



## **SAW Components**

### **SAW Duplexer**

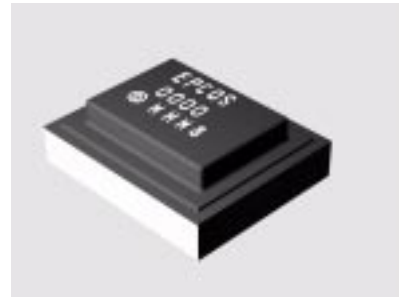
W-CDMA Band 5 / CDMA 800

<b>Series/type:</b>	<b>B7654</b>
<b>Ordering code:</b>	<b>B39881B7654P810</b>
<b>Date:</b>	<b>December 28, 2011</b>
<b>Version:</b>	<b>2.0</b>



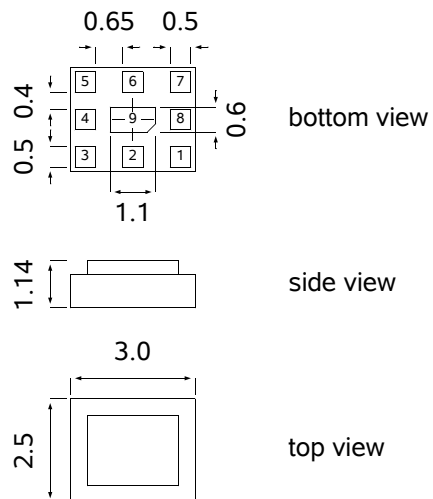
**Application**

- Low-loss SAW duplexer for mobile telephone W-CDMA Band 5 / CDMA 800 systems
- Low insertion attenuation
- Low amplitude ripple
- Single-ended to balanced transformation in Antenna-Rx path
- Impedance transformation 50 Ω to 100 Ω in Antenna-Rx path



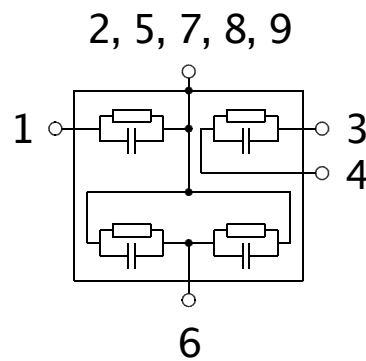
**Features**

- Package size 3.0 x 2.5 x 1.14 mm<sup>3</sup>
- RoHS compatible
- Approximate weight 0.032 g
- Package for **Surface Mount Technology (SMT)**
- Ni, Au-plated terminals
- Balanced Rx port, unbalanced Tx port
- **Electrostatic Sensitive Device (ESD)**
- Fully matched by integrated matching network
- **Moisture Sensitive Level 3**



**Pin configuration**

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





Data sheet



**Characteristics**

Temperature range for specification: T = -30 °C to +85 °C  
 Tx terminating impedance: Z<sub>Tx</sub> = 50 Ω  
 Antenna terminating impedance: Z<sub>Ant</sub> = 50 Ω  
 Rx terminating impedance: Z<sub>Rx</sub> = 100 Ω (balanced)

