SAW Components

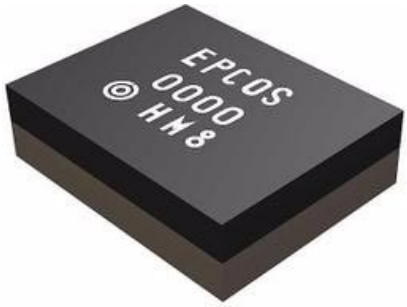
SAW Duplexer

WCDMA Band I

Series/type:	**B8550**
Ordering Code:	**B39212B8550P810**
Date:	January 28, 2011
Version:	2.0

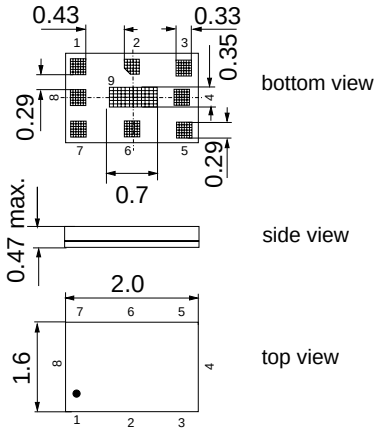
Application

- Low-loss SAW duplexer for mobile telephone WCDMA Band I systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz



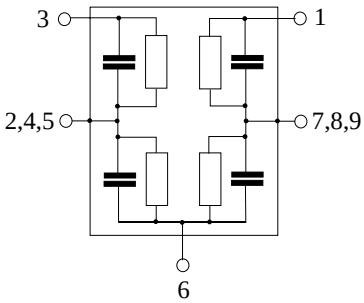
Features

- Package size 2.0 x 1.6 mm², package height 0.47 mm max.
- RoHS compatible
- Approx. weight 0.005g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitivity **L**evel 3



Pin configuration

- 3 TX Input
- 1 RX Output
- 6 Antenna
- 2, 4, 5 To be grounded
- 7, 8, 9 To be grounded



Data sheet SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω || 3.3nH
RX terminating impedance: Z_{RX} = 50Ω
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C		1950.0		MHz
Maximum insertion attenuation	α_{max}				
@$f_{Carrier}$ 1922.4 ... 1977.6 MHz	α_{WCDMA} [1]		1.2	1.7	dB
@$f_{Carrier}$ 1922.4 ... 1977.6 MHz	α_{WCDMA} [1] [2]		1.2	1.6	dB
1920.0 ... 1980.0 MHz	α_{CW}		1.2	1.7	dB
1920.0 ... 1980.0 MHz	α_{CW} [2]		1.2	1.6	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
@$f_{Carrier}$ 1922.4 ... 1977.6 MHz	$\Delta\alpha_{WCDMA}$ [1]		0.25	0.8	dB
@$f_{Carrier}$ 1922.4 ... 1977.6 MHz	$\Delta\alpha_{WCDMA}$ [1] [2]		0.25	0.7	dB
1920.0 ... 1980.0 MHz	$\Delta\alpha_{CW}$		0.3	0.8	dB
1920.0 ... 1980.0 MHz	$\Delta\alpha_{CW}$ [2]		0.3	0.7	dB
Amplitude ripple (p-p) **over any 3.84 MHz within passband**	$\Delta\alpha_{ch}$				
1920.0 ... 1980.0 MHz			0.15	0.5	dB
Error vector magnitude	EVM [3]				
1922.4 ... 1977.6 MHz			0.4	2.0	%
Input VSWR (TX port)					
1920.0 ... 1980.0 MHz			1.5	1.9	
Output VSWR (ANT port)					
1920.0 ... 1980.0 MHz			1.4	1.8	
Attenuation	α				
1.0 ... 470.0 MHz		30	50		dB
470.0 ... 770.0 MHz		30	42		dB
770.0 ... 1570.0 MHz		25	28		dB
1570.0 ... 1580.0 MHz		25	28		dB
1805.0 ... 1880.0 MHz		3	4.5		dB
@$f_{Carrier}$ 2112.4 ... 2167.6 MHz	α_{WCDMA} [1]	47	51		dB
2402.0 ... 2480.0 MHz		23	28		dB
2620.0 ... 2690.0 MHz		24	29		dB
3840.0 ... 3960.0 MHz		25	33		dB
5760.0 ... 5940.0 MHz		20	40		dB

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (6).
[2] Valid only for room temperature 25˚C.
[3] Error Vector Magnitude (EMV) based on definition given in 3GPP TS 25.141.

