



SAW Components

SAW duplexer

WCDMA band VIII

Series/type:	B8505
Ordering code:	B39941B8505P810
Date:	July 1, 2013
Version:	2.1

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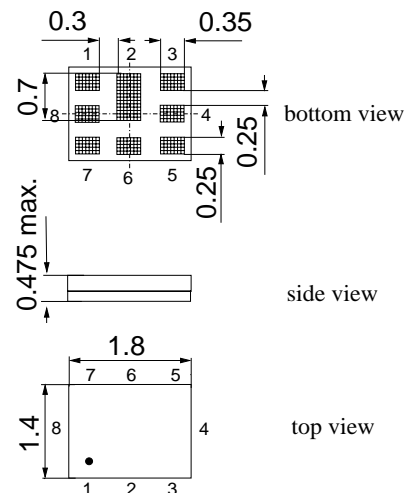
Data Sheet

Application

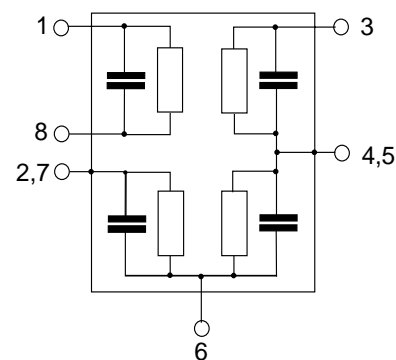
- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path
- high Tx - Rx isolation


Features

- Package size 1.8 x 1.4 mm², max package height 0.475 mm.
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


Pin configuration

- 1,8 RX output, balanced
- 3 TX input, single ended
- 6 Antenna
- 2,4,5,7 To be Grounded



Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 5.6nH
TX terminating impedance:	Z _{TX} = 50 Ω
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)

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} ¹⁾		—	2.1	2.8	dB
	880.0 ... 915.0	MHz			—	2.8	3.9	dB
	880.24 ... 914.76	MHz			—	2.7	3.8	dB
Amplitude ripple (p-p)								
@f _{Carrier}	882.4 ... 912.6	MHz	Δα _{WCDMA} ¹⁾		—	1.2	1.8	dB
Error Vector Magnitude								
@f _{Carrier}	882.4 ... 912.6	MHz	EVM ²⁾		—	2.1	6.0	%
VSWR								
TX port	880.0 ... 915.0	MHz			—	1.7	2.0	
ANT port	880.0 ... 915.0	MHz			—	1.7	2.0	
Attenuation			α					
	0.3 ... 716.0	MHz			30	37	—	dB
	716.0 ... 728.0	MHz			32	37	—	dB
	728.0 ... 821.0	MHz			30	35	—	dB
@f _{Carrier}	927.4 ... 957.6	MHz	α _{WCDMA} ¹⁾		42	48	—	dB
	925.0 ... 960.0	MHz			38 ³⁾	48	—	dB
	925.24 ... 959.76	MHz			41 ³⁾	48	—	dB
	1565.42 ... 1573.374	MHz			37	45	—	dB
	1573.374... 1577.466	MHz			37	45	—	dB
	1577.466... 1585.42	MHz			37	44	—	dB
	1597.55 ... 1605.89	MHz			37	43	—	dB
	1760.0 ... 1830.0	MHz			32	38	—	dB
	1830.0 ... 1880.0	MHz			27	33	—	dB
	2110.0 ... 2170.0	MHz			27	32	—	dB
	2400.0 ... 2500.0	MHz			28	33	—	dB
	2620.0 ... 2745.0	MHz			22	27	—	dB
	3520.0 ... 3660.0	MHz			20	26	—	dB
	4400.0 ... 4575.0	MHz			20	30	—	dB
	5150.0 ... 5490.0	MHz			15	18	—	dB
	5725.0 ... 5850.0	MHz			10	16	—	dB

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

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

³⁾ T=0 °C to +85 °C

Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 5.6nH
TX terminating impedance:	Z _{TX} = 50 Ω
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)

Charcteristics 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} ¹⁾				—	2.0	2.5	dB
925.0 ... 960.0 MHz					—	2.5	3.7	dB
925.24 ... 959.76 MHz					—	2.5	3.5	dB
Amplitude ripple (p-p)								
@f _{Carrier} 927.4 ... 957.6 MHz	Δα _{WCDMA} ¹⁾				—	0.6	1.2	dB
Error Vector Magnitude								
@f _{Carrier} 927.4 ... 957.6 MHz	EVM ²⁾				—	2.7	6.0	%
VSWR								
RX port 925.0 ... 960.0 MHz					—	1.8	2.1	
ANT port 925.0 ... 960.0 MHz					—	1.8	2.1	
Attenuation	α							
0.3 ... 880.0 MHz					35	62	—	dB
@f _{Carrier} 882.4 ... 912.6 MHz	α _{WCDMA} ¹⁾				50	58	—	dB
880.0 ... 915.0 MHz					46	56	—	dB
1045.0 ... 4810.0 MHz					35	58	—	dB
1850.0 ... 1920.0 MHz					40	58	—	dB
2400.0 ... 2484.0 MHz					45	58	—	dB
2775.0 ... 2880.0 MHz					45	60	—	dB
Common Mode Rejection Ratio	α							
925.0 ... 960.0 MHz					25	33	—	dB
IMD product level limits³⁾								
at f _{TX} = 897.5MHz, f _{RX} = 942.5MHz								
Blocker 1	45.0 MHz				—	-120	-110	dBm
Blocker 2	852.5 MHz				—	-108	-100	dBm
Blocker 3	1840.0 MHz				—	-110	-100	dBm
Blocker 4	2737.5 MHz				—	-108	-100	dBm

