THE DATASHEET OF

B39212B8510P810

SAW Components

SAW Duplexer

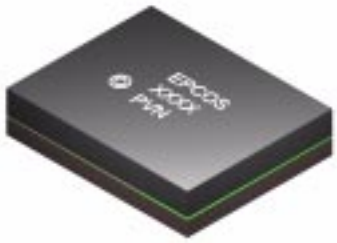
W-CDMA Band 1

Series/type:	**B8510**
Ordering code:	**B39212B8510P810**
Date:	September 09, 2013
Version:	2.0

EPCOS AG is a TDK Group Company.

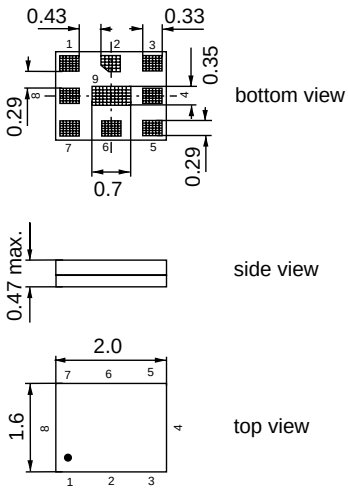
Application

- Low-loss SAW duplexer for mobile telephone W-CDMA Band 1 (UMTS) systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz
- High isolation between Tx and Rx



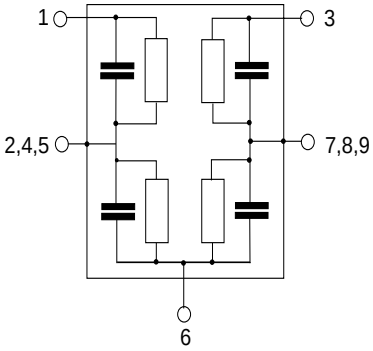
Features

- Package size 2.0 x 1.6 mm^2
- max. Package height 0.47mm
- RoHS compatible
- Approximate weight 0.005 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni terminals, Au-plated
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- Fully matched by integrated matching network
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

■	3	Tx input
■	6	Antenna
■	1	Rx output
■	2, 4, 5, 7, 8, 9	To be grounded



Data sheet SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
TX terminating impedance: Z_{Tx} = 50 Ω
ANT terminating impedance: Z_{Ant} = 50 Ω || 2.9nH
RX teminating impedance: Z_{Rx} = 50 Ω || 11.8nH

						B8510			
Characteristics Tx-Antenna						**min.**	**typ. @ 25 ˚C**	**max.**	
Center frequency				f_c			1950.0		MHz
Maximum insertion attenuation									
@$f_{Carrier}$	1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	—	1.2	1.7	dB
	1920.0	...	1980.0	MHz	α_{CW}	—	1.4	1.8	dB
Amplitude ripple (p-p)									
	1920.0	...	1980.0	MHz	$\Delta\alpha$	—	0.5	0.9	dB
	1920.0	...	1980.0	MHz	$\Delta\alpha_{5MHZ}$	—	0.3	0.5	dB
Error Vector Magnitude									
@$f_{Carrier}$	1922.4	...	1977.6	MHz	EVM [2)]	—	1.1	2.0	%
TX port VSWR									
	1920.0	...	1980.0	MHz		—	1.7	2.0	
ANT port VSWR									
	1920.0	...	1980.0	MHz		—	1.6	1.9	
Attenuation					α				
	10.0	...	1574.0	MHz		30	40	—	dB
	420.0	...	494.0	MHz		44	51	—	dB
	843.0	...	894.0	MHz		38	43	—	dB
	1559.0	...	1563.0	MHz		39	44	—	dB
	1565.42	...	1573.374	MHz		39	44	—	dB
	1573.374	...	1577.466	MHz		40	45	—	dB
	1577.466	...	1585.42	MHz		40	45	—	dB
	1597.5515	...	1605.886	MHz		41	46	—	dB
	1605.886	...	1805.0	MHz		25	36	—	dB
	1805.0	...	1865.0	MHz		25	33	—	dB
	1865.0	...	1880.0	MHz		15	28	—	dB
	2110.0	...	2170.0	MHz	α_{CW}	42	46	—	dB
@$f_{Carrier}$	2112.4	...	2167.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	42	46	—	dB
	2400.0	...	2500.0	MHz		30	35	—	dB
	2620.0	...	2690.0	MHz		25	32	—	dB
	3830.0	...	3970.0	MHz		20	32	—	dB

