EPCOS

# *SAW Components*

*Data Sheet B4223*

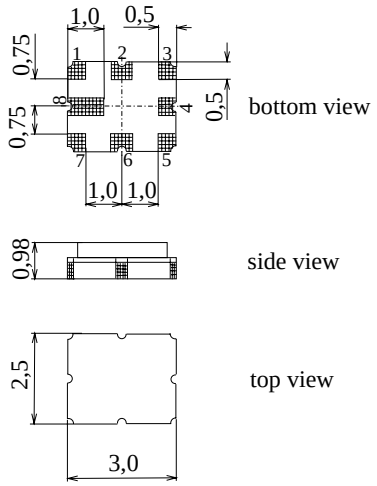
**Low-Loss Dual Band Filter for Mobile Communication** **881,5 / 1960 MHz**

**Data Sheet**

Ceramic package **QCC8E**

### Features

- Low-loss RF filter for mobile telephone GSM 850 and GSM 1900 system, receive path
- Usable Passband
  Filter 1 (GSM 850): 25 MHz
  Filter 2 (GSM 1900): 60 MHz
- 50 Ω ports for both filters
- Unbalanced to unbalanced operation
- Ceramic package for **S**urface **M**ounted **D**evice (**SMD**)



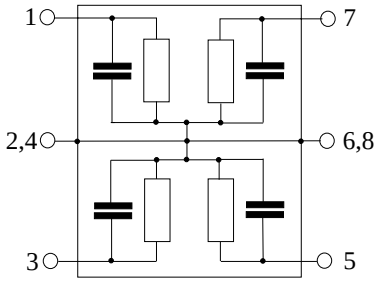

Dimensions in mm, approx. weight 27mg

### Terminals

- Ni, gold-plated

### Pin configuration

| | |
|---|---|
| 1 | GSM 850 Input |
| 7 | GSM 850 Output |
| 2,4,6,8 | Ground |
| 3 | GSM 1900 Input |
| 5 | GSM 1900 Output |




| Type | Ordering code | Marking and Package according to | Packing according to |
|---|---|---|---|
| B4223 | B39202-B4223-H410 | C61157-A7-A92 | F61074-V8129-Z0000 |

**E**lectrostatic **S**ensitive **D**evice (**ESD**)

### Maximum ratings

| | | | | |
|---|---|---|---|---|
| Operating temperature range | $T$ | – 20/+ 80 | ˚C | |
| Storage temperature range | $T_{stg}$ | – 40/+ 85 | ˚C | |
| DC voltage | $V_{DC}$ | 2,86 | V | |
| Input power max | | | | Source and load impedance 50 Ω |
| 824...849 MHz | $P_{IN}$ | 15 | dBm | 1:4 duty cycle |
| 1850...1910 MHz | | 12 | dBm | 1:4 duty cycle |

## Characteristics Filter 1 (GSM 850)

Operating temperature range $T$ = 25 ± 2°C
Terminating source impedance $Z_S$ = 50 Ω
Terminating load impedance $Z_L$ = 50 Ω

