



SAW Components

SAW Duplexer

Cellular / WCDMA Band V

Series/type:	B7683
Ordering code:	B39881B7683L310
Date:	October 13, 2009
Version:	2.3

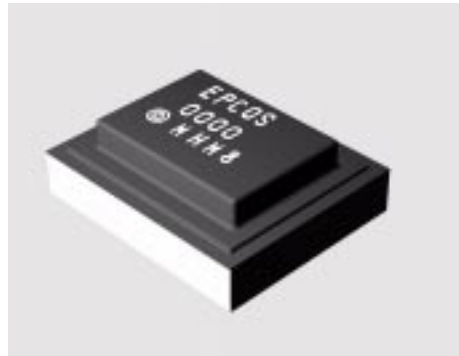


Data Sheet



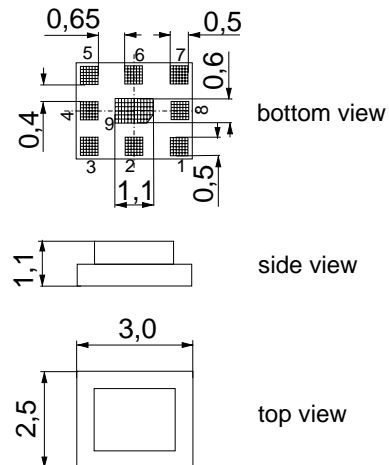
Application

- Low-loss SAW duplexer for mobile telephone 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



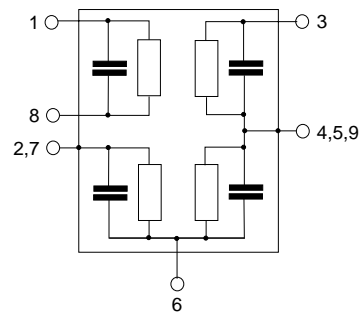
Features

- Package size 3.0 x 2.5 x 1.1 mm³
- RoHS compatible
- Approx. weight 0.035 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Fully matched by integrated matching network
- Electrostatic Sensitive Device (ESD)



Pin configuration

- 3 TX Input
- 1, 8 RX Output (balanced)
- 6 Antenna
- 2, 4, 5, 7, 9 To be grounded





Data Sheet



Characteristics

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 100 Ω (balanced)
 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 @f _{Carrier} 826.4 ... 846.6 MHz α _{WCDMA} ¹⁾		1.4	1.8	dB
Amplitude ripple (p-p) @f _{Carrier} 826.4 ... 846.6 MHz Δα _{WCDMA}		0.2	1.0	dB
Error Vector Magnitude @f _{Carrier} 826.4 ... 846.6 MHz EVM ²⁾		1.1	2.5	%
Input VSWR (TX port) 824.0 ... 849.0 MHz		1.5	1.9	
Output VSWR (ANT port) 824.0 ... 849.0 MHz		1.5	1.8	

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).
 2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.



Data Sheet



Characteristics

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 100 Ω (balanced)
 TX terminating impedance: Z_{TX} = 50 Ω

Characterisitcs TX - ANT				min.	typ. @ 25 °C	max.	
Attenuation			α				
	0.3 ...	779.0	MHz	30	35		dB
	779.0 ...	804.0	MHz	30	40		dB
@f _{Carrier}	871.4 ...	891.6	MHz $\alpha_{WCDMA}^{1)}$	45	48		dB
	1550.0 ...	1600.0	MHz	35	48		dB
	1648.0 ...	1698.0	MHz	30	54		dB
	2400.0 ...	2547.0	MHz	25	33		dB
	2547.0 ...	4120.0	MHz	10	18		dB
	4120.0 ...	4245.0	MHz	15	25		dB
	4245.0 ...	5150.0	MHz	10	13		dB
	5150.0 ...	5825.0	MHz	8	11		dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).



