



SAW Components

SAW duplexer

WCDMA band VIII

Series/type: B8605
Ordering code: B39941B8605P810

Date: July 02, 2013
Version: 2.1

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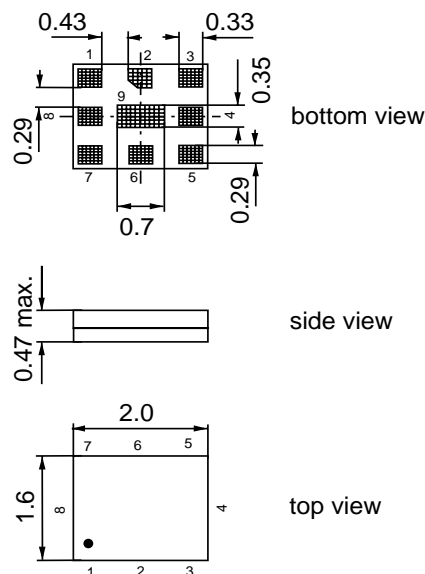
Data sheet


Application

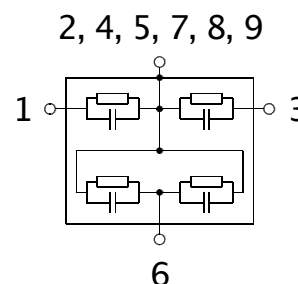
- Low-loss SAW duplexer for mobile telephone WCDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- 50 Ω single-ended in both in Antenna-Rx and Tx-Antenna paths


Features

- Package size 2.0 x 1.6mm²
- Max. package height 0.47mm
- RoHS compatible
- Approx. weight 0.006g
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


Pin configuration

- 1 Rx output (single-ended)
- 3 Tx input (single-ended)
- 6 Antenna
- 2,4,5,7,8,9 Ground



Data sheet


Characteristics

| | |
|--------------------------------------|-----------------------------------|
| Temperature range for specification: | T = -20 °C to +85 °C |
| Ant terminating impedance: | Z _{Ant} = 50 Ω 7.5 nH |
| Tx terminating impedance: | Z _{Tx} = 50 Ω |
| Rx terminating impedance: | Z _{Rx} = 50 Ω |

| Characteristics Tx - Ant | | | | | min. | typ. @25 °C | max. | |
|---|-------------------|----------------|-----------------------------------|--|------|----------------|-------------------|-----|
| Center frequency | | f _C | | | — | 897.5 | — | MHz |
| Maximum insertion attenuation | | | | | | | | |
| @f _{Carrier} | 882.4 ... 912.6 | MHz | α _{WCDMA} ¹⁾ | | — | 2.0 | 2.6 | dB |
| | 880.4 ... 914.6 | MHz | | | — | 2.3 | 3.8 | dB |
| | 880.0 ... 915.0 | MHz | | | — | 2.4 | 4.0 | dB |
| Amplitude ripple (p-p) | | | | | | | | |
| @f _{Carrier} | 882.4 ... 912.6 | MHz | Δα _{WCDMA} ¹⁾ | | — | 1.1 | 1.8 | dB |
| | 880.4 ... 914.6 | MHz | | | — | 1.4 | 3.0 | dB |
| | 880.0 ... 915.0 | MHz | | | — | 1.5 | 3.2 | dB |
| Amplitude ripple over any 5MHz channel | | | | | | | | |
| @f _{Carrier} | 882.4 ... 912.6 | MHz | Δα _{WCDMA} ¹⁾ | | — | 0.7 | 1.1 | dB |
| | 880.0 ... 915.0 | MHz | | | — | 0.8 | 2.1 | dB |
| Error Vector Magnitude | | | | | | | | |
| @f _{Carrier} | 882.4 ... 912.6 | MHz | EVM ²⁾ | | — | 2.6 | 7.0 | % |
| @f _{Carrier} | 882.4 ... 912.6 | MHz | EVM ²⁾ | | — | 2.6 | 4.5 ³⁾ | % |
| VSWR | | | | | | | | |
| Tx port | 880.0 ... 915.0 | MHz | | | — | 1.7 | 2.1 | |
| Ant port | 880.0 ... 915.0 | MHz | | | — | 1.8 | 2.1 | |
| Attenuation | | | α | | | | | |
| | 10.0 ... 716.0 | MHz | | | 30 | 34 | — | dB |
| | 716.0 ... 728.0 | MHz | | | 30 | 34 | — | dB |
| | 728.0 ... 793.0 | MHz | | | 30 | 34 | — | dB |
| @f _{Carrier} | 927.4 ... 957.6 | MHz | α _{WCDMA} ¹⁾ | | 44 | 50 | — | dB |
| | 1559.0 ... 1563.0 | MHz | | | 45 | 51 | — | dB |

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 8.

