



## **SAW Components**

### **SAW Rx 2in1 output diplex filter**

GSM 1800 / GSM 1900

<b>Series/type:</b>	<b>B9516</b>
<b>Ordering code:</b>	<b>B39202B9516P810</b>
<b>Date:</b>	<b>February 9, 2012</b>
<b>Version:</b>	<b>2.0</b>

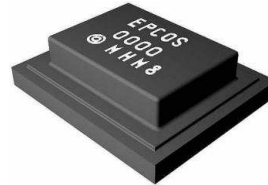


Data sheet



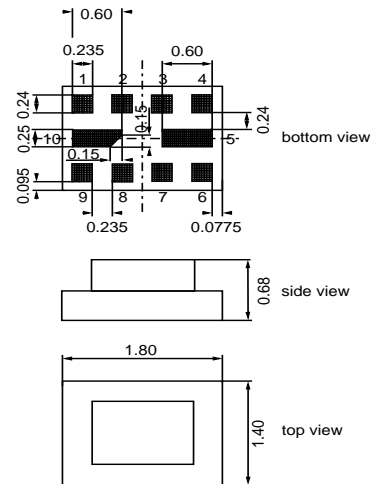
Application

- Low-loss 2in1 RF filter for mobile telephone  
GSM 1800 and GSM 1900 systems, receive path (Rx)
- Usable passband:  
Filter 1 (GSM 1800): 75 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
- Suitable for GPRS class 1 to 12



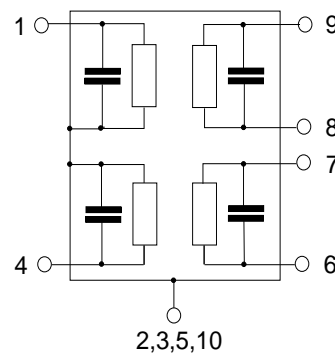
Features

- Package size 1.8 x 1.4 x 0.68 mm<sup>3</sup>
- RoHS compatible
- Approximate weight 0.006 g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- Moisture Sensitive Level 3



Pin configuration

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





<b>SAW Components</b>	<b>B9516</b>
<b>SAW Rx 2in1 output diplex filter</b>	<b>1842.5 / 1960.0 MHz</b>

Data sheet



**Characteristics of Filter 1 (GSM1800)**

Temperature range for specification: T = -20 °C to +85 °C  
 Terminating source impedance: Z<sub>S</sub> = 50 Ω  
 Terminating load impedance: Z<sub>L</sub> = 150 Ω || 6.2nH (balanced)

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	f <sub>C</sub>	—	1842.5	—	MHz
<b>Maximum insertion attenuation</b>	α <sub>max</sub>	—	2.0	2.8	dB
1805.0 ... 1880.0	MHz				
<b>Amplitude ripple (p-p)</b>	Δα	—	0.8	1.8	
1805.0 ... 1880.0	MHz				
<b>Input VSWR</b>		—	1.9	2.3	
1805.0 ... 1880.0	MHz				
<b>Output VSWR</b>		—	1.7	2.3	
1805.0 ... 1880.0	MHz				
<b>CMRR ( S<sub>21</sub>-S<sub>31</sub> / S<sub>21</sub>+S<sub>31</sub> )</b>		18 <sup>1)</sup>	24	—	dB
1805.0 ... 1880.0	MHz				
<b>Attenuation</b>	α				
0.2 ... 902.0	MHz	45	57	—	dB
902.0 ... 940.0	MHz	45	56	—	
940.0 ... 1690.0	MHz	27	36	—	
1690.0 ... 1705.0	MHz	27	37	—	
1705.0 ... 1785.0	MHz	12	19	—	
1920.0 ... 1980.2	MHz	20	32	—	
1980.2 ... 2030.0	MHz	24	38	—	
2030.0 ... 2400.0	MHz	28	38	—	
2400.0 ... 6000.0	MHz	24	34	—	

<sup>1)</sup> A CMRR of 18.0dB corresponds to a phase balance of 12° together with an amplitude balance of 1.2dB