Data Sheet



Characteristics

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 RX terminating impedance: Z_{RX} = 100 Ω (balanced)
 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				
869.0 ... 894.0 MHz α _{max}		1.9	2.7 ¹⁾	dB
@f _{Carrier} 871.4 ... 891.6 MHz α _{WCDMA} ²⁾		1.8	2.5	dB
Amplitude ripple (p-p)				
869.0 ... 894.0 MHz Δα		0.6	1.3	dB
@f _{Carrier} 871.4 ... 891.6 MHz Δα _{WCDMA}		0.5	1.0	dB
Common mode rejection ratio CMRR				
869.0 ... 894.0 MHz	23	28		dB
Error Vector Magnitude				
@f _{Carrier} 871.4 ... 891.6 MHz EVM ³⁾		1.7	2.5	%
Input VSWR (ANT port)				
869.0 ... 894.0 MHz		1.5	1.8	
Output VSWR (RX port)				
869.0 ... 894.0 MHz		1.8	2.0	

1) 3.0 dB for T = -25 ... -15 °C and T = +80 ... +85 °C.
 2) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).
 3) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.



Data Sheet



Characteristics

Temperature range for specification: T = -15 °C to +80 °C
 Antenna terminating impedance: Z_{ANT} = 50 Ω
 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 limits¹⁾								
at f_{TX} = 836.5 MHz f_{RX} = 881.5 MHz								
Blocker 1	45.0	MHz			-105	-101		dBm
Blocker 2	791.5	MHz			-121	-110		dBm
Blocker 3	1718.0	MHz			-120	-110		dBm
Attenuation								
				α				
	0.3 ...	779.0	MHz		40	56		dB
		779.0 ...	824.0	MHz	40	58		dB
@f _{Carrier}	826.4 ...	846.6	MHz	α _{WCDMA} ²⁾	47	53		dB
		849.0 ...	854.0	MHz	23	50		dB
		914.0 ...	1693.0	MHz	23	37		dB
		1693.0 ...	1788.0	MHz	45	63		dB
		1788.0 ...	2400.0	MHz	40	55		dB
		2400.0 ...	2500.0	MHz	40	49		dB
		2500.0 ...	2682.0	MHz	40	45		dB
		2682.0 ...	5000.0	MHz	30	45		dB
		5150.0 ...	5825.0	MHz	30	37		dB
		5825.0 ...	6000.0	MHz	30	34		dB

1) Power levels: 21dBm Tx signal, -15dBm blocker at antenna port.
 2) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

Characteristics TX - RX					min.	typ. @ 25 °C	max.	
Isolation								
				α				
@f _{Carrier}	826.4 ...	846.6	MHz	α _{WCDMA} ¹⁾	50	57		dB
@f _{Carrier}	871.4 ...	891.6	MHz	α _{WCDMA}	45	49		dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).



Maximum ratings

Temperature range for specification ¹⁾	T	-15/+80	°C	
Operable temperature range ²⁾	T	-25/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	100	V	machine model, 1 pulse ³⁾
	V _{ESD}	Tx: 150	V	human body model, 1 pulse ⁴⁾
	V _{ESD}	Ant: 300	V	human body model, 1 pulse ⁴⁾
	V _{ESD}	Rx: 150	V	human body model, 1 pulse ⁴⁾
	V _{ESD}	500	V	field -induced charged device model ⁵⁾
Input power at 824.0 ... 849.0 MHz elsewhere	P _{IN}	30	dBm	} source and load impedance 50 Ω continuous wave T = 55° C, 50.000 h
		10	dBm	

- 1) Defines the temperature range in which the specification values are warranted.
- 2) Defines the temperature range in which the SAW device keeps its typical characteristics, however the specification values are not guaranteed.
- 3) acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.
- 4) acc. to JESD22-A114B (human body model), 1 negative & 1 positive pulse.
- 5) acc. to JESD22-C101C (field-induced charged device model).