2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141

3) T = +25 °C

Data sheet


Characteristics

| | |
|--------------------------------------|----------------------------------|
| Temperature range for specification: | T = -20 °C to +85 °C |
| Ant terminating impedance: | Z _{Ant} = 50Ω 7.5 nH |
| Tx terminating impedance: | Z _{Tx} = 50Ω |
| Rx terminating impedance: | Z _{Rx} = 50Ω |

| Characteristics Tx - Ant | min. | typ. @ 25 °C | max. | |
|----------------------------|------|-----------------|------|----|
| Attenuation | | | | |
| | | | | α |
| 1565.42 ... 1573.374 MHz | 45 | 51 | — | dB |
| 1573.374 ... 1577.466 MHz | 45 | 51 | — | dB |
| 1577.466 ... 1585.42 MHz | 45 | 52 | — | dB |
| 1597.5515 ... 1605.886 MHz | 45 | 51 | — | dB |
| 1760.0 ... 1830.0 MHz | 38 | 43 | — | dB |
| 1830.0 ... 1880.0 MHz | 27 | 42 | — | dB |
| 2110.0 ... 2170.0 MHz | 27 | 36 | — | dB |
| 2400.0 ... 2500.0 MHz | 27 | 33 | — | dB |
| 2620.0 ... 2745.0 MHz | 20 | 32 | — | dB |
| 3520.0 ... 3660.0 MHz | 20 | 29 | — | dB |
| 4400.0 ... 4575.0 MHz | 20 | 27 | — | dB |
| 5150.0 ... 5490.0 MHz | 10 | 25 | — | dB |
| 5725.0 ... 5850.0 MHz | 10 | 21 | — | dB |

Data sheet


Characteristics

| | |
|--------------------------------------|-----------------------------------|
| Temperature range for specification: | T = -20 °C to +85 °C |
| Ant terminating impedance: | Z _{Ant} = 50 Ω 7.5 nH |
| Tx terminating impedance: | Z _{Tx} = 50 Ω |
| Rx terminating impedance: | Z _{Rx} = 50 Ω |

| Characteristics Rx - Ant | | min. | typ. @25 °C | max. | |
|---|-----------------------------------|------|----------------|-------------------|-----|
| Center frequency | f _C | — | 942.5 | — | MHz |
| Maximum insertion attenuation | | | | | |
| @f _{Carrier} 927.4 ... 957.6 MHz | α _{WCDMA} ¹⁾ | — | 1.7 | 2.5 | dB |
| 925.4 ... 959.6 MHz | | — | 1.9 | 3.5 | dB |
| 925.0 ... 960.0 MHz | | — | 1.9 | 4.0 | dB |
| Amplitude ripple (p-p) | | | | | |
| @f _{Carrier} 927.4 ... 957.6 MHz | Δα _{WCDMA} ¹⁾ | — | 0.5 | 1.3 | dB |
| 925.4 ... 959.6 MHz | | — | 0.7 | 2.3 | dB |
| 925.0 ... 960.0 MHz | | — | 0.7 | 2.8 | dB |
| Amplitude ripple over any 5MHz channel | | | | | |
| @f _{Carrier} 927.4 ... 957.6 MHz | Δα _{WCDMA} ¹⁾ | — | 0.3 | 1.0 | dB |
| 925.0 ... 960.0 MHz | | — | 0.5 | 1.8 | dB |
| Error Vector Magnitude | | | | | |
| @f _{Carrier} 927.4 ... 957.6 MHz | EVM ²⁾ | — | 2.8 | 8.0 | % |
| @f _{Carrier} 927.4 ... 957.6 MHz | EVM ²⁾ | — | 2.8 | 5.0 ³⁾ | % |
| VSWR | | | | | |
| Rx port 925.0 ... 960.0 MHz | | — | 1.7 | 2.3 | |
| Ant port 925.0 ... 960.0 MHz | | — | 1.7 | 2.1 | |
| Attenuation | | | | | |
| 10.0 ... 880.0 MHz | α | 40 | 60 | — | dB |
| 902.5 ... 910.0 MHz | | 30 | 55 | — | dB |
| @f _{Carrier} 882.4 ... 912.6 MHz | α _{WCDMA} ¹⁾ | 45 | 58 | — | dB |
| 980.0 ... 1045.0 MHz | | 22 | 28 | — | dB |

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 8.

