



SAW Components

Wireless LAN / Bluetooth Filters (IF)

Series/Type: B7-) -

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product	Date of Withdrawal	Deadline Last Orders	Last Shipments
B39212B7959P810	B39212B8563P810	2012-12-21	2013-12-31	2014-02-28

For further information please contact your nearest EPCOS sales office, which will also support you in selecting a suitable substitute. The addresses of our worldwide sales network are presented at www.epcos.com/sales.

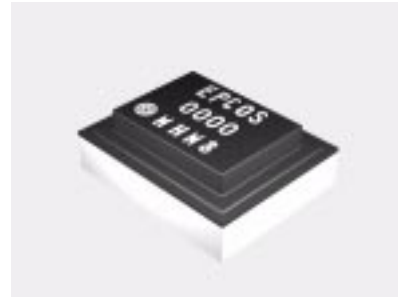
© EPCOS AG 2015. Reproduction, publication and dissemination of this publication, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.

EPCOS AG is a TDK Group Company.

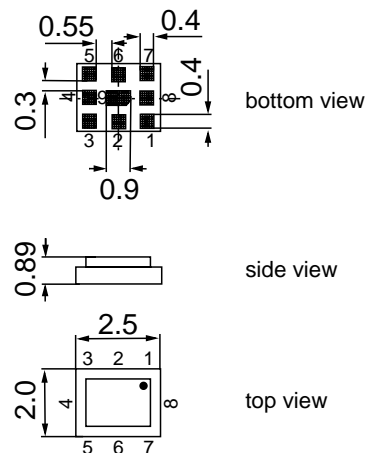
Data sheet

Application

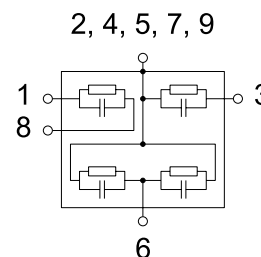
- Low-loss SAW duplexer for mobile telephone W-CDMA Band 4 (UMTS) / CDMA 1x AWS systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 45 MHz
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path
- High isolation between Tx and Rx


Features

- Package size 2.5 * 2.0 * 0.89 mm³
- RoHS compatible
- Approximate weight 0.017 g
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- Balanced Rx port, unbalanced Tx port
- **Electrostatic Sensitive Device (ESD)**
- Fully matched by integrated matching network
- **Moisture Sensitive Level 3**


Pin configuration

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



Data sheet

Characteristics for W-CDMA Band 4

Temperature range for specification:	T = -15°C to +80 °C
TX terminating impedance:	Z _{Tx} = 50 Ω
ANT terminating impedance:	Z _{Ant} = 50 Ω
RX terminating impedance:	Z _{Rx} = 100 Ω (balanced) 8.2nH

Characteristics Tx-Antenna		min.	typ. @ 25 °C	max.	
Center frequency	f _c	-	1732.5	-	MHz
Maximum insertion attenuation @f _{Carrier} 1712.4 ... 1752.6MHz	α _{W-CDMA} ¹⁾	-	1.6	1.8	dB
Amplitude ripple (p-p) @f _{Carrier} 1712.4 ... 1752.6MHz	Δα _{W-CDMA} ¹⁾	-	0.3	0.5	dB
Error Vector Magnitude @f _{Carrier} 1712.4 ... 1752.6MHz	EVM ²⁾	-	0.5	2.0	%
Input VSWR (Tx port) 1710.0 ... 1755.0MHz		-	1.7	2.0	
Output VSWR (Ant Port) 1710.0 ... 1755.0MHz		-	1.6	2.0	
Attenuation	α				
10.0 ... 1565.4MHz		30	37	-	dB
728.0 ... 764.0MHz		39	43	-	dB
851.0 ... 894.0MHz		37	41	-	dB
1565.4 ... 1573.3MHz		40	48	-	dB
1573.3 ... 1577.5MHz		45	51	-	dB
1577.5 ... 1585.5MHz		40	50	-	dB
1597.5 ... 1605.9MHz		45	50	-	dB
1805.0 ... 1880.0MHz		20	43	-	dB
1930.0 ... 1990.0MHz		38	42	-	dB
@f _{Carrier} 2112.4 ... 2152.6MHz	α _{W-CDMA} ¹⁾	43	47	-	dB
2400.0 ... 2500.0MHz		32	35	-	dB
3410.0 ... 3520.0MHz		20	32	-	dB
5120.0 ... 5350.0MHz		20	23	-	dB
5725.0 ... 5850.0MHz		20	25	-	dB

1) Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 9 of this document.

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

Data sheet


Characteristics for W-CDMA Band 4

Temperature range for specification:	T = -15 °C to +80 °C
TX terminating impedance:	Z _{Tx} = 50 Ω
ANT terminating impedance:	Z _{Ant} = 50 Ω
RX terminating impedance:	Z _{Rx} = 100 Ω (balanced) 8.2nH

Characteristics Antenna-Rx		min.	typ. @ 25 °C	max.	
Center frequency	f _c	-	2132.5	-	MHz
Maximum insertion attenuation @f _{Carrier} 2112.4 ... 2152.6MHz	α _{W-CDMA} ¹⁾	-	2.0	2.3	dB
Amplitude ripple (p-p) @f _{Carrier} 2112.4 ... 2152.6MHz	Δα _{W-CDMA} ¹⁾	-	0.2	0.5	dB
Input VSWR (Ant port) 2110.0 ... 2155.0MHz		-	1.3	2.0	
Output VSWR (Rx port) 2110.0 ... 2155.0MHz		-	1.4	2.0	
CMRR (S ₃₂ -S ₄₂ / S ₃₂ +S ₄₂) 2110.0 ... 2155.0MHz		22 ²⁾	25	-	dB
IMD product level limits³⁾					
at f_{Tx}=1732.5 MHz, f_{Rx}= 2132.5 MHz					
Blocker 1	400.0MHz		-130		dBm
Blocker 2	1332.5MHz		-107		dBm
Blocker 3	3865.0MHz		-117		dBm
Blocker 4	5597.5MHz		-130		dBm

¹⁾ Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 9 of this document.

²⁾ A combination of 10 ° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

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 for W-CDMA Band 4

Temperature range for specification:	T = -15 °C to +80 °C
TX terminating impedance:	Z _{Tx} = 50 Ω
ANT terminating impedance:	Z _{Ant} = 50 Ω
RX terminating impedance:	Z _{Rx} = 100 Ω (balanced) 8.2nH

Characteristics Antenna-Rx				min.	typ. @ 25 °C	max.	
Attenuation							
			α				
@f _{Carrier}	1.0 ... 1710.0	MHz	α _{W-CDMA} ¹⁾	35	53	-	dB
	1712.4 ... 1752.6	MHz		45	58	-	dB
	1755.0 ... 2025.0	MHz		30	38	-	dB
	2240.0 ... 2400.0	MHz		15	40	-	dB
	2400.0 ... 2484.0	MHz		30	44	-	dB
	2484.0 ... 6000.0	MHz		35	46	-	dB

¹⁾ Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 9 of this document.

Characteristics Tx-Rx				min.	typ. @ 25 °C	max.	
Differential Mode Isolation							
			α				
	1574.0 ... 1577.0	MHz	α _{W-CDMA} ¹⁾	40	60	-	dB
	1712.4 ... 1752.6	MHz		55	60	-	dB
	2112.4 ... 2152.6	MHz		50	54	-	dB
	3410.0 ... 3520.0	MHz		20	60	-	dB
	5120.0 ... 5275.0	MHz		20	60	-	dB
Common Mode Isolation							
			α				
	1712.4 ... 1752.6	MHz	α _{W-CDMA} ¹⁾	50	53	-	dB

¹⁾ Attenuation of W-CDMA signal (Power Transfer Function). Please, refer to page 9 of this document.

