SAW Components

SAW Duplexer

W-CDMA/LTE Band 1 / CDMA 1x

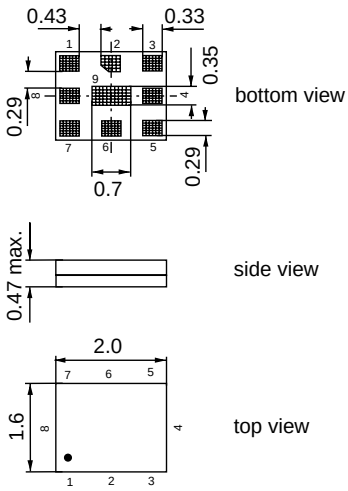
Series/type:	**B8575**
Ordering code:	**B39212B8575P810**
Date:	July 15, 2013
Version:	2.3

Application

- Low-loss SAW duplexer for mobile telephone W-CDMA/LTE Band 1 and CDMA 1x systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 60 MHz
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path
- High isolation between Tx and Rx

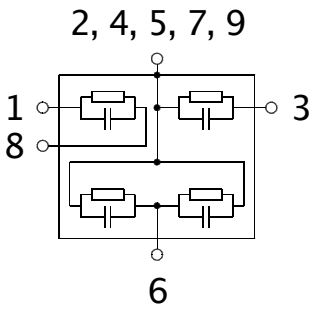
Features

- Package size 2.0 * 1.6 mm^2
- max. Package height 0.47mm
- RoHS compatible
- Approximate weight 0.005g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni terminals, Au-plated
- Balanced Rx port, unbalanced Tx port
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3



Pin configuration

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



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 || 3.0nH
RX teminating impedance: Z_{Rx} = 100 Ω (balanced) || 22nH

Characteristics Tx-Antenna					min.	typ. @ 25 ˚C	max.	
Center frequency				f_c		1950.0		MHz
Maximum insertion attenuation				α				
1920.0	...	1980.0	MHz			1.5	2.0	dB
1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]		1.4	1.9	dB
Amplitude ripple (p-p)				$\Delta\alpha$				
1920.0	...	1980.0	MHz			0.6	1.0	dB
1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]		0.5	1.0	dB
Error Vector Magnitude				EVM [2)]				
1922.4	...	1977.6	MHz			1.1	2.0	%
TX port VSWR								
1920.0	...	1980.0	MHz			1.6	1.9	
ANT port VSWR								
1920.0	...	1980.0	MHz			1.5	1.8	

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 || 3.0nH
RX teminating impedance: Z_{Rx} = 100 Ω (balanced) || 22nH

Characteristics Tx-Antenna					min.	typ. @ 25 ˚C	max.	
Attenuation				α				
10.0	...	410.0	MHz		47	57		dB
420.0	...	494.0	MHz		44	53		dB
843.0	...	894.0	MHz		40	43		dB
1565.42	...	1573.374	MHz		38	42		dB
1573.374	...	1577.466	MHz		40	43		dB
1577.466	...	1585.42	MHz		40	43		dB
1597.5515	...	1605.886	MHz		40	44		dB
1605.886	...	1805.0	MHz		25	40		dB
1805.0	...	1865.0	MHz		25	35		dB
1865.0	...	1880.0	MHz		10	37		dB
2010.0	...	2025.0	MHz		18[1)]	25		dB
2110.0	...	2170.0	MHz		42	47		dB
2112.4	...	2167.6	MHz	$\alpha_{W\text{-}CDMA}$[2)]	42	47		dB
2400.0	...	2500.0	MHz		33	36		dB
2620.0	...	2690.0	MHz		30	33		dB
3840.0	...	3960.0	MHz		26	33		dB
5150.0	...	5940.0	MHz		18	22		dB

1) Temperature range for this specification is +15 to +85 ˚C
2) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 8 of this document.

