



# SAW filters for mobile communications

**Series/Type: B9815**

The following products presented in this data sheet are being withdrawn.

Ordering Code	Substitute Product	Date of Withdrawal	Deadline Last Orders	Last Shipments
B39202B9815P810	B39202B9825P810	2015-11-20	2016-03-01	2016-06-30

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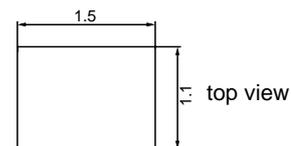
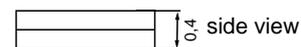
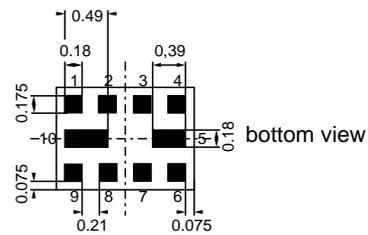
Data sheet


**Application**

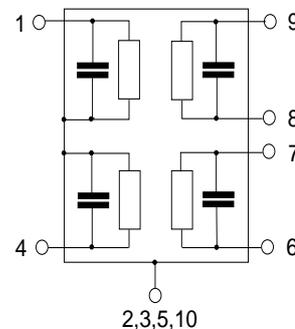
- Low-loss 2in1 RF filter for mobile telephone TD-SCDMA 1900 and TD-SCDMA 2100 systems
- Usable passband:
  - Filter 1 (TD-SCDMA 1900): 40 MHz
  - Filter 2 (TD-SCDMA 2100): 15 MHz
- Unbalanced to balanced operation for both filters
- Impedance transformation from 50 Ω to 200 Ω for both filters
- Low amplitude ripple
- No matching network required


**Features**

- Package size 1.5 x 1.1 x 0.4 mm<sup>3</sup>
- Moisture Sensitive Level 3
- RoHS compatible
- Approx. weight 0.003g.
- 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 (TD-SCDMA 1900)**

Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$   
 Terminating source impedance:  $Z_S = 50\ \Omega$   
 Terminating load impedance:  $Z_L = 200\ \Omega$

		B9815			
		min.	typ. @ 25 °C	max.	
<b>Center frequency</b>	$f_C$	—	1900.0	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$	—	1.6	2.0	dB
	1880.0 ... 1920.0MHz				
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.5	1.0	dB
	1880.0 ... 1920.0MHz				
<b>Input VSWR</b>		—	1.6	2.0	
	1880.0 ... 1920.0MHz				
<b>Output VSWR</b>		—	1.7	2.0	
	1880.0 ... 1920.0MHz				
<b>Group delay ripple (p-p)</b>		—	8	18	ns
	1880.0 ... 1920.0MHz				
<b>Common mode rejection ratio</b>		20 <sup>1)</sup>	27	—	dB
	1880.0 ... 1920.0MHz				
<b>Attenuation</b>	$\alpha$				
	0.0 ... 925.0MHz	28	62	—	dB
	925.0 ... 960.0MHz	35	63	—	dB
	960.0 ... 1805.0MHz	28	41	—	dB
	1805.0 ... 1840.0MHz	30	35	—	dB
	1840.0 ... 1850.0MHz	32	44	—	dB
	1980.0 ... 2005.0MHz	15	29	—	dB
	2005.0 ... 6000.0MHz	28	37	—	dB

1) A CMRR of 19.6dB corresponds to a phase balance of 10° together with an amplitude balance of 1.0dB

