



SAW Components

SAW Duplexer

Cellular / WCDMA Band V

Series/type: B8577

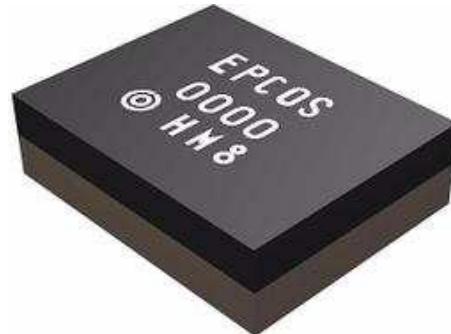
Ordering code: B39881B8577P810

Date: June 4, 2013

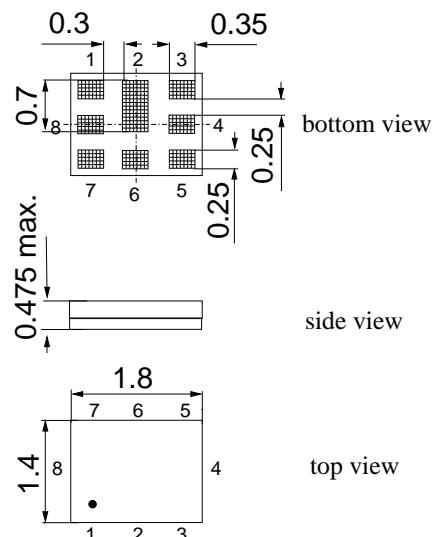
Version: 2.0

Application

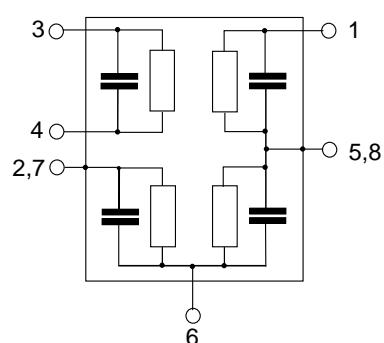
- Multimode SAW duplexer for mobile telephone
- Cellular / WCDMA Band V systems
- Low insertion attenuation
- Low amplitude ripple
- High Tx band isolation
- Single ended to balanced transformation in
- Antenna - Rx path
- Impedance transformation from 50Ω to 100Ω in
- Antenna - RX path


Features

- Package size $1.8 \times 1.4 \text{ mm}^2$
- 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



Characteristics

Temperature range for specification:

 $T = -30 \text{ }^{\circ}\text{C} \text{ to } +85 \text{ }^{\circ}\text{C}$

Antenna terminating impedance:

 $Z_{\text{ANT}} = 50 \Omega \parallel 8.2 \text{ nH}$

RX terminating impedance:

 $Z_{\text{RX}} = 100 \Omega \text{ (balanced)}$

TX terminating impedance:

 $Z_{\text{TX}} = 50 \Omega$

Characterisitcs TX - ANT		min.	typ. @ 25 °C	max.	
Center frequency	f_{C}	—	836.5	—	MHz
Maximum insertion attenuation 824.0 ... 849.0 MHz @ f_{Carrier} 826.4 ... 846.6 MHz	α_{max} $\alpha_{\text{WCDMA}}^{1)}$	— —	1.5 1.3	2.3 2.1	dB dB
Amplitude ripple 824.0 ... 849.0 MHz	$\Delta\alpha$	—	0.6	1.4	dB
Error Vector Magnitude @ f_{Carrier} 826.4 ... 846.6 MHz	EVM ²⁾	—	2.1	4.0	%
Input VSWR (TX port) 824.0 ... 849.0 MHz		—	1.5	2.0	
Output VSWR (ANT port) 824.0 ... 849.0 MHz		—	1.4	2.0	

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.

