SAW Components

SAW Duplexer
Cellular / WCDMA Band V

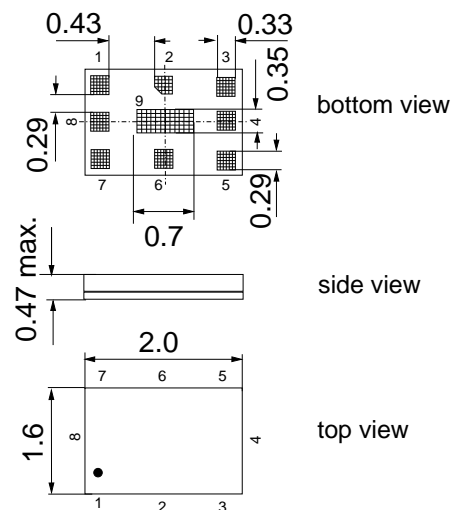|	
Series/type:	**B8568**
Ordering code:	**B39881B8568P810**
Date:	May 13, 2013
Version:	2.0

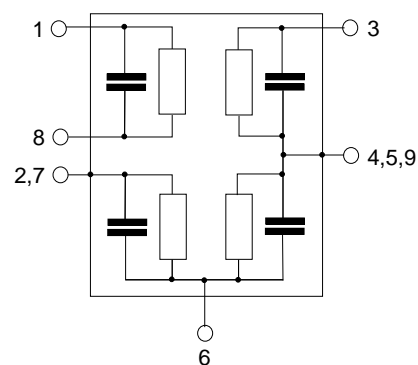## ⨂TDK

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
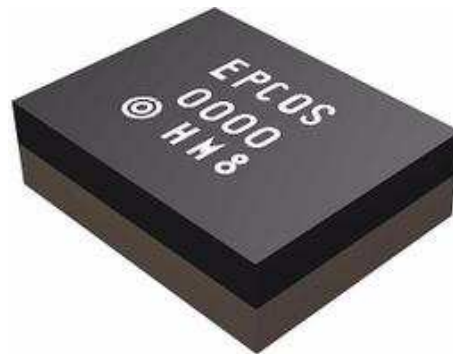
Features

■ Component size 2.0 x 1.6 mm^2
■ 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

bottom view

side view

top view

Pin configuration

■ 3   TX Input
■ 1, 8   RX Output (balanced)
■ 6   Antenna
■ 2, 4, 5, 7, 9   To be grounded

Please read *cautions and warnings and
important notes* at the end of this document.

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Characteristics

Temperature range for specification: T = $-30\,°C$ to $+85\,°C$
Antenna terminating impedance: Z_{ANT} = $50\,\Omega$ ‖ 8.2 nH
RX terminating impedance: Z_{RX} = $100\,\Omega$ (balanced)
TX terminating impedance: Z_{TX} = $50\,\Omega$

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.

SAW Components	**B8568**
SAW Duplexer	**836.50 / 881.50 MHz**

Preliminary Data   ᔕᗰᗪ

Characteristics

Temperature range for specification: T =   −30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}=   50 Ω ‖ 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

⚡TDK

Preliminary Data   SMD

Characteristics

Temperature range for specification: T = $-30\ ^{\circ}C$ to $+85\ ^{\circ}C$
Antenna terminating impedance: Z_{ANT} = $50\ \Omega$ ‖ 8.2 nH
RX terminating impedance: Z_{RX} = $100\ \Omega$ (balanced)
TX terminating impedance: Z_{TX} = $50\ \Omega$

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

SAW Components	**B8568**
SAW Duplexer	**836.50 / 881.50 MHz**

Preliminary Data   ᔕᗰᗪ

Characteristics

Temperature range for specification:	T =	−30 ˚C to +85 ˚C
Antenna terminating impedance:	Z_{ANT} =	50 Ω ‖ 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.

Please read *cautions and warnings and important notes* at the end of this document.

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SAW Components	**B8568**
SAW Duplexer	**836.50 / 881.50 MHz**

Preliminary Data   ☐☐☐☐

Characteristics

Temperature range for specification: T = −30 ˚C to +85 ˚C
Antenna terminating impedance: Z_{ANT}= 50 Ω ‖ 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.

Please read *cautions and warnings and important notes* at the end of this document.

