



## **SAW Components**

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

GSM 850 / GSM 1900

<b>Series/type:</b>	<b>B9505</b>
<b>Ordering code:</b>	<b>B39202B9505L310</b>
<b>Date:</b>	<b>October 28, 2008</b>
<b>Version:</b>	<b>2.0</b>



Data sheet



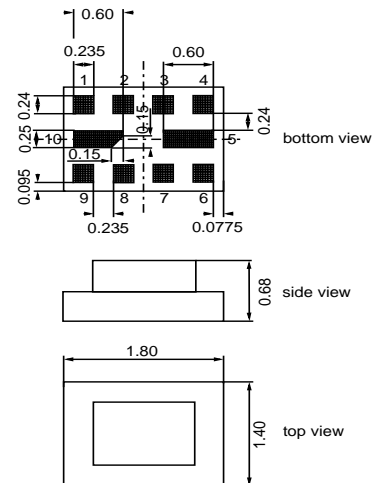
Application

- Low-loss 2in1 RF filter for mobile telephone GSM 850 and GSM 1900 systems, receive path (Rx)
- Usable passband:  
 Filter 1 (GSM 850): 25 MHz  
 Filter 2 (GSM 1900): 60 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12



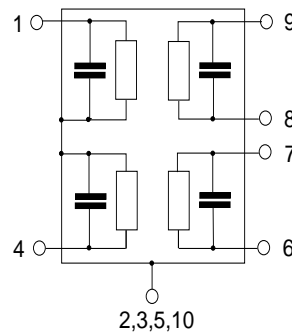
Features

- Package size 1.8 x 1.4 x 0.68 mm<sup>3</sup>
- Package code QCS10V
- RoHS compatible
- Approx. weight 0.006g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- 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





Data sheet



Characteristics of Filter 1 (GSM850)

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>	$\alpha_{\max}$	—	1.4	2.0 <sup>1)</sup>	dB
869.0 ... 894.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.5	1.2 <sup>2)</sup>	dB
869.0 ... 894.0 MHz					
<b>Input VSWR</b>		—	1.6	2.0	
869.0 ... 894.0 MHz					
<b>Output VSWR</b>		—	1.6	2.0	
869.0 ... 894.0 MHz					
<b>Output amplitude balance (<math> S_{31}/S_{21} </math>)</b>		-1.2	-1.0/+1.0	1.2	dB
869.0 ... 894.0 MHz					
<b>Output phase balance (<math>\phi(S_{31})-\phi(S_{21}))+180^\circ</math></b>		-12	-7/+7	12	°
869.0 ... 894.0 MHz					
<b>Attenuation</b>	$\alpha$				
10.0 ... 447.0 MHz		45	49	—	dB
447.0 ... 849.0 MHz		30	37	—	
914.0 ... 954.0 MHz		21	26	—	dB
954.0 ... 1738.0 MHz		28	36	—	
1738.0 ... 1788.0 MHz		40	56	—	dB
1788.0 ... 3476.0 MHz		35	43	—	
3476.0 ... 6000.0 MHz		26	30	—	dB

1) 1.7 dB at 25 °C.

2) 0.9 dB at 25 °C.



