



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



Data Sheet



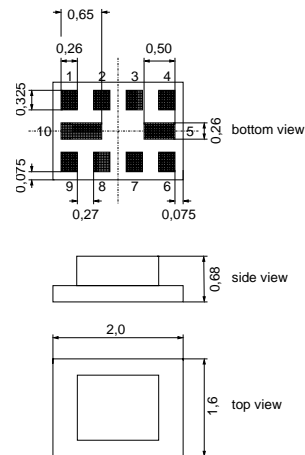
Application

- 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



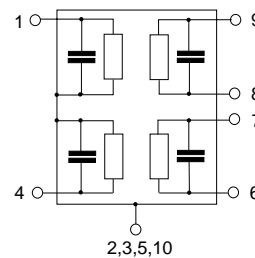
Features

- 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





Data Sheet



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	α_{\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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836.5 / 1880.0 MHz

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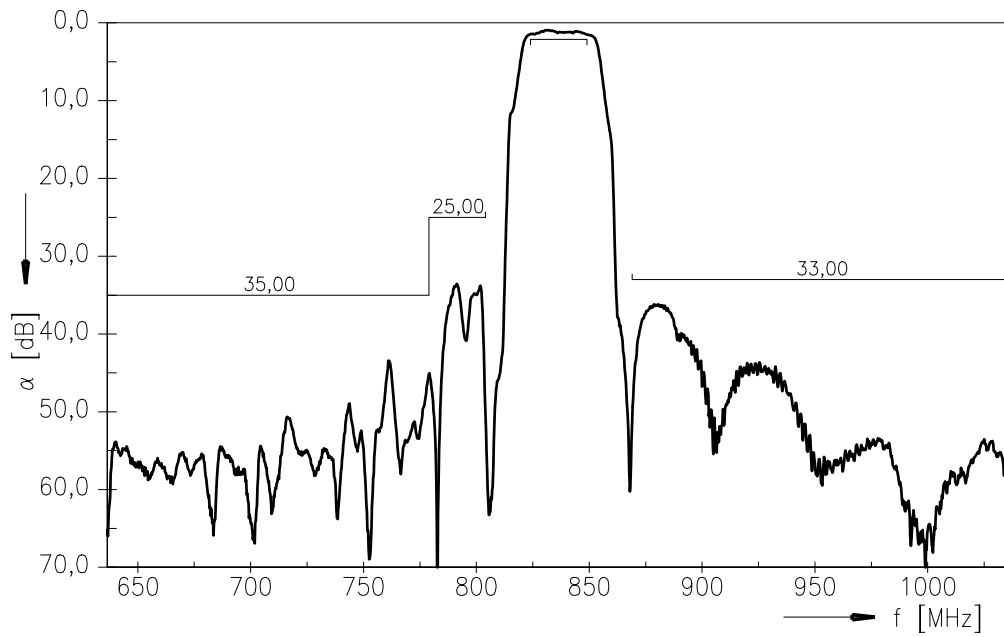
Maximum ratings

