SAW Components

SAW Duplexer

Cellular / WCDMA Band V

Series/type:	**B7671**
Ordering code:	**B39881B7671A710**
Date:	September 23, 2009
Version:	2.0

EPCOS

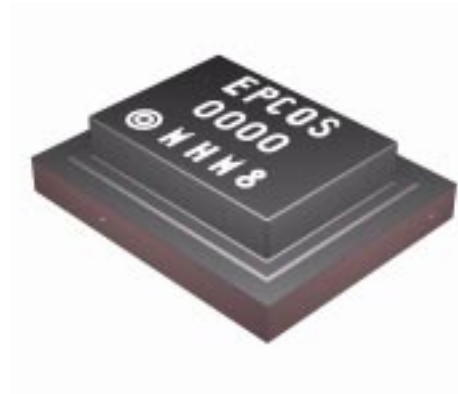| SAW Components	B7671
SAW Duplexer	**836.50 / 881.50 MHz**

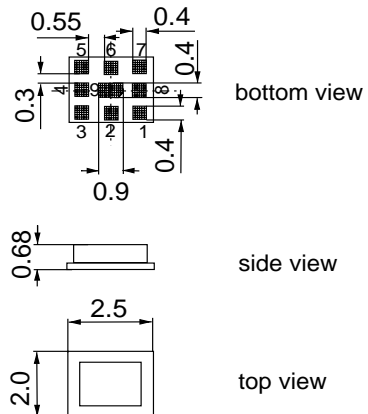**Data Sheet**   SMD

Application

- Multimode SAW duplexer for mobile telephone Cellular / WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple
- Single ended to balanced transformation in Antenna - Rx path
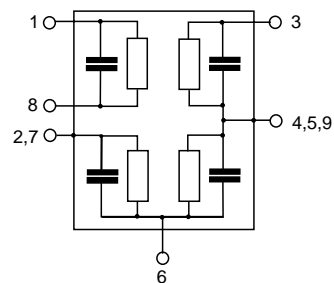- Impedance transformation 50Ω to 100Ω in Antenna - Rx path

Features

- Package size 2.5 x 2.0 x 0.68 mm^3
- RoHS compatible
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)

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.

2 September 23, 2009

EPCOS

Data Sheet   SMD

Characteristics

Temperature range for specification: $T = -20\ °C$ to $+85\ °C$
Antenna terminating impedance: $Z_{ANT} = 50\ \Omega$ ll 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		1.7	2.2	dB
@f$_{Carrier}$	826.4	...	846.6	MHz	α_{WCDMA}[1]		1.6	2.0	dB
Amplitude ripple				$\Delta\alpha$				
	824.0	...	849.0	MHz		0.5	1.0	dB
@f$_{Carrier}$	826.4	...	846.6	MHz	α_{WCDMA}[1]		0.4	0.8	dB
Error Vector Magnitude								
@f$_{Carrier}$	826.4	...	846.6	MHz	EVM[2]		1.4	2.5	%
Input VSWR (TX port)								
	824.0	...	849.0	MHz			1.9	2.2	
Output VSWR (ANT port)								
	824.0	...	849.0	MHz			1.7	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.

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

3 September 23, 2009

Data Sheet SMD

Characteristics

Temperature range for specification:	T =	−20 ˚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	42		dB
420.0 ... 494.0 MHz	35	39		dB
494.0 ... 701.0 MHz	30	33		dB
701.0 ... 728.0 MHz	30	34		dB
728.0 ... 764.0 MHz	30	34		dB
764.0 ... 804.0 MHz	30	36		dB
860.0 ... 869.0 MHz	4	16		dB
869.0 ... 894.0 MHz	44	50		dB
1574.0 ... 1577.0 MHz	40	45		dB
1638.0 ... 1708.0 MHz	20	48		dB
1844.9 ... 1879.9 MHz	30	49		dB
1884.5 ... 1919.6 MHz	30	48		dB
1930.0 ... 1990.0 MHz	35	45		dB
2110.0 ... 2170.0 MHz	33	41		dB
2400.0 ... 2557.0 MHz	30	35		dB
3286.0 ... 3406.0 MHz	20	28		dB
4110.0 ... 4255.0 MHz	20	25		dB
4934.0 ... 5350.0 MHz	15	22		dB
5725.0 ... 5953.0 MHz	6	10		dB

