SAW Components

SAW Duplexer

Cellular / WCDMA Band V

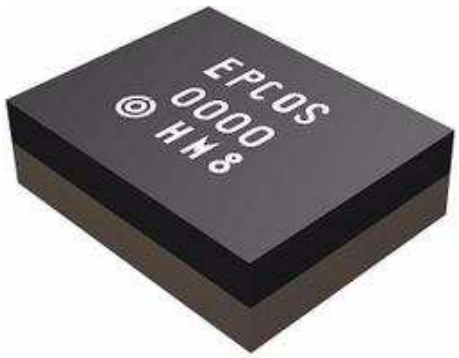
Series/type:	**B8568**
Ordering code:	**B39881B8568P810**
Date:	May 13, 2013
Version:	2.0

Preliminary Data

SMD

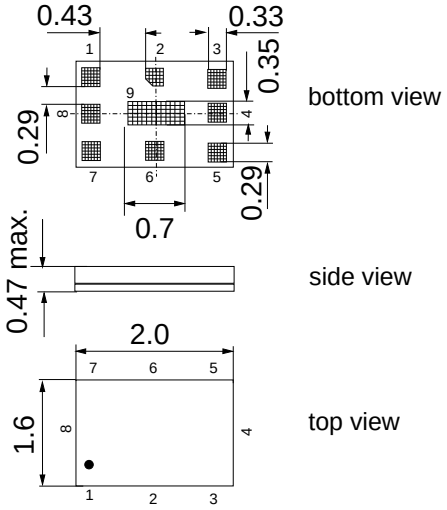
Application

- Multimode SAW duplexer for mobile telephone Cellular\WCDMA Band V, Band VI (830-840 MHz) and Band IXX (830-845 MHz) systems
- Low insertion attenuation
- Low amplitude ripple
- High Tx band isolation
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation 50Ω to 100Ω in Antenna - Rx path



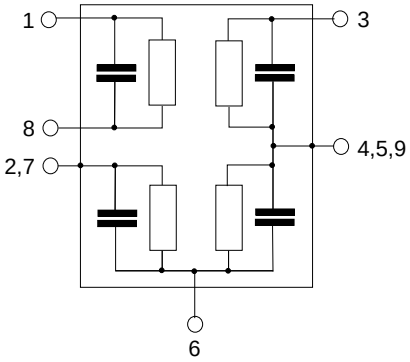
Features

- Component size 2.0 x 1.6 mm²
- Component height 0.47 mm max.
- RoHS compatible
- Approximate 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, 8	RX Output (balanced)
6	Antenna
2, 4, 5, 7, 9	To be grounded



Preliminary Data SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω ll 8.2 nH
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characteristics TX - ANT				min.	typ. @ 25 ˚C	max.	
Center frequency		f_C			836.5		MHz
Maximum insertion attenuation		α_{max}					
824.0 ... 849.0 MHz					1.4	2.4	dB
@$f_{Carrier}$ 826.4 ... 846.6 MHz		α_{WCDMA} 1)			1.2	2.1 2)	dB
Amplitude ripple		$\Delta\alpha$					
824.0 ... 849.0 MHz					0.6	1.6	dB
@$f_{Carrier}$ 826.4 ... 846.6 MHz		α_{WCDMA} 1)			0.4	1.3 2)	dB
Error Vector Magnitude							
@$f_{Carrier}$ 826.4 ... 846.6 MHz		EVM 3)			1.7	3.5 2)	%
Input VSWR (TX port)							
824.0 ... 849.0 MHz					1.4	2.1	
Output VSWR (ANT port)							
824.0 ... 849.0 MHz					1.4	2.1	

1) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (8).
2) Temperature range for this parameter is -20ºC to +85ºC.
3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω ll 8.2 nH
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characteristics TX - ANT					min.	typ. @ 25 ˚C	max.	
Absolute attenuation				α				
10.0	...	420.0	MHz		30	40		dB
420.0	...	494.0	MHz		35	37		dB
494.0	...	701.0	MHz		30	33		dB
701.0	...	728.0	MHz		30	33		dB
728.0	...	768.0	MHz		31	34		dB
768.0	...	804.0	MHz		28	31		dB
860.0	...	869.0	MHz		3	27		dB
869.0	...	894.0	MHz		45	51		dB
1565.42	...	1573.374	MHz		36	42		dB
1573.374	...	1577.466	MHz		36	42		dB
1577.466	...	1585.42	MHz		36	42		dB
1597.5515	...	1605.886	MHz		36	41		dB
1605.886	...	1610.0	MHz		36	41		dB
1638.0	...	1708.0	MHz		25	38		dB
1708.0	...	1743.0	MHz		25	38		dB
1844.9	...	1879.9	MHz		30	35		dB
1884.5	...	1919.6	MHz		30	35		dB
1930.0	...	1990.0	MHz		30	34		dB
2110.0	...	2170.0	MHz		28	32		dB
2400.0	...	2557.0	MHz		24	27		dB
2557.0	...	2592.0	MHz		23	29		dB
3286.0	...	3406.0	MHz		20	24		dB
4110.0	...	4255.0	MHz		18	21		dB
4934.0	...	5350.0	MHz		10	19		dB
5725.0	...	5953.0	MHz		10	17		dB

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω ll 8.2 nH
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characteristics ANT - RX				min.	typ. @ 25 ˚C	max.	
Center frequency		f_C			881.5		MHz
Maximum insertion attenuation		α_{max}					
869.0 ... 894.0	MHz				2.2	2.7	dB
@$f_{Carrier}$ 871.4 ... 891.6	MHz	α_{WCDMA} [1]			1.9	2.5 [2]	dB
Amplitude ripple (p-p)		$\Delta\alpha$					
869.0 ... 894.0	MHz				0.8	1.2	dB
@$f_{Carrier}$ 871.4 ... 891.6	MHz	α_{WCDMA} [1]			0.5	1.0 [2]	dB
Error Vector Magnitude							
@$f_{Carrier}$ 871.4 ... 891.6	MHz	EVM [3]			1.5	3.2 [2]	%
Input VSWR (ANT port)							
869.0 ... 894.0	MHz				1.8	2.1	
Output VSWR (RX port)							
869.0 ... 894.0	MHz				1.7	2.2	
Common mode rejection ratio							
869.0 ... 894.0	MHz	CMRR		23 [4]	32 [4]		dB

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (8).
[2] Temperature range for this parameter is -20ºC to +85ºC.
[3] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
[4] A combination of 10º phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

Preliminary Data SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω ll 8.2 nH
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characteristics ANT - RX					min.	typ. @ 25 ˚C	max.	
IMD product level limits[1)]								
at f_{TX} = 836.5 MHz f_{RX} = 881.5 MHz								
Blocker 1		45.0	MHz			-135	-110	dBm
Blocker 2		791.5	MHz			-103	-93	dBm
Blocker 3		1718.0	MHz			-109	-99	dBm
Blocker 4		2554.5	MHz			-116	-106	dBm
Attenuation				α				
10.0	...	447.0	MHz		45	85		dB
447.0	...	779.0	MHz		30	68		dB
779.0	...	784.0	MHz		45	67		dB
784.0	...	804.0	MHz		35	66		dB
804.0	...	824.0	MHz		30	64		dB
824.0	...	849.0	MHz		55	70		dB
849.0	...	854.0	MHz		10	61		dB
909.0	...	1000.0	MHz		15	19		dB
1000.0	...	1850.0	MHz		40	60		dB
1850.0	...	1920.0	MHz		40	60		dB
1920.0	...	2607.0	MHz		35	57		dB
2607.0	...	2682.0	MHz		50	56		dB
2682.0	...	6000.0	MHz		35	52		dB

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

Preliminary Data

SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω ll 8.2 nH
RX terminating impedance: Z_{RX} = 100 Ω (balanced)
TX terminating impedance: Z_{TX} = 50 Ω