Data sheet SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω || 3.3nH
RX terminating impedance: Z_{RX} = 50Ω
TX terminating impedance: Z_{TX} = 50Ω

Characterisitcs ANT - RX		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C		2140.0		MHz
Maximum insertion attenuation	α_{max}				
@$f_{Carrier}$ 2112.4 ... 2167.6 MHz	α_{WCDMA} 1)		1.6	2.2	dB
@$f_{Carrier}$ 2112.4 ... 2167.6 MHz	α_{WCDMA} 1) 2)		1.6	2.0	dB
2110.0 ... 2170.0 MHz	α_{CW}		1.6	2.3	dB
2110.0 ... 2170.0 MHz	α_{CW} 2)		1.6	2.1	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
@$f_{Carrier}$ 2112.4 ... 2167.6 MHz	$\Delta\alpha_{WCDMA}$ 1)		0.3	1.0	dB
@$f_{Carrier}$ 2112.4 ... 2167.6 MHz	$\Delta\alpha_{WCDMA}$ 1) 2)		0.3	0.8	dB
2110.0 ... 2170.0 MHz	$\Delta\alpha_{CW}$		0.35	1.1	dB
2110.0 ... 2170.0 MHz	$\Delta\alpha_{CW}$ 2)		0.35	0.9	dB
Amplitude ripple (p-p) **over any 3.84 MHz within passband**	$\Delta\alpha_{ch}$				
2110.0 ... 2170.0 MHz			0.15	0.5	dB
Error vector magnitude	EVM 3)				
2112.4 ... 2167.6 MHz			0.6	2.0	%
Input VSWR (ANT port)					
2110.0 ... 2170.0 MHz			1.5	2.1	
Output VSWR (RX port)					
2110.0 ... 2170.0 MHz			1.6	2.1	

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (6).
2) Valid only for room temperature 25˚C.
3) Error Vector Magnitude (EMV) based on definition given in 3GPP TS 25.141.

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω || 3.3nH
RX terminating impedance: Z_{RX} = 50Ω
TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs ANT - RX					min.	typ. @ 25 ˚C	max.	
Attenuation				α				
1.0	...	130.0	MHz		30	76		dB
130.0	...	240.0	MHz		35	67		dB
240.0	...	1730.0	MHz		30	39		dB
1730.0	...	1790.0	MHz		35	40		dB
1790.0	...	1920.0	MHz		30	41		dB
@$f_{Carrier}$ 1922.4	...	1977.6	MHz	α_{WCDMA} [1)]	50	54		dB
2015.0	...	2025.0	MHz		21	30		dB
2025.0	...	2050.0	MHz		7	13		dB
2050.0	...	2075.0	MHz		2	5		dB
2075.0	...	2095.0	MHz		1.0	2.4		dB
2185.0	...	2230.0	MHz		1.0	1.9		dB
2230.0	...	2255.0	MHz		5	13		dB
2255.0	...	2400.0	MHz		10	37		dB
2400.0	...	2500.0	MHz		30	41		dB
2500.0	...	4030.0	MHz		30	38		dB
4030.0	...	4150.0	MHz		36	49		dB
4150.0	...	5000.0	MHz		20	47		dB
5000.0	...	6000.0	MHz		30	40		dB

Characterisitcs TX - RX					min.	typ. @ 25 ˚C	max.	
Isolation				α				
@$f_{Carrier}$ 1922.4	...	1977.6	MHz	α_{WCDMA} [1)]	51	54		dB
@$f_{Carrier}$ 2112.4	...	2167.6	MHz	α_{WCDMA} [1)]	49	52		dB

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (6).

Maximum ratings

Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	150	V	human body model[1)]
Input power at	P_{IN}			source and load impedance 50 Ω
1922.4 ... 1977.6 MHz		29	dBm	} continuous wave
elsewhere		10	dBm	T = 55°C, 20.000 h

1) acc. to JESD22-A115E (human body model), 1 negative & 1 positive pulse.

