



# *SAW Components*

*Data Sheet B9309*

Data Sheet

A large, stylized, 3D-rendered EPCOS logo is shown, appearing to be part of a globe or a sphere. The logo is white and stands out against a dark, textured background that resembles a globe's surface.



# SAW Components

B9309

## Low-Loss Dual Band Filter for Mobile Communication

881,5 / 1960,0 MHz

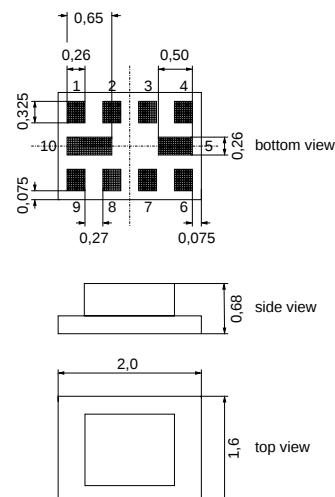
### Data Sheet



### Chip Sized Saw Package QCS10H

#### Features

- Low-loss 2in1 RF filter for mobile telephone GSM850/1900 systems, receive path
- Usable passband:  
Filter 1 (GSM850): 25 MHz  
Filter 2 (GSM1900): 60 MHz
- Unbalanced to balanced operation of both filters
- Impedance transformation from 50  $\Omega$  to 150  $\Omega$  for both filters
- Suitable for GPRS Class 1 to 12
- Ceramic package for Surface Mounted Technology (SMT)
- Pb-free

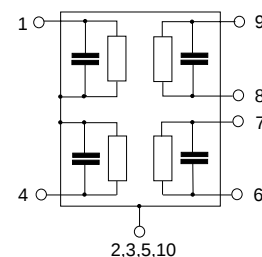


#### Terminals

Dimensions in mm, approx. weight 0,008g.

#### Pin configuration

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



| Type  | Ordering code     | Marking and Package according to | Packing according to |
|-------|-------------------|----------------------------------|----------------------|
| B9309 | B39192-B9309-G110 | C61157-A7-A141                   | F61074-V8152-Z000    |

#### Electrostatic Sensitive Device (ESD)

#### Maximum ratings

|                                                                    |                  |             |                    |                                                    |
|--------------------------------------------------------------------|------------------|-------------|--------------------|----------------------------------------------------|
| Operable temperature range                                         | $T$              | - 40 / + 85 | $^{\circ}\text{C}$ | Machine Model, 10 pulses                           |
| Storage temperature range                                          | $T_{\text{stg}}$ | - 40 / + 85 | $^{\circ}\text{C}$ |                                                    |
| DC voltage                                                         | $V_{\text{DC}}$  | 5           | V                  |                                                    |
| ESD voltage                                                        | $V_{\text{ESD}}$ | 50*         | V                  |                                                    |
| Input power at<br>GSM850, GSM900,<br>GSM1800, GSM1900<br>Tx bands: |                  |             |                    |                                                    |
| Filter 1 (GSM850)                                                  | $P_{\text{IN}}$  | 15          | dBm                | effective power in the on-state,<br>duty cycle 4:8 |
| Filter 2 (GSM1900)                                                 | $P_{\text{IN}}$  | 15          | dBm                |                                                    |

\* - acc. to JESD22-A115A (Machine Model), 10 negative & 10 positive pulses


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**Characteristics Filter 1 ( GSM850 )**

Operating temperature range:

 $T = -20 \text{ to } +75^{\circ}\text{C}$ 

Terminating source impedance:

 $Z_S = 50 \Omega$ 

Terminating load impedance:

