



# SAW Components

## SAW duplexer

WCDMA band VIII

<b>Series/type:</b>	<b>B8514</b>
<b>Ordering code:</b>	<b>B39941B8514P810</b>
<b>Date:</b>	<b>April 9, 2013</b>
<b>Version:</b>	<b>2.0</b>

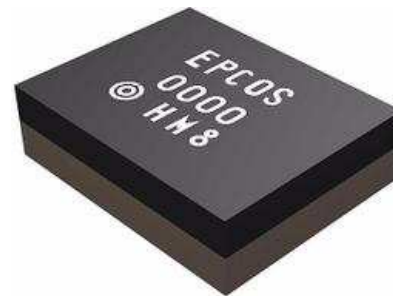
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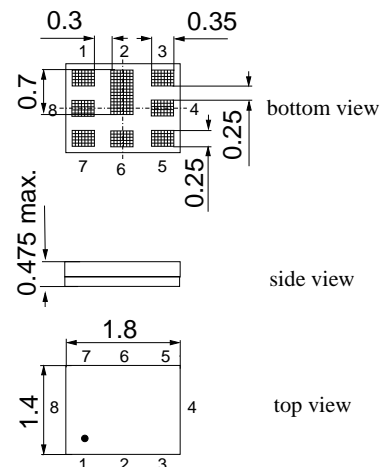
**Preliminary Data**

**Application**

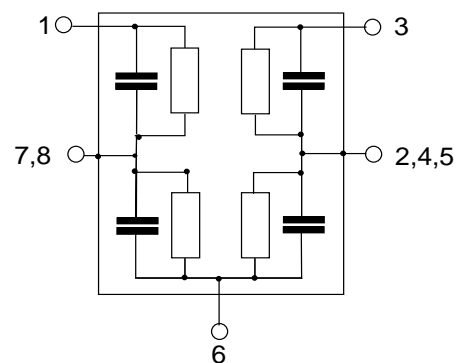
- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- 50 Ω single-ended in both in Antenna-Rx and Tx-Antenna paths


**Features**

- Package size 1.8 x 1.4 x 0.475 mm<sup>3</sup>.
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


**Pin configuration**

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



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

**SAW Components**
**B8514**
**SAW duplexer**
**897.5 / 942.5 MHz**
**Preliminary Data**

**Characteristics**

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z <sub>ANT</sub> = 50 Ω    5.6nH
TX terminating impedance:	Z <sub>TX</sub> = 50 Ω
RX terminating impedance:	Z <sub>RX</sub> = 50 Ω

Characteristics Tx - Ant						min.	typ. @ 25 °C	max.	
<b>Center frequency</b>				f <sub>C</sub>		—	897.5	—	MHz
<b>Maximum insertion attenuation</b>									
	@f <sub>Carrier</sub>	882.4 ... 912.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>		—	2.0	2.7	dB
		880.0 ... 915.0	MHz			—	2.2	3.9	dB
		880.0 ... 915.0	MHz			—	2.2	2.8 <sup>3)</sup>	dB
<b>Amplitude ripple (p-p)</b>									
	@f <sub>Carrier</sub>	882.4 ... 912.6	MHz	Δα <sub>WCDMA</sub> <sup>1)</sup>		—	1.0	2.1	dB
		880.0 ... 915.0	MHz			—	1.2	3.1	dB
<b>Error Vector Magnitude</b>									
	@f <sub>Carrier</sub>	882.4 ... 912.6	MHz	EVM <sup>2)</sup>		—	2.3	6.0	%
<b>VSWR</b>									
	TX port	880.0 ... 915.0	MHz			—	1.7	2.0	
	ANT port	880.0 ... 915.0	MHz			—	1.7	2.2	
<b>Attenuation</b>				α					
		10.0 ... 716.0	MHz			30	35	—	dB
		716.0 ... 728.0	MHz			30	35	—	dB
		728.0 ... 793.0	MHz			30	35	—	dB
	@f <sub>Carrier</sub>	927.4 ... 957.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>		42	51	—	dB
	@f <sub>Carrier</sub>	927.4 ... 957.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>		44 <sup>3)</sup>	51	—	dB
		1559.0 ... 1563.0	MHz			42	45	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 8.

