



## **SAW Components**

### **SAW Rx 2in1 filter**

GSM 850 / GSM 900

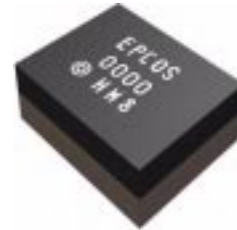
<b>Series/type:</b>	<b>B9802</b>
<b>Ordering code:</b>	<b>B39941B9802J610</b>
<b>Date:</b>	<b>October 22, 2009</b>
<b>Version:</b>	<b>2.0</b>

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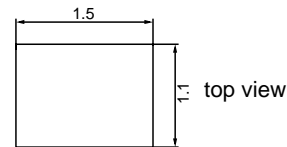
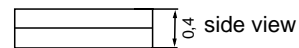
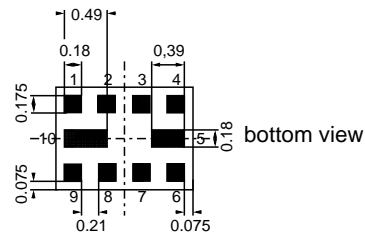
**Data sheet**

**Application**

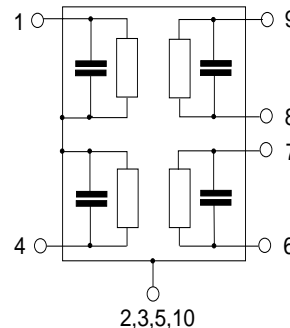
- Low-loss 2in1 RF filter for mobile telephone GSM 900 and GSM 850 systems, receive path (Rx)
- Usable passband:
  - Filter 1 (GSM 850): 25 MHz
  - Filter 2 (GSM 900): 35 MHz
- Unbalanced to balanced operation for all filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude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


**Features**

- Package size 1.5 x 1.1 x 0.4 mm<sup>3</sup>
- Package code QCT10L
- Approx. weight 0.003g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **RoHS compatible**
- **Electrostatic Sensitive Device (ESD)**


**Pin configuration**

- 1            Input [ filter 1 ]
- 4            Input [ filter 2 ]
- 6,7         Output balanced [ filter 2 ]
- 8,9         Output balanced [ filter 1 ]
- 2,3,5,10    Case ground





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SAW Rx 2in1 filter

881.5 / 942.5 MHz

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**Characteristics of filter 1 ( GSM 850 )**

Temperature range for specification:  $T = -20\text{ °C to }+75\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$   
 Terminating load impedance:  $Z_L = 150\ \Omega \parallel 82\text{ nH (balanced)}$

		min.	typ. @25 °C	max.	
<b>Center frequency</b>	$f_C$	—	881.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{max}$	—	1.2 <sup>1)</sup>	2.0 <sup>2)</sup>	dB
869.0 ... 894.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.5	1.2 <sup>3)</sup>	dB
869.0 ... 894.0 MHz					
<b>Input VSWR</b>		—	1.5	2.0	
869.0 ... 894.0 MHz					
<b>Output VSWR</b>		—	1.5	2.0	
869.0 ... 894.0 MHz					
<b>Output amplitude balance (<math> S_{31}/S_{21} </math>)</b>		-1.5	-1.1/+1.1	1.5	dB
869.0 ... 894.0 MHz					
<b>Output phase balance (<math>\phi(S_{31})-\phi(S_{21})+180^\circ</math>)</b>		-13	-8/+8	13	°
869.0 ... 894.0 MHz					
<b>Attenuation</b>	$\alpha$				
10.0 ... 447.0 MHz		45	48	—	dB
447.0 ... 849.0 MHz		30	34	—	
914.0 ... 954.0 MHz		21	25	—	dB
954.0 ... 1738.0 MHz		28	33	—	
1738.0 ... 1788.0 MHz		40	55	—	dB
1788.0 ... 3476.0 MHz		35	37	—	
3476.0 ... 6000.0 MHz		26	31	—	dB

1) Typical value excluding PCB losses.

