



# SAW Components

SAW Rx 2in1 input duplex filter  
GSM 850 / GSM 900

<b>Series/type:</b>	<b>B9814</b>
<b>Ordering code:</b>	<b>B39941B9814P810</b>
Date:	September 30, 2011
Version:	2.1

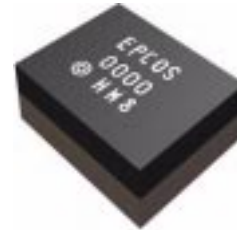
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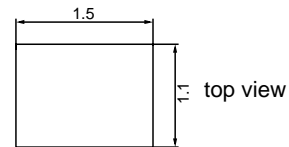
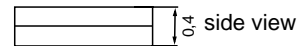
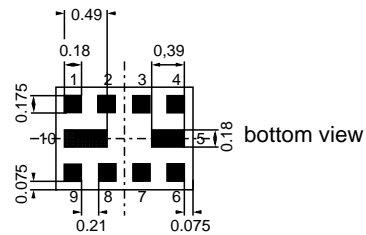
Data sheet


**Application**

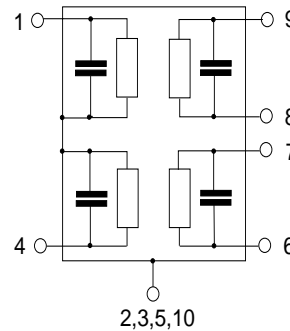
- Low-loss 2in1 RF filter for mobile telephone GSM 900 and GSM 850 systems, receive path (Rx)
- Usable passband:  
 Filter 1 (GSM 900): 35 MHz  
 Filter 2 (GSM 850): 25 MHz
- Unbalanced to balanced operation for all filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12


**Features**

- Package size 1.5 x 1.1 x 0.4 mm<sup>3</sup>
- RoHS compatible
- Approx. weight 0.003g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitive Level 3**


**Pin configuration**

- 1 Input [Diplex]
- 8,9 Output, balanced [Filter 1]
- 6,7 Output, balanced [Filter 2]
- 4 To be grounded
- 2,3,5,10 Case-ground



Data sheet


**Characteristics of filter 1 ( GSM 900 )**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega \parallel 10\text{ nH (unbalanced)}$   
 Terminating load impedance:  $Z_L = 150\ \Omega \parallel 40\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	942.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	1.9 <sup>1)</sup>	3.0	dB
925.0 ... 960.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.9	2.1	dB
925.0 ... 960.0 MHz					
<b>Input VSWR</b>		—	1.9	2.3	
925.0 ... 960.0 MHz					
<b>Output VSWR</b>		—	2.0	2.3	
925.0 ... 960.0 MHz					
<b>Common mode rejection ratio</b>		22	27	—	dB
925.0 ... 960.0 MHz					
<b>Attenuation</b>	$\alpha$				
10.0 ... 480.0 MHz		45	55	—	dB
480.0 ... 825.0 MHz		35	39	—	dB
825.0 ... 905.0 MHz		21	26	—	dB
905.0 ... 915.0 MHz		14	20	—	dB
980.0 ... 1050.0 MHz		21	26	—	dB
1050.0 ... 1850.0 MHz		26	32	—	dB
1850.0 ... 1920.0 MHz		38	39	—	dB
1920.0 ... 5000.0 MHz		30	38	—	dB
5000.0 ... 6000.0 MHz		30	36	—	dB

<sup>1)</sup> Typical value excluding PCB losses.

