SAW Components

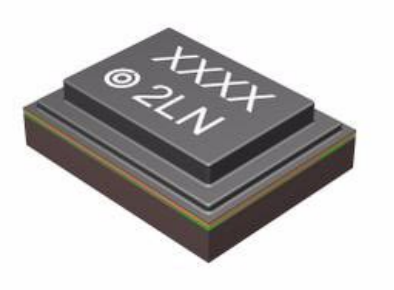
SAW duplexer

WCDMA band VIII

Series/type:	**B8072**
Ordering code:	**B39941B8072P810**
Date:	February 28, 2013
Version:	2.6

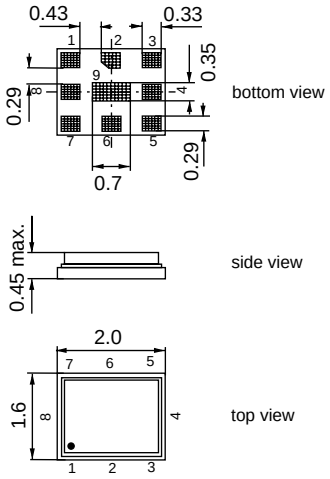
Application

- 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
- High Tx - Rx isolation



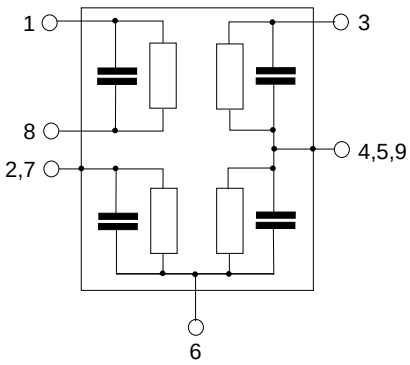
Features

- Package size 2.0 x 1.6 mm²
- Max. height 0.45 mm
- RoHS compatible
- Approximate weight 0.006g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

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



Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 8.0nH
TX terminating impedance: Z_{TX} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced) [1)]

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	α_{WCDMA} [2)]	—	1.8	2.8	dB
	880.0	...	915.0	MHz		—	2.2	3.9	dB
	880.0	...	915.0	MHz		—	2.2	2.8 [3)]	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	882.4	...	912.6	MHz	$\Delta\alpha_{WCDMA}$ [2)]	—	0.8	1.8	dB
	880.0	...	915.0	MHz		—	1.2	2.9	dB
Error Vector Magnitude									
@$f_{Carrier}$	882.4	...	912.6	MHz	EVM [4)]	—	2.3	6.0	%
@$f_{Carrier}$	882.4	...	912.6	MHz	EVM [4)]	—	2.3	4.0 [3)]	%
VSWR									
TX port	880.0	...	915.0	MHz		—	1.8	2.1	
ANT port	880.0	...	915.0	MHz		—	1.7	2.0	
Attenuation					α				
	0.3	...	716.0	MHz		30	35	—	dB
	716.0	...	728.0	MHz		32	35	—	dB
	728.0	...	865.0	MHz		30	35	—	dB
	865.0	...	870.0	MHz		10	41	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA} [2)]	38	54	—	dB
@$f_{Carrier}$	927.4	...	957.6	MHz	α_{WCDMA} [2)]	45 [5)]	54	—	dB
	1452.0	...	1477.0	MHz		20	37	—	dB
	1565.42	...	1573.374	MHz		40	49	—	dB
	1573.374	...	1577.466	MHz		40	49	—	dB
	1577.466	...	1585.42	MHz		40	49	—	dB
	1597.55	...	1605.89	MHz		40	49	—	dB
	1670.0	...	1675.0	MHz		25	51	—	dB
	1760.0	...	1830.0	MHz		38	46	—	dB
	1830.0	...	1880.0	MHz		27	45	—	dB

1) Appropriate matching network has to be applied towards PA and LNA. See page (8) for recommendation
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).
3) T= +25˚C
4) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
5) T = +5˚C to +85˚C

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 8.0nH
TX terminating impedance: Z_{TX} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced) [1)]