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

4 September 23, 2009

Data Sheet   SMD

Characteristics

Temperature range for specification:	T =	$-20\ ^\circ$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	2.4	dB
Amplitude ripple		$\Delta\alpha$				
869.0 ... 894.0	MHz			0.8	1.6	dB
@$f_{Carrier}$ 871.4 ... 891.6	MHz	α_{WCDMA}[1]		0.4	1.0	dB
Input VSWR (ANT port)						
869.0 ... 894.0	MHz			1.5	1.8	
Output VSWR (RX port)						
869.0 ... 894.0	MHz			1.7	2.0	
Common mode rejection ratio						
869.0 ... 894.0	MHz	CMRR	23[2]	30		dB

[1] Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (8).
[2] A combination of 10 ˚ phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

EPCOS

Data Sheet   SMD

Characteristics

Temperature range for specification: T = −20 ˚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		-127		dBm
Blocker 2		791.5	MHz		-89		dBm
Blocker 3		1718.0	MHz		-114		dBm
Attenuation			α				
10.0	...	447.0	MHz	45	60		dB
447.0	...	824.0	MHz	35	55		dB
824.0	...	849.0	MHz	45	54		dB
849.0	...	854.0	MHz	10	35		dB
909.0	...	1000.0	MHz	7	10		dB
1000.0	...	1850.0	MHz	28	45		dB
1850.0	...	1920.0	MHz	40	50		dB
1920.0	...	6000.0	MHz	35	40		dB

[1] IMD product level limits for power levels P_{TX}=21dBm (antenna port output power) and $P_{Blocker}$= -15dBm (antenna port input power)

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

6   September 23, 2009

Data Sheet

Characteristics

Temperature range for specification: $T = -20\,°C$ 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 - RX	min.	typ. @ 25 °C	max.	
Isolation				
824.0 ... 849.0 MHz	54	56		dB
@$f_{Carrier}$ 826.4 ... 846.6 MHz α_{WCDMA}[1]	55	57		dB
869.0 ... 894.0 MHz	48	51		dB
@$f_{Carrier}$ 871.4 ... 891.6 MHz α_{WCDMA}[1]	48	52		dB
1574.0 ... 1577.0 MHz	40	67		dB
1638.0 ... 1708.0 MHz	20	65		dB
2462.0 ... 2557.0 MHz	20	62		dB
Common Mode Isolation				
824.0 ... 849.0 MHz	50	54		dB
@$f_{Carrier}$ 826.4 ... 846.6 MHz α_{WCDMA}[1]	50	57		dB

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

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

7   September 23, 2009

SAW Components	B7671
SAW Duplexer	**836.50 / 881.50 MHz**

Data Sheet   SMD

Maximum ratings

Operable temperature range[1]	T	−30/+85	˚C	
Storage temperature range	T_{stg}	−40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[2]	V	machine model, 10 pulses
Input power at	P_{IN}			source and load impedance 50 Ω
824.0 ... 849.0 MHz		29	dBm	continuous wave
elsewhere		10	dBm	$T = 50$˚C, 5.000 h

[1] Defines the temperature range in which the SAW device keeps its typical characteristics, however the specification values are not guaranteed.

[2] acc. to JESD22-A115A (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:

