



SAW Components

SAW Duplexer

Cellular / WCDMA Band V

Series/type:	B8652
Ordering code:	B39881B8652P810
Date:	September 12, 2014
Version:	2.0

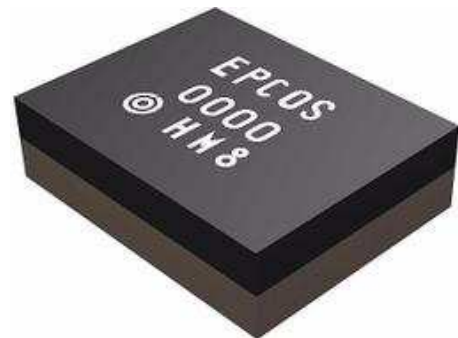
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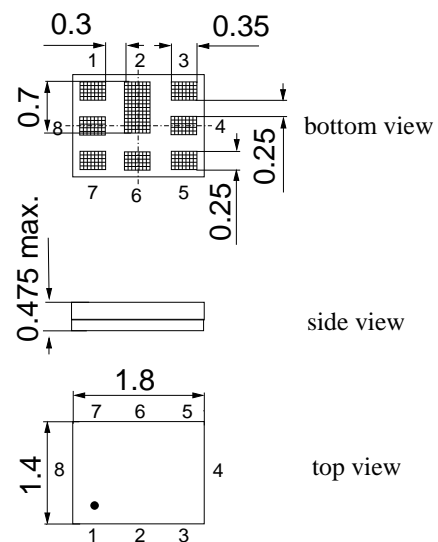
Data sheet

Application

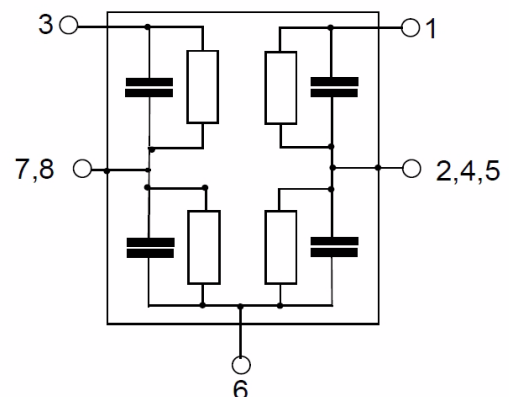
- Multimode SAW duplexer for mobile telephone Cellular / WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple


Features

- Package size 1.8 x 1.4 mm²
- Package height 0.475 mm
- RoHS compatible
- Approx. weight 0.0042g
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level 3**


Pin configuration

- 1 TX Input
- 3 RX Output
- 6 Antenna
- 2, 4, 5, 7,8 To be grounded



Data sheet

Characteristics

Temperature range for specification:	T = -30 °C to +90 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 8.2 nH
RX terminating impedance:	Z _{RX} = 50 Ω
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}	—	1.4	1.9	dB
824.0 ... 849.0 MHz		—	1.3	1.7	dB
824.59... 848.41MHz		—	1.3	1.5	dB
@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ¹⁾	—	0.5	1.1	dB
Amplitude ripple (p-p)	Δα	—	0.5	0.9	dB
824.0 ... 849.0 MHz		—	0.5	0.9	dB
@f _{Carrier} 826.4 ... 846.6 MHz	Δα _{WCDMA} ³⁾	—	0.4	1.0	dB
Amplitude ripple over any 5MHz channel	Δα _{ch}	—	0.4	1.0	dB
824.0 ... 849.0 MHz		—	1.6	2.5	%
Error Vector Magnitude	EVM ²⁾	—	1.6	2.0	
@f _{Carrier} 826.4 ... 846.6 MHz		—	1.6	2.0	
Input VSWR (TX port)		—	1.6	2.0	
824.0 ... 849.0 MHz		—	1.6	2.0	
Output VSWR (ANT port)		—	1.6	2.0	
824.0 ... 849.0 MHz		—	1.6	2.0	

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (8).

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

Data sheet

Characteristics

Temperature range for specification:	T = -30 °C to +90 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 8.2 nH
RX terminating impedance:	Z _{RX} = 50 Ω
TX terminating impedance:	Z _{TX} = 50 Ω

Characterisitcs TX - ANT				min.	typ. @ 25 °C	max.	
Absolute attenuation							
			α				
	10.0	... 420.0	MHz	35	43	—	dB
	420.0	... 494.0	MHz	35	40	—	dB
	494.0	... 701.0	MHz	32	35	—	dB
	701.0	... 728.0	MHz	32	35	—	dB
	728.0	... 764.0	MHz	32	35	—	dB
	764.0	... 804.0	MHz	30	37	—	dB
	860.0	... 864.0	MHz	3	10	—	dB
	864.0	... 869.0	MHz	14	24	—	dB
	869.0	... 894.0	MHz	44	50	—	dB
@f _{Carrier}	871.4	... 891.6	MHz α _{WCDMA} ¹⁾	45	52	—	dB
	1559.0	... 1563.0	MHz	39	42	—	dB
	1565.420	... 1573.374	MHz	39	42	—	dB
	1573.374	... 1577.466	MHz	39	42	—	dB
	1577.466	... 1585.420	MHz	39	42	—	dB
	1597.5515	... 1605.886	MHz	39	43	—	dB
	1638.0	... 1708.0	MHz	39	42	—	dB
	1844.9	... 1879.9	MHz	40	47	—	dB
	1884.5	... 1919.6	MHz	40	49	—	dB
	1930.0	... 1990.0	MHz	44	49	—	dB
	2110.0	... 2170.0	MHz	44	47	—	dB
	2400.0	... 2547.0	MHz	36	39	—	dB
	3286.0	... 3406.0	MHz	30	35	—	dB
	4110.0	... 4255.0	MHz	20	35	—	dB
	4900.0	... 5950.0	MHz	24	30	—	dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (8).

