SAW Components

SAW Rx 2in1 input diplex filter

GSM1900 / GSM1800

Series/type:	**B9513**
Ordering code:	**B39202B9513L310**
Date:	May 27, 2010
Version:	2.0

SAW Rx 2in1 input diplex filter 1960.0 / 1842.5 MHz

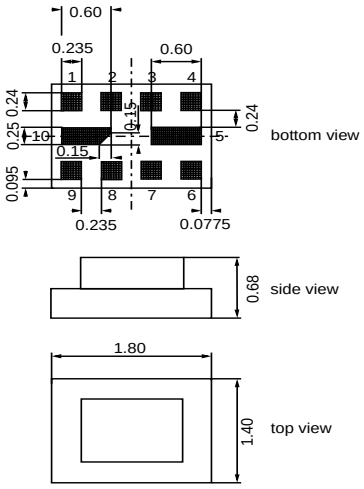
Data sheet SMD

Application

- Low-loss 2in1 RF filter for mobile telephone GSM1900 and GSM1800 systems, receive path (Rx)
- Usable passband:
  Filter 1 (GSM1900): 60 MHz
  Filter 2 (GSM1800): 75 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12

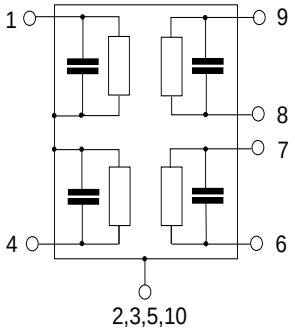
Features

- Package size 1.8 x 1.4 x 0.68 mm³
- Moisture Sensitive Level 3
- RoHS compatible
- Approx. weight 0.006g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **RoHS compatible**
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

■	1	Input [Diplex]
■	8,9	Output balanced [Filter 1]
■	6,7	Output balanced [Filter 2]
■	2,3,4,5,10	Case-ground



Characteristics of Filter 1 (GSM1900)

Temperature range for specification: T = -30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 3.3nH
Terminating load impedance: Z_L = 150 Ω || 18nH (balanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1960.0	—	MHz
Maximum insertion attenuation	α_{max}				
1930.0 ... 1990.0 MHz		—	2.2	3.0	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1930.0 ... 1990.0 MHz		—	0.9	1.8	dB
Input VSWR					
1930.0 ... 1990.0 MHz		—	1.5	2.0	
Output VSWR					
1930.0 ... 1990.0 MHz		—	1.6	2.1	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1930.0 ... 1990.0 MHz		22[1)]	29	—	dB
Attenuation	α				
10.0 ... 1510.0 MHz		40	53	—	dB
1510.0 ... 1830.0 MHz		30	35	—	dB
1830.0 ... 1850.0 MHz		23	33	—	dB
1850.0 ... 1890.0 MHz		18	30	—	dB
1890.0 ... 1910.0 MHz		9	14	—	dB
2010.0 ... 2070.0 MHz		4	12	—	dB
2070.0 ... 2400.0 MHz		21	33	—	dB
2400.0 ... 6000.0 MHz		30	43	—	dB

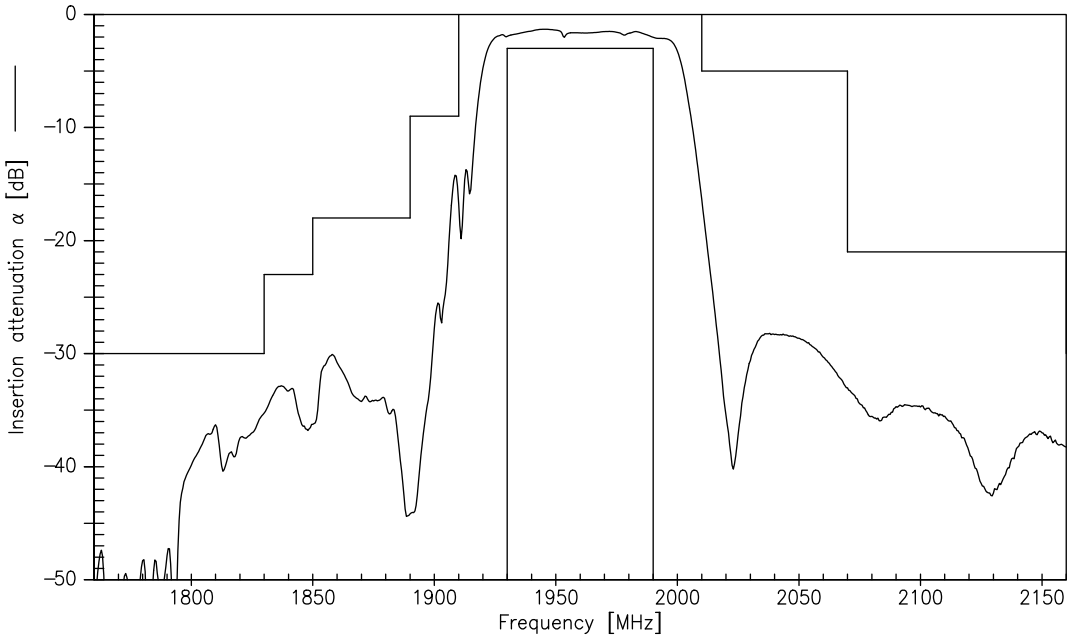
1) A CMRR of 21.9dB corresponds to a phase balance of 7˚ together with an amplitude balance of 0.9dB