Characteristics Tx-Antenna				B8510 min.	B8510 typ. @ 25 °C	B8510 max.	
Attenuation (cont.)			α				
4900.0	...	5150.0	MHz	15	29	—	dB
5150.0	...	5950.0	MHz	8	12	—	dB
7670.0	...	7930.0	MHz	—	9	—	dB
9590.0	...	9910.0	MHz	—	10	—	dB
11510.0	...	11890.0	MHz	—	14	—	dB

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 8 of this document.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
TX terminating impedance: Z_{Tx} = 50 Ω
ANT terminating impedance: Z_{Ant} = 50 Ω || 2.9nH
RX teminating impedance: Z_{Rx} = 50 Ω || 11.8nH

						B8510		
Characteristics Antenna-Rx						**min.**	**typ. @ 25 ˚C**	**max.**	
Center frequency				f_c			2140.0		MHz
Maximum insertion attenuation									
@$f_{Carrier}$	2112.4	...	2167.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	—	1.8	2.3	dB
	2110.0	...	2170.0	MHz	α_{CW}	—	1.9	2.4	dB
Amplitude ripple (p-p)									
	2110.0	...	2170.0	MHz	$\Delta\alpha$	—	0.4	0.9	dB
	2110.0	...	2170.0	MHz	$\Delta\alpha_{5MHz}$	—	0.3	0.5	dB
Error Vector Magnitude									
@$f_{Carrier}$	2112.4	...	2167.6	MHz	EVM [2)]	—	1.0	2.0	%
ANT port VSWR									
	2110.0	...	2170.0	MHz		—	1.5	1.8	
RX port VSWR									
	2110.0	...	2170.0	MHz		—	1.5	1.8	
Attenuation					α				
	10.0	...	1920.0	MHz		40	50	—	dB
	190.0	MHz				50	>80	—	dB
	814.0	...	849.0	MHz		50	62	—	dB
	880.0	...	915.0	MHz		50	61	—	dB
	1730.0	...	1790.0	MHz		40	52	—	dB
	1920.0	...	1980.0	MHz	α_{CW}	50	57	—	dB
@$f_{Carrier}$	1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	50	57	—	dB
	1980.0	...	2015.0	MHz		30	52	—	dB
	2015.0	...	2075.0	MHz		10	23	—	dB
	2255.0	...	2400.0	MHz		40	54	—	dB
	2400.0	...	2500.0	MHz		40	52	—	dB
	2500.0	...	6000.0	MHz		30	40	—	dB
	4030.0	...	4150.0	MHz		38	44	—	dB
	4220.0	...	4340.0	MHz		35	41	—	dB
	4900.0	...	5950.0	MHz		30	47	—	dB
	5725.0	...	5875.0	MHz		30	48	—	dB
	5950.0	...	6130.0	MHz		—	48	—	dB
	6130.0	...	6330.0	MHz		—	48	—	dB

Characteristics Antenna-Rx			B8510 min.	B8510 typ. @ 25 °C	B8510 max.	
Attenuation (cont.)		α				
6330.0	... 6510.0	MHz	—	47	—	dB
6510.0	...13020.0	MHz	—	29	—	dB
8440.0	... 8680.0	MHz	—	42	—	dB
10550.0	...10850.0	MHz	—	48	—	dB
12660.0	...13020.0	MHz	—	29	—	dB
IMD product level limits[3]						
at f_{TX}=1950.0 MHz, f_{RX}=2140.0 MHz						
Blocker 1	190.0	MHz	—	129[4]	115	dBm
Blocker 2	1760.0	MHz	—	108	95	dBm
Blocker 3	4090.0	MHz	—	116	105	dBm
Blocker 4	6040.0	MHz	—	115	105	dBm

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 8 of this document.
2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141
3) IMD product level limits for power levels P_{TX}=21.5 dBm (antenna port output power) and $P_{Blocker}$=-15dBm (antenna port input power)
4) Value at noise level of test setup

Data sheet SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
TX terminating impedance: Z_{Tx} = 50 Ω
ANT terminating impedance: Z_{Ant} = 50 Ω || 2.9nH
RX teminating impedance: Z_{Rx} = 50 Ω || 11.8nH

Characteristics Tx-Rx					B8510 min.	B8510 typ. @ 25 ˚C	B8510 max.	
Isolation				α				
	1920.0	... 1980.0	MHz	α_{CW}	55	59	—	dB
	1922.4	... 1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	55	59	—	dB
	2110.0	... 2170.0	MHz	α_{CW}	50	55	—	dB
	2112.4	... 2167.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	50	55	—	dB
	1574.0	... 1577.0	MHz		40	66	—	dB
	3830.0	... 3970.0	MHz		20	66	—	dB
	5750.0	... 5950.0	MHz		20	51	—	dB

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 8 of this document.