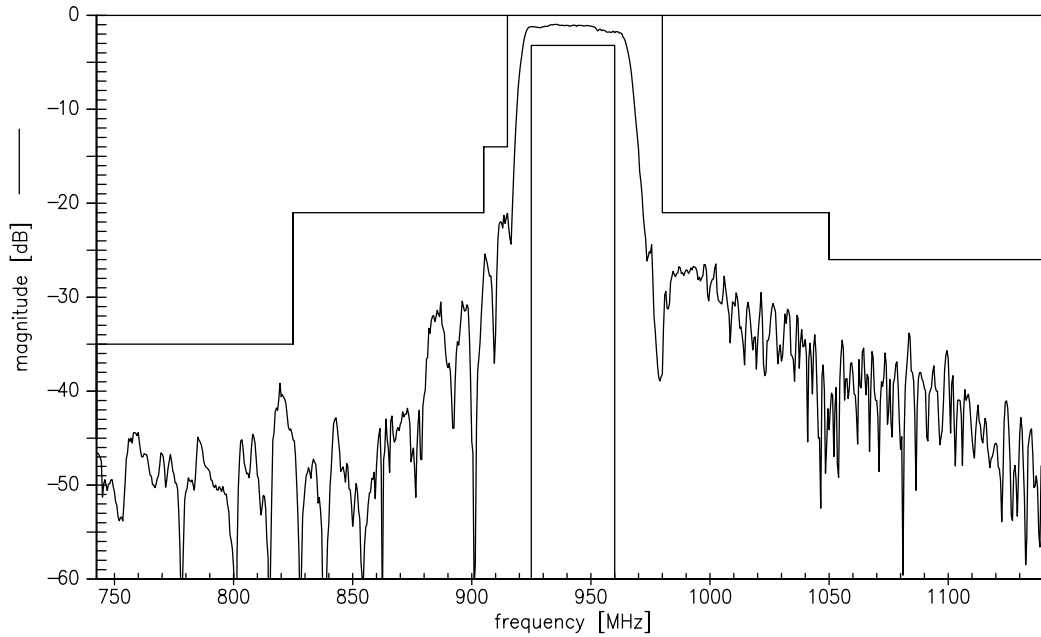

**Maximum ratings of filter 1**

Operable temperature range	T	-40/+85	°C	
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	100 <sup>1)</sup>	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P <sub>IN</sub>	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P <sub>IN</sub>	15	dBm	
Tx bands				

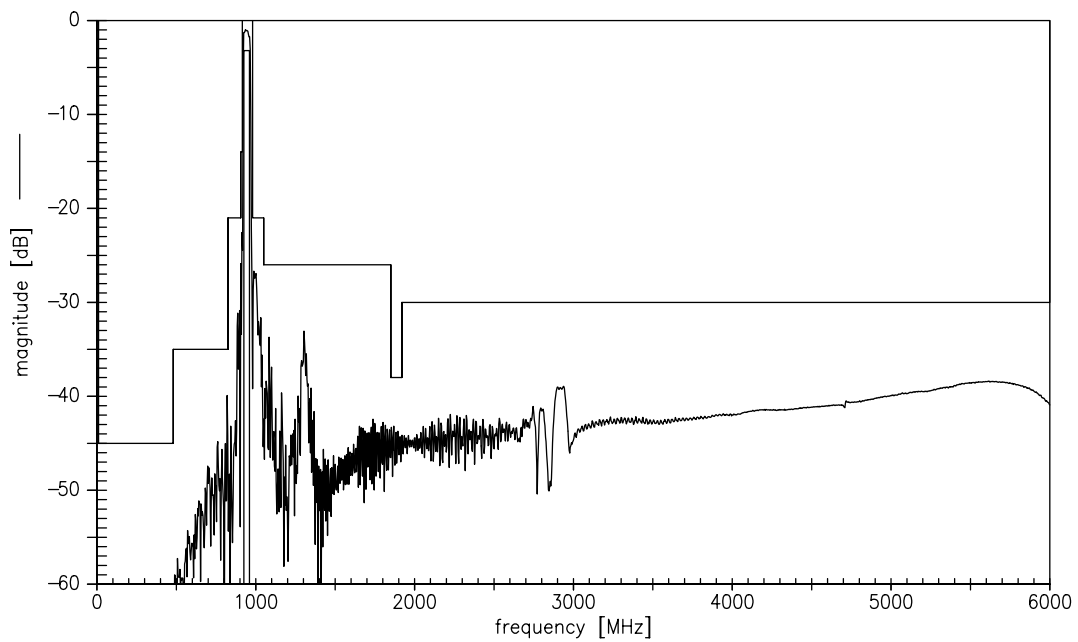
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function of filter 1



