



SAW Components

SAW Duplexer

Automotive telematics

Series/type:	B4401
Ordering code:	B39941B4401P810
Date:	June 13, 2014
Version:	2.3

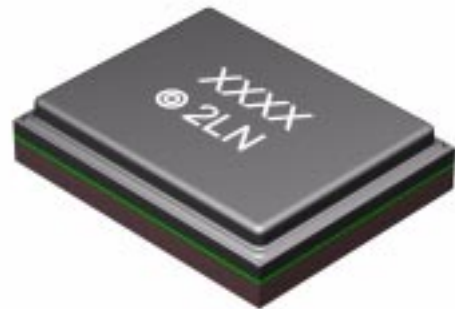
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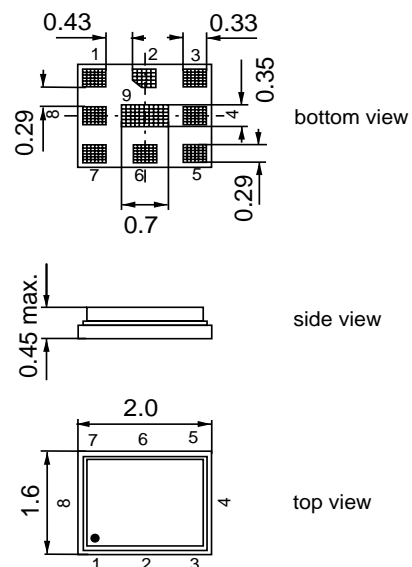
Data sheet


Application

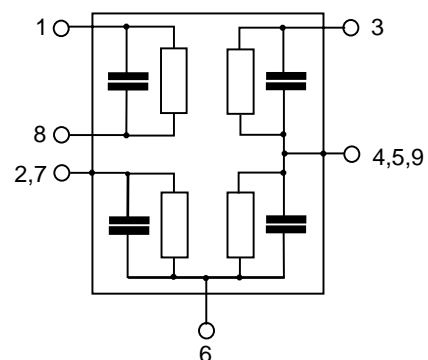
- Low-loss SAW duplexer for W-CDMA Band VIII systems
- Low insertion attenuation
- Low amplitude ripple
- Usable passband 35 MHz
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path
- High isolation between Tx and Rx


Features

- Package size 2.0 * 1.6 mm²
- Package height max. 0.45mm
- RoHS compatible
- Approximate weight 0.005 g
- Package for **Surface Mount Technology (SMT)**
- Ni terminals, Au-plated
- **Electrostatic Sensitive Device (ESD)**
- AEC-Q200 qualified component family (operable temperature range -40°C to +85°C)


Pin configuration

- 3 Tx input
- 6 Antenna
- 1, 8 Rx output, balanced
- 2, 4, 5, 7, 9 To be grounded



Data sheet


Characteristics

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 7.8nH
TX terminating impedance:	Z _{TX} = 50 Ω 25nH
RX terminating impedance:	Z _{RX} = 100 Ω 39nH (balanced)

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	—	1.8	2.8	dB
	880.0 ... 915.0 MHz	—	2.4	3.9	dB
	880.0 ... 915.0 MHz	—	2.4	2.8 ²⁾	dB
Amplitude ripple (p-p)					
@f _{Carrier}	882.4 ... 912.6 MHz	—	1.0	2.0	dB
	880.0 ... 915.0 MHz	—	1.6	3.1	dB
Error Vector Magnitude					
@f _{Carrier}	882.4 ... 912.6 MHz	—	2.3	6.0	%
@f _{Carrier}	882.4 ... 912.6 MHz	—	2.3	4.0 ²⁾	%
VSWR					
TX port	880.0 ... 915.0 MHz	—	1.8	2.1	
ANT port	880.0 ... 915.0 MHz	—	1.7	2.0	
Attenuation					
	50.0 ... 716.0 MHz	30	34	—	dB
	716.0 ... 728.0 MHz	30	34	—	dB
	728.0 ... 865.0 MHz	30	34	—	dB
	865.0 ... 870.0 MHz	10	41	—	dB
@f _{Carrier}	927.4 ... 957.6 MHz	38	53	—	dB
@f _{Carrier}	927.4 ... 957.6 MHz	45 ⁴⁾	53	—	dB
	1452.0 ... 1477.0 MHz	20	42	—	dB
	1565.42 ... 1573.374MHz	40	48	—	dB
	1573.374... 1577.466MHz	40	49	—	dB
	1577.466... 1585.42 MHz	40	49	—	dB
	1597.55 ... 1605.89 MHz	40	49	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