2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141

3) T= +25°C

Data sheet


Characteristics

| | |
|--------------------------------------|-----------------------------------|
| Temperature range for specification: | T = -20 °C to +85 °C |
| Ant terminating impedance: | Z _{Ant} = 50 Ω 7.5 nH |
| Tx terminating impedance: | Z _{Tx} = 50 Ω |
| Rx terminating impedance: | Z _{Rx} = 50 Ω |

| Characteristics Rx - Ant | | | | min. | typ. @ 25 °C | max. | |
|---|-----|--------|-----|------|-----------------|------|-----|
| Attenuation | | | | | | | |
| 1045.0 | ... | 1805.0 | MHz | 35 | 56 | — | dB |
| 1805.0 | ... | 1920.0 | MHz | 40 | 66 | — | dB |
| 1920.0 | ... | 2400.0 | MHz | 40 | 65 | — | dB |
| 2400.0 | ... | 2500.0 | MHz | 40 | 65 | — | dB |
| 2685.0 | ... | 2880.0 | MHz | 40 | 55 | — | dB |
| 2880.0 | ... | 3700.0 | MHz | 40 | 59 | — | dB |
| 3700.0 | ... | 3840.0 | MHz | 40 | 55 | — | dB |
| 4625.0 | ... | 4800.0 | MHz | 35 | 43 | — | dB |
| 5550.0 | ... | 5725.0 | MHz | 30 | 35 | — | dB |
| 5725.0 | ... | 5875.0 | MHz | 30 | 38 | — | dB |
| IMD Product Level Limit¹⁾ | | | | | | | |
| at f _{Tx} =897.5 MHz, f _{Rx} =942.5 MHz | | | | | | | |
| Blocker 1 | | 45.0 | MHz | — | -126 | -117 | dBm |
| Blocker 2 | | 852.5 | MHz | — | -109 | -100 | dBm |
| Blocker 3 | | 1840.0 | MHz | — | -111 | -100 | dBm |
| Blocker 4 | | 2737.5 | MHz | — | -111 | -103 | dBm |

¹⁾ IMD product level limits for power levels P_{Tx}=21dBm (antenna port output power) and P_{Blocker}=-15dBm (antenna port input power)

Data sheet


Characteristics

| | |
|--------------------------------------|-----------------------------------|
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| Ant terminating impedance: | Z _{Ant} = 50 Ω 7.5 nH |
| Tx terminating impedance: | Z _{Tx} = 50 Ω |
| Rx terminating impedance: | Z _{Rx} = 50 Ω |

| Characteristics Tx - Rx | | | | | | min. | typ. @25 °C | max. | |
|-------------------------|-------|-----|-------|-----|----------------------------------|------------------|----------------|------|----|
| Isolation | | | | | | | | | |
| @f _{Carrier} | 882.4 | ... | 912.6 | MHz | α _{WCDMA} ¹⁾ | 55 | 61 | — | dB |
| | 880.0 | ... | 915.0 | MHz | | 50 | 60 | — | dB |
| | 880.0 | ... | 915.0 | MHz | | 55 ²⁾ | 60 | — | dB |
| @f _{Carrier} | 927.4 | ... | 957.6 | MHz | α _{WCDMA} ¹⁾ | 50 | 54 | — | dB |

¹⁾ Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page 8.

²⁾ T= +25 °C


Maximum ratings

| | | | | |
|---------------------------|------------------|-----------------------|-----|---|
| Storage temperature range | T _{stg} | -40/+85 ¹⁾ | °C | Machine Model } continuous wave 50 °C, 5000 h |
| DC voltage | V _{DC} | 5 ²⁾ | V | |
| DC impedance to ground | | >100 | MΩ | |
| ESD voltage | V _{ESD} | 100 ³⁾ | V | |
| Input power at | P _{IN} | | | |
| 880.0 ... 915.0 MHz | | 29 | dBm | |
| elsewhere | | 10 | dBm | |

1) extended upperlimit: 168h@125°C acc. to IEC 60068-2-2 Bb

2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy

3) acc. to JESD22-A115B (MM - Machine Model), 10 negative and 10 positive pulses.