Data sheet

Characteristics

Temperature range for specification:	T = -30 °C to +90°C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 8.2 nH
RX terminating impedance:	Z _{RX} = 50 Ω
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		—	1.5	2.0	dB
@f _{Carrier} 871.4 ... 891.6 MHz	α _{WCDMA} ¹⁾	—	1.4	1.8	dB
Amplitude ripple (p-p)	Δα				
869.0 ... 894.0 MHz		—	0.3	0.9	dB
@f _{Carrier} 871.4 ... 891.6 MHz	Δα _{WCDMA} ³⁾	—	0.2	0.6	dB
Amplitude ripple over any 5MHz channel	Δα _{ch}				
869.0 ... 894.0 MHz		—	0.5	0.8	dB
Error Vector Magnitude	EVM ²⁾				
@f _{Carrier} 871.4 ... 891.6 MHz		—	1.5	2.5	%
Input VSWR (ANT port)					
869.0 ... 894.0 MHz		—	1.6	2.0	
Output VSWR (RX port)					
869.0 ... 894.0 MHz		—	1.6	2.0	
IMD product level limits³⁾					
at f_{TX}=836.5MHz, f_{RX}=881.5MHz					
Blocker 1	45.0 MHz	—	-128	-109	dBm
Blocker 2	791.5 MHz	—	-106	-96	dBm
Blocker 3	1718.0 MHz	—	-104	-94	dBm
Blocker 4	2554.5 MHz	—	-110	-100	dBm

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (8).

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

³⁾ IMD product level limits for power levels P_{TX}=21.5 dBm (antenna port output power) and P_{Blocker}=-15dBm (antenna port input power).

Data sheet

Characteristics

Temperature range for specification:	T = -30 °C to +90 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 8.2 nH
RX terminating impedance:	Z _{RX} = 50 Ω
TX terminating impedance:	Z _{TX} = 50 Ω

Characteristics ANT - RX				min.	typ. @ 25 °C	max.	
Attenuation			α				
	10.0	...	477.0 MHz	50	65	—	dB
			45.0 MHz	50	100	—	dB
	477.0	...	824.0 MHz	50	59	—	dB
	779.0	...	804.0 MHz	50	68	—	dB
	824.0	...	849.0 MHz	45	60	—	dB
@f _{Carrier}	826.4	...	846.6 MHz	51	61	—	dB
	849.0	...	854.0 MHz	30	34	—	dB
	909.0	...	920.0 MHz	10	18	—	dB
	920.0	...	979.0 MHz	25	29	—	dB
	979.0	...	1710.0 MHz	45	51	—	dB
	1693.0	...	1743.0 MHz	45	53	—	dB
	1710.0	...	1785.0 MHz	50	53	—	dB
	1785.0	...	1788.0 MHz	45	53	—	dB
	1850.0	...	1920.0 MHz	45	52	—	dB
	1920.0	...	1980.0 MHz	45	52	—	dB
	1980.0	...	2400.0 MHz	40	49	—	dB
	2400.0	...	2500.0 MHz	40	49	—	dB
	2517.0	...	2592.0 MHz	40	47	—	dB
	2607.0	...	2682.0 MHz	40	48	—	dB
	3476.0	...	3576.0 MHz	40	47	—	dB
	4345.0	...	4470.0 MHz	40	49	—	dB
	4900.0	...	5950.0 MHz	40	52	—	dB
	5214.0	...	5364.0 MHz	40	57	—	dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (8).

Data sheet

Characteristics

Temperature range for specification:	T = -30 °C to +90 °C
Antenna terminating impedance:	Z _{ANT} = 50 Ω 8.2 nH
RX terminating impedance:	Z _{RX} = 50 Ω
TX terminating impedance:	Z _{TX} = 50 Ω

Characterisitcs TX - RX		min.	typ. @ 25 °C	max.		
Isolation	824.0 ... 849.0 MHz	α	55	60	—	dB
	824.59... 848.41MHz		57	60	—	dB
	@f _{Carrier} 826.4 ... 846.6 MHz	α _{WCDMA} ¹⁾	57	63	—	dB
	869.0 ... 894.0 MHz		52	54	—	dB
	@f _{Carrier} 871.4 ... 891.6 MHz	α _{WCDMA} ³⁾	52	55	—	dB
	1574.0 ... 1577.0 MHz		40	59	—	dB
	1638.0 ... 1708.0 MHz		20	58	—	dB
	2462.0 ... 2557.0 MHz		20	53	—	dB

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (8).