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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

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

$f_{Carrier}$ 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:

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

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SAW Components	B8568
SAW Duplexer	**836.50 / 881.50 MHz**

Preliminary Data   SMD

Frequency Response TX-ANT (Passband)
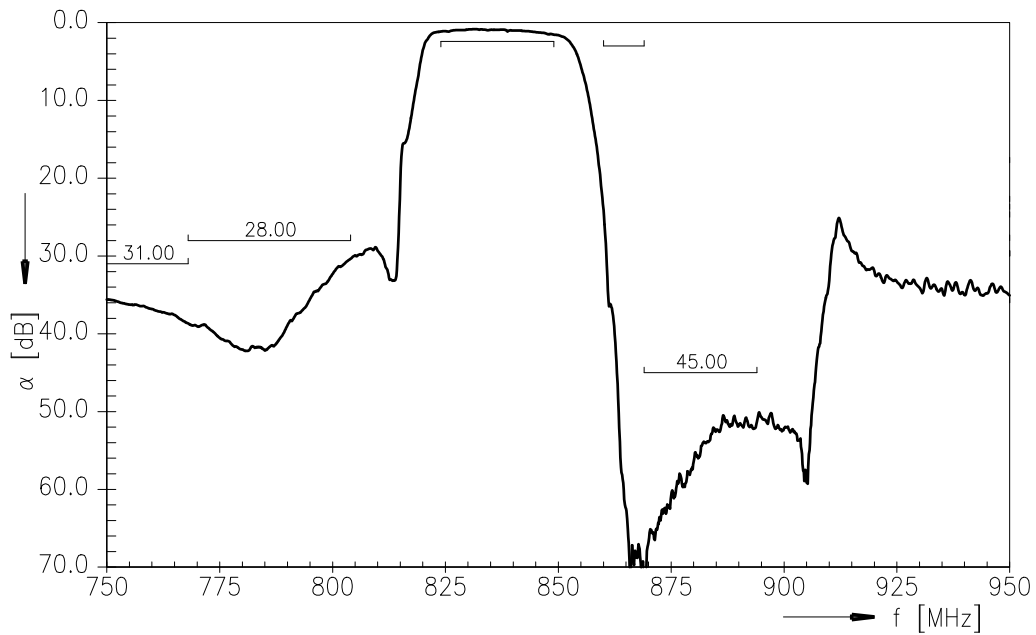
Frequency Response TX-ANT (Wideband)