Annotation for characteristics section

Attenuation of W-CDMA signal (Power Transfer Function, $\alpha_{W\text{-}CDMA}$) is determined by

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

with $f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS pass band, $f_{Carrier}$ ranges from 1922.4 MHz (lowest Tx channel) to 1967.6 MHz (highest Tx channel)). Here, $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

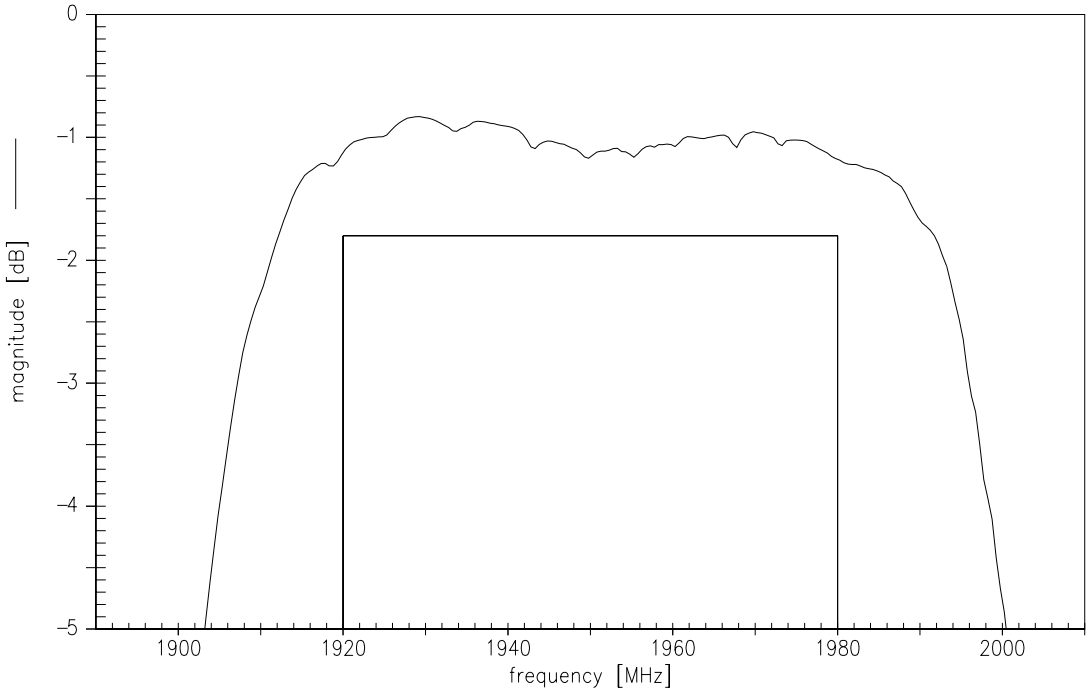
$$\int_{-\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum Ratings