Annotation for characteristics section

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

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

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

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

Maximum ratings

Storage temperature range	T_{stg}	-40/+85	°C	Machine Model source and load impedance 50 Ω } continuous wave } $T = 50^\circ\text{C}, 3000\text{ h}$
DC voltage	V_{DC}	5 ¹⁾	V	
ESD voltage	V_{ESD}	100 ²⁾	V	
Input power	P_{IN}			
824.0 ... 849.0 MHz elsewhere		29 10	dBm dBm	

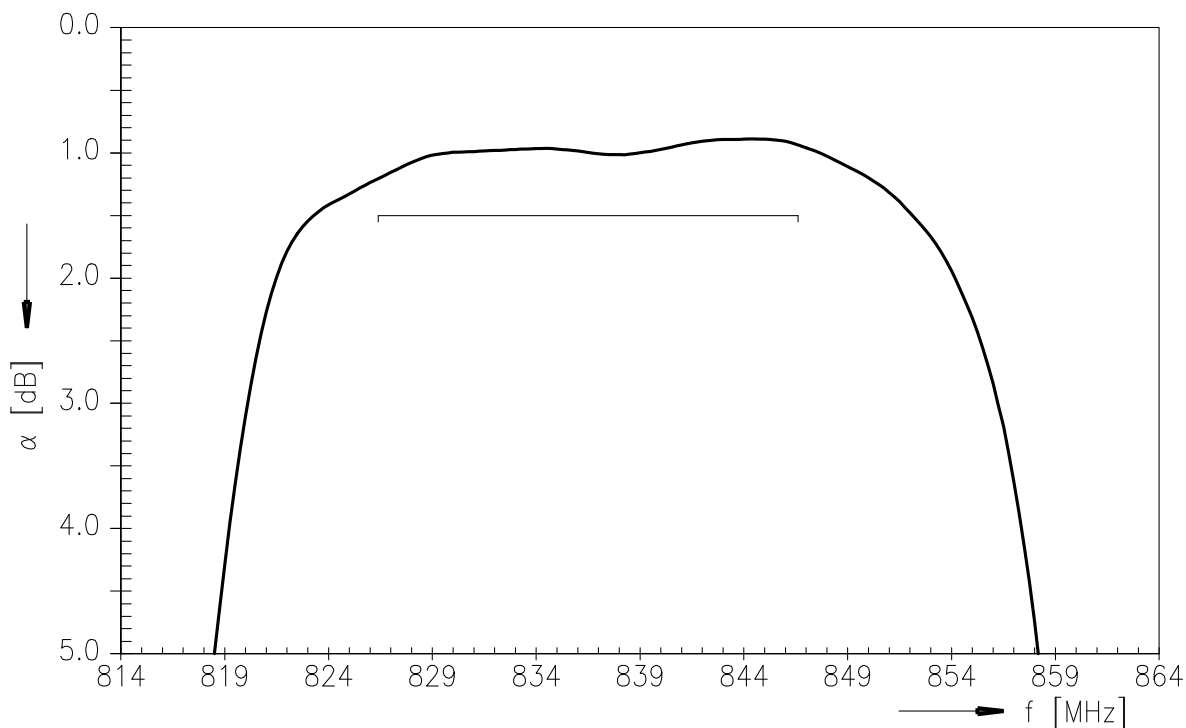
¹⁾ 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy

²⁾ acc. to JESD22-A115B (MM - Machine Model), 10 negative and 10 positive pulses.