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 || 3.0nH
RX teminating impedance: Z_{Rx} = 100 Ω (balanced) || 22nH

Characteristics Antenna-Rx					**min.**	**typ. @ 25 ˚C**	**max.**	
Center frequency				f_c		2140.0		MHz
Maximum insertion attenuation				α				
2110.0	...	2170.0	MHz			1.7	2.1	dB
2112.4	...	2167.6	MHz	$\alpha_{W\text{-}CDMA}$ [1]		1.7	2.1	dB
Amplitude ripple (p-p)				$\Delta\alpha$				
2110.0	...	2170.0	MHz			0.4	1.0	dB
2112.4	...	2167.6	MHz	$\alpha_{W\text{-}CDMA}$ [1]		0.3	1.0	dB
Error Vector Magnitude				EVM [2]				
2112.4	...	2167.6	MHz			0.8	2.0	%
ANT port VSWR								
2110.0	...	2170.0	MHz			1.4	1.8	
RX port VSWR								
2110.0	...	2170.0	MHz			1.4	1.8	
Common Mode Rejection Ratio CMRR								
2110.0	...	2170.0	MHz		20 [3]	25		dB
IMD product level limits [4]								
at f_{Tx}=1950.0 MHz, f_{Rx}=2140.0 MHz								
Blocker 1		190.0	MHz			-134	-110	dBm
Blocker 2		1760.0	MHz			-112	-102	dBm
Blocker 3		4090.0	MHz			-118	-106	dBm
Blocker 4		6040.0	MHz			-131	-110	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) A combination of 10˚ phase balance and 1dB amplitude balance corresponds to 19.6 CMRR
4) IMD product level limits for power levels P_{TX}=21.5 dBm (antenna port output power) and $P_{Blocker}$=-15dBm (antenna port input power)

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 || 3.0nH
RX teminating impedance: Z_{Rx} = 100 Ω (balanced) || 22nH

Characteristics Antenna-Rx					min.	typ. @ 25 ˚C	max.	
Attenuation				α				
1.0	...	1920.0	MHz		35	44		dB
1920.0	...	1980.0	MHz		45	58		dB
1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	45	61		dB
1980.0	...	2025.0	MHz		27	37		dB
2255.0	...	2400.0	MHz		15	44		dB
2400.0	...	2484.0	MHz		30	45		dB
2484.0	...	6000.0	MHz		35	45		dB

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

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 || 3.0nH
RX teminating impedance: Z_{Rx} = 100 Ω (balanced) || 22nH

Characteristics Tx-Rx					min.	typ. @ 25 ˚C	max.	
Differential Mode Isolation				α				
1920.0	...	1980.0	MHz		55	60		dB
1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	55	60		dB
2110.0	...	2170.0	MHz		50	57		dB
2112.4	...	2167.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	50	58		dB
3830.0	...	3970.0	MHz		20	67		dB
5750.0	...	5950.0	MHz		20	56		dB
Common Mode Isolation				α				
1920.0	...	1980.0	MHz		46	49		dB
1922.4	...	1977.6	MHz	$\alpha_{W\text{-}CDMA}$ [1)]	46	50		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 2167.6 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:

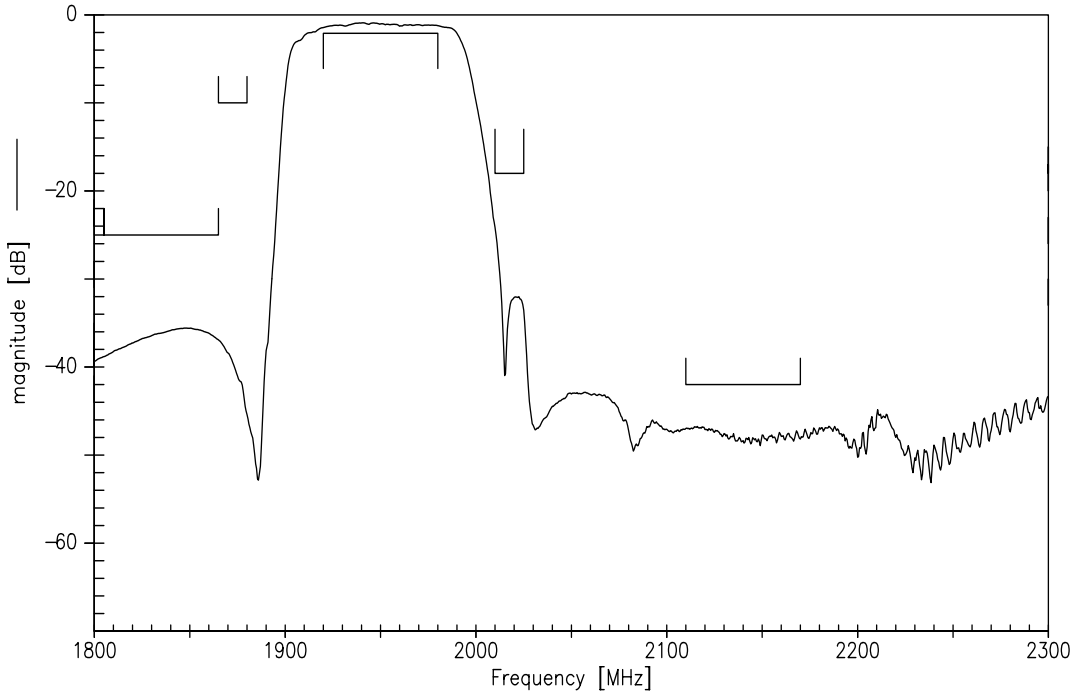
$$\int_{-\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum Ratings