Characteristics TX - RX					min.	typ. @ 25 ˚C	max.	
Isolation								
824.0	...	849.0	MHz		60	67		dB
869.0	...	894.0	MHz		50	54		dB
@$f_{Carrier}$ 871.4	...	891.6	MHz	α_{WCDMA} [1]	50 [2]	54		dB
1574.0	...	1577.0	MHz		40	72		dB
1638.0	...	1708.0	MHz		20	70		dB
2462.0	...	2557.0	MHz		20	63		dB
Common Mode Isolation								
824.0	...	849.0	MHz		55	63		dB

[1] Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (8).
[2] Temperature range for this parameter is -20ºC to +85ºC.

Maximum ratings

Storage temperature range	T_{stg}	–40/+85	°C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	250[1)]	V	human body model, 1 pulse
		300[2)]	V	charged device model, 3 pulses
		100[3)]	V	machine model, 10 pulses
Input power at	P_{IN}			source and load impedance 50 Ω
824.0 ... 849.0 MHz		29	dBm	} WCDMA UP wave
elsewhere		10	dBm	T = 55°C, 1000 h

1) acc. to JESD22-A114F (human body model), 1 negative & 1 positive pulse.
2) acc. to JESD22-C101E (charged device model), 3 negative & 3 positive pulses.
3) acc. to JESD22-A115C (machine model), 10 negative & 10 positive pulses.

Annotation for characteristics section

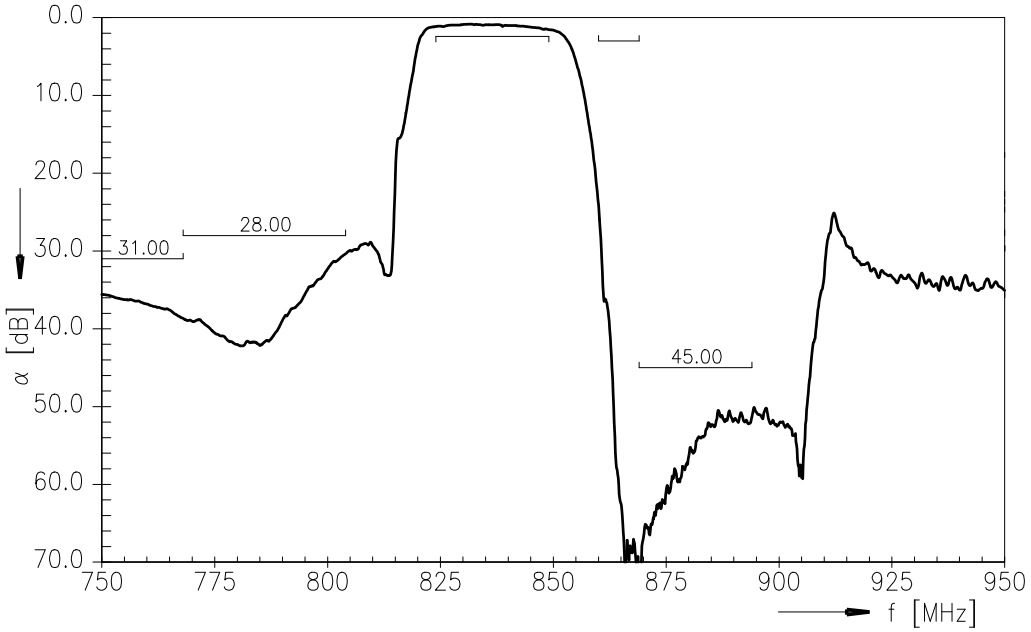
Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

