



# SAW Components

## Duplexers for Cellular Phones

**Series/Type:** B7953

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product	Date of Withdrawal	Deadline Last Orders	Last Shipments
B39941B7953E110	B39941B7934P810	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](http://www.epcos.com/sales).

## SAW Components

B7953

### SAW duplexer

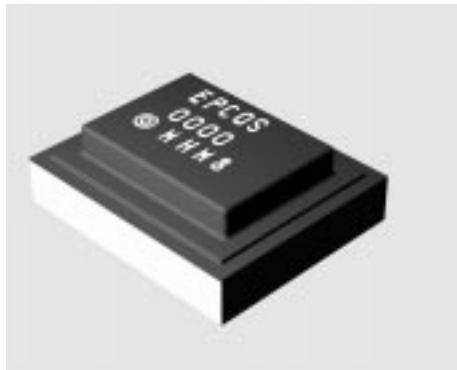
897.5 / 942.5 MHz

Data sheet



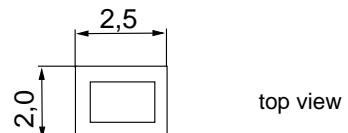
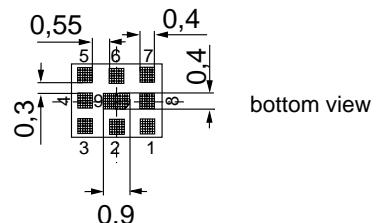
#### Application

- 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  $50\Omega$  to  $100\Omega$  in Antenna - Rx path
- Fully matched by integrated passives network



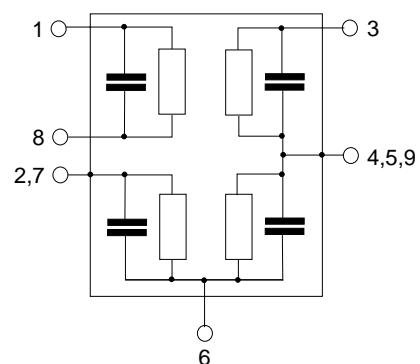
#### Features

- Package size  $2.5 \times 2.0 \times 0.89 \text{ mm}^3$
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**



#### Pin configuration

- 1,8 RX output, balanced
- 3 TX input, single ended
- 6 Antenna
- 2,4,5,7,9 Ground



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

<b>SAW Components</b>	<b>B7953</b>
<b>SAW duplexer</b>	<b>897.5 / 942.5 MHz</b>

Data sheet



### Characteristics

Temperature range for specification:  $T = -20^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 ANT terminating impedance:  $Z_{\text{ANT}} = 50 \Omega$   
 TX terminating impedance:  $Z_{\text{TX}} = 50 \Omega$   
 RX terminating impedance:  $Z_{\text{RX}} = 100 \Omega$  (balanced)

			<b>B7953</b>				
			<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>		
<b>Characteristics Tx - Ant</b>		$f_{\text{C}}$	—	897.5	—	MHz	
<b>Center frequency</b>		$f_{\text{C}}$	—	897.5	—	MHz	
<b>Maximum insertion attenuation</b>							
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz		$\alpha_{\text{WCDMA}}^{1)}$	—	1.9	2.8	dB	
<b>Amplitude ripple (p-p)</b>							
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz		$\Delta\alpha_{\text{WCDMA}}^{1)}$	—	0.7	1.6	dB	
<b>Error Vector Magnitude</b>							
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz		EVM <sup>2)</sup>	—	2.2	5.5	%	
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz		EVM <sup>2)</sup>	—	2.2	4.0 <sup>3)</sup>	%	
<b>VSWR</b>							
TX port 880.0 ... 915.0 MHz			—	1.7	2.0		
ANT port 880.0 ... 915.0 MHz			—	1.7	2.0		
<b>Attenuation</b>		$\alpha$					
0.3 ... 793.0 MHz			30	33	—	dB	
@ $f_{\text{Carrier}}$ 927.4 ... 957.6 MHz		$\alpha_{\text{WCDMA}}^{1)}$	38	44	—	dB	
1574.0 ... 1577.0 MHz			38	42	—	dB	
1760.0 ... 1830.0 MHz			38	49	—	dB	
1830.0 ... 1880.0 MHz			27	52	—	dB	
2110.0 ... 2170.0 MHz			27	44	—	dB	
2400.0 ... 2500.0 MHz			30	36	—	dB	
2620.0 ... 2745.0 MHz			30	35	—	dB	
3520.0 ... 3660.0 MHz			20	27	—	dB	
4400.0 ... 4575.0 MHz			15	23	—	dB	
5150.0 ... 5490.0 MHz			2	10	—	dB	
5725.0 ... 5850.0 MHz			2	8	—	dB	

<sup>1)</sup> Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (5).