Characteristics

Temperature range for specification:

 $T = -30 \text{ }^{\circ}\text{C} \text{ to } +85 \text{ }^{\circ}\text{C}$

Antenna terminating impedance:

 $Z_{\text{ANT}} = 50 \Omega \parallel 8.2 \text{ nH}$

RX terminating impedance:

 $Z_{\text{RX}} = 100 \Omega \text{ (balanced)}$

TX terminating impedance:

 $Z_{\text{TX}} = 50 \Omega$

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).

Characteristics

Temperature range for specification:

 $T = -30 \text{ }^{\circ}\text{C} \text{ to } +85 \text{ }^{\circ}\text{C}$

Antenna terminating impedance:

 $Z_{\text{ANT}} = 50 \Omega \parallel 8.2 \text{ nH}$

RX terminating impedance:

 $Z_{\text{RX}} = 100 \Omega \text{ (balanced)}$

TX terminating impedance:

 $Z_{\text{TX}} = 50 \Omega$

Characterisitcs ANT - RX			min.	typ. @ 25 °C	max.	
Center frequency	f_{C}	—	881.5	—	—	MHz
Maximum insertion attenuation 869.0 ... 894.0 MHz @ f_{Carrier} 871.4 ... 891.6 MHz	α_{max} $\alpha_{\text{WCDMA}}^1)$	—	1.7 1.5	2.4 2.2	—	dB dB
Amplitude ripple (p-p) 869.0 ... 894.0 MHz	$\Delta\alpha$	—	0.5	1.2	—	dB
Error Vector Magnitude @ f_{Carrier} 871.4 ... 891.6 MHz	EVM ²⁾	—	1.7	3.5	—	%
Input VSWR (ANT port) 869.0 ... 894.0 MHz		—	1.7	2.0	—	
Output VSWR (RX port) 869.0 ... 894.0 MHz		—	1.6	2.0	—	
Common mode rejection ratio 869.0 ... 894.0 MHz	CMRR	23 ³⁾	27	—	—	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⁾ A combination of 10° phase balance and 1 dB amplitude balance corresponds to 19.6 dB CMRR

Characteristics

Temperature range for specification:

 $T = -30 \text{ }^{\circ}\text{C} \text{ to } +85 \text{ }^{\circ}\text{C}$

Antenna terminating impedance:

 $Z_{\text{ANT}} = 50 \Omega \parallel 8.2 \text{ nH}$

RX terminating impedance:

 $Z_{\text{RX}} = 100 \Omega \text{ (balanced)}$

TX terminating impedance:

 $Z_{\text{TX}} = 50 \Omega$

Characterisitcs ANT - RX		min.	typ. @ 25 °C	max.	
IMD product level limits¹⁾					
at $f_{\text{TX}} = 836.5 \text{ MHz}$ $f_{\text{RX}} = 881.5 \text{ MHz}$					
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			
@ f_{Carrier}	10.0 ... 447.0 MHz	$\alpha_{\text{WCDMA}}^2)$	45	75	dB
	447.0 ... 824.0 MHz		45	61	dB
	824.0 ... 849.0 MHz		50	60	dB
	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).

Characteristics

Temperature range for specification:

 $T = -30 \text{ }^{\circ}\text{C} \text{ to } +85 \text{ }^{\circ}\text{C}$

Antenna terminating impedance:

 $Z_{\text{ANT}} = 50 \Omega \parallel 8.2 \text{ nH}$

RX terminating impedance:

 $Z_{\text{RX}} = 100 \Omega \text{ (balanced)}$

TX terminating impedance:

 $Z_{\text{TX}} = 50 \Omega$

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

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

$f_{Carrier}$ 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)). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

