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RF360 Europe GmbH

A Qualcomm – TDK Joint Venture

SAW Components

SAW Duplexer

Cellular / WCDMA Band V

| | |
|----------------|-----------------|
| Series/type: | B8577 |
| Ordering code: | B39881B8577P810 |
| Date: | June 4, 2013 |
| Version: | 2.0 |

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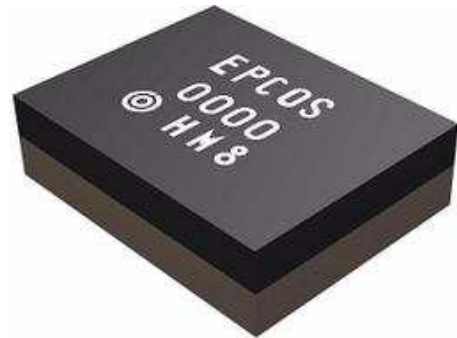
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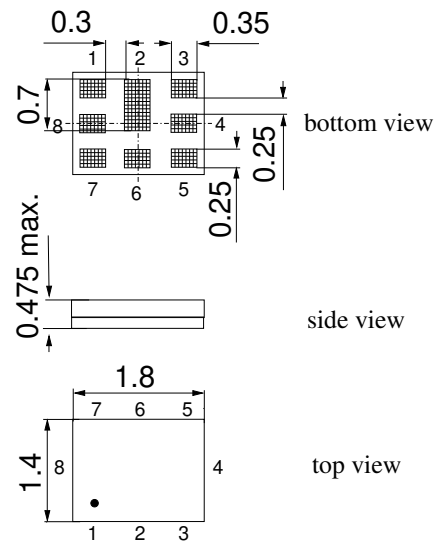
Data sheet

Application

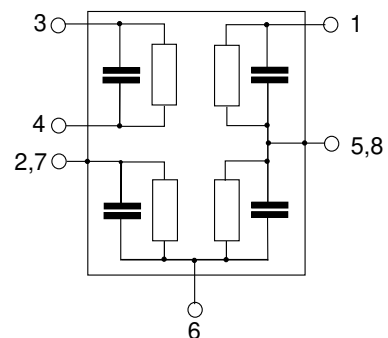
- Multimode SAW duplexer for mobile telephone Cellular / WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple
- High Tx band isolation
- Single ended to balanced transformation in Antenna - Rx path
- Impedance transformation from 50 Ω to 100 Ω in Antenna - RX path


Features

- Package size 1.8 x 1.4 mm²
- Max. package height 0.475 mm
- RoHS compatible
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level 3**


Pin configuration

- 1 TX Input
- 3,4 RX Output (balanced)
- 6 Antenna
- 2, 5, 7, 8 To be grounded



Data sheet

Characteristics

| | |
|--------------------------------------|------------------------------------|
| Temperature range for specification: | T = -30 °C to +85 °C |
| Antenna terminating impedance: | Z _{ANT} = 50 Ω 8.2 nH |
| RX terminating impedance: | Z _{RX} = 100 Ω (balanced) |
| TX terminating impedance: | Z _{TX} = 50 Ω |

| Characteristics TX - ANT | | min. | typ. @ 25 °C | max. | |
|---|----------------------------------|------|-----------------|------|-----|
| Center frequency | f _C | — | 836.5 | — | MHz |
| Maximum insertion attenuation | α _{max} | — | 1.5 | 2.3 | dB |
| 824.0 ... 849.0 MHz | | — | 1.3 | 2.1 | |
| @f _{Carrier} 826.4 ... 846.6 MHz | α _{WCDMA} ¹⁾ | — | | | dB |
| Amplitude ripple | Δα | — | 0.6 | 1.4 | dB |
| 824.0 ... 849.0 MHz | | — | | | |
| Error Vector Magnitude | EVM ²⁾ | — | 2.1 | 4.0 | % |
| @f _{Carrier} 826.4 ... 846.6 MHz | | — | | | |
| Input VSWR (TX port) | | — | 1.5 | 2.0 | |
| 824.0 ... 849.0 MHz | | — | | | |
| Output VSWR (ANT port) | | — | 1.4 | 2.0 | |
| 824.0 ... 849.0 MHz | | — | | | |

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.