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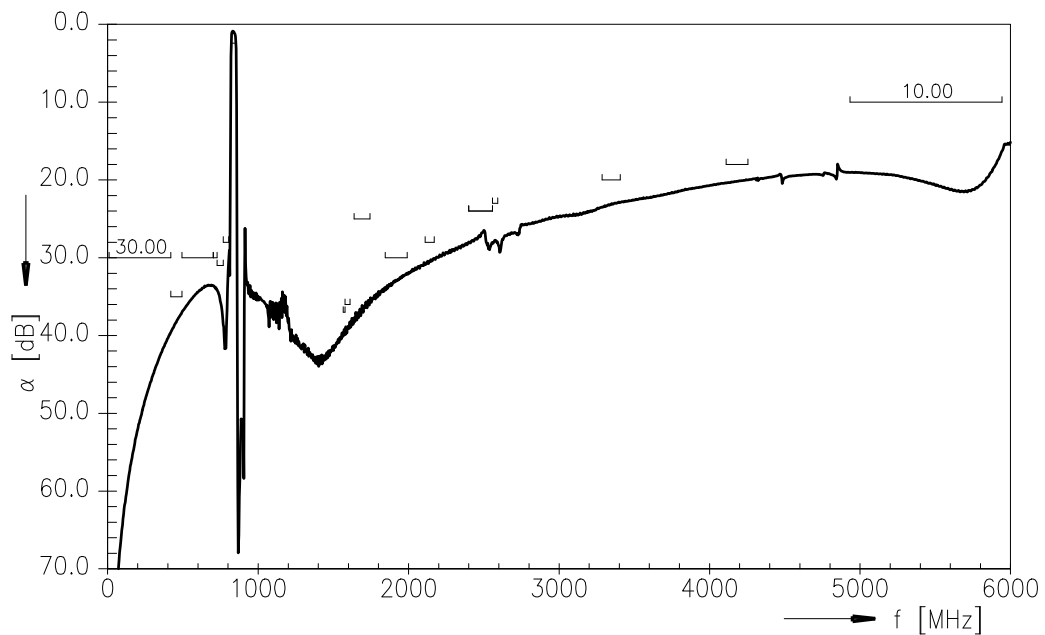
Frequency Response RX-ANT (Passband)
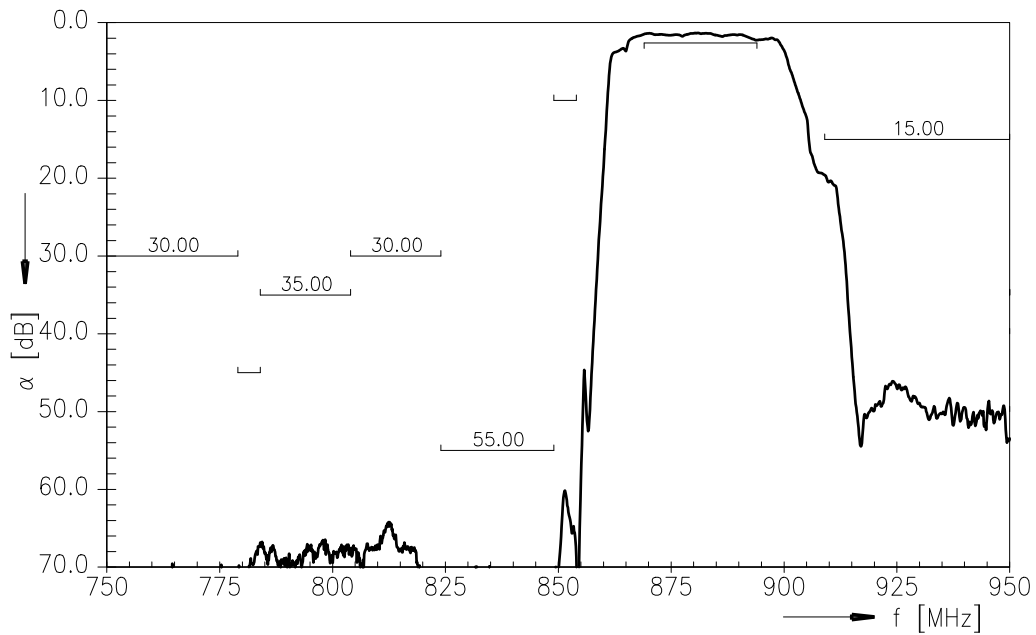
Frequency Response RX-ANT (Wideband)
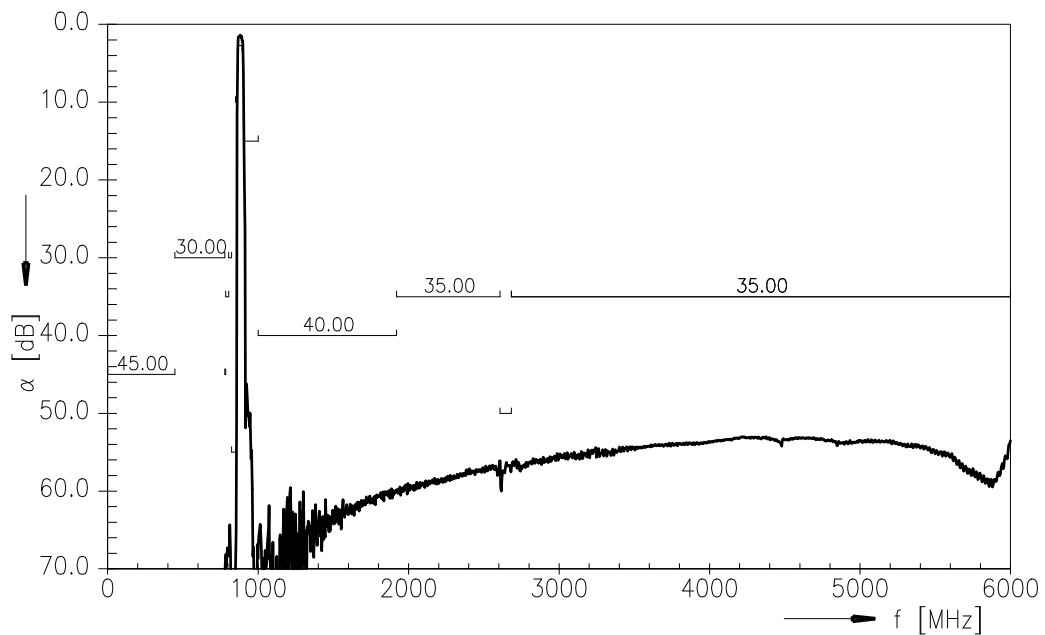
Frequency Response TX-RX (Passband Differential Mode Isolation)
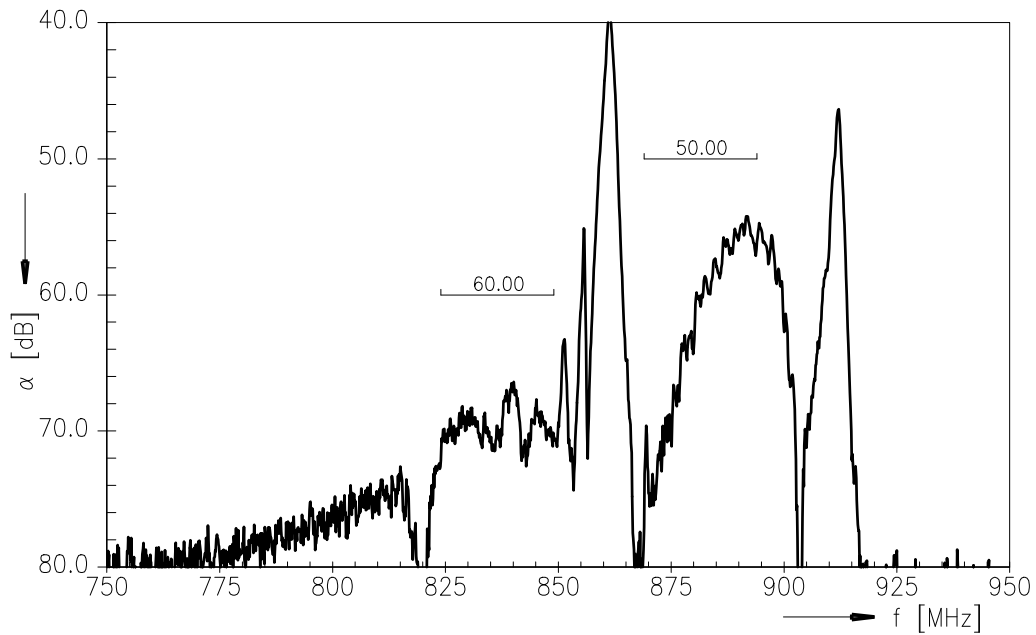
Frequency Response TX-RX (Wideband Differential Mode Isolation)