Annotation for characteristics section

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

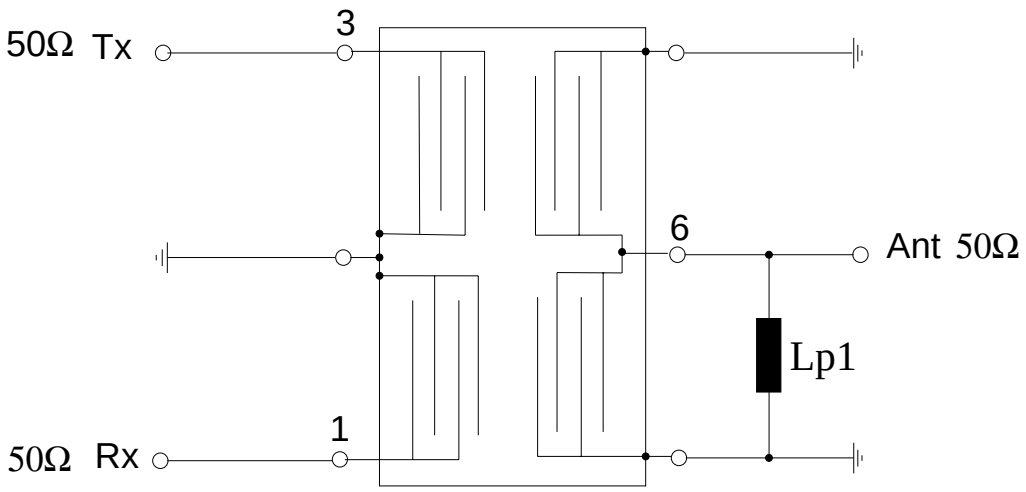
$$\int_{-\infty}^{\infty} \left| S_{ds21}(f) H_{RRC}(f - f_{Carrier}) \right|^2 df$$

$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS-Passband, $f_{Carrier}$ ranges from 882.4 MHz (lowest Tx channel) to 912.6 MHz (highest Tx 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:

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

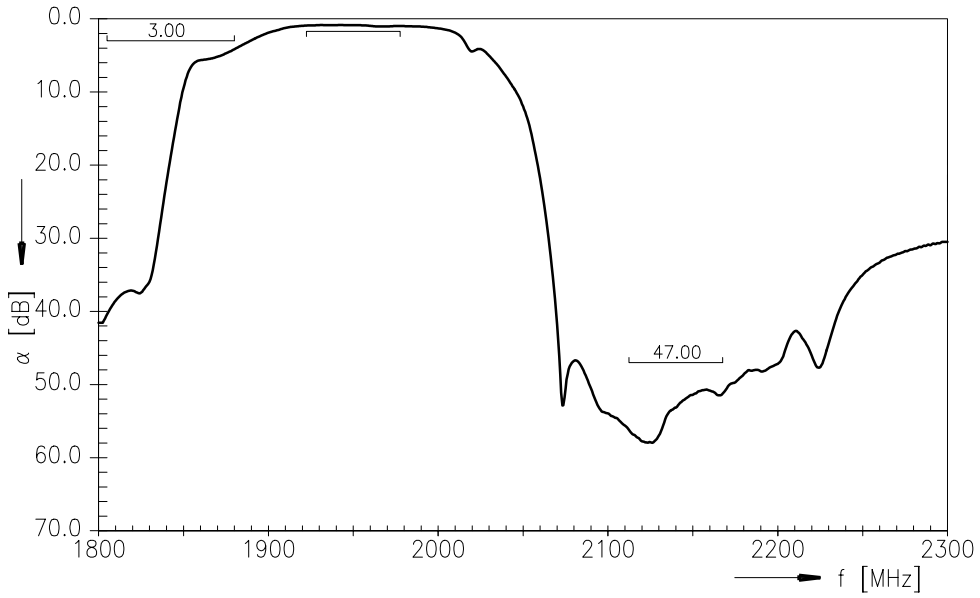
Matching circuit to terminating impedances

(Element values depend upon PCB layout)