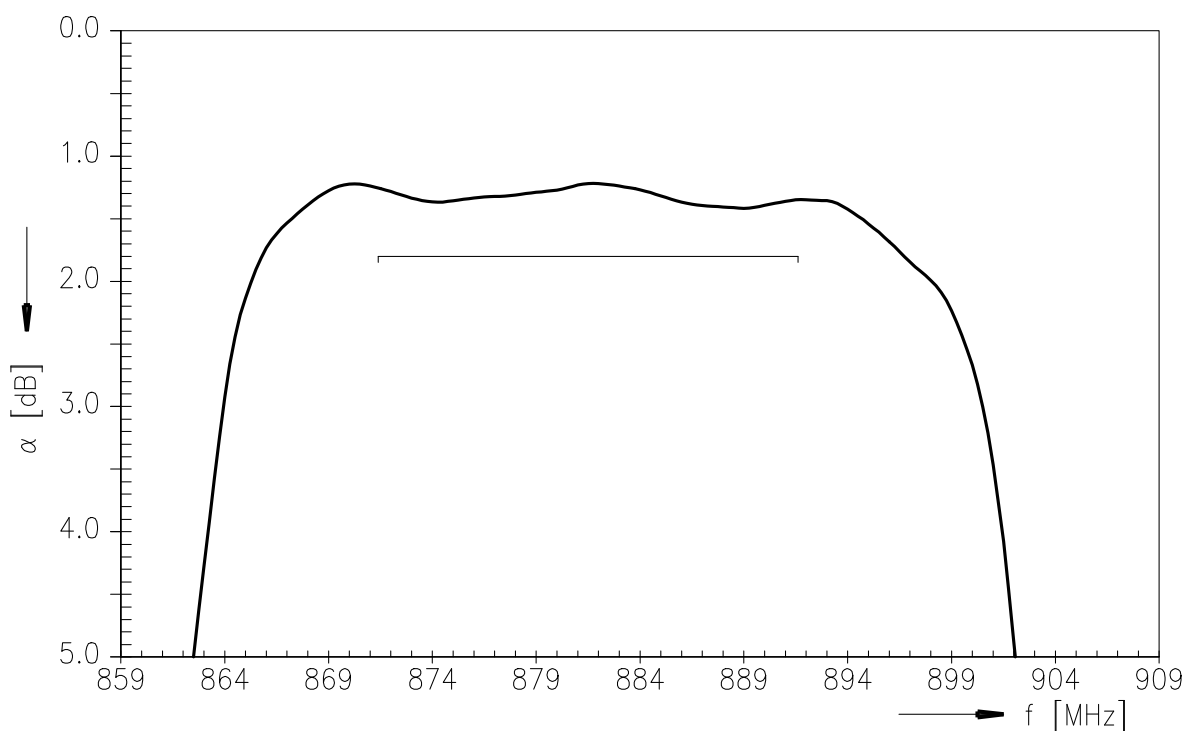
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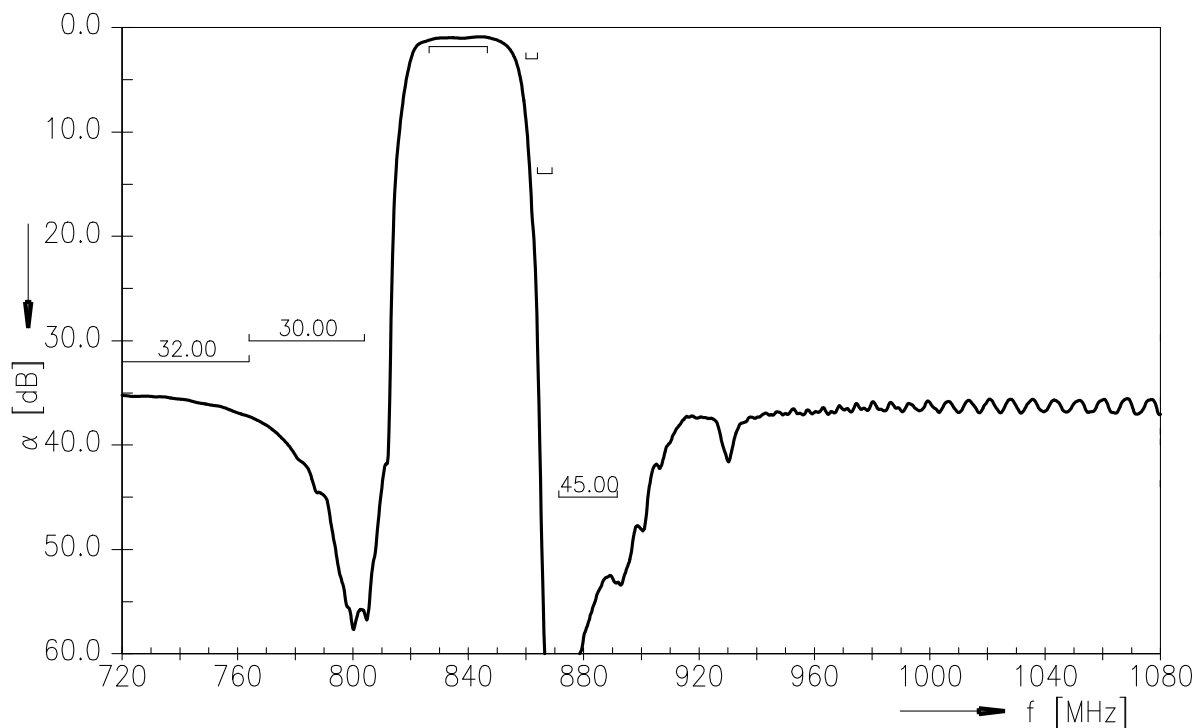
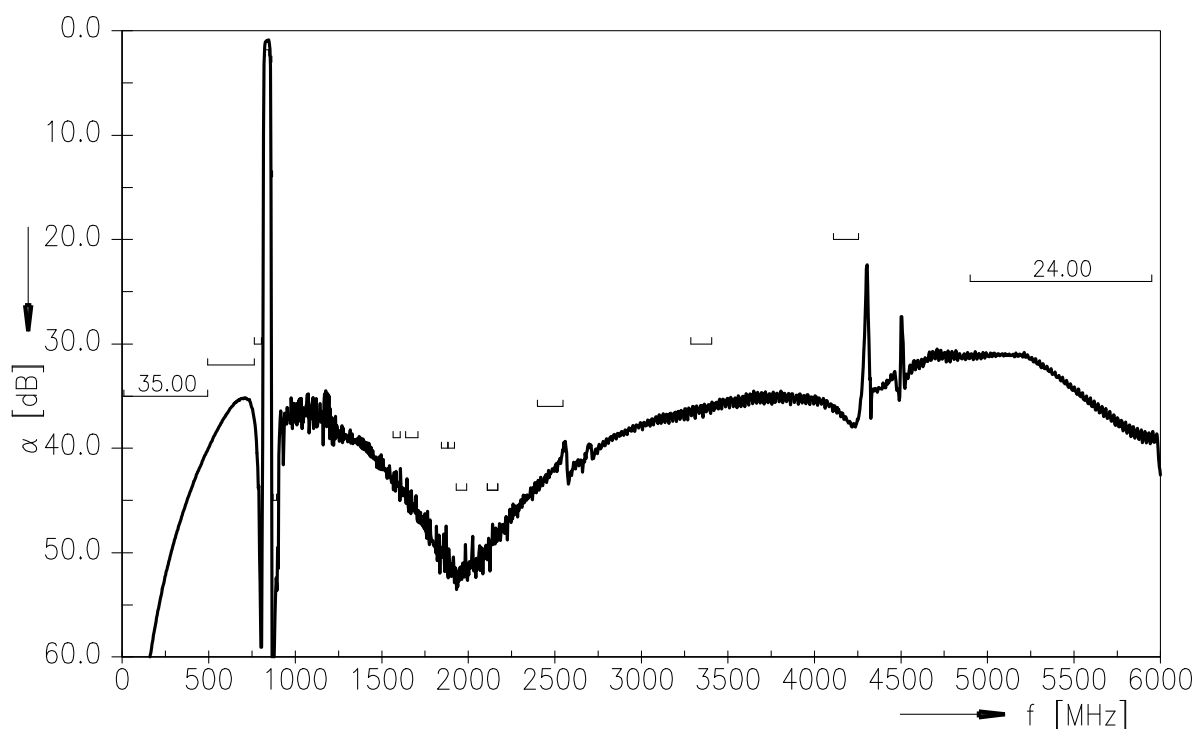
Frequency Response TX-ANT (Power transfer function)