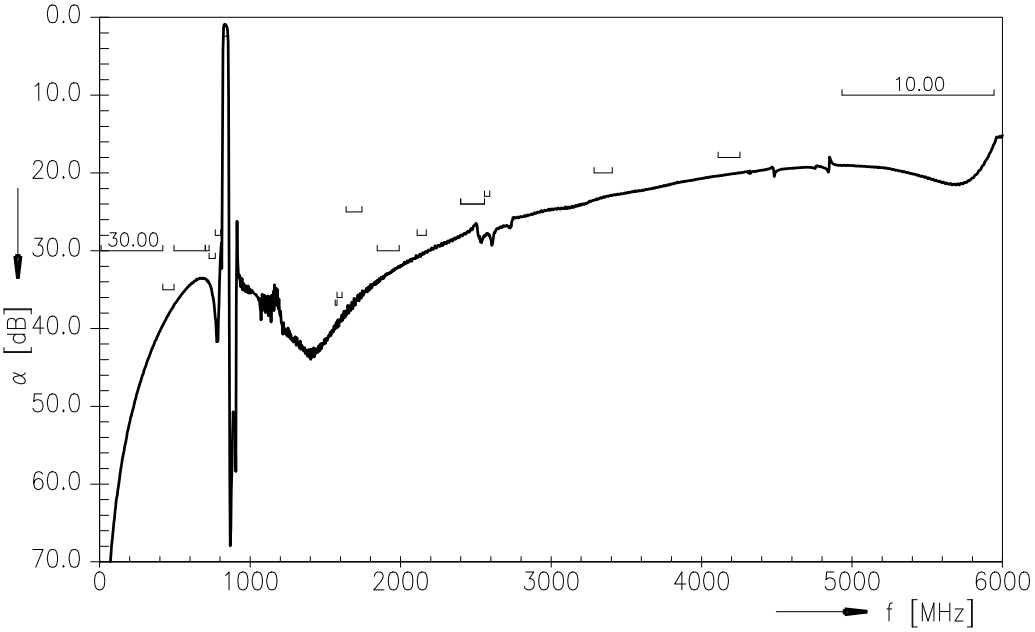
$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for WCDMA Band 5-Passband, $f_{Carrier}$ ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx channel)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

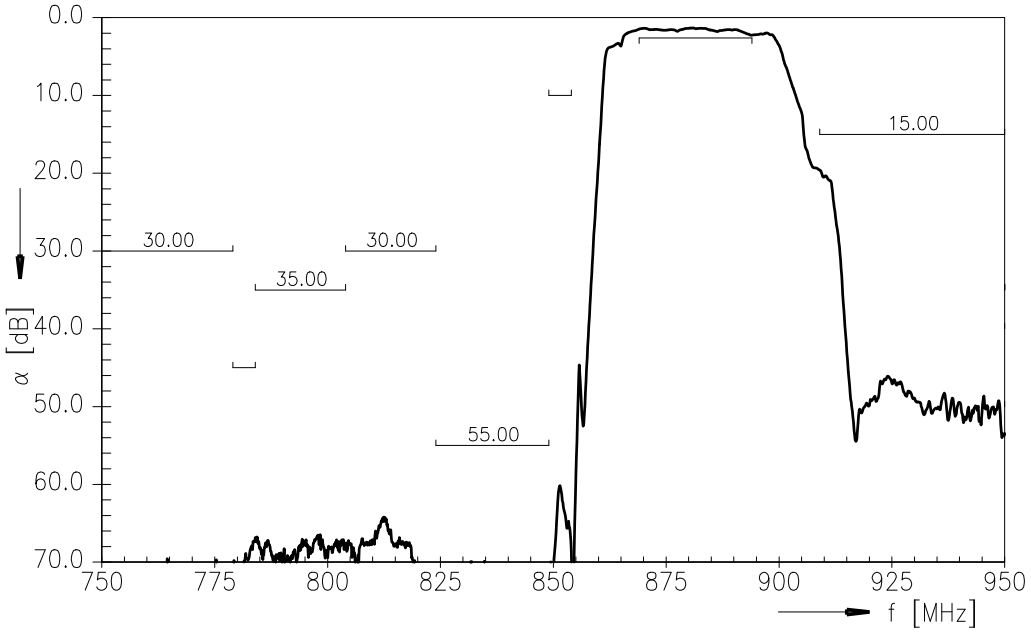
Frequency Response TX-ANT (Passband)



