SAW Components

SAW TX Filter

PCS / WCDMA Band II

Series/type: **LP31B**
Ordering code:

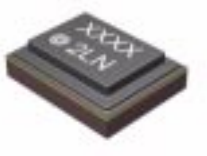
Date: June 15, 2007
Version: 1.2

Preliminary data

SMD

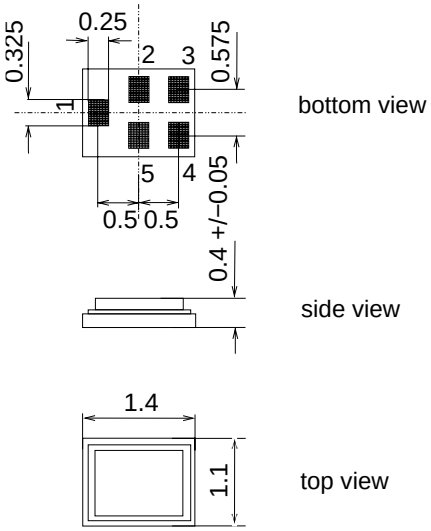
Application

- Low-loss RF filter for mobile telephone PCS and WCDMA systems, transmit path (TX)
- High selectivity
- Usable passband 60 MHz
- Impedance at input and output 50 Ω
- Unbalanced to unbalanced operation



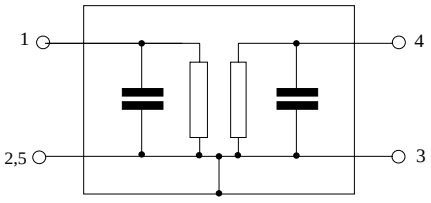
Features

- Package size 1.4 x1.1 x 0.4 mm³
- Package code QCS5M
- RoHS compatible
- Approximate weight 0.003 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

- 1 Input unbalanced [1)]
- 4 Output unbalanced [1)]
- 2,3,5 To be grounded



1) Input and Output can also be used vice versa.

Preliminary data SMD

Characteristics

Temperature range for specification: T = –30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 50 Ω

				LP31B[1] min.	LP31B[1] typ. @ 25 ˚C	LP31B[1] max.	
Center frequency		f_C		—	1880.0	—	MHz
Maximum insertion attenuation							
1850.625...1909.375	MHz	α_{max}		—	2.5	3.8[2]	dB
@$f_{Carrier}$ 1852.4 ...1907.6	MHz	α_{WCDMA}[3]		—	2.5	3.5	dB
Amplitude ripple (p-p)							
1850.625...1909.375	MHz	$\Delta\alpha$		—	1.3	3.0	dB
Error Vector Magnitude[4]							
@$f_{Carrier}$ 1852.4 ...1907.6	MHz	EVM		—	2.0	4.5	%
Input VSWR							
1850.625...1909.375	MHz			—	2.0		
Output VSWR							
1850.625...1909.375	MHz			—	2.2		
Attenuation			α				
0.0 ...1550.0	MHz			32	38	—	dB
1550.0 ...1580.0	MHz			35	40	—	dB
1580.0 ...1770.0	MHz			30	35	—	dB
1770.0 ...1830.0	MHz			14	18		
1930.625...1990.0	MHz			33[5]	36	—	dB
@$f_{Carrier}$ 1932.4 ...1987.6	MHz	α_{WCDMA}[3]		33	36	—	dB
1990.0 ...2032.0	MHz			35	39	—	dB
2032.0 ...2500.0	MHz			35	39		
2500.0 ...3700.0	MHz			30	37	—	dB
3700.0 ...3820.0	MHz			35	52	—	dB
3820.0 ...6000.0	MHz			25	39	—	dB

1) Values in columns min, typ and max indicate the development status of the current version.
2) Valid in temperature range -30˚C to +75˚C. Guaranteed for +85˚C: 4.2dB
3) Attenuation of WCDMA signal (“Powertransferfunction”). Please refer to annotation on page (4).
4) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.
5) Valid in temperature range -20˚C to +85˚C. Guaranteed for -30˚C: 29dB