**SAW Components** **B9505**

**SAW Rx 2in1 filter** **881.5 / 1960.0 MHz**

Data sheet



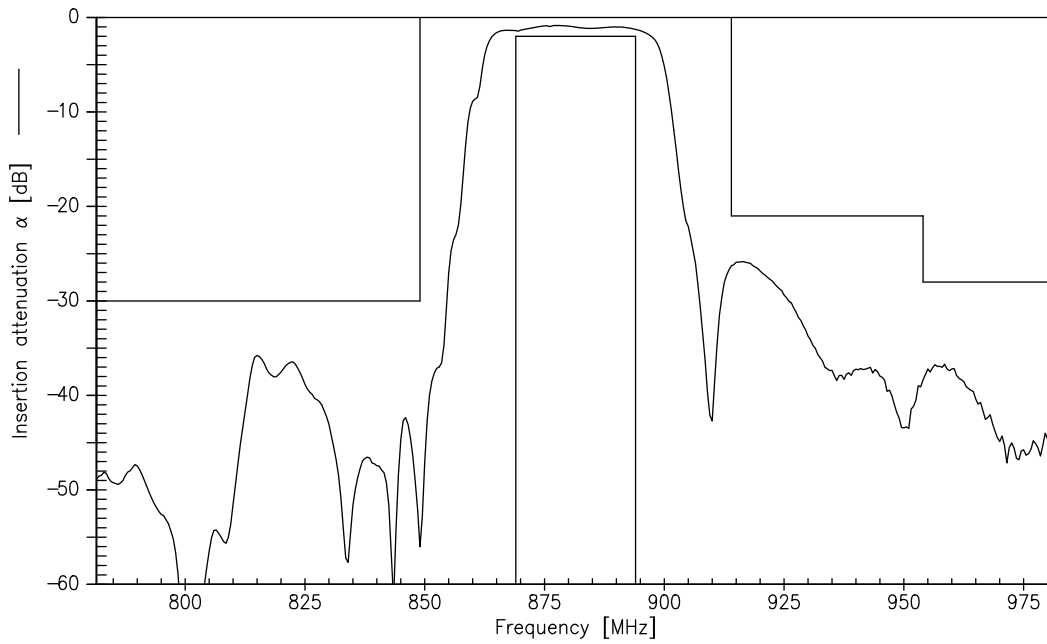
**Maximum ratings of Filter 1**

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				

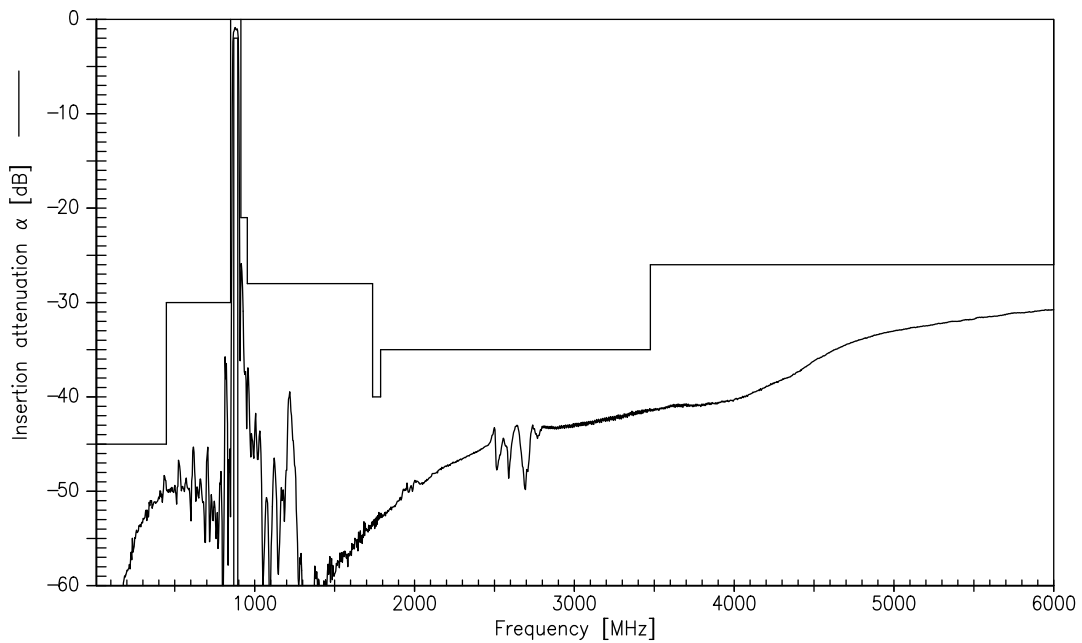
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function Filter 1 (GSM850)