Characteristics Tx - Ant		min.	typ. @ 25 ˚C	max.	
2110.0 ... 2170.0 MHz		27	40	—	dB
2400.0 ... 2500.0 MHz		30	36	—	dB
2620.0 ... 2640.0 MHz		28	35	—	dB
2640.0 ... 2745.0 MHz		30	35	—	dB
3520.0 ... 3660.0 MHz		20	32	—	dB
4400.0 ... 4575.0 MHz		20	32	—	dB
5100.0 ... 5490.0 MHz		15	24	—	dB
5490.0 ... 5850.0 MHz		10	17	—	dB
Characteristics Tx - Rx		**min.**	**typ. @ 25 ˚C**	**max.**	
Differential Mode Isolation					
$@f_{Carrier}$ 882.4 ... 912.6 MHz	α_{WCDMA} [2)]	56	60	—	dB
$@f_{Carrier}$ 927.4 ... 957.6 MHz	α_{WCDMA} [2)]	45	57	—	dB
$@f_{Carrier}$ 927.4 ... 957.6 MHz	α_{WCDMA} [2)]	50 [3)]	57	—	dB
Common Mode Isolation					
$@f_{Carrier}$ 882.4 ... 912.6 MHz	α_{WCDMA} [2)]	55	65	—	dB

1) Appropriate matching network has to be applied towards PA and LNA. See page (8) for recommendation
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3) T= +5˚C to +85˚C

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 8.0nH
TX terminating impedance: Z_{TX} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced) [1)]

Characteristics 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} [2)]	—	1.8	2.5	dB
	925.0	...	960.0	MHz		—	2.2	4.7	dB
	925.0	...	960.0	MHz		—	2.2	3.2 [3)]	dB
	925.0	...	960.0	MHz		—	2.2	3.7 [4)]	dB
Amplitude ripple (p-p)									
@$f_{Carrier}$	927.4	...	957.6	MHz	$\Delta\alpha_{WCDMA}$ [2)]	—	0.6	1.3	dB
	925.0	...	960.0	MHz		—	1.0	3.5	dB
Error Vector Magnitude									
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM [5)]	—	3.3	8.5	%
@$f_{Carrier}$	927.4	...	957.6	MHz	EVM [5)]	—	3.3	4.5 [3)]	%
VSWR									
RX port	925.0	...	960.0	MHz		—	1.8	2.1	
ANT port	925.0	...	960.0	MHz		—	1.7	2.0	
Common Mode Rejection Ratio					α				
	925.0	...	960.0	MHz		23	30		dB
Attenuation					α				
	0.3	...	462.0	MHz		35	90	—	dB
	462.0	...	480.0	MHz		45	86	—	dB
	480.0	...	835.0	MHz		38	66	—	dB
	835.0	...	870.0	MHz		56	66	—	dB
	870.0	...	880.0	MHz		38	66	—	dB
@$f_{Carrier}$	882.4	...	912.6	MHz	α_{WCDMA} [2)]	50	56	—	dB
	980.0	...	1045.0	MHz		16	19	—	dB
	1045.0	...	2400.0	MHz		35	58	—	dB
	2400.0	...	2500.0	MHz		45	58	—	dB
	2500.0	...	4810.0	MHz		35	55	—	dB
	5100.0	...	5825.0	MHz		35	52	—	dB

1) Appropriate matching network has to be applied towards PA and LNA. See page (8) for recommendation
2) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (7).
3) T= +25˚C
4) T= +5˚C to +85˚C
5) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Characteristics

Temperature range for specification: T = –20 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT} = 50 Ω || 8.0nH
TX terminating impedance: Z_{TX} = 50 Ω [1)]
RX terminating impedance: Z_{RX} = 100 Ω (balanced)[1)]

Characteristics Rx - Ant		min.	typ. @ 25˚C	max.	
IMD Product Level Limit [2)]					
at f_{TX} = 897.5 MHz f_{RX} = 942.5 MHz					
Blocker 1	45.0MHz	-	-130	-	dBm
Blocker 2	852.5MHz	-	-115	-	dBm
Blocker 3	1840.0MHz	-	-111	-	dBm

[1)] Appropriate matching network has to be applied towards PA and LNA. See page (8) for recommendation
[2)] IMD product level limits for power levels P_{TX}= 21dBm (antenna port output power) and $P_{Blocker}$= -15dBm (antenna port input power).