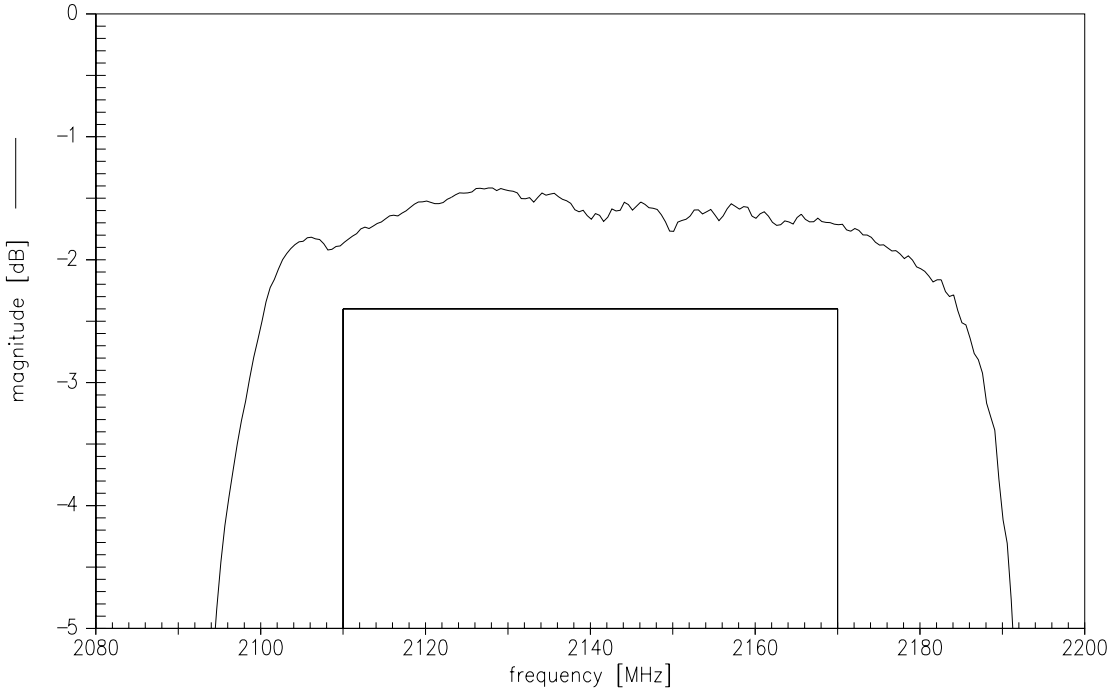
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5[1)]	V	
ESD voltage	V_{ESD}	50[2)]	V	MM - machine model
		200[3)]	V	HBM - human body model
		500[4)]	V	CDM - field induced charged device model
Input power at				
1920.0 ... 1980.0 MHz	P_{in}	29	dBm	} continuous wave
elsewhere	P_{in}	10	dBm	} 50 ˚C, 5000h

1) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy
2) Acc. to JESD22-A115B (MM - Machine Model) , 10 negative & 10 positive pulses.
3) Acc. to JESD22-A114F (HBM - Human Body Model) , 1 negative & 1 positive pulses
4) Acc. to JESD22-C101C (CDM - Field Induced Charged Device Model) , 3 negative & 3 positive pulses

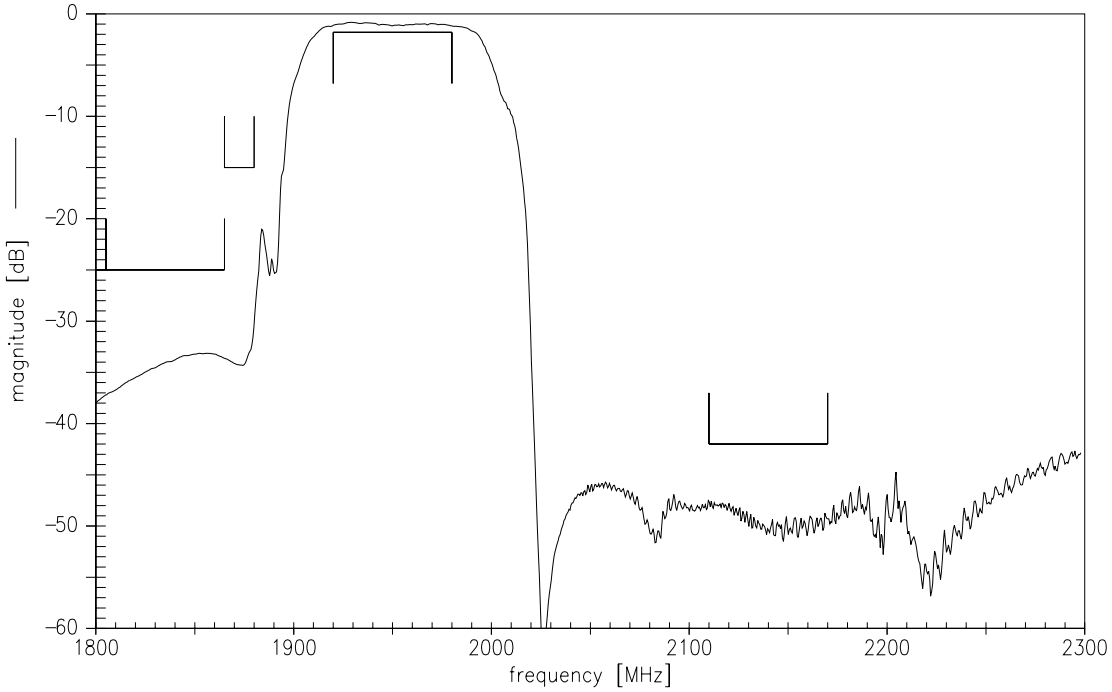
Frequency Response TX-ANT (CW signal)