Characteristics Tx-Antenna		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	f <sub>c</sub>	—	836.5	—	MHz
<b>Maximum insertion attenuation</b>	α				
	824.0 ... 849.0 MHz	—	1.7	2.2	dB
<b>Amplitude ripple (p-p)</b>	Δα				
	824.0 ... 849.0 MHz	—	0.8	1.3	dB
<b>Tx port VSWR</b>					
	824.0 ... 849.0 MHz	—	1.8	2.1	
<b>Antenna port VSWR</b>					
	824.0 ... 849.0 MHz	—	1.8	2.1	
<b>Attenuation</b>	α				
	10.0 ... 420.0 MHz	30	45	—	dB
	420.0 ... 494.0 MHz	38	55	—	dB
	494.0 ... 701.0 MHz	30	42	—	dB
	701.0 ... 728.0 MHz	35	42	—	dB
	728.0 ... 764.0 MHz	36	42	—	dB
	764.0 ... 804.0 MHz	30	42	—	dB
	860.0 ... 869.0 MHz	5	11	—	dB
	869.0 ... 894.0 MHz	44	55	—	dB
	1565.42 ... 1573.374 MHz	35	45	—	dB
	1573.374 ... 1577.466 MHz	40	45	—	dB
	1577.466 ... 1585.42 MHz	35	45	—	dB
	1597.5515 ... 1605.88 MHz	40	44	—	dB
	1648.0 ... 1698.0 MHz	30	42	—	dB
	1884.0 ... 1919.0 MHz	30	39	—	dB
	1930.0 ... 1990.0 MHz	34	38	—	dB
	2110.0 ... 2170.0 MHz	33	37	—	dB
	2400.0 ... 2500.0 MHz	25	35	—	dB
	2500.0 ... 2547.0 MHz	20	33	—	dB
	3286.0 ... 3406.0 MHz	15	24	—	dB
	4255.0 ... 4600.0 MHz	15	26	—	dB
	4934.0 ... 5350.0 MHz	8	17	—	dB
	5725.0 ... 6000.0 MHz	6	14	—	dB



Data sheet



**Characteristics**

Temperature range for specification: T = -30 °C to +85 °C  
 Tx terminating impedance: Z<sub>Tx</sub> = 50 Ω  
 Antenna terminating impedance: Z<sub>Ant</sub> = 50 Ω  
 Rx terminating impedance: Z<sub>Rx</sub> = 100 Ω (balanced)

Characteristics Antenna-Rx		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	f <sub>c</sub>	—	881.5	—	MHz
<b>Maximum insertion attenuation</b>	α	—	2.2	2.7	dB
869.0 ... 894.0 MHz					
<b>Amplitude ripple (p-p)</b>	Δα	—	0.9	1.4	dB
869.0 ... 894.0 MHz					
<b>Antenna port VSWR</b>		—	1.7	2.0	
869.0 ... 894.0 MHz					
<b>Rx port VSWR</b>		—	2.0	2.3	
869.0 ... 894.0 MHz					
<b>CMRR ( S<sub>32</sub>-S<sub>42</sub> / S<sub>32</sub>+S<sub>42</sub> )</b>		21 <sup>1)</sup>	26	—	dB
869.0 ... 894.0 MHz					
<b>Attenuation</b>	α				
10.0 ... 447.0MHz		45	55	—	dB
447.0 ... 824.0MHz		40	55	—	
824.0 ... 849.0MHz		45	55	—	dB
849.0 ... 854.0MHz		23	31	—	
909.0 ... 970.0MHz		13	17	—	dB
970.0 ... 1320.0 MHz		40	46	—	
1360.0 ... 2180.0MHz		45	60	—	dB
2180.0 ... 4500.0MHz		35	41	—	
4500.0 ... 6000.0MHz		30	37	—	dB

<sup>1)</sup> 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
Tx terminating impedance:	Z <sub>Tx</sub> = 50 Ω
Antenna terminating impedance:	Z <sub>Ant</sub> = 50 Ω
Rx terminating impedance:	Z <sub>Rx</sub> = 100 Ω (balanced)

Characteristics Tx-Rx	min.	typ. @ 25 °C	max.	
<b>Differential mode isolation</b> α				
824.0 ... 849.0 MHz	52	56	—	dB
869.0 ... 894.0 MHz	50	57	—	dB
<b>Common mode isolation</b> α				
824.0 ... 849.0 MHz	45	49	—	dB



Data sheet



Characteristics

Temperature range for specification:	T = -30 °C to +85 °C
Tx terminating impedance:	Z <sub>Tx</sub> = 50 Ω
Antenna terminating impedance:	Z <sub>Ant</sub> = 50 Ω
Rx terminating impedance:	Z <sub>Rx</sub> = 100 Ω (balanced)