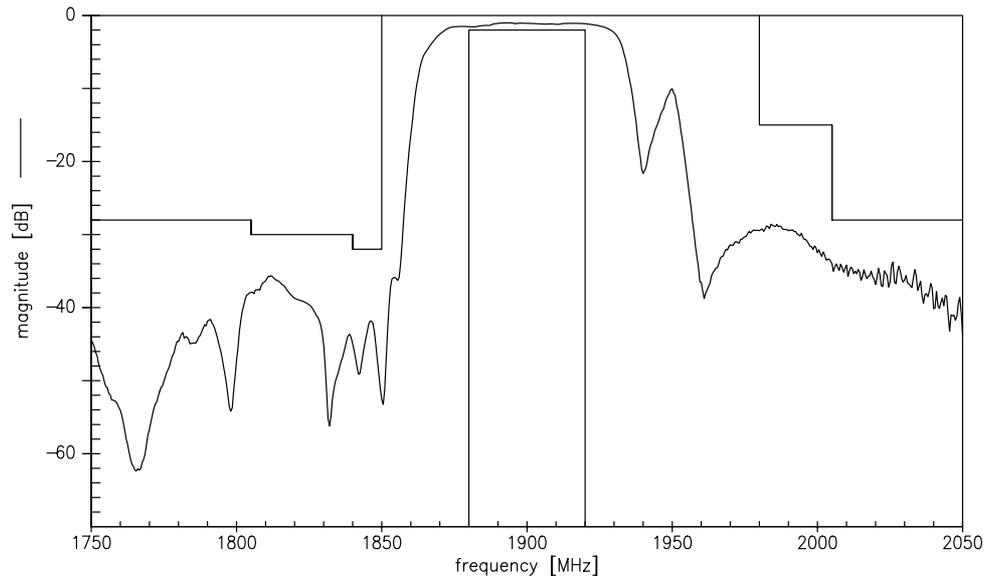

**Maximum ratings of Filter 1 (TD-SCDMA 1900)**

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				
1880.0 ... 1920.0 MHz	P <sub>IN</sub>	10	dBm	effective power in the on-state, duty cycle 4:8, 2000hours
2010.0 ... 2025.0 MHz	P <sub>IN</sub>	10	dBm	

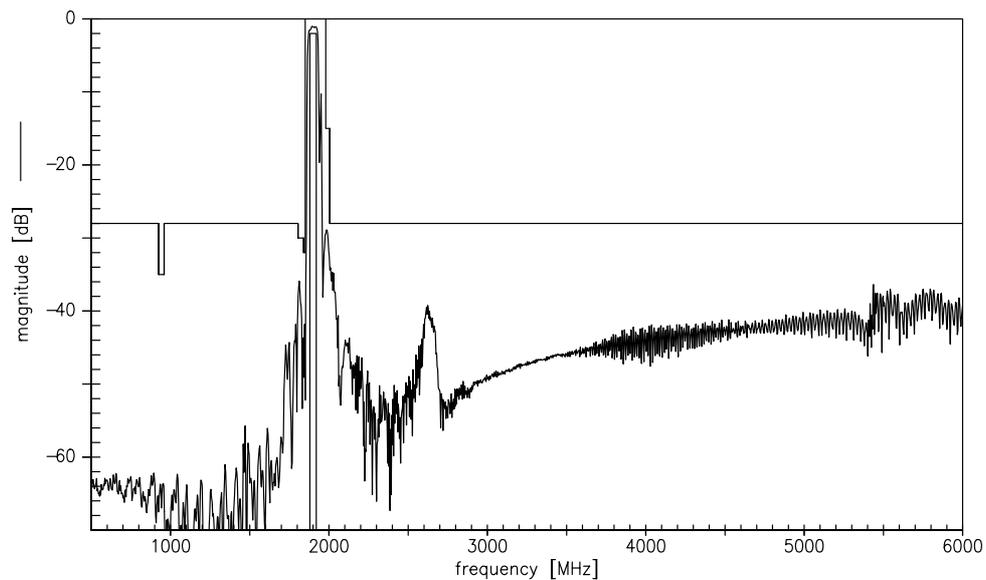
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function Filter 1 (TD-SCDMA 1900)