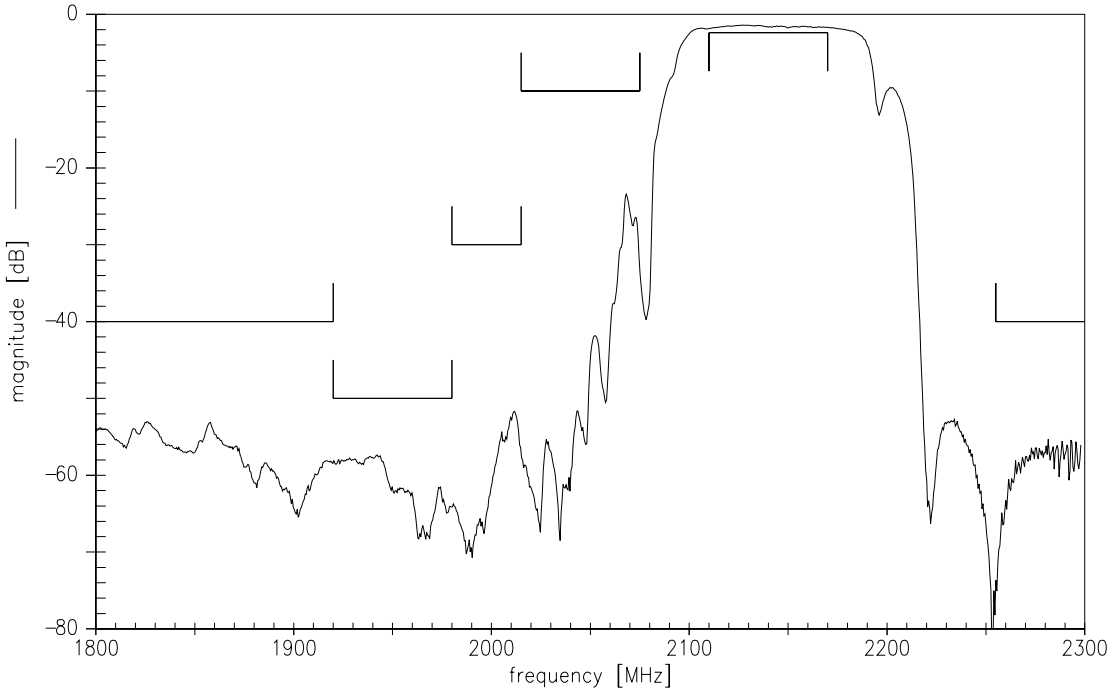
Frequency Response RX-ANT (CW signal)



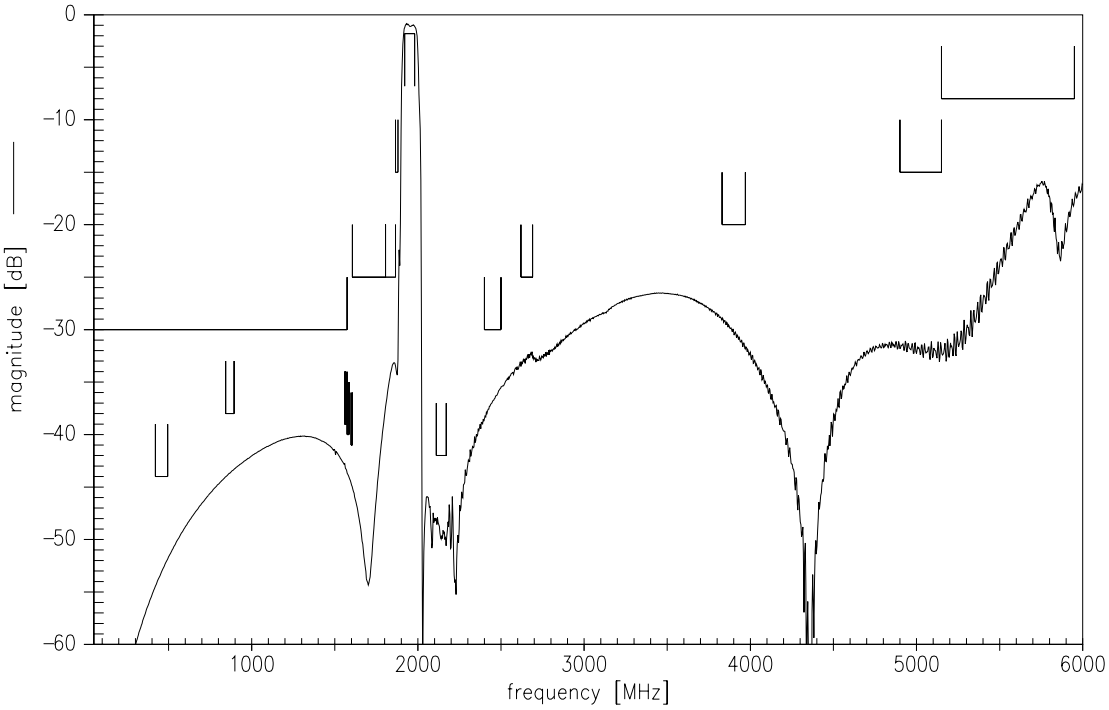
Frequency Response TX-ANT (CW signal)