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

<sup>3)</sup>  $T = -15^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$

SAW Components		B7953		
SAW duplexer		897.5 / 942.5 MHz		
Data sheet				
<b>Characteristics</b>				
Temperature range for specification:		$T = -20^{\circ}\text{C}$ to $+85^{\circ}\text{C}$		
ANT terminating impedance:		$Z_{\text{ANT}} = 50 \Omega$		
TX terminating impedance:		$Z_{\text{TX}} = 50 \Omega$		
RX terminating impedance:		$Z_{\text{RX}} = 100 \Omega$ (balanced)		
		<b>B7953</b>		
<b>Charcteristics Rx - Ant</b>		<b>min.</b>	<b>typ. @ 25 °C</b>	<b>max.</b>
<b>Center frequency</b>	$f_{\text{C}}$	—	942.5	—
<b>Maximum insertion attenuation</b>				
@ $f_{\text{Carrier}}$ 927.4 ... 957.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$	—	2.3	2.9
925.0 ... 960.0 MHz		—	3.0	4.0
<b>Amplitude ripple (p-p)</b>				
@ $f_{\text{Carrier}}$ 927.4 ... 957.6 MHz	$\Delta\alpha_{\text{WCDMA}}^{1)}$	—	0.7	1.4
<b>Error Vector Magnitude</b>				
@ $f_{\text{Carrier}}$ 927.4 ... 957.6 MHz	EVM <sup>2)</sup>	—	2.7	5.5
@ $f_{\text{Carrier}}$ 927.4 ... 957.6 MHz	EVM <sup>2)</sup>	—	2.7	4.5 <sup>3)</sup>
<b>VSWR</b>				
RX port	925.0 ... 960.0 MHz	—	1.9	2.2
ANT port	925.0 ... 960.0 MHz	—	1.6	2.0
<b>Common Mode Suppression</b>		$\alpha$		
925.0 ... 960.0 MHz		25	28	—
<b>Attenuation</b>		$\alpha$		
0.3 ... 880.0 MHz		35	57	—
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$	48	58	—
1045.0 ... 1750.0 MHz		35	54	—
1750.0 ... 4810.0 MHz		35	54	—
<b>Characteristics Tx - Rx</b>				
<b>Differential Mode Isolation</b>				
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$	55	58	—
@ $f_{\text{Carrier}}$ 927.4 ... 957.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$	42	45	—
<b>Common Mode Isolation</b>				
@ $f_{\text{Carrier}}$ 882.4 ... 912.6 MHz	$\alpha_{\text{WCDMA}}^{1)}$	50	55	—

<sup>1)</sup> Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (5).

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

<sup>3)</sup>  $T = +5^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$

SAW Components	B7953
SAW duplexer	897.5 / 942.5 MHz

Data sheet



### Maximum ratings

Operable temperature range <sup>1)</sup>	T	–30/+85	°C	
Storage temperature range	T <sub>stg</sub>	–40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	100 <sup>2)</sup>	V	machine model, 10 pulses
Input power at	P <sub>IN</sub>			
880.0 ... 915.0 MHz		30	dBm	continuous wave 55 °C, 10000 h
elsewhere		10	dBm	

<sup>1)</sup> Defines the temperature range in which the SAW device keeps its typical characteristics, however the specification values are not guaranteed.

<sup>2)</sup> acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

### Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction",  $\alpha_{WCDMA}$ ) 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 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:

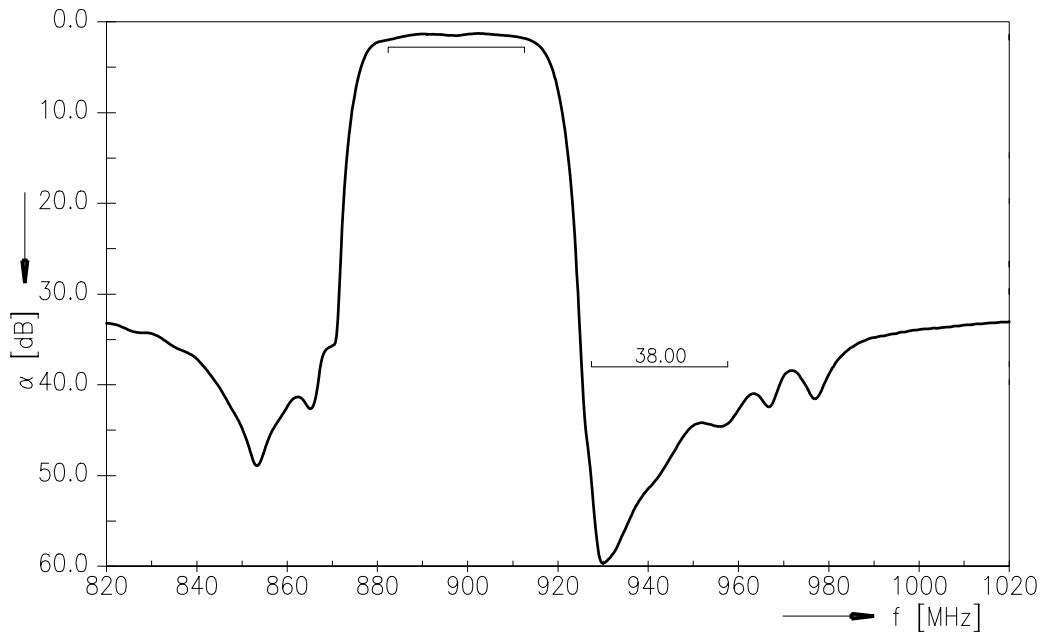
$$\int_{\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$