2) T = +25 °C

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

4) T = +5 °C to +85 °C

Data sheet


Characteristics

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 7.8nH
TX terminating impedance:	Z _{TX} = 50 Ω 25nH
RX terminating impedance:	Z _{RX} = 100 Ω 39nH (balanced)

Characteristics Tx - Ant	min.	typ. @ 25 °C	max.	
1670.0 ... 1675.0 MHz	25	51	—	dB
1760.0 ... 1830.0 MHz	38	46	—	dB
1830.0 ... 1880.0 MHz	27	45	—	dB
2110.0 ... 2170.0 MHz	27	40	—	dB
2400.0 ... 2500.0 MHz	30	36	—	dB
2620.0 ... 2650.0 MHz	27	31	—	dB
2650.0 ... 2745.0 MHz	30	35	—	dB
3520.0 ... 3660.0 MHz	20	32	—	dB
4400.0 ... 4575.0 MHz	20	32	—	dB
5100.0 ... 5490.0 MHz	15	24	—	dB
5490.0 ... 5850.0 MHz	10	17	—	dB
Characteristics Tx - Rx	min.	typ. @ 25 °C	max.	
Differential Mode Isolation				
@f _{Carrier} 882.4 ... 912.6 MHz α _{WCDMA} ¹⁾	56	60	—	dB
@f _{Carrier} 927.4 ... 957.6 MHz α _{WCDMA} ¹⁾	43	57	—	dB
@f _{Carrier} 927.4 ... 957.6 MHz α _{WCDMA} ¹⁾	50 ²⁾	57	—	dB
Common Mode Isolation				
@f _{Carrier} 882.4 ... 912.6 MHz α _{WCDMA} ¹⁾	55	65	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

2) T= +5°C to +85°C

Data sheet


Characteristics

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 7.8nH
TX terminating impedance:	Z _{TX} = 50 Ω 25nH
RX terminating impedance:	Z _{RX} = 100 Ω 39nH (balanced)

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⁾	—	1.8	2.5	dB
925.0 ... 960.0 MHz		—	2.4	4.7	dB
925.0 ... 960.0 MHz		—	2.4	3.2 ²⁾	dB
925.0 ... 960.0 MHz		—	2.4	3.7 ³⁾	dB
Amplitude ripple (p-p)					
@f _{Carrier} 927.4 ... 957.6 MHz	Δα _{WCDMA} ¹⁾	—	0.6	1.3	dB
925.0 ... 960.0 MHz		—	1.0	3.5	dB
Error Vector Magnitude					
@f _{Carrier} 927.4 ... 957.6 MHz	EVM ⁴⁾	—	3.3	8.5	%
@f _{Carrier} 927.4 ... 957.6 MHz	EVM ⁴⁾	—	3.3	4.5 ²⁾	%
VSWR					
RX port 925.0 ... 960.0 MHz		—	1.8	2.1	
ANT port 925.0 ... 960.0 MHz		—	1.7	2.0	
Common Mode Rejection Ratio	α				
925.0 ... 960.0 MHz		23	30		dB
Attenuation	α				
50.0 ... 462.0 MHz		35	90	—	dB
462.0 ... 480.0 MHz		45	86	—	dB
480.0 ... 835.0 MHz		38	68	—	dB
835.0 ... 870.0 MHz		49	65	—	dB
870.0 ... 880.0 MHz		38	67	—	dB
@f _{Carrier} 882.4 ... 912.6 MHz	α _{WCDMA} ¹⁾	50	57	—	dB
980.0 ... 1045.0 MHz		16	20	—	dB
1045.0 ... 2400.0 MHz		35	57	—	dB

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (7).

2) T= +25°C

3) T= +5°C to +85°C

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

Data sheet


Characteristics

Temperature range for specification:	T = -20 °C to +85 °C
ANT terminating impedance:	Z _{ANT} = 50 Ω 7.8nH
TX terminating impedance:	Z _{TX} = 50 Ω 25nH
RX terminating impedance:	Z _{RX} = 100 Ω 39nH (balanced)

Characteristics Rx - Ant		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	942.5	—	MHz
Attenuation	α				
	2400.0 ... 2500.0 MHz	45	60	—	dB
	2500.0 ... 4810.0 MHz	35	55	—	dB
	5100.0 ... 5825.0 MHz	35	52	—	dB


Maximum ratings

Operable temperature range ¹⁾	T	-40/+85	°C	
Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	0	V	
Input power at 880.0 ... 915.0 MHz elsewhere	P _{IN}	30 10	dBm dBm	} WCDMA signal 55 °C, 10000 h

1) Defines the temperature range in which the SAW device keeps its typical characteristics, however the specification values are not guaranteed.