Annotation for characteristics section

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

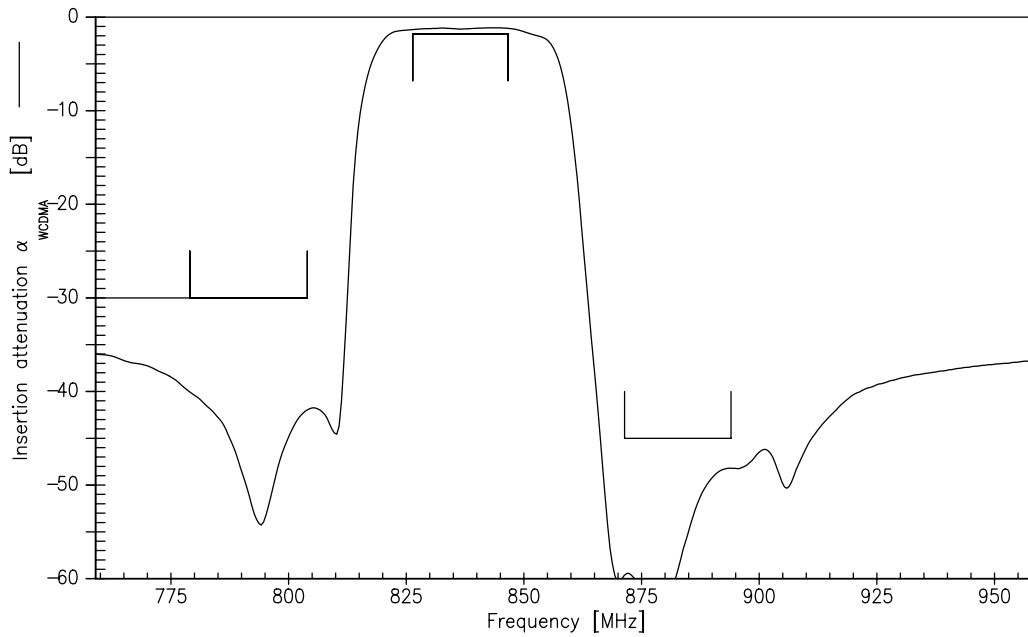
$$\int_{-\infty}^{\infty} |S_{ds21}(f)H_{RRC}(f - f_{Carrier})|^2 df$$

$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for 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:

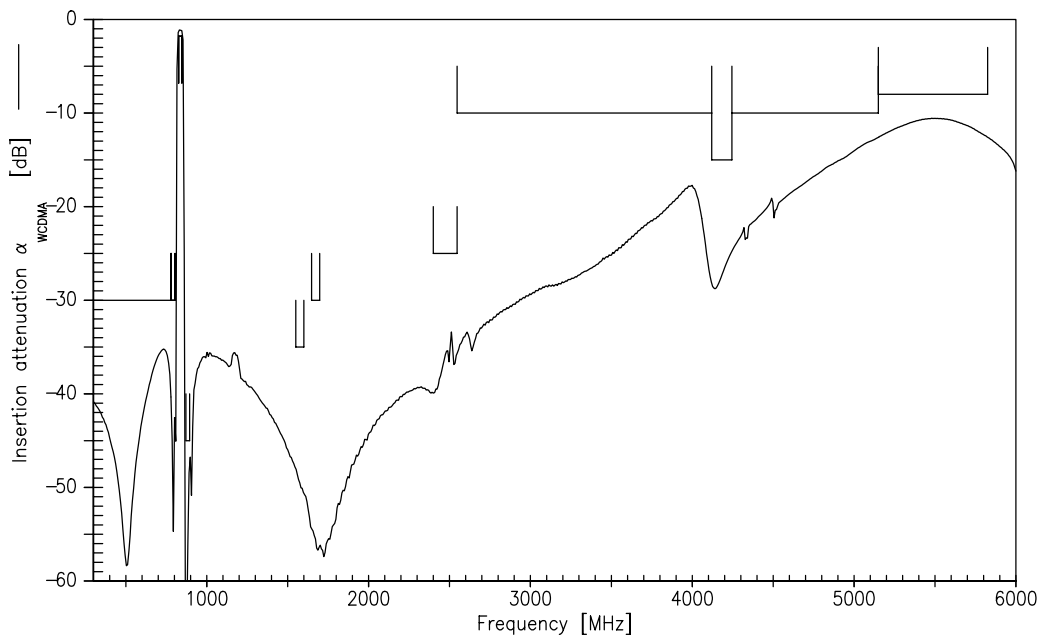
$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