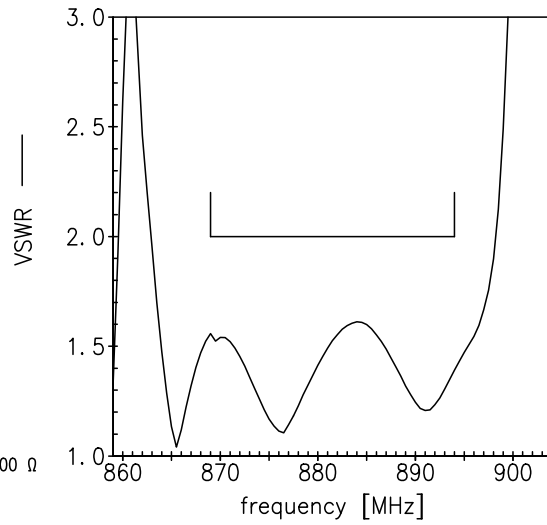
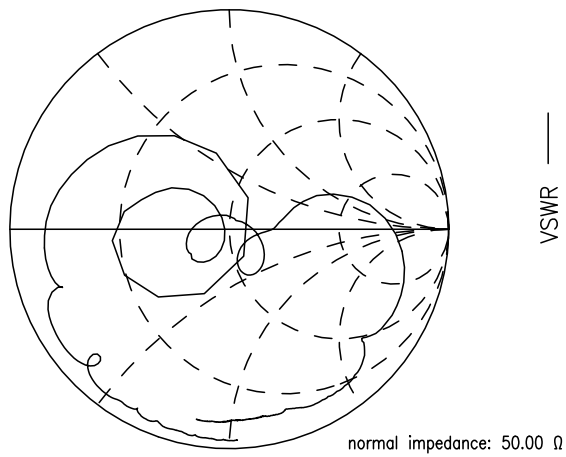
Transfer function Filter 1 (GSM850) - Wideband



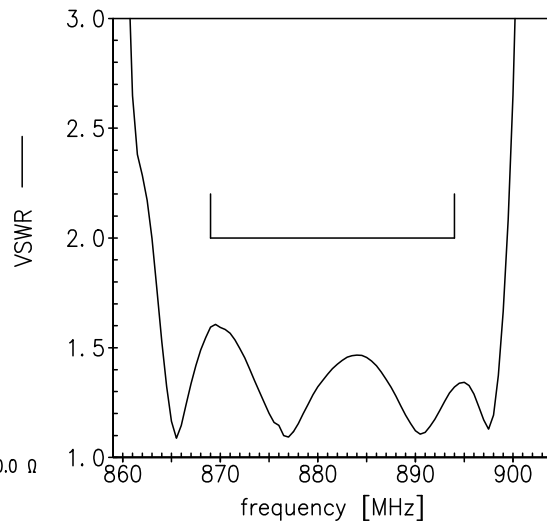
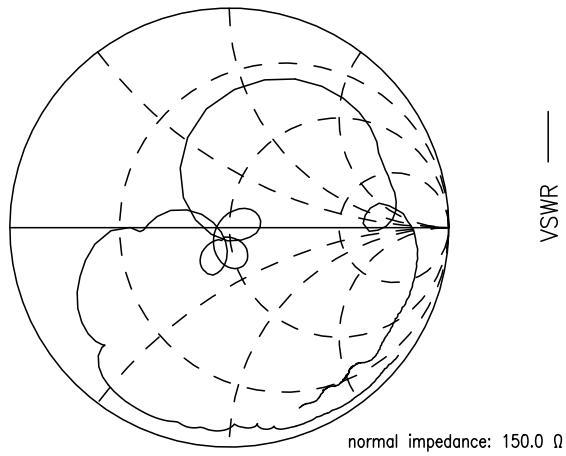
Please read *cautions and warnings* and *important notes* at the end of this document.

