



# SAW Components

## SAW Rx filter

WCDMA Band V / GSM850

|                       |                        |
|-----------------------|------------------------|
| <b>Series/type:</b>   | <b>B9867</b>           |
| <b>Ordering code:</b> | <b>B39881B9867P810</b> |
| <b>Date:</b>          | <b>March 22, 2012</b>  |
| <b>Version:</b>       | <b>2.0</b>             |

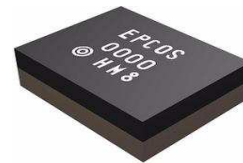
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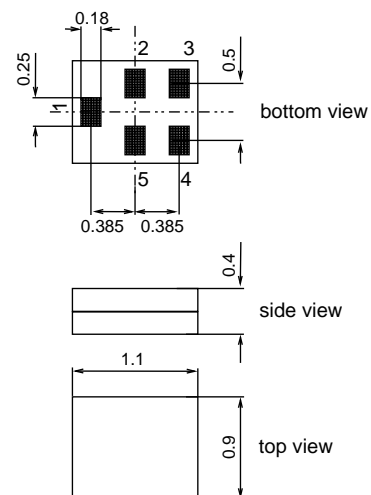
Data sheet

**Application**

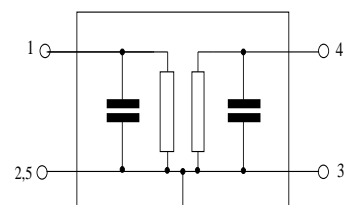
- Low-loss RF filter for mobile telephone WCDMA Band V and GSM 850 systems, receive path (RX)
- Suitable for diversity applications
- Very high TX suppression
- Impedance transformation from 50 Ω to 100 Ω
- Unbalanced to balanced operation
- Usable passband 25 MHz
- Suitable for GPRS class 1 to 12


**Features**

- Package size 1.1 x 0.9 x 0.4 mm<sup>3</sup>
- RoHS compatible
- Approx. weight 0.001g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


**Pin configuration**

- 1 Input, unbalanced
- 3,4 Output, balanced
- 2,5 To be grounded



**SAW Components**
**B9867**
**SAW Rx filter**
**881.5 MHz**

Data sheet


**Characteristics**

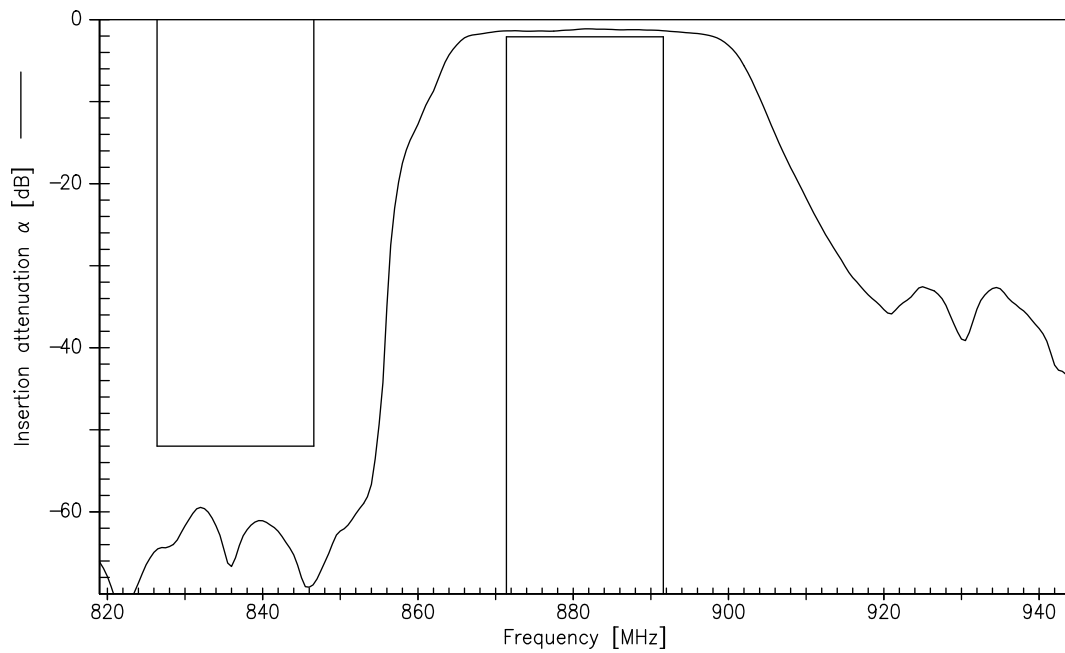
Temperature range for specification:  $T = -20\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$  (unbalanced)  
 Terminating load impedance:  $Z_L = 100\ \Omega$  (balanced)