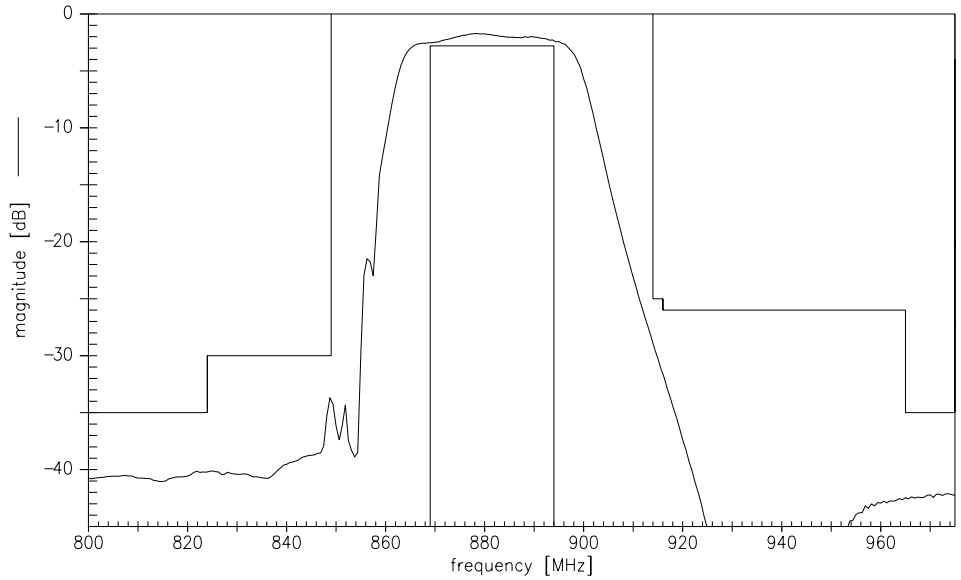
| | | min. | typ. | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_c$ | — | 881,5 | — | MHz |
| **Maximum insertion attenuation** | $\alpha_{max}$ | | | | |
| 869 ... 894 MHz | | — | 2,5 | 2,8 | dB |
| **Amplitude ripple** | $\Delta\alpha$ | | | | |
| 869 ... 894 MHz | | — | 0,9 | 1,2 | dB |
| **Input return loss** | | | | | |
| 869 ... 894 MHz | | 10,0 | 15,5 | — | dB |
| **Output return loss** | | | | | |
| 869 ... 894 MHz | | 10,0 | 15,5 | — | dB |
| **Attenuation** | $\alpha$ | | | | |
| 0 ... 824 MHz | | 35 | 40 | — | dB |
| 824 ... 849 MHz (Tx) | | 30 | 34 | — | dB |
| 914 ... 916 MHz | | 25 | 27 | — | dB |
| 916 ... 965 MHz | | 26 | 30 | — | dB |
| 965 ...1200 MHz | | 35 | 38 | — | dB |
| 1200 ... 3700 MHz | | 27 | 30 | — | dB |
| 3700 ... 4000 MHz | | 20 | 27 | — | dB |
| 4000 ... 6000 MHz | | 4 | 6 | — | dB |

## Characteristics Filter 1 (GSM 850)

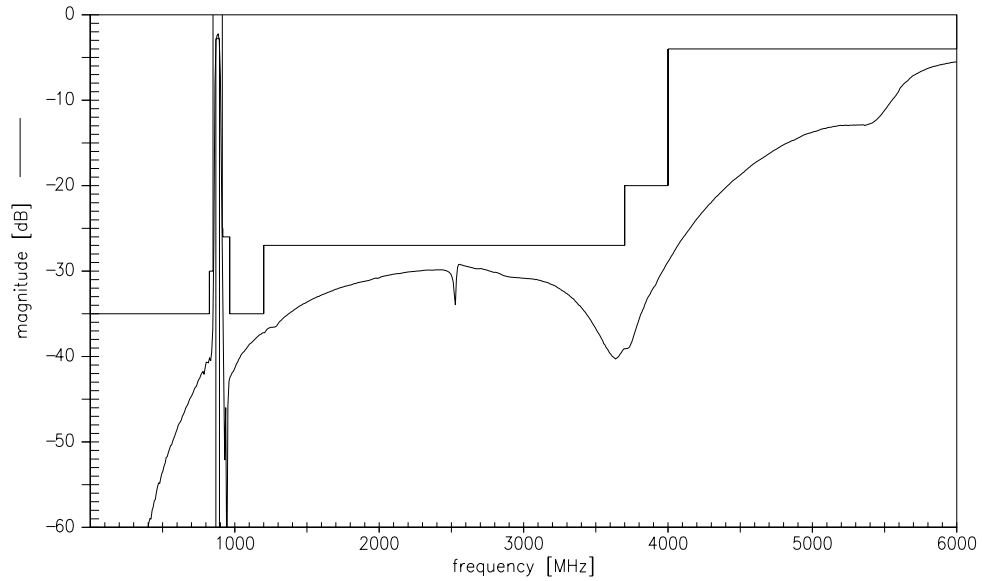
Operating temperature range $T$ = -20 to 80˚C
Terminating source impedance $Z_S$ = 50 Ω
Terminating load impedance $Z_L$ = 50 Ω

