



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The following products presented in this data sheet are being withdrawn.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

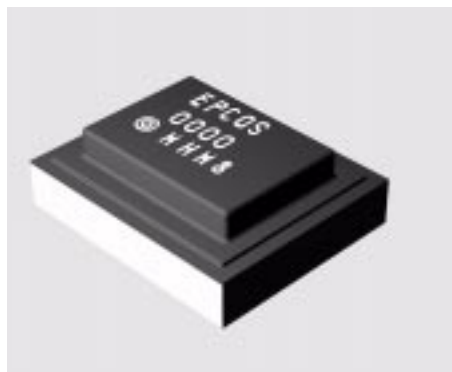
897.5 / 942.5 MHz

Data sheet



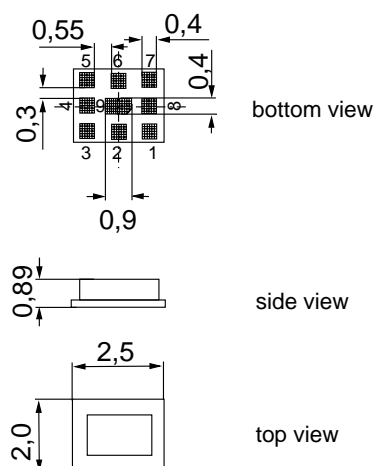
Application

- 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



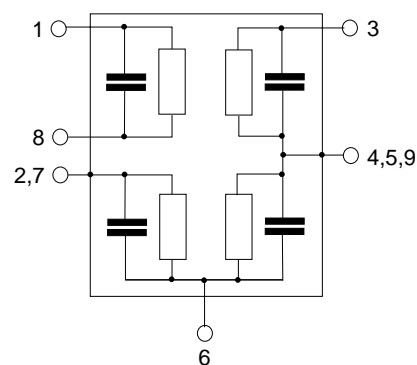
Features

- 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: $T = -20\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$
 ANT terminating impedance: $Z_{\text{ANT}} = 50\text{ }\Omega$
 TX terminating impedance: $Z_{\text{TX}} = 50\text{ }\Omega$
 RX terminating impedance: $Z_{\text{RX}} = 100\text{ }\Omega$ (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⁾ $T = -15\text{ }^{\circ}\text{C}$ to $+55\text{ }^{\circ}\text{C}$

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Characteristics

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 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	$\alpha_{\text{WCDMA}}^{1)}$					—	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	$\Delta\alpha_{\text{WCDMA}}^{1)}$					—	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	$\alpha_{\text{WCDMA}}^{1)}$					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	$\alpha_{\text{WCDMA}}^{1)}$					55	58	—	dB
@ f_{Carrier} 927.4 ... 957.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$					42	45	—	dB
Common Mode Isolation									
@ f_{Carrier} 882.4 ... 912.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$					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⁾ $T = +5\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$

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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 880.0 ... 915.0 MHz elsewhere	P _{IN}	30 10	dBm dBm	} continuous wave 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.