|  |  | min. | typ.<br>@ 25 °C   | max. |     |
|--|--|------|-------------------|------|-----|
| <b>Center frequency</b>                                      | $f_C$  | —    | 881.5             | —    | MHz |
| <b>Maximum insertion attenuation</b>                         |  |      |                   |      |     |
|  | 869.0... 894.0 MHz $\alpha_{\max}$               | —    | 1.9               | 2.4  | dB  |
| @ $f_{\text{Carrier Bd 5 RX}}$                               | 871.4 ... 891.6 MHz $\alpha_{\text{WCDMA}}^{1)}$ | —    | 1.6               | 2.1  | dB  |
| <b>Amplitude ripple (p-p)</b>                                |  |      |                   |      |     |
|  | 869.0 ... 894.0 MHz $\Delta\alpha$               | —    | 0.8               | 1.3  | dB  |
| <b>Error Vector Magnitude<sup>2)</sup></b>                   |  |      |                   |      |     |
|  | 871.4 ... 891.6 MHz EVM                          | —    | 2.6 <sup>2)</sup> | 3.2  | %   |
| <b>Input VSWR</b>  | 869.0 ... 894.0 MHz                              | —    | 1.7               | 2.0  |     |
| <b>Output VSWR</b>   | 869.0 ... 894.0 MHz                              | —    | 1.8               | 2.1  |     |
| <b>CMRR (<math> S_{21}-S_{31}  /  S_{21}+S_{31} </math>)</b> | 869.0 ... 894.0 MHz                              | 21   | 25                | —    | dB  |
| <b>Attenuation</b>   |  |      |                   |      |     |
|  | DC ... 824.0 MHz $\alpha$                        | 40   | 69                | —    | dB  |
|  | 824.0 ... 849.0 MHz                              | 50   | 55                | —    | dB  |
| @ $f_{\text{Carrier Bd 5 TX}}$                               | 826.4 ... 846.6 MHz $\alpha_{\text{WCDMA}}^{1)}$ | 52   | 57                | —    | dB  |
|  | 849.0 ... 854.0 MHz                              | 10   | 56                | —    | dB  |
|  | 914.0 ... 954.0 MHz                              | 24   | 28                | —    | dB  |
|  | 954.0 ... 979.0 MHz                              | 28   | 54                | —    | dB  |
|  | 979.0 ... 1693.0 MHz                             | 35   | 49                | —    | dB  |
|  | 1693.0 ... 2607.0 MHz                            | 40   | 60                | —    | dB  |
|  | 2607.0 ... 2682.0 MHz                            | 42   | 47                | —    | dB  |
|  | 2682.0 ... 4345.0 MHz                            | 40   | 54                | —    | dB  |
|  | 4345.0 ... 6000.0 MHz                            | 45   | 54                | —    | dB  |