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

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

8   September 23, 2009

Frequency Response TX-ANT (passband)
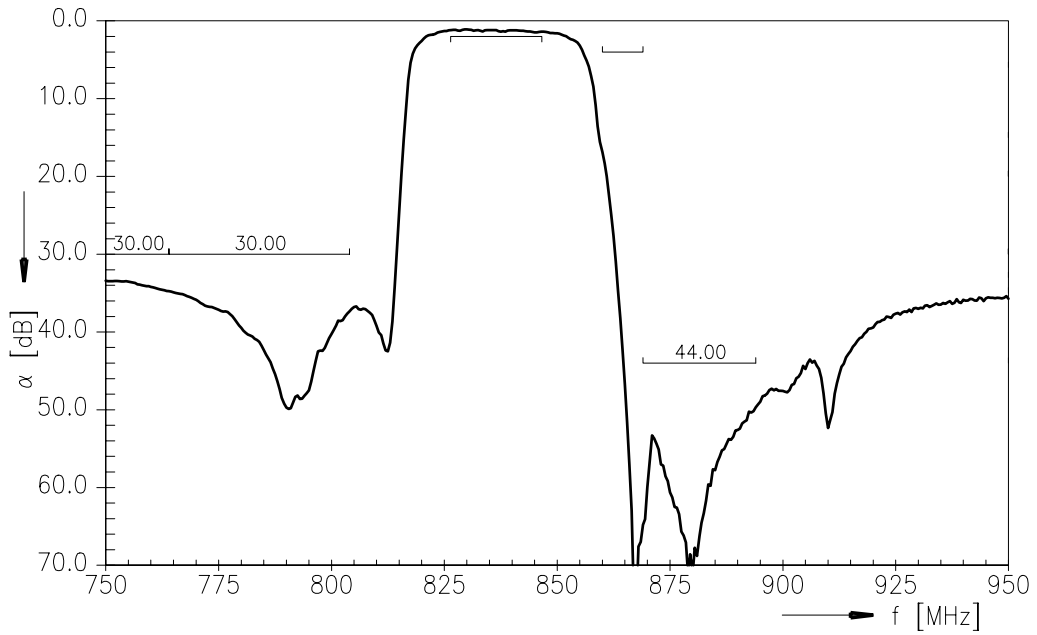