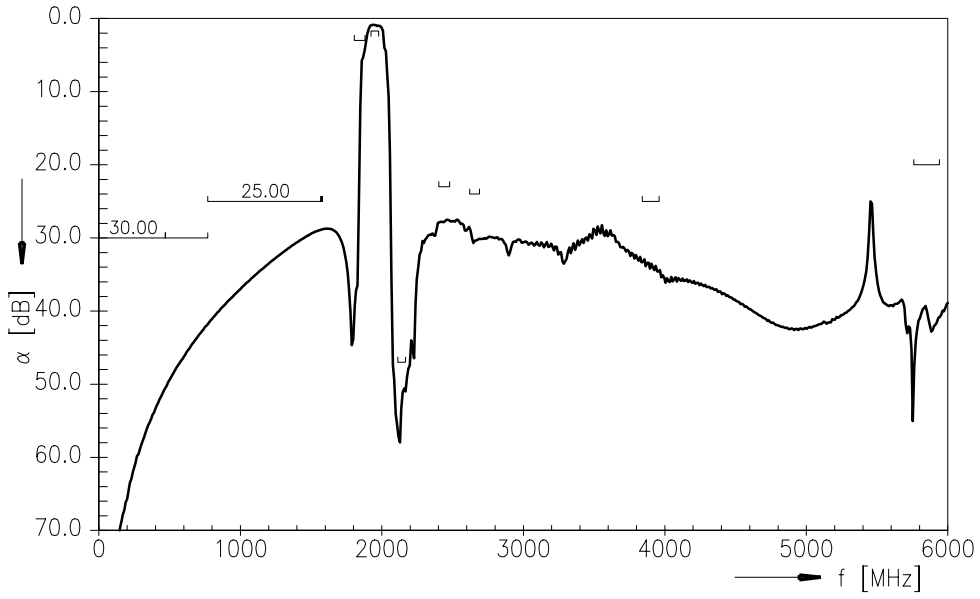


L_{p1} = 3.3nH

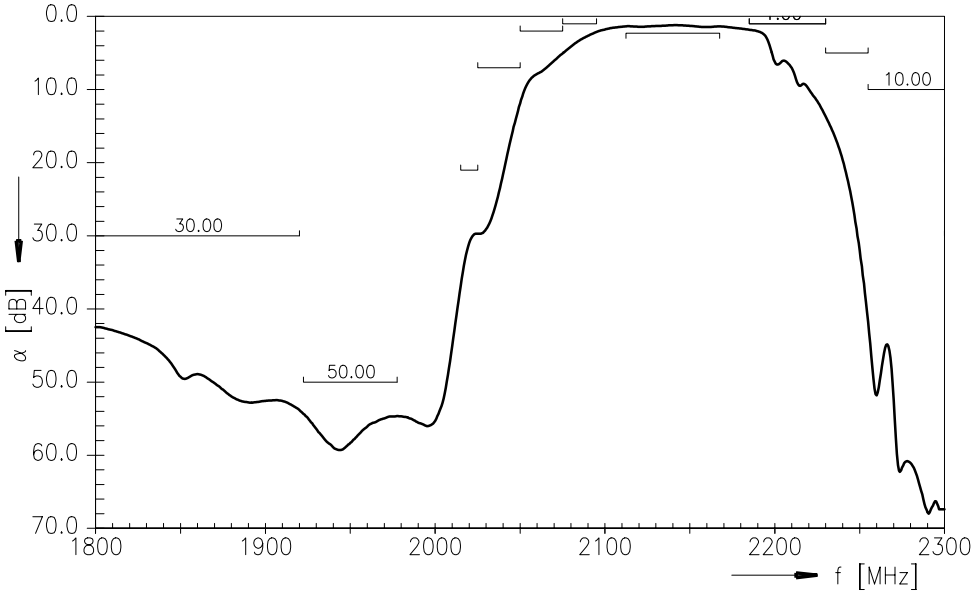
Frequency Response TX-ANT



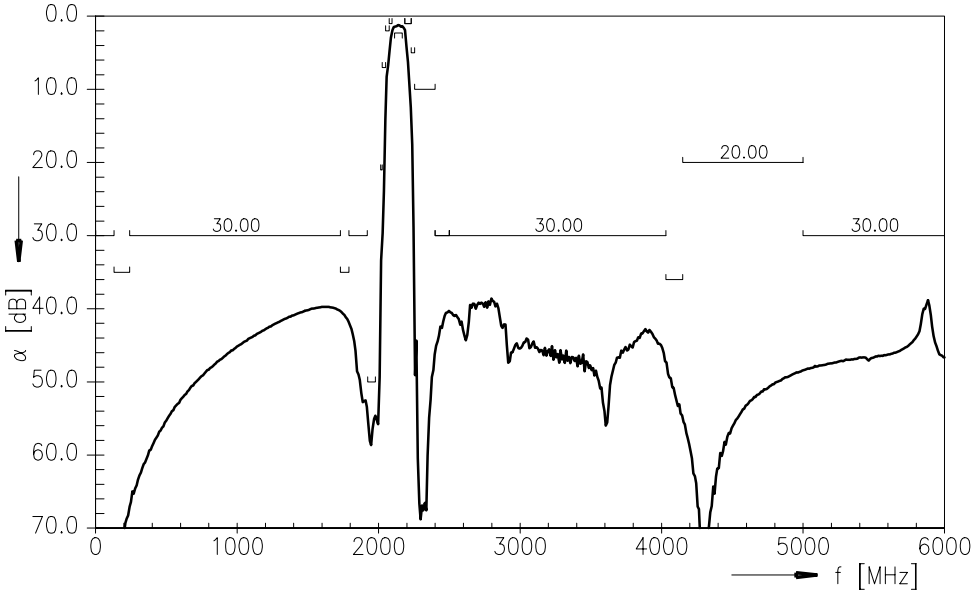
Frequency Response TX-ANT (wideband)