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

3) T = +25 °C

**Preliminary Data**

**Characteristics**

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z <sub>ANT</sub> = 50Ω    5.6nH
TX terminating impedance:	Z <sub>TX</sub> = 50Ω
RX terminating impedance:	Z <sub>RX</sub> = 50Ω

Characteristics Tx - Ant	min.	typ. @ 25 °C	max.	
<b>Attenuation</b> α				
1565.42 ... 1573.374 MHz	42	45	—	dB
1573.374 ... 1577.466 MHz	40	45	—	dB
1577.466 ... 1585.42 MHz	40	45	—	dB
1597.5515 ... 1605.886 MHz	40	44	—	dB
1760.0 ... 1830.0 MHz	35	38	—	dB
1830.0 ... 1880.0 MHz	27	36	—	dB
2110.0 ... 2170.0 MHz	27	33	—	dB
2400.0 ... 2500.0 MHz	26	30	—	dB
2620.0 ... 2745.0 MHz	22	27	—	dB
3520.0 ... 3660.0 MHz	20	26	—	dB
4400.0 ... 4575.0 MHz	20	25	—	dB
5150.0 ... 5490.0 MHz	10	19	—	dB
5725.0 ... 5850.0 MHz	10	14	—	dB

**SAW Components**
**B8514**
**SAW duplexer**
**897.5 / 942.5 MHz**
**Preliminary Data**

**Characteristics**

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z <sub>ANT</sub> = 50 Ω    5.6nH
TX terminating impedance:	Z <sub>TX</sub> = 50 Ω
RX terminating impedance:	Z <sub>RX</sub> = 50 Ω

Charcteristics Rx - Ant						min.	typ. @25 °C	max.	
<b>Center frequency</b>	f <sub>C</sub>				—	942.5	—	MHz	
<b>Maximum insertion attenuation</b>									
@f <sub>Carrier</sub>	927.4	...	957.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>	—	1.9	2.6	dB
	925.0	...	960.0	MHz		—	2.4	4.3	dB
	925.0	...	960.0	MHz		—	2.4	2.8 <sup>3)</sup>	dB
<b>Amplitude ripple (p-p)</b>									
@f <sub>Carrier</sub>	927.4	...	957.6	MHz	Δα <sub>WCDMA</sub> <sup>1)</sup>	—	0.6	1.2	dB
	925.0	...	960.0	MHz		—	2.7	3.1	dB
<b>Error Vector Magnitude</b>									
@f <sub>Carrier</sub>	927.4	...	957.6	MHz	EVM <sup>2)</sup>	—	3.4	8.0	%
@f <sub>Carrier</sub>	927.4	...	957.6	MHz	EVM <sup>4)</sup>	—	3.4	5.0 <sup>3)</sup>	%
<b>VSWR</b>									
RX port	925.0	...	960.0	MHz		—	1.7	2.2	
ANT port	925.0	...	960.0	MHz		—	1.9	2.2	
<b>Attenuation</b>					α				
	10.0	...	880.0	MHz		40	58	—	dB
	902.5	...	910.0	MHz		30	55	—	dB
@f <sub>Carrier</sub>	882.4	...	912.6	MHz	α <sub>WCDMA</sub> <sup>1)</sup>	45	55	—	dB
	980.0	...	1045.0	MHz		20	29	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 8.

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

3) T = +25 °C

**Preliminary Data**

**Characteristics**

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z <sub>ANT</sub> = 50 Ω    5.6nH
TX terminating impedance:	Z <sub>TX</sub> = 50 Ω
RX terminating impedance:	Z <sub>RX</sub> = 50 Ω

<b>Charcteristics Rx - Ant</b>	<b>min.</b>	<b>typ. @25 °C</b>	<b>max.</b>	
<b>Attenuation</b>				
1045.0 ... 1805.0 MHz	35	52	—	dB
1805.0 ... 1920.0 MHz	40	51	—	dB
1920.0 ... 2400.0 MHz	35	48	—	dB
2400.0 ... 2500.0 MHz	40	47	—	dB
2685.0 ... 2880.0 MHz	40	46	—	dB
2880.0 ... 3700.0 MHz	35	42	—	dB
3700.0 ... 3840.0 MHz	35	42	—	dB
4625.0 ... 4800.0 MHz	35	41	—	dB
5550.0 ... 5725.0 MHz	30	38	—	dB
5725.0 ... 5875.0 MHz	30	37	—	dB