| | | min. | typ. | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_c$ | — | 881,5 | — | MHz |
| **Maximum insertion attenuation** | $\alpha_{max}$ | | | | |
| 869 ... 894 MHz | | — | 2,7 | 3,0 | dB |
| **Amplitude ripple** | $\Delta\alpha$ | | | | |
| 869 ... 894 MHz | | — | 1,1 | 1,4 | dB |
| **Input return loss** | | | | | |
| 869 ... 894 MHz | | 10,0 | 15,0 | — | dB |
| **Output return loss** | | | | | |
| 869 ... 894 MHz | | 10,0 | 15,0 | — | dB |
| **Attenuation** | $\alpha$ | | | | |
| 0 ... 824 MHz | | 35 | 40 | — | dB |
| 824 ... 849 MHz (Tx) | | 30 | 34 | — | dB |
| 914 ... 916 MHz | | 23,5 | 26 | — | dB |
| 916 ... 965 MHz | | 26 | 29 | — | dB |
| 965 ...1200 MHz | | 35 | 38 | — | dB |
| 1200 ... 3700 MHz | | 27 | 30 | — | dB |
| 3700 ... 4000 MHz | | 20 | 27 | — | dB |
| 4000 ... 6000 MHz | | 4 | 6 | — | dB |

**Transfer function of the AMPS filter** (narrow band measurement, all values at 25˚C)

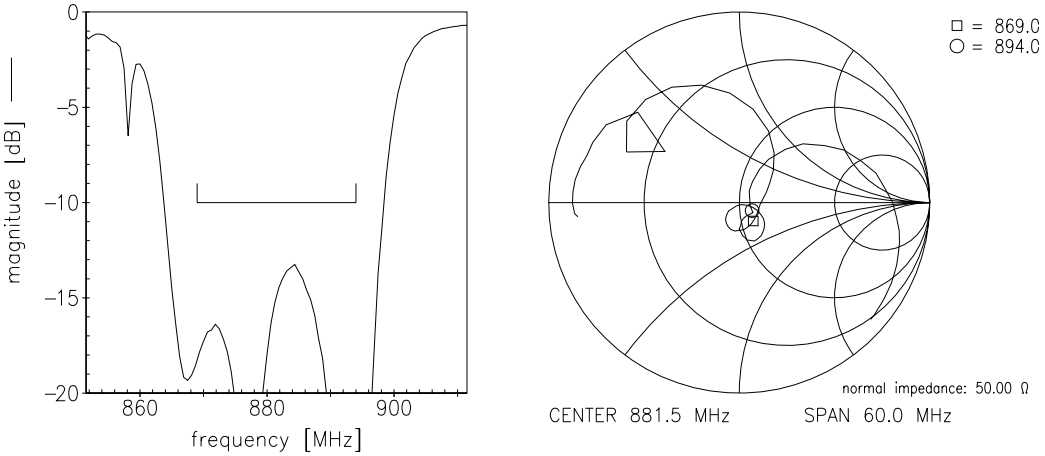



**Transfer function of the AMPS filter** (wide band measurement)

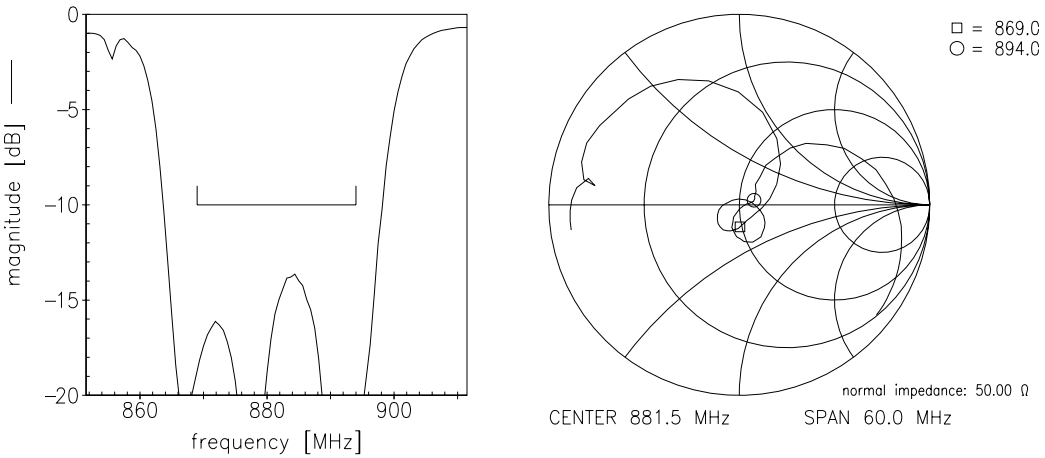


**Reflection coefficients AMPS filter** (measurement)

$S_{11}$




$S_{22}$