Annotation for characteristics section

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

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

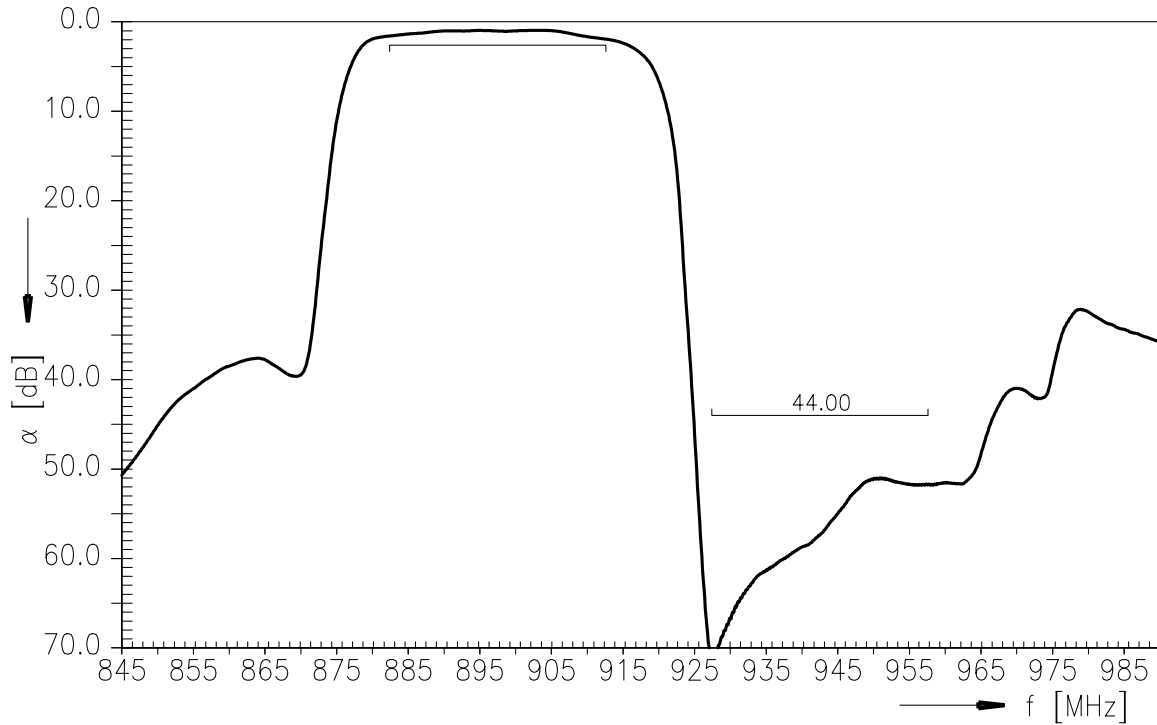
f_{Carrier} according to 3GPP TS 25.101 (e.g. for band VIII Rx Passband, f_{Carrier} ranges from 927.4 MHz (lowest Rx channel) to 957.6 MHz (highest Rx channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the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