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

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

³⁾ Power levels: 21.5 dBm Tx signal, -15dBm blocker at antenna port

Data Sheet

Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 5.6nH
TX terminating impedance:	Z _{TX} = 50 Ω
RX terminating impedance:	Z _{RX} = 100 Ω (balanced)

Charcteristics Tx - Rx					min.	typ. @ 25 °C	max.	
Differential Mode Isolation								
	880.0	...	915.0	MHz	52	58	—	dB
@f _{Carrier}	882.4	...	912.6	MHz α _{WCDMA} ¹⁾	55	60	—	dB
	925.0	...	960.0	MHz	40 ²⁾	56	—	dB
	925.24	...	959.76	MHz	43 ²⁾	56	—	dB
@f _{Carrier}	927.4	...	957.6	MHz α _{WCDMA} ¹⁾	48	58	—	dB
Common Mode Isolation								
@f _{Carrier}	882.4	...	912.6	MHz α _{WCDMA} ¹⁾	55	63	—	dB

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

²⁾ T=0 °C to +85 °C


Maximum ratings

Storage temperature range	T_{stg}	-40/+85 ¹⁾	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100 ²⁾	V	machine model, 10 pulses
ESD voltage	V_{ESD}	300 ³⁾	V	HBM,+/- 1 pulses
ESD voltage	V_{ESD}	600 ⁴⁾	V	CDM,+/- 3 pulses
Input power at	P_{IN}			
880.0 ... 915.0 MHz		29	dBm	} WCDMA signal 55 °C, 10000 h
elsewhere		10	dBm	

1) Extended upperlimit: 168@125°C acc. to IEC 60068-2-2 Bb.

2) acc. to JESD22-A115B (machine model), 10 negative & 10 positive pulses.

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

4) acc. to JESD22-A101C (charge device model), 3 negative & 3 positive pulse

Annotation for characteristics section

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

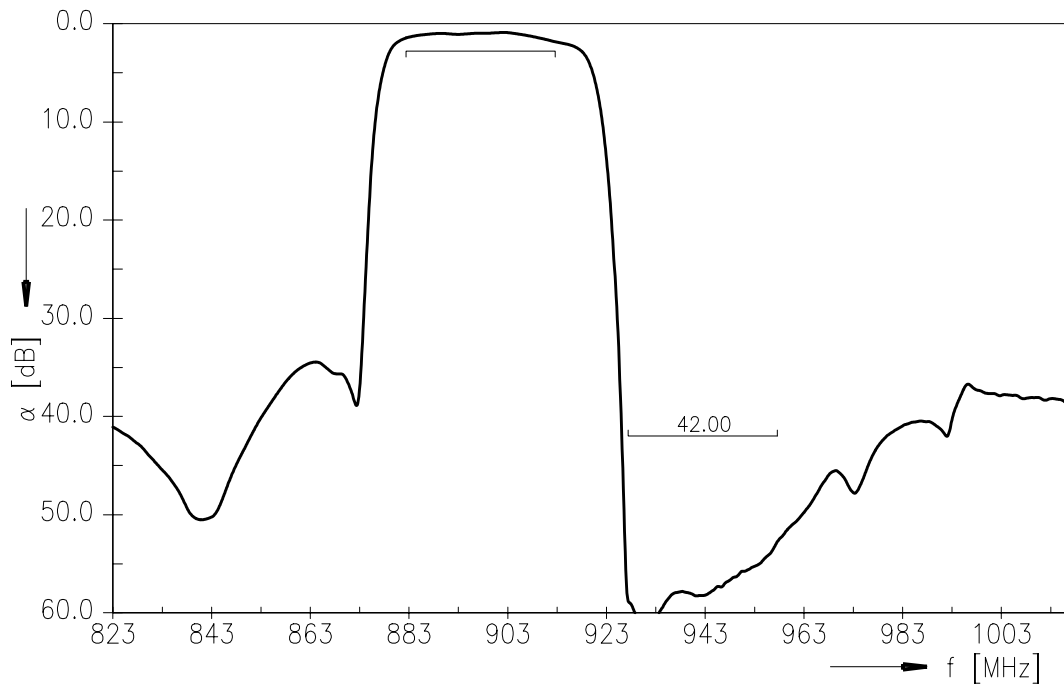
$$\int_{-\infty}^{\infty} |S_{ds2l}(f)H_{RRC}(f - f_{Carrier})|^2 df$$

$f_{Carrier}$ 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:

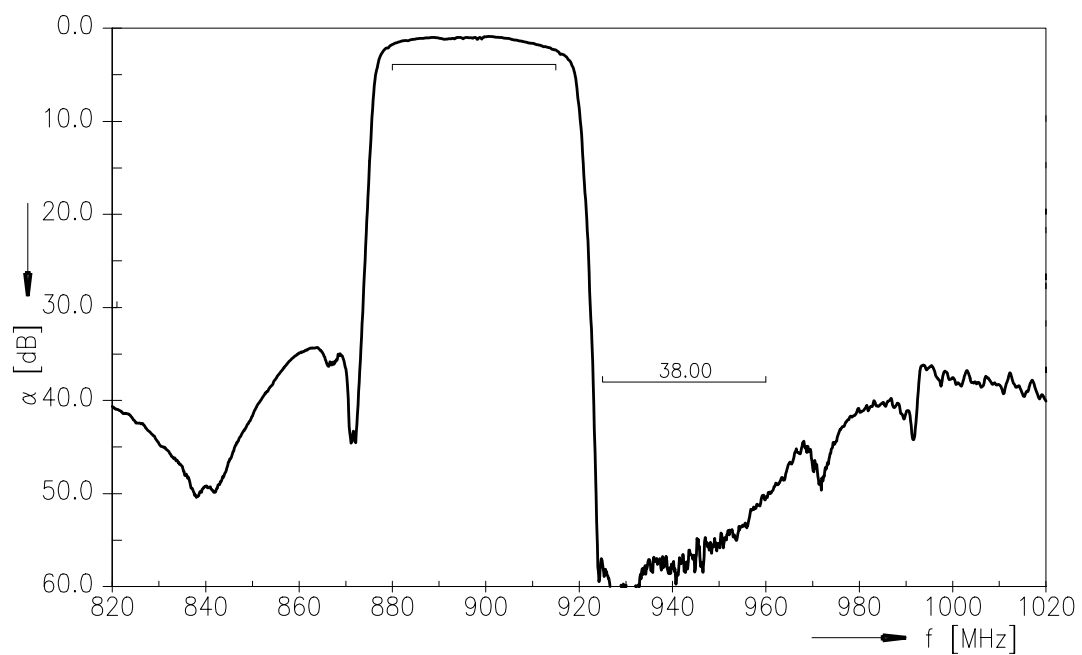
$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



Frequency Response TX-ANT (Power transfer function)

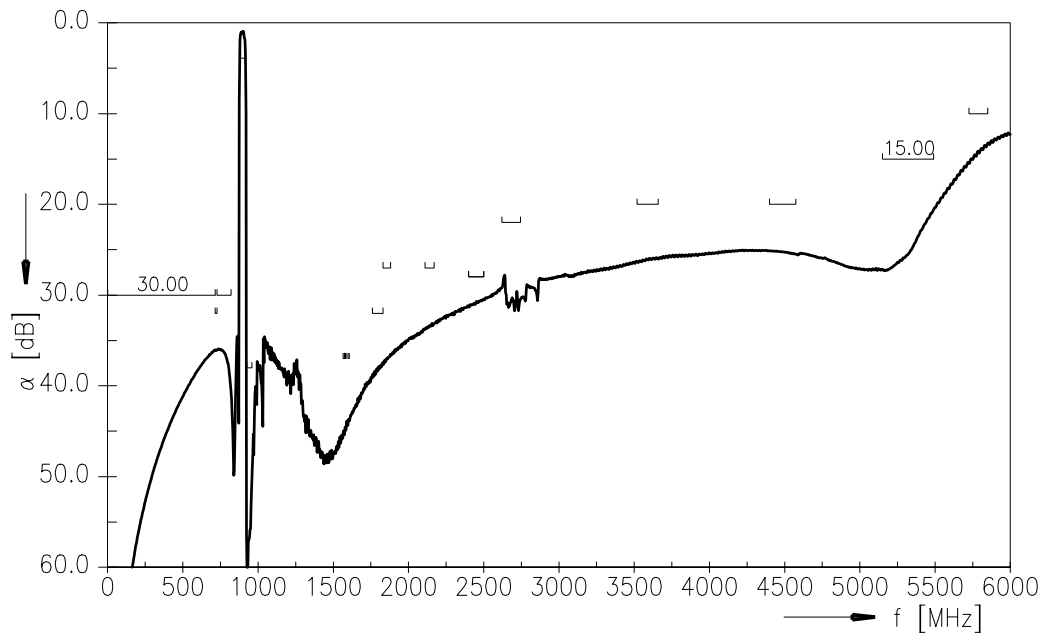


Frequency Response TX - Ant (CW test signal, specification temperature range T=0 °C to +85 °C)