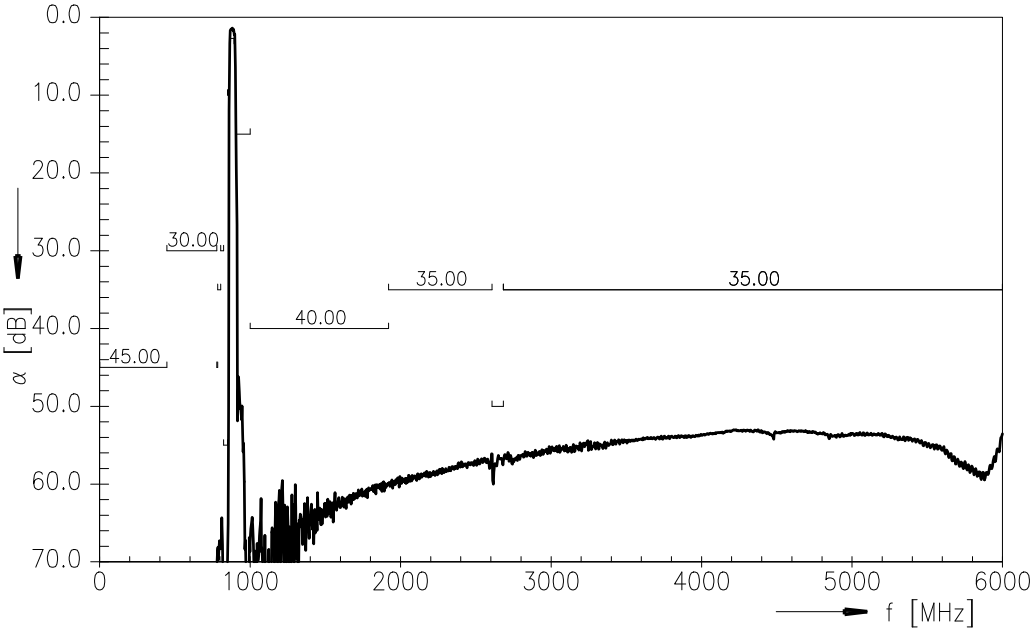
Frequency Response TX-ANT (Wideband)



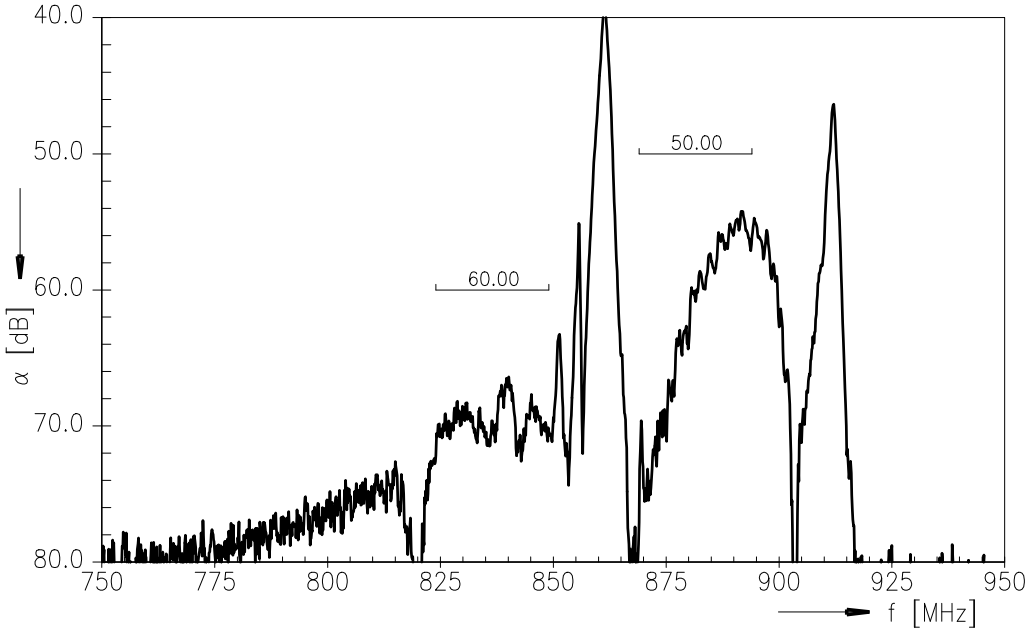
Frequency Response RX-ANT (Passband)



