35	66	—	dB
3980.0 ... 6000.0MHz	35	62	—	dB

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

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

3) Valid for reduced temperature range +20 °C to +85 °C



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BAW/SAW Duplexer

1880.0 / 1960.0 MHz

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Characteristics

Temperature range for specification: $T = -10\text{ °C to }+85\text{ °C}$
 Antenna terminating impedance: $Z_{ANT} = 50\ \Omega$
 RX terminating impedance: $Z_{RX} = 100\ \Omega$ (balanced) || 15 nH
 TX terminating impedance: $Z_{TX} = 50\ \Omega$

Characteristics ANT - RX		min.	typ. @ 25 °C	max.	
Common mode suppression	S_{cs21} 1930.0 ... 1990.0 MHz	25	30	—	dB
IMD Product Level Limits¹⁾					
at $f_{TX}=1880\text{MHz}$, $f_{RX}=1960\text{MHz}$					
Blocker 1	80.0 MHz	—	-118	—	dBm
Blocker 2	1800.0 MHz	—	-108	—	dBm
Blocker 3	3840.0 MHz	—	-100	—	dBm

¹⁾ IMD product level limits for power levels $P_{TX}=21\text{dBm}$ (antenna port output power) and $P_{Blocker}=-15\text{dBm}$ (antenna port input power)

Characteristics TX - RX		min.	typ. @ 25 °C	max.	
Isolation	α				
@ $f_{Carrier}$ 1852.4 ... 1907.6 MHz	α_{WCDMA} ¹⁾	53	57	—	dB
@ $f_{Carrier}$ 1932.4 ... 1987.6 MHz	α_{WCDMA} ¹⁾	48	52	—	dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (6).



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Maximum ratings

Operable temperature range ¹⁾	T	-30/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	3	V	
ESD voltage	V _{ESD}	50 ²⁾	V	machine model, 10 pulses
Input power at	P _{IN}			source and load impedance 50 Ω
1850.0 ... 1910.0 MHz		30	dBm	} continuous wave T = 55° C, 50.000 h
elsewhere		10	dBm	

1) Defines the temperature range in which the BAW/SAW device keeps its typical characteristics, however the specification values are not guaranteed.

2) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

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

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



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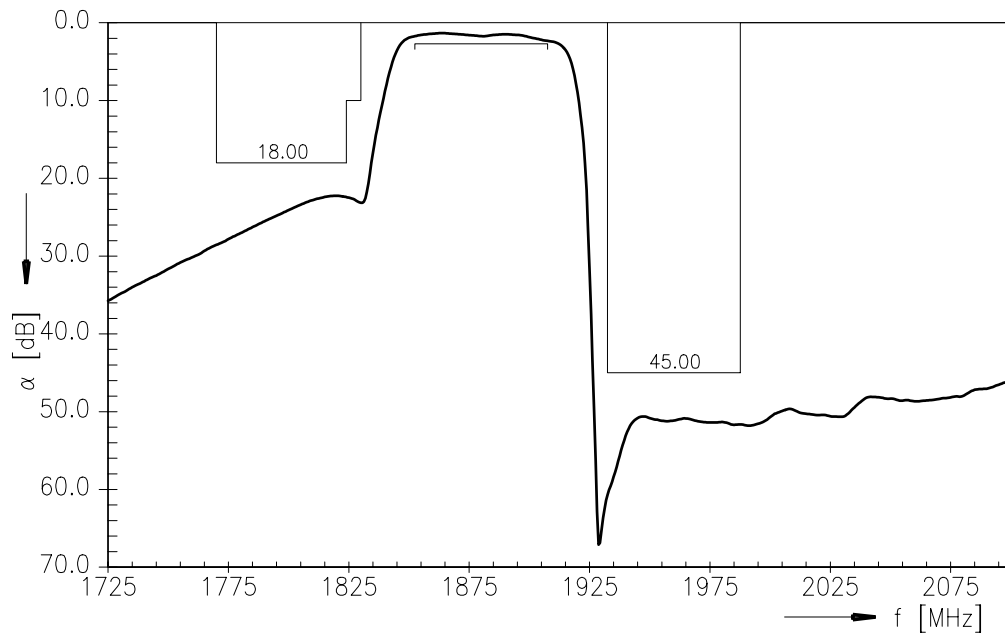
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1880.0 / 1960.0 MHz