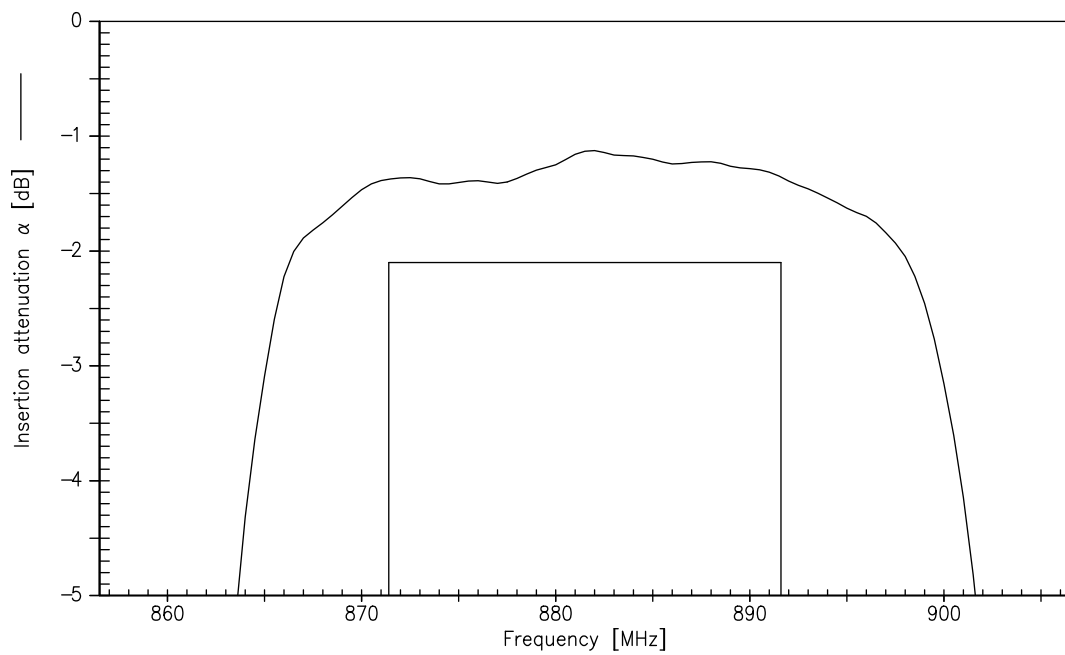
<sup>1)</sup> Attenuation of WCDMA signal ("Powertransferfunction").

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

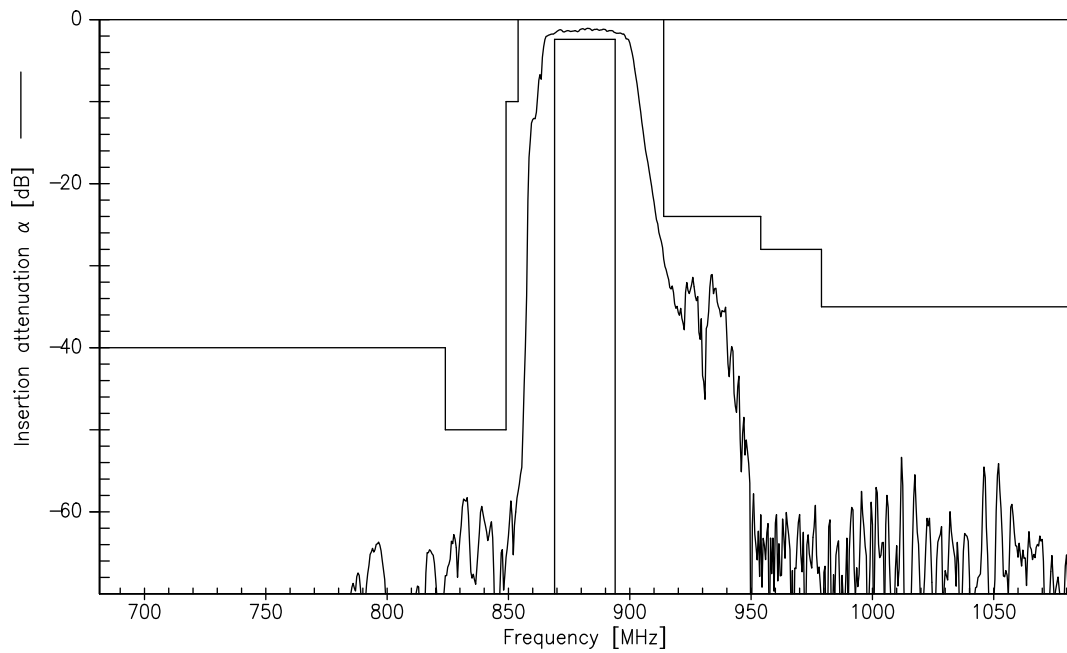
**Transfer function for WCDMA signals (Power transfer function vs. carrier frequency)**