**Characteristics Filter 2 (GSM 1900)**

Operating temperature range $T$ = 25 ± 2 °C
Terminating source impedance $Z_S$ = 50 Ω
Terminating load impedance $Z_L$ = 50 Ω

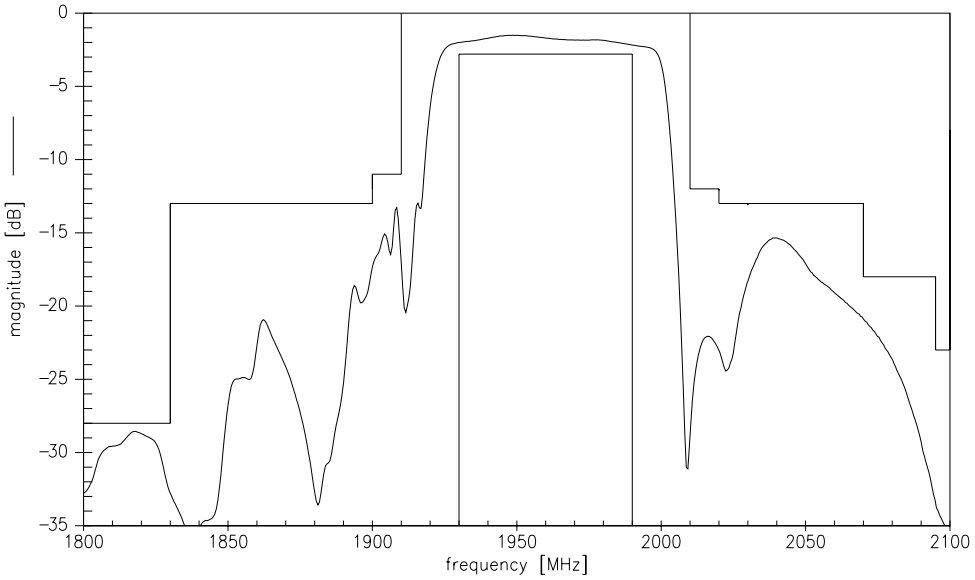
| | | min. | typ. | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_c$ | — | 1960 | — | MHz |
| **Maximum insertion attenuation** | $\alpha_{max}$ | | | | |
| 1930 ... 1990 MHz | | — | 2,5 | 2,8 | dB |
| **Amplitude ripple** (p-p) | $\Delta\alpha$ | | | | |
| 1930 ... 1990 MHz | | — | 1,1 | 1,4 | dB |
| **Input return loss** | | | | | |
| 1930 ... 1990 MHz | | 9,0 | 10,5 | — | dB |
| **Output return loss** | | | | | |
| 1930 ... 1990 MHz | | 9,5 | 10,5 | — | dB |
| **Attenuation** | $\alpha$ | | | | |
| 0 ... 1830 MHz | | 28 | 30 | — | dB |
| 1830 ... 1900 MHz (Tx) | | 13 | 15 | — | dB |
| 1900 ... 1910 MHz (Tx) | | 11 | 14 | — | dB |
| 2010 ... 2020 MHz | | 12 | 17 | — | dB |
| 2020 ... 2070 MHz | | 13 | 15 | — | dB |
| 2070 ... 2095 MHz | | 18 | 20 | — | dB |
| 2095 ... 2500 MHz | | 23 | 26 | — | dB |
| 2500 ... 4000 MHz | | 18 | 25 | — | dB |
| 4000 ... 5500 MHz | | 13 | 21 | — | dB |
| 5500 ... 6000 MHz | | 8 | 18 | — | dB |