Maximum ratings of Filter 1

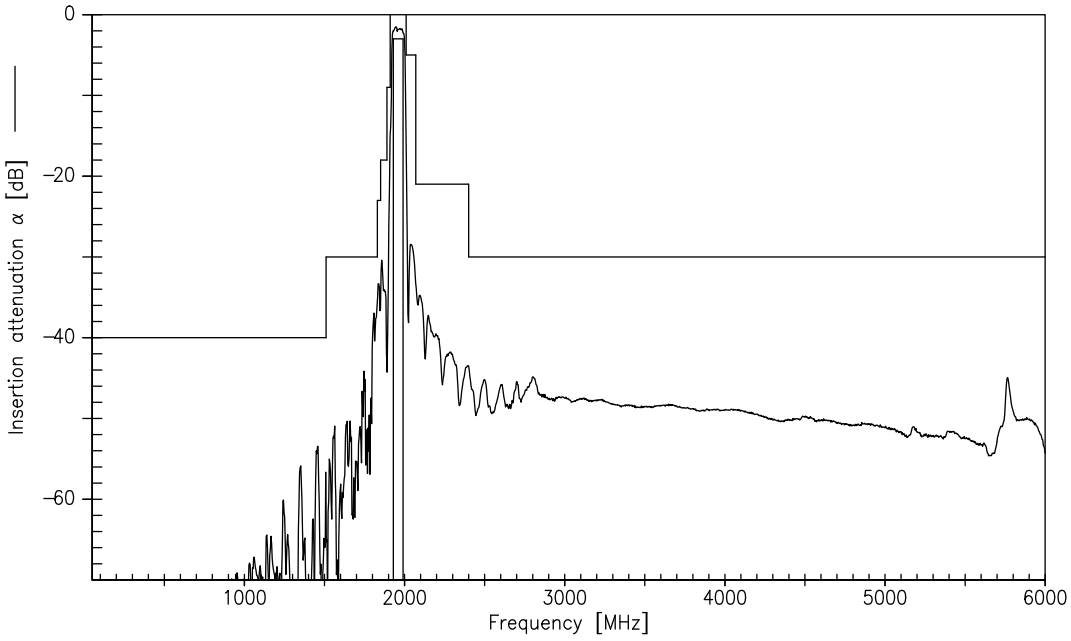
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

1) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

Transfer function Filter 1 (GSM1900)