Annotation for characteristics section

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

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

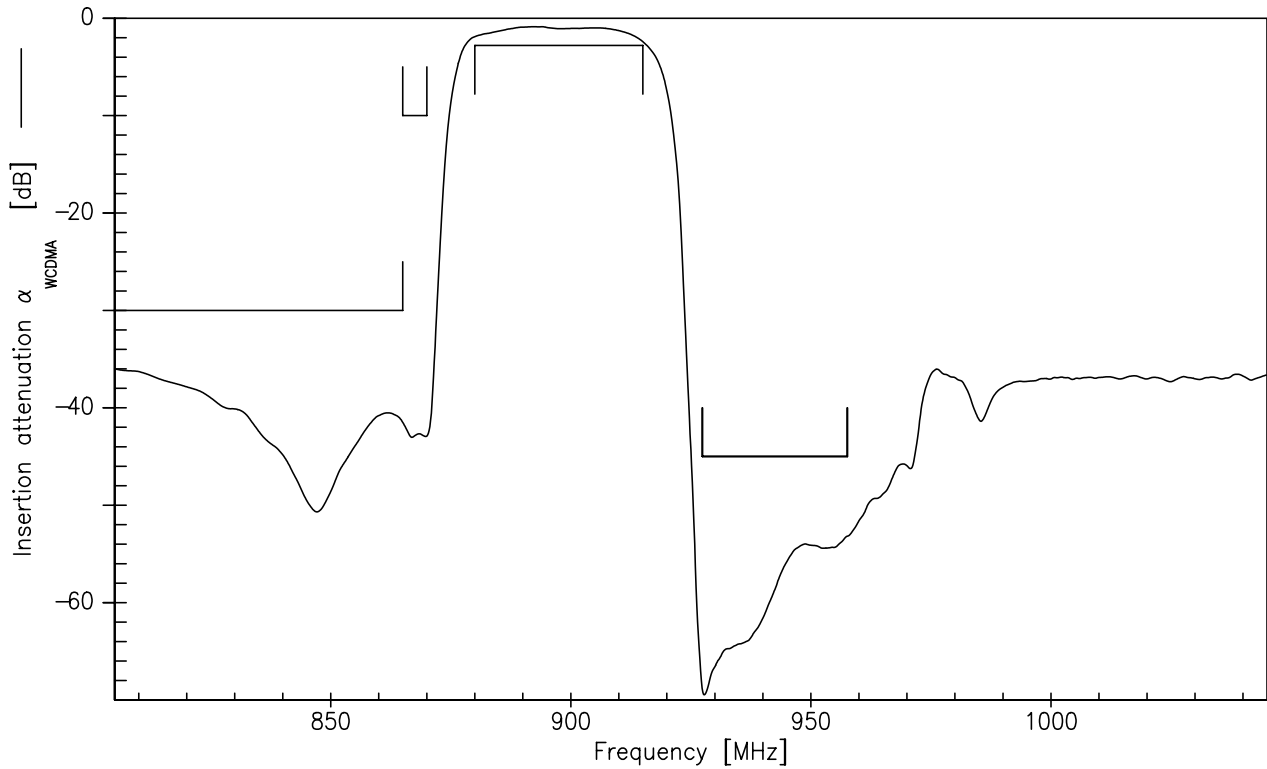
f_{Carrier} according to 3GPP TS 25.101 (e.g. for UMTS-Passband, f_{Carrier} ranges from 2112.4 MHz (lowest Rx channel) to 2167.6 MHz (highest Rx channel)). $H_{\text{RRC}}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