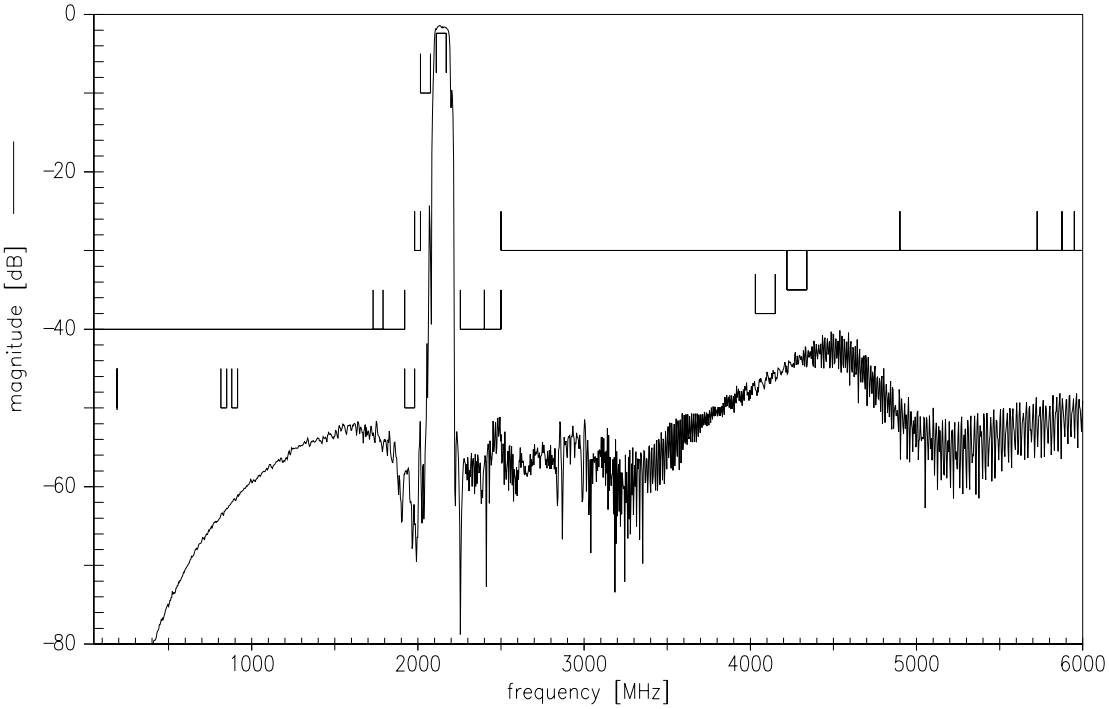
Frequency Response RX-ANT (CW signal)