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

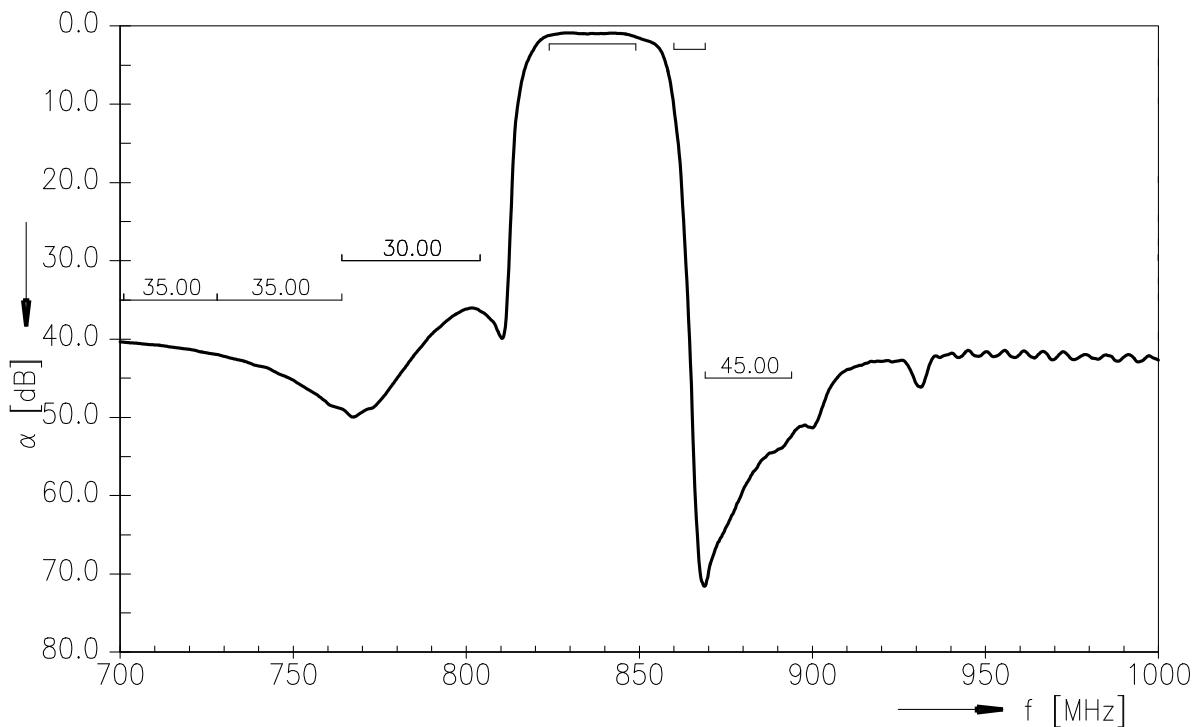
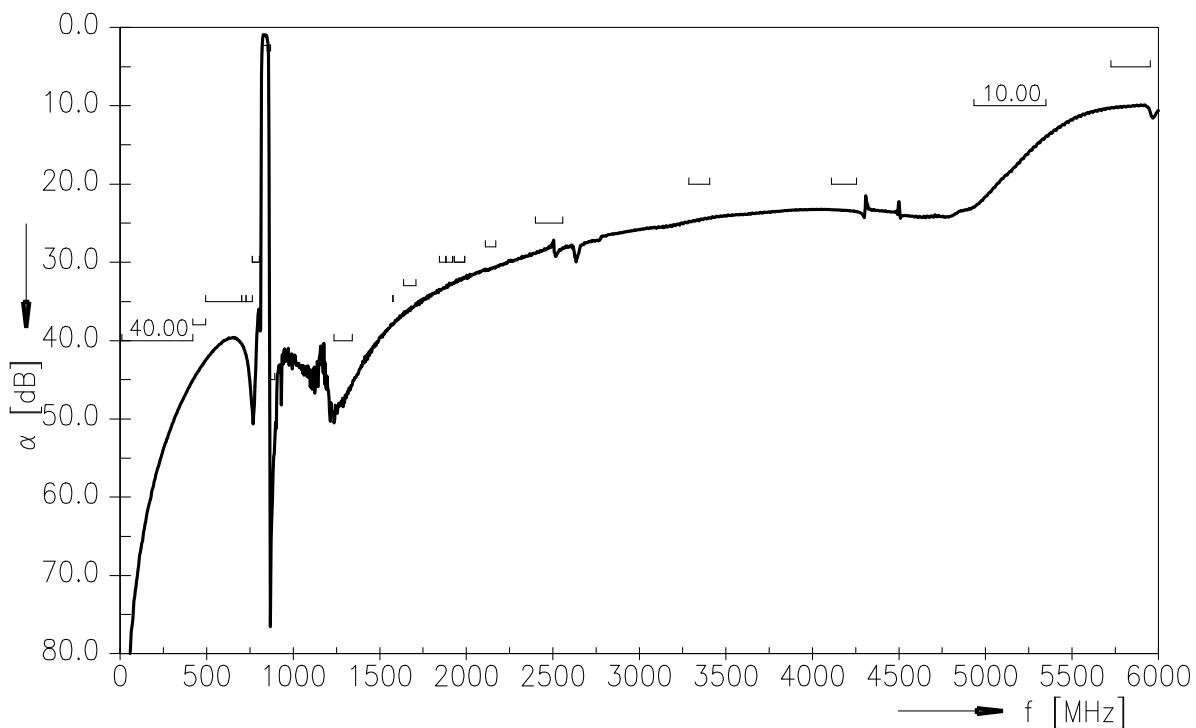
Maximum ratings