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 Passband, $f_{Carrier}$ ranges from 1852.4 MHz (lowest Tx channel) to 1907.6 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:

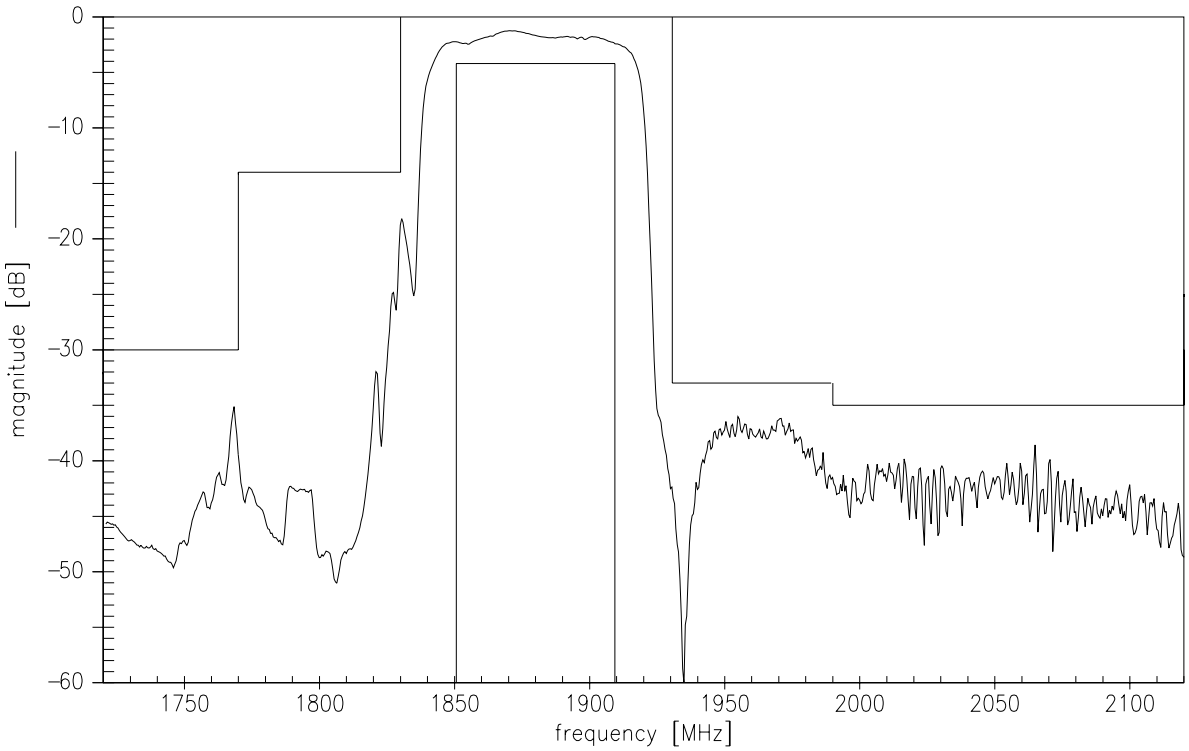
$$\int_{\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$