Frequency Response TX-ANT



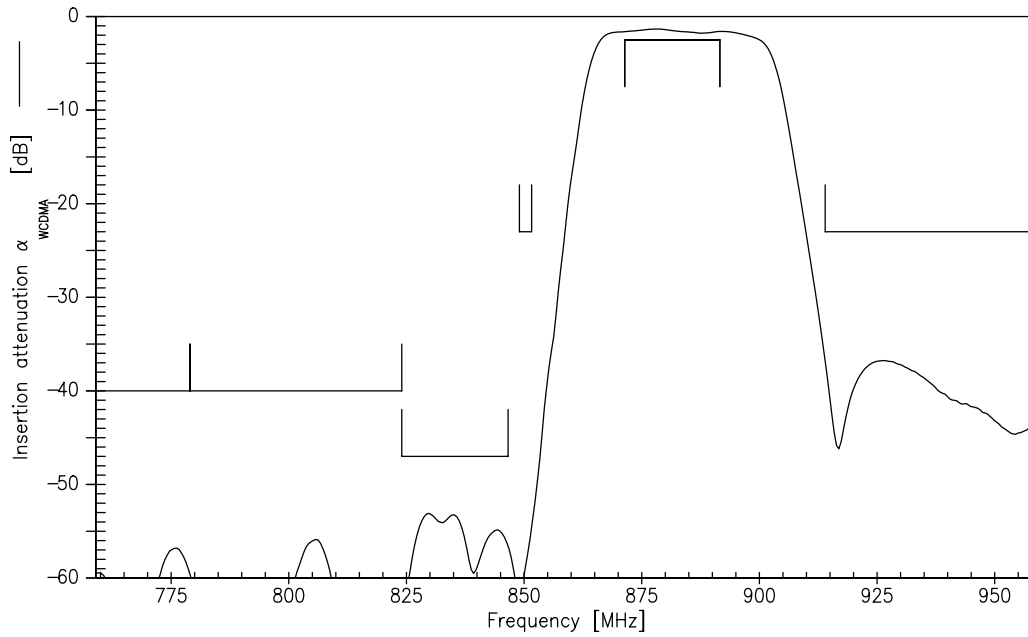
Frequency Response TX-ANT (wideband)



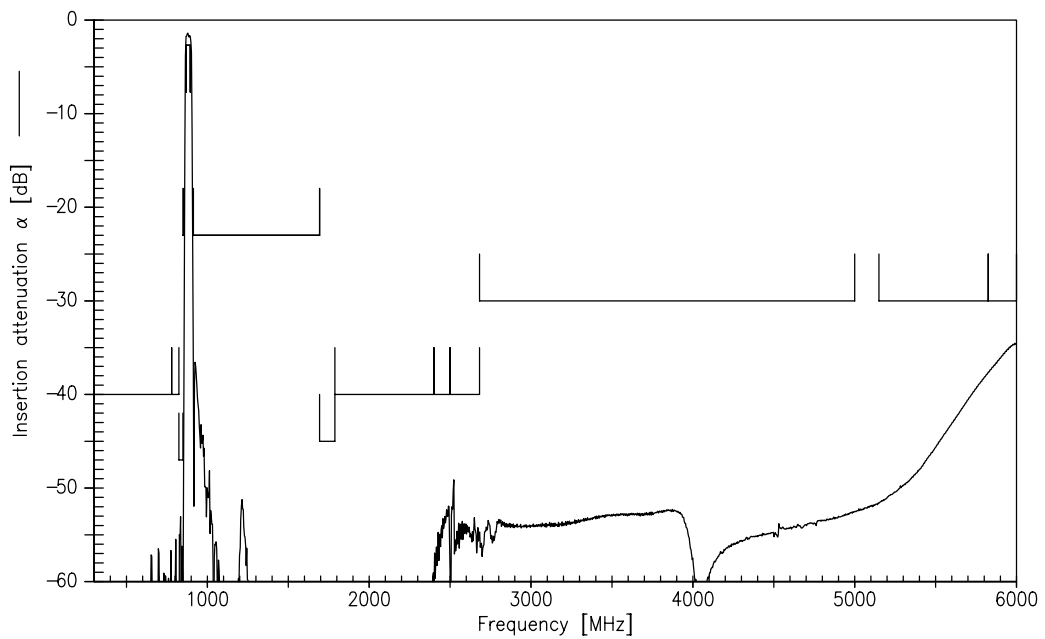
Please read *cautions and warnings* and *important notes* at the end of this document.