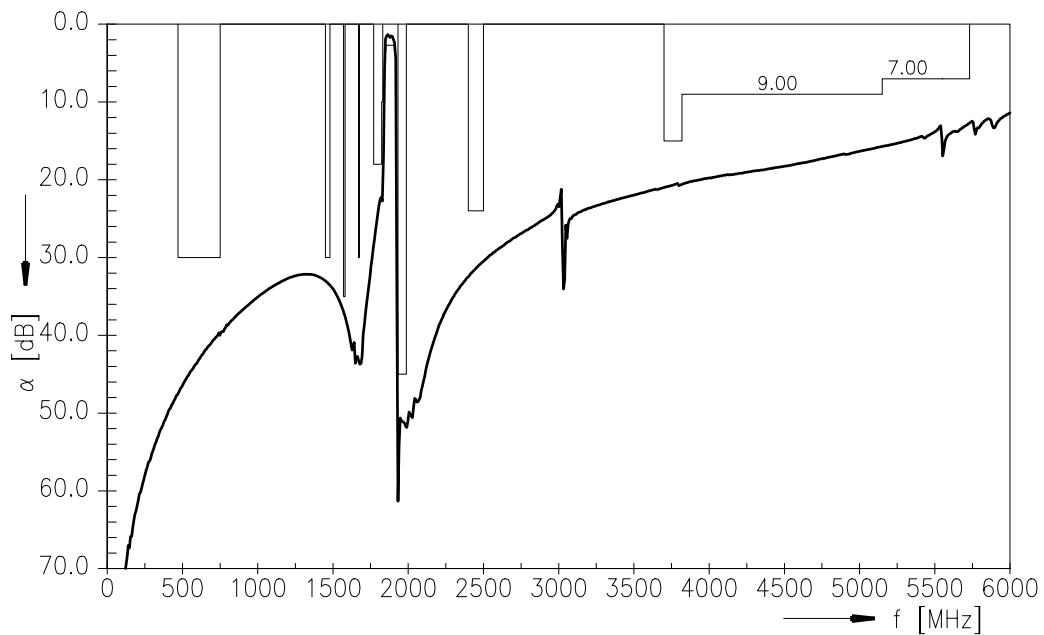
Data sheet



Frequency Response TX-ANT (PTF)



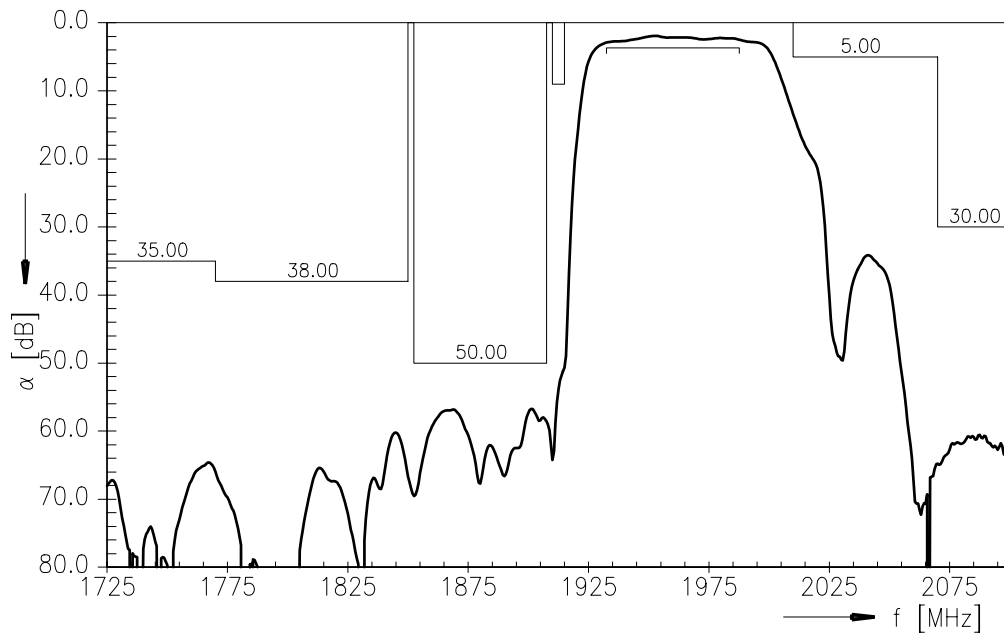
Frequency Response TX-ANT (wideband)