Maximum ratings

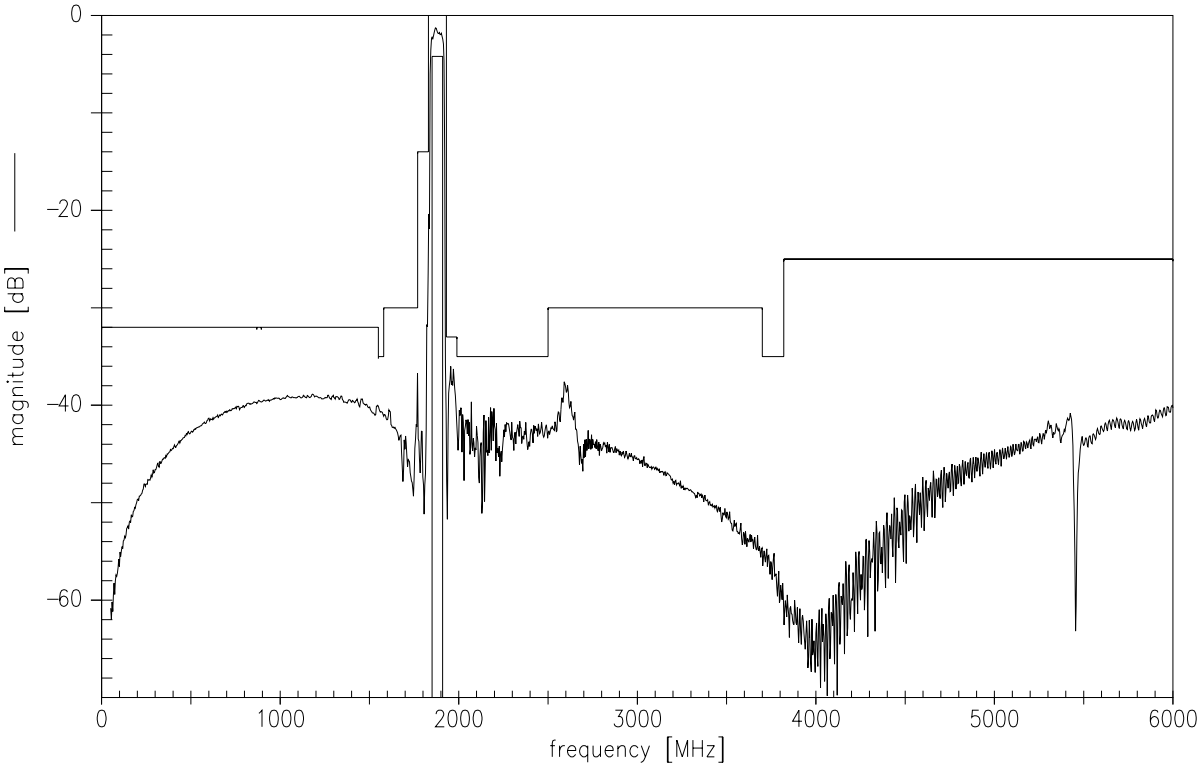
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 10 pulses
Input power	P_{IN}	tbd.		

1) acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.