Transfer function Filter 1 (TD-SCDMA 1900) - Wideband

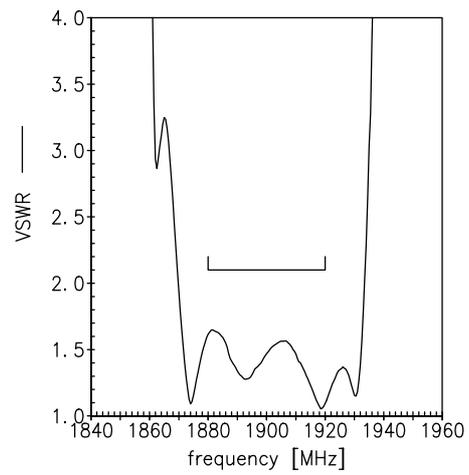
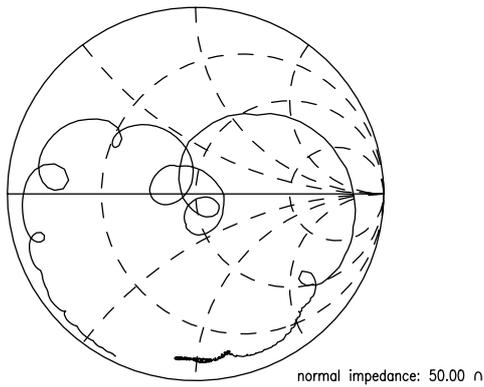


Data sheet

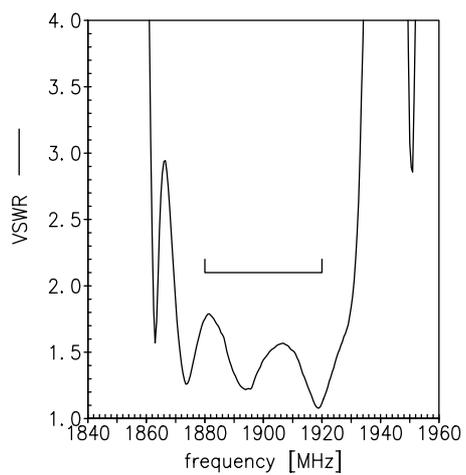
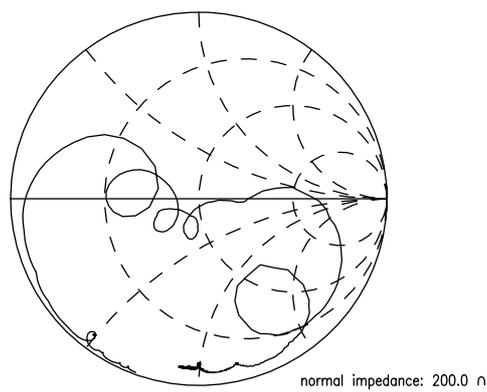


Smith charts Filter 1 (TD-SCDMA 1900)

$S_{11}$  function



$S_{22}$  function




**Characteristics of Filter 2 (TD-SCDMA 2100)**

 Temperature range for specification:  $T = -30\text{ °C to }+85\text{ °C}$ 

 Terminating source impedance:  $Z_S = 50\ \Omega$ 

 Terminating load impedance:  $Z_L = 200\ \Omega$ 

		B9815			
		min.	typ. @ 25°C	max.	
<b>Center frequency</b>	$f_C$	—	2017.5	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{\max}$				
2010.0 ... 2025.0	MHz	—	1.7	2.6	dB
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$				
2010.0 ... 2025.0	MHz	—	0.5	1.2	dB
<b>Input VSWR</b>					
2010.0 ... 2025.0	MHz	—	1.5	2.0	
<b>Output VSWR</b>					
2010.0 ... 2025.0	MHz	—	1.4	2.0	
<b>Group delay ripple (p-p)</b>					
2010.0 ... 2025.0	MHz	—	8	20	ns
<b>Common mode rejection ratio</b>					
2010.0 ... 2025.0	MHz	18 <sup>1)</sup>	22	—	dB
<b>Attenuation</b>	$\alpha$				
0 ... 1840.0	MHz	45	50	—	dB
1840.0 ... 1935.0	MHz	25	34	—	dB
1935.0 ... 1970.0	MHz	22	25	—	dB
1970.0 ... 1980.0	MHz	14	25	—	dB
1980.0 ... 1990.0	MHz	6	12	—	dB
2045.0 ... 2085.0	MHz	3	12	—	dB
2085.0 ... 2120.0	MHz	22	25	—	dB
2120.0 ... 2160.0	MHz	27	30	—	dB
2160.0 ... 2300.0	MHz	35	37	—	dB
2300.0 ... 2700.0	MHz	30	37	—	dB
2700.0 ... 2900.0	MHz	30	35	—	dB
2900.0 ... 6000.0	MHz	30	38	—	dB