Data sheet

Characteristics for CDMA 1x AWS Band

Temperature range for specification:	T = -30 °C to +85 °C
TX terminating impedance:	Z _{Tx} = 50 Ω
ANT terminating impedance:	Z _{Ant} = 50 Ω
RX terminating impedance:	Z _{Rx} = 100 Ω (balanced) 8.2nH

Characteristics Tx-Antenna		min.	typ. @ 25 °C	max.	
Center frequency	f _c	-	1732.5	-	MHz
Maximum insertion attenuation	α				
1710.00 ... 1755.00 MHz		-	1.6	2.0	dB
Amplitude ripple (p-p)	Δα				
1710.00 ... 1755.00 MHz		-	0.3	0.7	dB
Input VSWR (Tx port)					
1710.00 ... 1755.00 MHz		-	1.7	2.0	
Output VSWR (Ant Port)					
1710.00 ... 1755.00 MHz		-	1.6	2.0	
Attenuation	α				
10.0 ... 1565.4 MHz		30	37	-	dB
728.0 ... 764.0 MHz		39	43	-	dB
851.0 ... 894.0 MHz		37	41	-	dB
1565.4 ... 1573.3 MHz		40	48	-	dB
1573.3 ... 1577.5 MHz		45	51	-	dB
1577.5 ... 1585.5 MHz		40	50	-	dB
1597.5 ... 1605.9 MHz		45	50	-	dB
1805.0 ... 1880.0 MHz		20	43	-	dB
1930.0 ... 1990.0 MHz		38	42	-	dB
2110.0 ... 2155.0 MHz		43	47	-	dB
2400.0 ... 2500.0 MHz		32	35	-	dB
3410.0 ... 3520.0 MHz		20	32	-	dB
5120.0 ... 5350.0 MHz		20	23	-	dB
5725.0 ... 5850.0 MHz		20	25	-	dB

Data sheet


Characteristics for CDMA 1x AWS Band

Temperature range for specification:	T = -30 °C to +85 °C
TX terminating impedance:	Z _{Tx} = 50 Ω
ANT terminating impedance:	Z _{Ant} = 50 Ω
RX terminating impedance:	Z _{Rx} = 100 Ω (balanced) 8.2nH

Characteristics Antenna-Rx		min.	typ. @ 25 °C	max.	
Center frequency	f _c	-	2132.5	-	MHz
Maximum insertion attenuation	α				
2110.00 ... 2155.00 MHz		-	2.0	2.4	dB
Amplitude ripple (p-p)	Δα				
2110.00 ... 2155.00 MHz		-	0.3	0.7	dB
Input VSWR (Ant port)					
2110.00 ... 2155.00 MHz		-	1.3	2.0	
Output VSWR (Rx port)					
2110.00 ... 2155.00 MHz		-	1.4	2.0	
CMRR (S₃₂-S₄₂ / S₃₂+S₄₂)					
2110.0 ... 2155.0 MHz		22 ¹⁾	25	-	dB
Attenuation	α				
1.0 ... 1710.0 MHz		35	53	-	dB
1710.0 ... 1755.0 MHz		45	58	-	dB
1755.0 ... 2025.0 MHz		30	38	-	dB
2240.0 ... 2400.0 MHz		15	40	-	dB
2400.0 ... 2484.0 MHz		30	44	-	dB
2484.0 ... 6000.0 MHz		35	46	-	dB

¹⁾ A combination of 10 ° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

Data sheet


Characteristics for CDMA 1x AWS Band

Temperature range for specification:	T = -30 °C to +85 °C
TX terminating impedance:	Z _{Tx} = 50 Ω
ANT terminating impedance:	Z _{Ant} = 50 Ω
RX terminating impedance:	Z _{Rx} = 100 Ω (balanced) 8.2nH