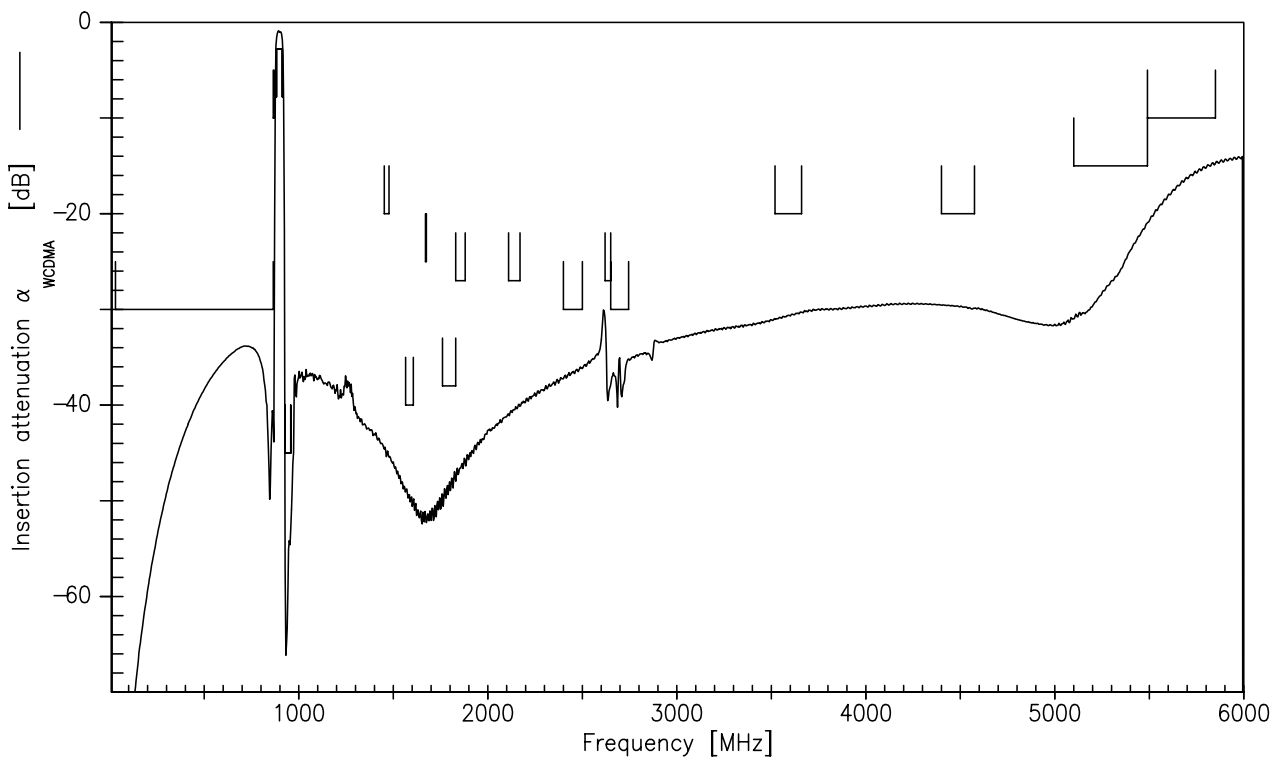
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Frequency Response TX-ANT



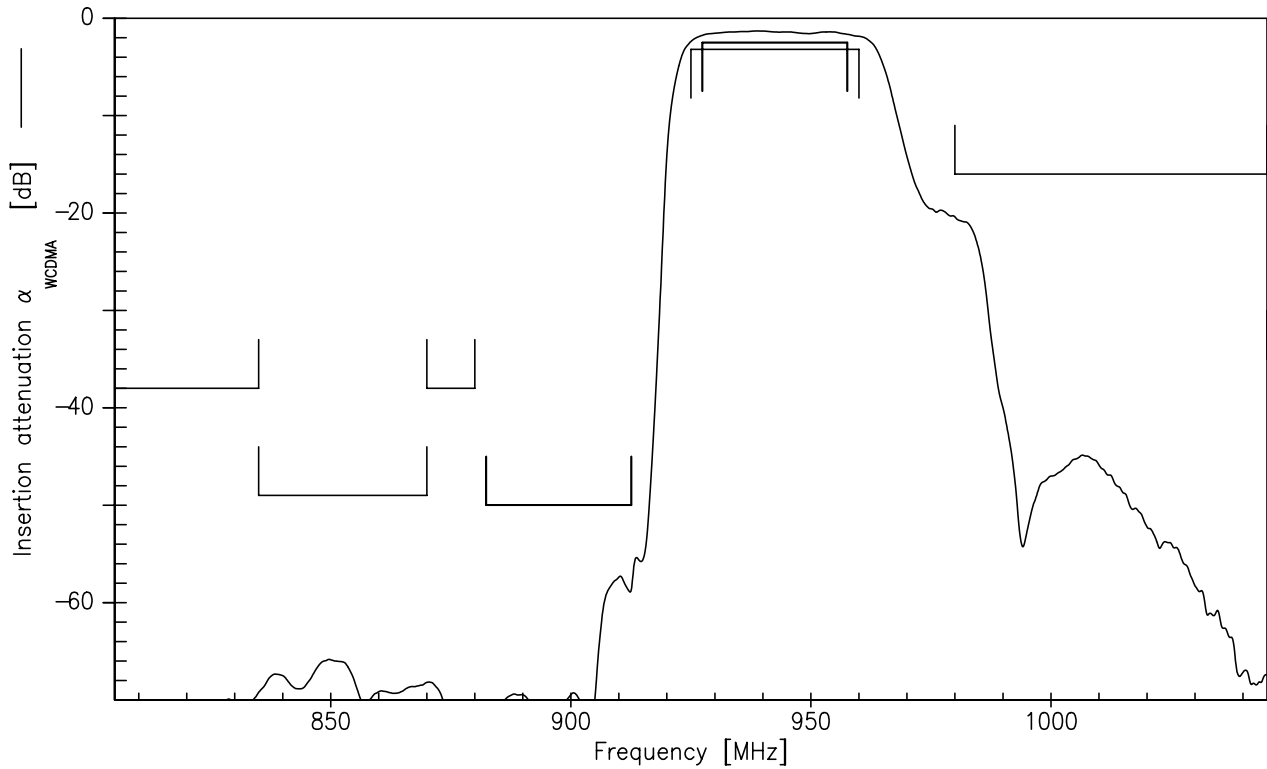
Frequency Response TX-ANT (wideband)