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

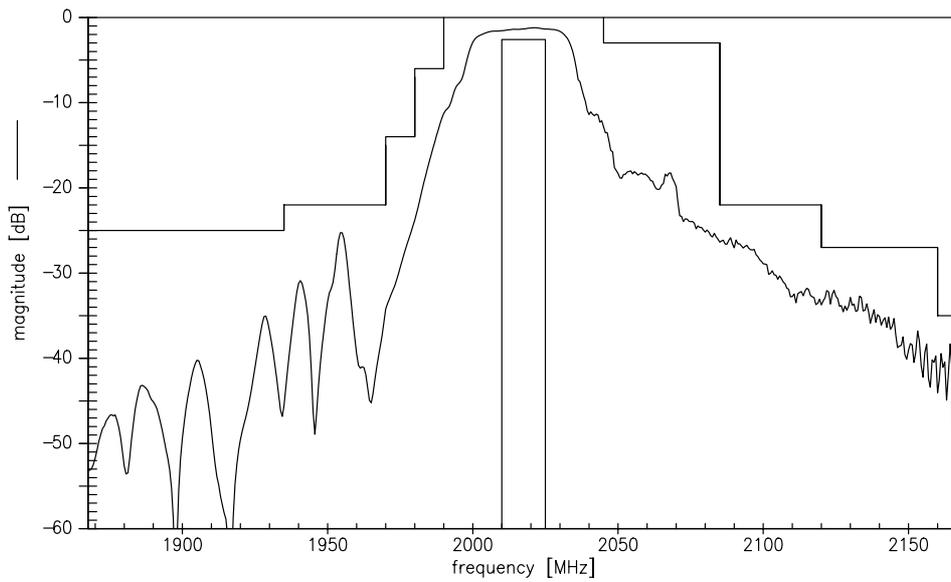

**Maximum ratings of Filter 2 (TD-SCDMA 2100)**

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				
1880.0 ... 1920.0 MHz	P <sub>IN</sub>	10	dBm	effective power in the on-state, duty cycle 4:8, 2000hours
2010.0 ... 2025.0 MHz	P <sub>IN</sub>	10	dBm	

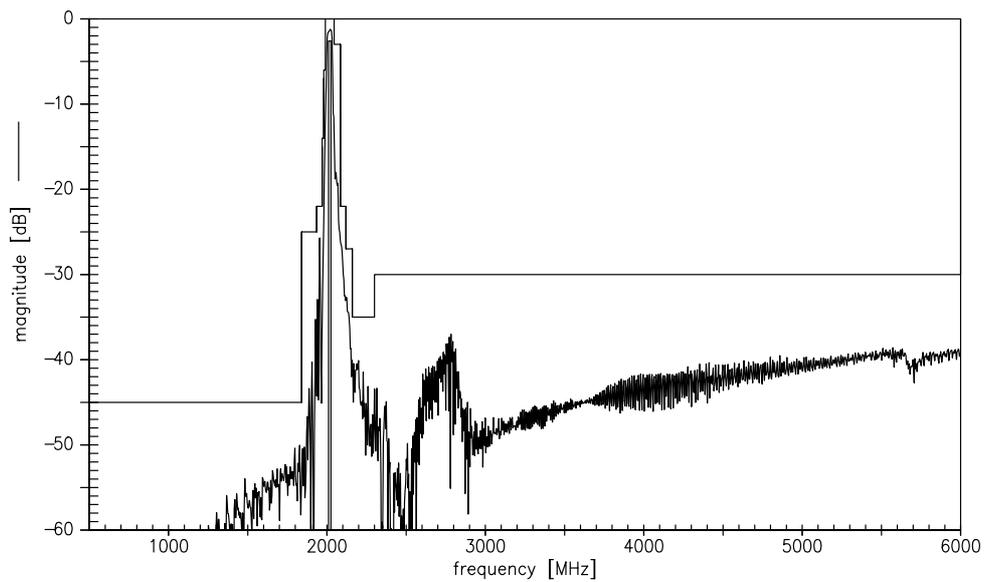
<sup>1)</sup> acc. to JESD22-A115A (machine model), 1 negative & 1 positive pulse.