Frequency Response TX-ANT (wideband)
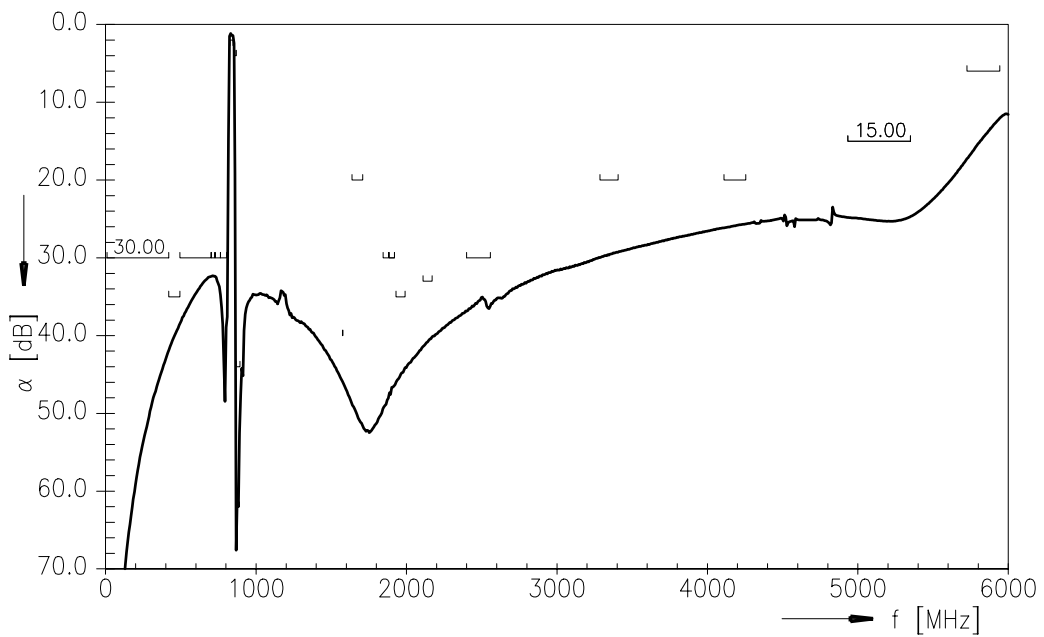
Frequency Response RX-ANT (Passband)
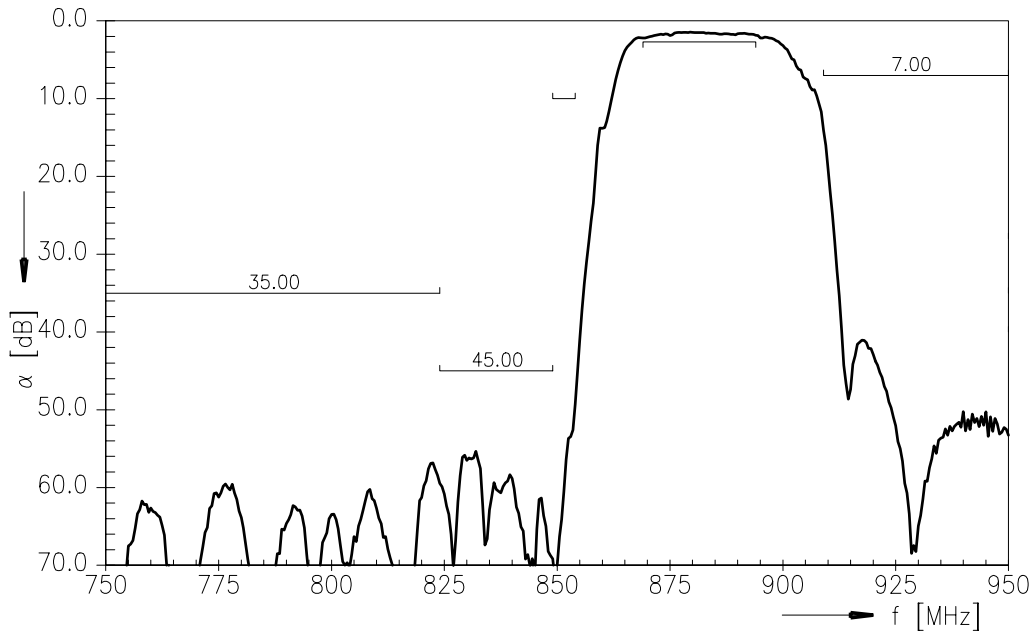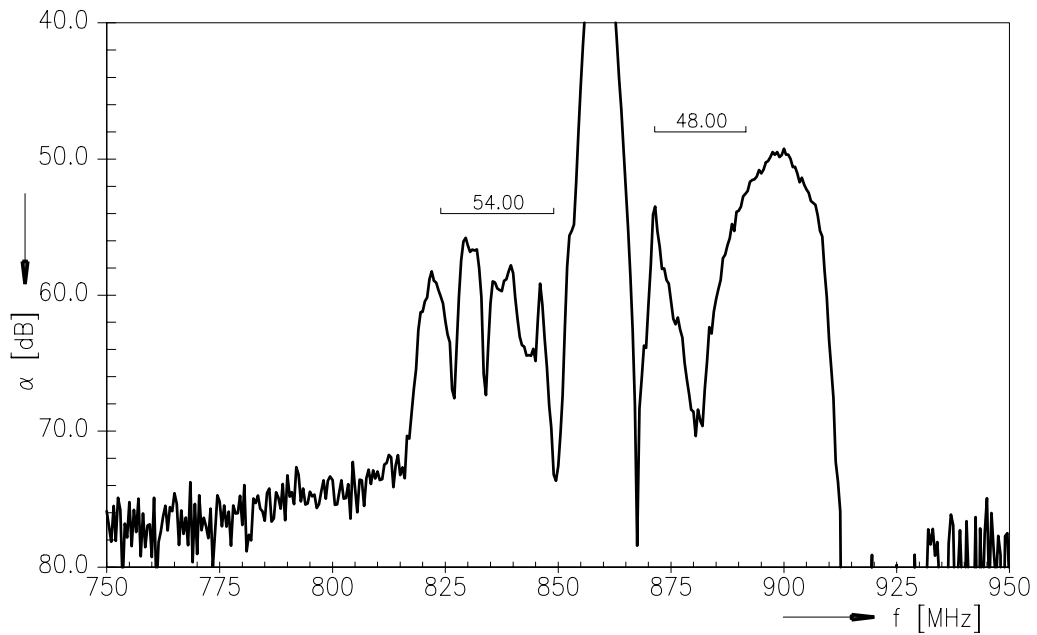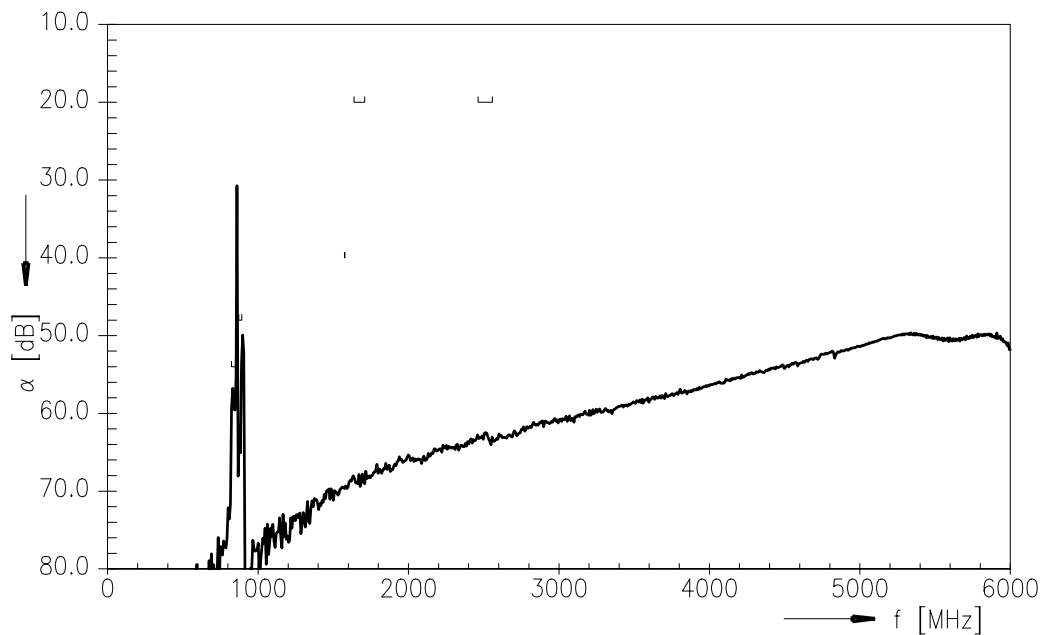