Frequency Response RX-ANT (Power transfer function)



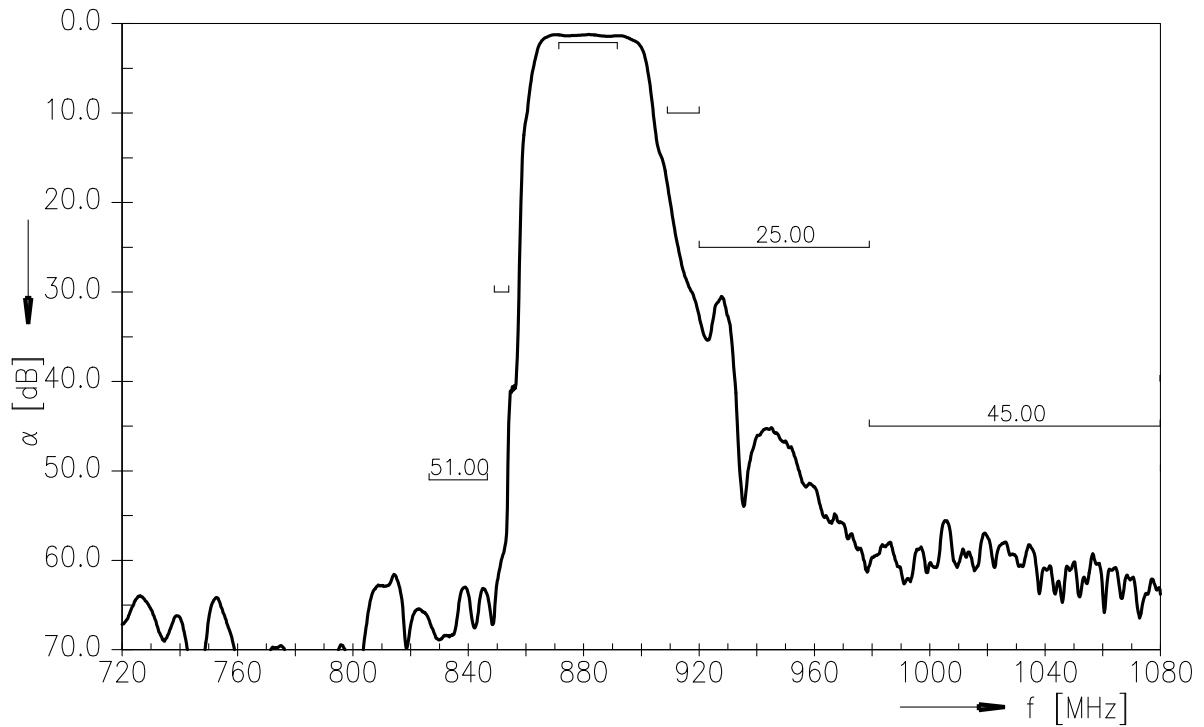
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Frequency Response TX-ANT (Power transfer function)