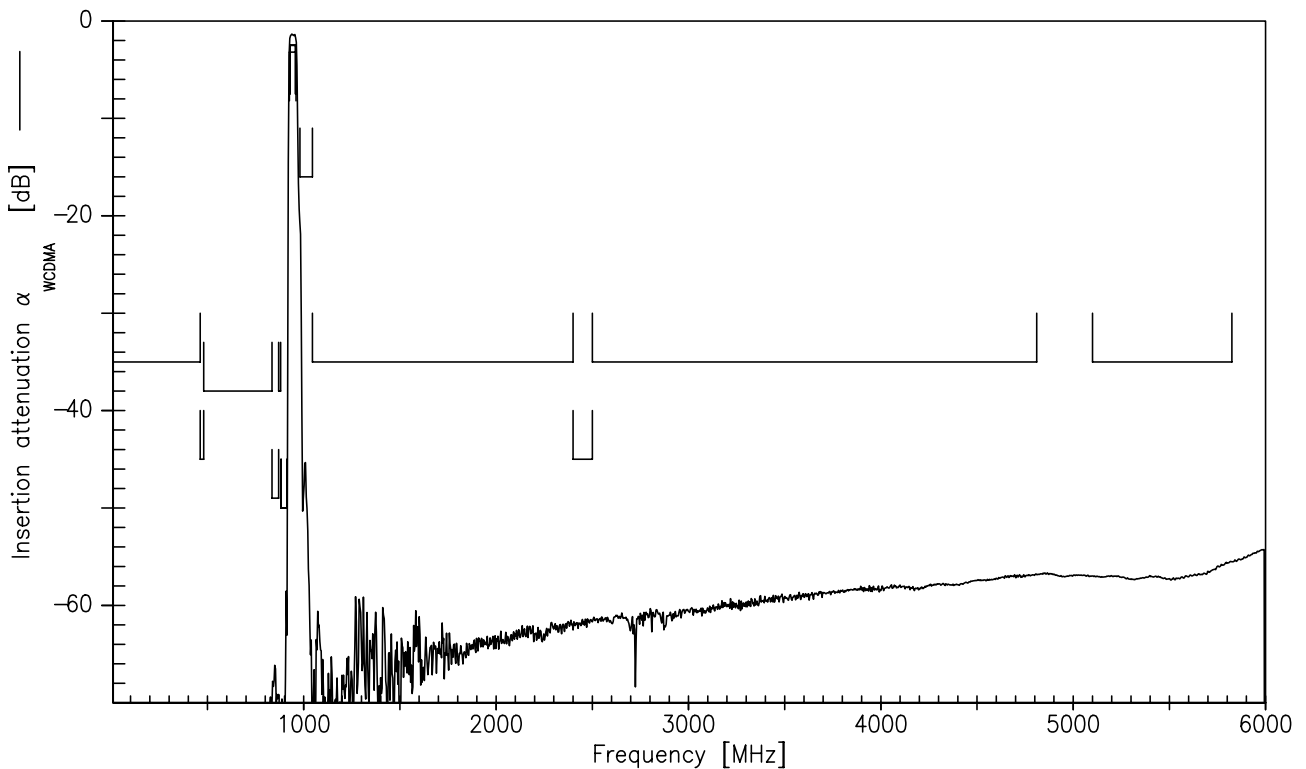
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Frequency Response RX-ANT