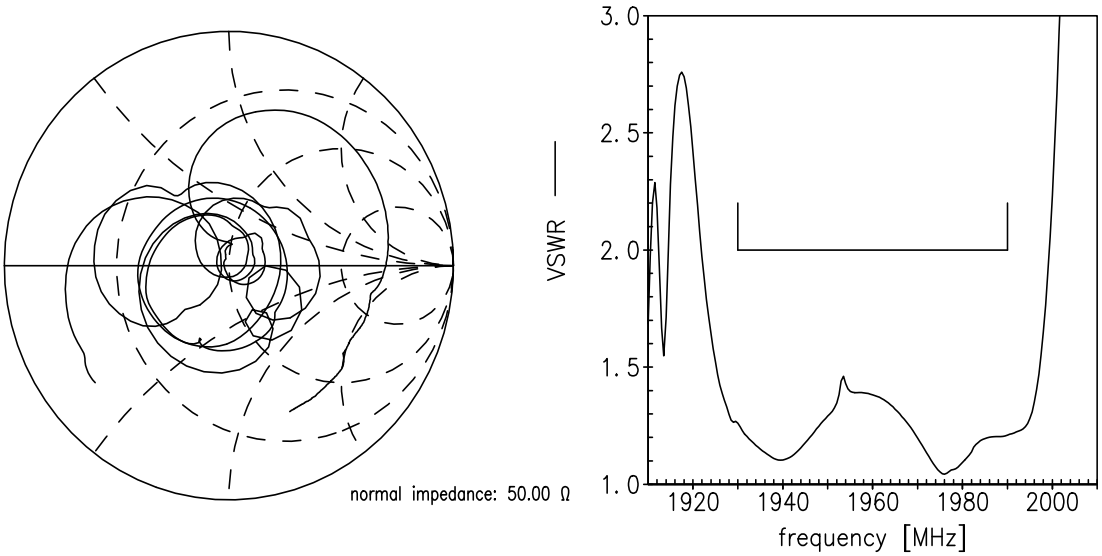


Transfer function Filter 1 (GSM1900) - Wideband

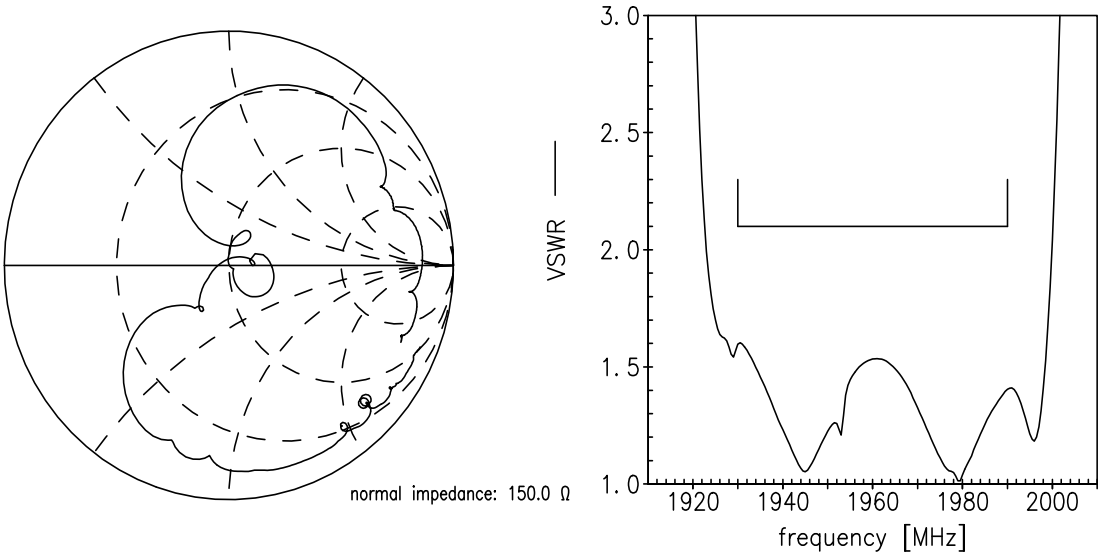


Smith charts Filter 1 (GSM1900)

S_{11} function



S_{22} function



Characteristics of Filter 2 (GSM1800)

Temperature range for specification: T = -30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω || 3.3nH
Terminating load impedance: Z_L = 150 Ω || 15nH (balanced)

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}				
1805.0 ... 1880.0 MHz		—	2.2	2.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1805.0 ... 1880.0 MHz		—	1.0	1.8	dB
Input VSWR					
1805.0 ... 1880.0 MHz		—	1.5	2.0	
Output VSWR					
1805.0 ... 1880.0 MHz		—	1.7	2.1	
CMRR ($\lvert S_{21}-S_{31}\rvert/\lvert S_{21}+S_{31}\rvert$)					
1805.0 ... 1880.0 MHz		20[1)]	24	—	dB
Attenuation	α				
10.0 ... 940.0 MHz		45	62	—	dB
940.0 ... 1705.0 MHz		20	34	—	dB
1705.0 ... 1785.0 MHz		12	18	—	dB
1920.0 ... 1980.0 MHz		17	26	—	dB
1980.0 ... 2030.0 MHz		25	30	—	dB
2030.0 ... 2700.0 MHz		28	35	—	dB
2700.0 ... 6000.0 MHz		30	37	—	dB