**SAW Components** **B9516**

**SAW Rx 2in1 output diplex filter** **1842.5 / 1960.0 MHz**

Data sheet



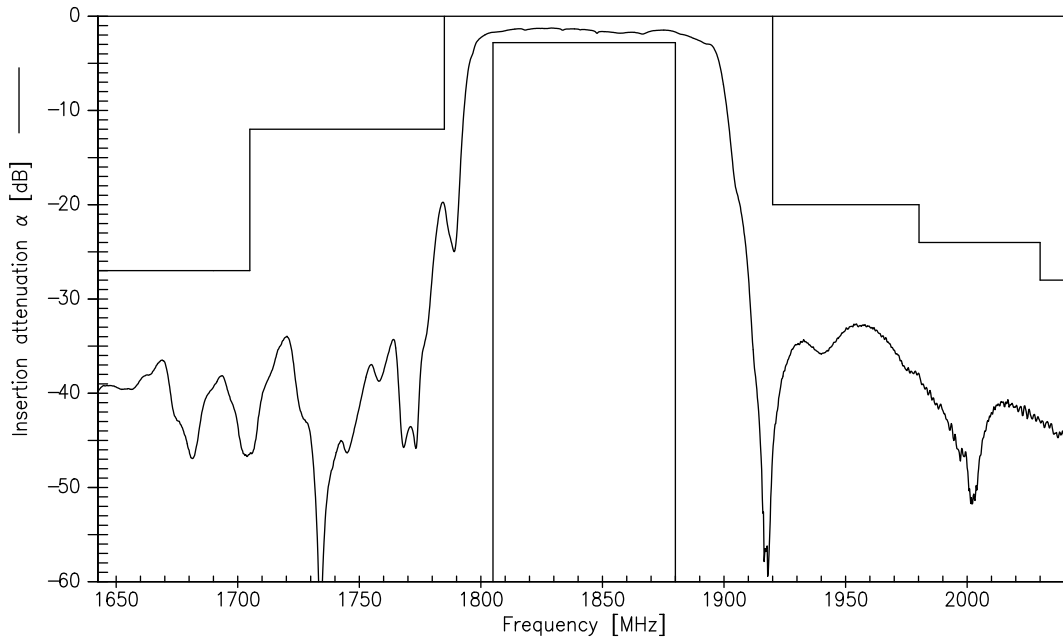
**Maximum ratings of Filter 1**

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>	50 <sup>1)</sup>	V	machine model, 1 pulse
Input power at				
GSM850, GSM900	P <sub>IN</sub>	15	dBm	effective power in the on-state, duty cycle 4:8
GSM1800, GSM1900	P <sub>IN</sub>	15	dBm	
Tx bands				

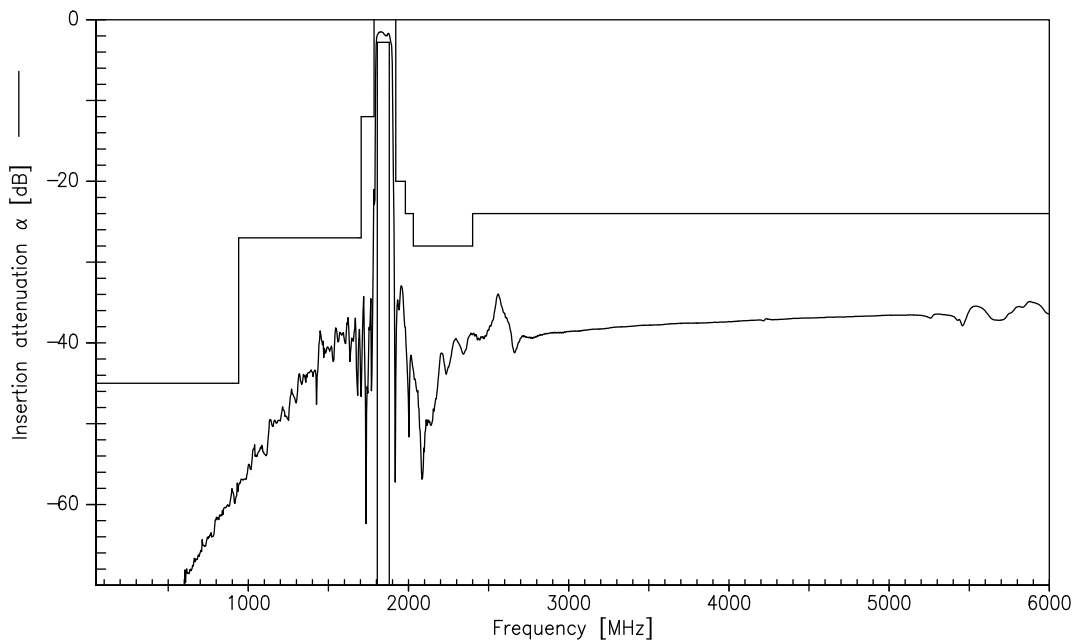
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function Filter 1 (GSM1800)