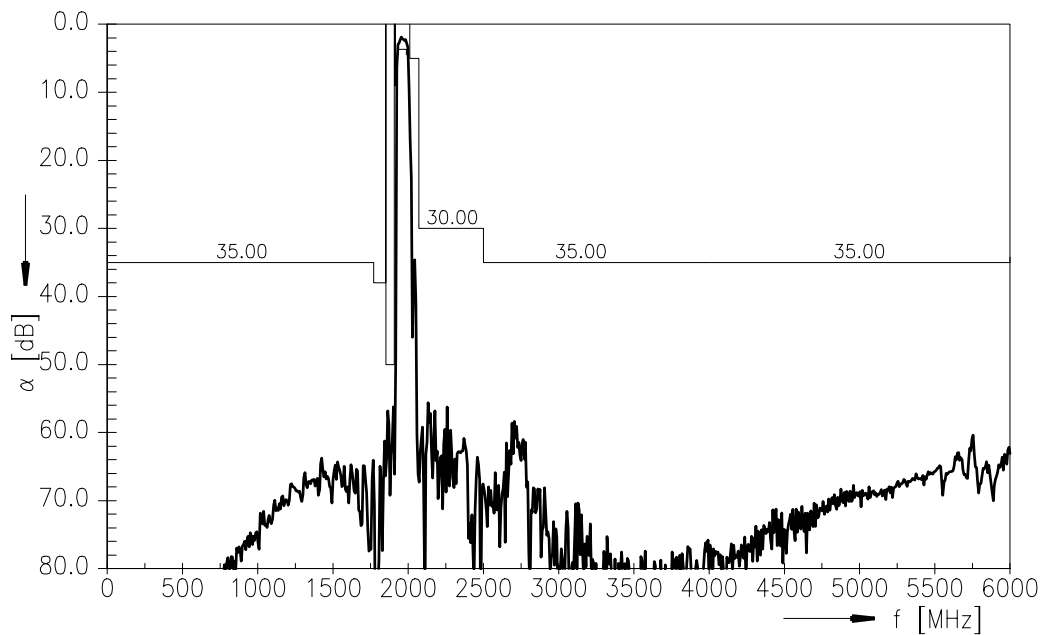
Please read *cautions and warnings* and *important notes* at the end of this document.



Frequency Response ANT-RX (PTF)



Frequency Response ANT-RX (wideband)