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

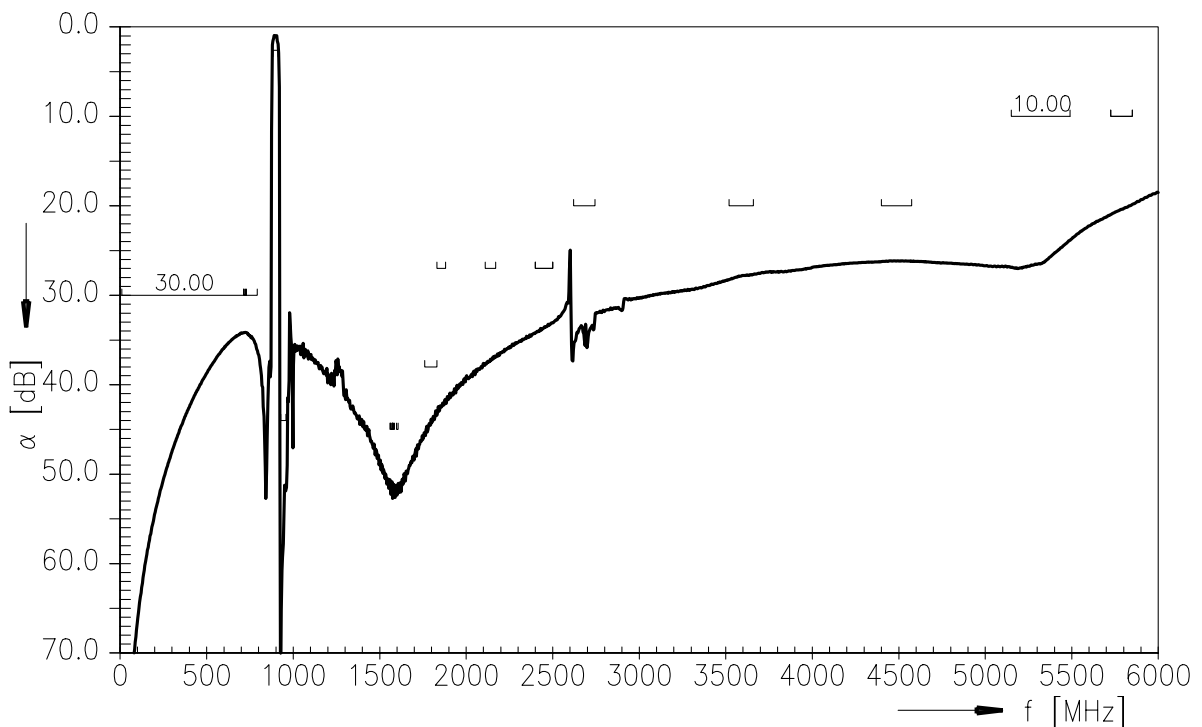
Data sheet



Frequency response Tx-Antenna (Power transfer function)



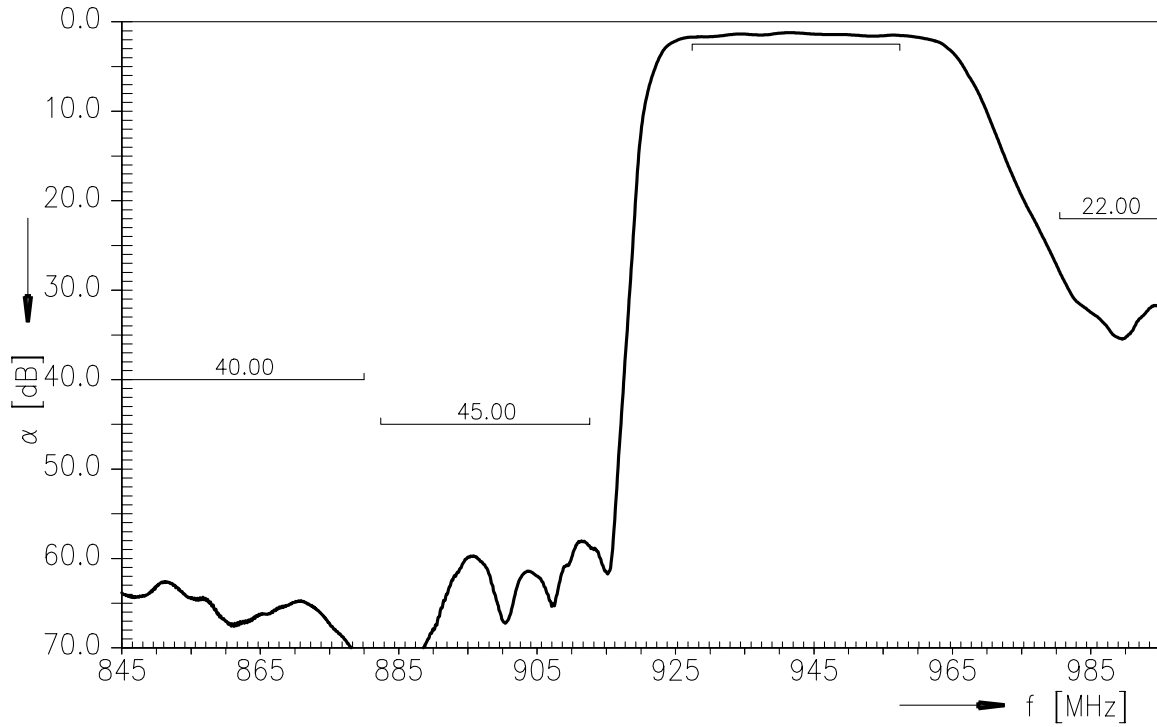
Frequency response Tx-Antenna (wideband)