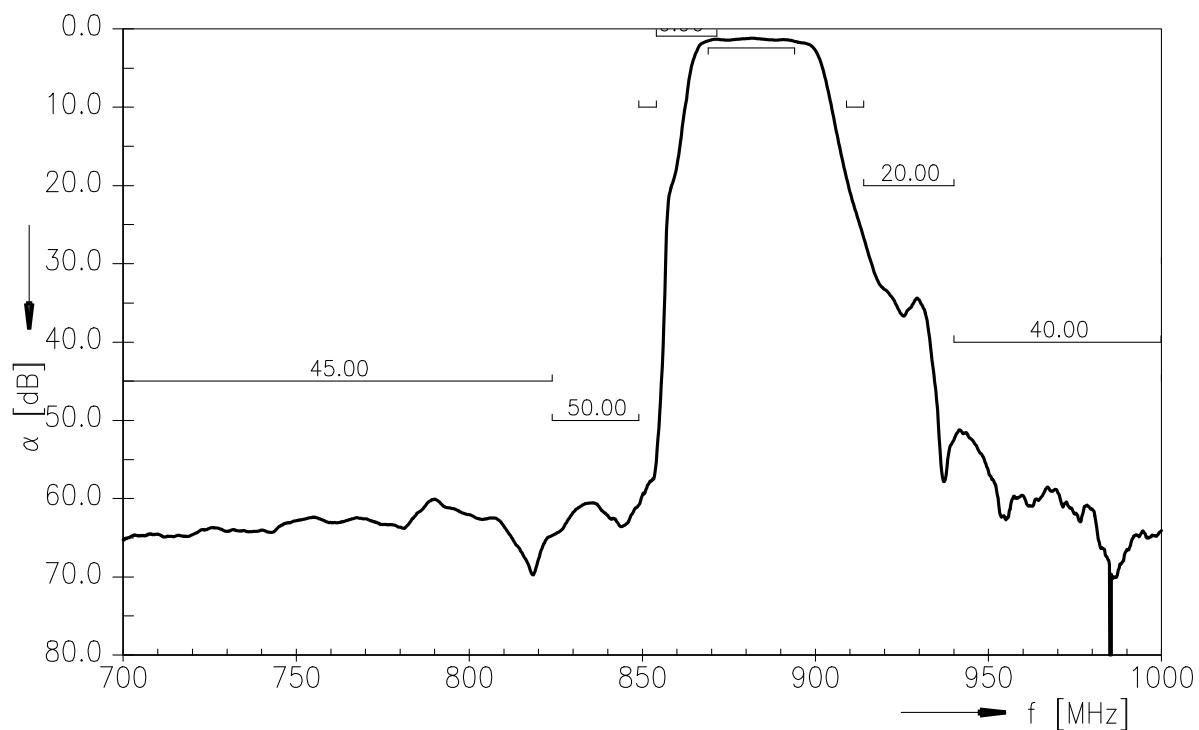
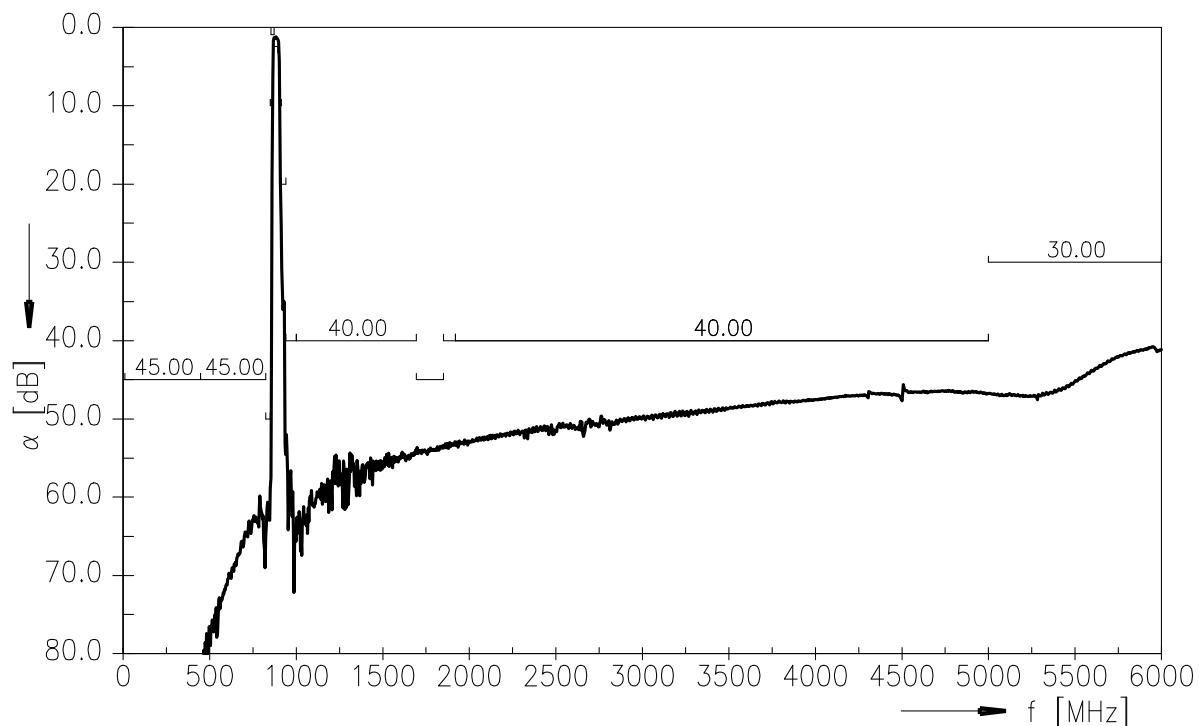
Storage temperature range	T_{stg}	-40/+85 ¹⁾	°C	
DC voltage	V_{DC}	5 ²⁾	V	
ESD voltage	V_{ESD}	100 ³⁾	V	Machine Model
Input power	P_{IN}			source and load impedance 50 Ω
824.0 ... 849.0 MHz		28	dBm	continuous wave
elsewhere		10	dBm	$T = 50^\circ C, 3000 h$

