



SAW Components

Duplexers for Cellular Phones

Series/Type: B7953

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product	Date of Withdrawal	Deadline Last Orders	Last Shipments
B39941B7953E110	B39941B7934P810	2012-12-21	2013-12-31	2014-02-28

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SAW Components

B7953

SAW duplexer

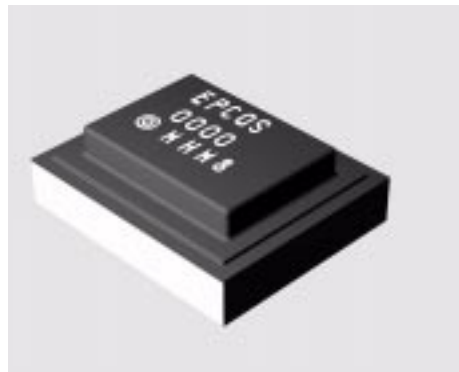
897.5 / 942.5 MHz

Data sheet



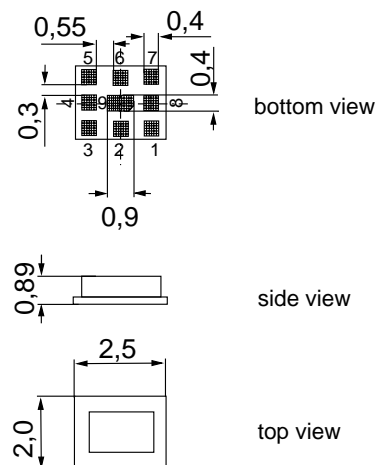
Application

- 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



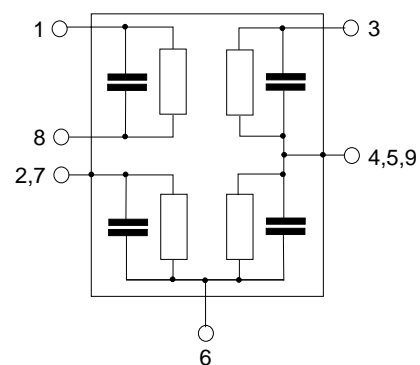
Features

- Package size 2.5 x 2.0 x 0.89 mm³
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**



Pin configuration

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





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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)

						B7953			
Characteristics Tx - Ant						min.	typ. @ 25 °C	max.	
Center frequency	f_C					—	897.5	—	MHz
Maximum insertion attenuation									
@f _{Carrier} 882.4 ... 912.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$					—	1.9	2.8	dB
Amplitude ripple (p-p)									
@f _{Carrier} 882.4 ... 912.6 MHz	$\Delta\alpha_{\text{WCDMA}}^{1)}$					—	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	$\alpha_{\text{WCDMA}}^{1)}$					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



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Characteristics

Temperature range for specification: $T = -20\text{ °C to }+85\text{ °C}$
 ANT terminating impedance: $Z_{\text{ANT}} = 50\ \Omega$
 TX terminating impedance: $Z_{\text{TX}} = 50\ \Omega$
 RX terminating impedance: $Z_{\text{RX}} = 100\ \Omega$ (balanced)

							B7953			
Charcteristics Rx - Ant							min.	typ. @ 25 °C	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				Δα _{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⁾ $T = +5\text{ °C to }+85\text{ °C}$



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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}	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 55 °C, 10000 h
elsewhere		10	dBm	

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

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

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)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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



