SAW Components

SAW duplexer
WCDMA band VIII

Series/type:	**B7953**
Ordering code:	**B39941B7953E110**
Date:	September 28, 2009
Version:	2.0

EPCOS

SAW Components	**B7953**
SAW duplexer	**897.5 / 942.5 MHz**

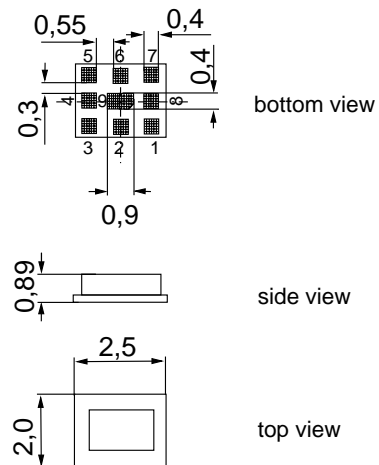**Data sheet**   SMD

Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII 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
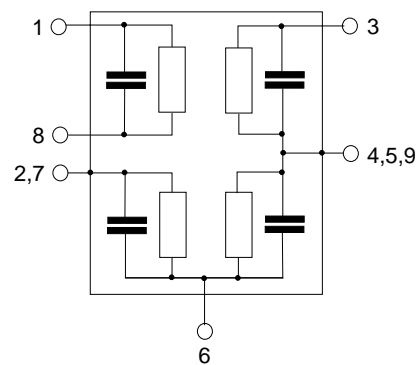- Fully matched by integrated passives network
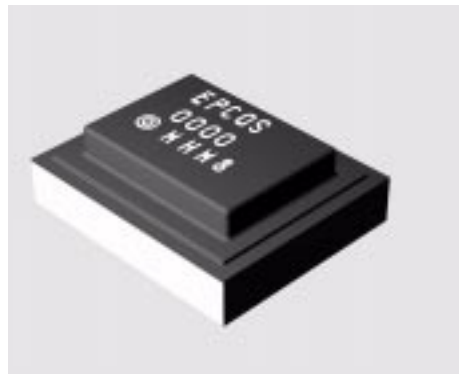
Features

- Package size 2.5 x 2.0 x 0.89 mm^3
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)

bottom view

side view

top view

Pin configuration

- 1,8   RX output, balanced
- 3   TX input, single ended
- 6   Antenna
- 2,4,5,7,9   Ground

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

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Data sheet   SMD

Characteristics

Temperature range for specification: T = −20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT} = 50 Ω
TX terminating impedance: Z_{TX} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)

Characteristics Tx - Ant						B7953		
---	---	---	---	---	---	min.	typ. @ 25 ˚C	max.	
Center frequency					f_C	—	897.5	—	MHz
Maximum insertion attenuation									
@$f_{Carrier}$ 882.4	...	912.6	MHz		α_{WCDMA}[1]	—	1.9	2.8	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$ 882.4	...	912.6	MHz		$\Delta\alpha_{WCDMA}$[1]	—	0.7	1.6	dB
Error Vector Magnitude									
@$f_{Carrier}$ 882.4	...	912.6	MHz		EVM[2]	—	2.2	5.5	%
@$f_{Carrier}$ 882.4	...	912.6	MHz		EVM[2]	—	2.2	4.0[3]	%
VSWR									
TX port	880.0	...	915.0	MHz		—	1.7	2.0	
ANT port	880.0	...	915.0	MHz		—	1.7	2.0	
Attenuation					α				
	0.3	...	793.0	MHz		30	33	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA}[1]	38	44	—	dB
	1574.0	...	1577.0	MHz		38	42	—	dB
	1760.0	...	1830.0	MHz		38	49	—	dB
	1830.0	...	1880.0	MHz		27	52	—	dB
	2110.0	...	2170.0	MHz		27	44	—	dB
	2400.0	...	2500.0	MHz		30	36	—	dB
	2620.0	...	2745.0	MHz		30	35	—	dB
	3520.0	...	3660.0	MHz		20	27	—	dB
	4400.0	...	4575.0	MHz		15	23	—	dB
	5150.0	...	5490.0	MHz		2	10	—	dB
	5725.0	...	5850.0	MHz		2	8	—	dB