Transfer function Filter 1 (GSM1800) - Wideband



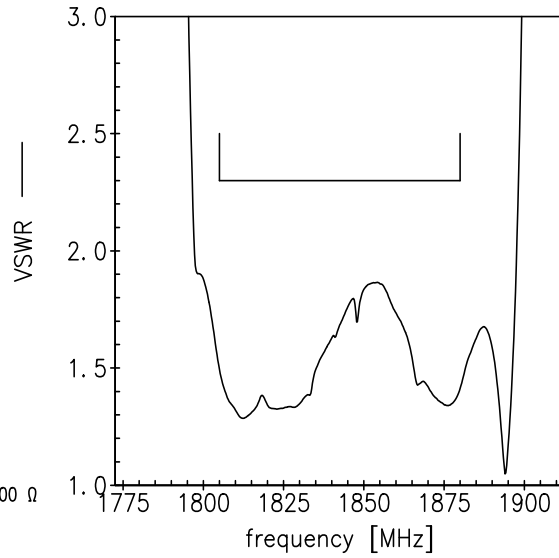
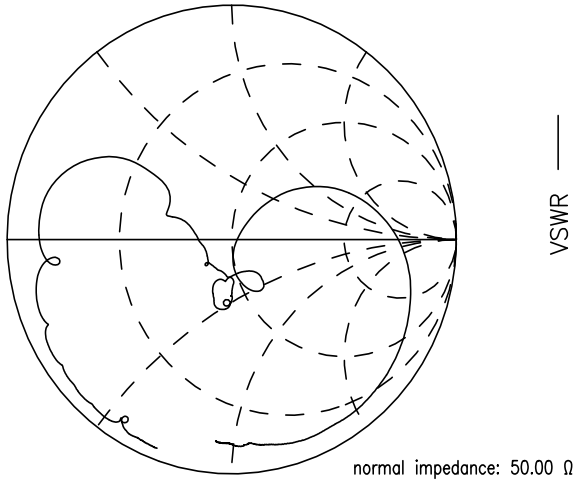
Please read *cautions and warnings* and *important notes* at the end of this document.

Data sheet

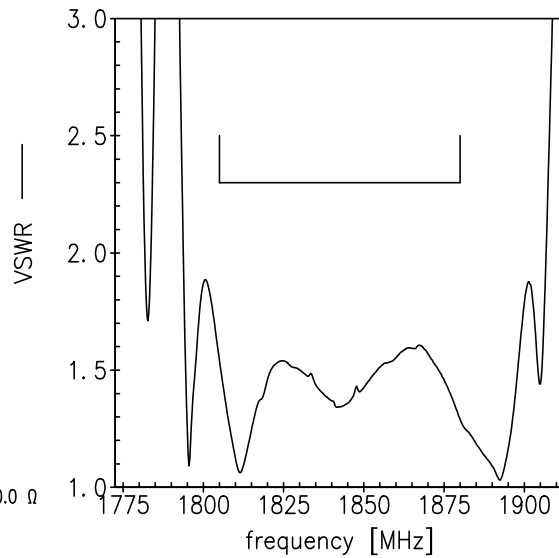
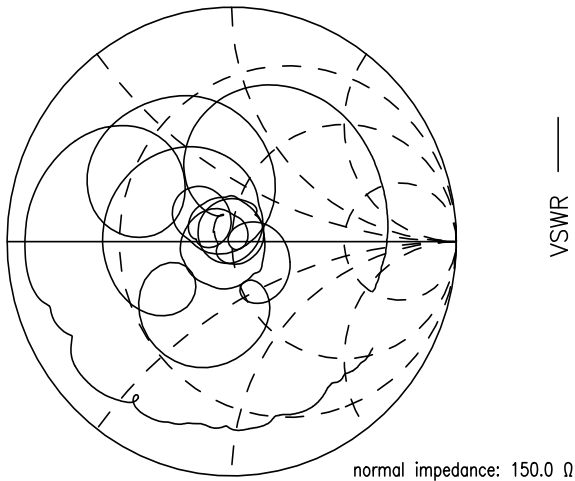
**SMD**