Frequency Response RX-ANT (Wideband)

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

10 September 23, 2009
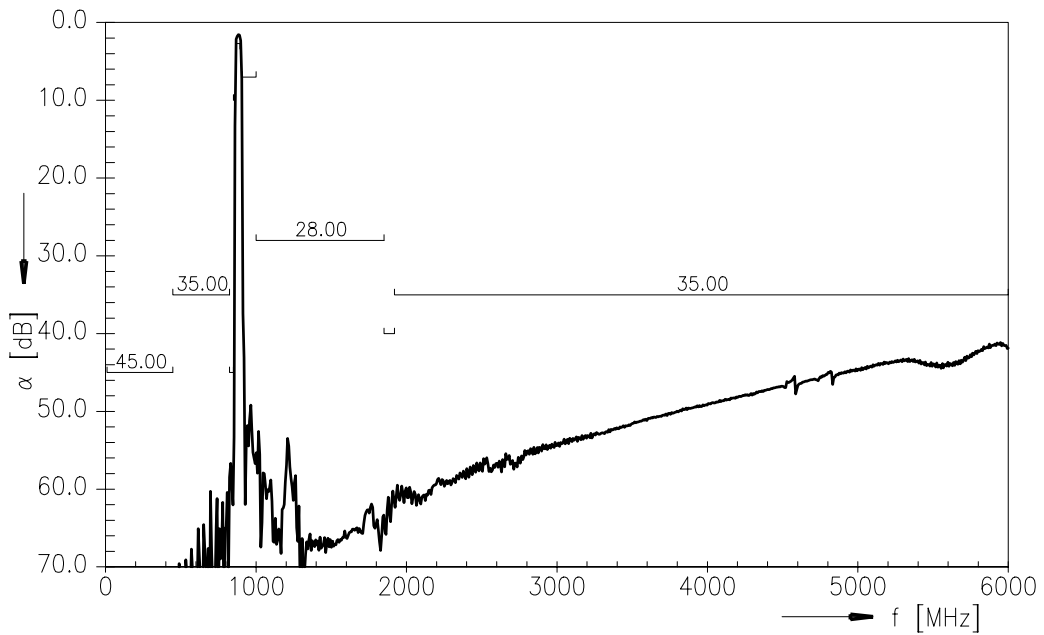
Frequency Response TX-RX (Isolation)

Frequency Response TX-RX (Wideband)

References

Type	B7671
Ordering code	B39881B7671A710
Marking and package	C61157-A3-A61
Packaging	F71074-V8153-Z000
Date codes	L_1126
S-parameters	B7671_NB.s4p B7671_WB.s4p see file header for pin/port assignments.
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."

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

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

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, 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.