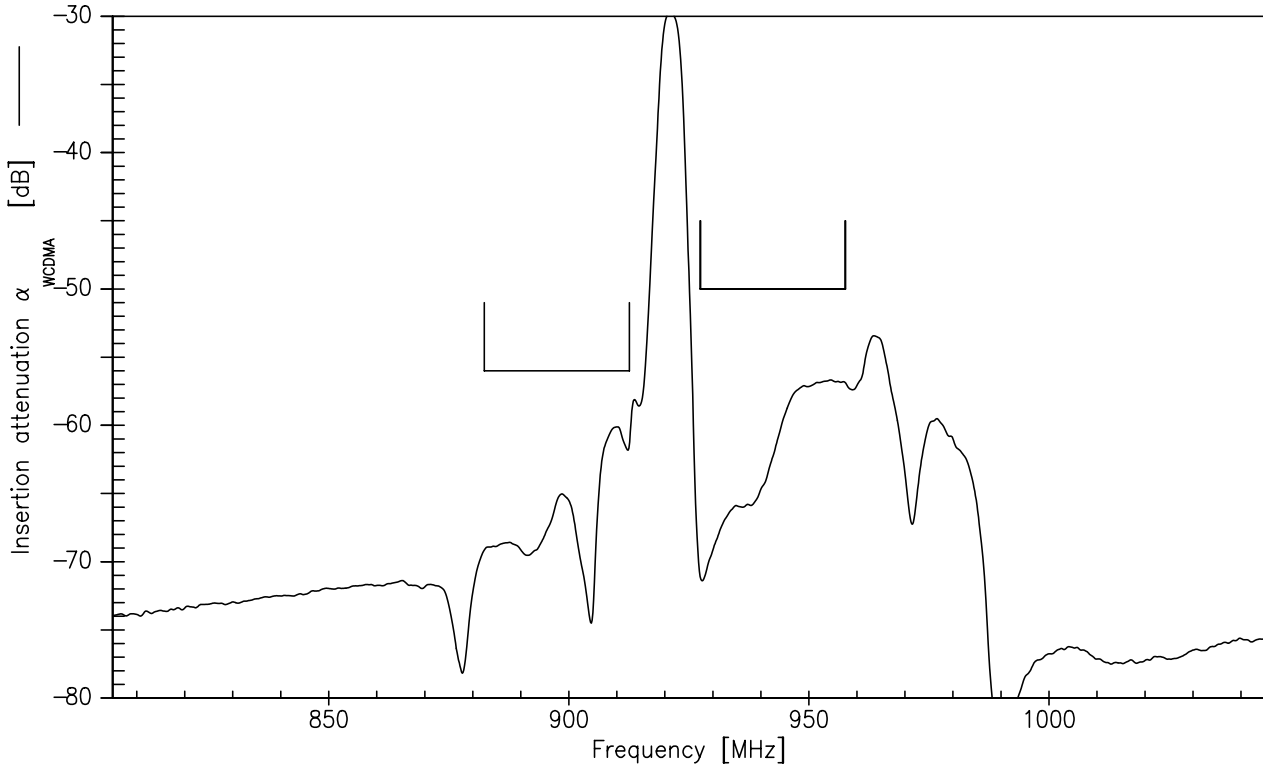
Frequency Response RX-ANT (wideband)