Characteristics Tx-Rx				min.	typ. @ 25 °C	max.	
Differential Mode Isolation α							
1574.0	...	1577.0	MHz	40	60	-	dB
1710.0	...	1755.0	MHz	55	59	-	dB
2110.0	...	2155.0	MHz	50	54	-	dB
3410.0	...	3520.0	MHz	20	60	-	dB
5120.0	...	5275.0	MHz	20	60	-	dB
Common Mode Isolation α							
1710.0	...	1755.0	MHz	50	53	-	dB


Annotation for characteristics section

Attenuation of W-CDMA signal (Power Transfer Function, α_{W-CDMA}) is determined by

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

with $f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for UMTS pass band, $f_{Carrier}$ ranges from 882.4 MHz (lowest Tx channel) to 912.6 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:

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

Data sheet

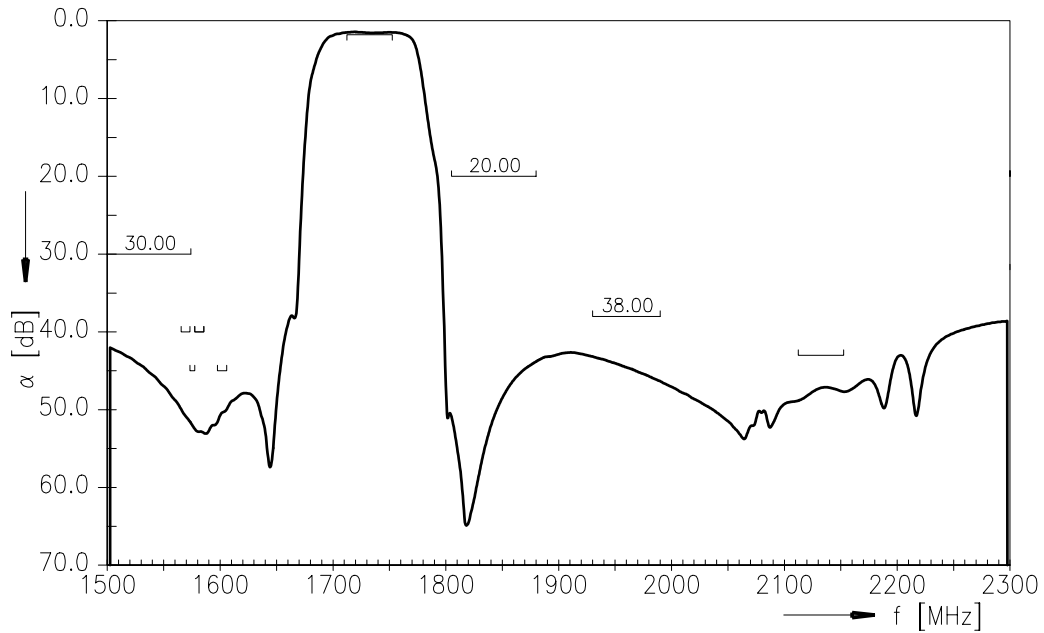

Maximum Ratings

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
Input power at				
1710.0 ... 1755.0 MHz	P_{in}	29	dBm	} continuous wave 50 °C, 5000h
elsewhere	P_{in}	10	dBm	