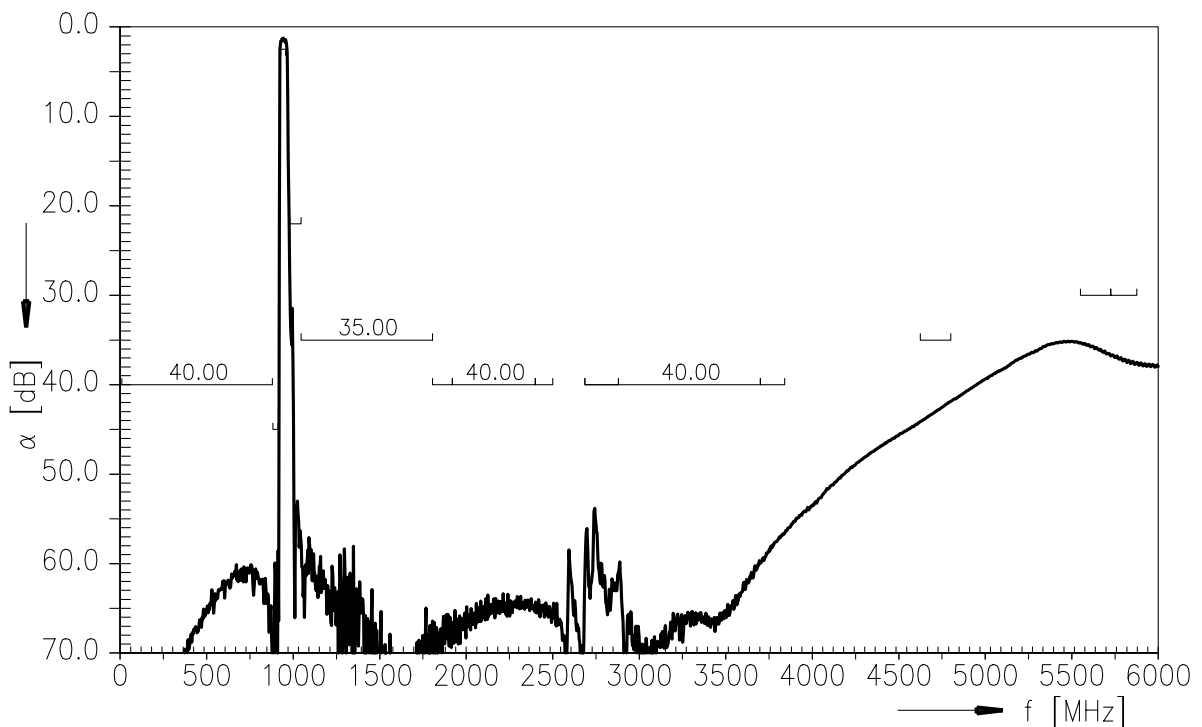
Data sheet



Frequency response Antenna-Rx (Power transfer function)



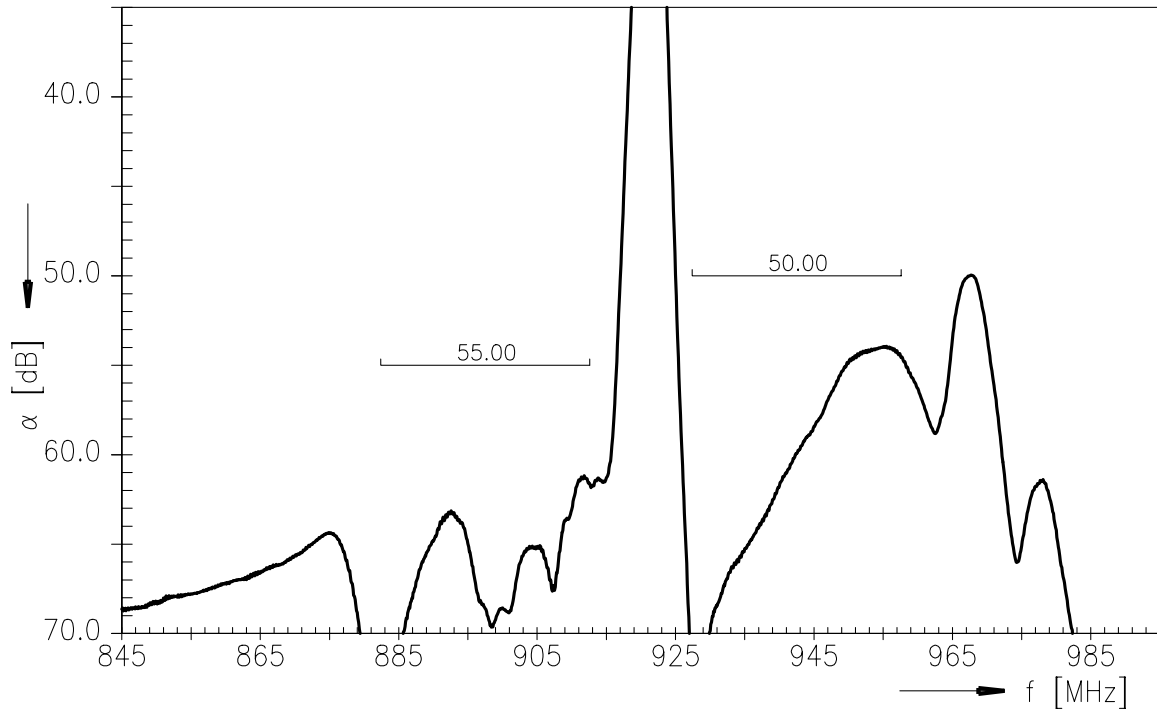
Frequency response Antenna-Rx (wideband)