Frequency Response TX-RX (Passband Common Mode Isolation)
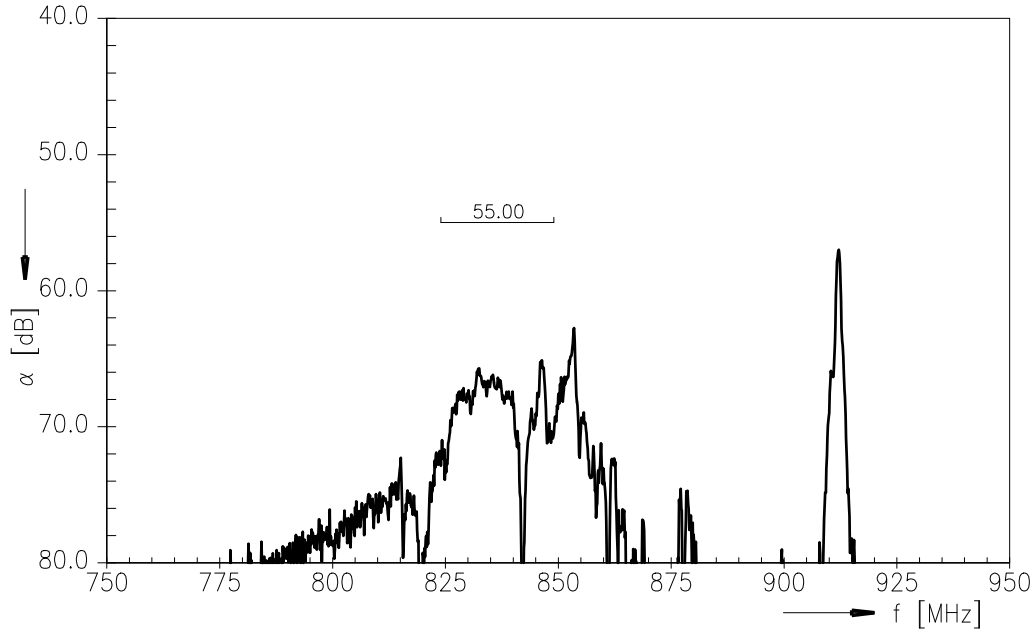
Frequency Response TX-RX (Wideband Common Mode Isolation)