[1] Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (5).
[2] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
[3] T=-15˚C to +55˚C

SAW Components	B7953
SAW duplexer	**897.5 / 942.5 MHz**

Data sheet   SMD

Characteristics

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TX terminating impedance: Z_{TX} = 50 Ω
RX terminating impedance: Z_{RX} = 100 Ω (balanced)

Charcteristics Rx - Ant				B7953 min.	B7953 typ. @ 25 ˚C	B7953 max.	
Center frequency			f_C	—	942.5	—	MHz
Maximum insertion attenuation							
@$f_{Carrier}$ 927.4 ... 957.6	MHz		α_{WCDMA}[1]	—	2.3	2.9	dB
925.0 ... 960.0	MHz			—	3.0	4.0	dB
Amplitude ripple (p-p)							
@$f_{Carrier}$ 927.4 ... 957.6	MHz		$\Delta\alpha_{WCDMA}$[1]	—	0.7	1.4	dB
Error Vector Magnitude							
@$f_{Carrier}$ 927.4 ... 957.6	MHz		EVM[2]	—	2.7	5.5	%
@$f_{Carrier}$ 927.4 ... 957.6	MHz		EVM[2]	—	2.7	4.5[3]	%
VSWR							
RX port 925.0 ... 960.0	MHz			—	1.9	2.2	
ANT port 925.0 ... 960.0	MHz			—	1.6	2.0	
Common Mode Suppression			α				
925.0 ... 960.0	MHz			25	28	—	dB
Attenuation			α				
0.3 ... 880.0	MHz			35	57	—	dB
@$f_{Carrier}$ 882.4 ... 912.6	MHz		α_{WCDMA}[1]	48	58	—	dB
1045.0 ... 1750.0	MHz			35	54	—	dB
1750.0 ... 4810.0	MHz			35	54	—	dB
Characteristics Tx - Rx							
Differential Mode Isolation							
@$f_{Carrier}$ 882.4 ... 912.6	MHz		α_{WCDMA}[1]	55	58	—	dB
@$f_{Carrier}$ 927.4 ... 957.6	MHz		α_{WCDMA}[1]	42	45	—	dB
Common Mode Isolation							
@$f_{Carrier}$ 882.4 ... 912.6	MHz		α_{WCDMA}[1]	50	55	—	dB

[1] Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (5).
[2] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
[3] T= +5˚C to +85˚C

Maximum ratings

Operable temperature range[1]	T	−30/+85	˚C	
Storage temperature range	T_{stg}	−40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[2]	V	machine model, 10 pulses
Input power at	P_{IN}			
880.0 ... 915.0 MHz		30	dBm	} continuous wave
elsewhere		10	dBm	55 ˚C, 10000 h

[1] Defines the temperature range in which the 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 UMTS-Passband, $f_{Carrier}$ ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 MHz (highest Rx 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:
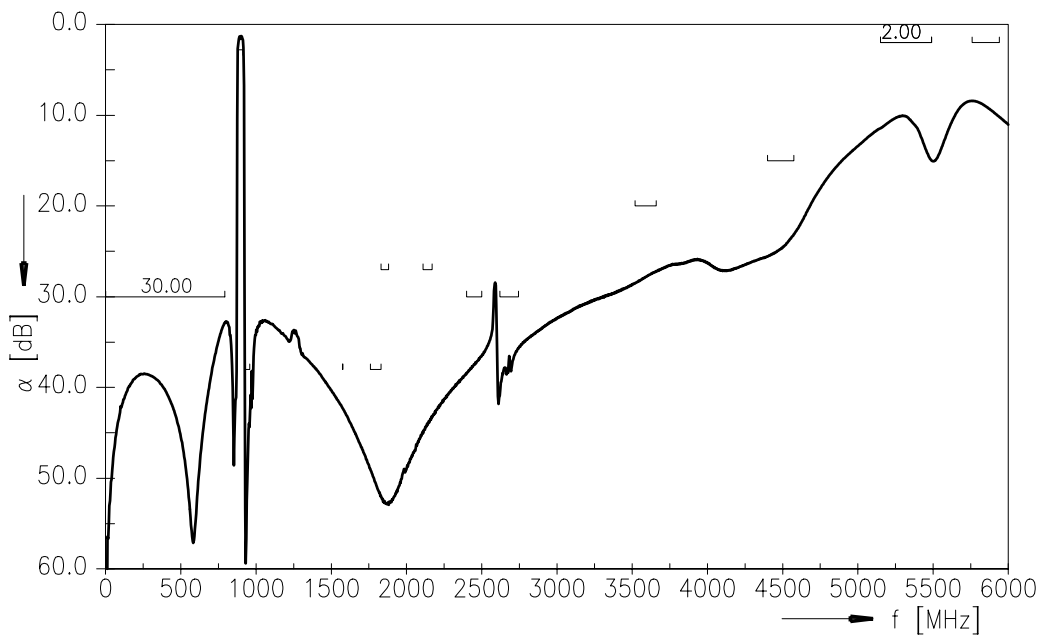
$$\int_{\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$