Intermodulation Characteristics SV-LTE coexistence CDMA Cell - LTE Band 13 <sup>1)</sup>	min.	typ. @ 25 °C	max.	
<b>Case 1 - IM3 in CDMA Cell Rx band<sup>2)</sup></b> f <sub>TX5</sub> = 824.0 ... 832.0 MHz P <sub>TX5<sup>3)</sup></sub> = 24 dBm f <sub>jam</sub> = 779.0 ... 787.0 MHz P <sub>jam</sub> = 9 dBm f <sub>RX5</sub> = 869.0 ... 877.0 MHz <b>P<sub>RX5</sub></b>	—	-103	—	dBm
<b>Case 2 - IM3 in B13 Rx band<sup>2)</sup></b> f <sub>TX5</sub> = 824.0 ... 828.0 MHz P <sub>TX5<sup>3)</sup></sub> = 24 dBm f <sub>jam</sub> = 785.0 ... 787.0 MHz P <sub>jam</sub> = 9 dBm f <sub>RX13</sub> = 746.0 ... 750.0 MHz <b>P<sub>RX13</sub></b>	—	-112	—	dBm

1) In combination with TDK-EPC LTE Band13 duplexer B7928

2) See picture 1 on page 7.

3) Power level at Ant of picture 1 on page 7.



**SAW Components** **B7654**

**SAW Duplexer** **836.5 / 881.5 MHz**

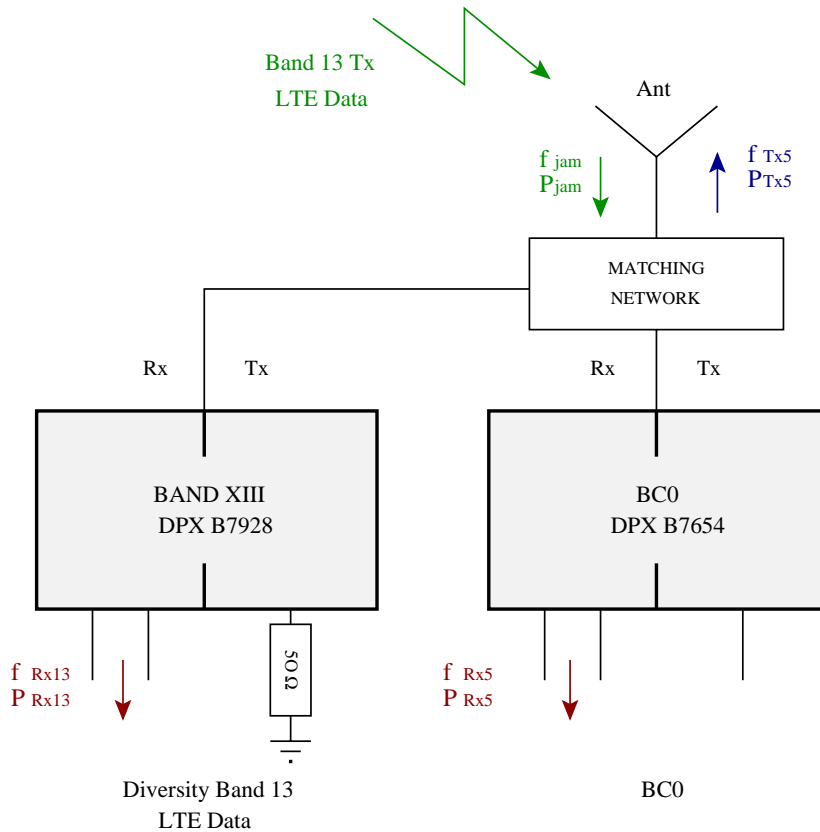
Data sheet



**Maximum ratings**

Storage temperature range	$T_{stg}$	-40/+85	°C	machine model, 1 pulse source and load impedance 50 Ω } continuous wave 55 °C, 5000h
DC voltage	$V_{DC}$	5	V	
ESD voltage	$V_{ESD}$	100 <sup>1)</sup>	V	
Input power at 824.0 ... 849.0 MHz	$P_{in}$	29	dBm	
elsewhere	$P_{in}$	10	dBm	