2) 1.7 dB at 25 °C

3) 0.9 dB at 25 °C



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SAW Rx 2in1 filter

881.5 / 942.5 MHz

Data sheet



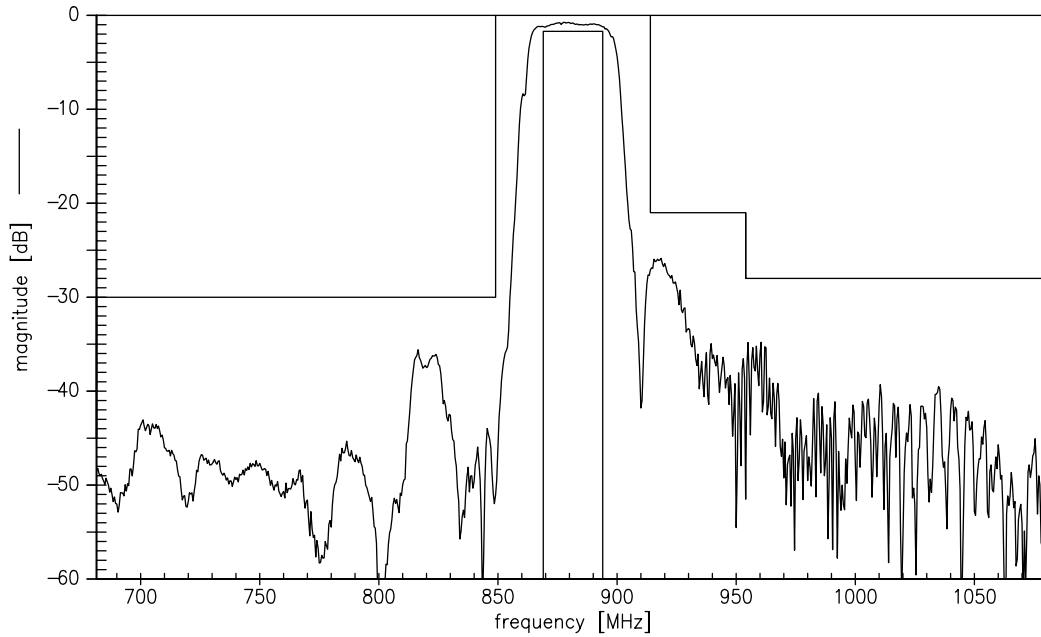
### Maximum ratings of filter 1

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				

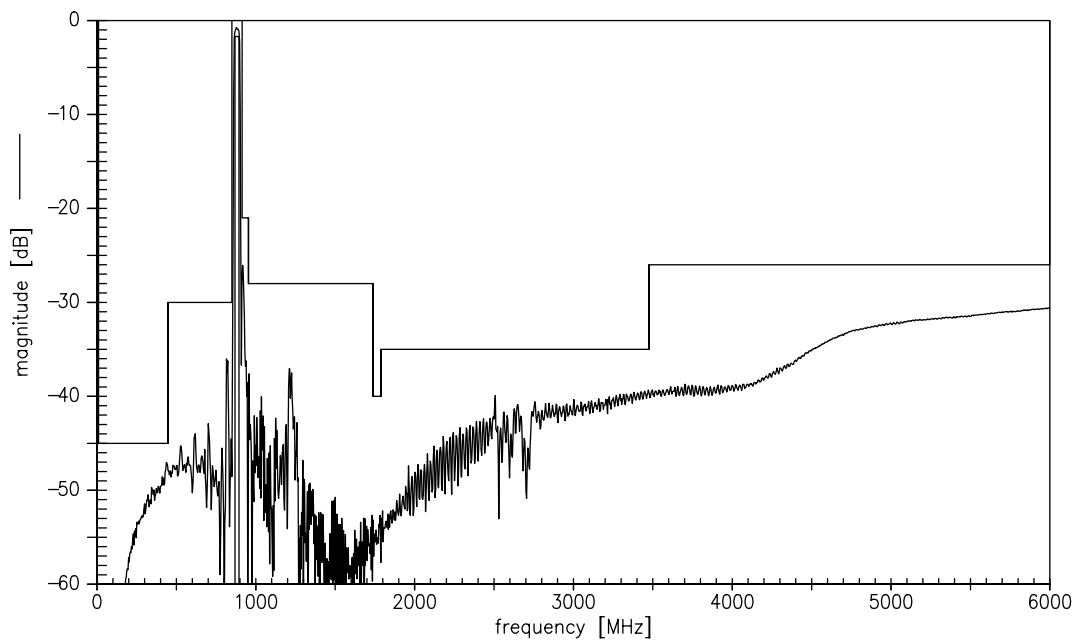
<sup>1)</sup> acc. to JEDEC22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function of filter 1