**SAW Components**
**B8514**
**SAW duplexer**
**897.5 / 942.5 MHz**
**Preliminary Data**
**SMD**
**Characteristics**

Temperature range for specification:  $T = -20\text{ }^{\circ}\text{C to }+85\text{ }^{\circ}\text{C}$   
 ANT terminating impedance:  $Z_{\text{ANT}} = 50\ \Omega \parallel 5.6\text{ nH}$   
 TX terminating impedance:  $Z_{\text{TX}} = 50\ \Omega$   
 RX terminating impedance:  $Z_{\text{RX}} = 50\ \Omega$

<b>Charcteristics Tx - Rx</b>					<b>min.</b>	<b>typ. @25 °C</b>	<b>max.</b>	
<b>Isolation</b>								
@f <sub>Carrier</sub>	882.4	...	912.6	MHz $\alpha_{\text{WCDMA}}^{1)}$	53	56	—	dB
	880.0	...	915.0	MHz	52	55	—	dB
@f <sub>Carrier</sub>	927.4	...	957.6	MHz $\alpha_{\text{WCDMA}}^{1)}$	48	59	—	dB
@f <sub>Carrier</sub>	927.4	...	957.6	MHz $\alpha_{\text{WCDMA}}^{1)}$	55 <sup>2)</sup>	59	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 8.

2) T= +15°C to +85°C

**Maximum ratings**

Storage temperature range	$T_{stg}$	-40/+85 <sup>1)</sup>	°C	
DC voltage	$V_{DC}$	5 <sup>2)</sup>	V	
ESD voltage	$V_{ESD}$	100 <sup>3)</sup>	V	machine model, 1 pulse
Input power at	$P_{IN}$			
880.0 ... 915.0 MHz		29	dBm	} continuous wave 50 °C, 5000 h
elsewhere		10	dBm	

1) extended upperlimit: 96h@125°C acc. to IEC 60062-2-2 Bb

2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy

3) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

**Annotation for characteristics section**

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

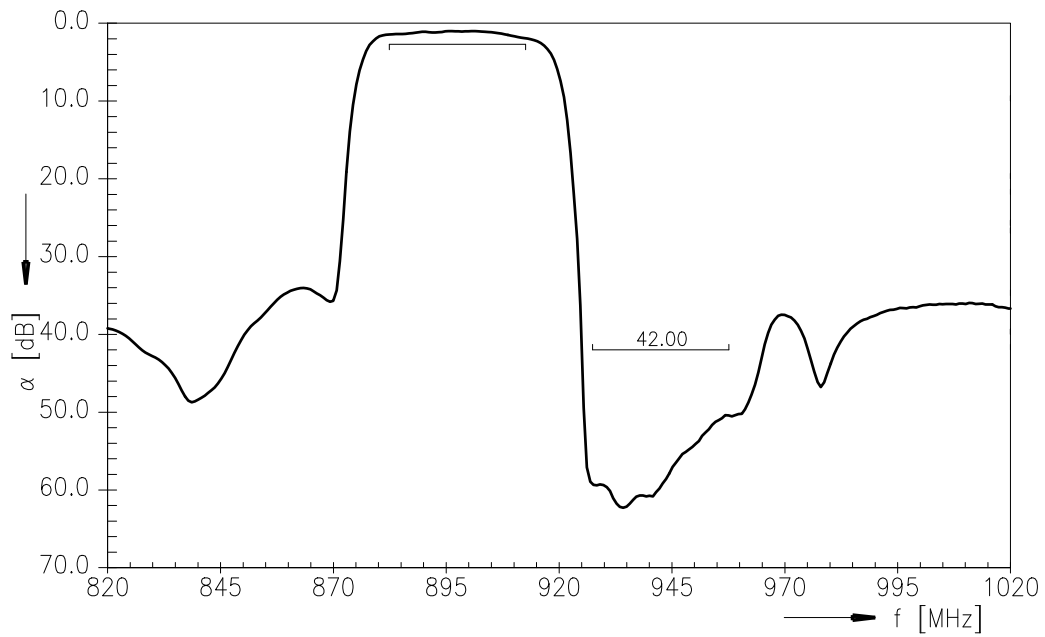
$$\int_{-\infty}^{\infty} |S_{ds21}(f)H_{RRC}(f - f_{Carrier})|^2 df$$