Matching (TX, RX, ANT)
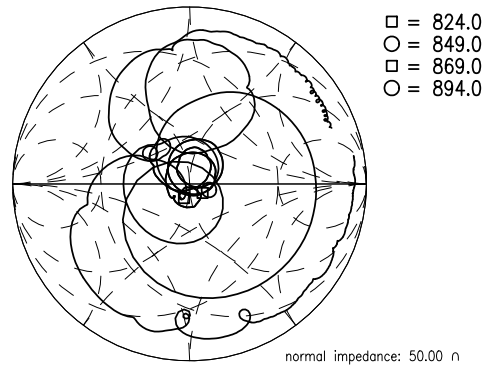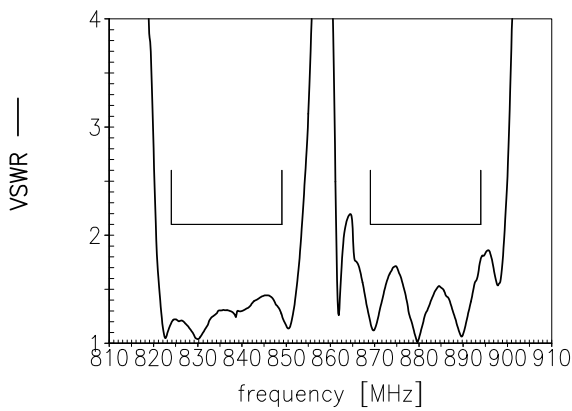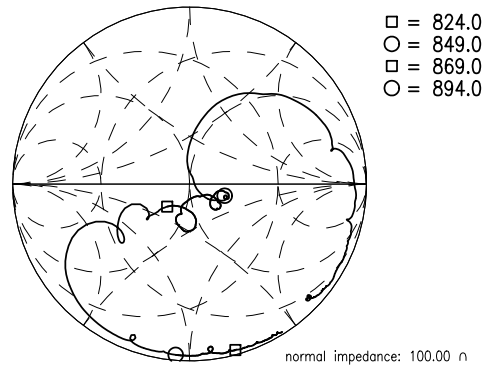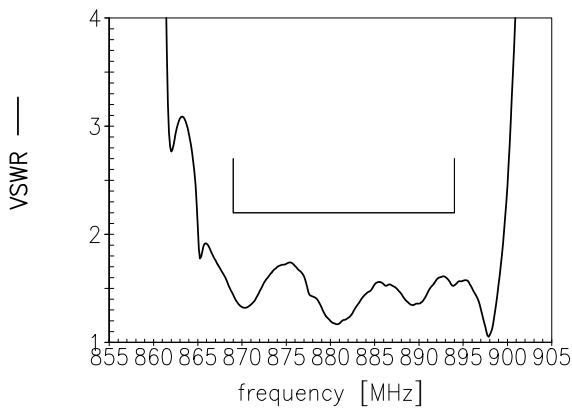

□ = 824.0
○ = 849.0
□ = 869.0
○ = 894.0

normal impedance: 50.00 Ω

□ = 824.0
○ = 849.0
□ = 869.0
○ = 894.0

normal impedance: 100.00 Ω

□ = 824.0
○ = 849.0
□ = 869.0
○ = 894.0

normal impedance: 50.00 Ω

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.

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	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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Published by EPCOS AG
Systems, Acoustics, Waves Business Group
P.O. Box 80 17 09, 81617 Munich, GERMANY

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