Transfer function of filter 1 - wideband



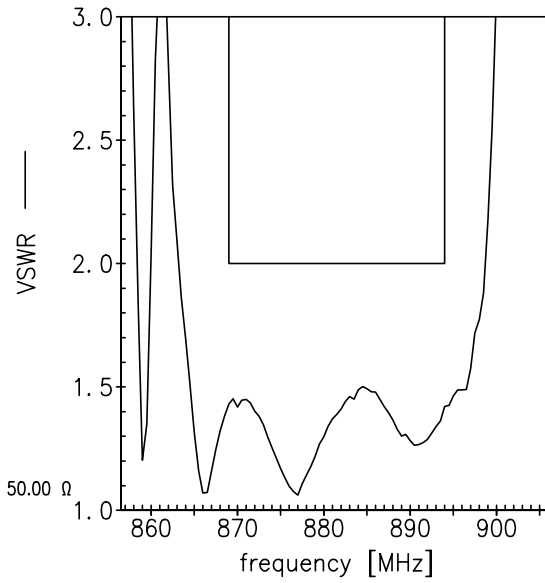
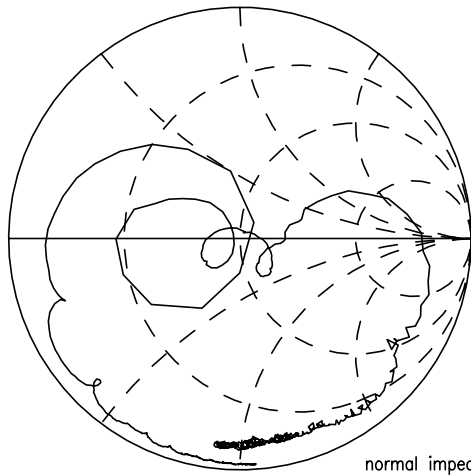
Please read *cautions and warnings* and *important notes* at the end of this document.

Data sheet

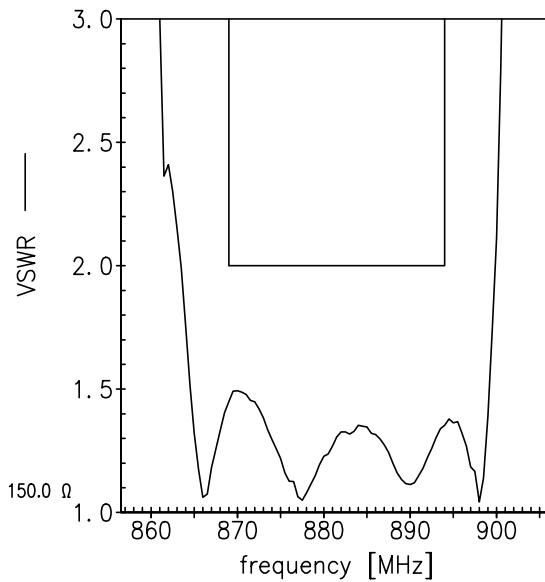
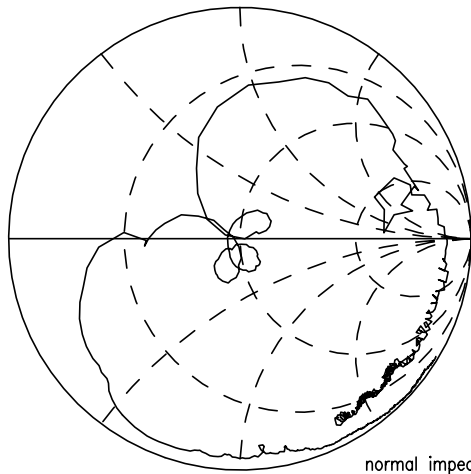