$f_{Carrier}$  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:

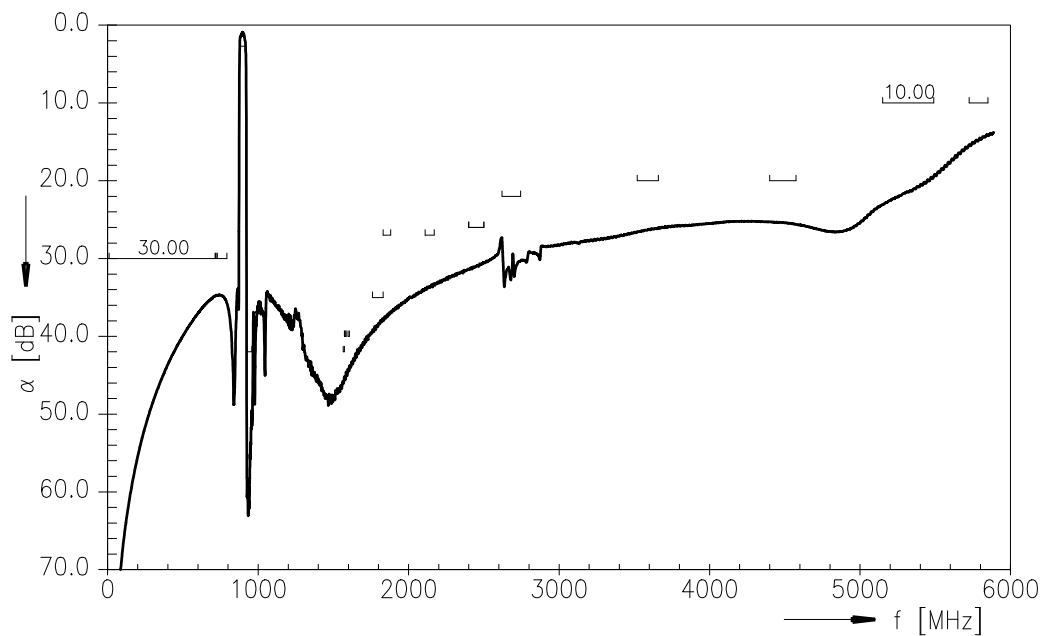
$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



Frequency response Tx-Antenna (Power transfer function)

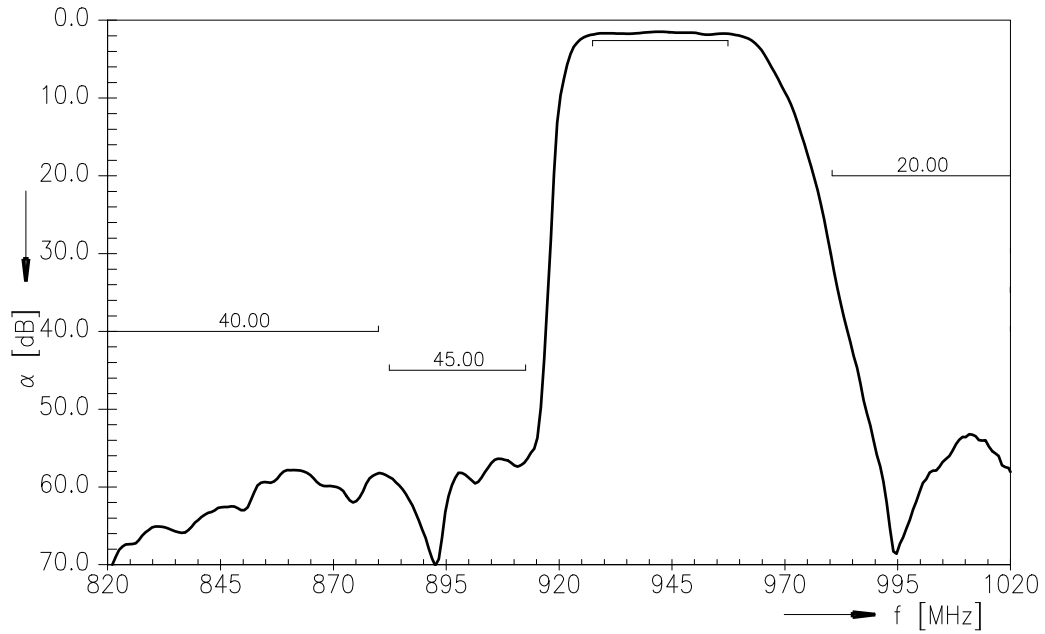


Frequency response Tx-Antenna (wideband)