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	MM, +/- 10 pulses
ESD voltage	V_{ESD}	300[3)]	V	HBM, +/- 1 pulse
ESD voltage	V_{ESD}	600[4)]	V	CDM, +/- 3 pulses
Input power at	P_{IN}			
880.0 ... 915.0 MHz		30	dBm	} WCDMA signal 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-A115B (machine model), 10 negative & 10 positive pulses

3) target, acc. to JESD22-A114F (human body model), 1 negative & 1 positive pulses.

4) target, acc. to JESD22-C101C (charge device model), 3 negative & 3 positive pulses.

Annotation for characteristics section

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

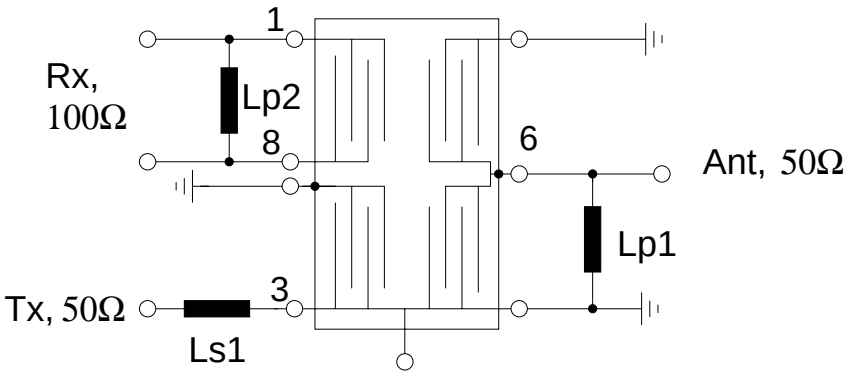
$$\int_{\infty}^{\infty} \left| S_{ds21}(f) H_{RRC}(f - f_{Carrier}) \right|^2 df$$

$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS-Passband, $f_{Carrier}$ ranges from 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:

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

Matching circuit to terminating impedances

(element values depend upon pcb layout)