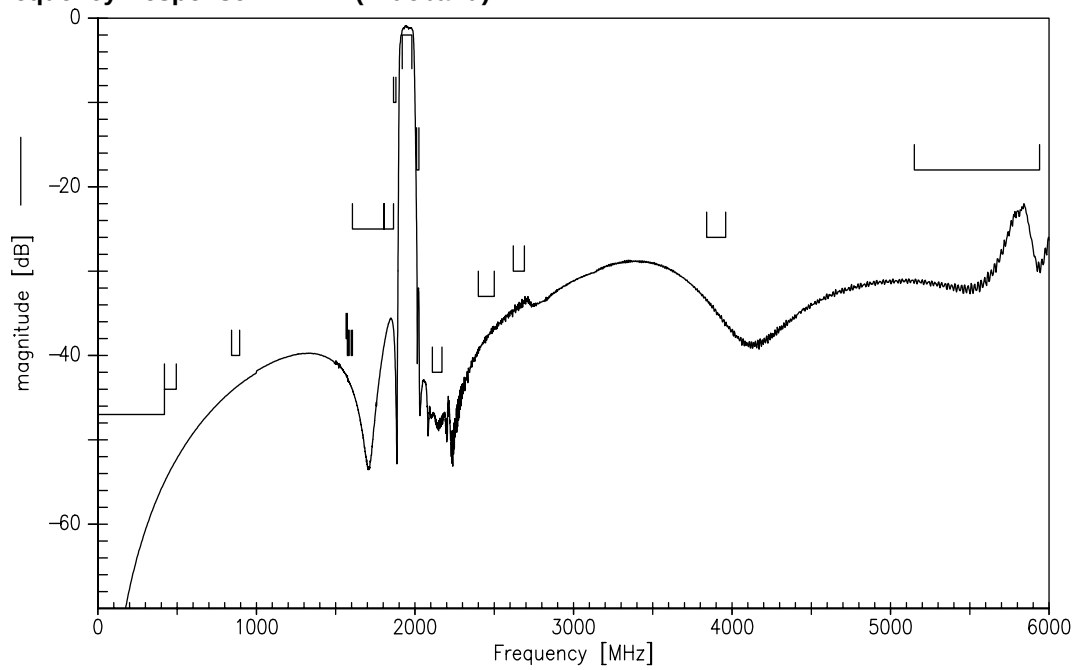
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
ESD voltage	V_{ESD}	100[2)]	V	human body model, 1 pulse
ESD voltage	V_{ESD}	500[3)]	V	field-induced charged device model
Input power at				
1920.0 ... 1980.0 MHz	P_{in}	29	dBm	} continuous wave, 50 ˚C, 5000h
elsewhere	P_{in}	10	dBm	

1) According to JESD22-A115B (machine model), 10 negative and 10 positive pulses.
2) According to JESD22-A114F (human body model), 1 negative and 1 positive pulse.
3) According to JESD22-C101C (field-induced charged device model).