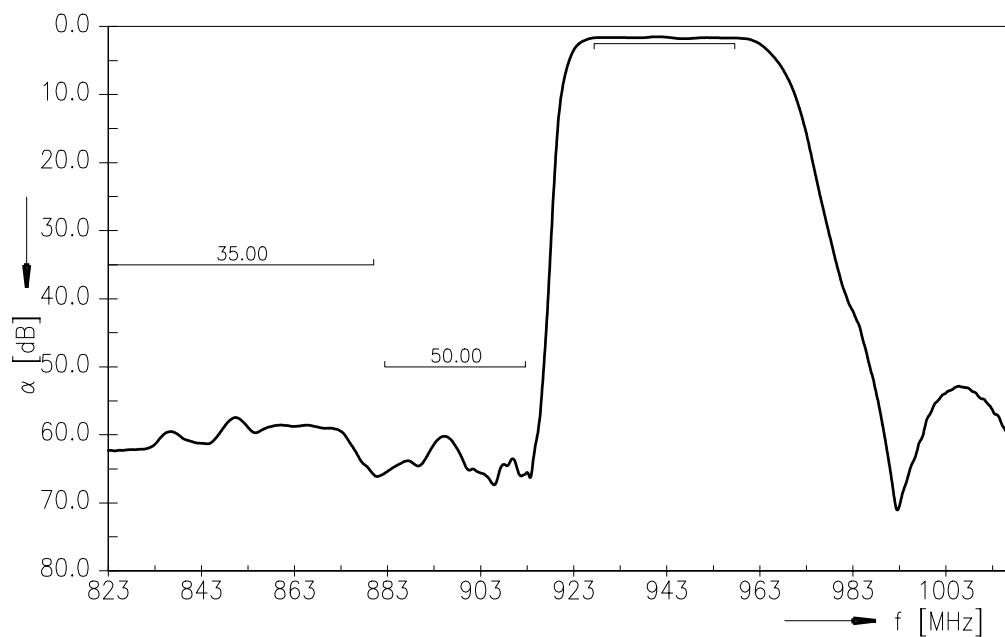




Frequency Response TX-ANT (wideband)

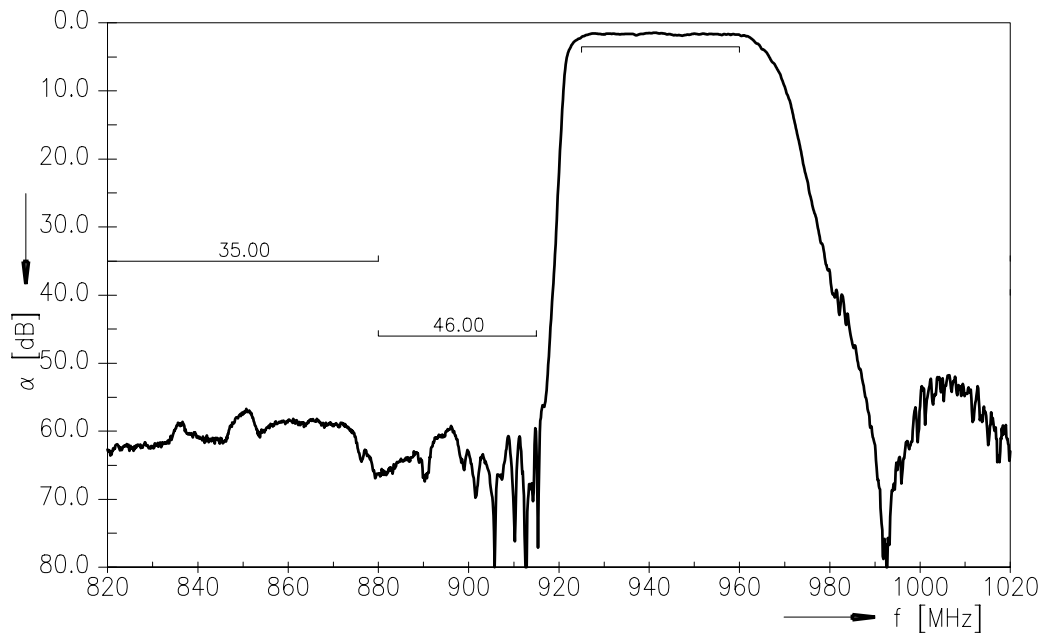


Frequency Response ANT - RX (Power transfer function)

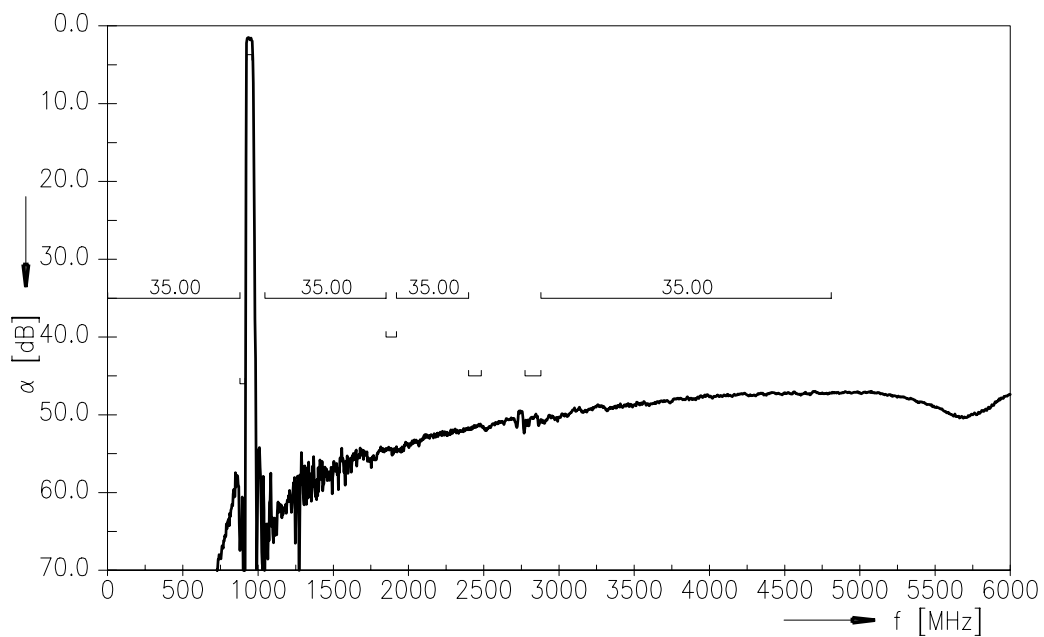




Frequency Response Ant - RX (CW test signal)