Frequency Response TX-ANT (wideband)


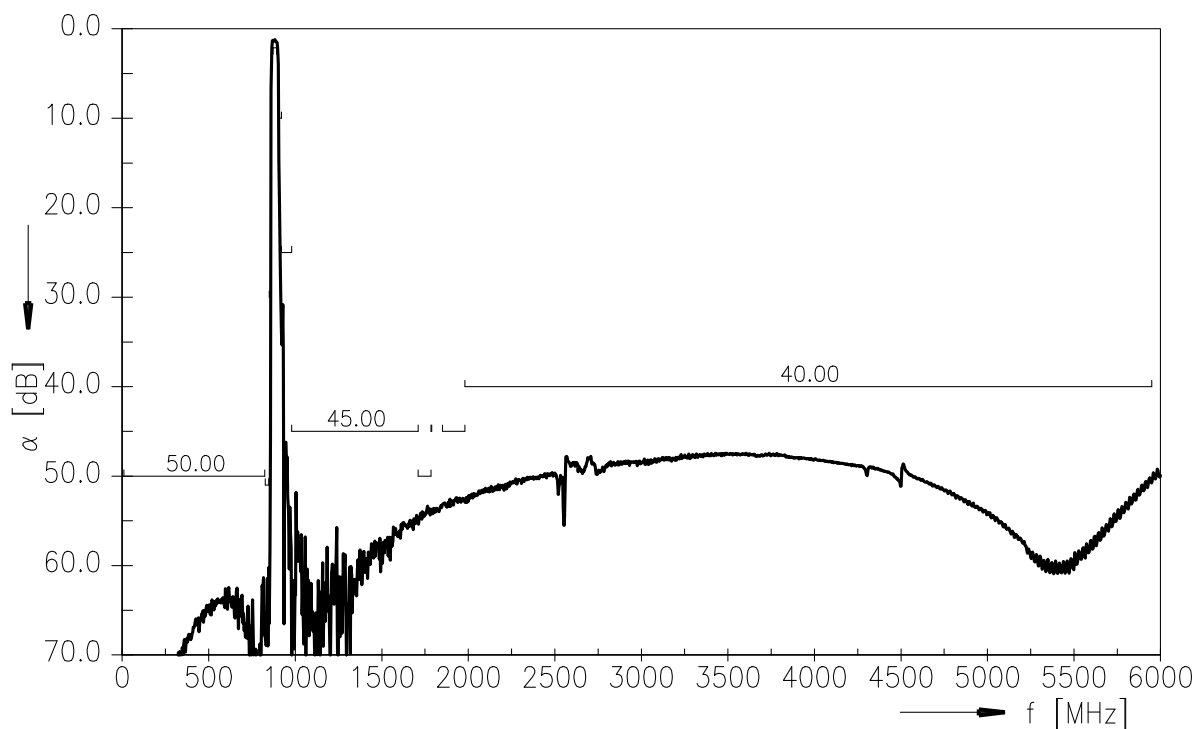
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