



SAW Components

SAW Tx 2in1 Filter

WCDMA band V / WCDMA band II

Series/type:	B9312
Ordering code:	B39192B9312N410
Date:	May 31, 2006
Version:	2.0



SAW Components

B9312

SAW Tx 2in1 Filter

836.5 / 1880.0 MHz

Data Sheet



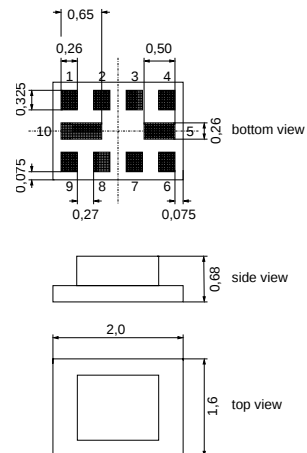
Application

- Low-loss RF filter for mobile telephone WCDMA band V / band II systems, transmit path (Tx)
- Usable passband:
 - Filter 1 (band V): 25 MHz
 - Filter 2 (band II): 60 MHz
- Impedance transformation from:
 - Filter 1 (band V): 100 Ω to 50 Ω
 - Filter 2 (band II): 100 Ω to 50 Ω
- Balanced to unbalanced operation



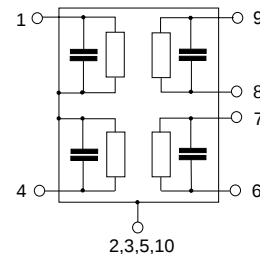
Features

- Package size 2.0 x 1.6 x 0.68 mm³
- Package code QCS10I
- RoHS compatible
- Approximate weight 0.008 g
- Package for Surface Mount Technology (SMT)
- Ni, gold-plated terminals
- Electrostatic Sensitive Device (ESD)



Pin configuration

- 1 Output [Filter 1: band V]
- 4 Output [Filter 2: band II]
- 6,7 Input balanced [Filter 2: band II]
- 8,9 Input balanced [Filter 1: band V]
- 2,3,5,10 Case ground





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Characteristics filter 1 (WCDMA band V)

Temperature range for specification: $T = -15\text{ °C to }+80\text{ °C}$
 Terminating source impedance: $Z_S = 100\ \Omega$ (balanced)
 Terminating load impedance: $Z_L = 50\ \Omega$ (unbalanced)

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	836.5	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$				
824.0 ... 849.0 MHz		—	1.6	2.2	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
824.0 ... 849.0 MHz		—	0.7	1.5	dB
Input VSWR					
824.0 ... 849.0 MHz		—	1.7	2.0	
Output VSWR					
824.0 ... 849.0 MHz		—	1.7	2.0	
Input amplitude balance (S_{31}/S_{21})					
824.0 ... 849.0 MHz		-1.0	-0.6/0.7	1.0	dB
Input phase balance ($\phi(S_{31}) - \phi(S_{21}) + 180^\circ$)					
824.0 ... 849.0 MHz		-10.0	-2/+1	10.0	°
Common mode suppression	S_{cs21}				
824.0 ... 849.0 MHz		23.0	28.0	—	dB
Attenuation	α				
0.0 ... 779.0 MHz		35.0	42.0	—	dB
779.0 ... 804.0 MHz		25.0	31.0	—	dB
869.0 ... 1570.0 MHz		33.0	36.0	—	dB
1570.0 ... 1580.0 MHz		43.0	48.0	—	dB
1580.0 ... 2547.0 MHz		35.0	43.0	—	dB
2547.0 ... 6000.0 MHz		25.0	34.0	—	dB



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Maximum ratings

Operable temperature range	T	−30/+85	°C	machine model, 10 pulses continuous wave @ +55°C ambient
Storage temperature range	T _{stg}	−40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	100 ¹⁾	V	
Input power at				
WCDMA band V	P _{IN}	10	dBm	
Tx band				

¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



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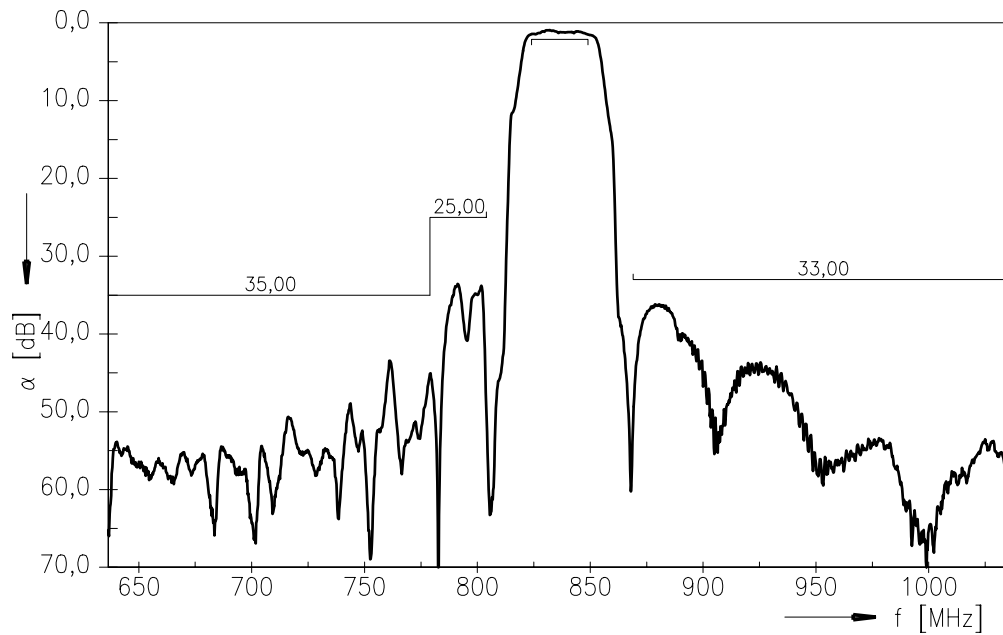
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836.5 / 1880.0 MHz

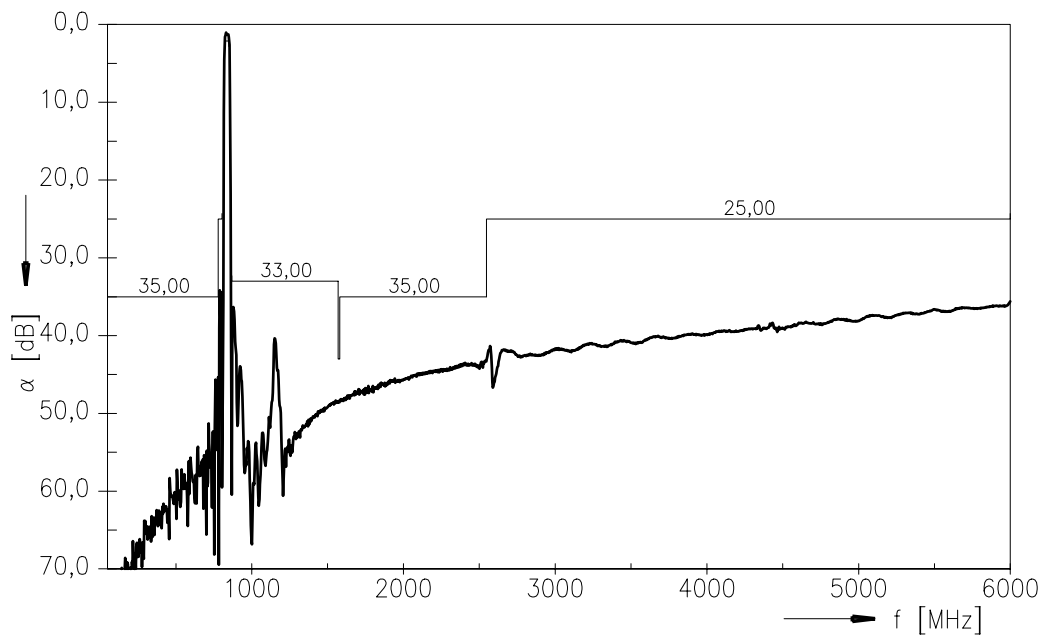
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Transfer function filter 1 (WCDMA band V)