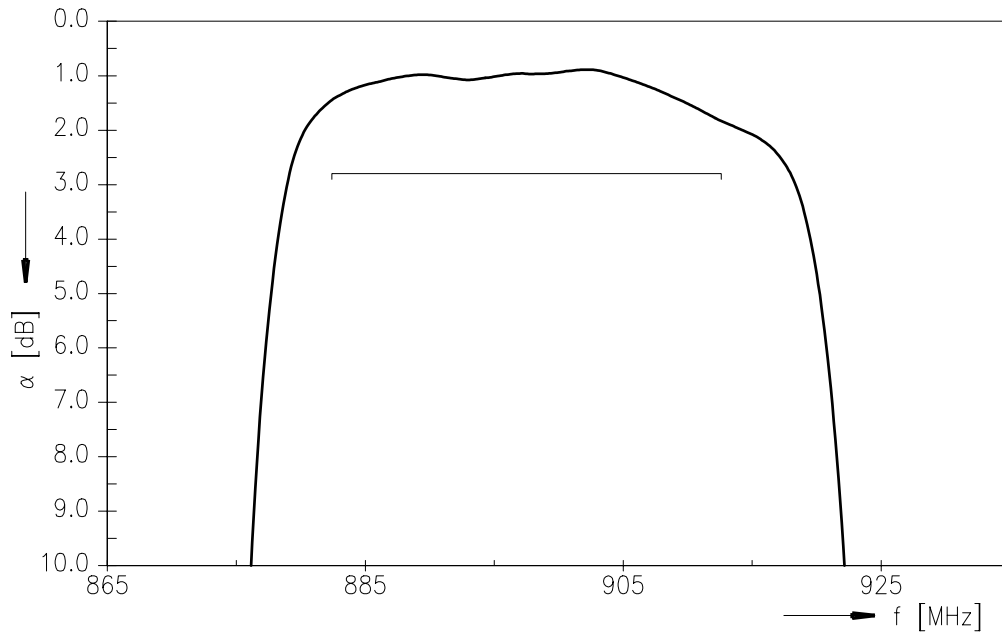


Frequency Response ANT - RX (wideband)

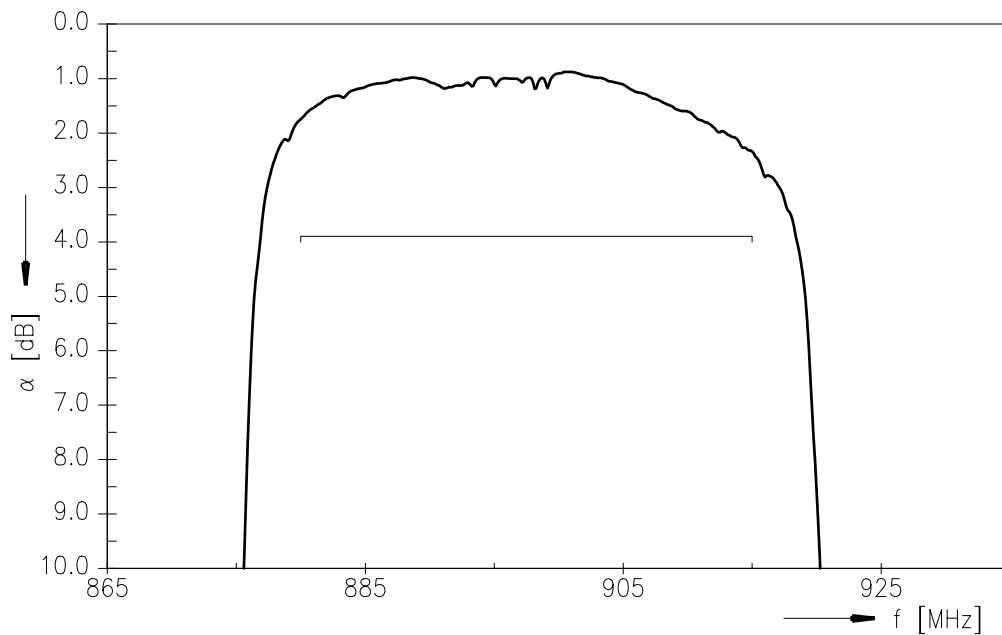




Frequency Response TX - Ant (passband, Power transfer function)