**Characteristics Filter 2 (GSM 1900)**

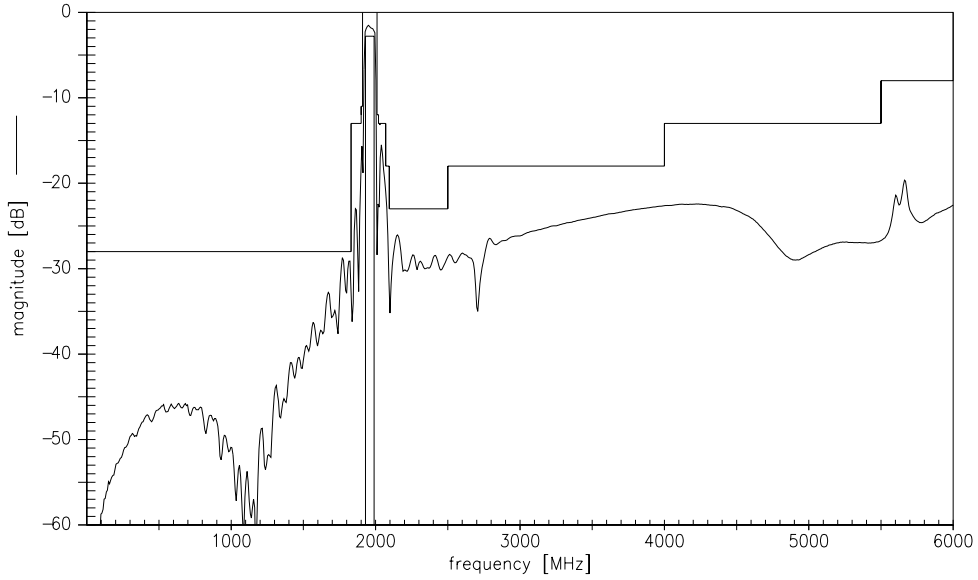
Operating temperature range $T$ = -20 to 80˚C
Terminating source impedance $Z_S$ = 50 Ω
Terminating load impedance $Z_L$ = 50 Ω

| | | min. | typ. | max. | |
|---|---|---|---|---|---|
| **Center frequency** | $f_c$ | — | 1960 | — | MHz |
| **Maximum insertion attenuation** | $\alpha_{max}$ | | | | |
| 1930 ... 1990 MHz | | — | 2,6 | 3,0 | dB |
| **Amplitude ripple** (p-p) | $\Delta\alpha$ | | | | |
| 1930 ... 1990 MHz | | — | 1,2 | 1,6 | dB |
| **Input return loss** | | | | | |
| 1930 ... 1990 MHz | | 8,5 | 10,5 | — | dB |
| **Output return loss** | | | | | |
| 1930 ... 1990 MHz | | 9,5 | 10,5 | — | dB |
| **Attenuation** | $\alpha$ | | | | |
| 0 ... 1830 MHz | | 28 | 30 | — | dB |
| 1830 ... 1900 MHz (Tx) | | 13 | 15 | — | dB |
| 1900 ... 1910 MHz (Tx) | | 10 | 13 | — | dB |
| 2010 ... 2020 MHz | | 12 | 14 | — | dB |
| 2020 ... 2070 MHz | | 13 | 15 | — | dB |
| 2070 ... 2095 MHz | | 18 | 20 | — | dB |
| 2095 ... 2500 MHz | | 23 | 26 | — | dB |
| 2500 ... 4000 MHz | | 18 | 25 | — | dB |
| 4000 ... 5500 MHz | | 13 | 21 | — | dB |
| 5500 ... 6000 MHz | | 8 | 18 | — | dB |