Smith charts Filter 1 (GSM1800)

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



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





**SAW Components**

**B9516**

**SAW Rx 2in1 output duplex filter**

**1842.5 / 1960.0 MHz**

Data sheet



**Characteristics of Filter 2 (GSM1900)**

Temperature range for specification: T = -20 °C to +85 °C  
 Terminating source impedance: Z<sub>S</sub> = 50 Ω  
 Terminating load impedance: Z<sub>L</sub> = 150 Ω || 6.2nH (balanced)

		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	f <sub>C</sub>	—	1960.0	—	MHz
<b>Maximum insertion attenuation</b>	α <sub>max</sub>				
1930.0 ... 1990.0 MHz		—	2.0	3.0	dB
<b>Amplitude ripple (p-p)</b>	Δα				
1930.0 ... 1990.0 MHz		—	0.8	1.8	dB
<b>Input VSWR</b>					
1930.0 ... 1990.0 MHz		—	1.8	2.5	
<b>Output VSWR</b>					
1930.0 ... 1990.0 MHz		—	1.5	2.3	
<b>CMRR ( S<sub>21</sub>-S<sub>31</sub> / S<sub>21</sub>+S<sub>31</sub> )</b>					
1930.0 ... 1990.0 MHz		18 <sup>1)</sup>	23	—	dB
<b>Attenuation</b>	α				
0.2 ... 1510.0 MHz		38	43	—	dB
1510.0 ... 1830.0 MHz		30	36	—	dB
1830.0 ... 1850.0 MHz		26	31	—	dB
1850.0 ... 1890.0 MHz		23	27	—	dB
1890.0 ... 1910.0 MHz		9	14	—	dB
2010.2 ... 2070.0 MHz		5	15	—	dB
2070.0 ... 2400.0 MHz		22	28	—	dB
2400.0 ... 6000.0 MHz		28	34	—	dB

<sup>1)</sup> A CMRR of 18.0dB corresponds to a phase balance of 12° together with an amplitude balance of 1.2dB



**SAW Components** **B9516**

**SAW Rx 2in1 output diplex filter** **1842.5 / 1960.0 MHz**

Data sheet



**Maximum ratings of Filter 2**

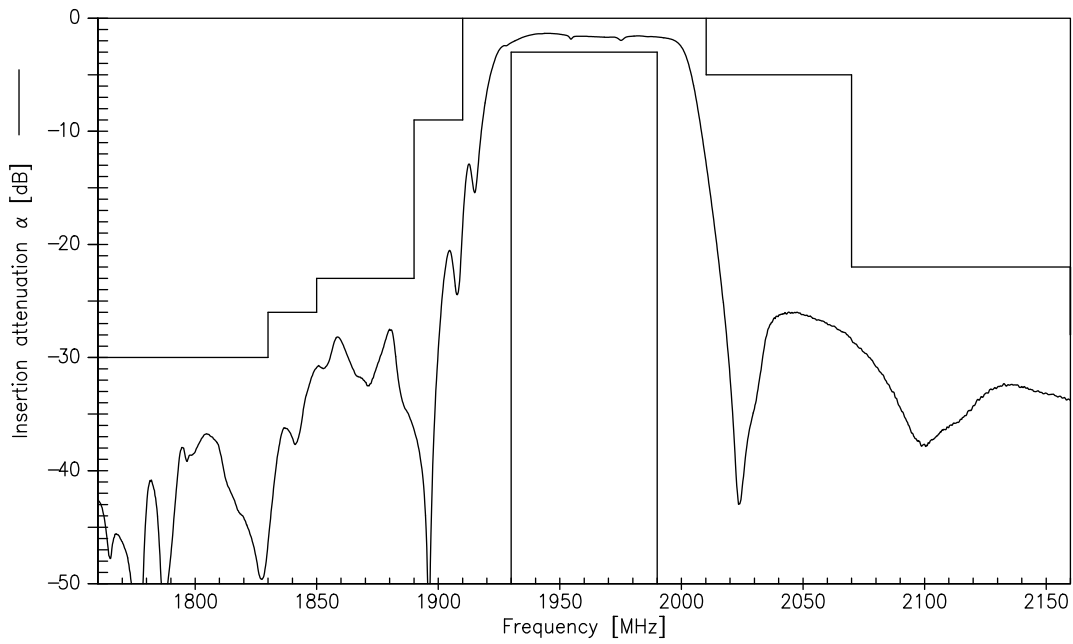
Operable temperature range	T	-40/+85	°C	
Storage temperature range	T <sub>stg</sub>	-40/+85	°C	
DC voltage	V <sub>DC</sub>	5	V	
ESD voltage	V <sub>ESD</sub>	50 <sup>1)</sup>	V	machine model, 1 pulse
Input power at				
GSM850, GSM900	P <sub>IN</sub>	15	dBm	effective power in the on-state, duty cycle 4:8
GSM1800, GSM1900	P <sub>IN</sub>	15	dBm	
Tx bands				