Transfer function filter 1 (WCDMA band V) - wideband



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



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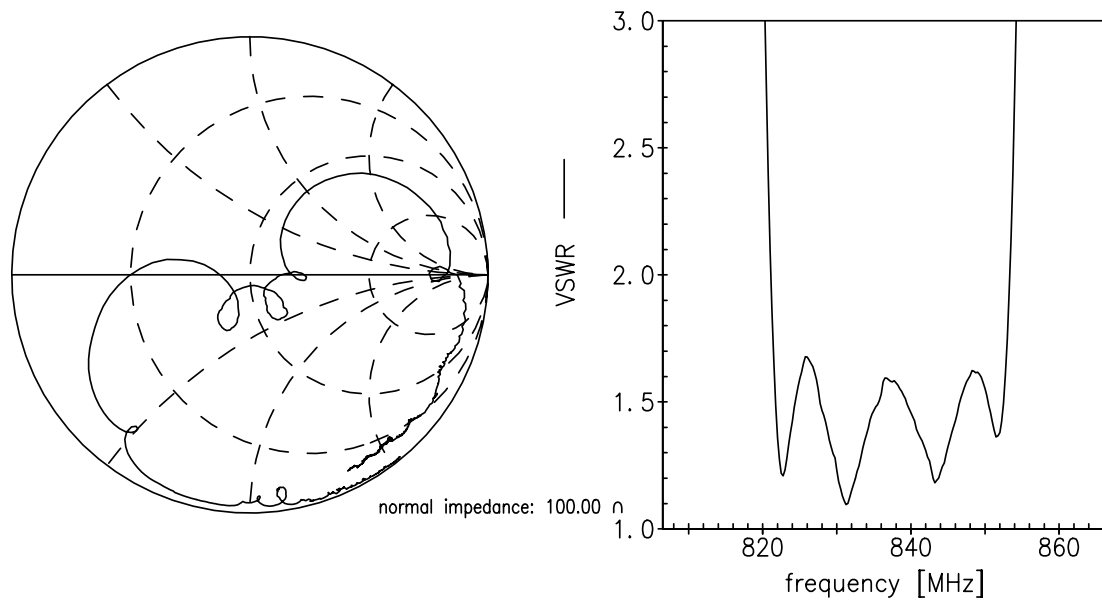
836.5 / 1880.0 MHz

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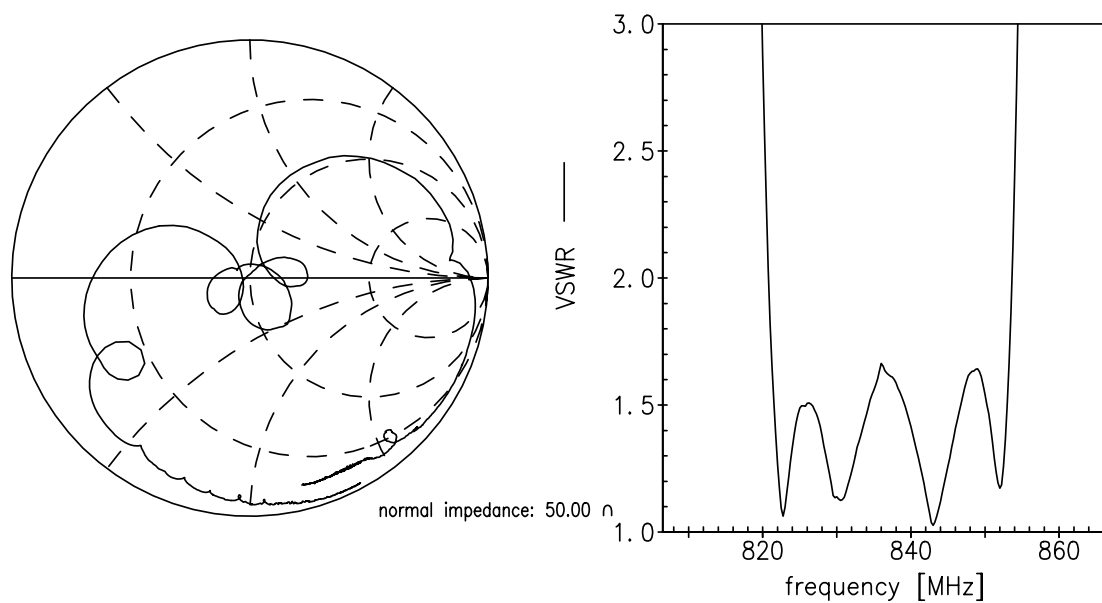