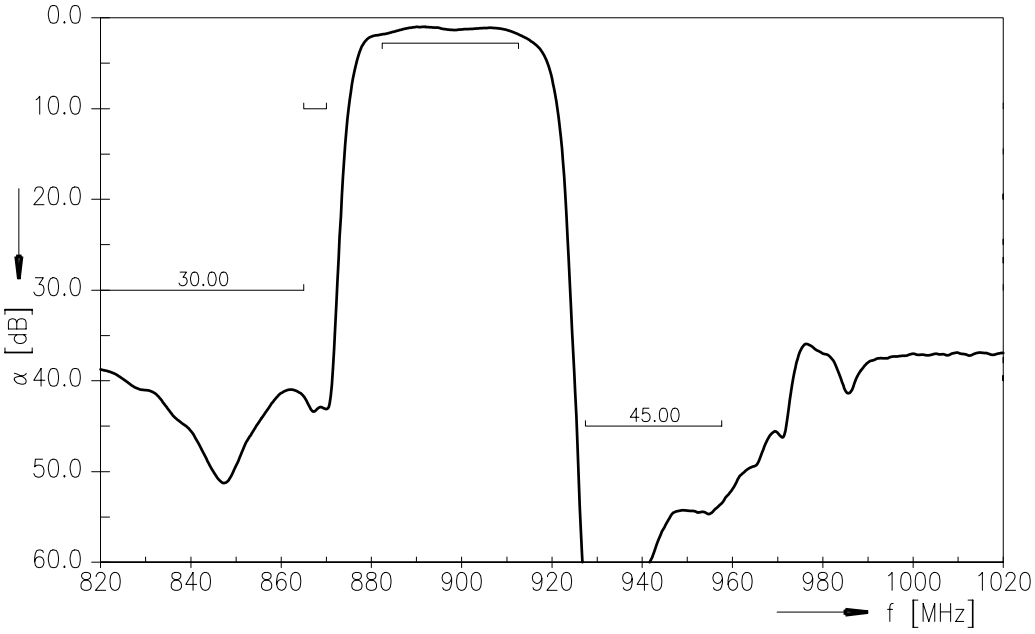


Lp1 = 8.0nH

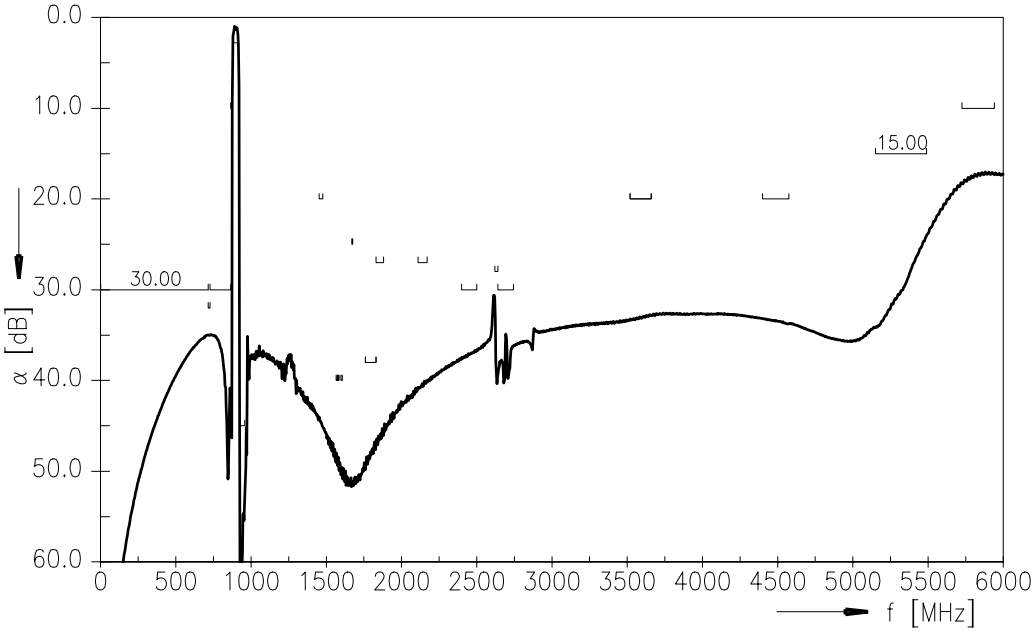
Lp2 = 41.0nH

Ls1 = 2.2nH

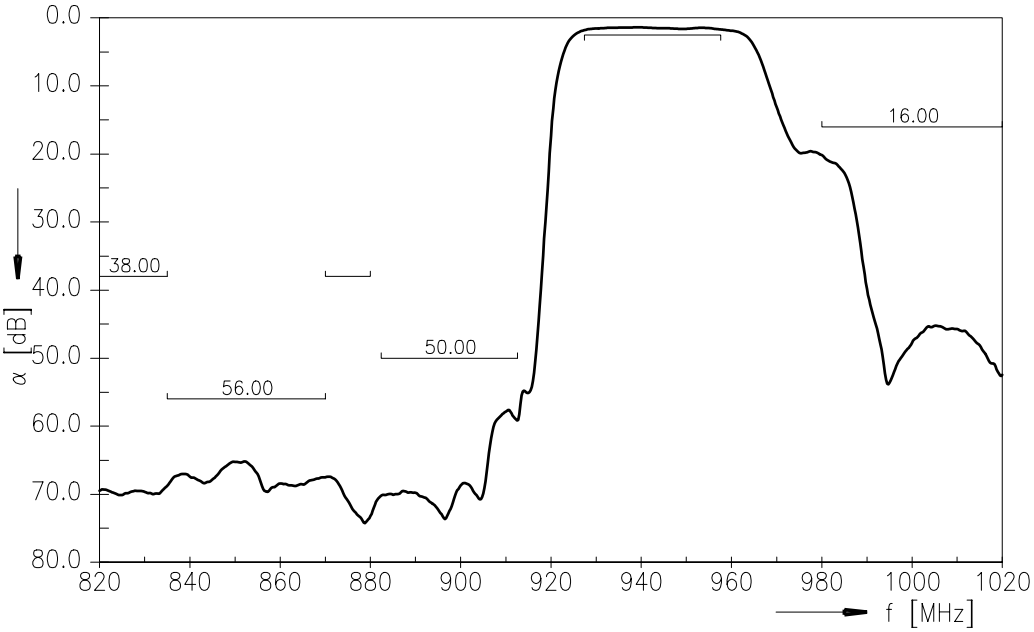
Frequency Response TX-ANT (Power transfer function)