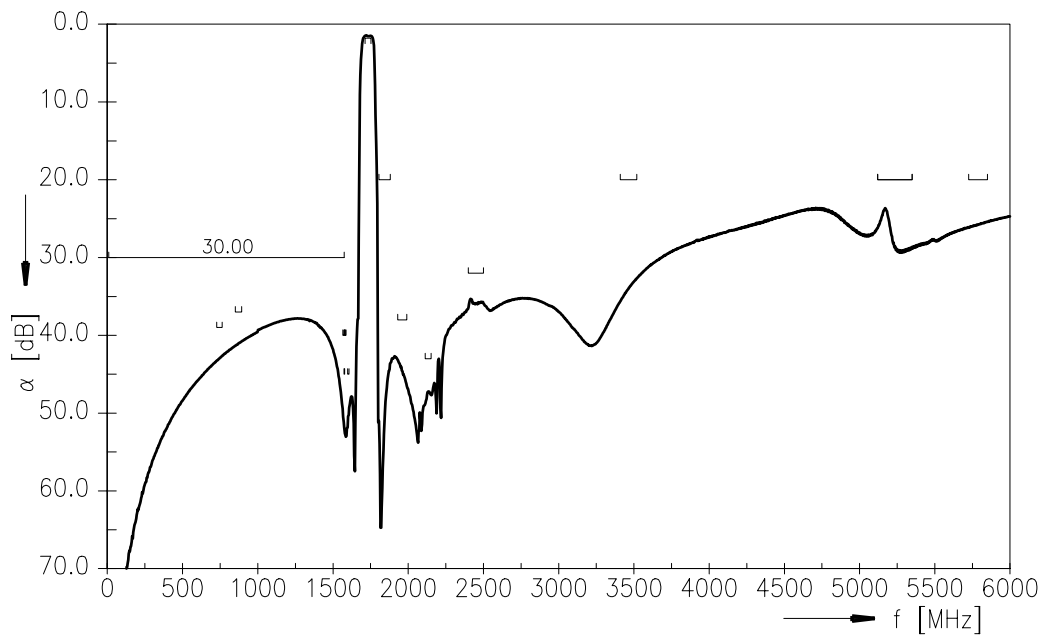
¹⁾ According to JESD22-A115A (machine model), 10 negative and 10 positive pulses.



Frequency Response TX-ANT (PTF)

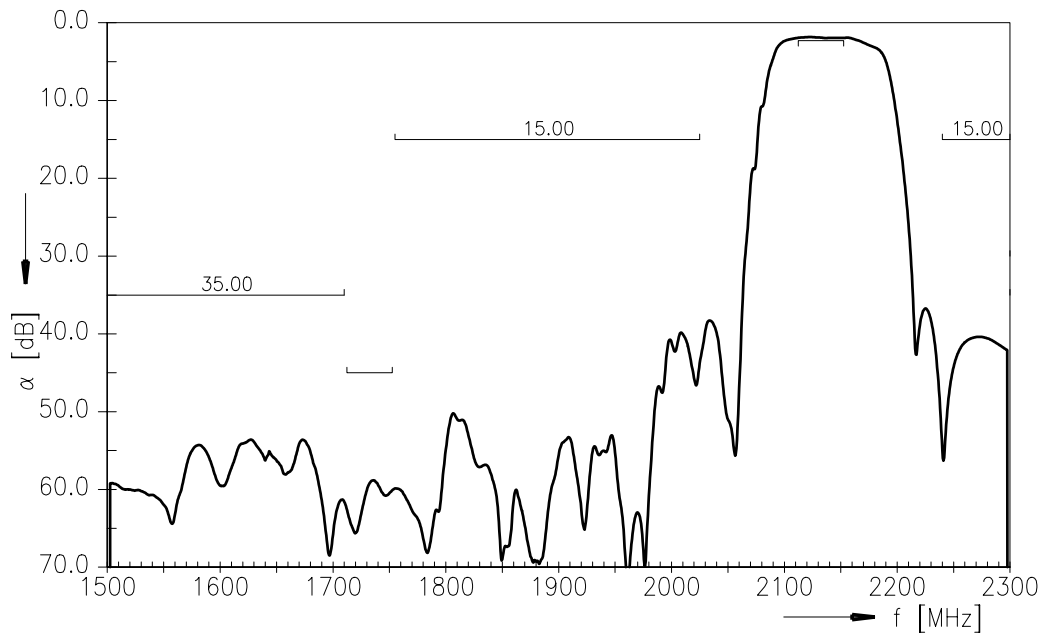


Frequency Response TX-ANT (wideband)