Data sheet

Characteristics

| | |
|--------------------------------------|------------------------------------|
| Temperature range for specification: | T = -30 °C to +85 °C |
| Antenna terminating impedance: | Z _{ANT} = 50 Ω 8.2 nH |
| RX terminating impedance: | Z _{RX} = 100 Ω (balanced) |
| TX terminating impedance: | Z _{TX} = 50 Ω |

| Characterisitcs TX - ANT | | min. | typ. @ 25 °C | max. | |
|---|------------------------------|------|-----------------|------|----|
| Absolute attenuation | α | | | | |
| 10.0 ... 420.0 MHz | | 40 | 45 | — | dB |
| 420.0 ... 494.0 MHz | | 38 | 42 | — | dB |
| 494.0 ... 701.0 MHz | | 35 | 39 | — | dB |
| 701.0 ... 728.0 MHz | | 35 | 40 | — | dB |
| 728.0 ... 764.0 MHz | | 35 | 41 | — | dB |
| 764.0 ... 804.0 MHz | | 30 | 37 | — | dB |
| 860.0 ... 869.0 MHz | | 3 | 10 | — | dB |
| 869.0 ... 894.0 MHz | | 45 | 52 | — | dB |
| @f _{Carrier} 871.4 ... 891.6 MHz | $\alpha_{\text{WCDMA}}^{1)}$ | 48 | 53 | — | dB |
| 1236.0 ... 1341.0 MHz | | 40 | 47 | — | dB |
| 1574.0 ... 1577.0 MHz | | 35 | 39 | — | dB |
| 1638.0 ... 1708.0 MHz | | 33 | 36 | — | dB |
| 1844.9 ... 1879.9 MHz | | 30 | 34 | — | dB |
| 1884.5 ... 1919.6 MHz | | 30 | 34 | — | dB |
| 1930.0 ... 1990.0 MHz | | 30 | 33 | — | dB |
| 2110.0 ... 2170.0 MHz | | 28 | 31 | — | dB |
| 2400.0 ... 2557.0 MHz | | 25 | 28 | — | dB |
| 3286.0 ... 3406.0 MHz | | 20 | 25 | — | dB |
| 4110.0 ... 4255.0 MHz | | 20 | 24 | — | dB |
| 4934.0 ... 5350.0 MHz | | 10 | 14 | — | dB |
| 5725.0 ... 5953.0 MHz | | 5 | 10 | — | dB |

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

Data sheet

Characteristics

| | |
|--------------------------------------|------------------------------------|
| Temperature range for specification: | T = -30 °C to +85 °C |
| Antenna terminating impedance: | Z _{ANT} = 50 Ω 8.2 nH |
| RX terminating impedance: | Z _{RX} = 100 Ω (balanced) |
| TX terminating impedance: | Z _{TX} = 50 Ω |

| Characteristics ANT - RX | | min. | typ. @ 25 °C | max. | |
|---|----------------------------------|------------------|-----------------|------|-----|
| Center frequency | f _C | — | 881.5 | — | MHz |
| Maximum insertion attenuation | α _{max} | — | 1.7 | 2.4 | dB |
| 869.0 ... 894.0 MHz | | | | | |
| @f _{Carrier} 871.4 ... 891.6 MHz | α _{WCDMA} ¹⁾ | — | 1.5 | 2.2 | dB |
| Amplitude ripple (p-p) | Δα | — | 0.5 | 1.2 | dB |
| 869.0 ... 894.0 MHz | | | | | |
| Error Vector Magnitude | EVM ²⁾ | — | 1.7 | 3.5 | % |
| @f _{Carrier} 871.4 ... 891.6 MHz | | | | | |
| Input VSWR (ANT port) | | — | 1.7 | 2.0 | |
| 869.0 ... 894.0 MHz | | | | | |
| Output VSWR (RX port) | | — | 1.6 | 2.0 | |
| 869.0 ... 894.0 MHz | | | | | |
| Common mode rejection ratio | CMRR | 23 ³⁾ | 27 | — | dB |
| 869.0 ... 894.0 MHz | | | | | |

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⁾ A combination of 10° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

Data sheet

Characteristics

| | |
|--------------------------------------|------------------------------------|
| Temperature range for specification: | T = -30 °C to +85 °C |
| Antenna terminating impedance: | Z _{ANT} = 50 Ω 8.2 nH |
| RX terminating impedance: | Z _{RX} = 100 Ω (balanced) |
| TX terminating impedance: | Z _{TX} = 50 Ω |