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

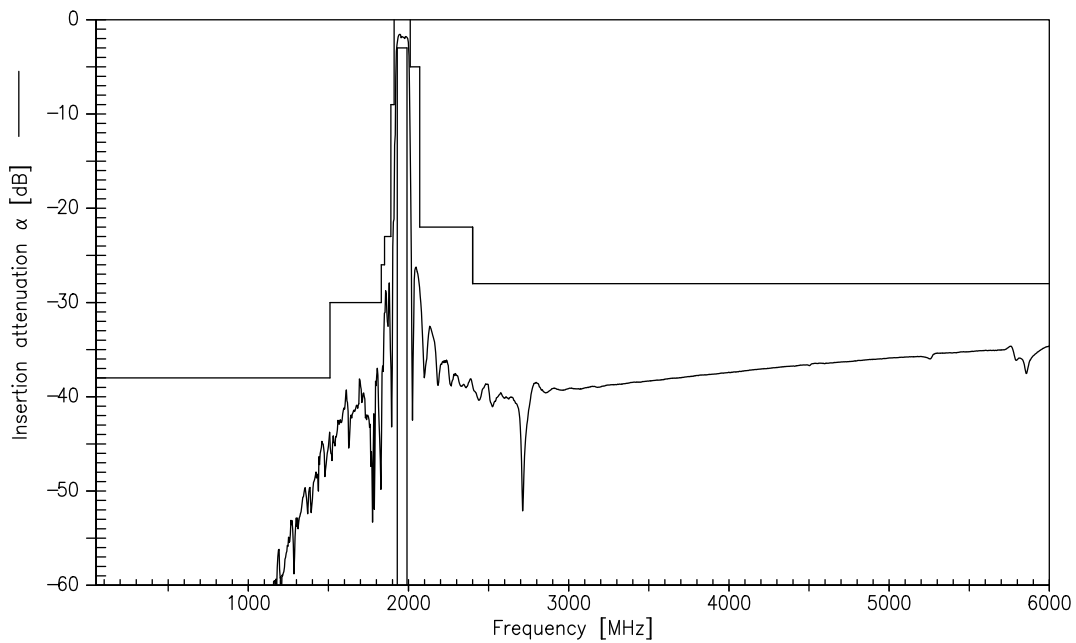




Transfer function Filter 2 (GSM1900)