Smith charts filter 1 (WCDMA band V)

S_{11} function



S_{22} function





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SAW Tx 2in1 Filter

836.5 / 1880.0 MHz

Data Sheet



Characteristics filter 2 (WCDMA band II)

Temperature range for specification: $T = -15\text{ °C to }+80\text{ °C}$
Terminating source impedance: $Z_S = 100\ \Omega$ (balanced) || 18nH
Terminating load impedance: $Z_L = 50\ \Omega$ (unbalanced)

		min.	typ. @ 25 °C	max.	
Center frequency	f_C	—	1880.0	—	MHz
Maximum insertion attenuation	$\alpha_{\max}$	—	2.4	3.8	dB
1850.0 ... 1910.0 MHz		—	2.4	3.8	dB
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.0	2.4	dB
1850.0 ... 1910.0 MHz		—	1.0	2.4	dB
Input VSWR		—	1.8	2.3	
1850.6 ... 1909.4 MHz		—	1.8	2.3	
Output VSWR		—	1.8	2.3	
1850.6 ... 1909.4 MHz		—	1.8	2.3	
Input amplitude balance (S_{31}/S_{21})		—1.1	—0.7/0.7	1.1	dB
1850.0 ... 1910.0 MHz		—1.1	—0.7/0.7	1.1	dB
Input phase balance ($\phi(S_{31}) - \phi(S_{21}) + 180^\circ$)		—10.0	—3/+3	10.0	°
1850.0 ... 1910.0 MHz		—10.0	—3/+3	10.0	°
Common mode suppression	S_{cs21}	23.0	29.0	—	dB
1850.0 ... 1910.0 MHz		23.0	29.0	—	dB
Attenuation	α	45.0	54.0	—	dB
0.0 ... 1580.0 MHz		45.0	54.0	—	dB
1580.0 ... 1770.0 MHz		30.0	42.0	—	dB
1770.0 ... 1830.0 MHz		18.0	36.0	—	dB
1930.6 ... 1990.0 MHz		33.0 ¹⁾	35.7	—	dB
1990.0 ... 2500.0 MHz		30.0	35.5	—	dB
2500.0 ... 6000.0 MHz		30.0	40.0	—	dB

1) Attenuation of WCDMA signal determined by

$$\int_{-\infty}^{\infty} |S_{ds21}(f) H_{RRC}(f - f_C)|^2 df$$

with f_C ranging from 1932.4 MHz (lowest Rx channel) to 1987.6 MHz (highest Rx channel).
 $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 with the following normalization:

$$\int_{-\infty}^{\infty} |H_{RRC}(f)|^2 df = 1$$



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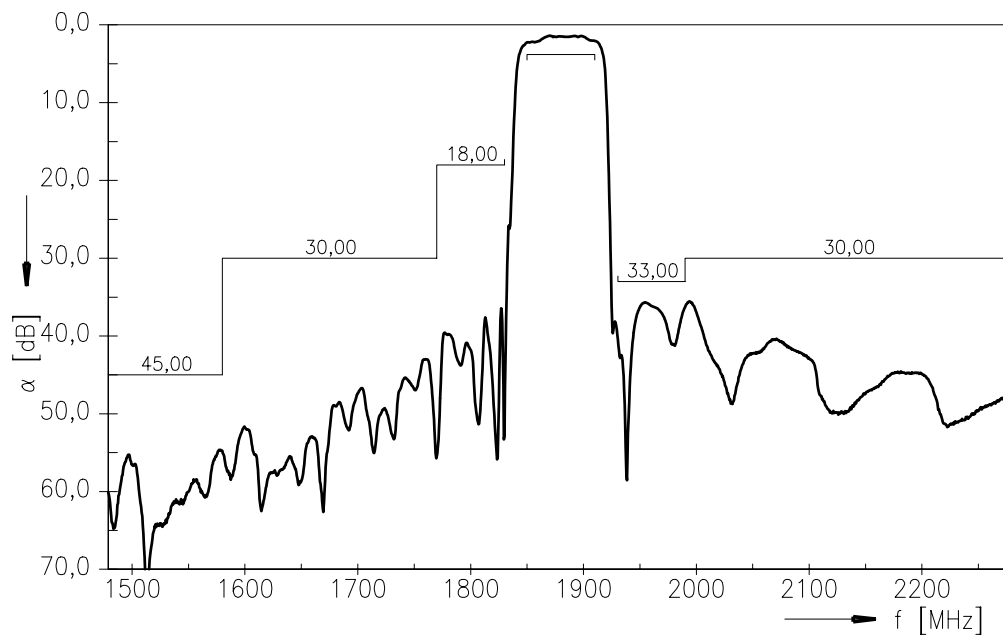
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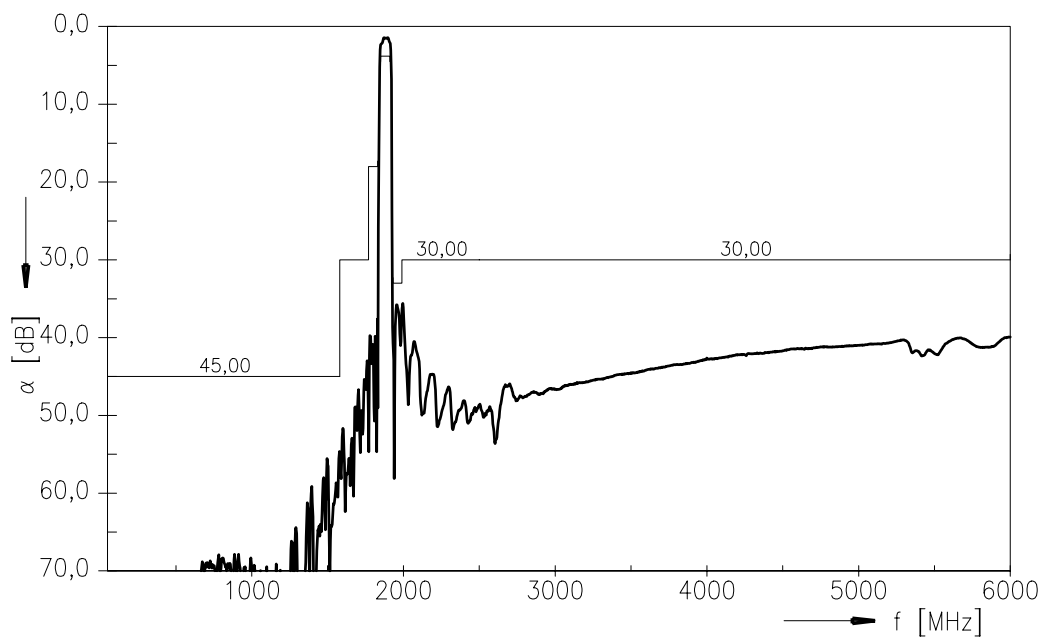
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Transfer function filter 2 (WCDMA band II)