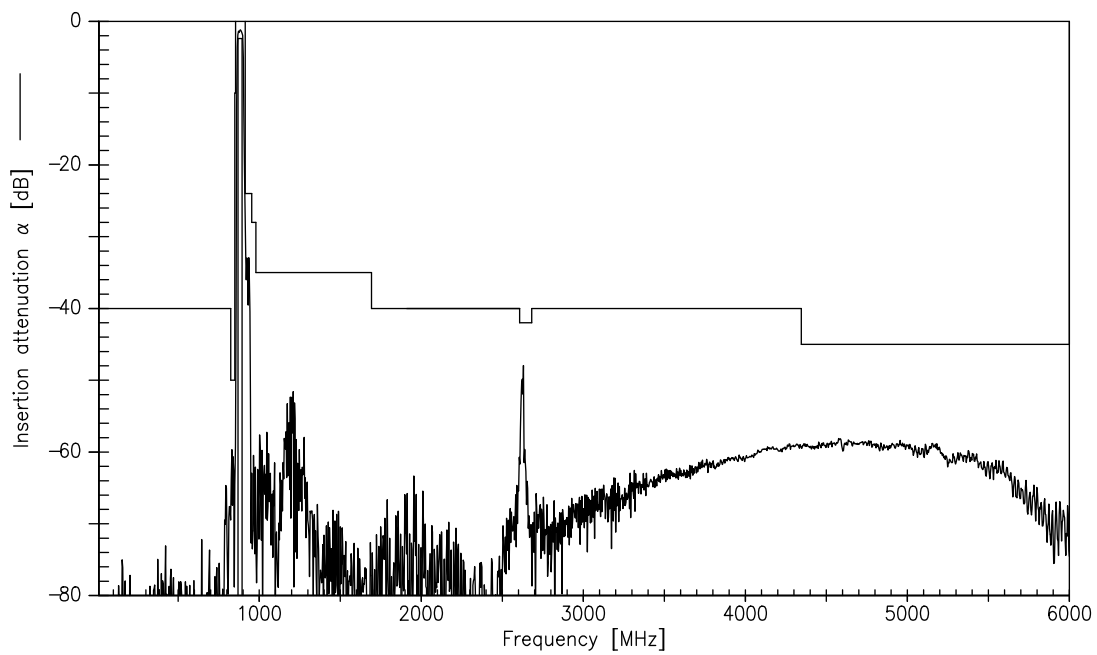
**Transfer function for WCDMA signals (Power transfer function vs. carrier frequency)**



Transfer function for CW signals (narrowband)



Transfer function for CW signals (wideband)

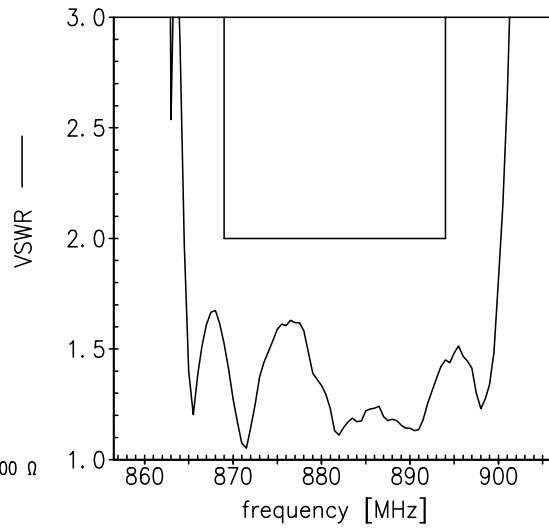
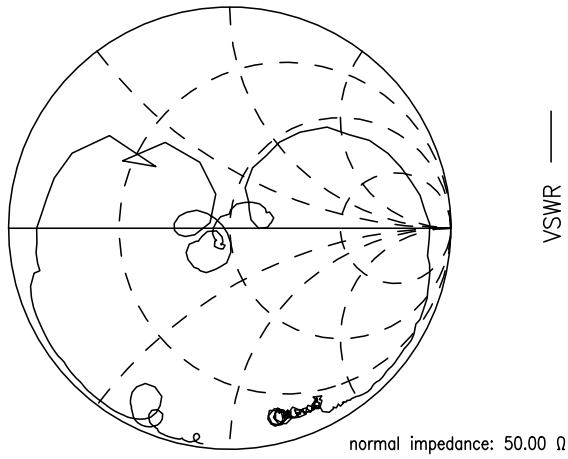