 $Z_L = 150 \Omega \parallel 82\text{nH (balanced)}$ 

|                                                                                  |                                   |  | min. | typ.      | max. |        |
|----------------------------------------------------------------------------------|-----------------------------------|--|------|-----------|------|--------|
| <b>Center frequency</b>                                                          | $f_c$                             |  | —    | 881,5     | —    | MHz    |
| <b>Maximum insertion attenuation</b>                                             | $\alpha_{\max}$                   |  |      |           |      |        |
|                                                                                  | 869,0 ... 894,0 MHz               |  | —    | 1,6       | 1,8  | dB     |
|                                                                                  | 869,0 ... 894,0 MHz <sup>1)</sup> |  | —    | 1,5       | 1,7  | dB     |
| <b>Amplitude ripple (p-p)</b>                                                    | $\Delta\alpha$                    |  |      |           |      |        |
|                                                                                  | 869,0 ... 894,0 MHz               |  | —    | 0,7       | 1,0  | dB     |
| <b>Input VSWR</b>                                                                |                                   |  |      |           |      |        |
|                                                                                  | 869,0 ... 894,0 MHz               |  | —    | 2,0       | 2,2  |        |
| <b>Output VSWR</b>                                                               |                                   |  |      |           |      |        |
|                                                                                  | 869,0 ... 894,0 MHz               |  | —    | 2,0       | 2,2  |        |
| <b>Output amplitude balance (<math> S_{31} / S_{21} </math>)</b>                 |                                   |  |      |           |      |        |
|                                                                                  | 869,0 ... 894,0 MHz               |  | -1,0 | -0,7/+0,2 | 1,0  | dB     |
| <b>Output phase balance (<math>\phi(S_{31})-\phi(S_{21})+180^{\circ}</math>)</b> |                                   |  |      |           |      |        |
|                                                                                  | 869,0 ... 894,0 MHz               |  | -10  | -3 /+3    | 10   | degree |
| <b>Attenuation</b>                                                               | $\alpha_{\min}$                   |  |      |           |      |        |
|                                                                                  | 10,0 ... 447,0 MHz                |  | 45   | 50        | —    | dB     |
|                                                                                  | 447,0 ... 849,0 MHz               |  | 30   | 34        | —    | dB     |
|                                                                                  | 914,0 ... 1000,0 MHz              |  | 24   | 26        | —    | dB     |
|                                                                                  | 1000,0 ... 1738,0 MHz             |  | 28   | 38        | —    | dB     |
|                                                                                  | 1738,0 ... 1788,0 MHz             |  | 40   | 50        | —    | dB     |
|                                                                                  | 1788,0 ... 6000,0 MHz             |  | 35   | 44        | —    | dB     |

 1)  $T = +25 \pm 2^{\circ}\text{C}$



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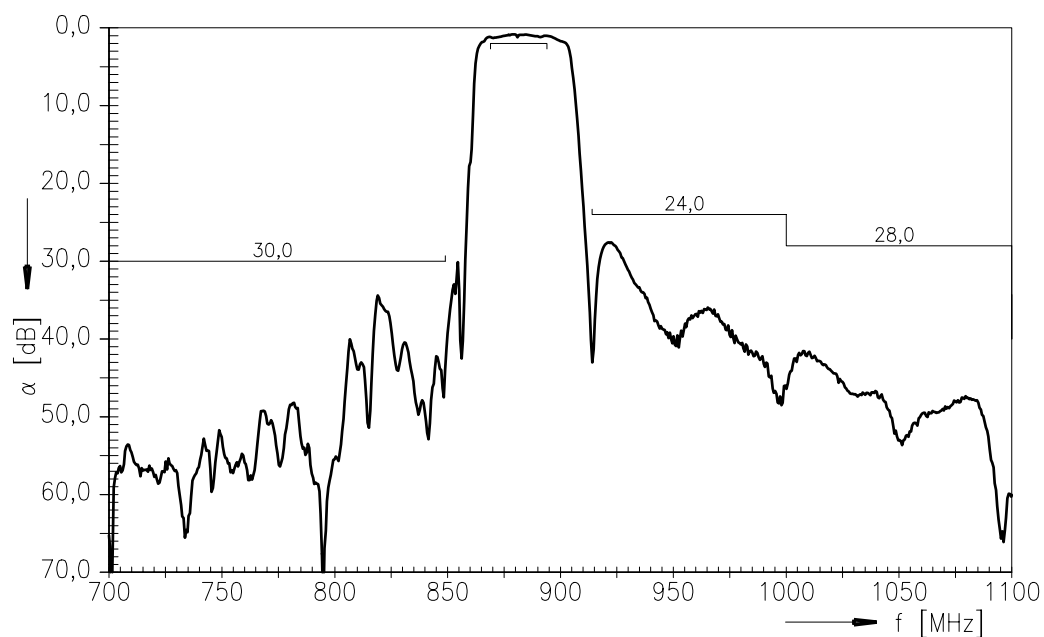
**Low-Loss Dual Band Filter for Mobile Communication**