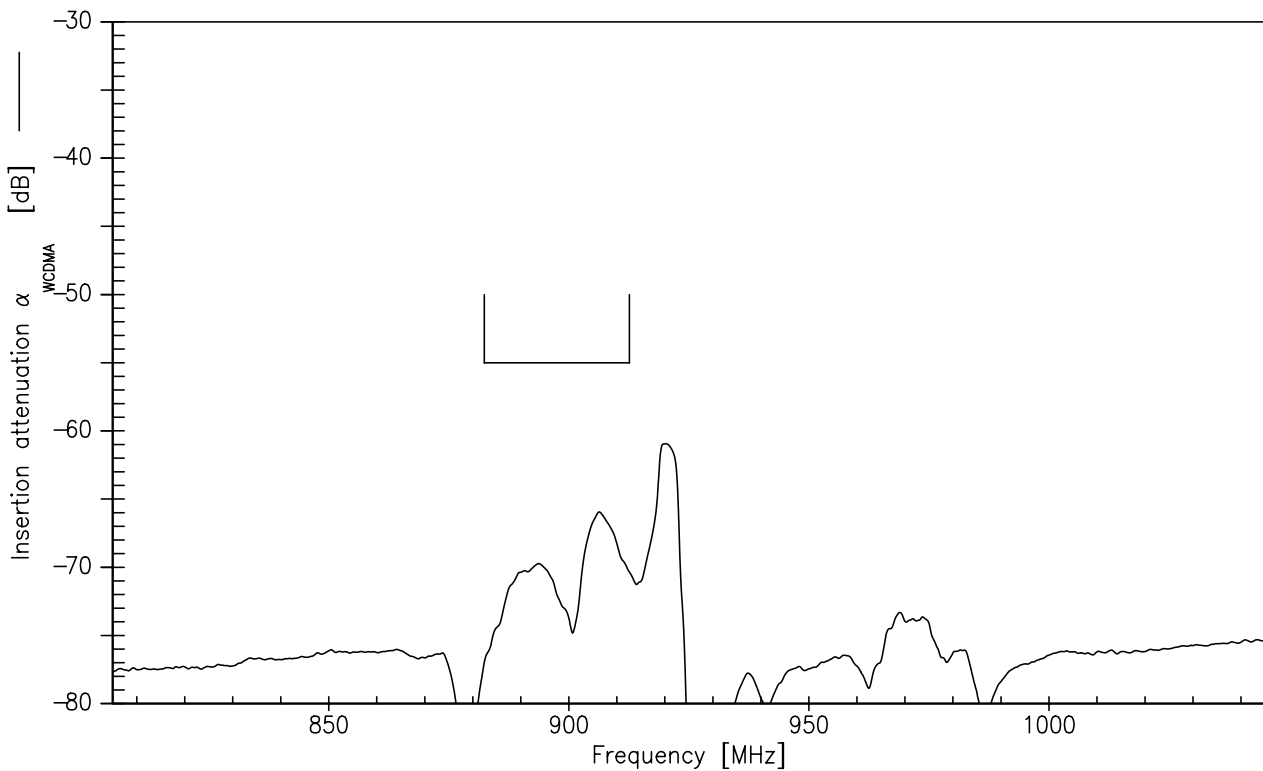
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Frequency Response TX-RX



Frequency Response TX-RX (Common Mode)