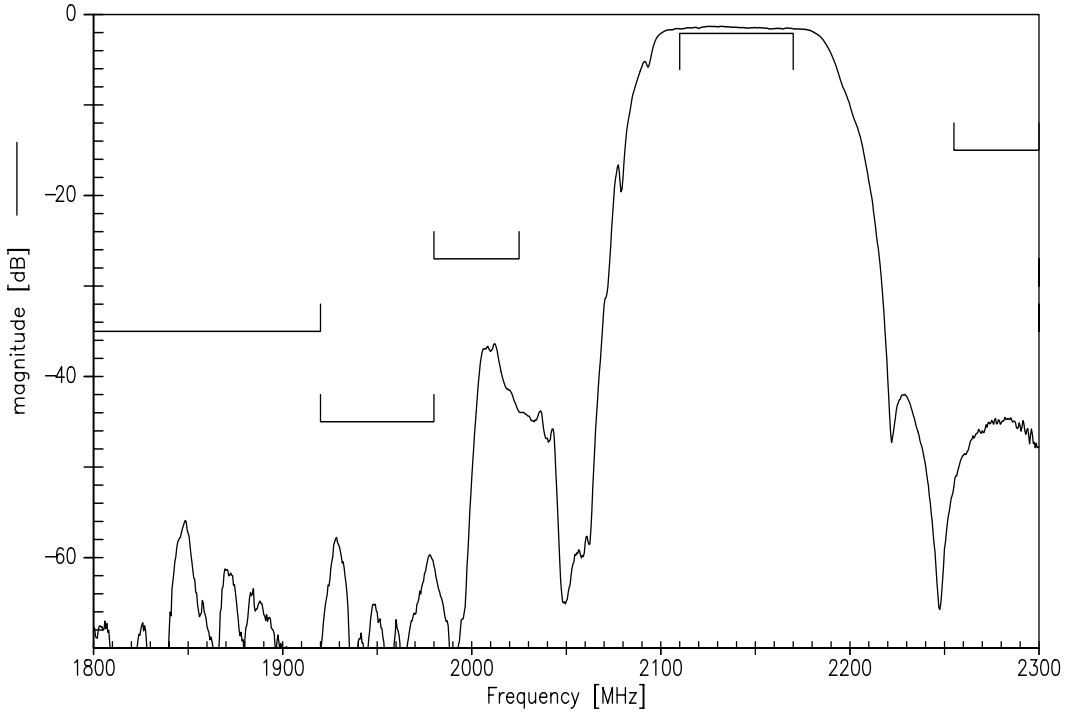
Frequency Response TX-ANT



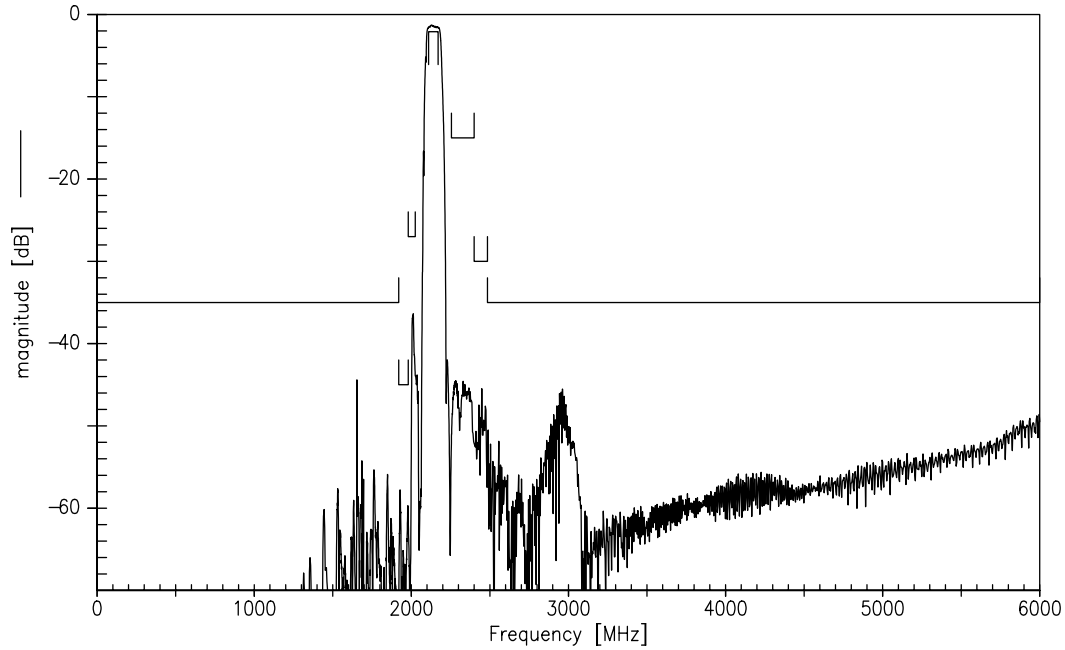
Frequency Response TX-ANT (wideband)