Smith charts of Filter 1 (GSM850)

$S_{11}$  function



$S_{22}$  function





<b>SAW Components</b>	<b>B9505</b>
<b>SAW Rx 2in1 filter</b>	<b>881.5 / 1960.0 MHz</b>

Data sheet



**Characteristics of Filter 2 (GSM1900)**

Temperature range for specification:  $T = -20\text{ °C to }+75\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$   
 Terminating load impedance:  $Z_L = 150\ \Omega \parallel 13\text{ nH (balanced)}$

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_c$	—	1960.0	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{max}$	—	1.3	2.3 <sup>1)</sup>	dB
1930.0 ... 1990.0 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.4	1.4 <sup>2)</sup>	dB
1930.0 ... 1990.0 MHz					
<b>Input VSWR</b>		—	1.7	2.1	
1930.0 ... 1990.0 MHz					
<b>Output VSWR</b>		—	1.7	2.1	
1930.0 ... 1990.0 MHz					
<b>Output amplitude balance (<math> S_{31}/S_{21} </math>)</b>		-1.3	-0.8/+0.2	1.3	dB
1930.0 ... 1990.0 MHz					
<b>Output phase balance (<math>\phi(S_{31})-\phi(S_{21})+180^\circ</math>)</b>		-10	-7/+5	10	°
1930.0 ... 1990.0 MHz					
<b>Attenuation</b>	$\alpha$				
10.0 ... 1510.0 MHz		40	44	—	dB
1510.0 ... 1830.0 MHz		30	34	—	dB
1830.0 ... 1890.0 MHz		20	25	—	dB
1890.0 ... 1910.0 MHz		12	16	—	dB
2010.0 ... 2070.0 MHz		12	17	—	dB
2070.0 ... 2400.0 MHz		19	23	—	dB
2400.0 ... 2500.0 MHz		35	40	—	dB
2500.0 ... 3860.0 MHz		28	33	—	dB
3860.0 ... 3980.0 MHz		36	43	—	dB
3980.0 ... 5790.0 MHz		30	39	—	dB
5790.0 ... 6000.0 MHz		32	40	—	dB

1) 2.2 dB at 25°C.  
 2) 1.3 dB at 25°C.



<b>SAW Components</b>	<b>B9505</b>
<b>SAW Rx 2in1 filter</b>	<b>881.5 / 1960.0 MHz</b>
Data sheet	<b>SMD</b>