**881,5 / 1960,0 MHz**

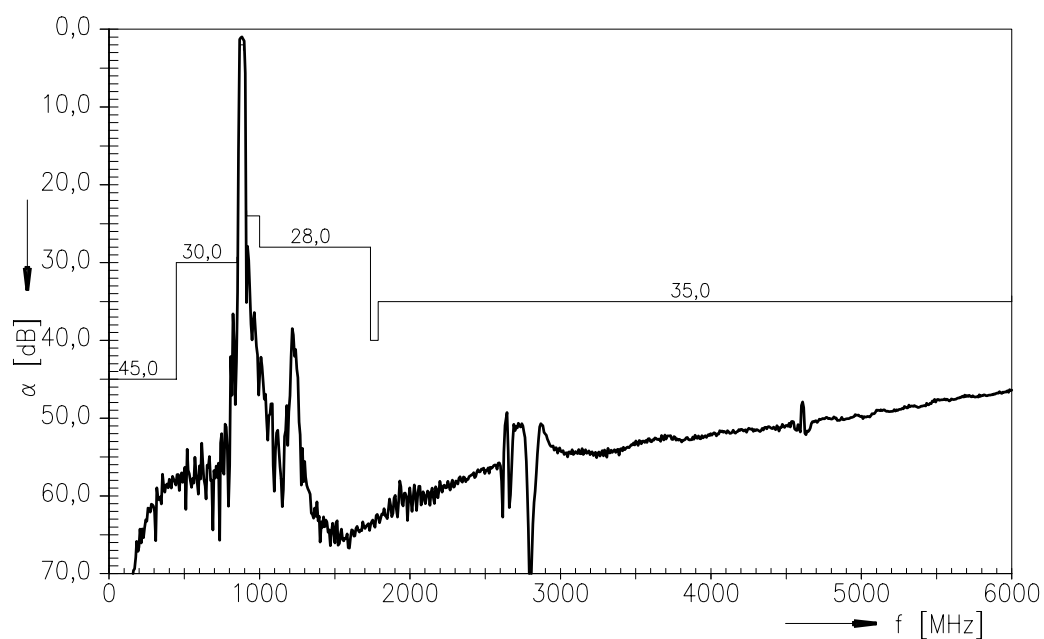
**Data Sheet**



**Transfer Function Filter 1 ( GSM850 )**



**Transfer Function Filter 1 ( GSM850 ) - wideband**




**SAW Components**
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**Low-Loss Dual Band Filter for Mobile Communication**
**881,5 / 1960,0 MHz**
**Data Sheet**

**Characteristics Filter 2 ( GSM1900 )**

Operating temperature range:

 $T = -20 \text{ to } +75^\circ\text{C}$ 

Terminating source impedance:

 $Z_S = 50 \Omega$ 

Terminating load impedance:

 $Z_L = 150 \Omega \parallel 18\text{nH (balanced)}$ 

|                                                                                |                 | min. | typ.      | max. |     |
|--------------------------------------------------------------------------------|-----------------|------|-----------|------|-----|
| <b>Center frequency</b>                                                        | $f_C$           | —    | 1960,0    | —    | MHz |
| <b>Maximum insertion attenuation</b>                                           | $\alpha_{\max}$ |      |           |      |     |
| 1930,0 ... 1990,0 MHz                                                          |                 | —    | 1,7       | 2,3  | dB  |
| 1930,0 ... 1990,0 MHz <sup>1)</sup>                                            |                 | —    | 1,6       | 2,1  | dB  |
| <b>Amplitude ripple (p-p)</b>                                                  | $\Delta\alpha$  |      |           |      |     |
| 1930,0 ... 1990,0 MHz                                                          |                 | —    | 0,5       | 1,0  | dB  |
| <b>Input VSWR</b>                                                              |                 |      |           |      |     |
| 1930,0 ... 1990,0 MHz                                                          |                 | —    | 1,7       | 2,0  |     |
| <b>Output VSWR</b>                                                             |                 |      |           |      |     |
| 1930,0 ... 1990,0 MHz                                                          |                 | —    | 1,7       | 2,0  |     |
| <b>Output amplitude balance (<math> S_{31} / S_{21} </math>)</b>               |                 |      |           |      |     |
| 1930,0 ... 1990,0 MHz                                                          |                 | -1,0 | -0,6/+0,6 | +1,0 | dB  |
| <b>Output phase balance (<math>\phi(S_{31})-\phi(S_{21})+180^\circ</math>)</b> |                 |      |           |      |     |
| 1930,0 ... 1990,0 MHz                                                          |                 | -10  | -2/+4     | +10  | °   |
| <b>Attenuation</b>                                                             | $\alpha$        |      |           |      |     |
| 10,0 ... 1830,0 MHz                                                            |                 | 30   | 36        | —    | dB  |
| 1830,0 ... 1910,0 MHz                                                          |                 | 12   | 16        | —    | dB  |
| 2010,0 ... 2070,0 MHz                                                          |                 | 12   | 16        | —    | dB  |
| 2070,0 ... 2400,0 MHz                                                          |                 | 21   | 24        | —    | dB  |
| 2400,0 ... 2500,0 MHz                                                          |                 | 30   | 34        | —    | dB  |
| 2500,0 ... 4000,0 MHz                                                          |                 | 28   | 34        | —    | dB  |
| 4000,0 ... 6000,0 MHz                                                          |                 | 28   | 34        | —    | dB  |