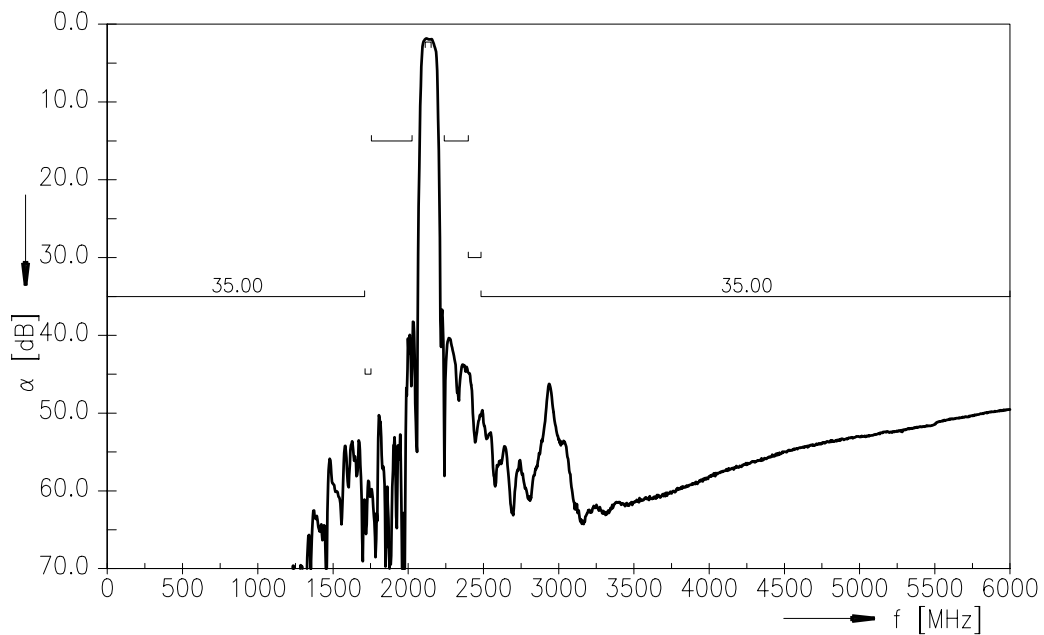




Frequency Response ANT-RX (PTF)