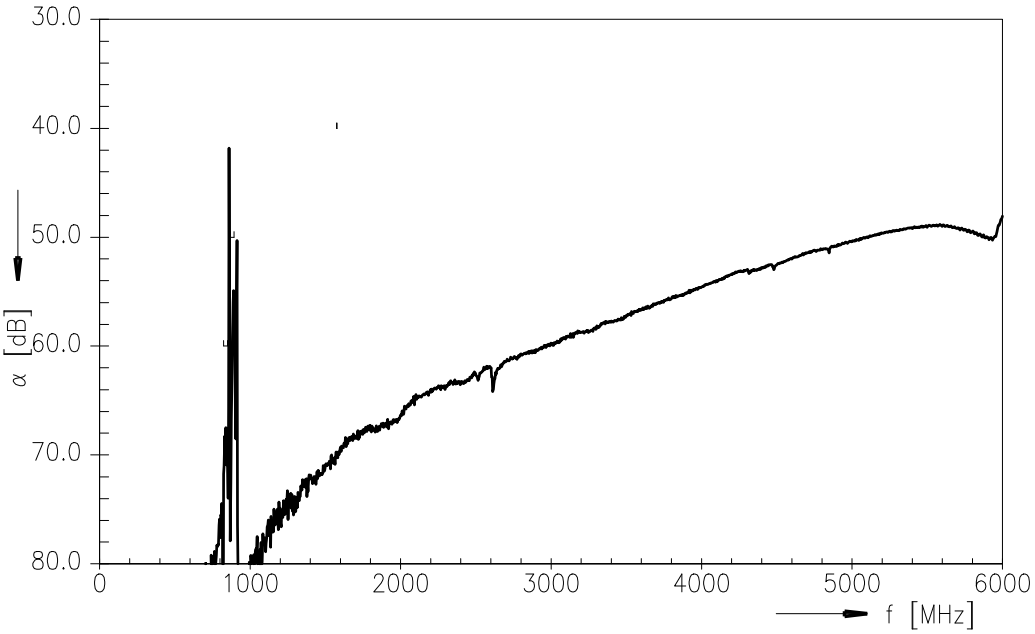
Frequency Response RX-ANT (Wideband)



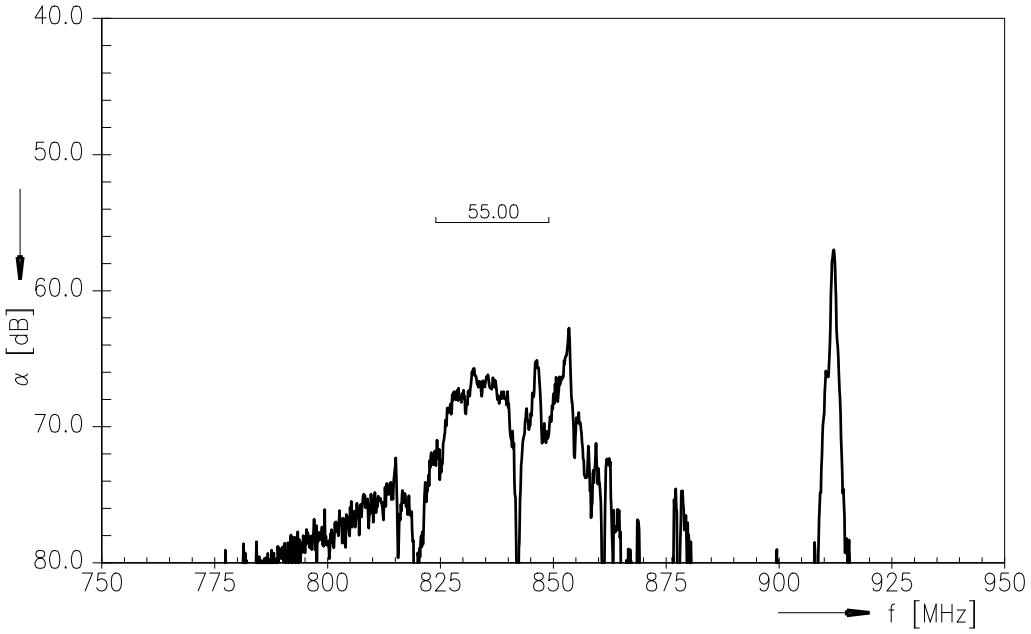
Frequency Response TX-RX (Passband Differential Mode Isolation)