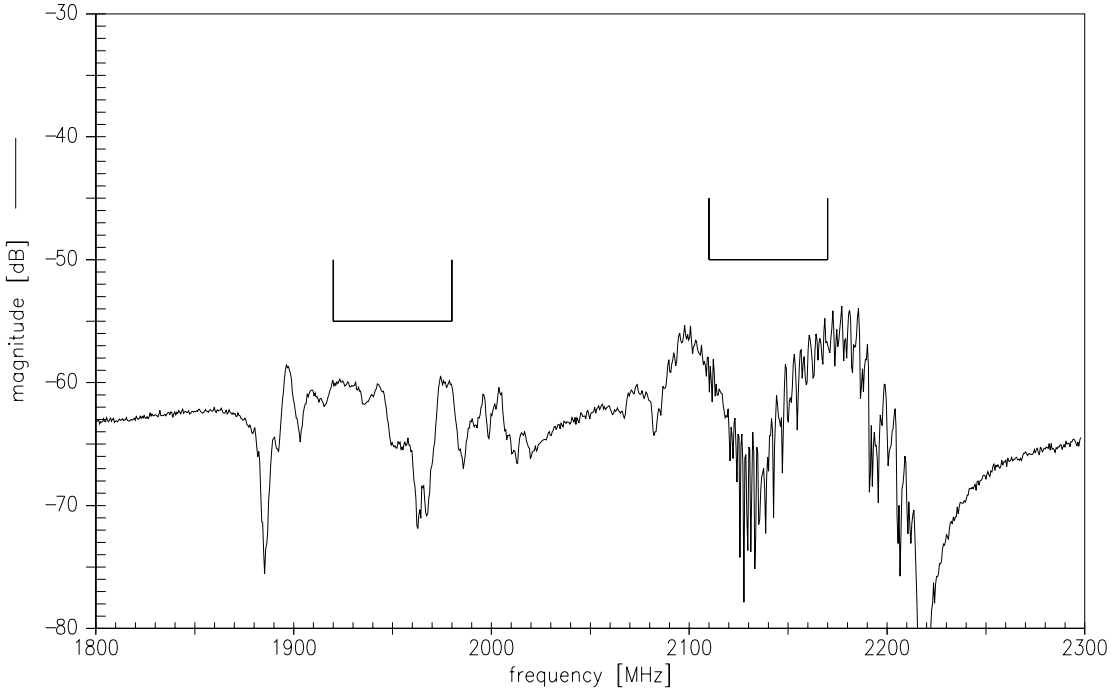
Frequency Response TX-ANT (wideband)



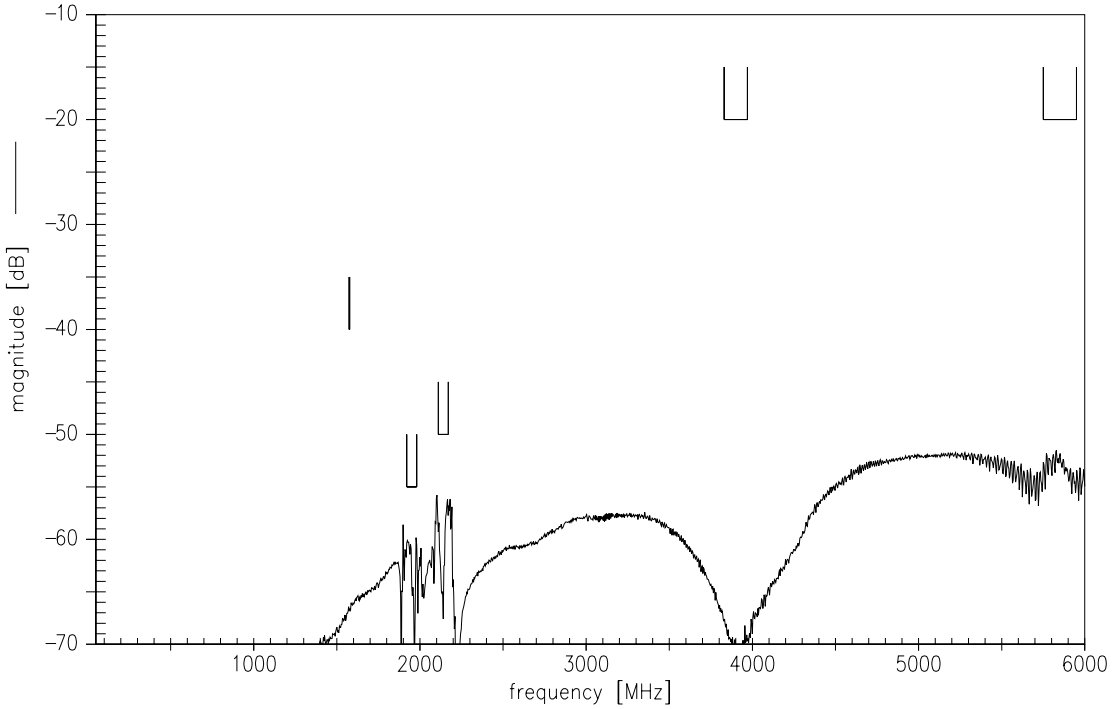
Frequency Response RX-ANT (wideband)



Frequency Response TX-RX (CW signal)