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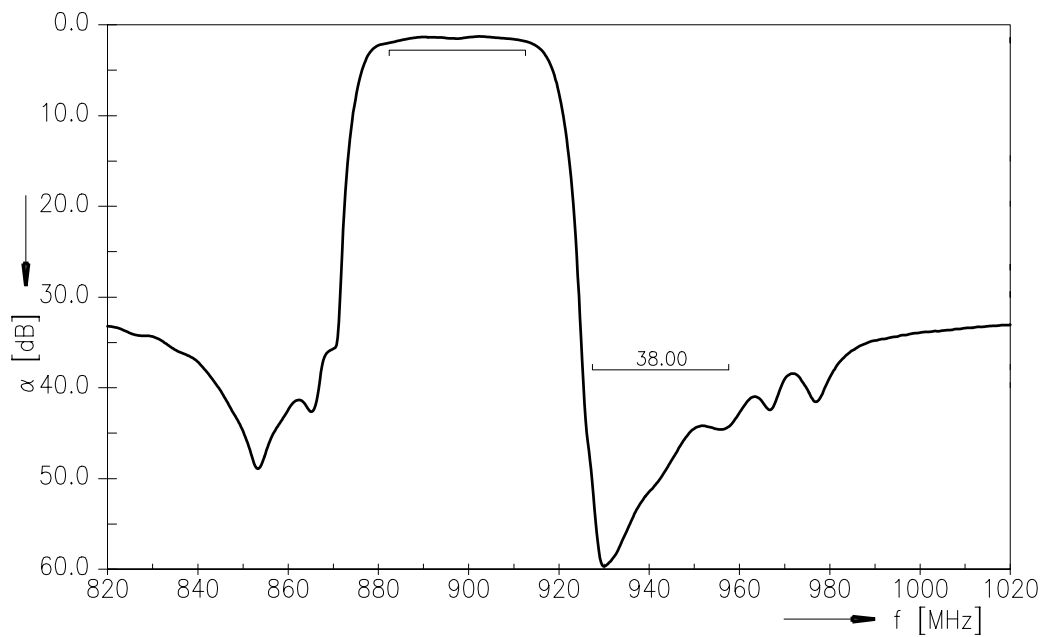
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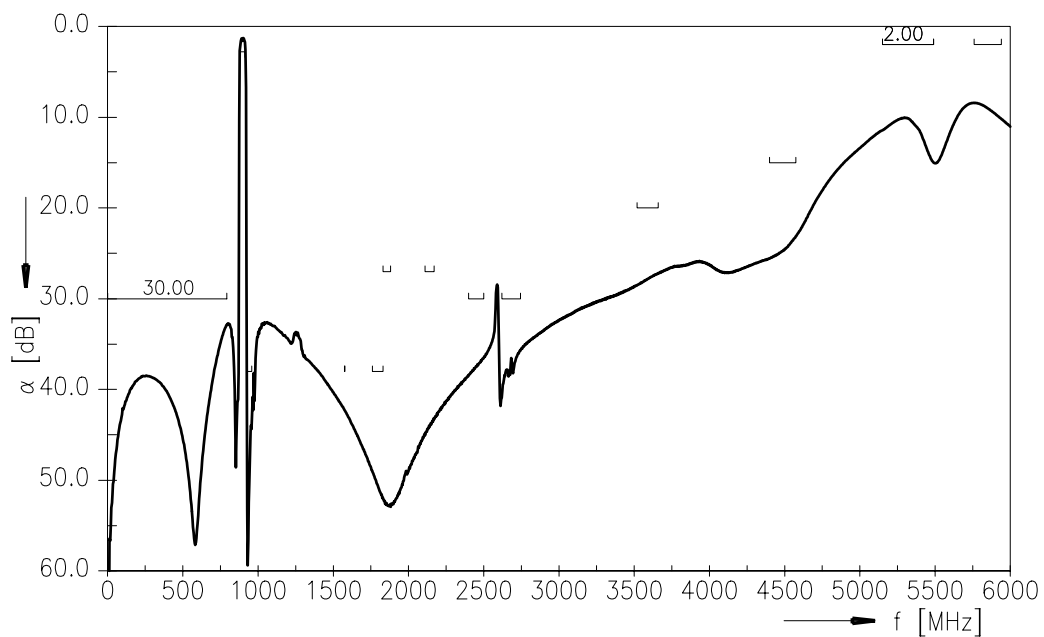
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Frequency Response TX-ANT (Power transfer function)



Frequency Response TX-ANT (wideband)