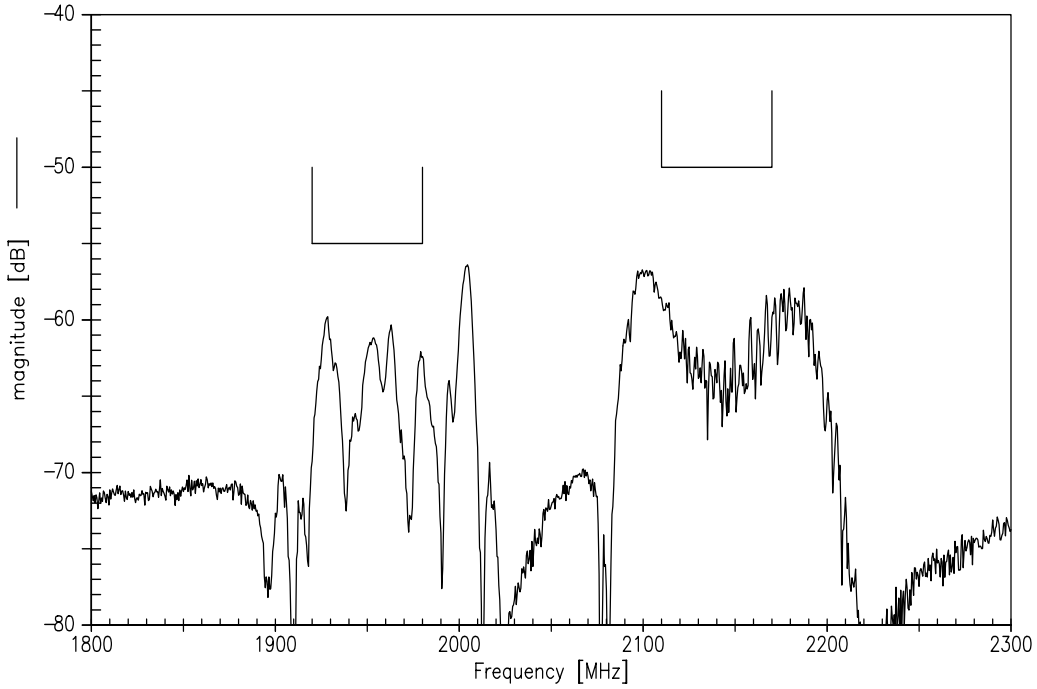
Frequency Response RX-ANT



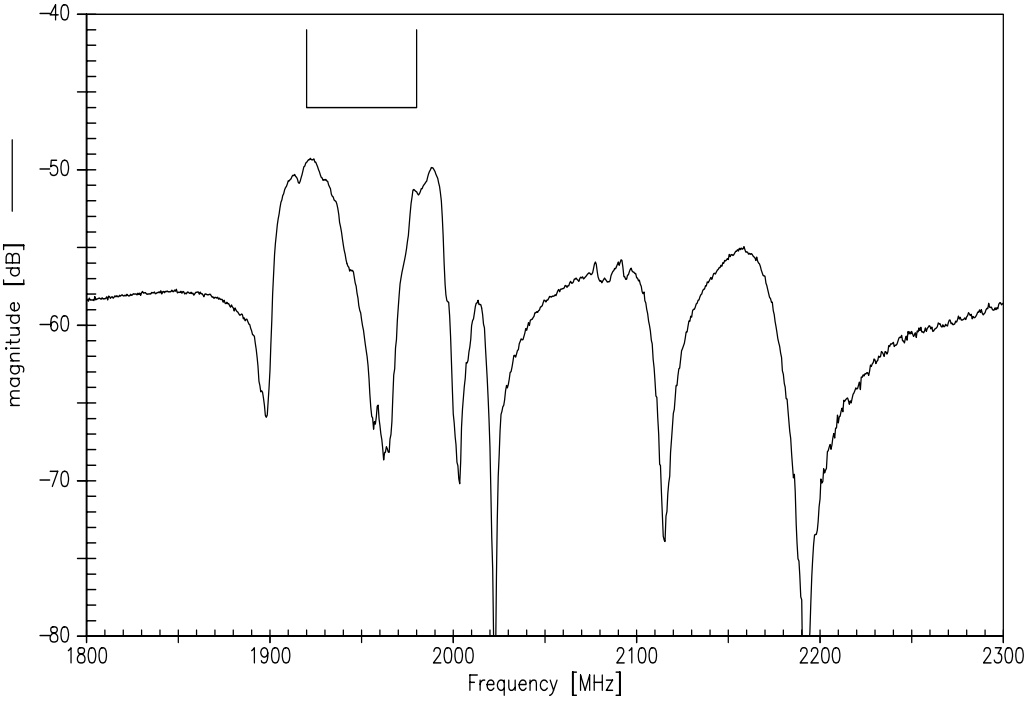
Frequency Response RX-ANT (wideband)