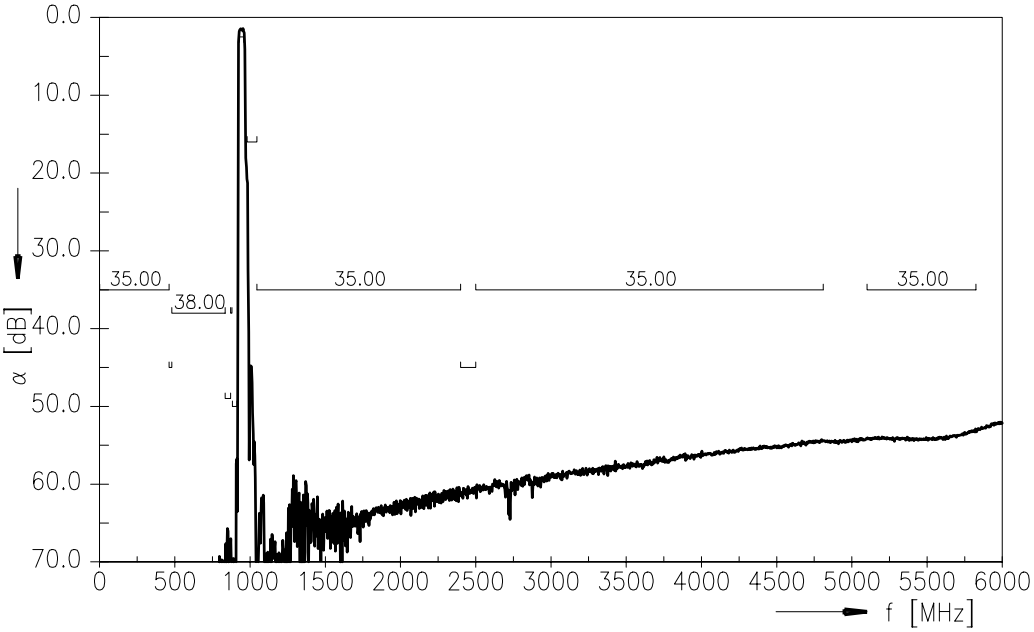
Frequency Response TX-ANT (wideband)



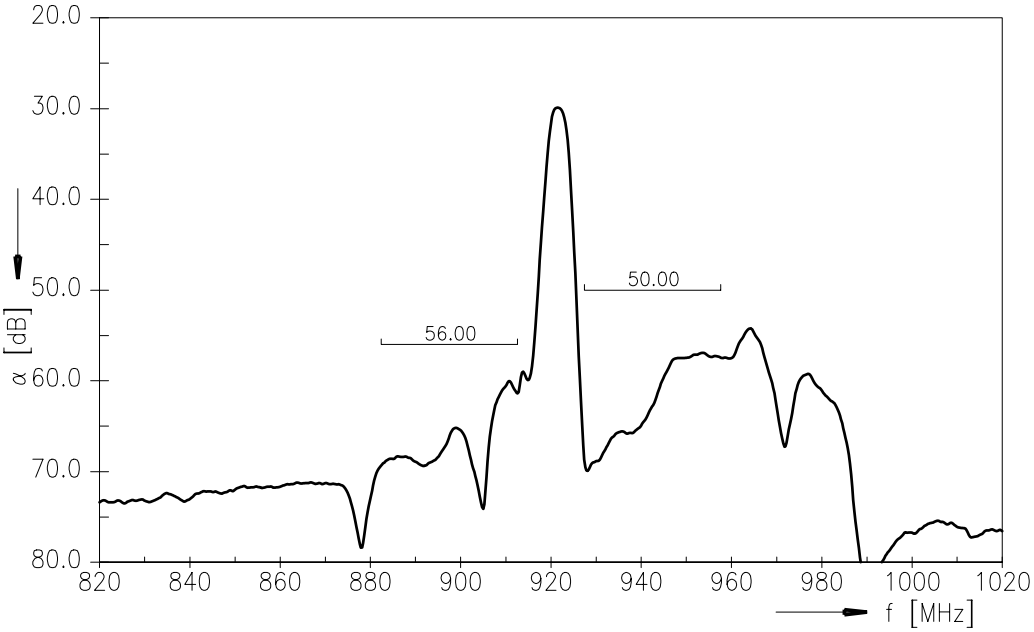
Frequency Response ANT - RX (Power transfer function)