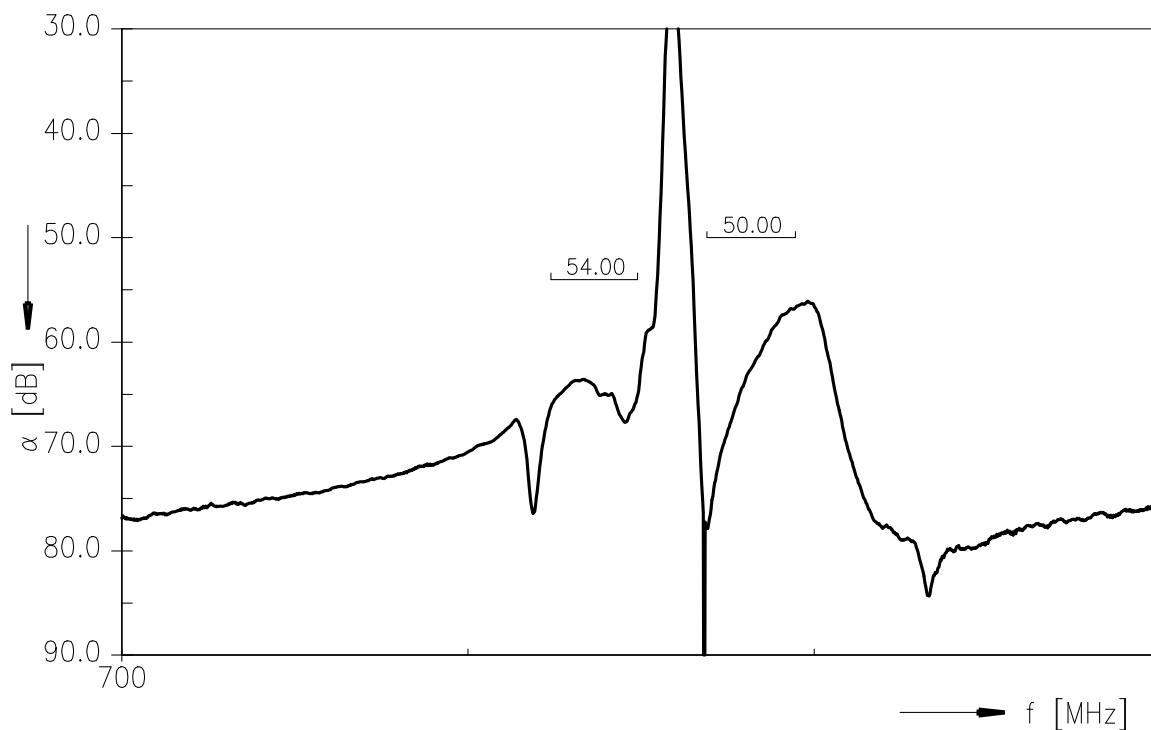
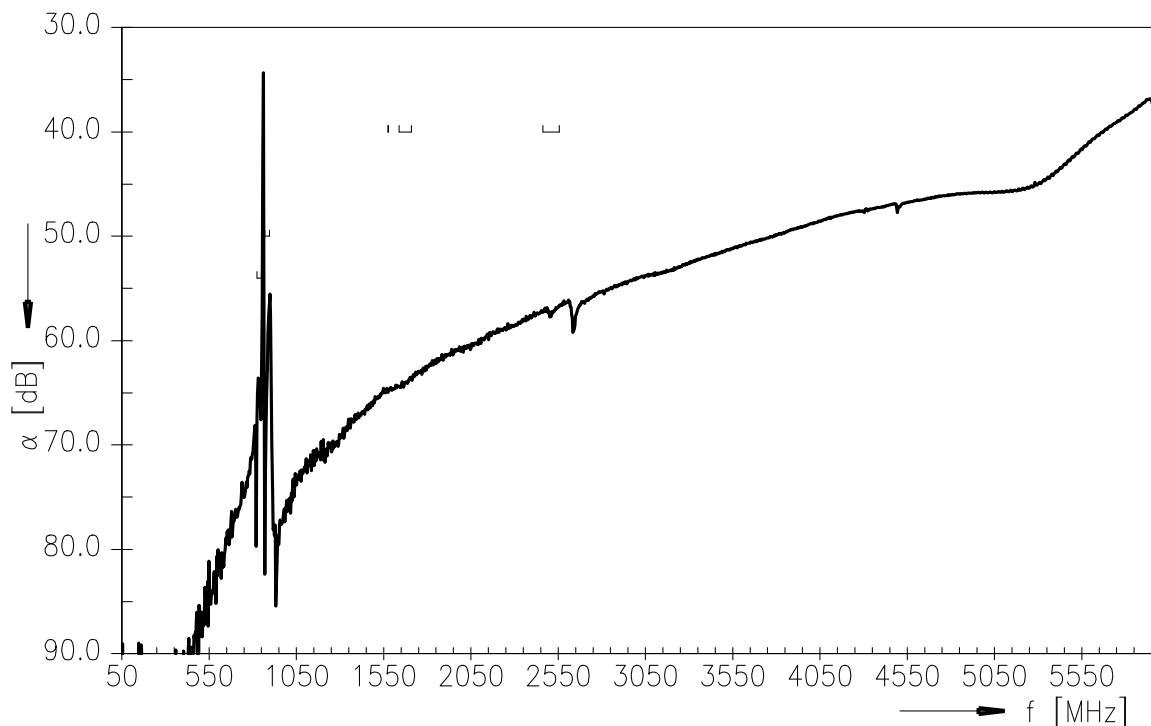
¹⁾ extended upperlimit: 168h@125°C acc. to IEC 60068-2-2 Bb