Transfer function filter 2 (WCDMA band II) - wideband



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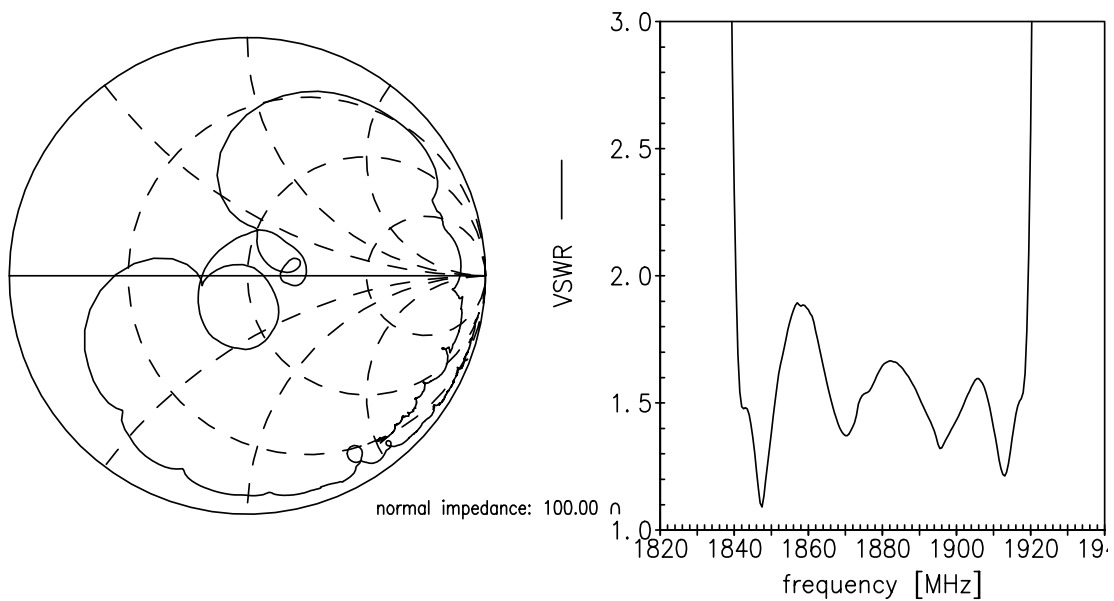
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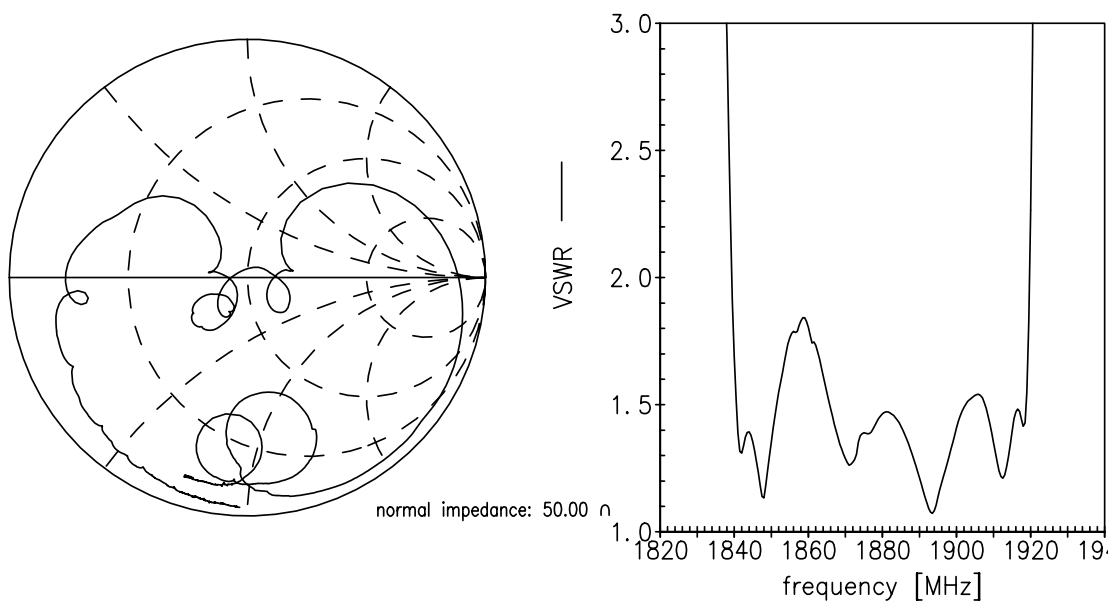


Smith charts filter 2 (WCDMA band II)

S_{11} function



S_{22} function



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**References**

Type	B9312
Ordering code	B39192B9312N410
Marking and package	C61157-A7-A146
Packaging	F61074-V8152-Z000
Date codes	L_1126
S-parameters	LN55D_band5_NB.s3p, LN55D_band5_WB.s3p LN55D_band2_NB.s3p, LN55D_band2_WB.s3p
Soldering profile	S_6001
RoHS compatible	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 maxi- mum concentration values for certain hazardous substances in electrical and electronic equipment."
Moldability	Before using in overmolding environment, please contact your EPCOS sales office.

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