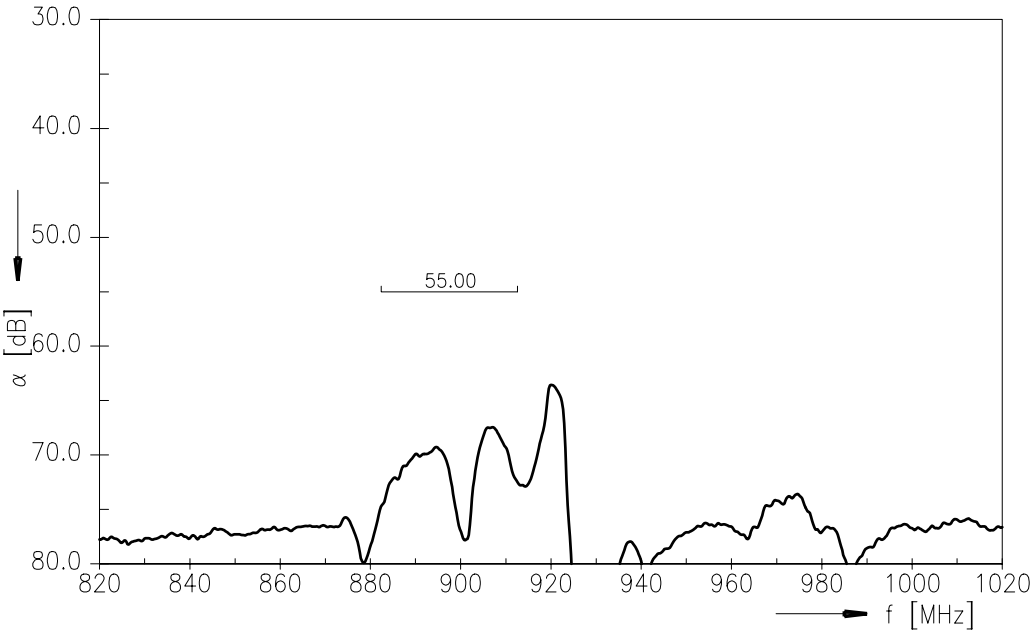
Frequency Response ANT - RX (wideband)



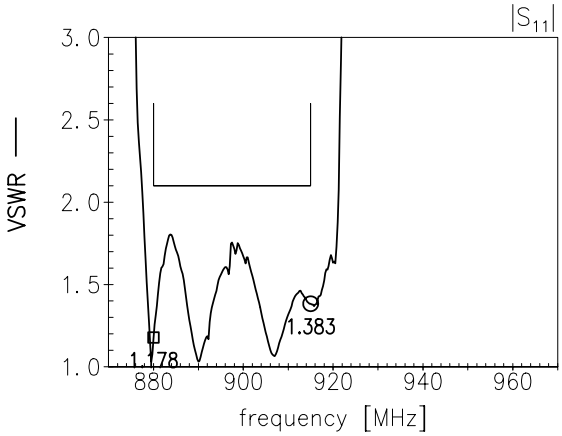
Frequency Response TX - RX (Power transfer function, differential mode)