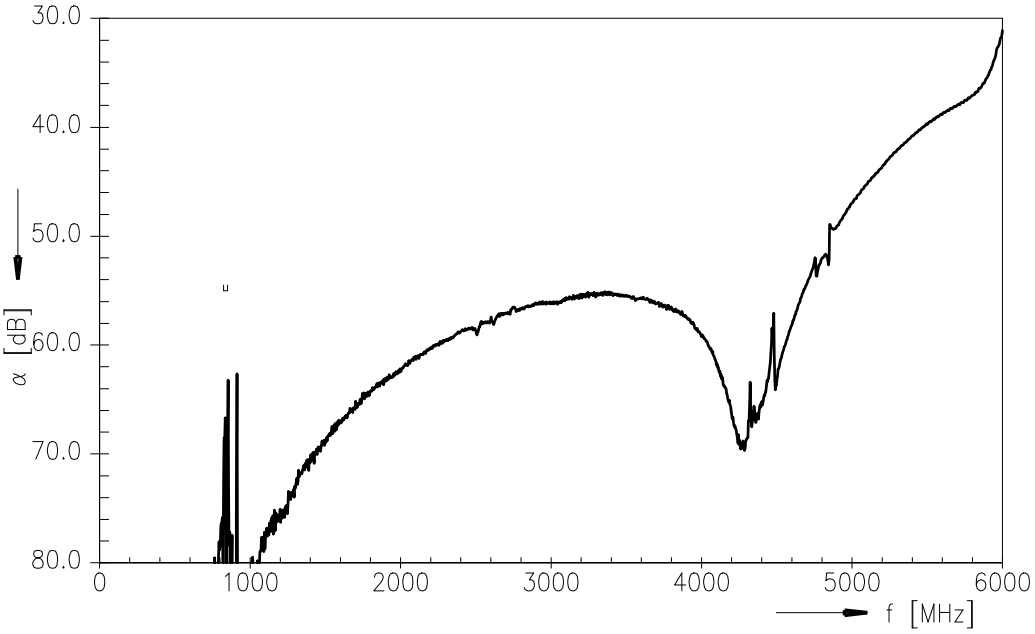
Frequency Response TX-RX (Wideband Differential Mode Isolation)



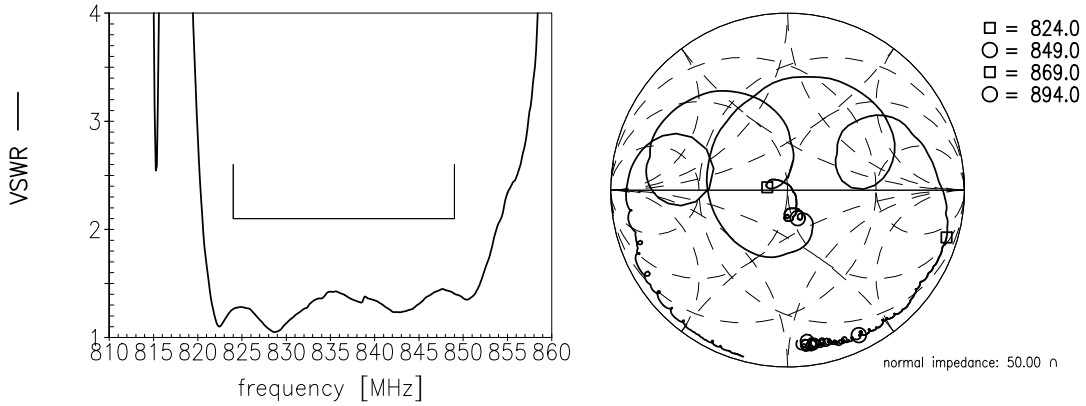
Frequency Response TX-RX (Passband Common Mode Isolation)