Frequency Response RX-ANT

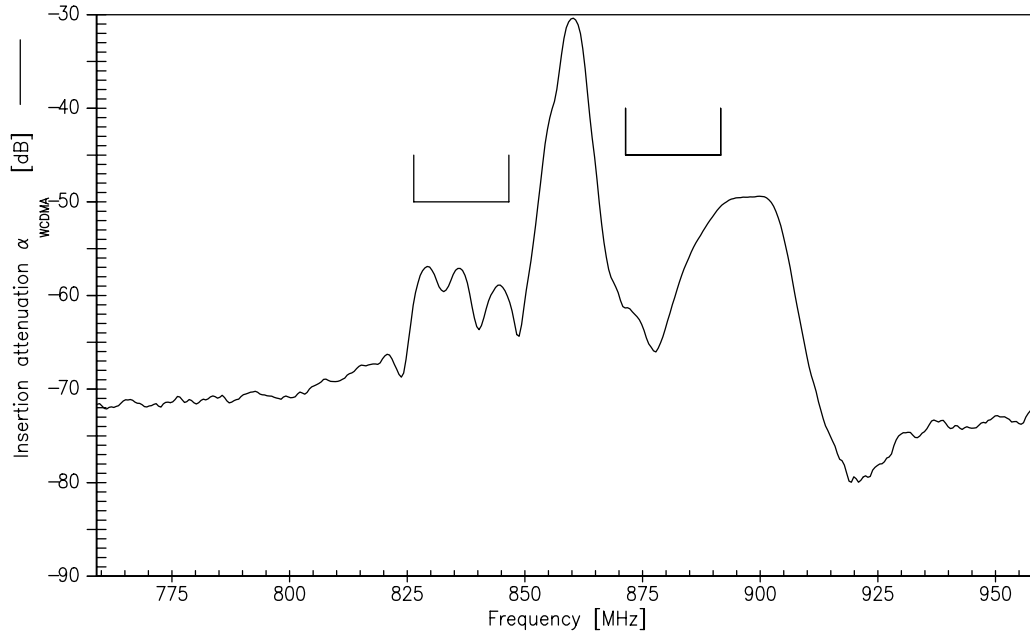


Frequency Response RX-ANT (wideband)

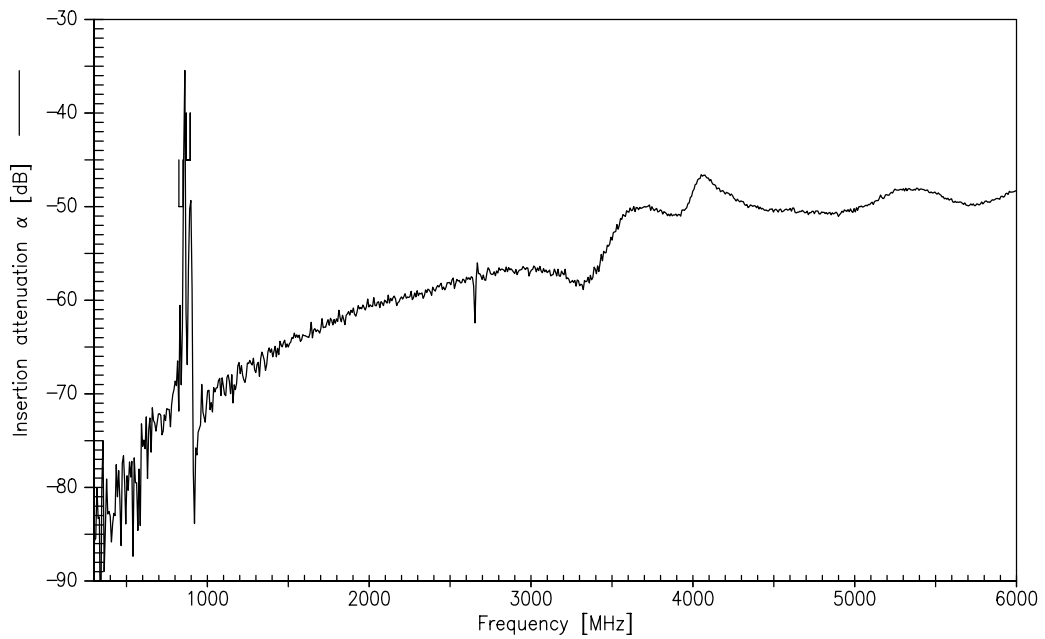




Frequency Response TX-RX



Frequency Response TX-RX (wideband)