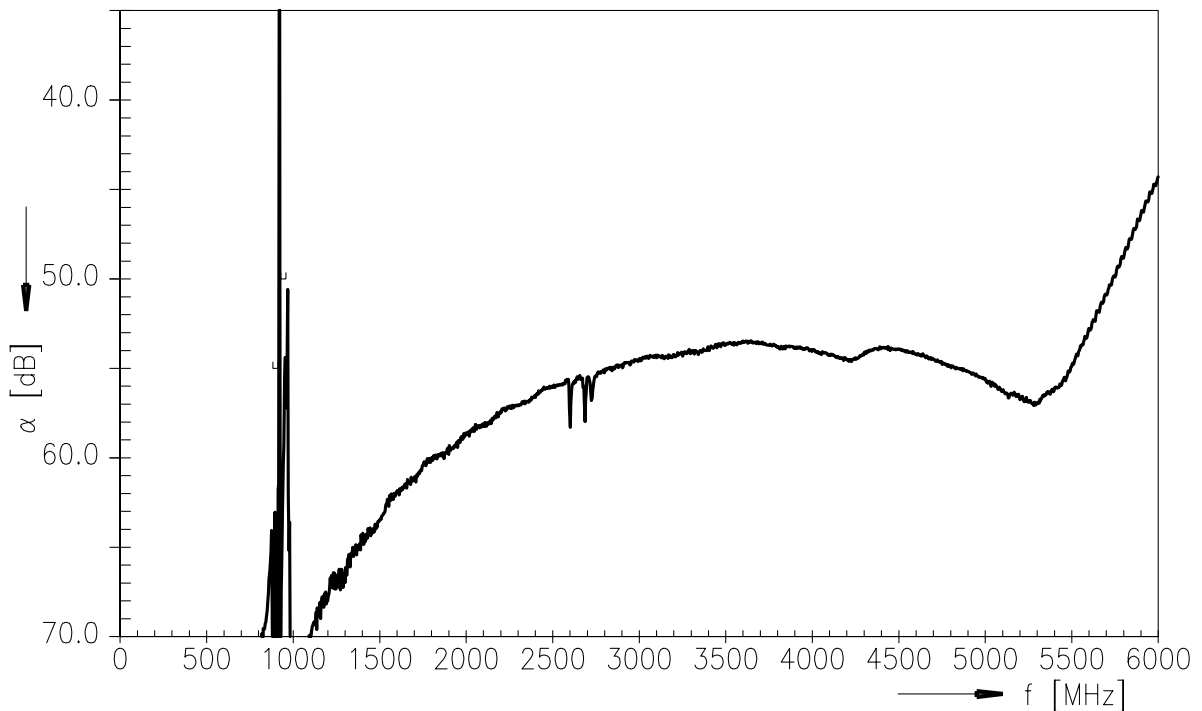
Data sheet



Frequency response Tx-Rx (Power transfer function)



Frequency response Tx-Rx (wideband)