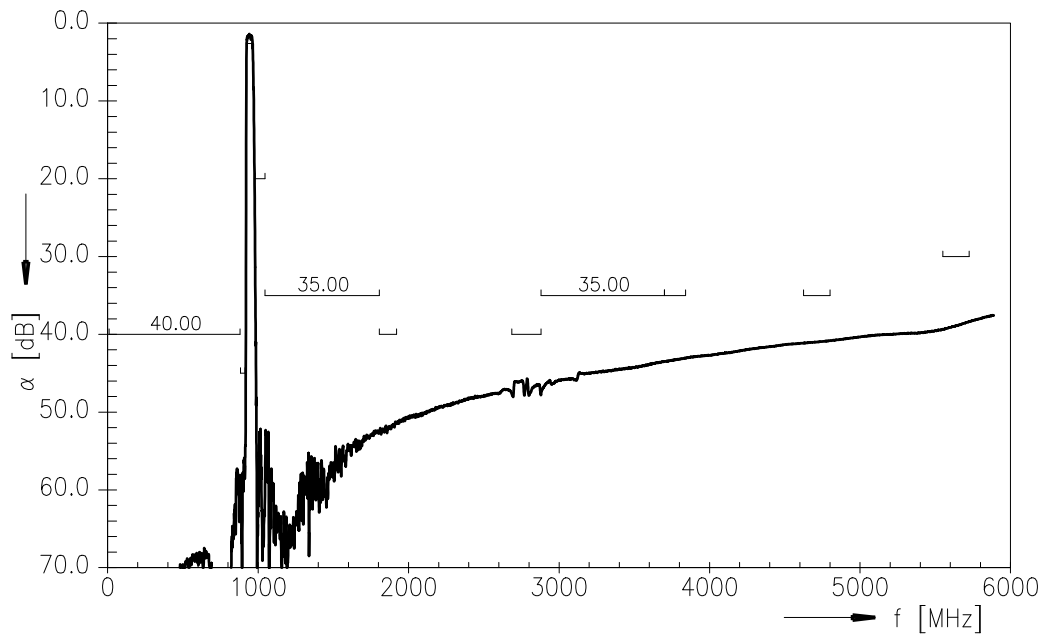


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Frequency response Antenna-Rx (Power transfer function)



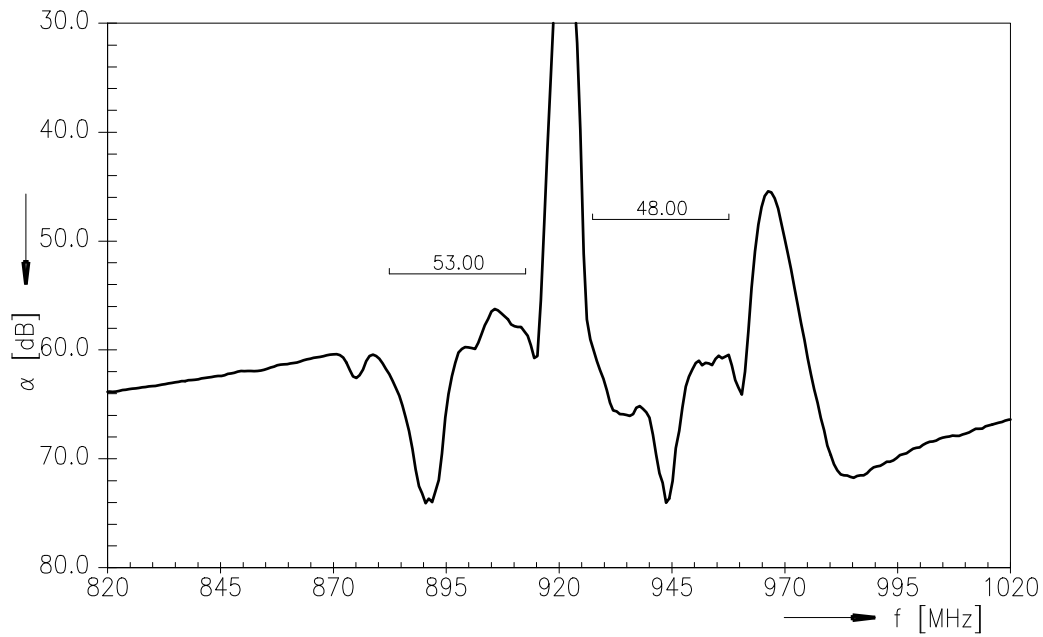
Frequency response Antenna-Rx (wideband)