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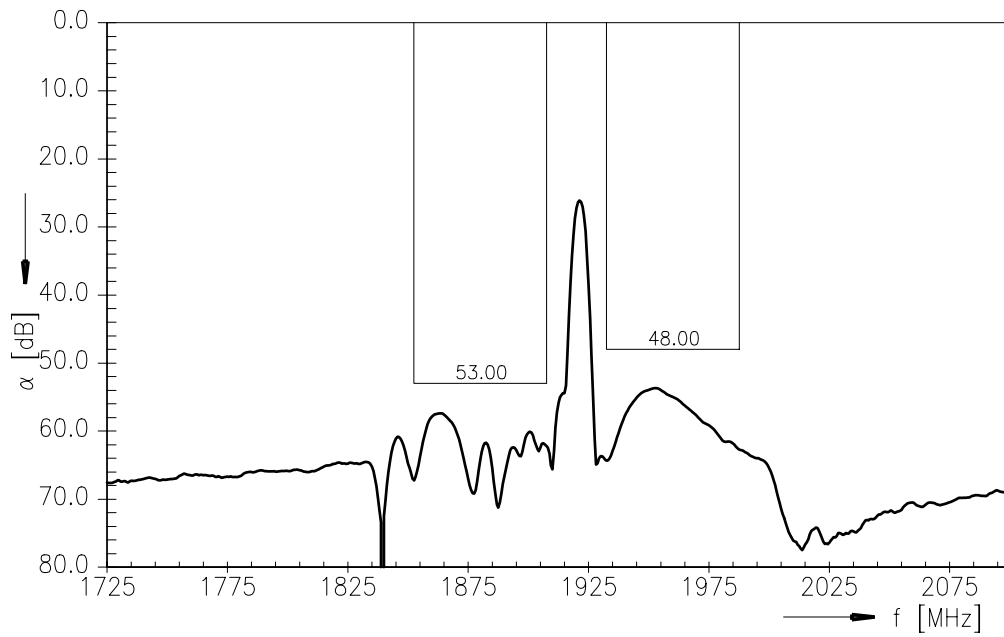
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1880.0 / 1960.0 MHz

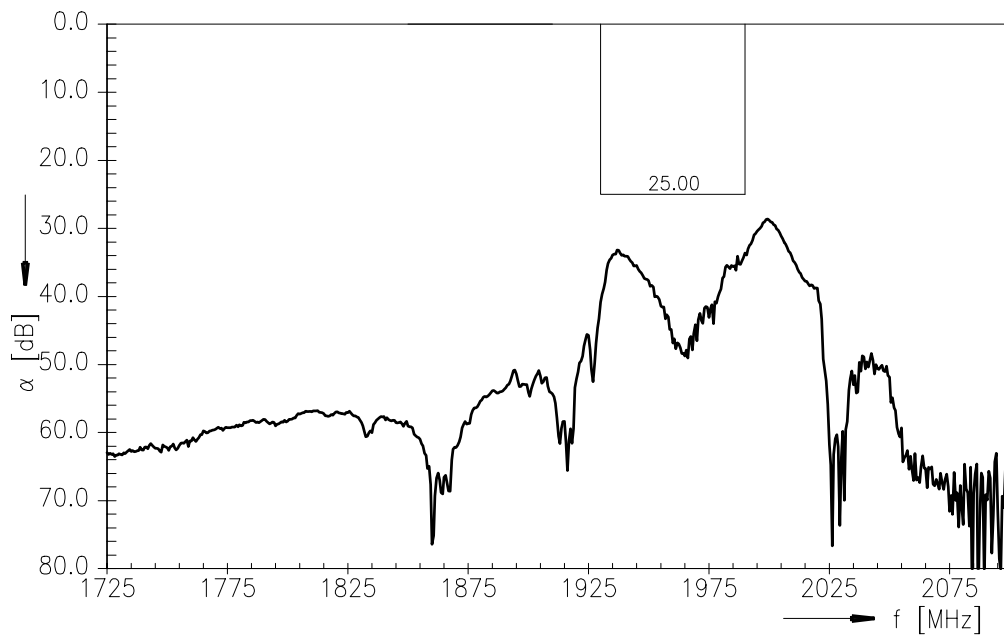
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Frequency Response TX-RX (PTF)



Frequency Response RX-ANT Common Mode Suppression



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**References**

Type	B7955
Ordering code	B39202B7955P810
Marking and package	C61157-A3-A64
Packaging	F61074-V8153-Z000
Date codes	L_1126
S-parameters	B7955_NB.s4p B7955_WB.s4p See file header for pin/port assignment
Soldering profile	S_6001
RoHS compatible	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."

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