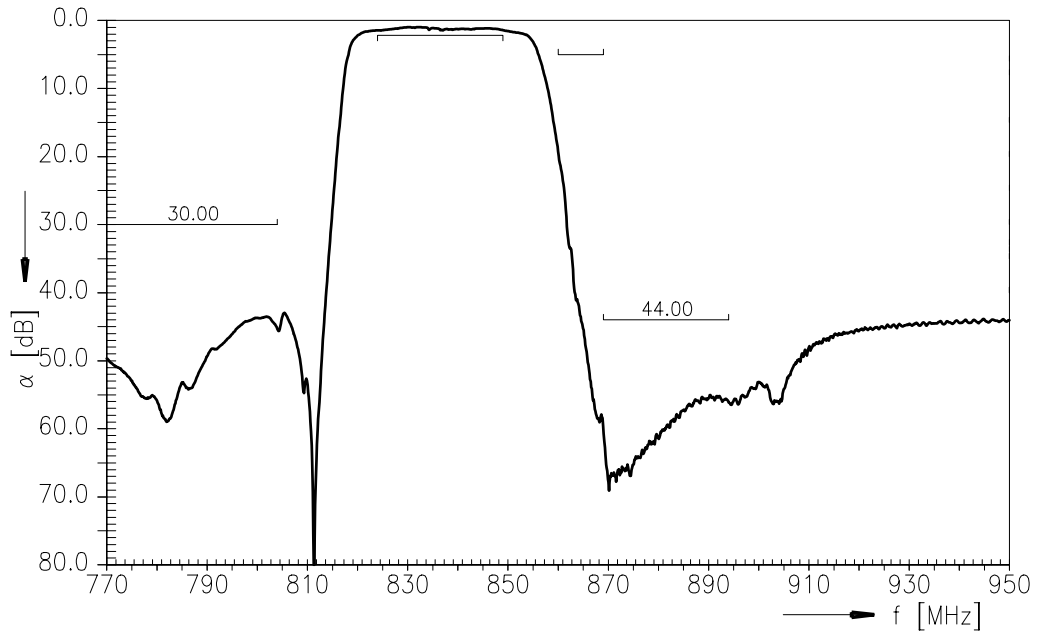
1) According to JESD22-A115A (machine model), 1 negative and 1 positive pulse.



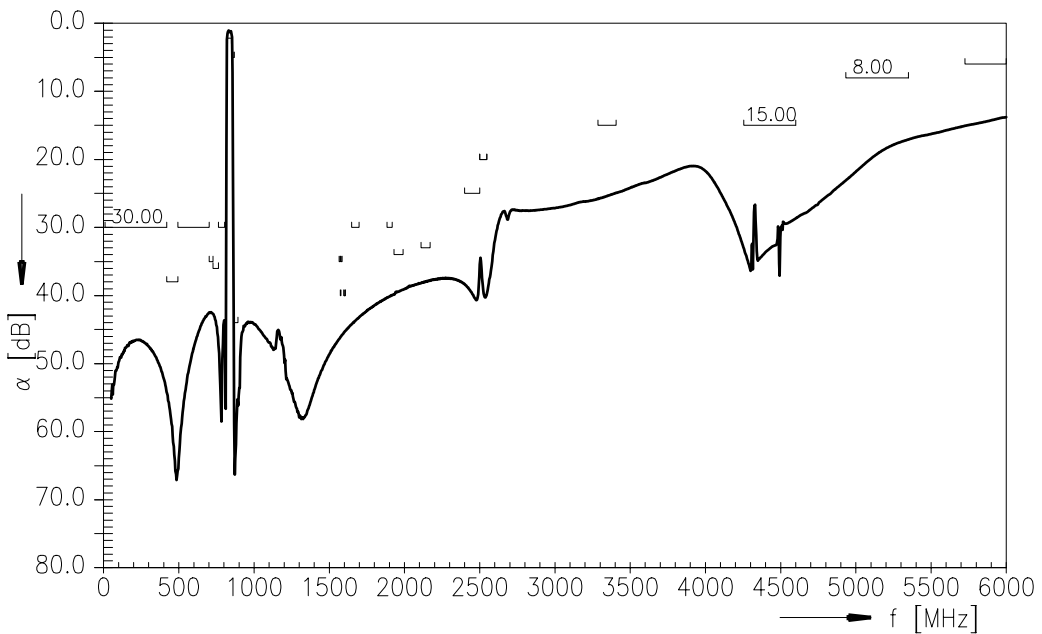
**Picture 1:** Signal definition for SV-LTE coexistence intermodulation specification using TDK-EPC CDMA cell duplexer B7654 in combination with LTE Band 13 duplexer B7928.