Smith Charts filter 1

$S_{11}$  function



$S_{22}$  function





SAW Components

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SAW Rx 2in1 filter

881.5 / 942.5 MHz

Data sheet



**Characteristics of filter 2 ( GSM 900 )**

Temperature range for specification:  $T = -20\text{ °C to }+75\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$   
 Terminating load impedance:  $Z_L = 150\ \Omega \parallel 72\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	942.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{max}$	—	1.2 <sup>1)</sup>	2.3 <sup>2)</sup>	dB
925.0 ... 960.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.5	1.5 <sup>3)</sup>	dB
925.0 ... 960.0 MHz					
<b>Input VSWR</b>		—	1.6	2.0	
925.0 ... 960.0 MHz					
<b>Output VSWR</b>		—	1.6	2.0	
925.0 ... 960.0 MHz					
<b>Output amplitude balance (<math> S_{31}/S_{21} </math>)</b>		-1.2	-0.8/+0.8	1.2	dB
925.0 ... 960.0 MHz					
<b>Output phase balance (<math>\phi(S_{31})-\phi(S_{21})+180^\circ</math>)</b>		-10	-3/+3	10	°
925.0 ... 960.0 MHz					
<b>Attenuation</b>	$\alpha$				dB
10.0 ... 480.0 MHz		45	55	—	
480.0 ... 900.0 MHz		30	34	—	
900.0 ... 905.0 MHz		27	31	—	
905.0 ... 915.0 MHz		20 <sup>4)</sup>	30	—	
980.0 ... 1000.0 MHz		25	28	—	
1000.0 ... 1850.0 MHz		28	31	—	
1850.0 ... 1920.0 MHz		40	44	—	
1920.0 ... 3700.0 MHz		35	39	—	
3700.0 ... 6000.0 MHz		33	37	—	

1) Typical value excluding PCB losses.  
 2) 1.9 dB at 25 °C  
 3) 1.2 dB at 25 °C  
 4) 23 dB at 25 °C



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SAW Rx 2in1 filter

881.5 / 942.5 MHz

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**Maximum ratings of filter 2**