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

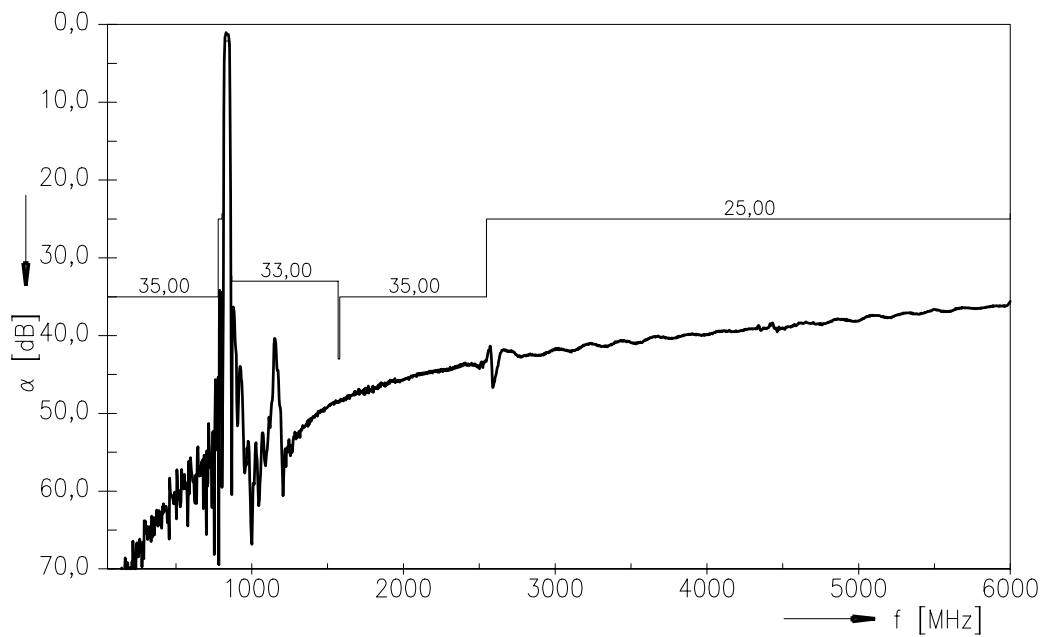
¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



Transfer function filter 1 (WCDMA band V)



Transfer function filter 1 (WCDMA band V) - wideband



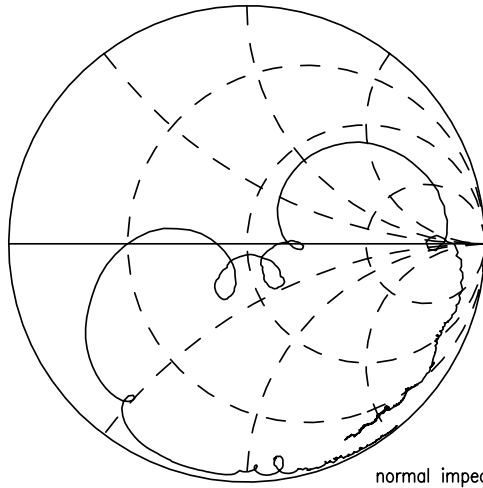


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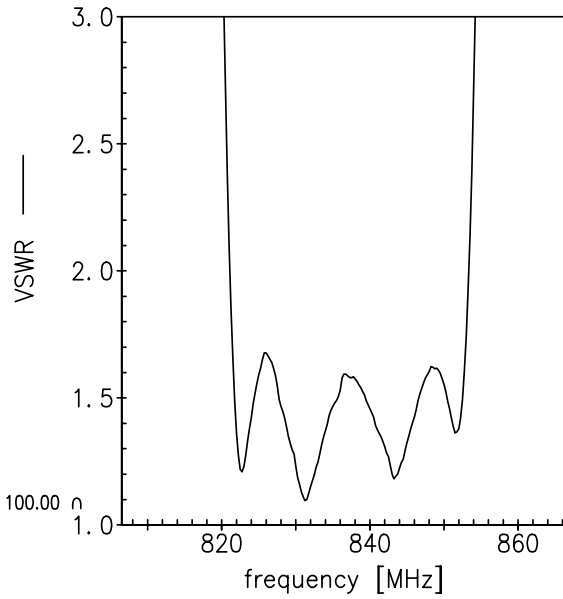


Smith charts filter 1 (WCDMA band V)