| Characterisitcs ANT - RX | | min. | typ. @ 25 °C | max. | |
|---|-----------------------|------|-----------------|------|-----|
| IMD product level limits¹⁾ | | | | | |
| at f_{TX} = 836.5 MHz f_{RX} = 881.5 MHz | | | | | |
| Blocker 1 | 45.0 MHz | — | -125 | — | dBm |
| Blocker 2 | 791.5 MHz | — | -106 | — | dBm |
| Blocker 3 | 1718.0 MHz | — | -106 | — | dBm |
| Blocker 4 | 2554.5 MHz | — | -115 | — | dBm |
| Attenuation | | | | | |
| | | | α | | |
| | 10.0 ... 447.0 MHz | 45 | 75 | — | dB |
| | 447.0 ... 824.0 MHz | 45 | 61 | — | dB |
| | 824.0 ... 849.0 MHz | 50 | 60 | — | dB |
| @f _{Carrier} | 826.4 ... 846.6 MHz | 55 | 61 | — | dB |
| | 849.0 ... 854.0 MHz | 10 | 56 | — | dB |
| | 854.0 ... 871.5 MHz | 0.9 | 1.3 | — | dB |
| | 909.0 ... 914.0 MHz | 10 | 20 | — | dB |
| | 914.0 ... 940.0 MHz | 20 | 27 | — | dB |
| | 940.0 ... 1000.0 MHz | 40 | 49 | — | dB |
| | 1000.0 ... 1693.0 MHz | 40 | 53 | — | dB |
| | 1693.0 ... 1850.0 MHz | 45 | 54 | — | dB |
| | 1850.0 ... 1920.0 MHz | 40 | 54 | — | dB |
| | 1920.0 ... 5000.0 MHz | 40 | 46 | — | dB |
| | 5000.0 ... 6000.0 MHz | 30 | 41 | — | dB |

1) Power levels: 21.5 dBm Tx signal, -15dBm blocker at antenna port.

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

Data sheet

Characteristics

| | |
|--------------------------------------|------------------------------------|
| Temperature range for specification: | T = -30 °C to +85 °C |
| Antenna terminating impedance: | Z _{ANT} = 50 Ω 8.2 nH |
| RX terminating impedance: | Z _{RX} = 100 Ω (balanced) |
| TX terminating impedance: | Z _{TX} = 50 Ω |

| Characterisitcs TX - RX | | min. | typ. @ 25 °C | max. | |
|---|------------------------------|------|-----------------|------|----|
| Isolation | α | | | | |
| 824.0 ... 849.0 MHz | | 54 | 63 | — | dB |
| @f _{Carrier} 826.4 ... 846.6 MHz | $\alpha_{\text{WCDMA}}^{3)}$ | 57 | 64 | — | dB |
| 869.0 ... 894.0 MHz | | 50 | 55 | — | dB |
| @f _{Carrier} 871.4 ... 891.6 MHz | $\alpha_{\text{WCDMA}}^{1)}$ | 52 | 56 | — | dB |
| 1574.0 ... 1577.0 MHz | | 40 | 64 | — | dB |
| 1638.0 ... 1708.0 MHz | | 40 | 62 | — | dB |
| 2462.0 ... 2557.0 MHz | | 40 | 56 | — | dB |
| Common Mode Isolation | | | | | |
| 824.0 ... 849.0 MHz | | 42 | 47 | — | dB |
| @f _{Carrier} 826.4 ... 846.6 MHz | $\alpha_{\text{WCDMA}}^{3)}$ | 42 | 48 | — | dB |

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

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 WCDMA Band 5-Passband, f_{Carrier} ranges from 826.4 MHz (lowest TX channel) to 846.6 MHz (highest TX 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

| | | | | |
|----------------------------------|------------------|-----------------------|------------|---|
| Storage temperature range | T_{stg} | -40/+85 ¹⁾ | °C | Machine Model source and load impedance 50 Ω } continuous wave } $T = 50^\circ\text{C}, 3000\text{ h}$ |
| DC voltage | V_{DC} | 5 ²⁾ | V | |
| ESD voltage | V_{ESD} | 100 ³⁾ | V | |
| Input power | P_{IN} | | | |
| 824.0 ... 849.0 MHz elsewhere | | 28 10 | dBm dBm | |