Transfer function Filter 1 (TD-SCDMA 2100)



Transfer function Filter 1 (TD-SCDMA 2100) - Wideband

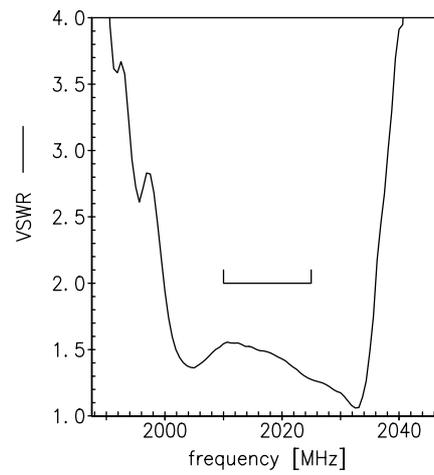
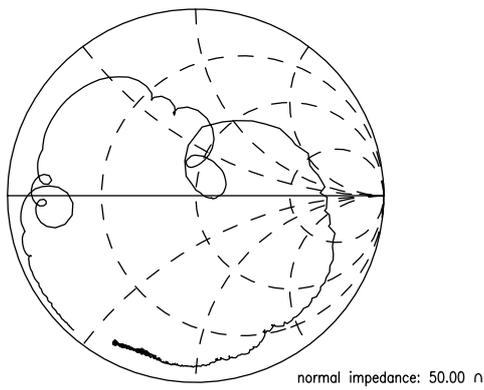


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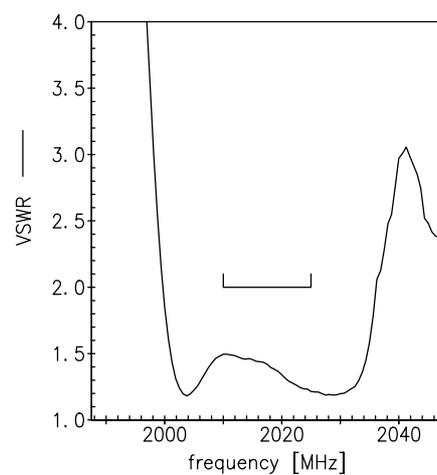
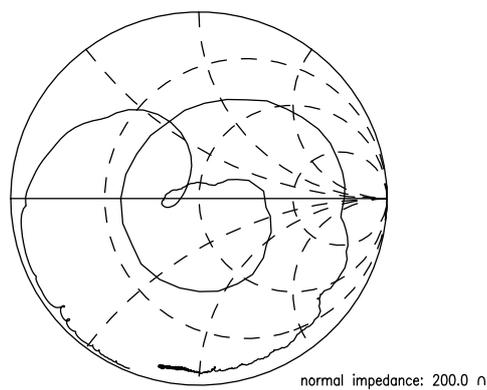


Smith charts Filter 1 (TD-SCDMA 2100)

$S_{11}$  function



$S_{22}$  function




**References**

<b>Type</b>	B9815
<b>Ordering code</b>	B39202B9815P810
<b>Marking and package</b>	C61157-A8-A19
<b>Packaging</b>	F61074-V8227-Z000
<b>Date codes</b>	L_1126
<b>S-parameters</b>	B9815_LB_NB.s3p, B9815_LB_WB.s3p B9815_UB_NB.s3p, B9815_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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<b>Matching coils</b>	See Inductor pdf-catalog <a href="http://www.tdk.co.jp/tefe02/coil.htm#aname1">http://www.tdk.co.jp/tefe02/coil.htm#aname1</a> and Data Library for circuit simulation <a href="http://www.tdk.co.jp/etvcl/index.htm">http://www.tdk.co.jp/etvcl/index.htm</a>

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