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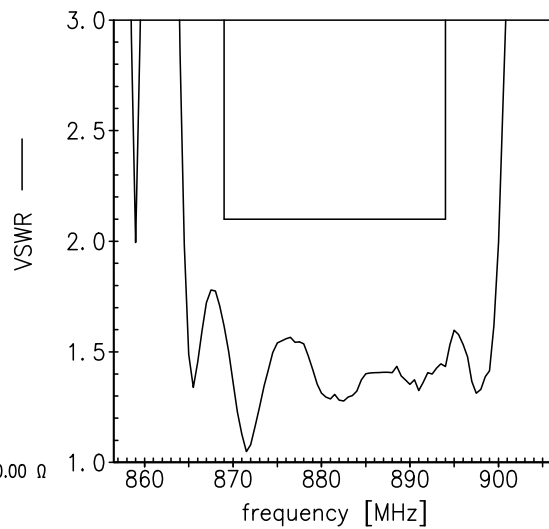
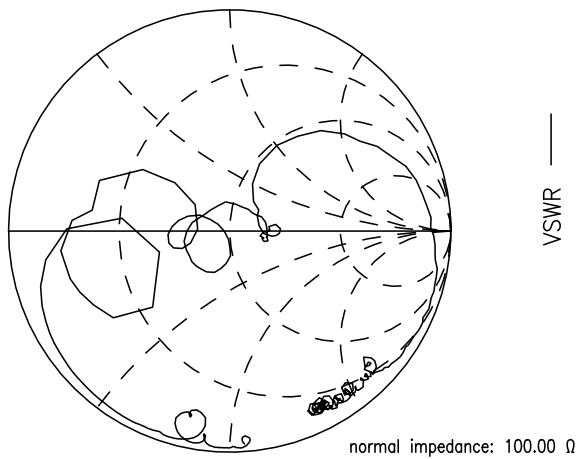


Smith charts

S<sub>11</sub> function



S<sub>22</sub> function



**Annotation for characteristics section**

Attenuation of WCDMA signal ("Powertransferfunction",  $\alpha_{\text{WCDMA}}$ ) is determined by

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

$f_{\text{Carrier}}$  according to 3GPP TS 25.101 (e.g. for band VIII RX passband,  $f_{\text{Carrier}}$  ranges from 927.4 MHz (lowest Rx channel) to 957.6 MHz (highest Rx channel)).  $H_{\text{RRC}}(f)$  is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

**Maximum ratings**

|                            |                  |                   |     |                        |
|----------------------------|------------------|-------------------|-----|------------------------|
| Operable temperature range | T                | -40/+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>1)</sup> | V   | machine model, 1 pulse |
| Input power at Tx band     | P <sub>IN</sub>  | 19                | dBm | 10000h @ 55°C          |

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

|                       |                  |
|-----------------------|------------------|
| <b>SAW Components</b> | <b>B9867</b>     |
| <b>SAW Rx filter</b>  | <b>881.5 MHz</b> |

Data sheet



## References

|                            |  |
|----------------------------|--|
| <b>Type</b>                | B9867  |
| <b>Ordering code</b>       | B39881B9867P810  |
| <b>Marking and package</b> | C61157-A8-A56  |
| <b>Packaging</b>           | F61074-V8255-Z000  |
| <b>Date codes</b>          | L_1126   |
| <b>S-parameters</b>        | B9867_NB.s3p<br>B9867_WB.s3p<br>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:<br>"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.   |
| <b>Matching coils</b>      | See Inductor pdf-catalog<br><a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a><br>and Data Library for circuit simulation<br><a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a>  |

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