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



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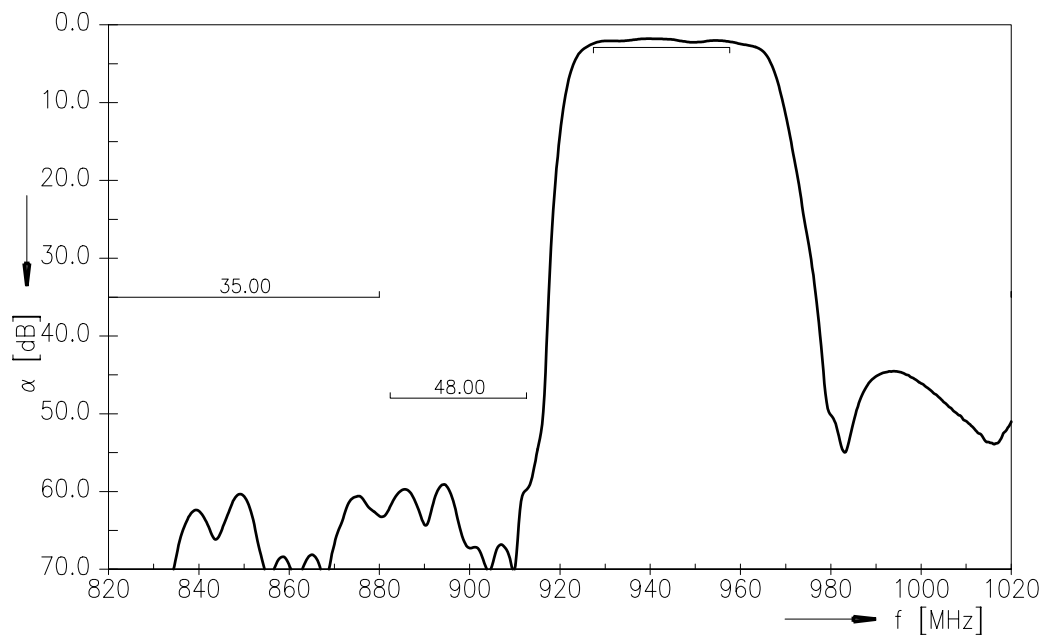
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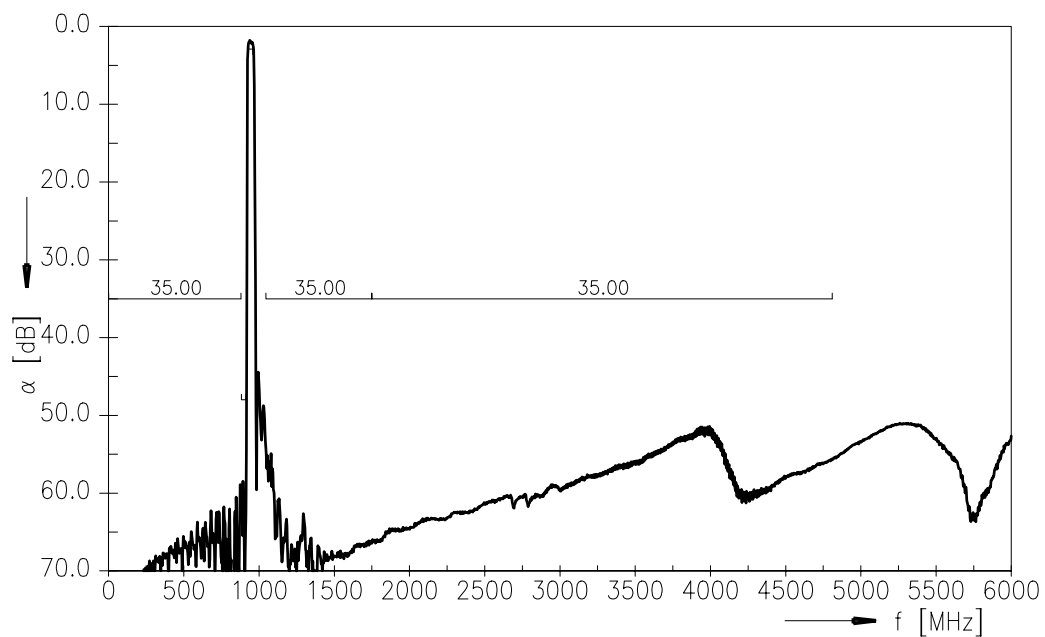
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Frequency Response ANT - RX (Power transfer function)



Frequency Response ANT - RX (wideband)