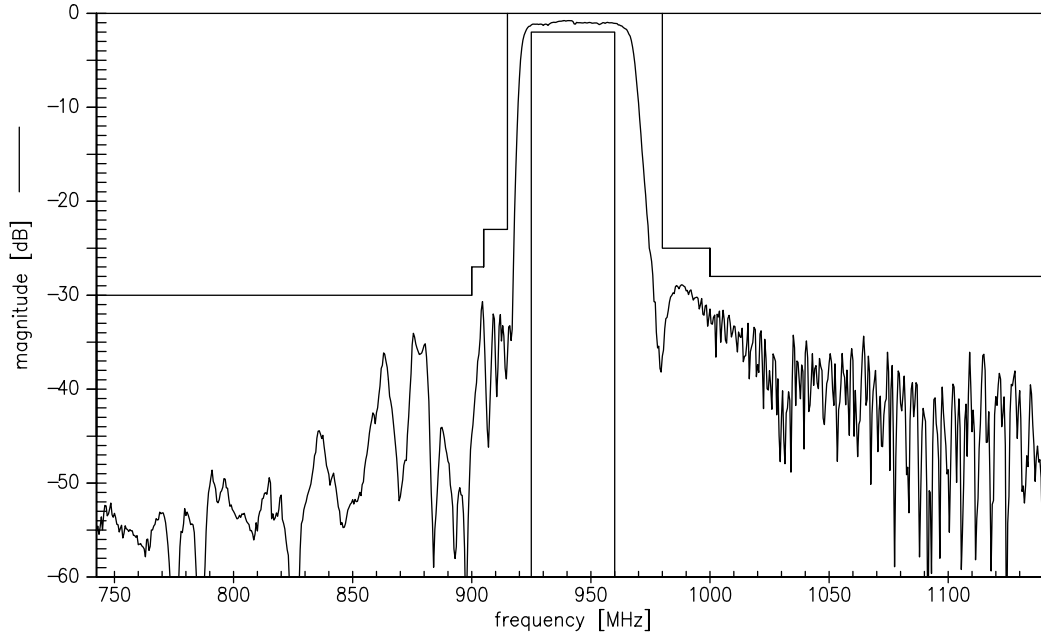
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	100 <sup>1)</sup>	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P <sub>IN</sub>	15	dBm	effective power in the on-state, duty cycle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