Transfer function of filter 1 - wideband

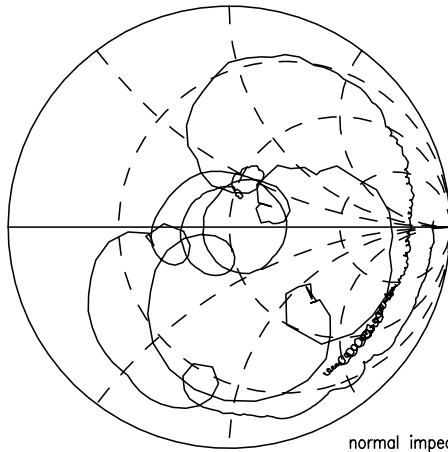


Data sheet

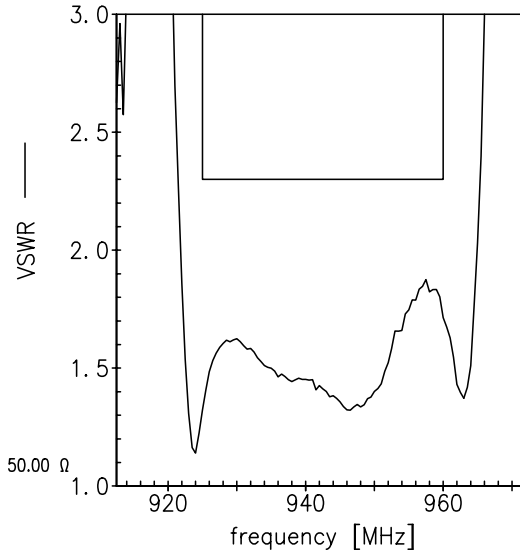


Smith Charts filter 1

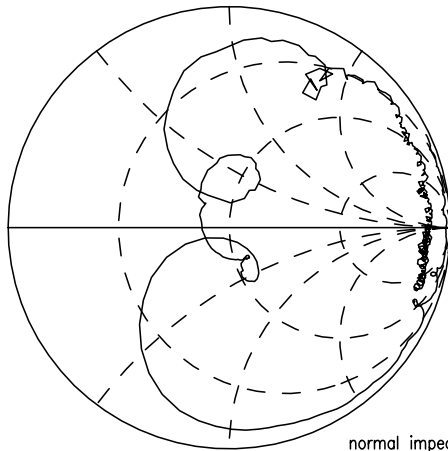
$S_{11}$  function



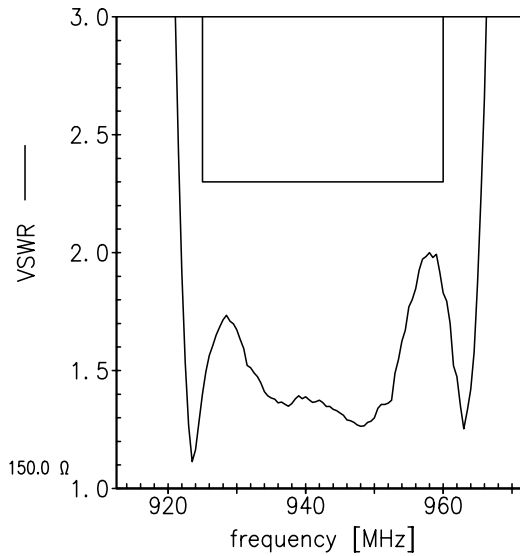
normal impedance: 50.00  $\Omega$



$S_{22}$  function



normal impedance: 150.0  $\Omega$



Data sheet


**Characteristics of filter 2 ( GSM 850 )**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega \parallel 10\text{ nH (unbalanced)}$   
 Terminating load impedance:  $Z_L = 150\ \Omega \parallel 56\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	881.5	—	MHz
<b>Maximum insertion attenuation</b> 869.0 ... 894.0 MHz	$\alpha_{\max}$	—	1.6 <sup>1)</sup>	2.1	dB
<b>Amplitude ripple (p-p)</b> 869.0 ... 894.0 MHz	$\Delta\alpha$	—	0.8	1.6	dB
<b>Input VSWR</b> 869.0 ... 894.0 MHz		—	1.5	2.2	
<b>Output VSWR</b> 869.0 ... 894.0 MHz		—	1.7	2.2	
<b>Common mode rejection ratio</b> 869.0 ... 894.0 MHz		19	24	—	dB
<b>Attenuation</b>	$\alpha$				
10.0 ... 447.0 MHz		45	50	—	dB
447.0 ... 849.0 MHz		28	33	—	dB
914.0 ... 1000.0 MHz		24	28	—	dB
1000.0 ... 1850.0 MHz		28	32	—	dB
1850.0 ... 1920.0 MHz		37	46	—	dB
1920.0 ... 4000.0 MHz		33	39	—	dB
4000.0 ... 6000.0 MHz		25	32	—	dB

1) Typical value excluding PCB losses.