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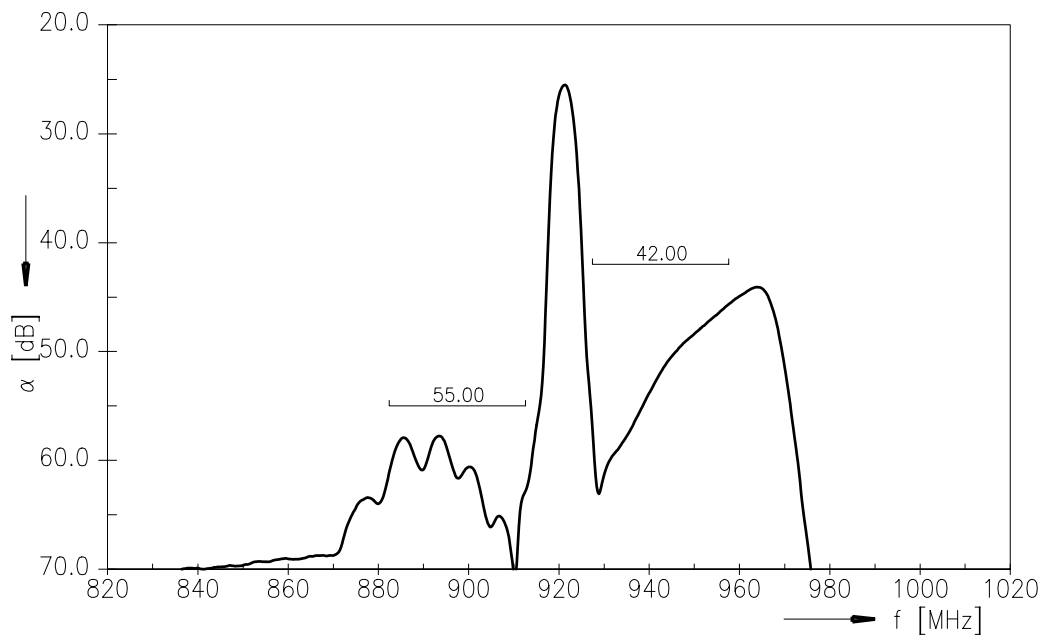
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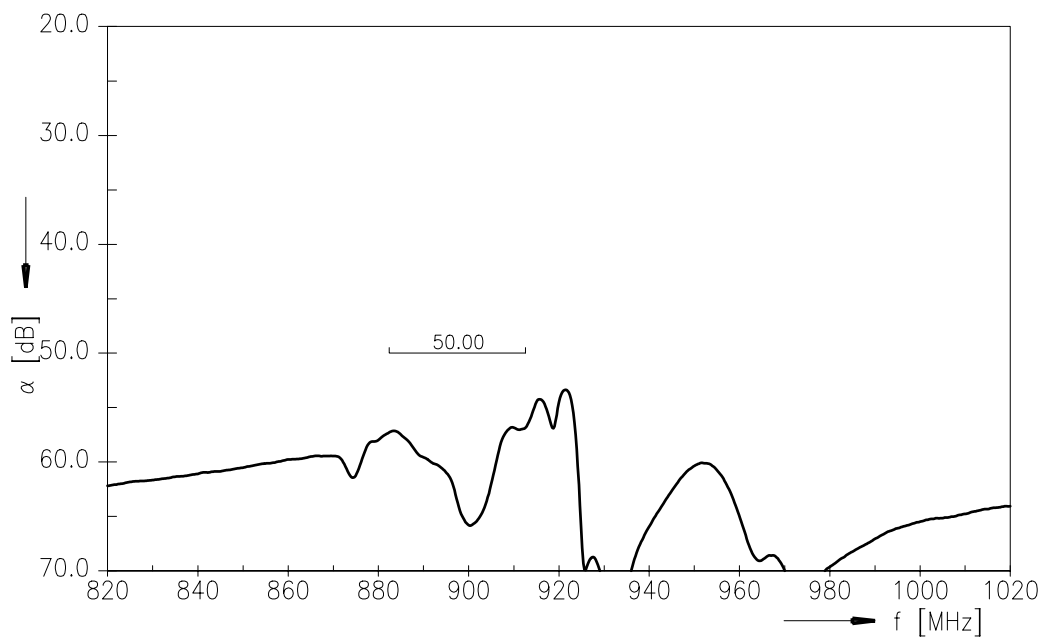
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Frequency Response TX - RX (Power transfer function, differential mode)



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



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**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 maxi- mum 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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Published by EPCOS AG

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