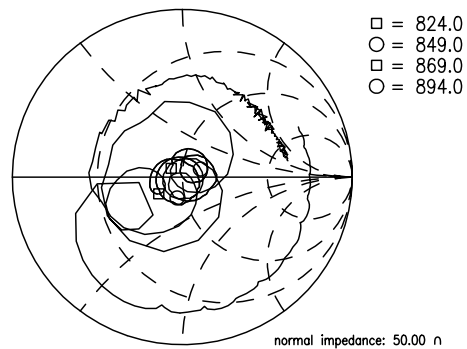
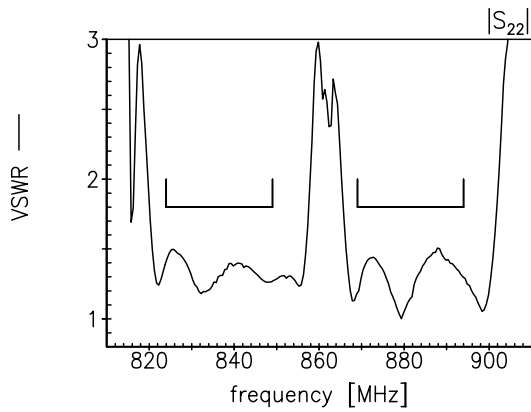
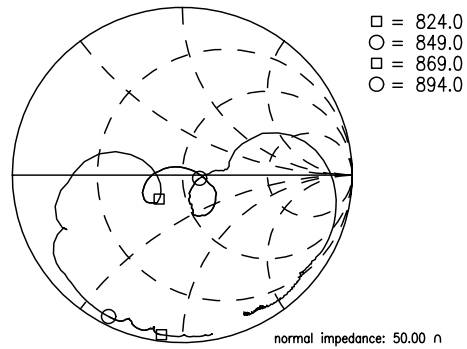
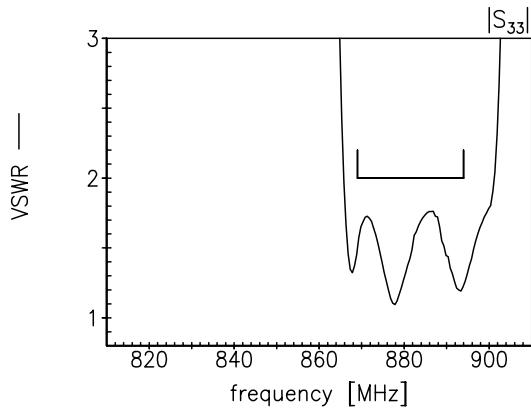
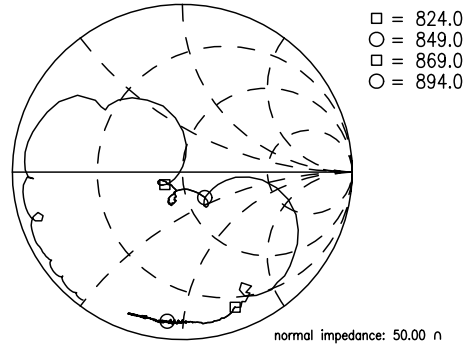
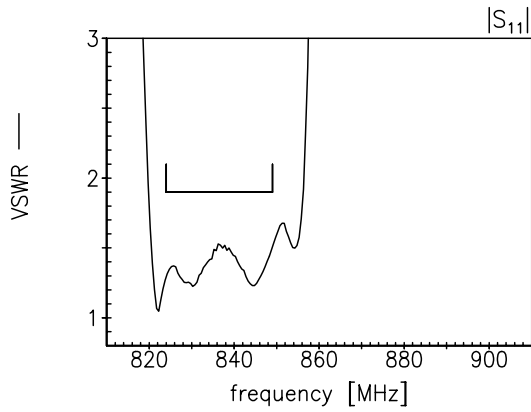


SAW Components **B7683**
SAW Duplexer **836.50 / 881.50 MHz**

Data Sheet



Return Loss **S₁₁ TX- port** **S₂₂ ANT-port** **S₃₃ RX-port**



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

**SAW Components****B7683****SAW Duplexer****836.50 / 881.50 MHz**

Data Sheet

**References**

Type	B7683
Ordering code	B39881B7683L310
Marking and package	C61157-A3-A56
Packaging	F61074-V8211-Z000
Date codes	L_1126
S-parameters	B7683_NB.s4p B7683_WB.s4p
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 .

**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). 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.