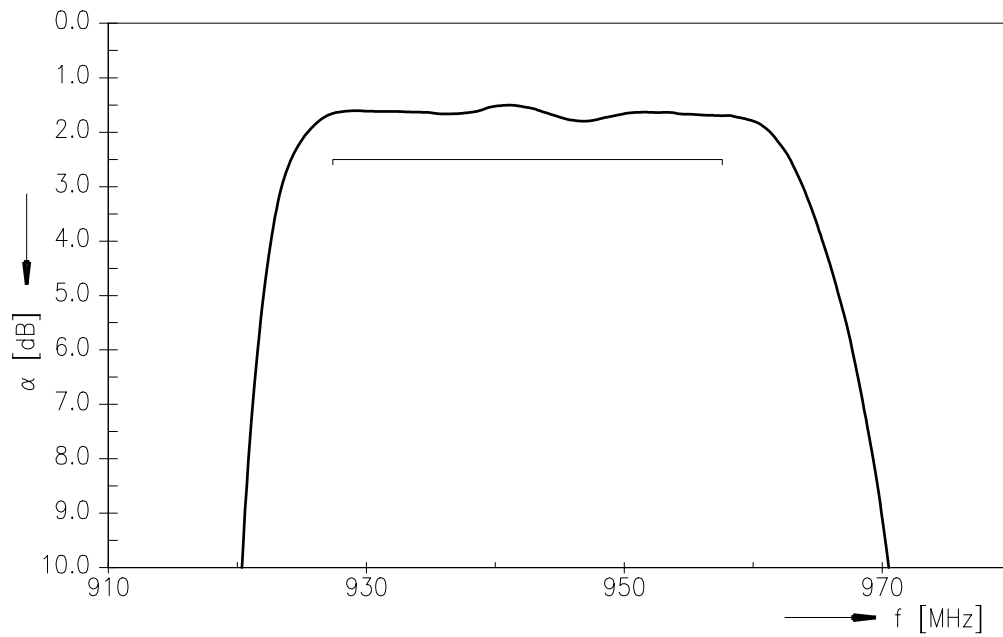


Frequency Response TX-Ant (passband, CW test signal)

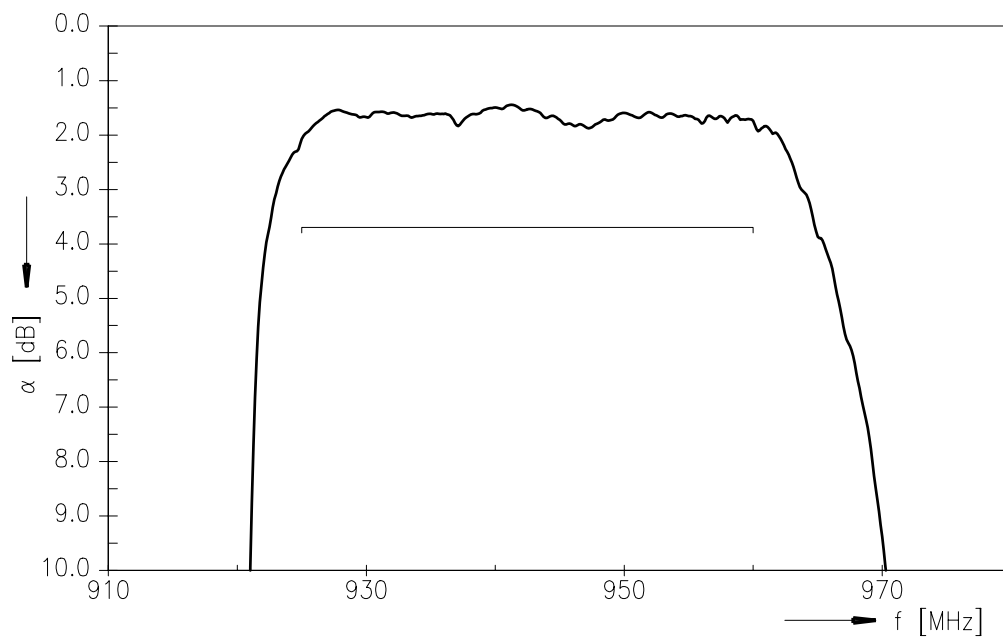




Frequency Response Ant - RX (passband, Power transfer function)