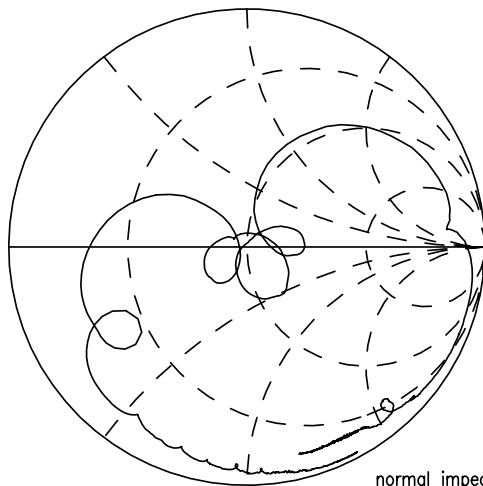
S₁₁ function



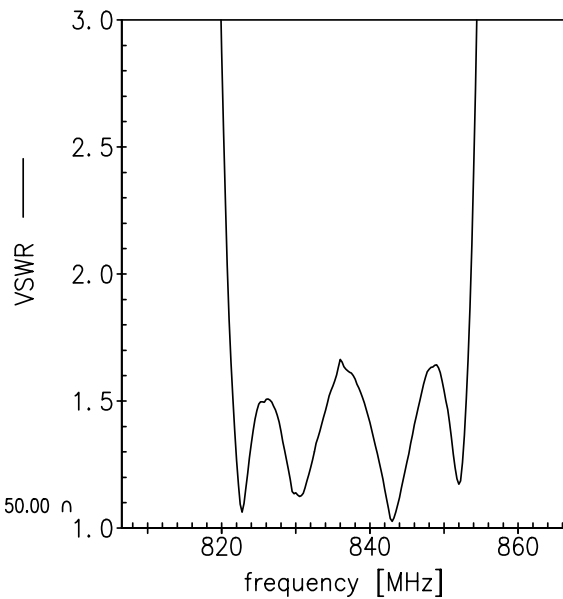
normal impedance: 100.00 Ω



S₂₂ function



normal impedance: 50.00 Ω





Data Sheet



Characteristics filter 2 (WCDMA band II)

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

		min.	typ. @ 25 °C	max.	
Center frequency	f _C	—	1880.0	—	MHz
Maximum insertion attenuation	α _{max}				
1850.0 ... 1910.0 MHz		—	2.4	3.8	dB
Amplitude ripple (p-p)	Δα				
1850.0 ... 1910.0 MHz		—	1.0	2.4	dB
Input VSWR					
1850.6 ... 1909.4 MHz		—	1.8	2.3	
Output VSWR					
1850.6 ... 1909.4 MHz		—	1.8	2.3	
Input amplitude balance (S₃₁/S₂₁)					
1850.0 ... 1910.0 MHz		-1.1	-0.7/0.7	1.1	dB
Input phase balance (φ(S₃₁) - φ(S₂₁) + 180°)					
1850.0 ... 1910.0 MHz		-10.0	-3/+3	10.0	°
Common mode suppression	S _{cs21}				
1850.0 ... 1910.0 MHz		23.0	29.0	—	dB
Attenuation	α				
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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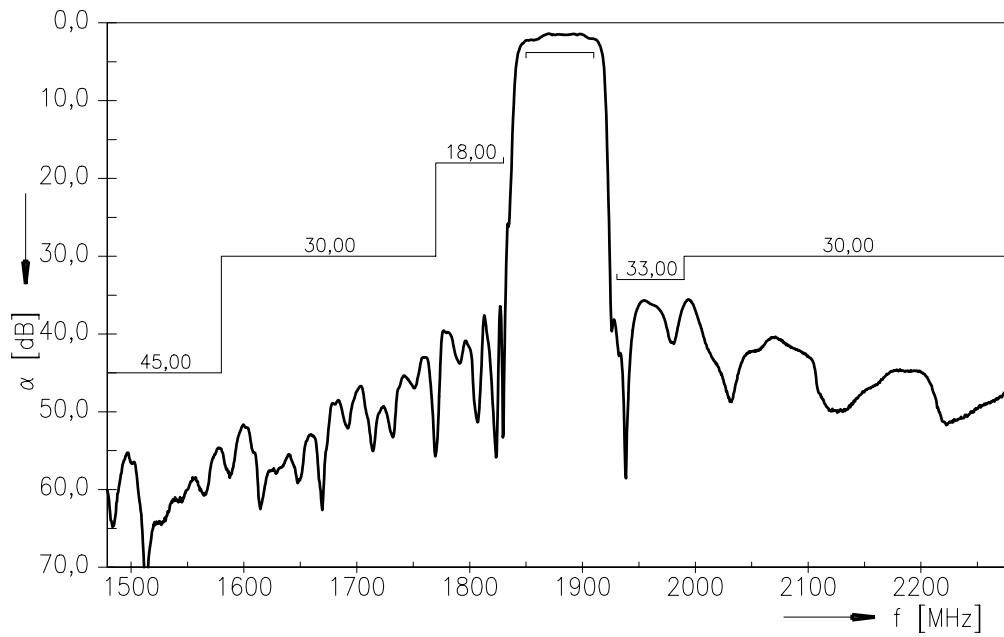
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Storage temperature range	T _{stg}	-40/+85	°C	
DC voltage	V _{DC}	5	V	
ESD voltage	V _{ESD}	50 ¹⁾	V	machine model, 10 pulses
Input power at				
WCDMA band II	P _{IN}	10	dBm	continuous wave @ +55°C ambient
Tx band				