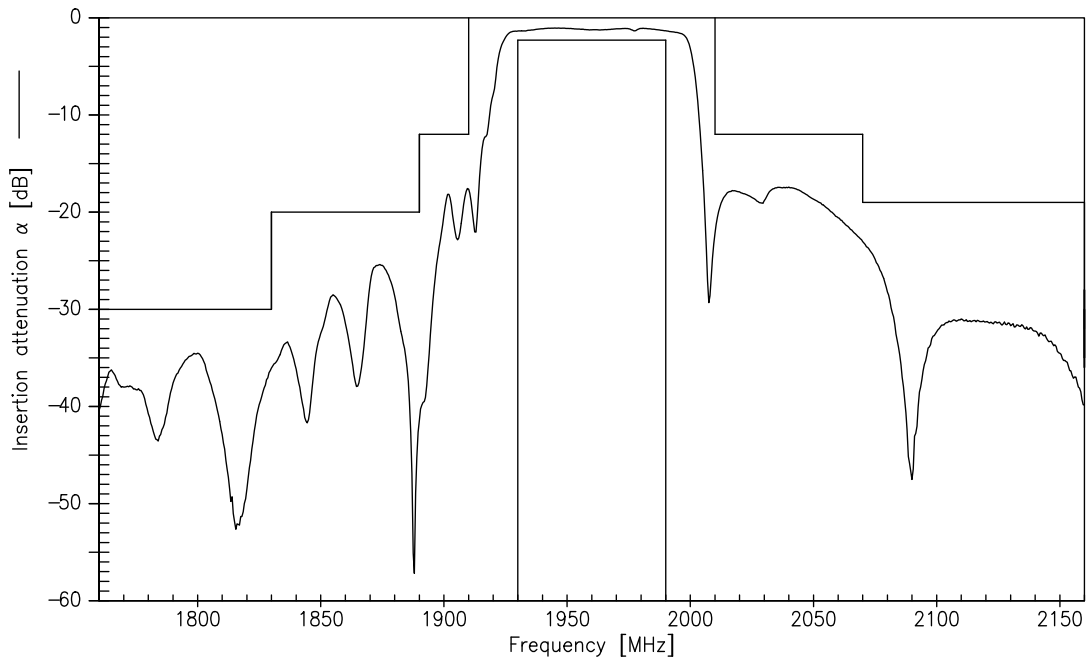
**Maximum ratings of Filter 2**

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>	50 <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				

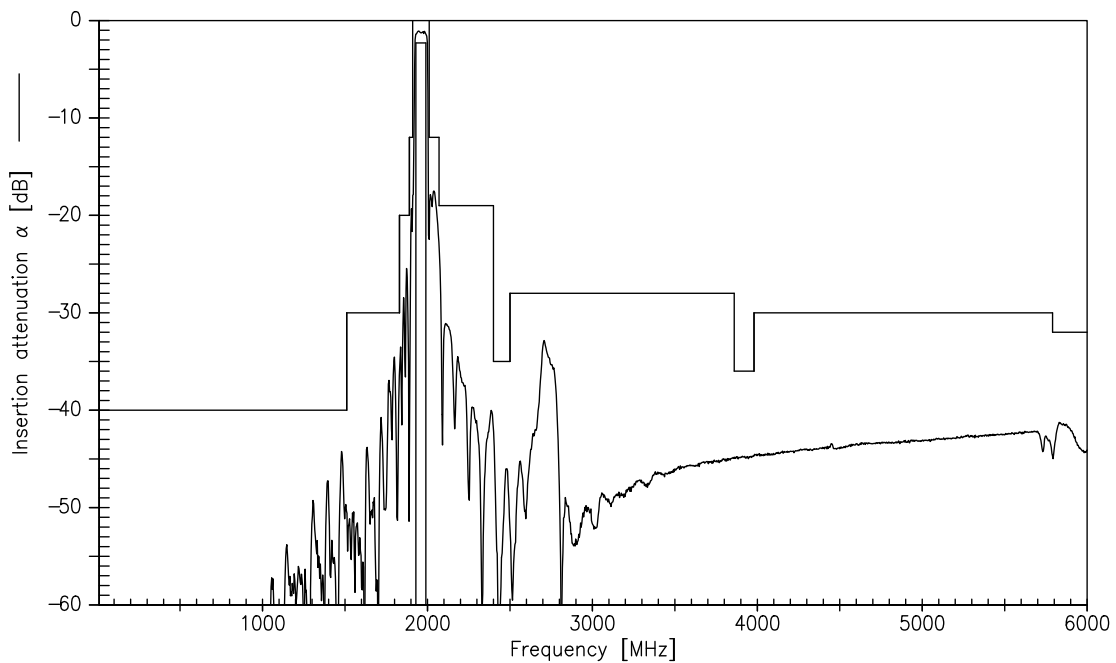
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function Filter 2 (GSM1900)