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

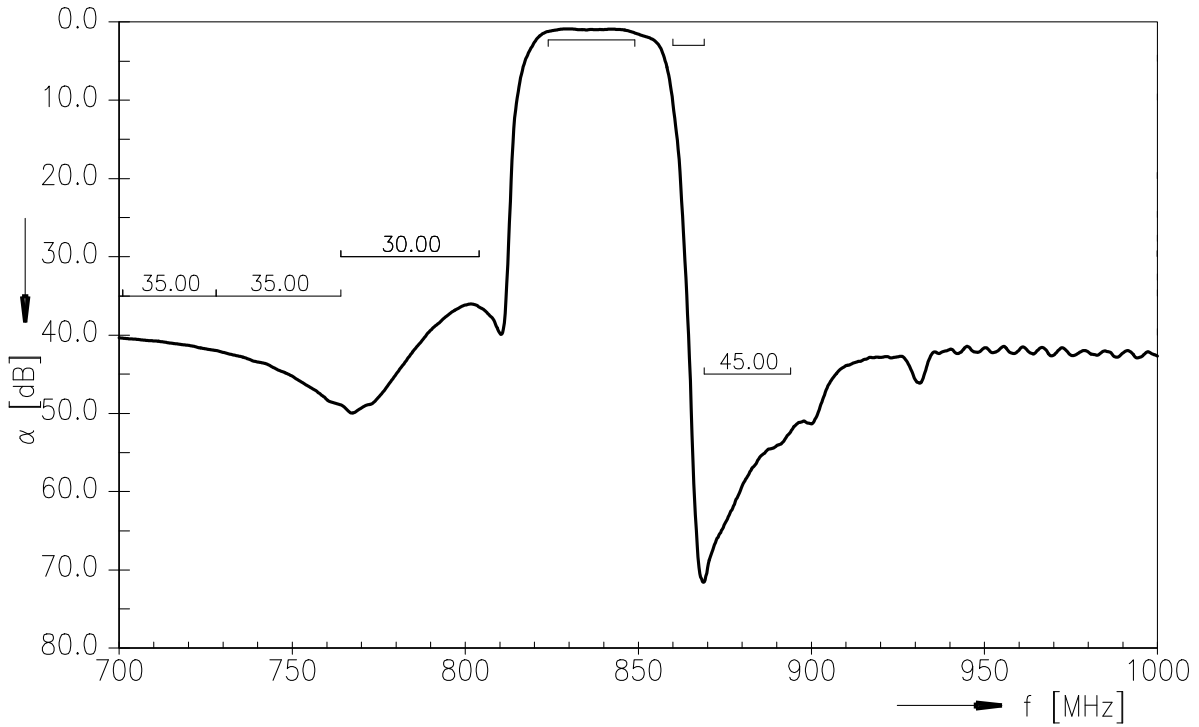
2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy

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

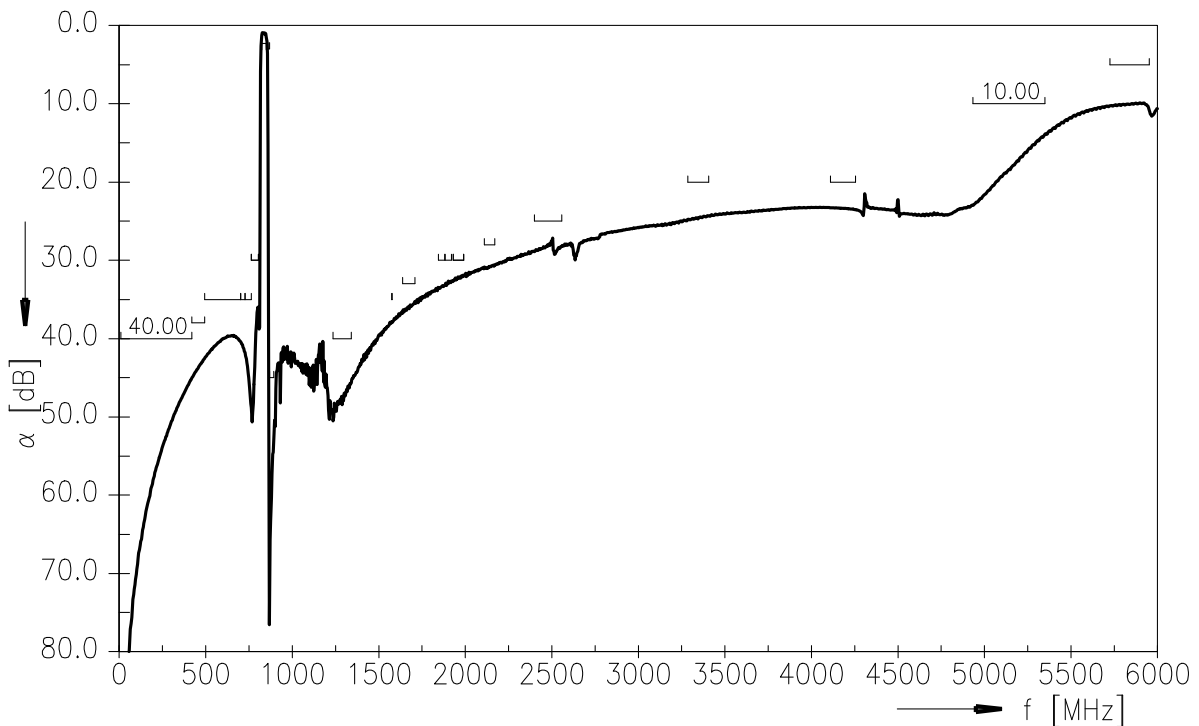
Data sheet



Transfer function TX (Power transfer function)



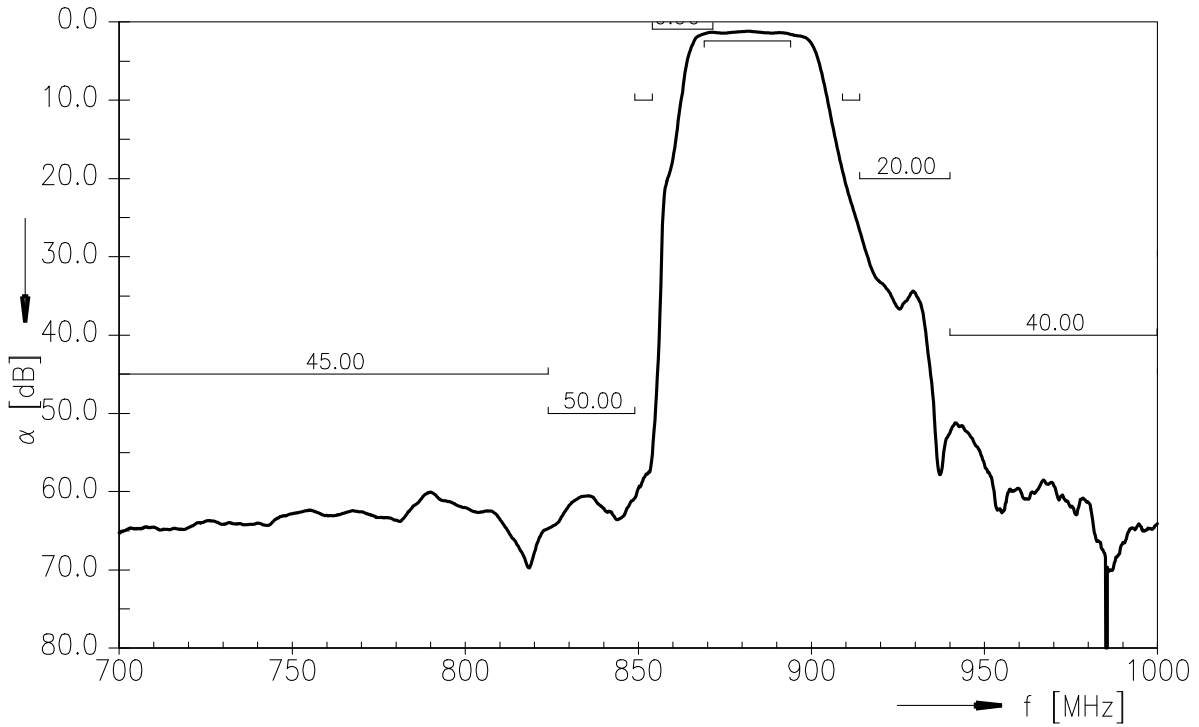
Transfer function TX (wideband)