Transfer function

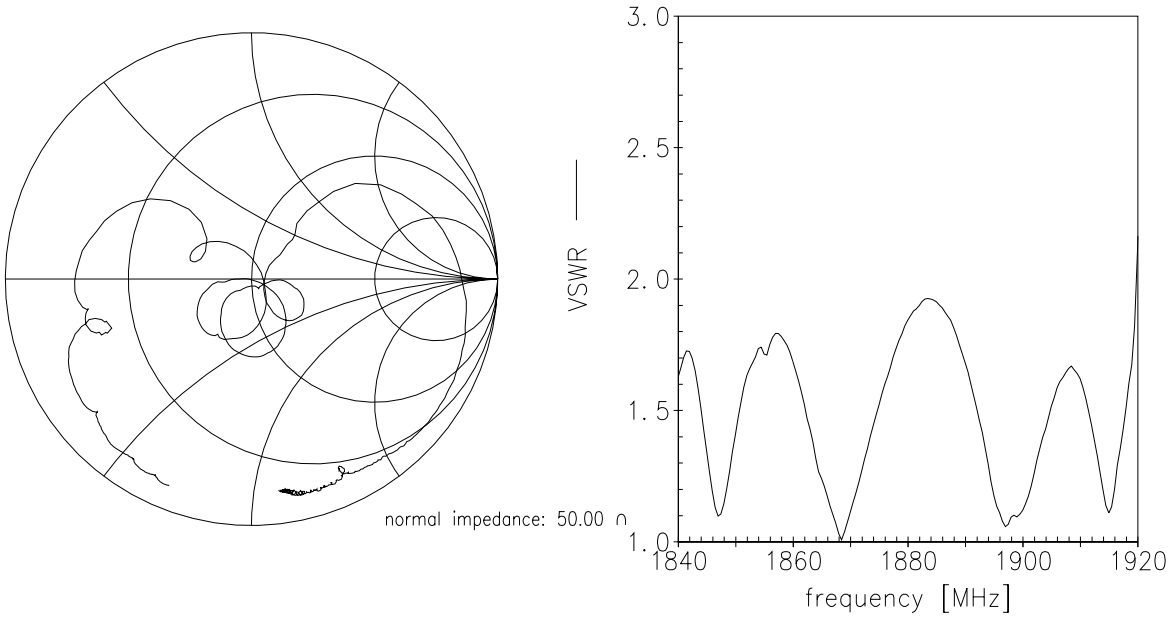


Transfer function (wideband)

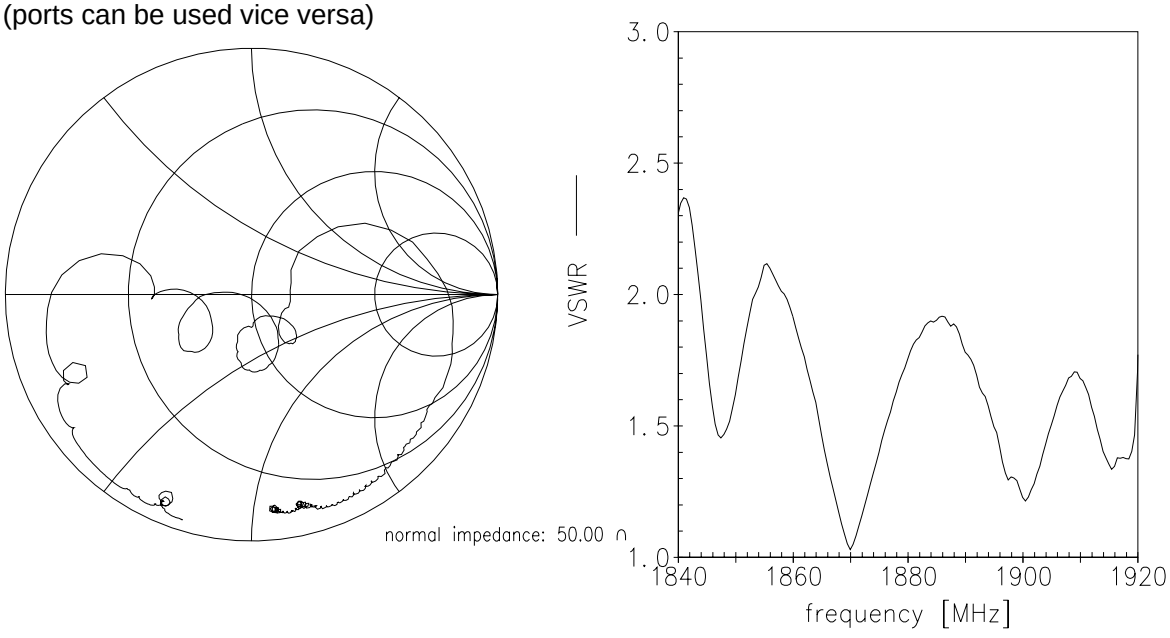


Smith charts

S_{11} function (unbalanced input)
(ports can be used vice versa)



S_{22} function (unbalanced output)
(ports can be used vice versa)



References

Type	LP31B
Ordering code	
Marking and package	tbd.
Packaging	tbd.
Date codes	L_1126
S-parameters	LP31B_NB.s2p LP31B_WB.s2p
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 passive 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 a passive 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 a passive 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.
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, CeraDiode, CSSP, PhaseCap, PhaseMod, SIFI, SIKOREL, SilverCap, SIMID, SIOV, SIP5D, SIP5K, TOPcap, UltraCap, 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.