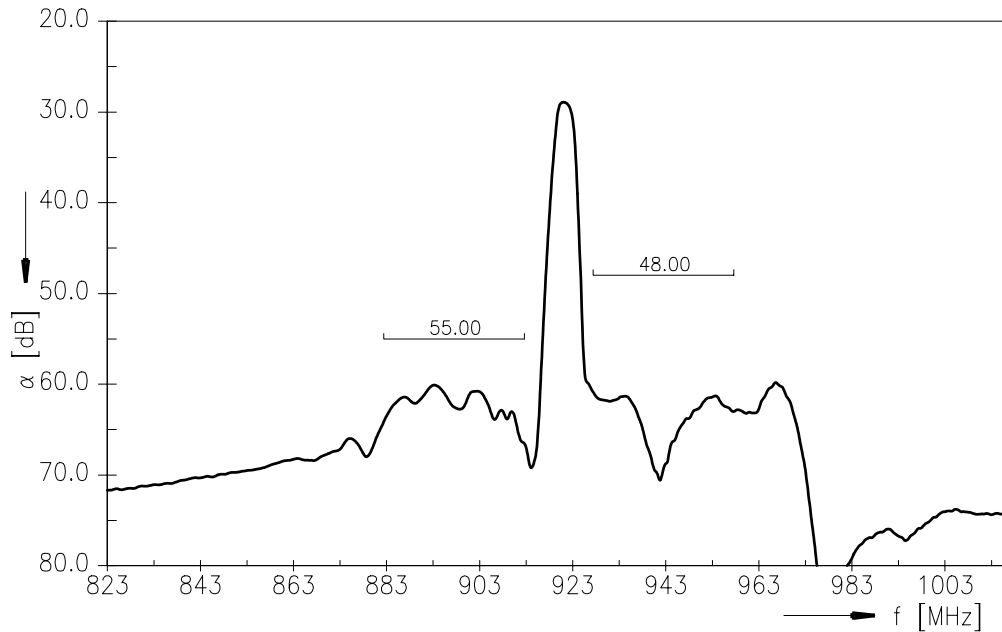


Frequency Response Ant - RX (passband, CW test signal)

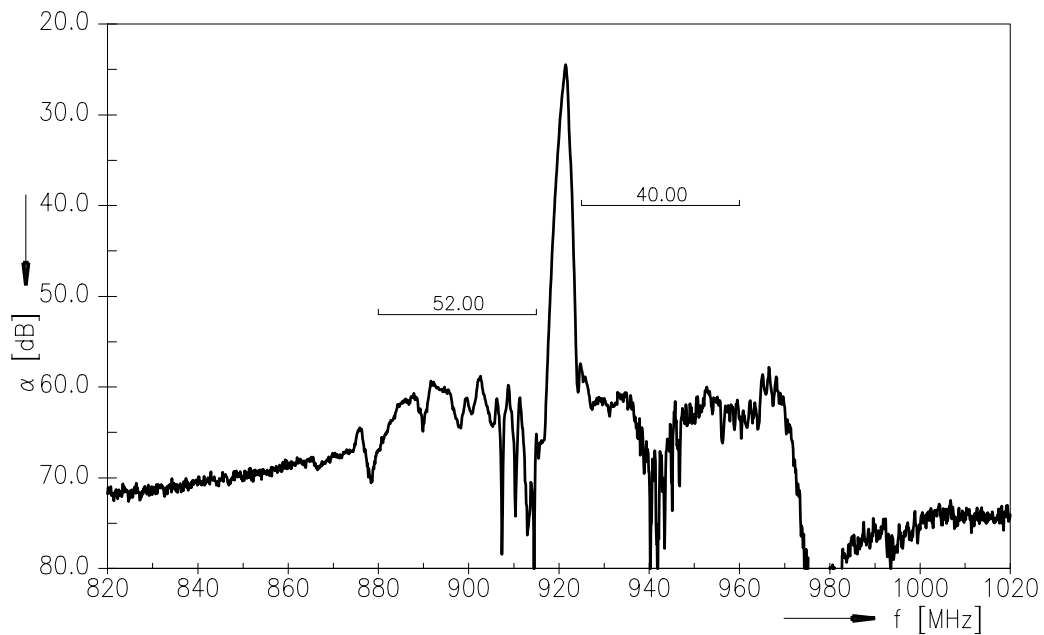




Frequency Response TX - RX (Power transfer function, differential mode)

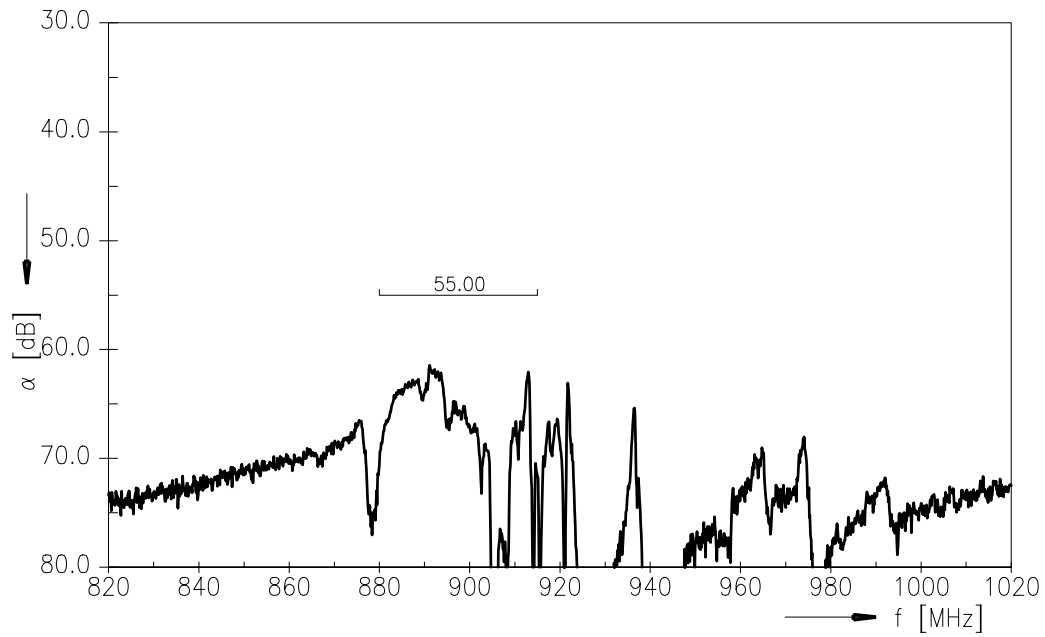


Frequency Response TX-RX (differential, CW signal , spec temperature range T=0°C to +85°C)