SAW Components

B4401

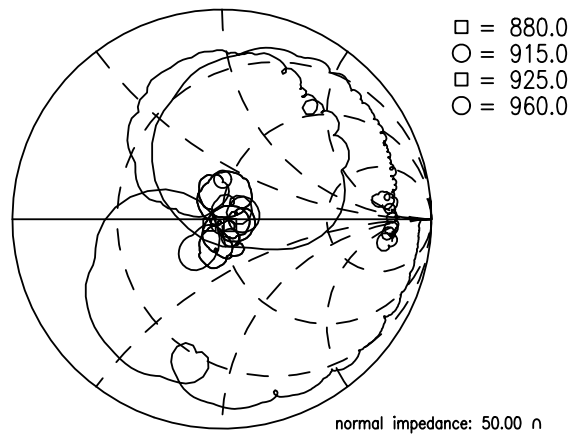
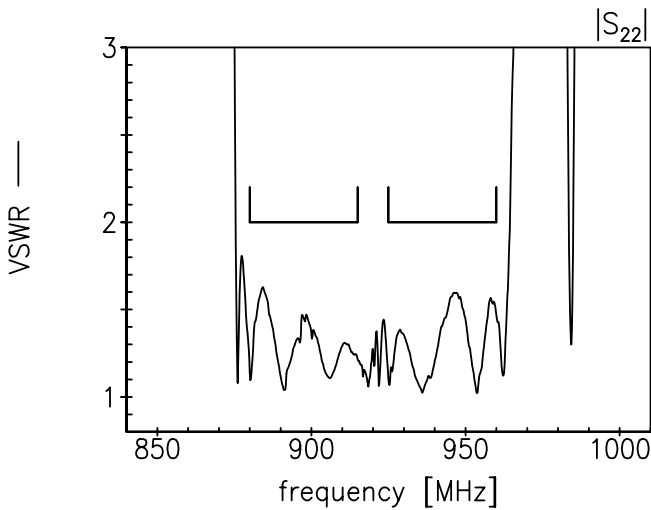
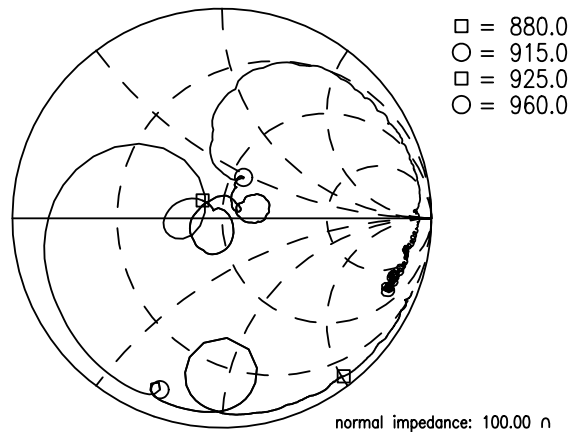
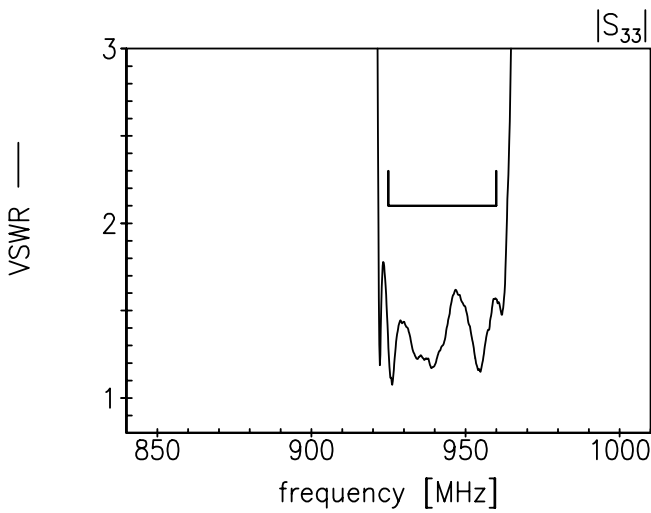
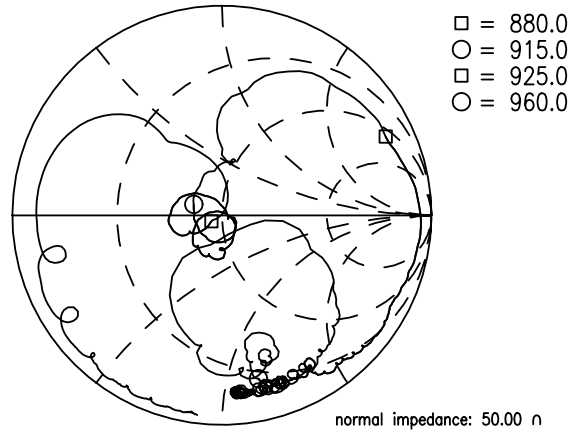
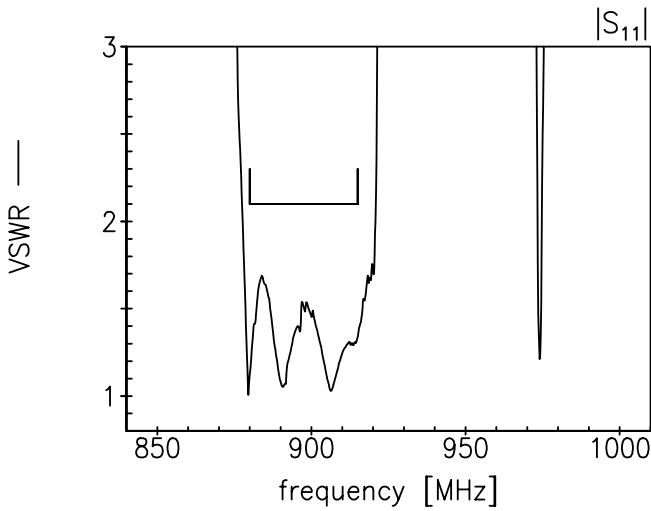
SAW Duplexer

897.5 / 942.5 MHz

Data sheet



Return Loss S_{11} TX-port S_{33} RX-port S_{22} ANT-port



SAW Components
B4401
SAW Duplexer
897.5 / 942.5 MHz

Data sheet



References

Type	B4401
Ordering code	B39941B4401P810
Marking and package	C61157-A8-A37
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B4401_NB_UN.s4p, B4401_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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