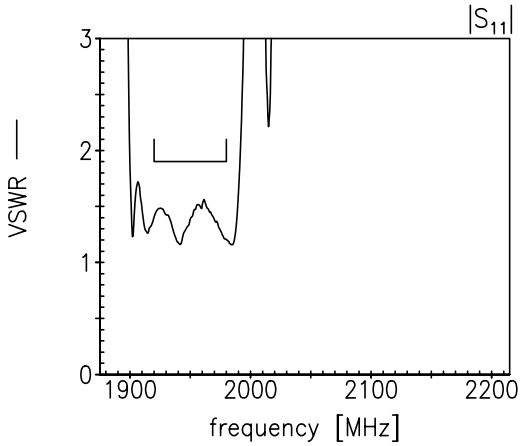
Frequency Response TX-RX

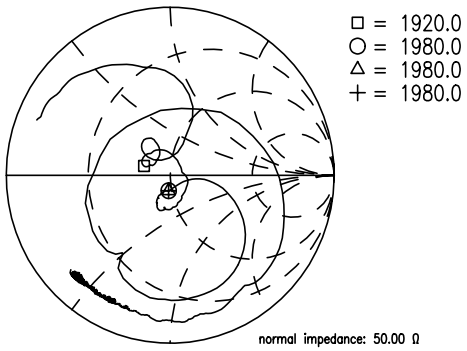


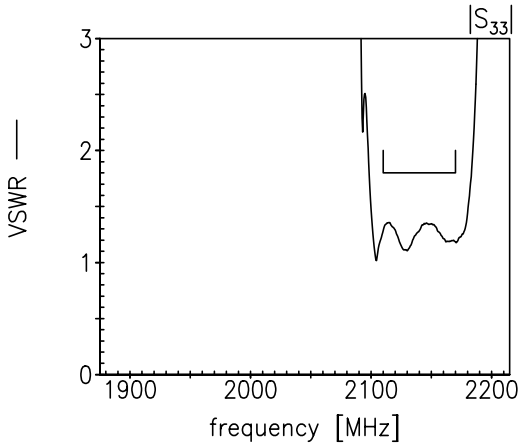
Frequency Response TX-RX (Common mode)

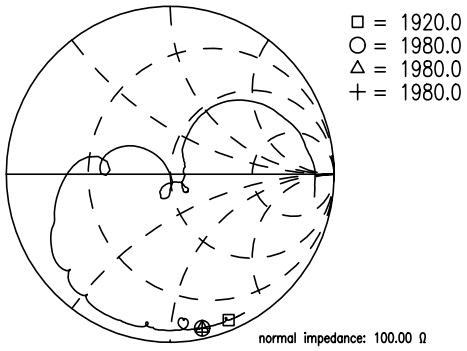


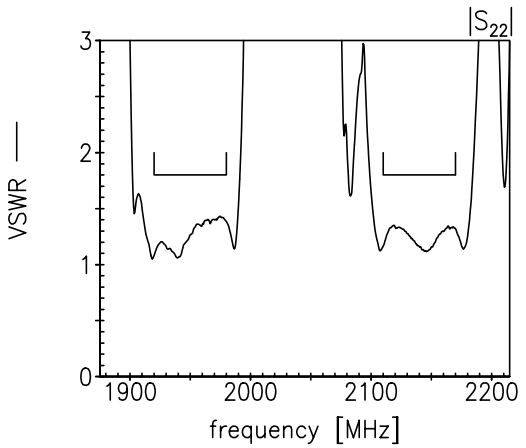
Return Loss **S_{11} TX- port** **S_{22} ANT-port** **S_{33} RX-port**

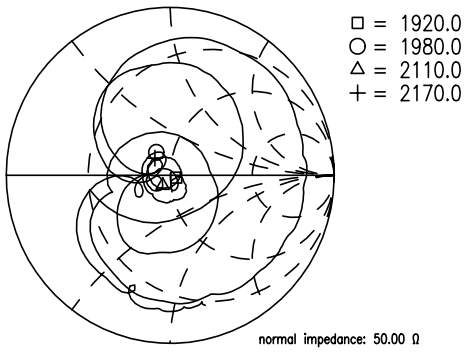












References

Type	B8575
Ordering code	B39212B8575P810
Marking and package	C61157-A8-A45-51-27
Packaging	F61074-V8247-Z000-3-27
Date codes	L_1126
S-parameters	B8575_NB_UN.s4p, B8575_WB_UN.s4p 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

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