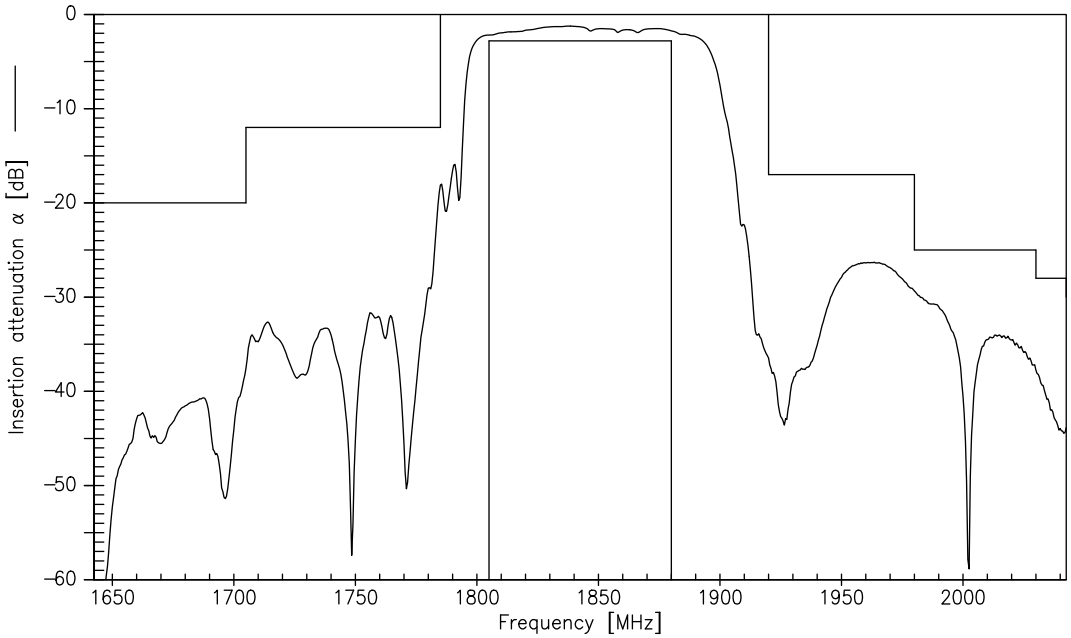
[1)] A CMRR of 19.6dB corresponds to a phase balance of 10˚ together with an amplitude balance of 1.0dB

Maximum ratings of Filter 2

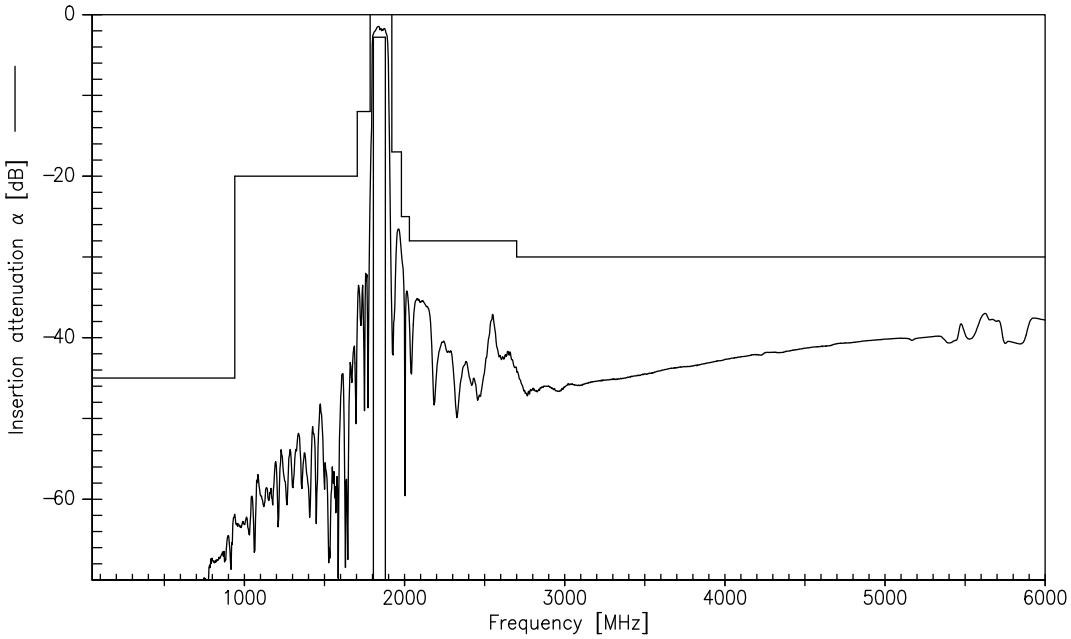
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input Power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

1) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

Transfer function Filter 2 (GSM1800)