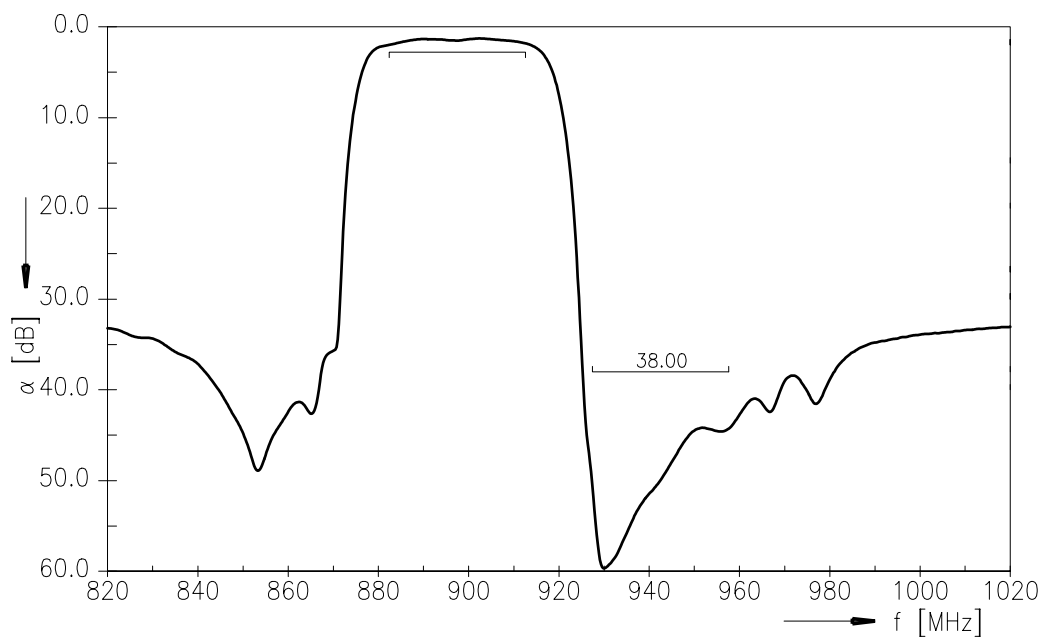
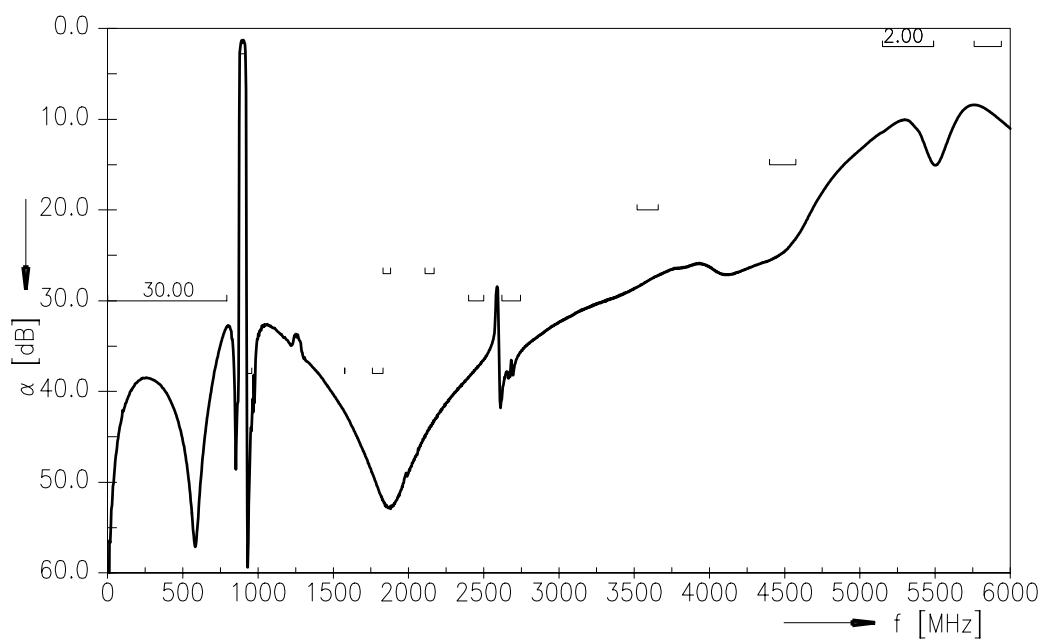
Annotation for characteristics section