Data sheet

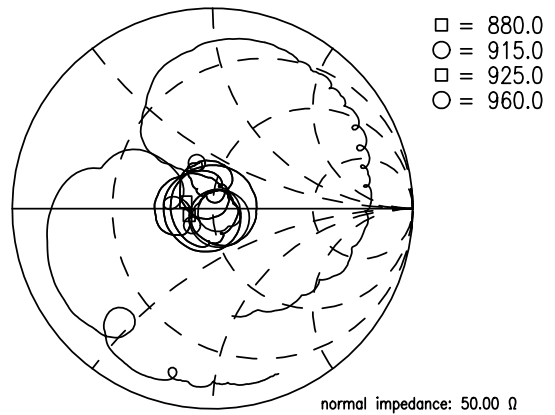
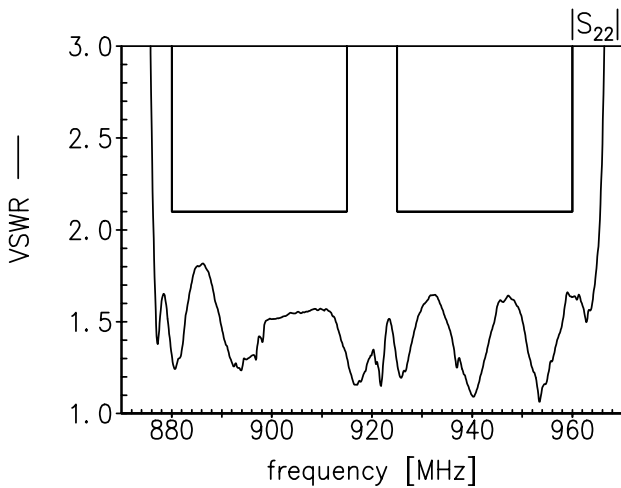
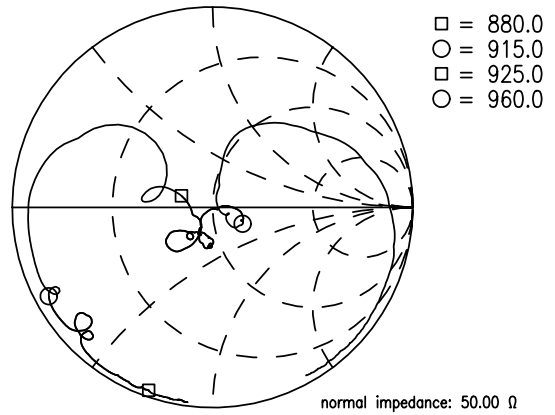
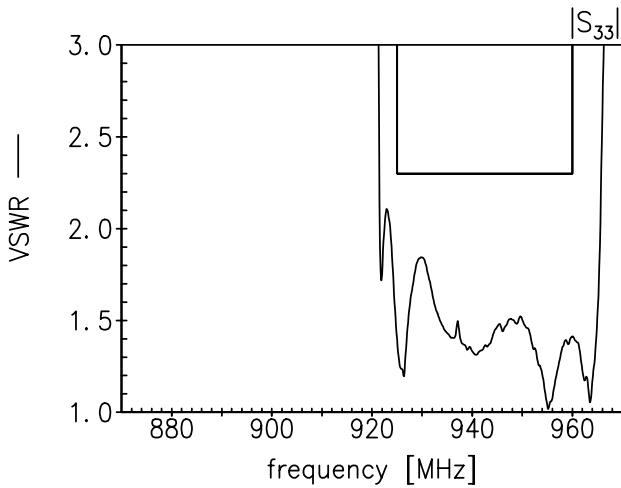
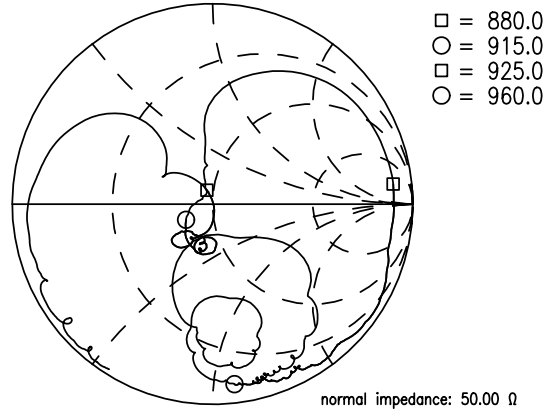
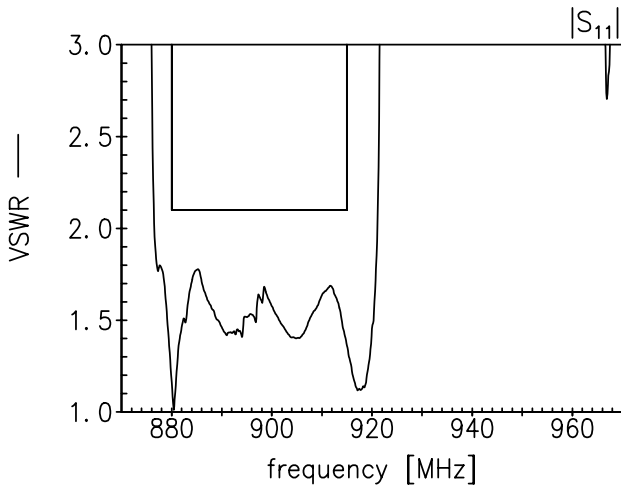


Return loss

S_{11} Tx-port

S_{22} Antenna-port

S_{33} Rx-portReferences



Data sheet


References

| | |
|----------------------------|---|
| Type | B8605 |
| Ordering code | B39941B8605P810 |
| Marking and package | C61157-A8-A38 |
| Packaging | F61074-V8247-Z000 |
| Date codes | L_1126 |
| S-parameters | B8605_NB_UN.s3p, B8605_WB_UN.s3p See file header for pin/port assignment. |
| Soldering profile | S_6001 |
| RoHS compatible | RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8 th , 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases. |
| Moldability | Before using in overmolding environment, please contact your EPCOS sales office. |
| Matching coils | See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm |

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