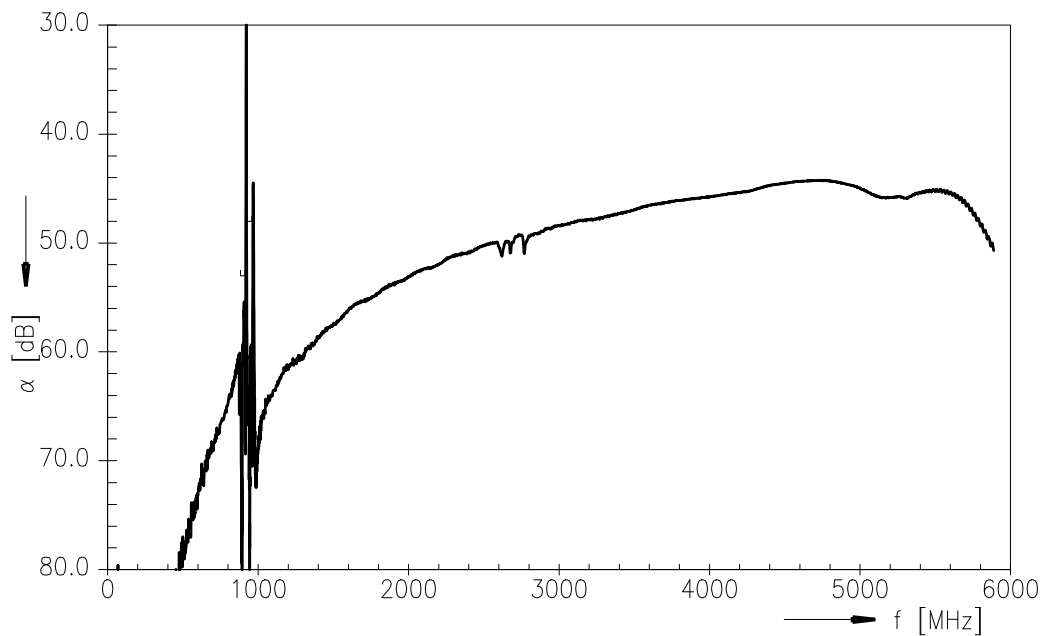
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Frequency response Tx-Rx (Power transfer function)



Frequency response Tx-Rx (wideband)