Frequency response Tx-Antenna



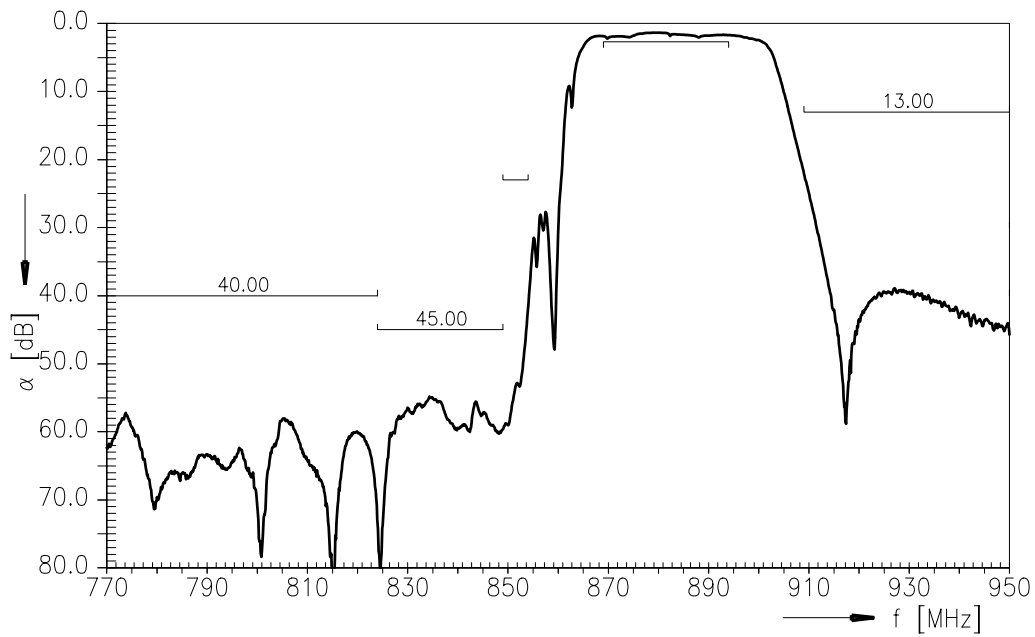
Frequency response Tx-Antenna (wideband)