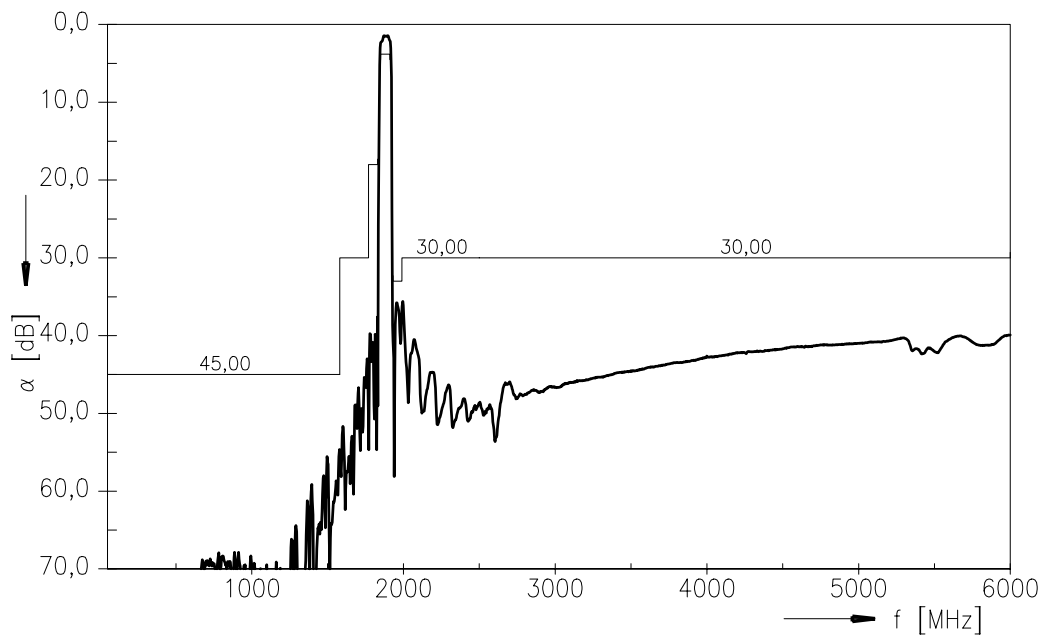
¹⁾ acc. to JESD22-A115A (machine model), 10 negative & 10 positive pulses.