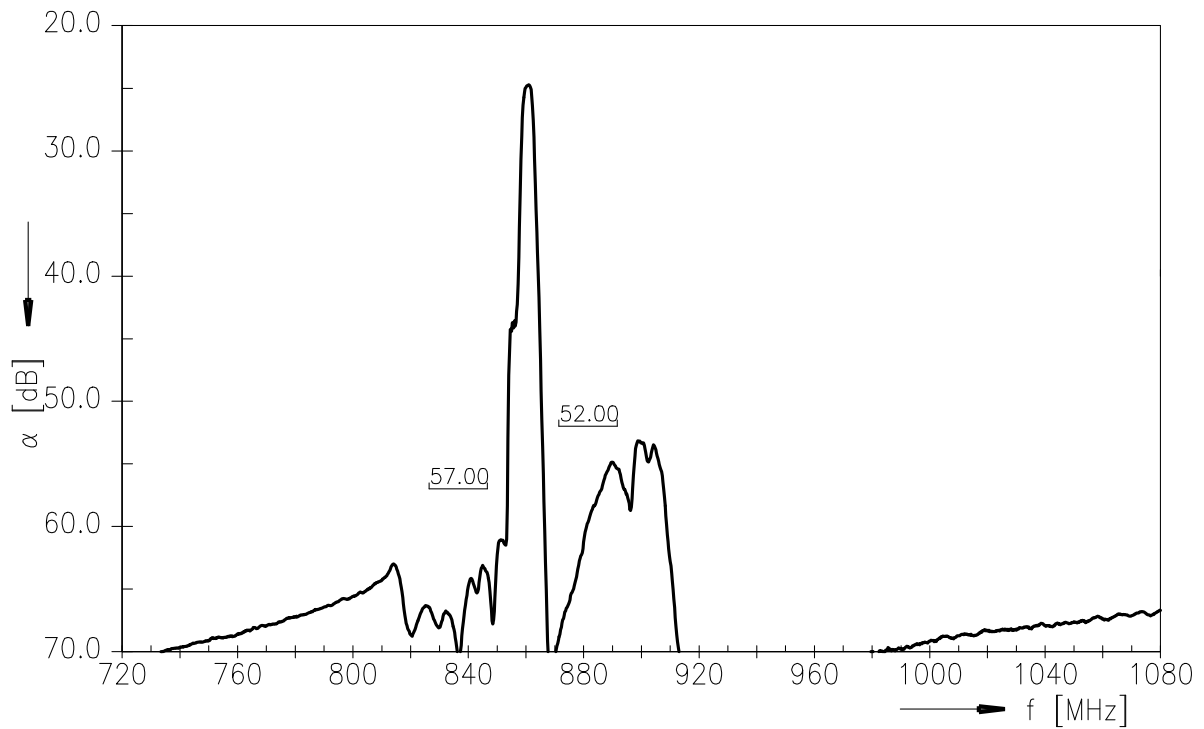
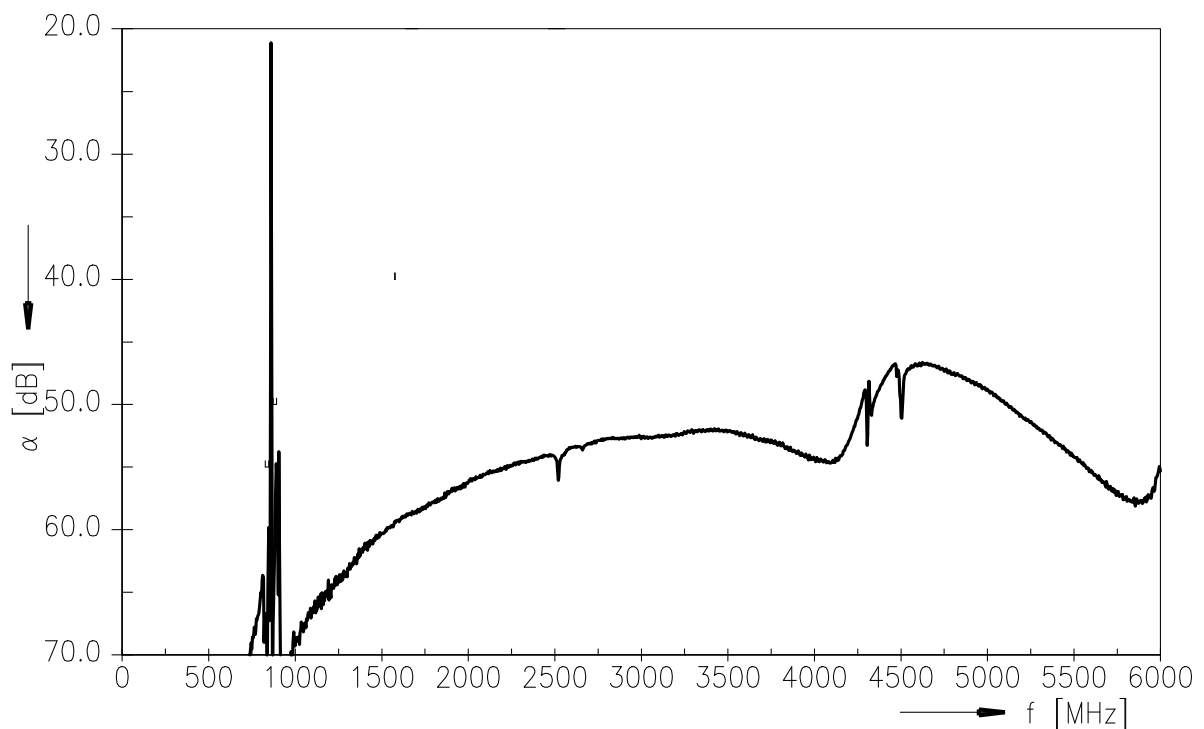
Frequency Response RX-ANT (Power transfer function)