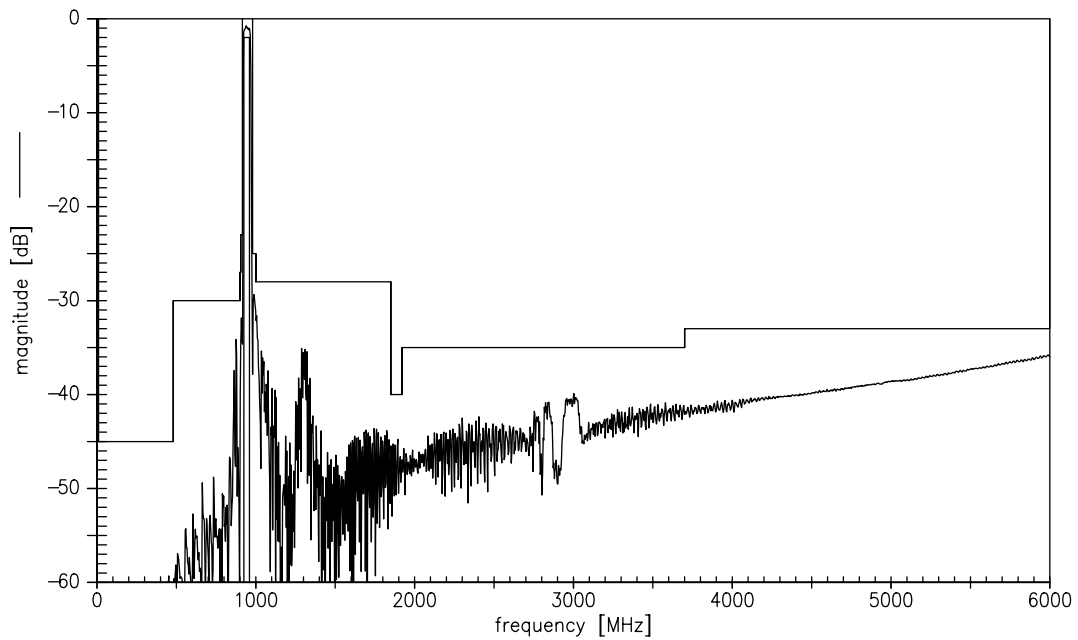




Transfer function of filter 2



Transfer function of filter 2 - wideband



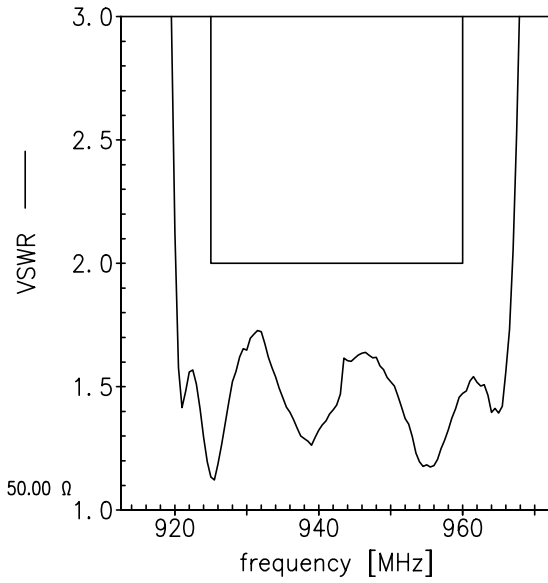
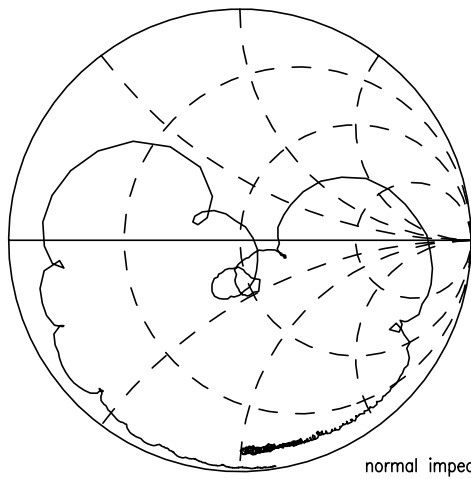
Please read *cautions and warnings* and *important notes* at the end of this document.

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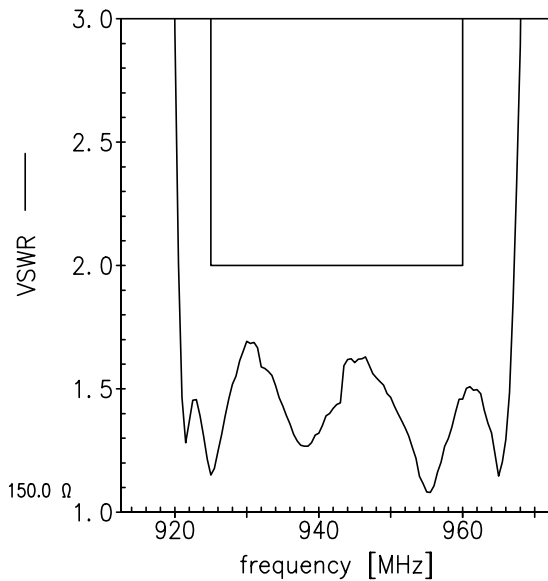
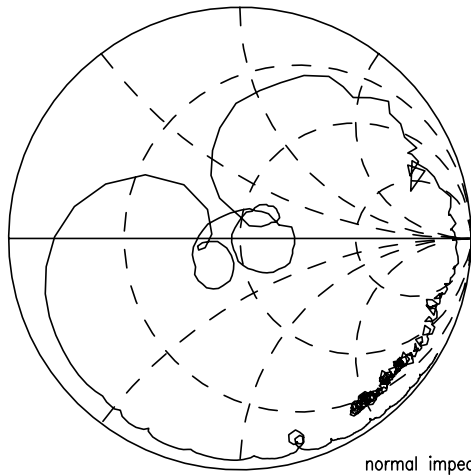


Smith Charts filter 2

$S_{11}$  function



$S_{22}$  function



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**References**

<b>Type</b>	B9802
<b>Ordering code</b>	B39941B9802J610
<b>Marking and package</b>	C61157-A8-A19
<b>Packaging</b>	F61074-V8227-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9802_LB_NB.s3p B9802_LB_WB.s3p B9802_UB_NB.s3p B9802_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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11 October 22, 2009



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