**Maximum ratings of filter 2**

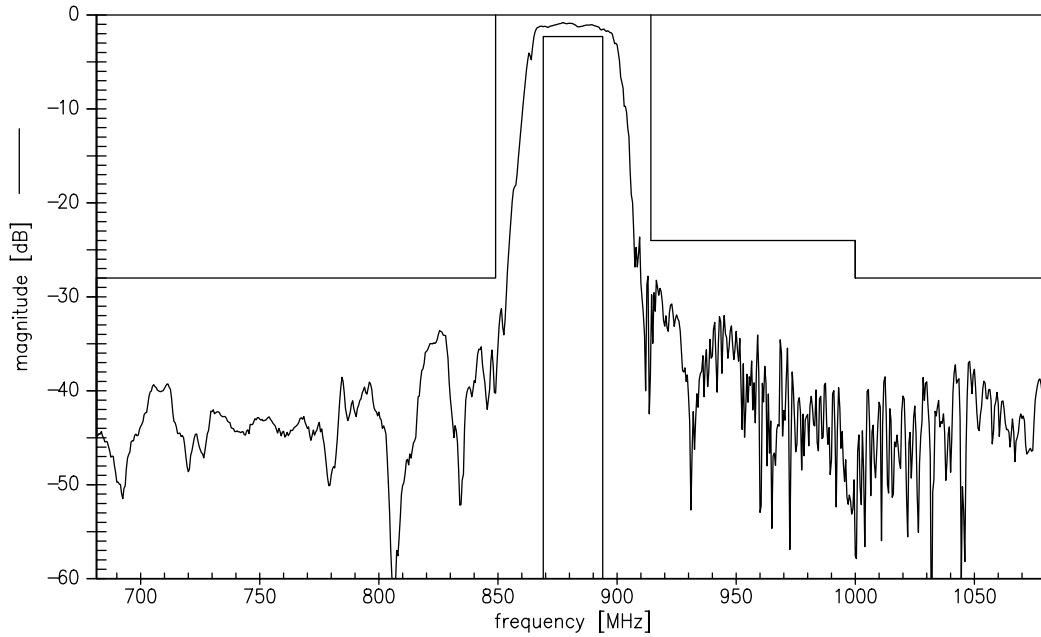
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	100 <sup>1)</sup>	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P <sub>IN</sub>	15	dBm	effective power in the on-state, duty cycle 4:8
GSM 1800, GSM 1900	P <sub>IN</sub>	15	dBm	
Tx bands				

<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.