Frequency Response RX-ANT (wideband)



Data sheet


Frequency Response TX-RX (Power transfer function)

Frequency Response TX-RX (wideband)


Data sheet

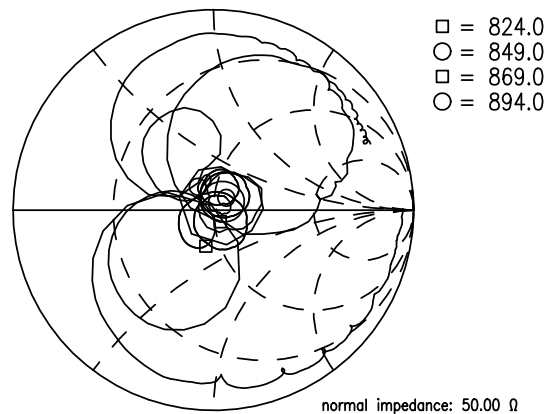
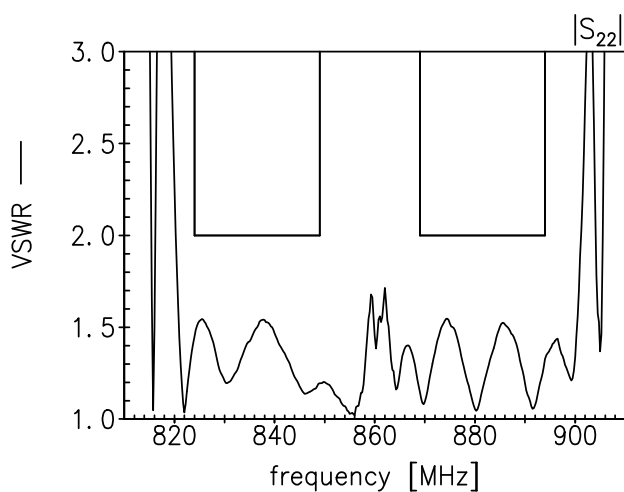
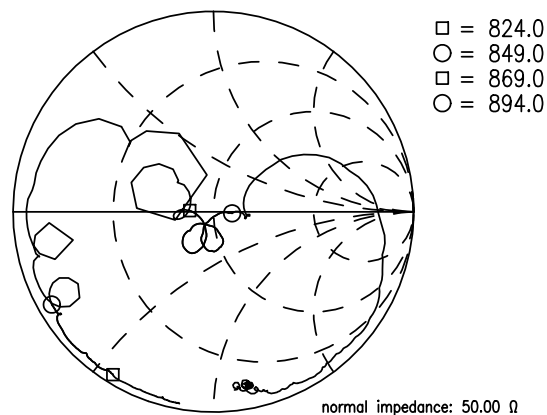
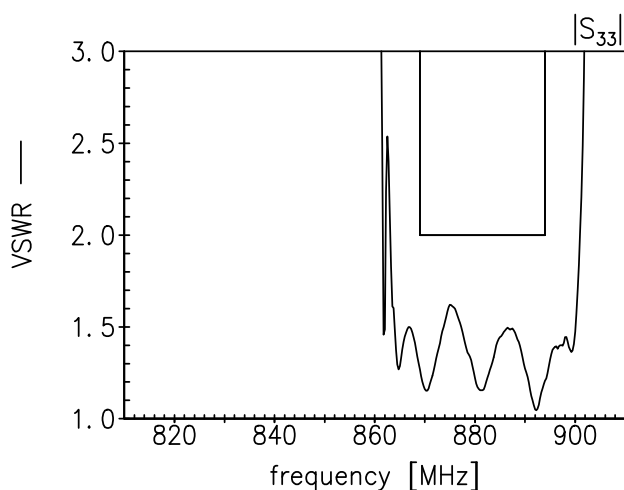
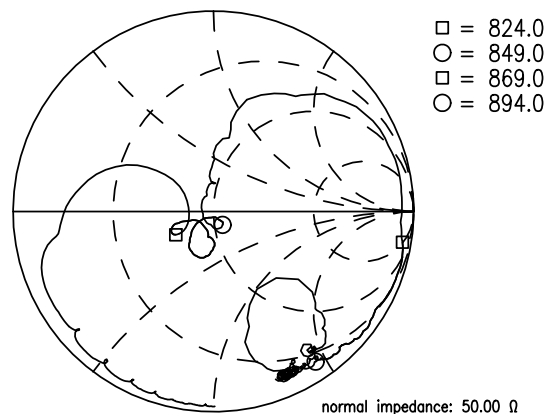
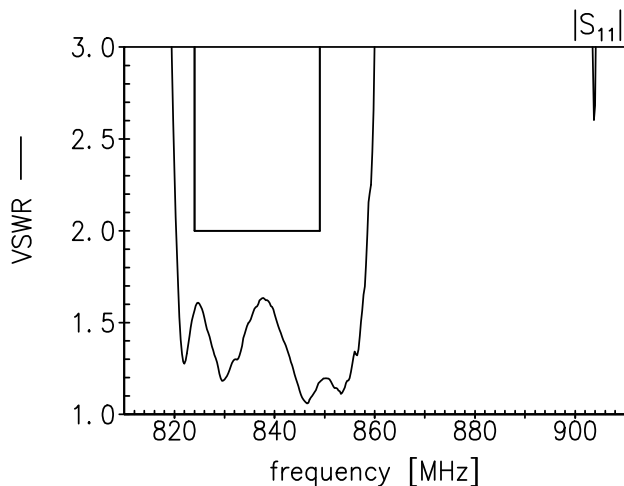


Return Loss

S_{11} TX- port

S_{22} ANT-port

S_{33} RX-port



Data sheet



References

Type	B8652
Ordering code	B39881B8652P810
Marking and package	C61157-A8-A68
Packaging	F61074-V8259-Z000
Date codes	L_1126
S-parameters	B8652_NB_UN.s3p, B8652_WB_UN.s3p 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 8 th , 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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Published by EPCOS AG
Systems, Acoustics, Waves Business Group
P.O. Box 80 17 09, 81617 Munich, GERMANY

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