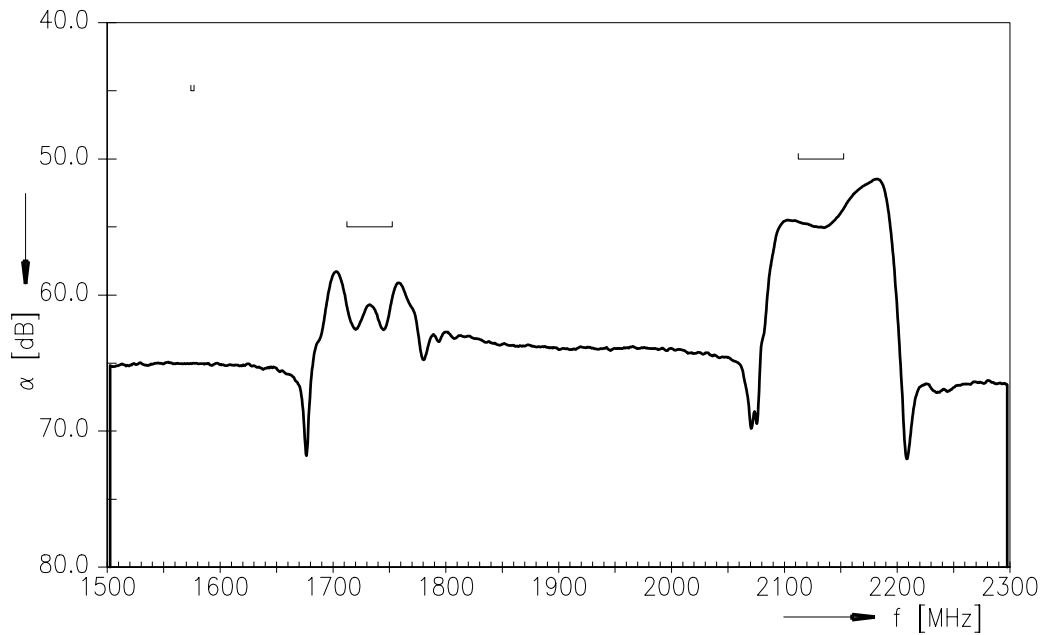


Frequency Response ANT-RX (wideband)

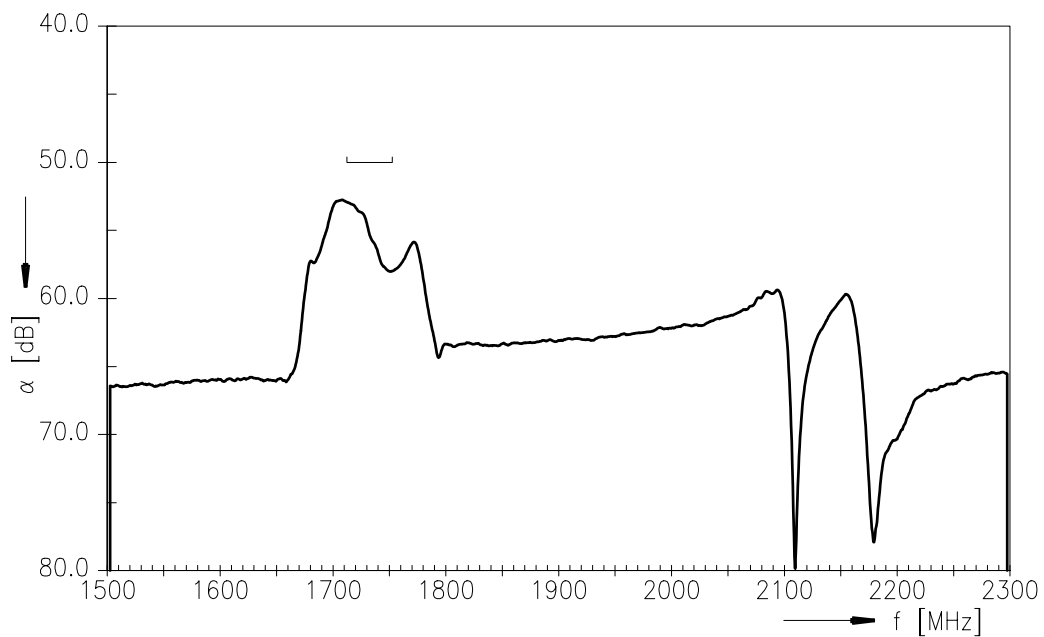




Frequency Response TX-RX (PTF) Differential Mode



Frequency Response TX-RX (PTF) Common Mode



Data sheet



References

Type	B7959
Ordering code	B39212B7959P810
Marking and package	C61157-A3-A59
Packaging	F61074-V8153-Z000
Date codes	L_1126
S-parameters	B7959_NB.s4p, B7959_WB.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

For further information please contact your local EPCOS sales office or visit our webpage at www.epcos.com.

Published by EPCOS AG
Surface Acoustic Wave Components Division
P.O. Box 80 17 09, 81617 Munich, GERMANY

© EPCOS AG 2011. This brochure replaces the previous edition.

For questions on technology, prices and delivery please contact the Sales Offices of EPCOS AG or the international Representatives.

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our Sales Offices.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CSMP, CSSP, CTVS, DeltaCap, DigiSiMic, DSSP, FormFit, MiniBlue, MiniCell, MKD, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.