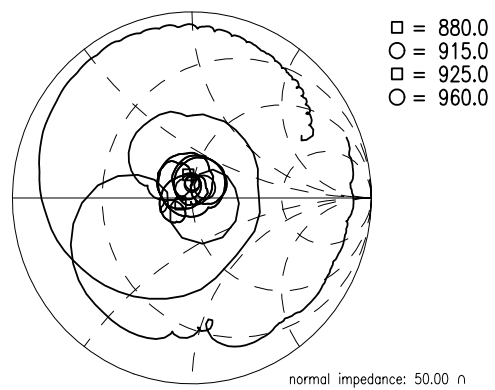
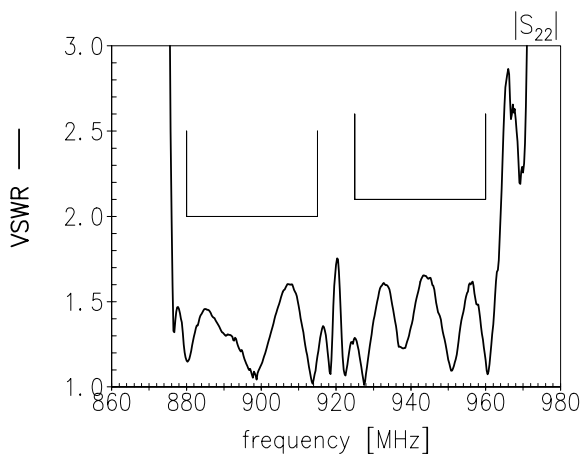
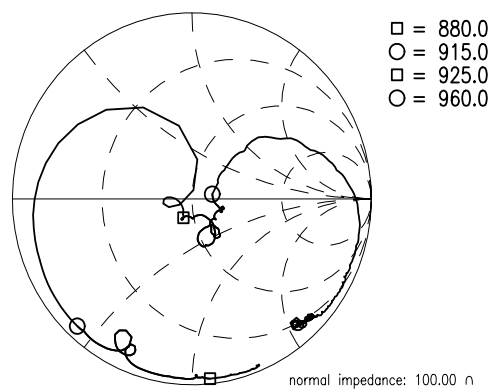
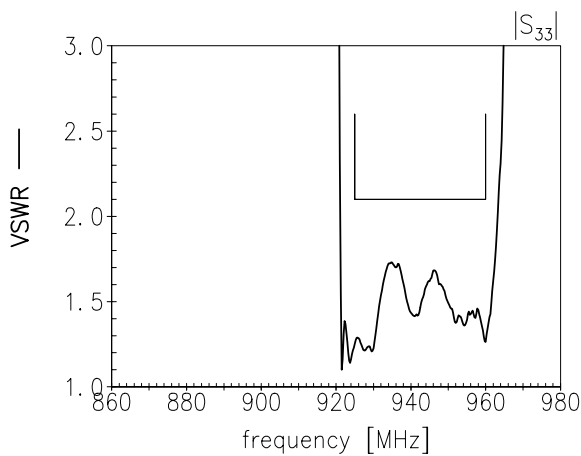
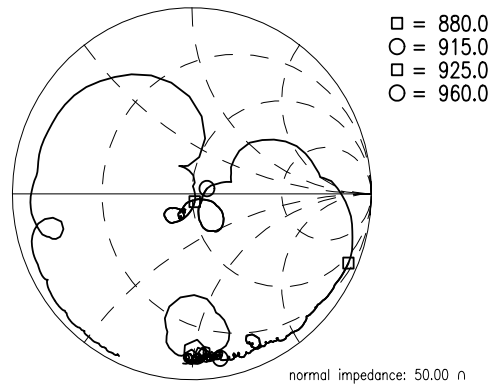
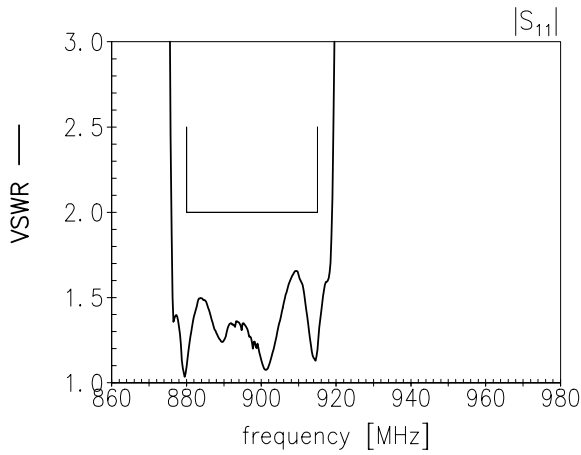


Frequency Response TX - RX (common mode, CW signal)





Matching (TX, RX, ANT)




References

Type	B8505
Ordering code	B39941B8505P810
Marking and package	C61157-A8-A79
Packaging	F61047-V8247-Z000
Date codes	L_1126
S-parameters	B8505_NB_UN.s4p, B8505_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

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