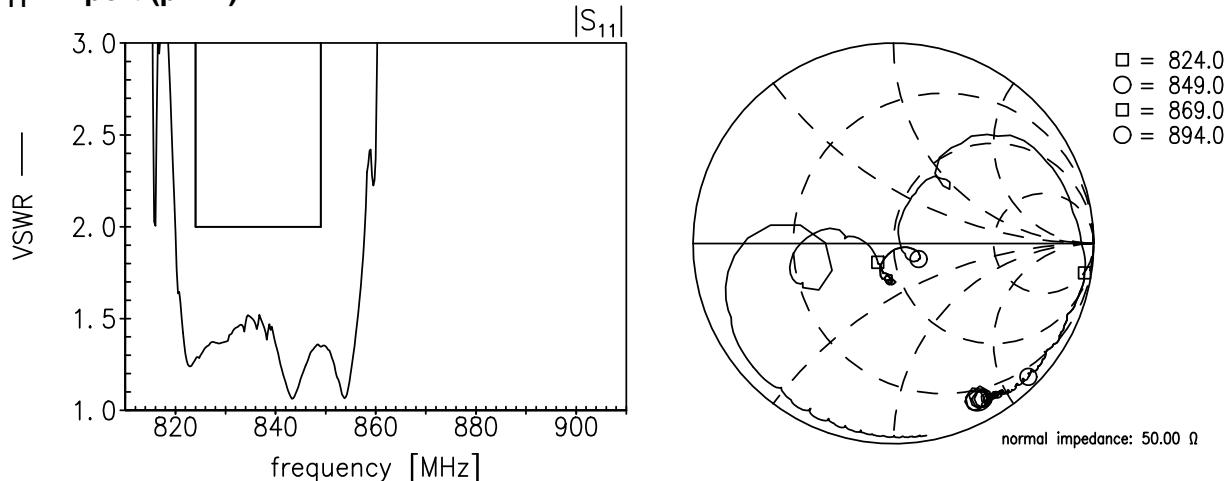
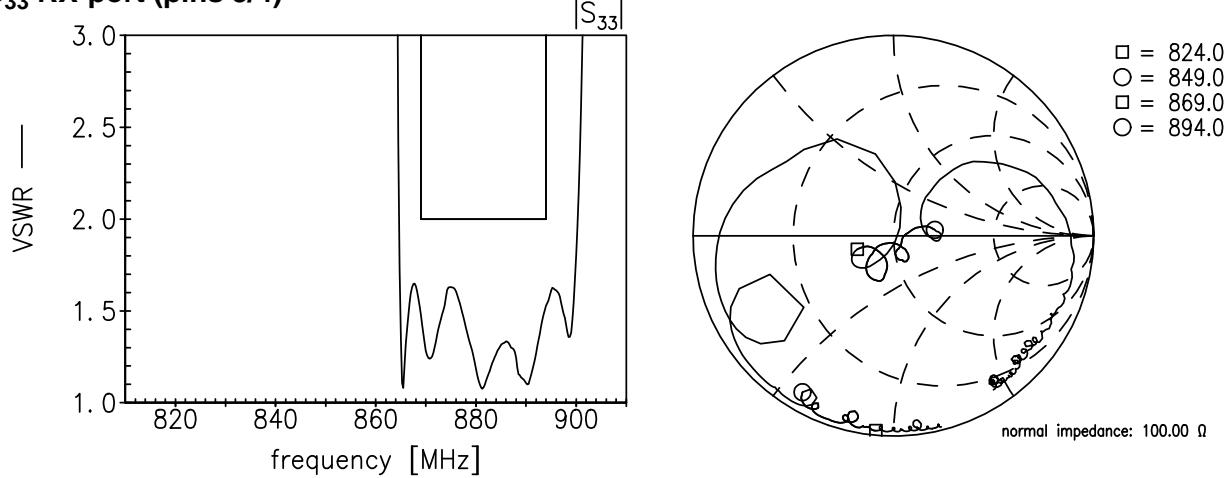
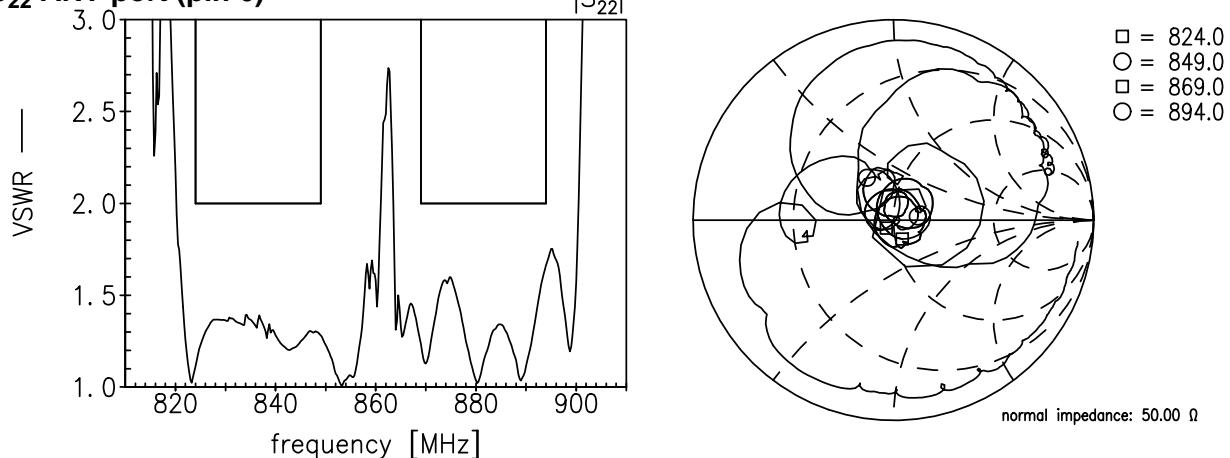
²⁾ 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy

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


Transfer function TX (wideband)


Transfer function RX (Power transfer function)

Transfer function RX (wideband)


Isolation TX-RX (Power transfer function)

Isolation TX-RX (wideband)


S_{11} TX-port (pin 1)

 S_{33} RX-port (pins 3/4)

 S_{22} ANT-port (pin 6)


SAW Components	B8577
SAW Duplexer	836.5 / 881.5 MHz
Data sheet	SMD
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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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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