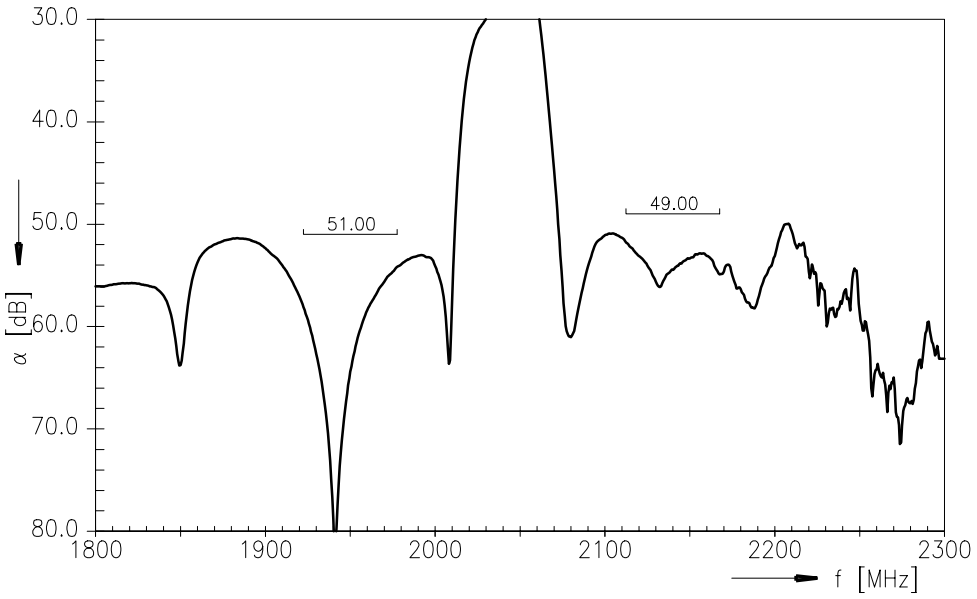
Frequency Response RX-ANT



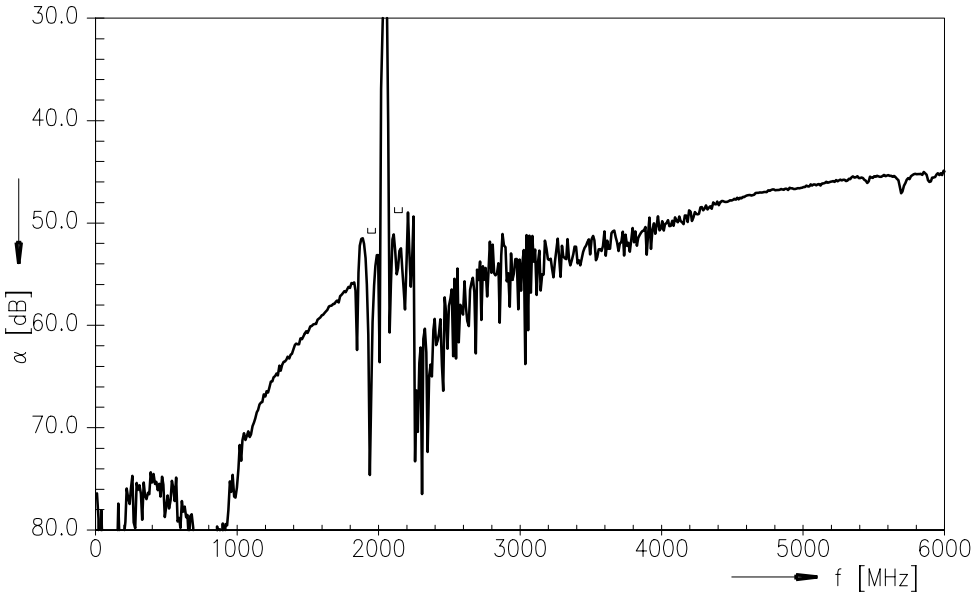
Frequency Response RX-ANT (wideband)