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**B8514**

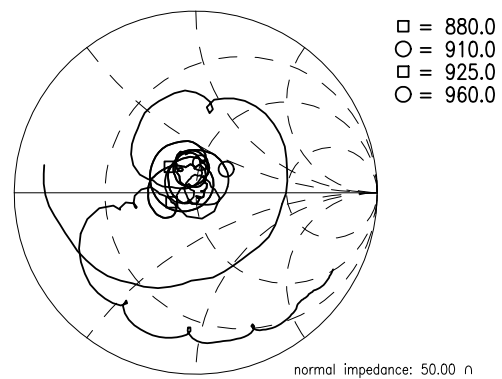
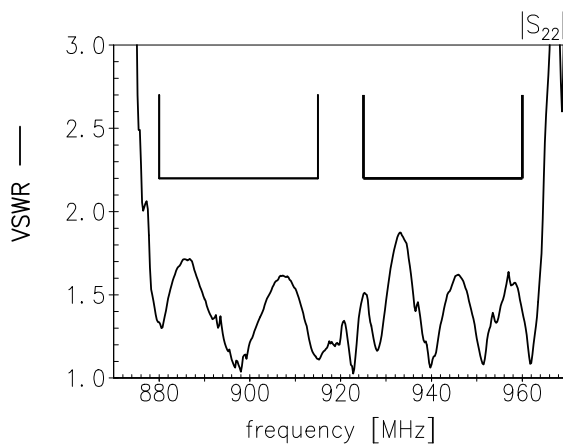
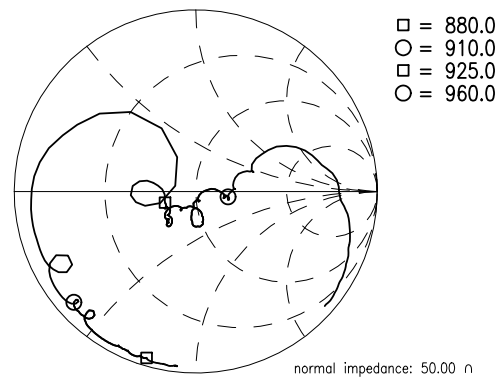
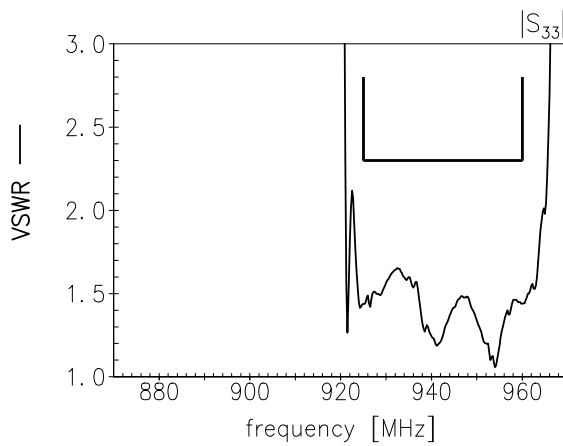
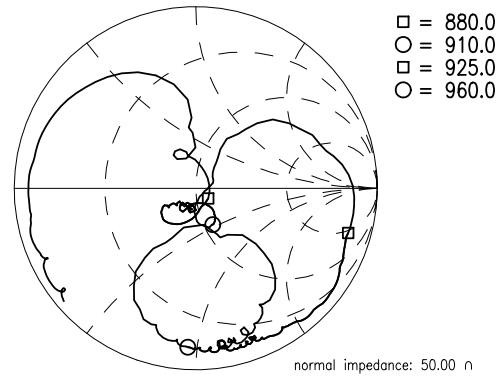
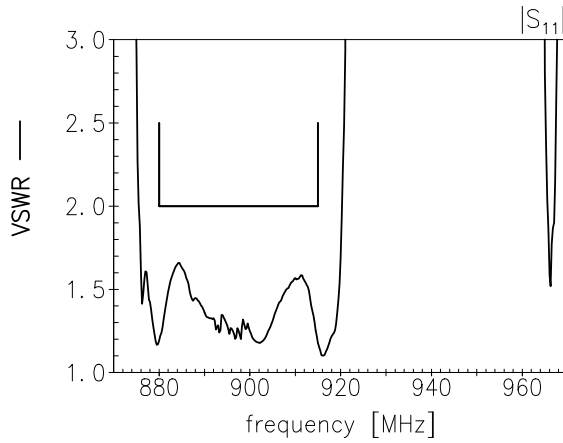
**SAW duplexer**

**897.5 / 942.5 MHz**

**Preliminary Data**



**Return loss     $S_{11}$  Tx-port     $S_{22}$  Antenna-port     $S_{33}$  Rx-portReferences**



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<b>SAW Components</b>	<b>B8514</b>
<b>SAW duplexer</b>	<b>897.5 / 942.5 MHz</b>

Preliminary Data



#### References

<b>Type</b>	B8514
<b>Ordering code</b>	B39941B8514P810
<b>Marking and package</b>	C61157-A8-A38
<b>Packaging</b>	F61074-V8247-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B8514_NB_UN.s3p, B8514_WB_UN.s3p See file header for pin/port assignment.
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8 <sup>th</sup> , 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.
<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>

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13 April 9, 2013

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