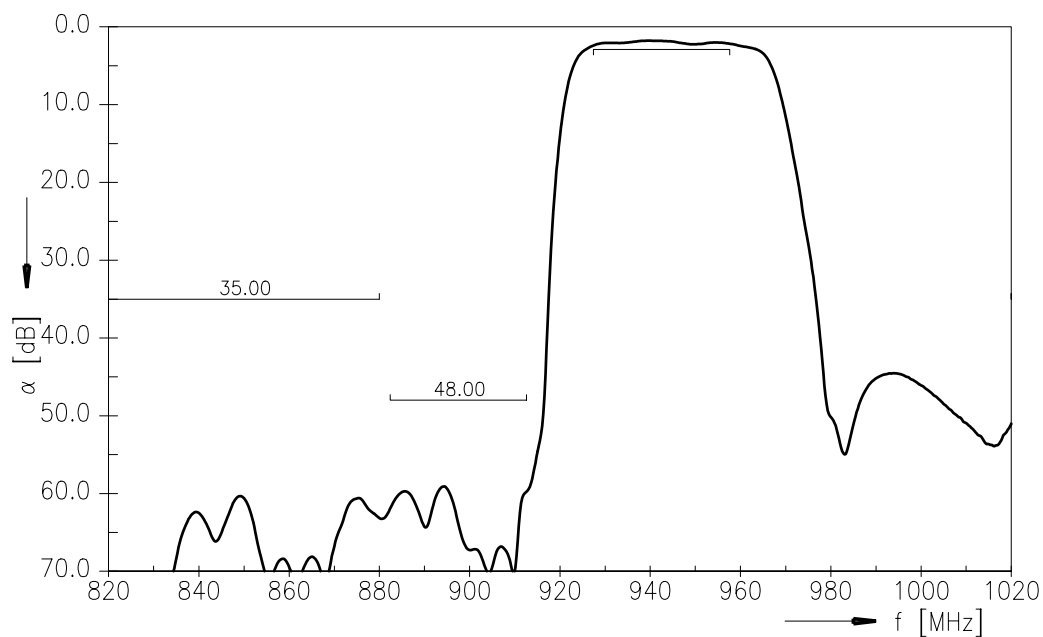
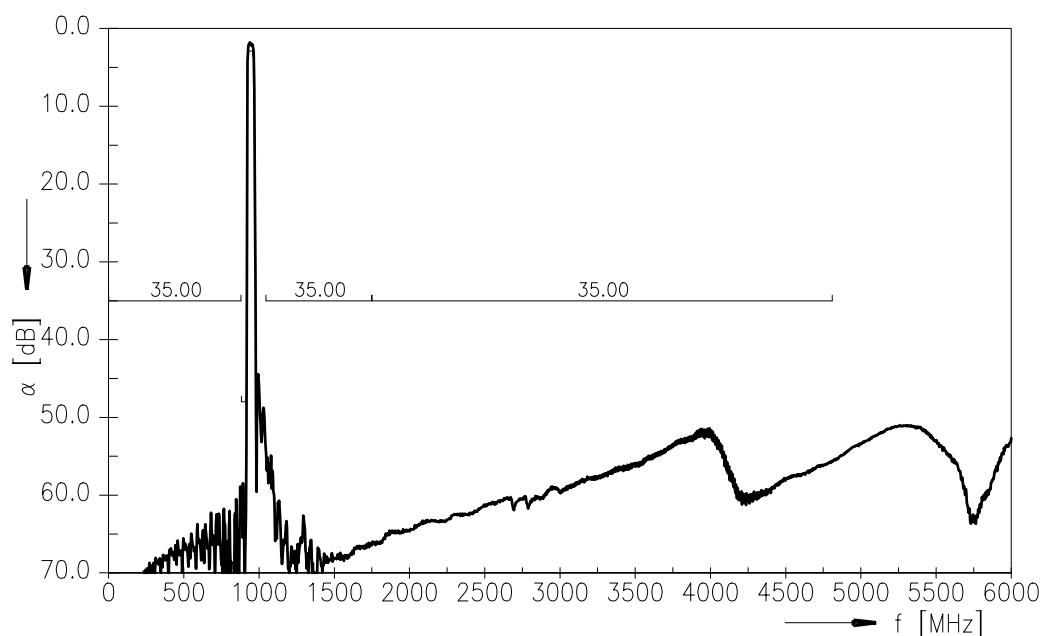
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