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Frequency Response TX-ANT (Power transfer function)
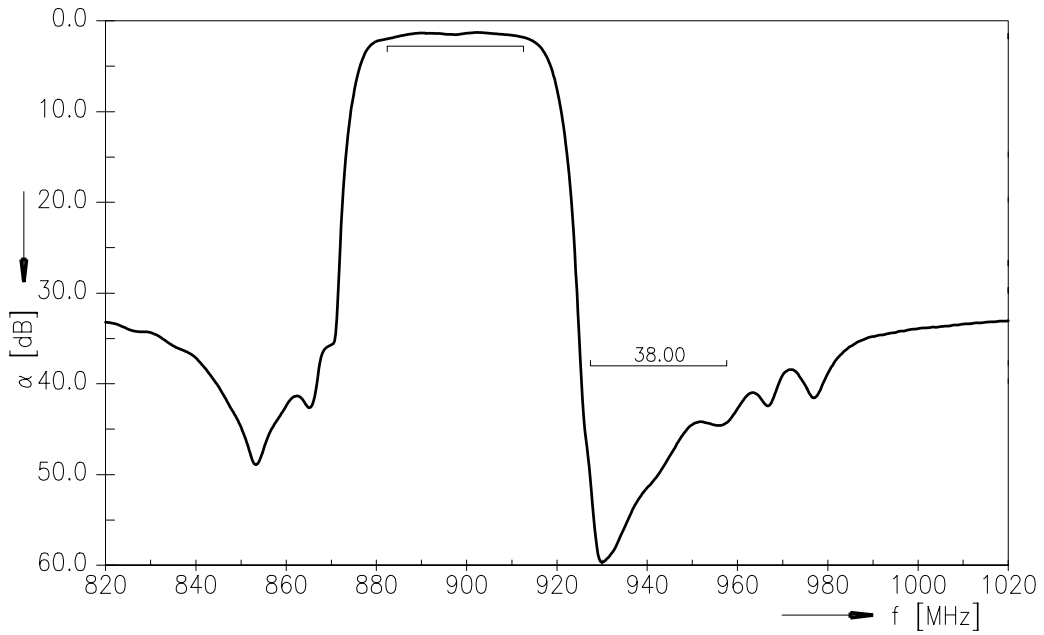
Frequency Response TX-ANT (wideband)