 1)  $T = +25 \pm 2^\circ\text{C}$



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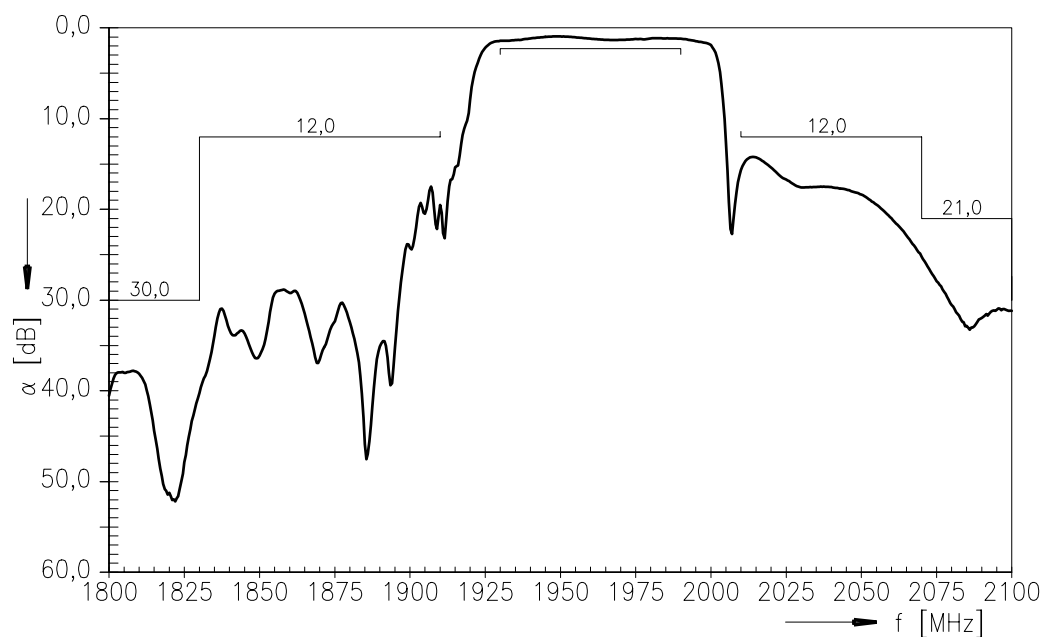
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**881,5 / 1960,0 MHz**

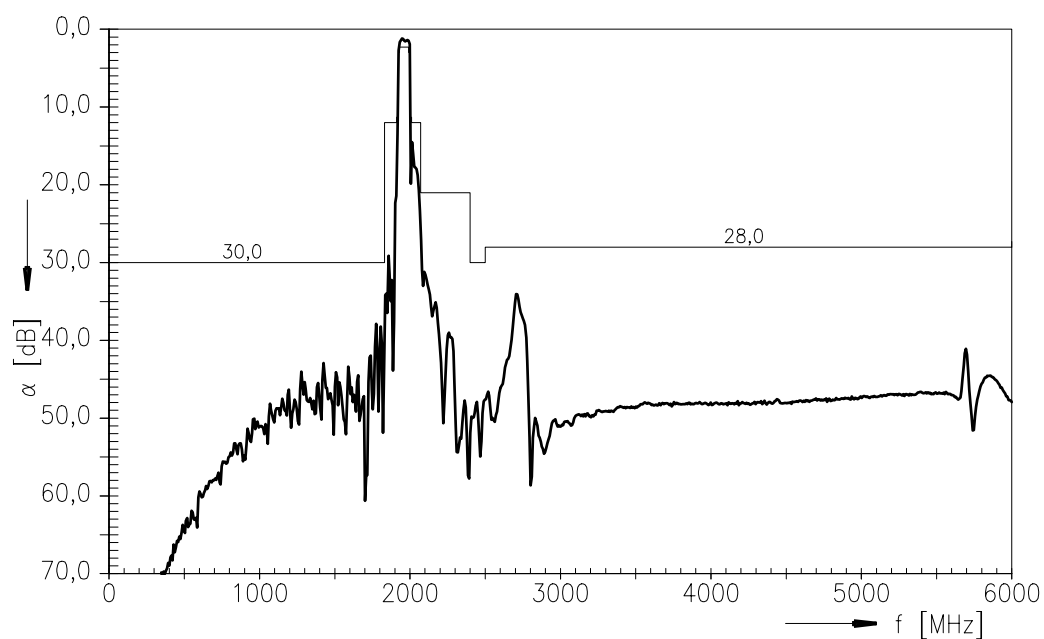
**Data Sheet**



**Transfer Function Filter 2 ( GSM1900 )**



**Transfer Function Filter 2 ( GSM1900 ) - wideband**





|                                                    |                                                                                   |
|----------------------------------------------------|-----------------------------------------------------------------------------------|
| SAW Components                                     | B9309                                                                             |
| Low-Loss Dual Band Filter for Mobile Communication | 881,5 / 1960,0 MHz                                                                |
| Data Sheet                                         |  |

**Published by EPCOS AG**

**Surface Acoustic Wave Components Division, SAW MC**

**P.O. Box 80 17 09, 81617 Munich, GERMANY**

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