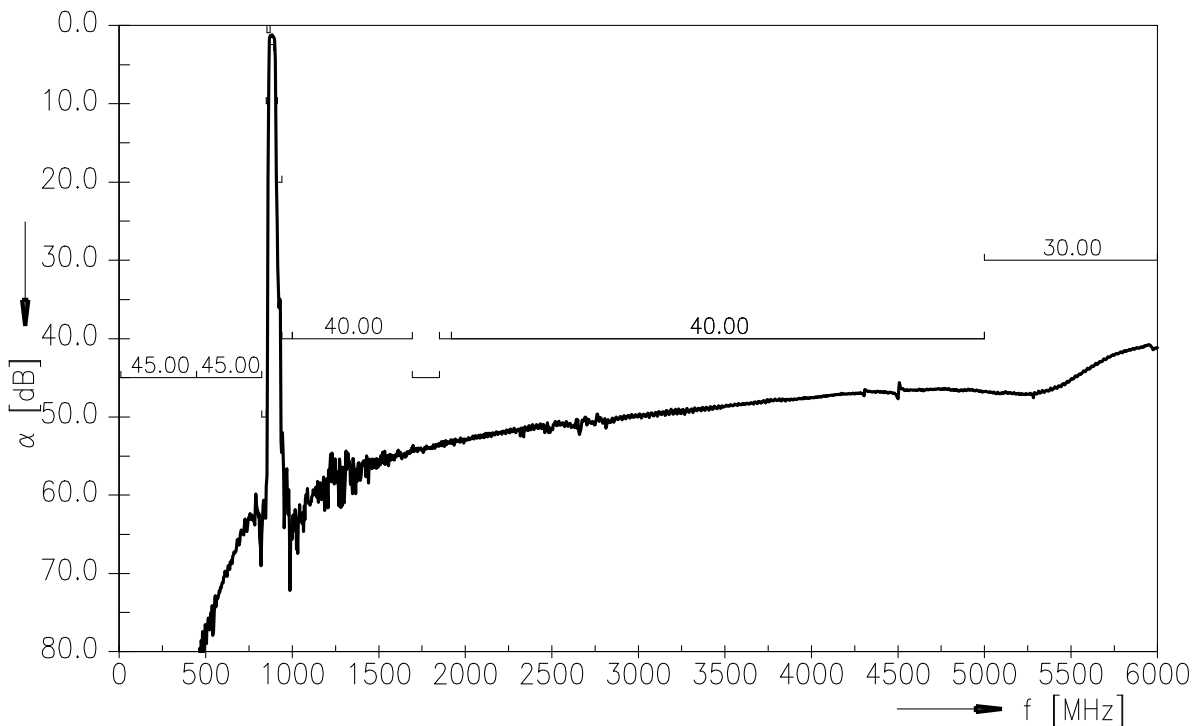
Data sheet



Transfer function RX (Power transfer function)



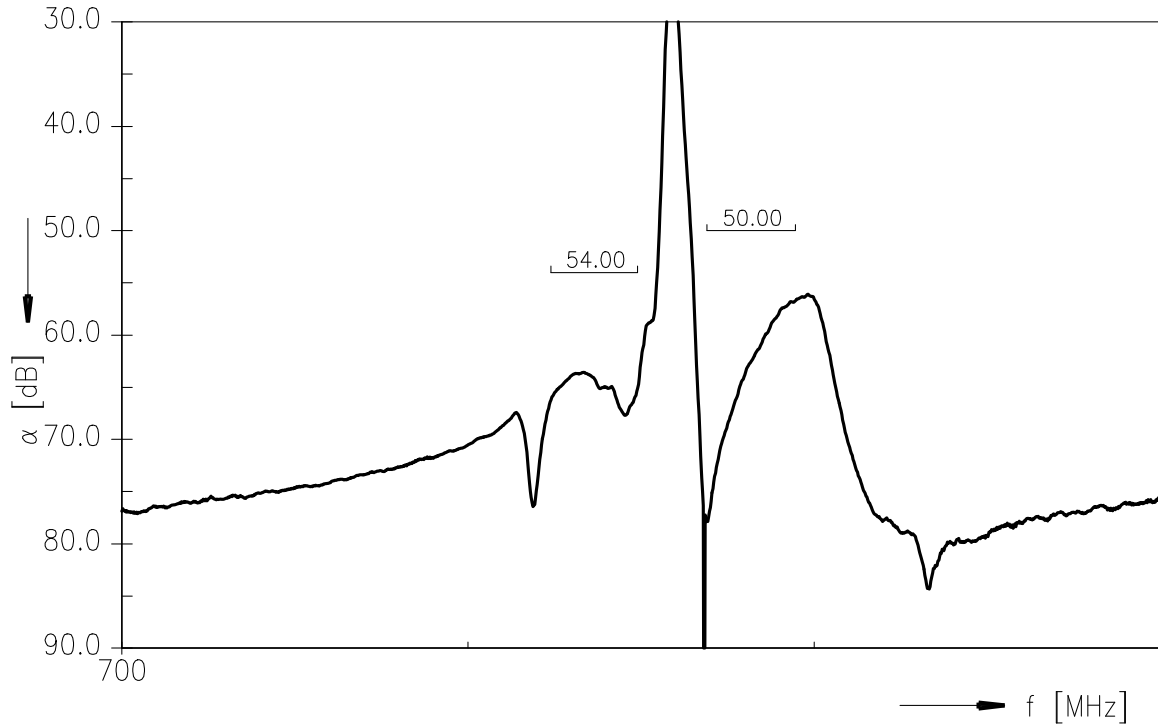
Transfer function RX (wideband)