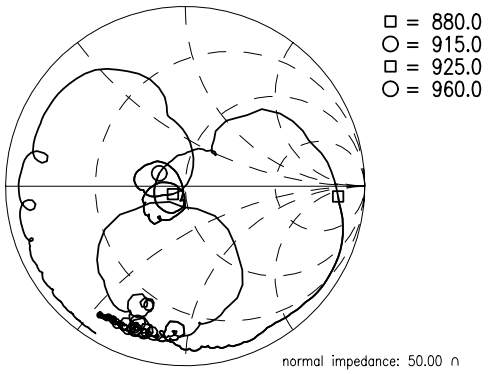


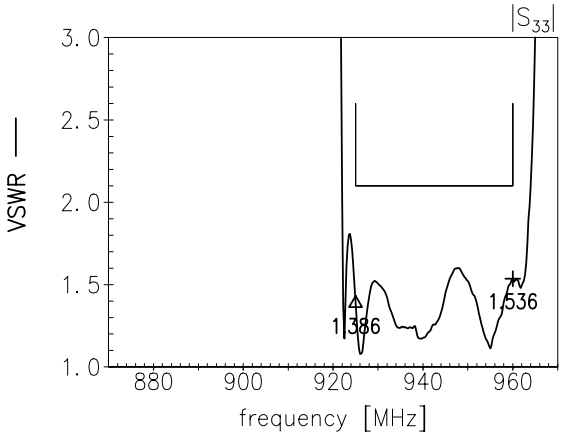
Frequency Response TX - RX (Power transfer function, common mode)

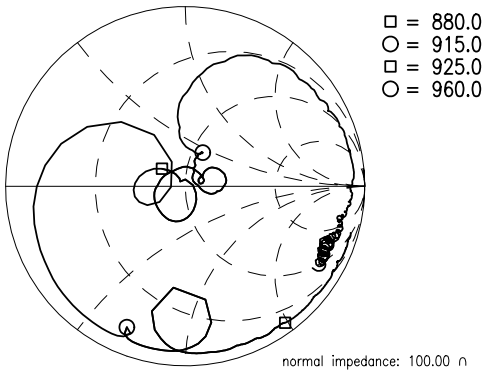


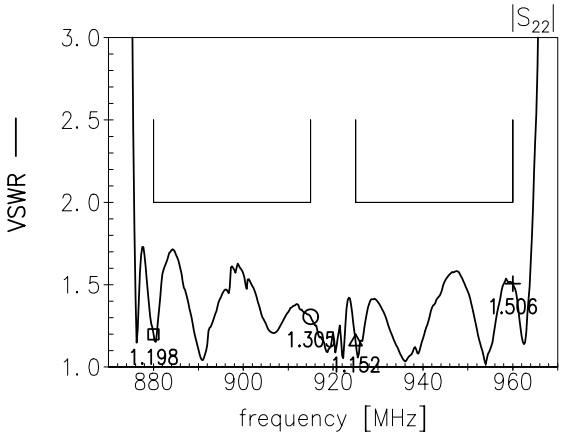
Frequency Response VSWR

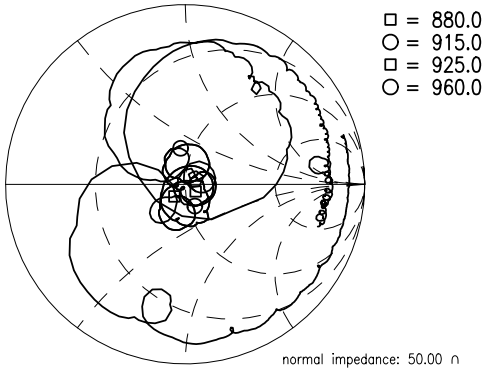












References

Type	B8072
Ordering code	B39941B8072P810
Marking and package	C61157-A8-A37
Packaging	F61047-V8247-Z000
Date codes	L_1126
S-parameters	B8072_NB_UN.s4p, B8072_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.
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 further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com .

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