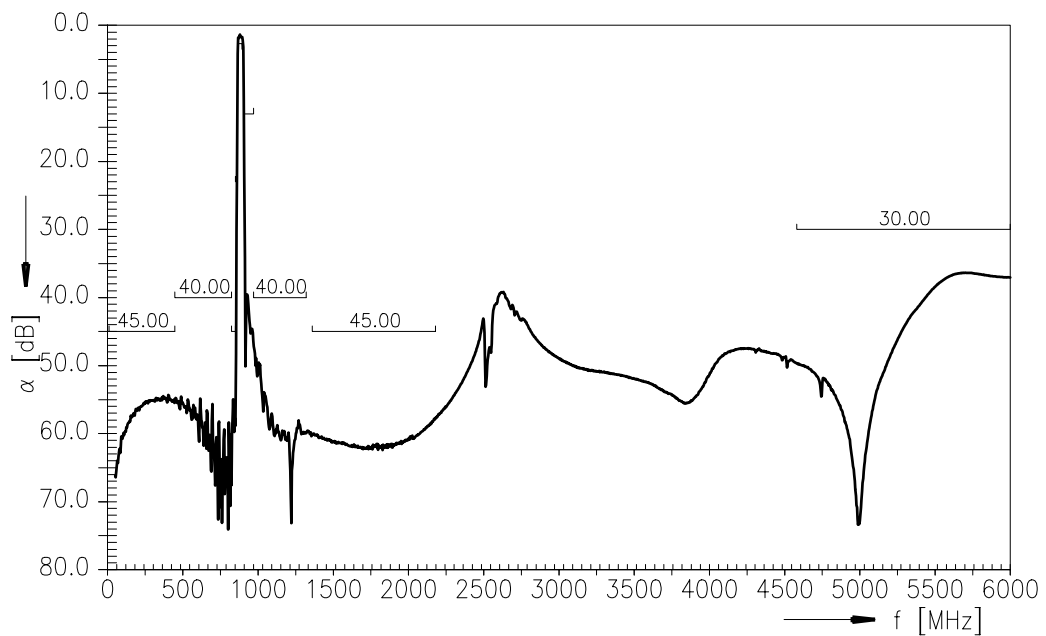




Frequency response Antenna-Rx

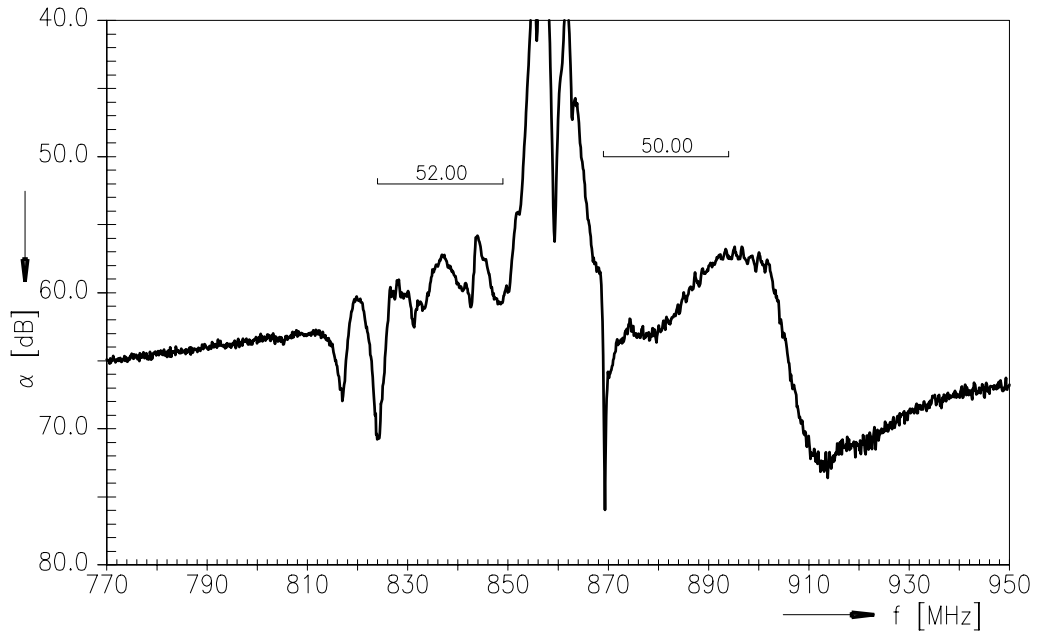


Frequency response Antenna-Rx (wideband)