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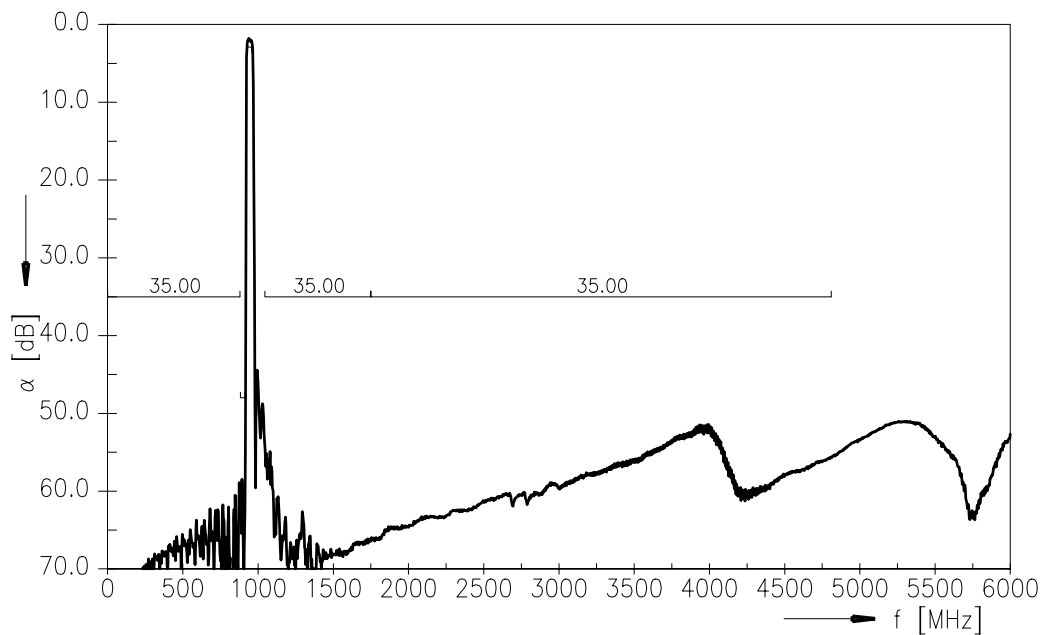
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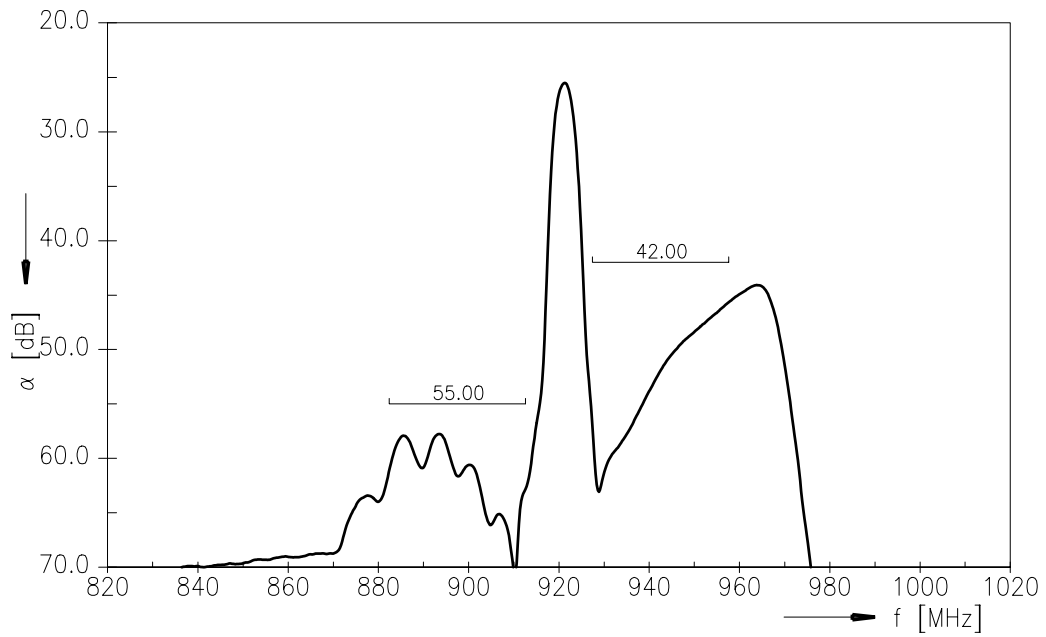**Frequency Response ANT - RX** (Power transfer function)
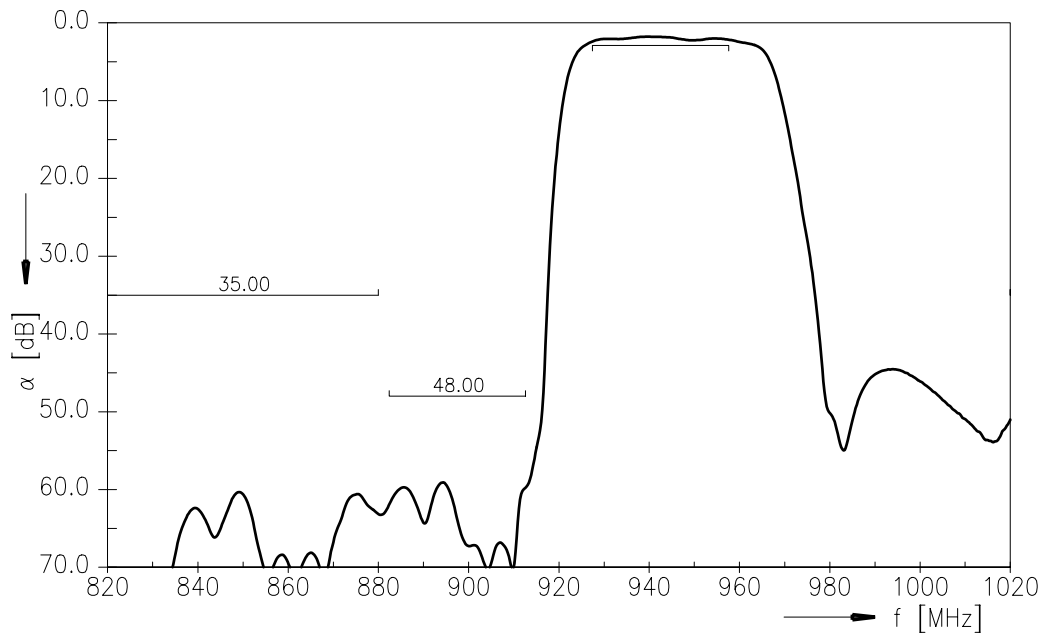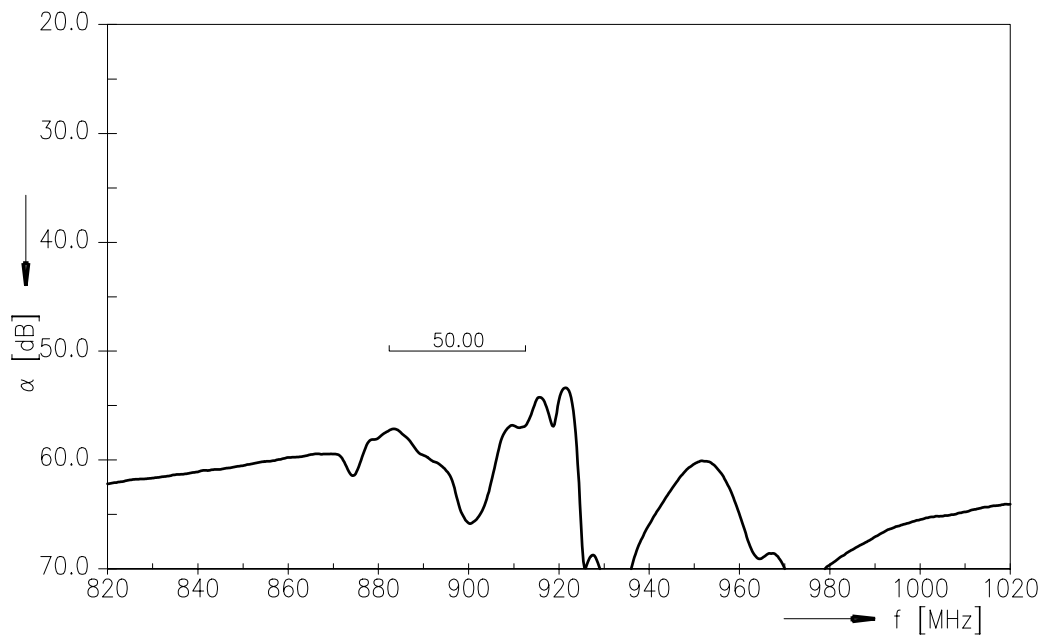

Frequency Response ANT - RX (wideband)

Frequency Response TX - RX (Power transfer function, differential mode)

Frequency Response TX - RX (Power transfer function, common mode)

References

Type	B7953
Ordering code	B39941B7953E110
Marking and package	C61157-Z3-C49
Packaging	F61074-V8153-Z000
Date codes	L_1126
S-parameters	B7953_NB_UN.s4p, B7953_WB_UN.s4p see file header for port/pin assignment table
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."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.

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