Transfer function Filter 2 (GSM1900) - Wideband

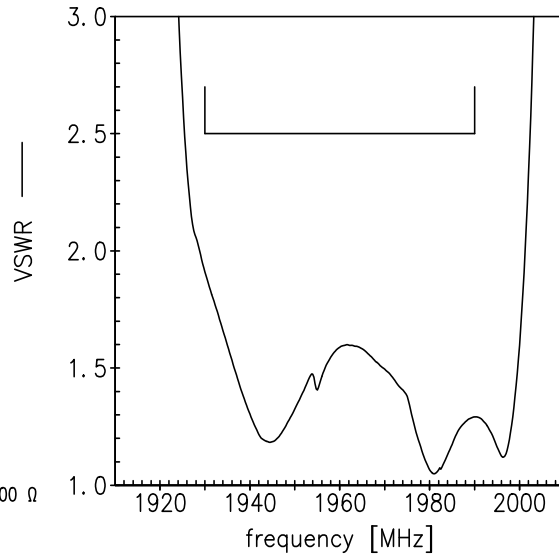
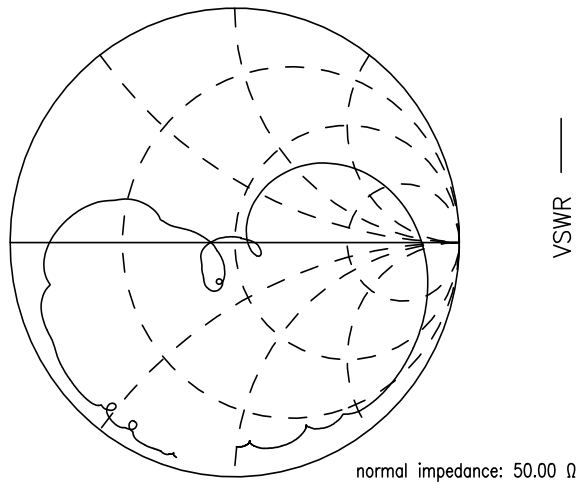


Data sheet

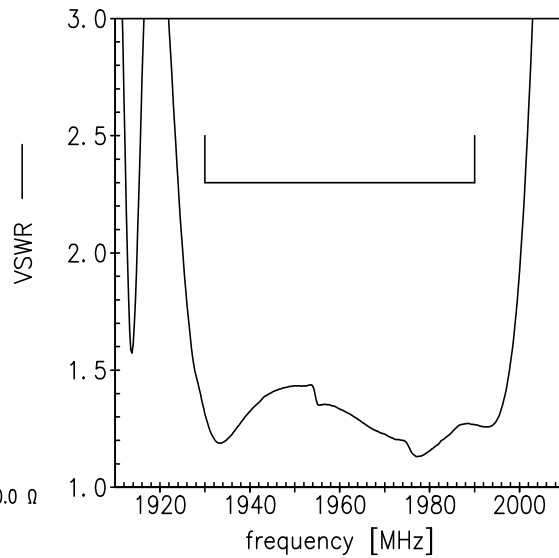
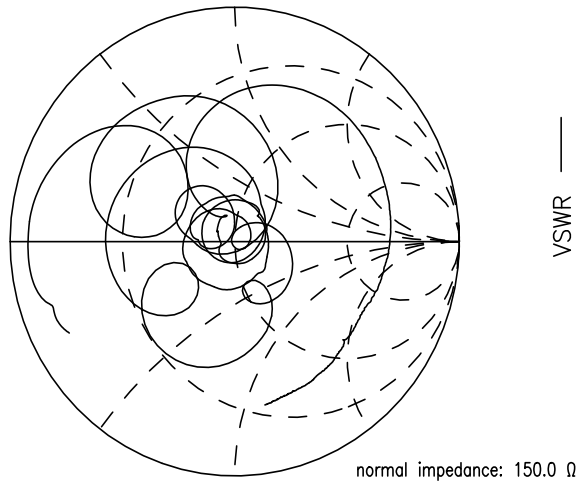
**SMD**

Smith charts Filter 2 (GSM1900)

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



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





<b>SAW Components</b>	<b>B9516</b>
<b>SAW Rx 2in1 output diplex filter</b>	<b>1842.5 / 1960.0 MHz</b>
Data sheet	<b>SMD</b>

## References

<b>Type</b>	B9516
<b>Ordering code</b>	B39202B9516P810
<b>Marking and package</b>	C61157-A7-A174
<b>Packaging</b>	F61074-V8226-Z000
<b>Date code</b>	L_1126
<b>S-parameters</b>	B9516_LB_NB.s3p, B9516_LB_WB.s3p B9516_UB_NB.s3p, B9516_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."
<b>Matching coils</b>	See <a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a> <a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a> for a large variety of matching coils.

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