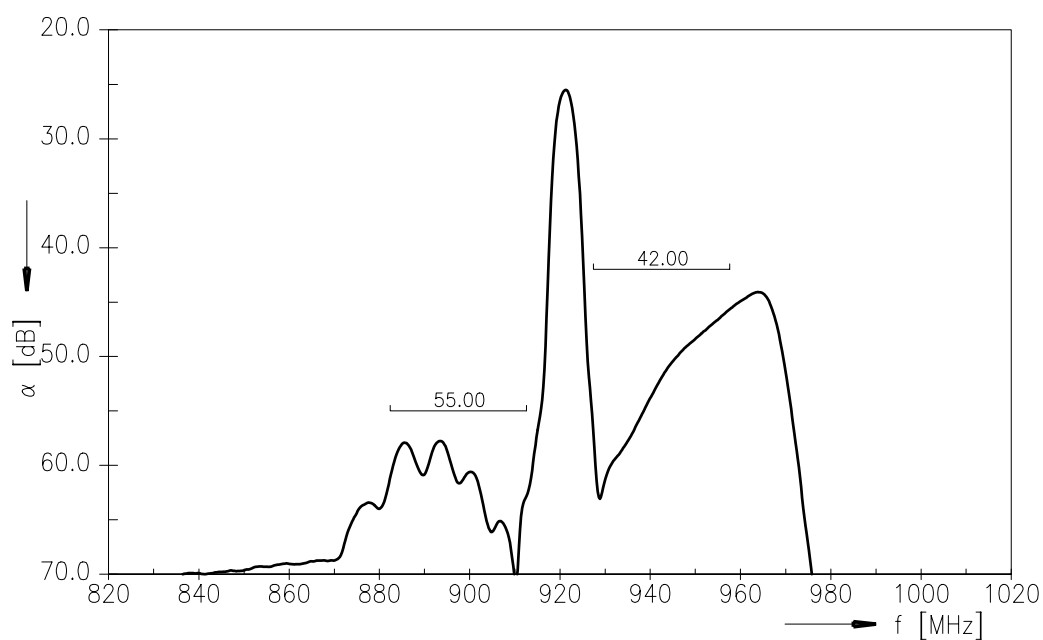
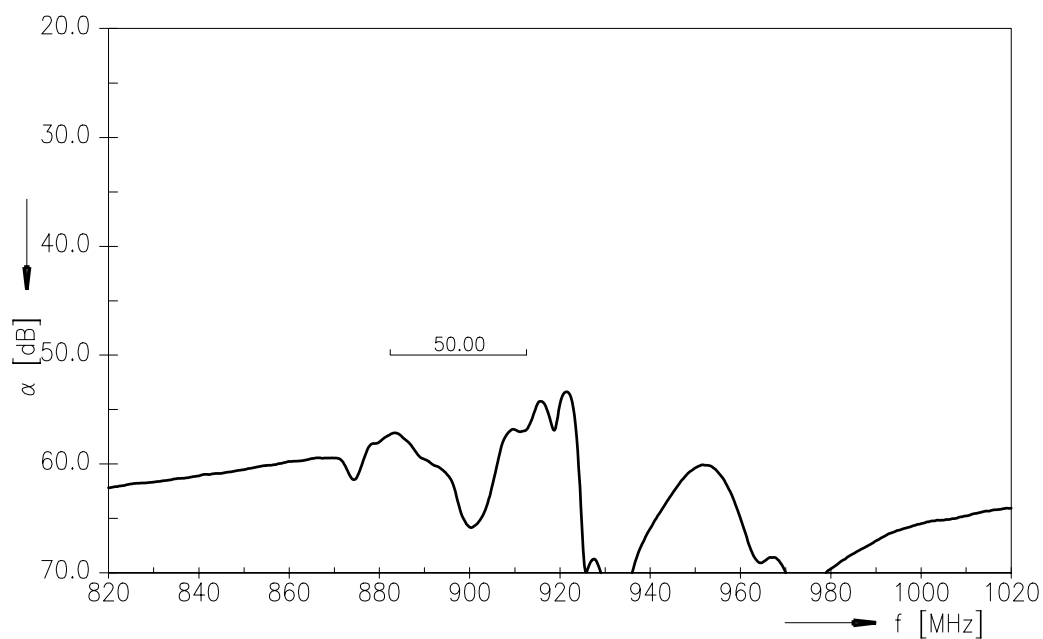
$$\int_{-\infty}^{\infty} |S_{\text{ds21}}(f) H_{\text{RRC}}(f - f_{\text{Carrier}})|^2 df$$

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:

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

Frequency Response TX-ANT (Power transfer function)

Frequency Response TX-ANT (wideband)


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)


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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 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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Surface Acoustic Wave Components Division

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