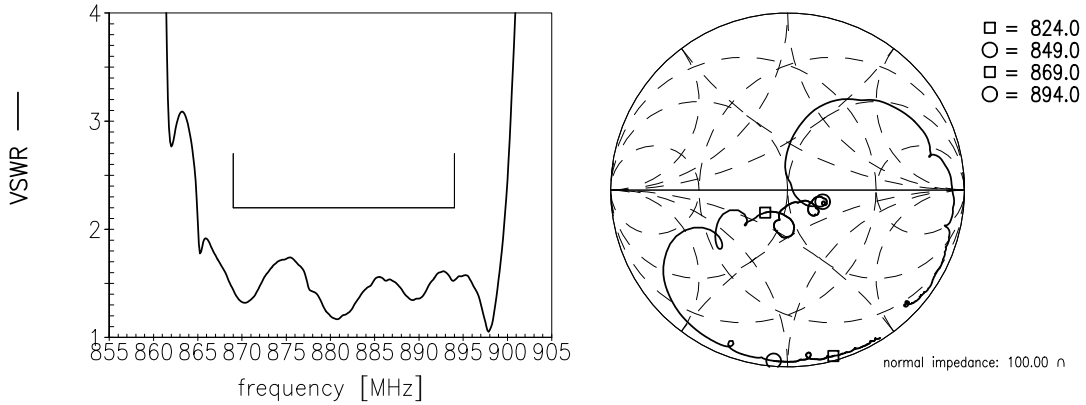


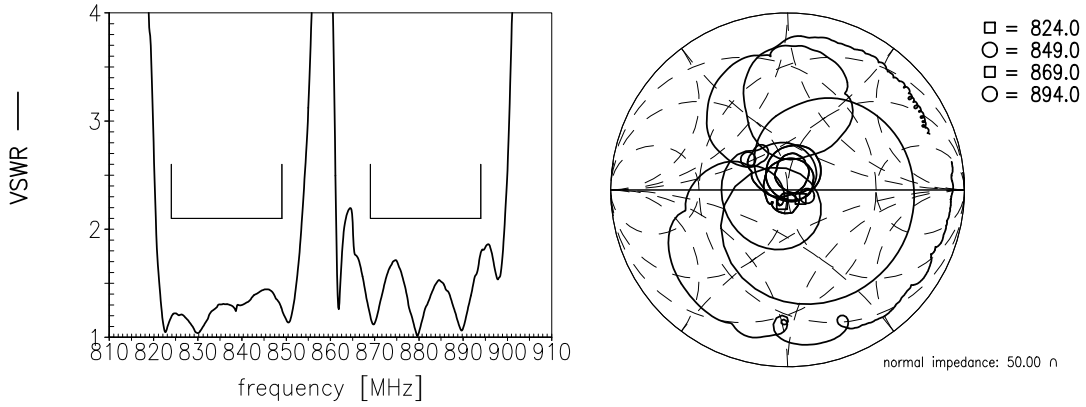
Frequency Response TX-RX (Wideband Common Mode Isolation)



Matching (TX, RX, ANT)







References

Type	B8568
Ordering code	B39881B8568P810
Marking and package	C61157-A8-A38
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B8568_UN_NB.s4p, B8568_UN_WB.s4p; see file header for pin/port assignments;
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.
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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