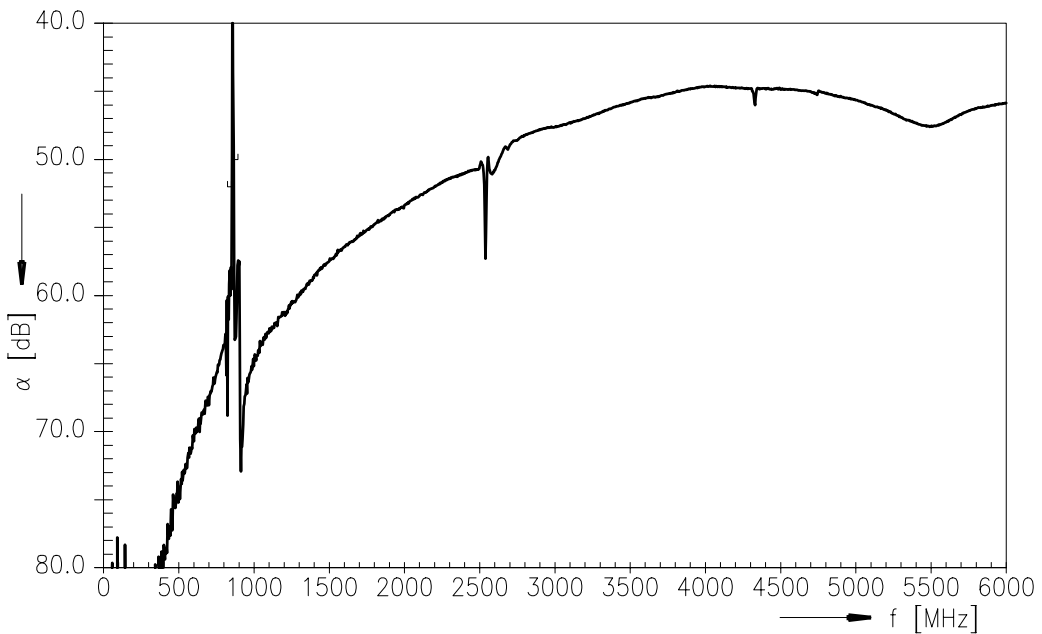




Frequency response Tx-Rx



Frequency response Tx-Rx (wideband)