**SAW Components** **B7953**  
**SAW duplexer** **897.5 / 942.5 MHz**

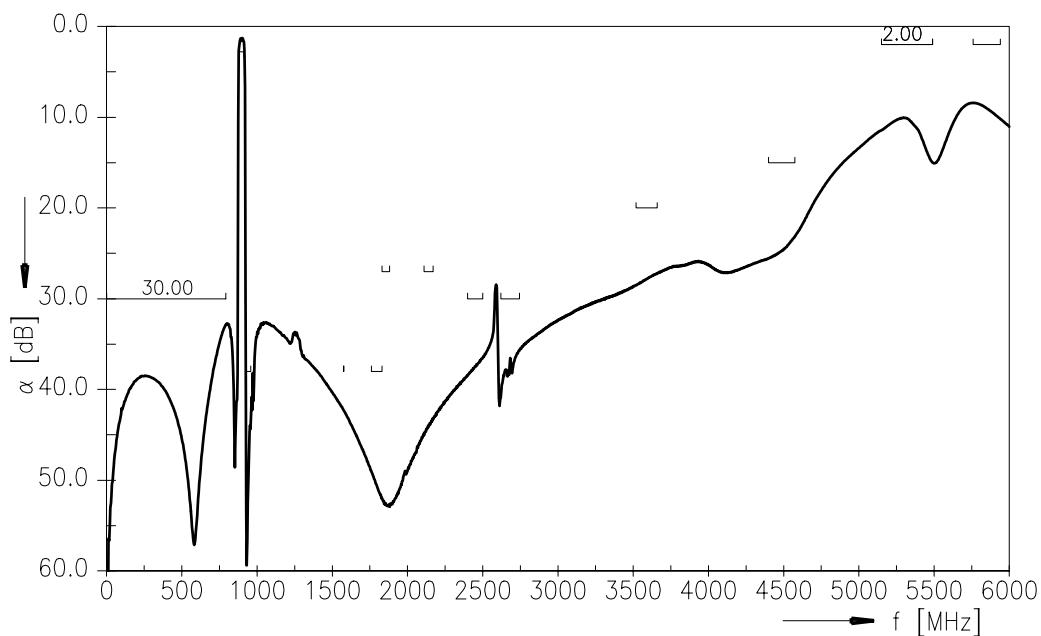
Data sheet



**Frequency Response TX-ANT** (Power transfer function)



**Frequency Response TX-ANT** (wideband)

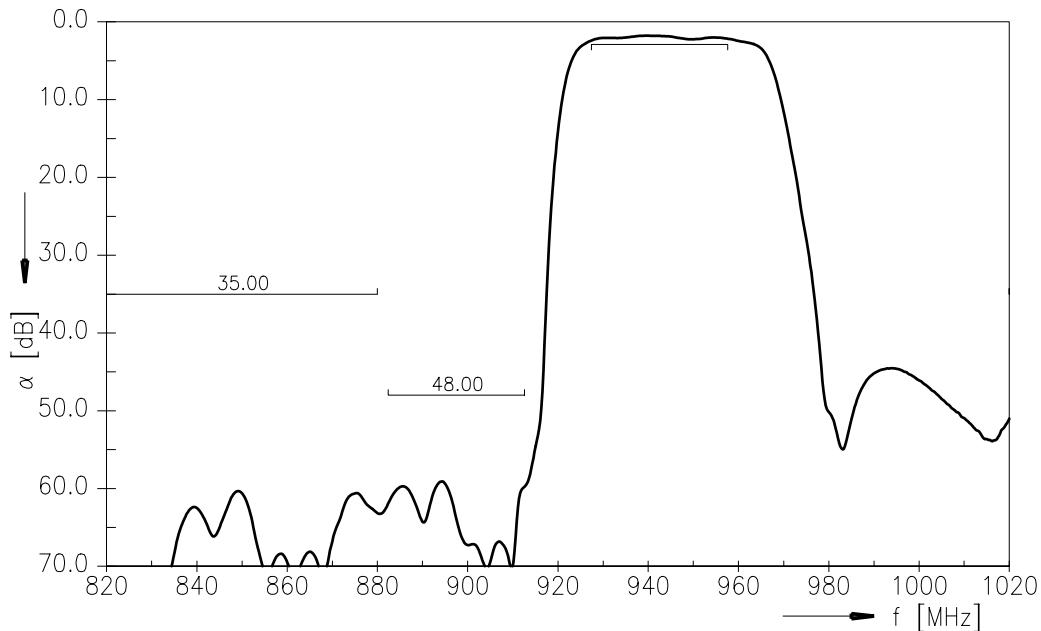


<b>SAW Components</b>	<b>B7953</b>
<b>SAW duplexer</b>	<b>897.5 / 942.5 MHz</b>

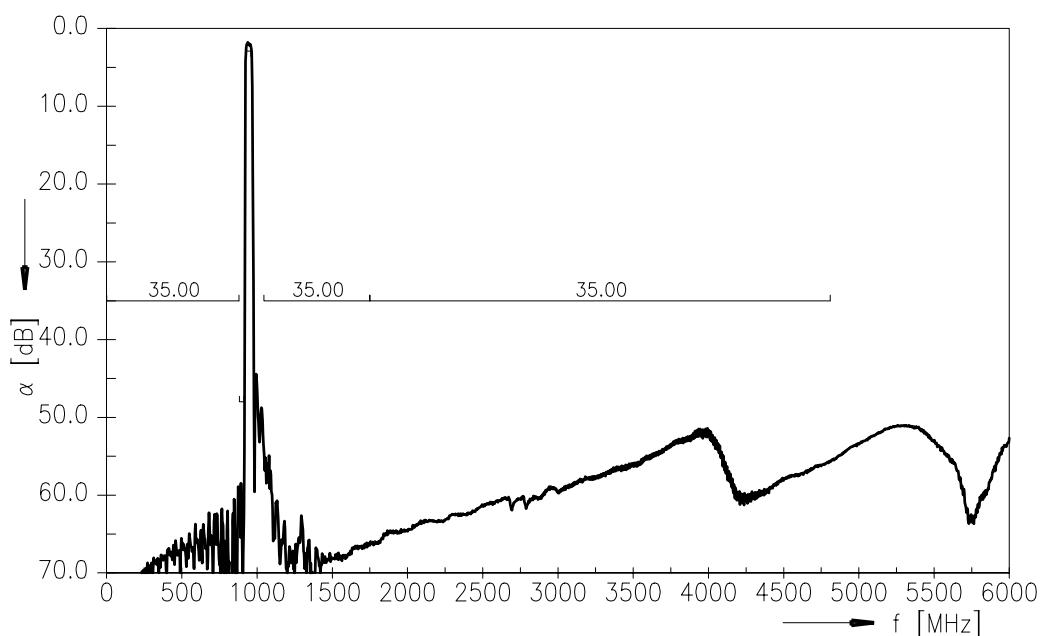
Data sheet



**Frequency Response ANT - RX (Power transfer function)**



**Frequency Response ANT - RX (wideband)**

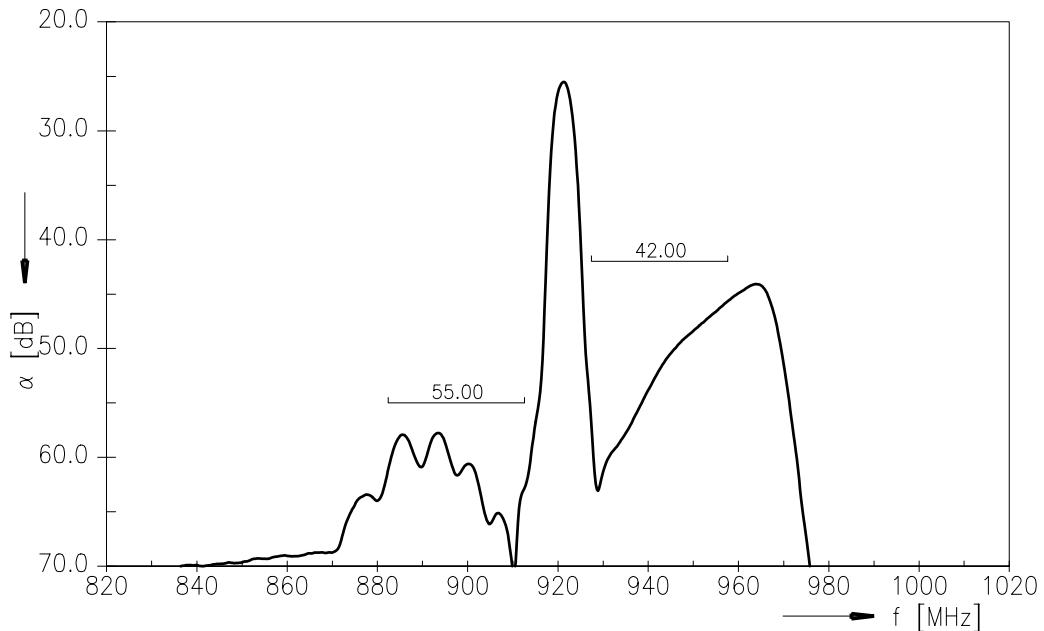


<b>SAW Components</b>	<b>B7953</b>
<b>SAW duplexer</b>	<b>897.5 / 942.5 MHz</b>

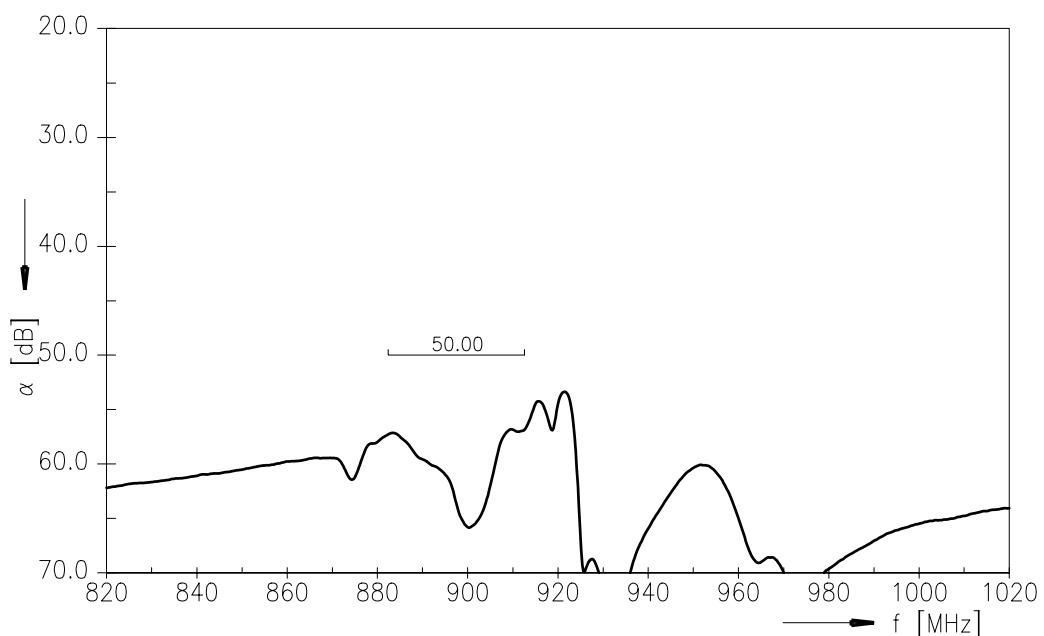
Data sheet



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



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



**SAW Components****B7953****SAW duplexer****897.5 / 942.5 MHz**

Data sheet

**References**

<b>Type</b>	B7953
<b>Ordering code</b>	B39941B7953E110
<b>Marking and package</b>	C61157-Z3-C49
<b>Packaging</b>	F61074-V8153-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B7953_NB_UN.s4p, B7953_WB_UN.s4p see file header for port/pin assignment table
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	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."
<b>Moldability</b>	Before using in overmolding environment, please contact your EPCOS sales office.

For further information please contact your local EPCOS sales office or visit our webpage at [www.epcos.com](http://www.epcos.com) .

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

© EPCOS AG 2009. 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.

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

## 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](http://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, DSSP, MiniBlue, MiniCell, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, 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](http://www.epcos.com/trademarks).

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[EPCOS:](#)

[B39941B7953E110](#)