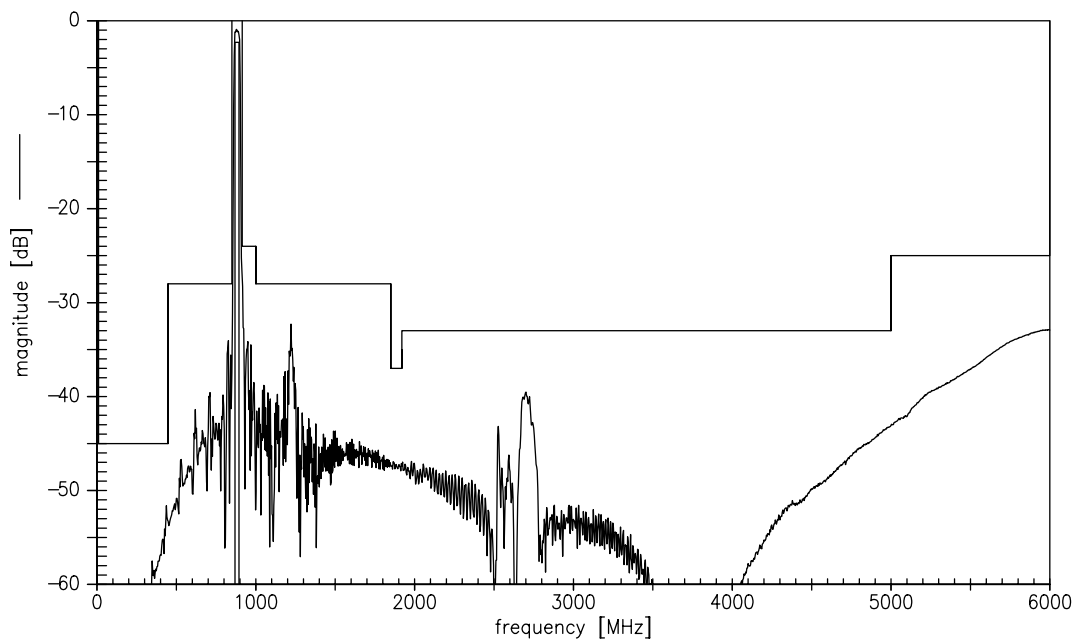




Transfer function of filter 2



Transfer function of filter 2 - wideband

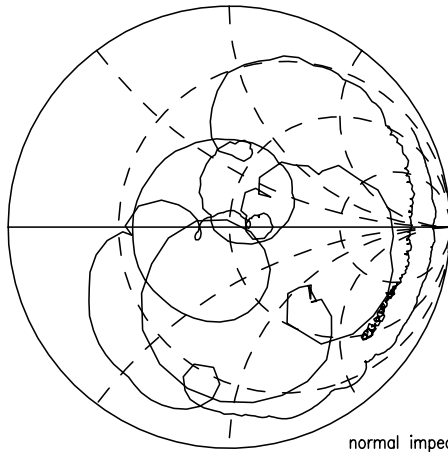


Data sheet

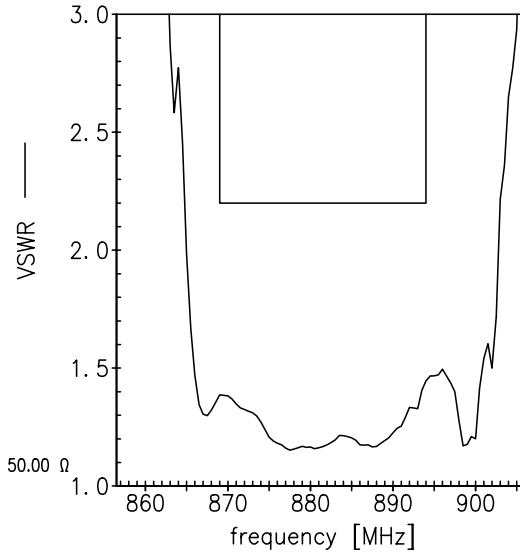


Smith Charts filter 2

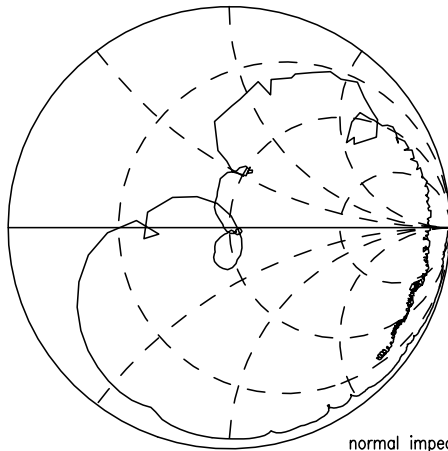
$S_{11}$  function



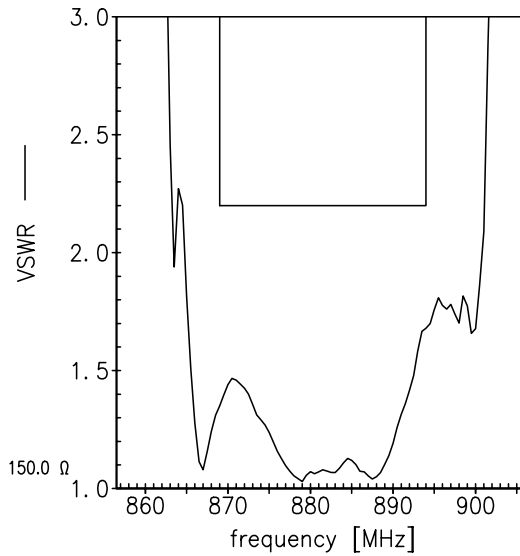
normal impedance: 50.00  $\Omega$



$S_{22}$  function



normal impedance: 150.0  $\Omega$



<b>SAW Components</b>	<b>B9814</b>
<b>SAW Rx 2in1 input diplex filter</b>	<b>881.5 / 942.5 MHz</b>

Data sheet



## References

<b>Type</b>	B9814
<b>Ordering code</b>	B39941B9814P810
<b>Marking and package</b>	C61157-Z8-C20
<b>Packaging</b>	F61074-V8227-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9814_LB_NB.s3p, B9814_LB_WB.s3p B9814_UB_NB.s3p, B9814_UB_WB.s3p see file header for port/pin assignment table
<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."
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