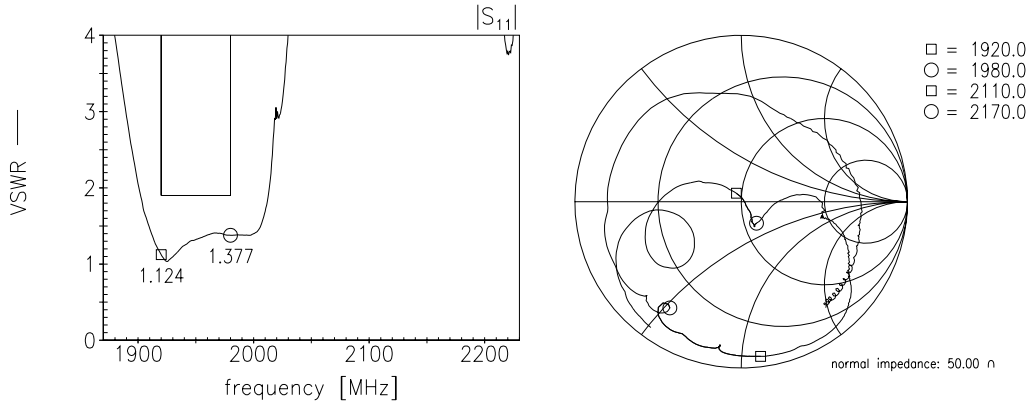
Frequency Response TX-RX

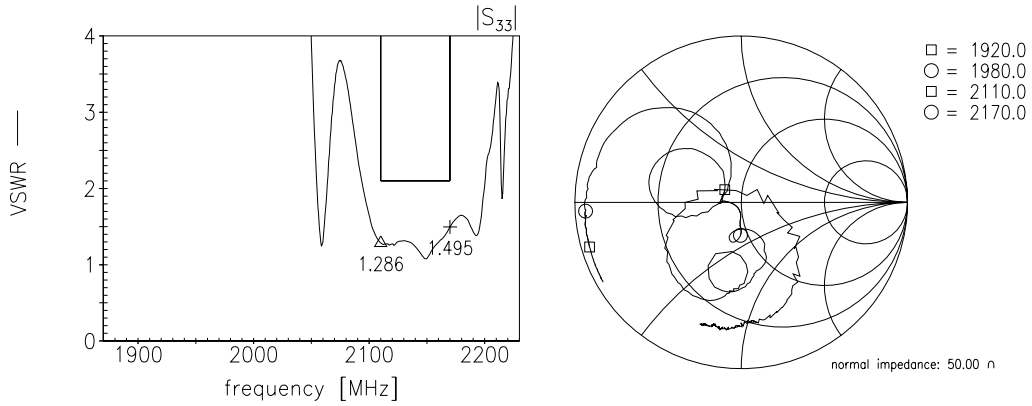


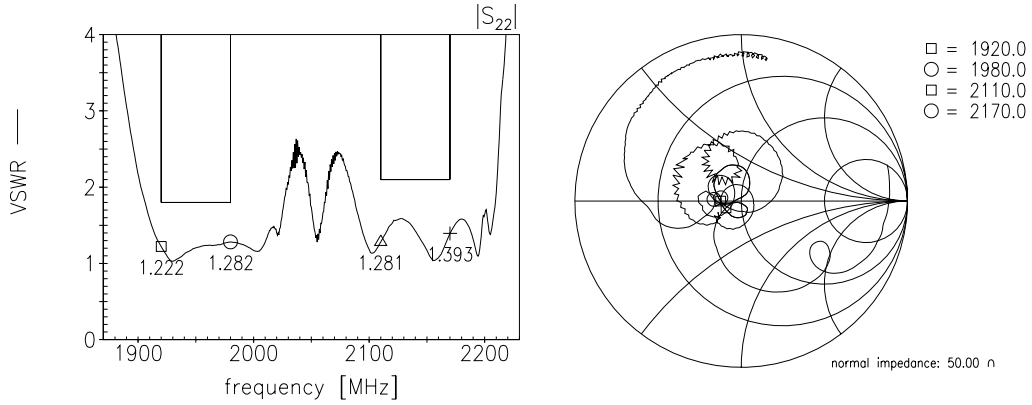
Frequency Response TX-RX (wideband)



Frequency Response VSWR







References

Type	B8550
Ordering code	B39212B8550P810
Marking and package	C61157-A3-A75
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8550_NB.s3p, B8550_WB.s3p See file header for pin/port assignment.
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."
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.

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