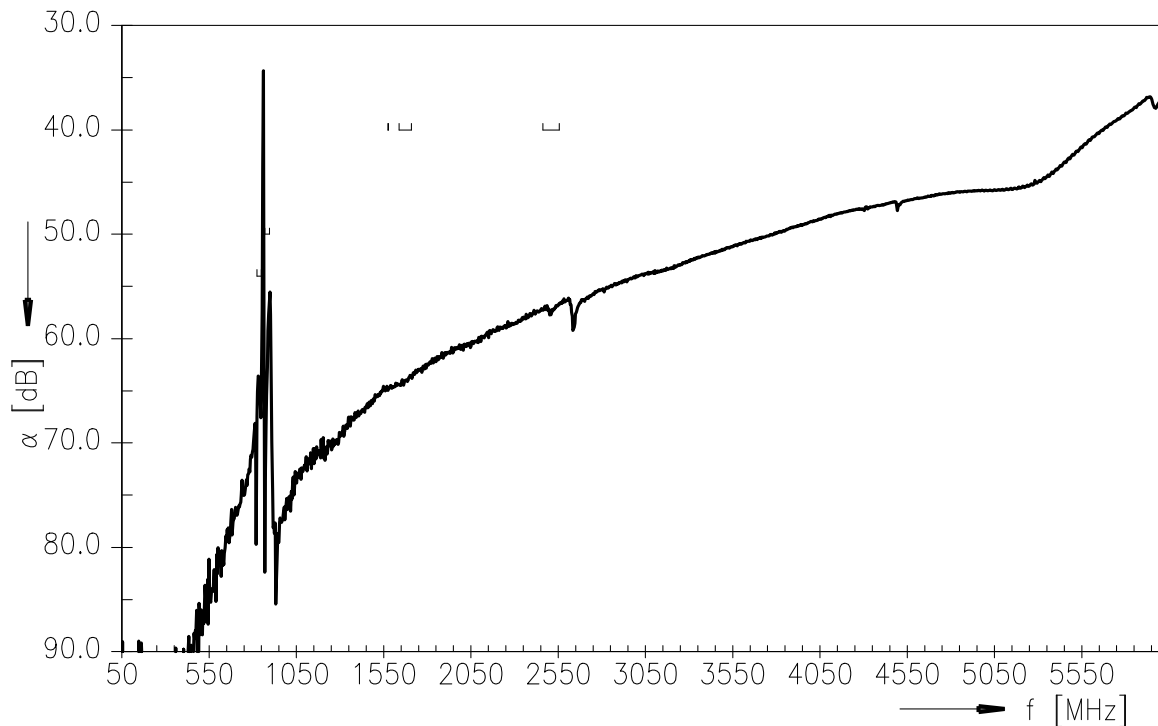
Data sheet



Isolation TX-RX (Power transfer function)



Isolation TX-RX (wideband)

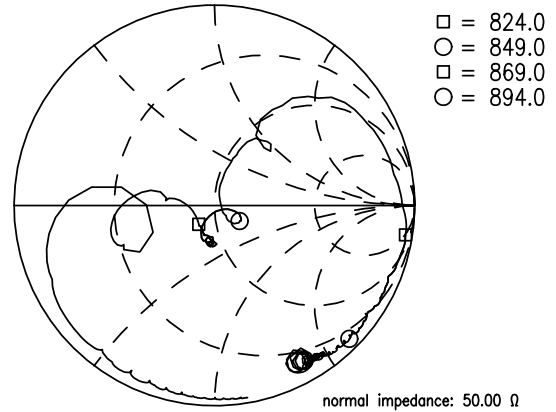
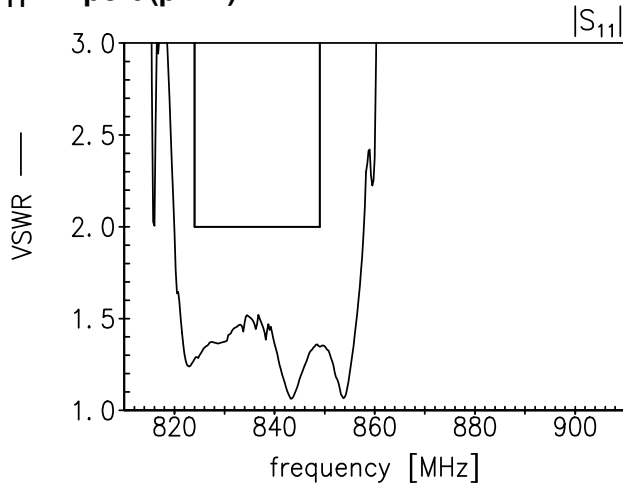