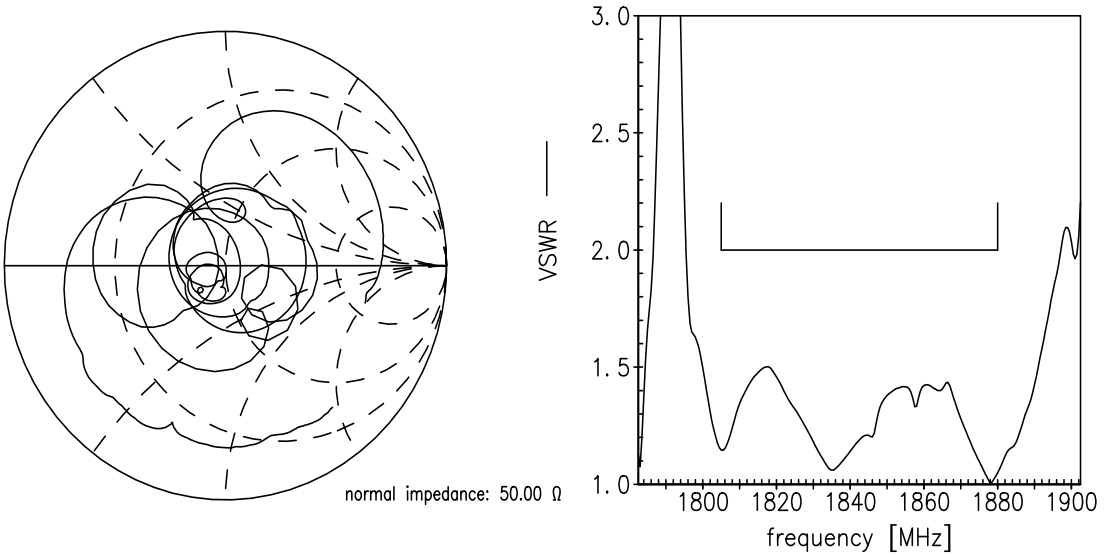


Transfer function Filter 2 (GSM1800) - Wideband

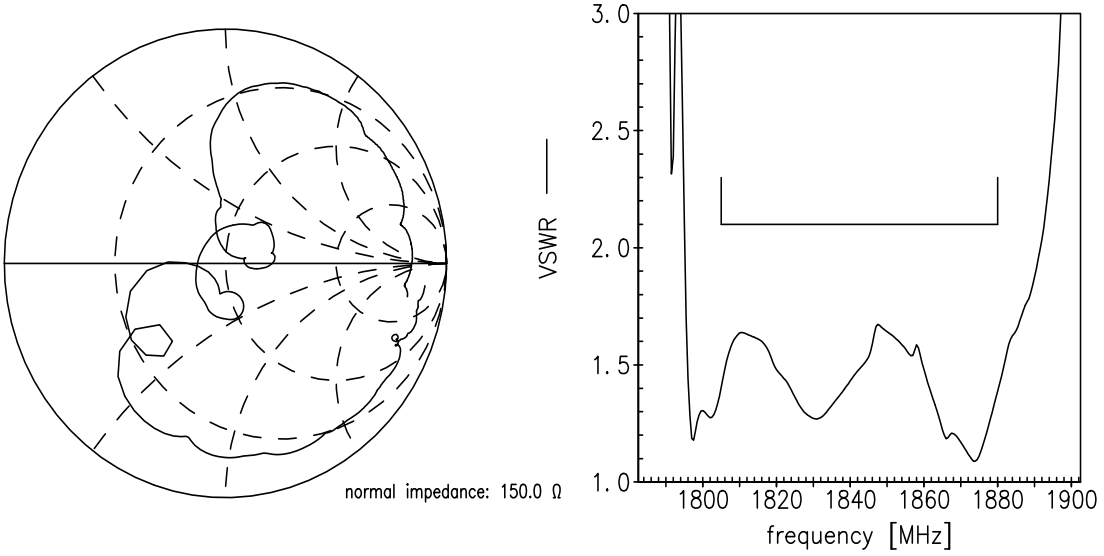


Smith charts Filter 2 (GSM1800)

S_{11} function



S_{22} function



References

Type	B9513
Ordering code	B39202B9513L310
Marking and package	C61157-A7-A153
Packaging	F61074-V8226-Z000
Date codes	L_1126
S-parameters	B9513_LB_NB.s3p B9513_LB_WB.s3p B9513_UB_NB.s3p B9513_UB_WB.s3p 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.

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

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.

Mouser Electronics

Authorized Distributor

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

EPCOS:
B39202B9513L310