Transfer function Filter 2 (GSM1900) - Wideband

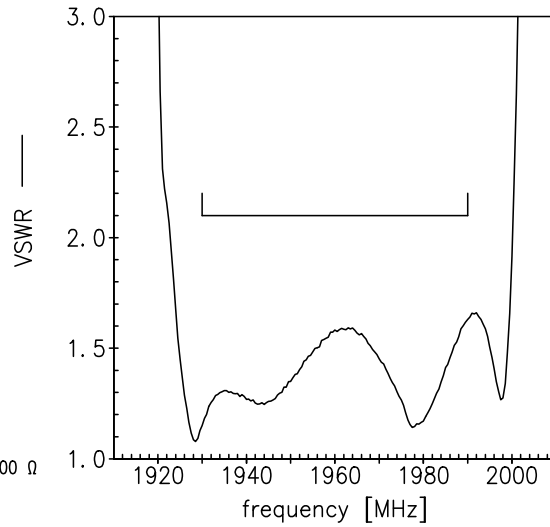
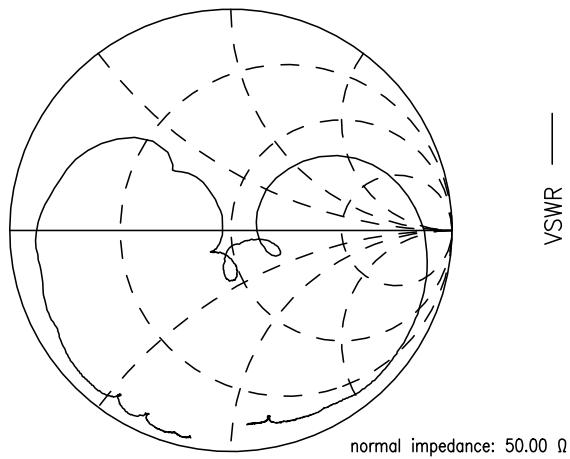


Data sheet

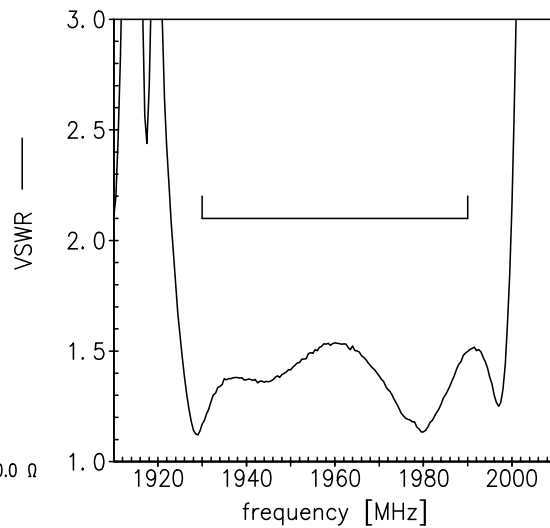
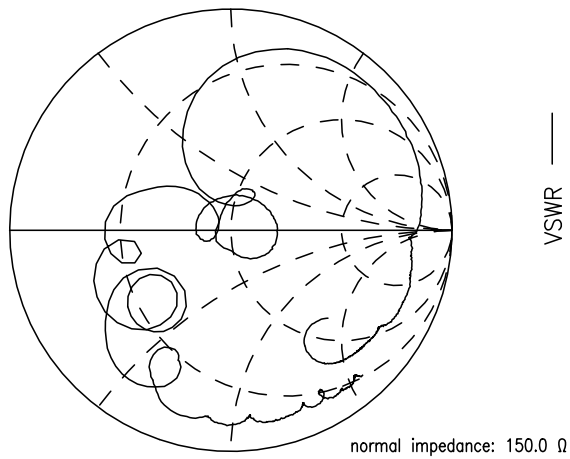
**SMD**

Smith charts of Filter 2 (GSM1900)

**S<sub>11</sub> function**



**S<sub>22</sub> function**





<b>SAW Components</b>	<b>B9505</b>
<b>SAW Rx 2in1 filter</b>	<b>881.5 / 1960.0 MHz</b>
Data sheet	<b>SMD</b>

## References

<b>Type</b>	B9505
<b>Ordering code</b>	B39202B9505L310
<b>Marking and package</b>	C61157-A7-A153
<b>Packaging</b>	F61074-V8226-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9505_LB_NB.s3p B9505_LB_WB.s3p B9505_UB_NB.s3p B9505_UB_WB.s3p
<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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