Data sheet

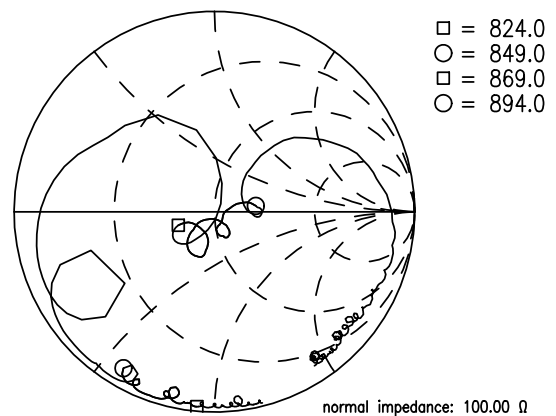
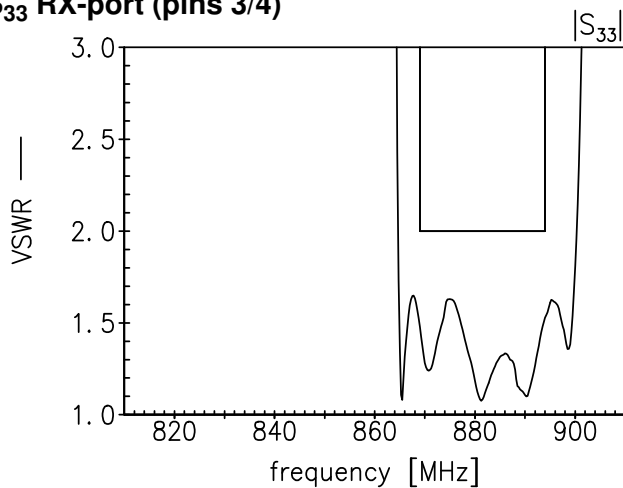


Smith charts

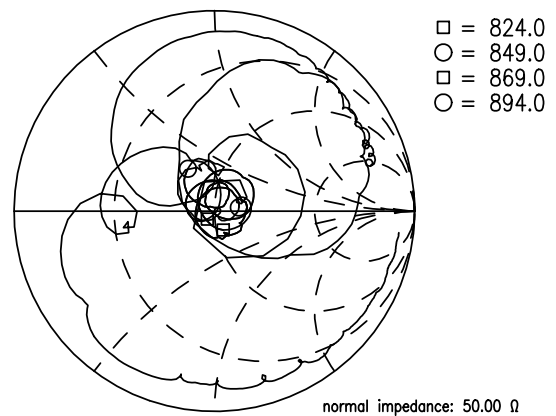
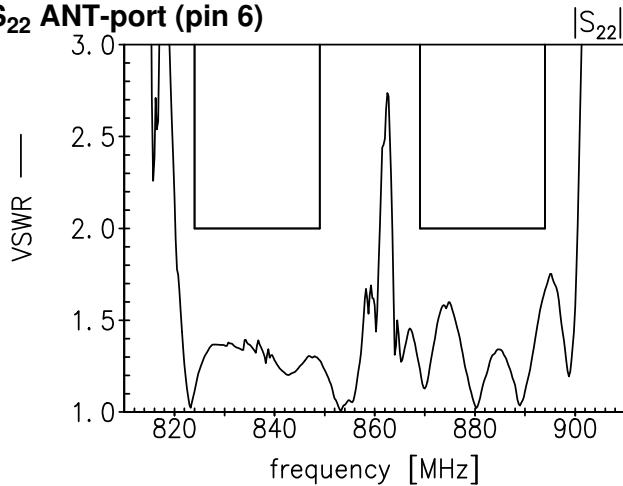
S₁₁ TX-port (pin 1)



S₃₃ RX-port (pins 3/4)



S₂₂ ANT-port (pin 6)



Data sheet



References

| | |
|----------------------------|---|
| Type | B8577 |
| Ordering code | B39881B8577P810 |
| Marking and package | C61157-A8-A69 |
| Packaging | F61074-V8259-Z000 |
| Date codes | L_1126 |
| S-parameters | B8577_NB_UN.s4p; B8577_WB_UN.s4p See file header for port/pin assignment table |
| 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. |
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