**Transfer function of the PCS filter** (narrow band measurement, all values at 25˚C)

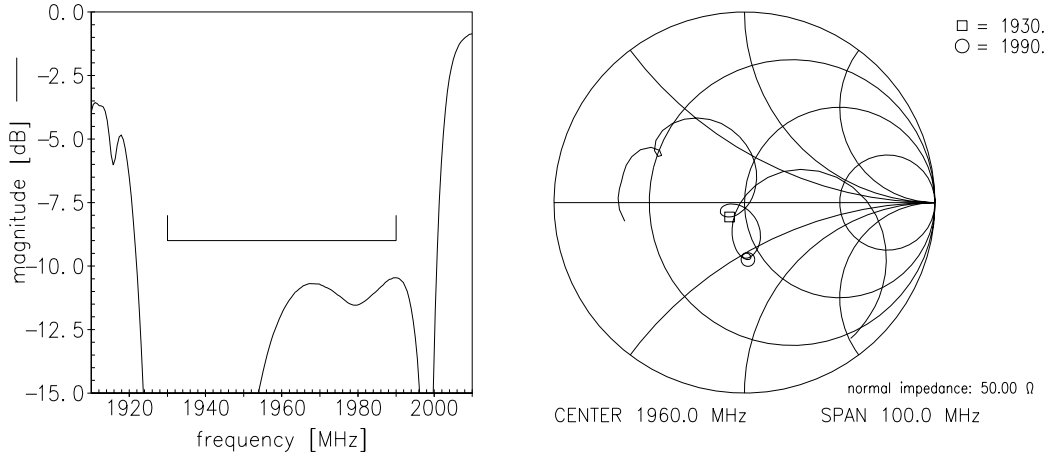



**Transfer function of the PCS filter** (wide band measurement)

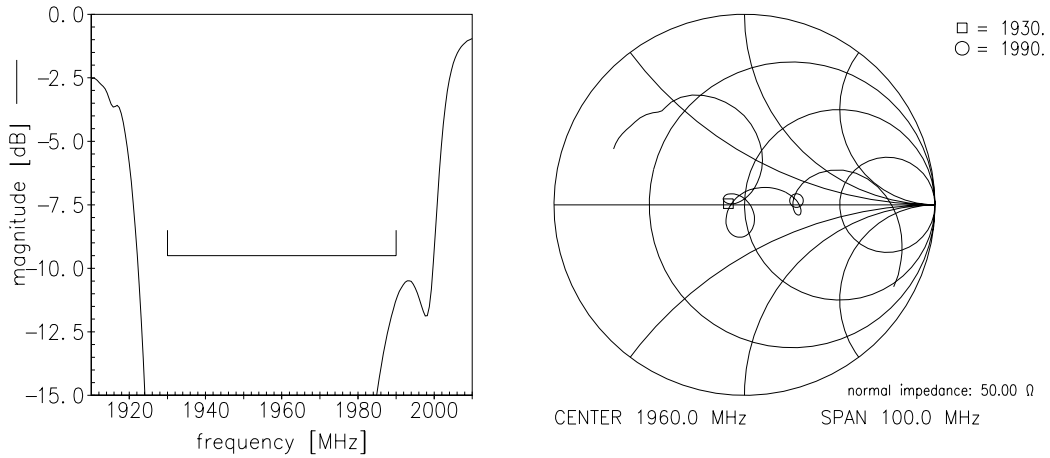


**Reflection coefficients PCS filter** (measurement)

$S_{11}$




$S_{22}$



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