Transfer function filter 2 (WCDMA band II)



Transfer function filter 2 (WCDMA band II) - wideband



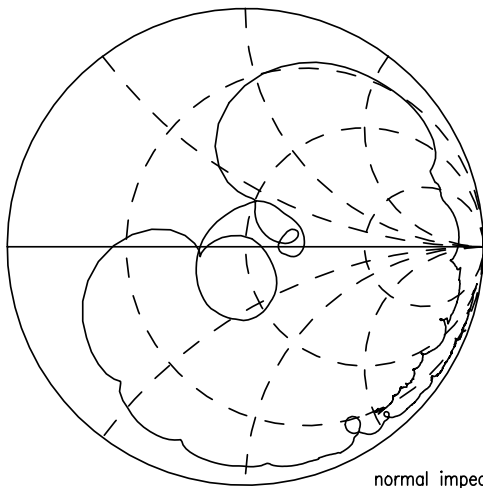


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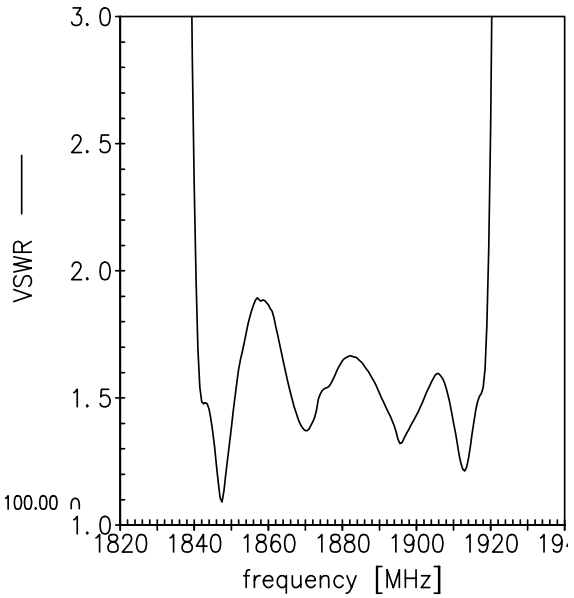


Smith charts filter 2 (WCDMA band II)

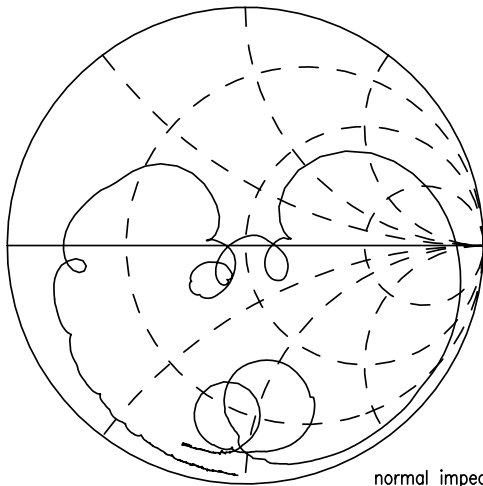
S₁₁ function



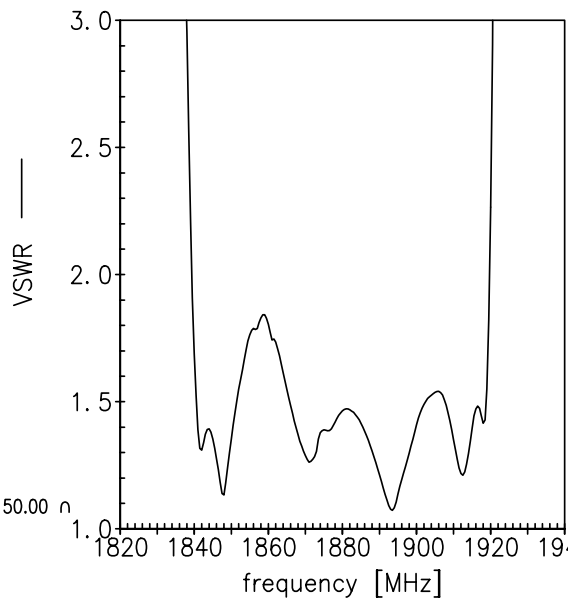
normal impedance: 100.00 Ω



S₂₂ function



normal impedance: 50.00 Ω





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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 maximum 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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