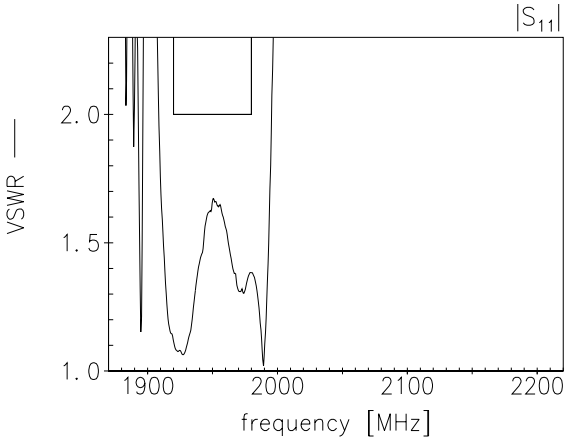


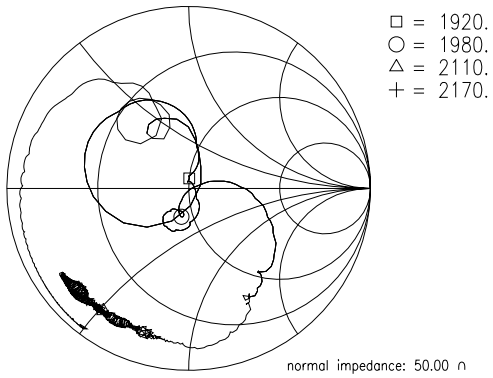
Frequency Response TX-RX (wideband)

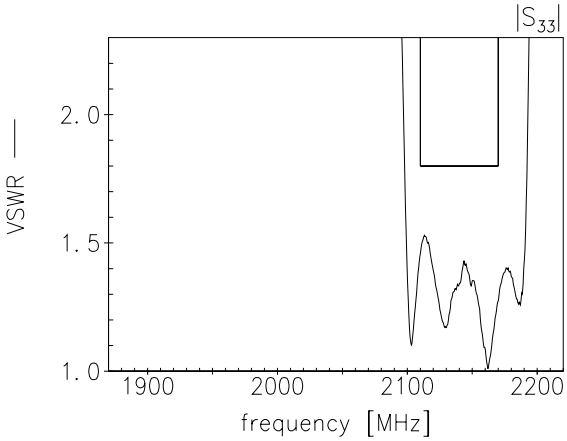


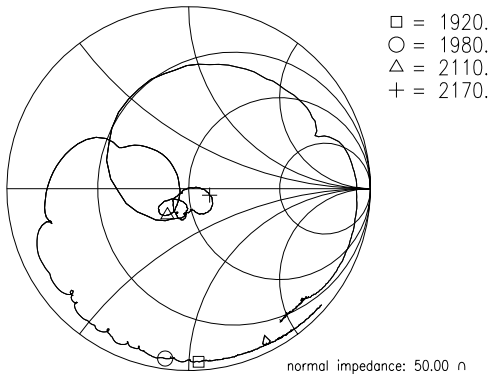
Data sheet

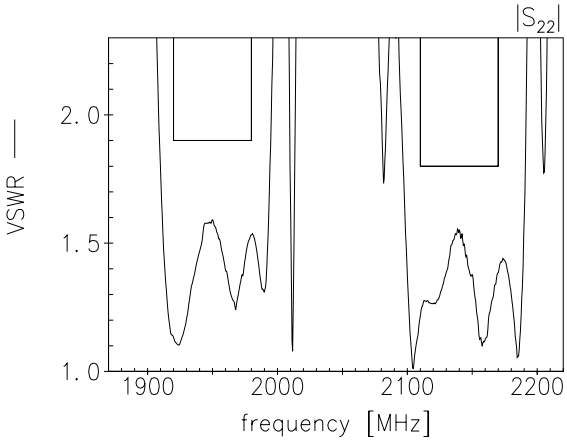
Return Loss **S_{11} TX- port** **S_{33} RX-port** **S_{22} ANT-port**

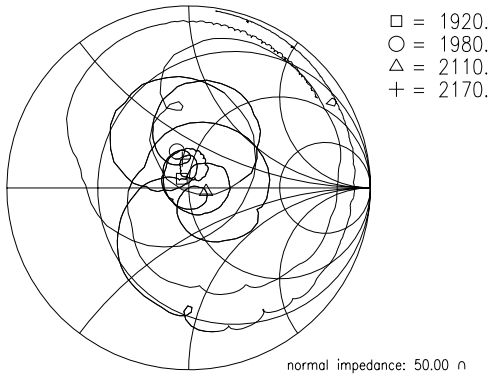












References

Type	B8510
Ordering code	B39212B8510P810
Marking and package	C61157-A8-A76
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8510_NB.s3p B8510_WB.s3p See file header for port/pin assignment table.
Soldering profile	S_6001
RoHS compatible	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 8th, 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.
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm for a large variety of matching coils.

For further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com .

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