Data sheet

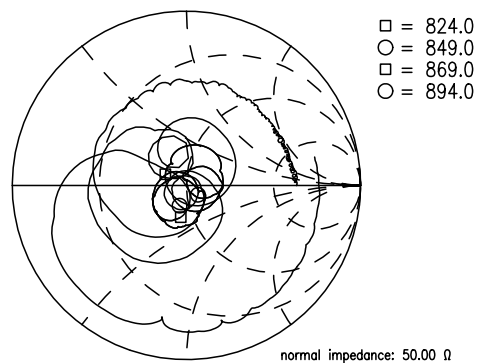
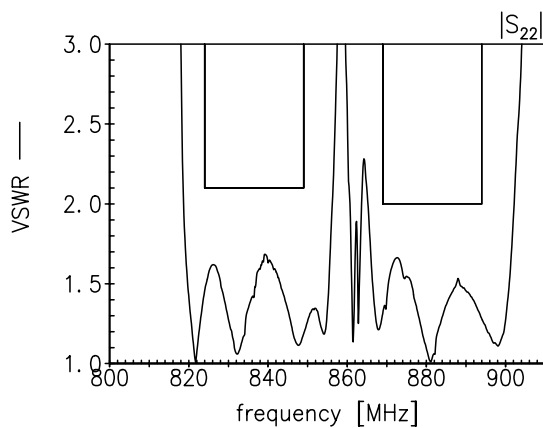
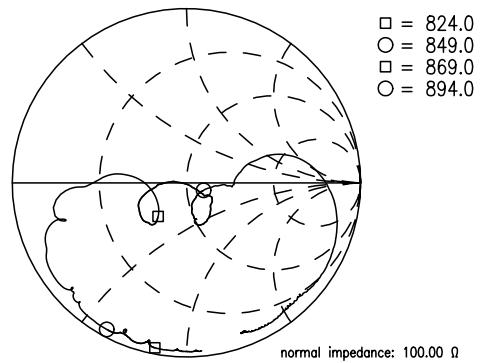
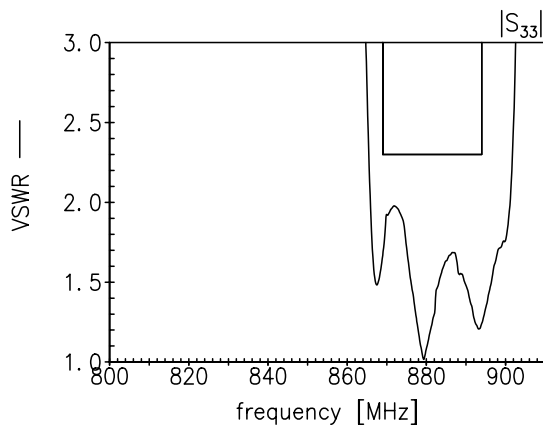
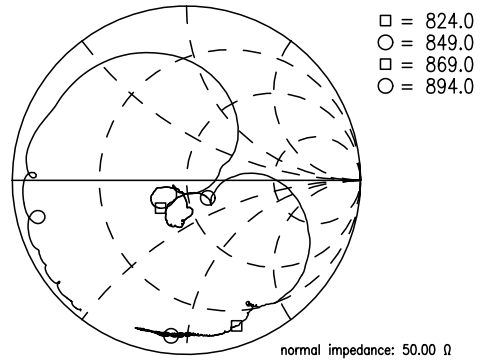
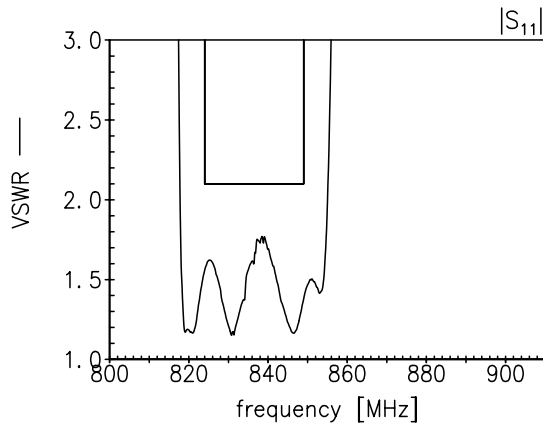


Return loss

$S_{11}$  Tx-port

$S_{22}$  Antenna-port

$S_{33}$  Rx-portReferences



Please read *cautions and warnings* and *important notes* at the end of this document.



<b>SAW Components</b>	<b>B7654</b>
<b>SAW Duplexer</b>	<b>836.5 / 881.5 MHz</b>

Data sheet



<b>Type</b>	B7654
<b>Ordering code</b>	B39881B7654P810
<b>Marking and package</b>	C61157-A3-A87
<b>Packaging</b>	F61074-V8211-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B7654_NB.s4p, B7654_WB.s4p See file header for pin/port assignment.
<b>Soldering profile</b>	S_6001
<b>RoHS compatible</b>	Defined as compatible with the following documents: "DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. 2005/618/EC from April 18th, 2005, amending Directive 2002/95/EC of the European Parliament and of the Council for the purposes of establishing the maximum concentration values for certain hazardous substances in electrical and electronic equipment."
<b>Moldability</b>	Before using in overmolding environment, please contact your EPCOS sales office.
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