



SAW Components

SAW TX Filter

Cellular / WCDMA band V

Series/type:	B9859
Ordering code:	B39841B9859P810
Date:	June 27, 2012
Version:	2.0



Data sheet



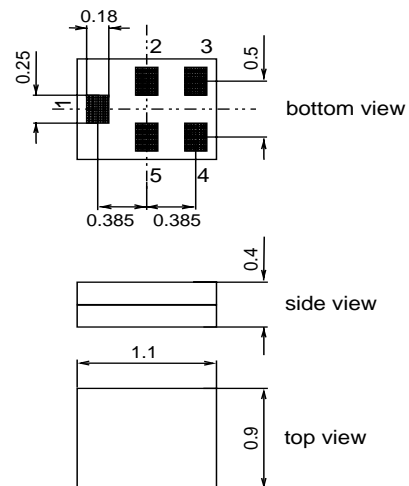
Application

- Low-loss RF filter for mobile telephone WCDMA Band V / Cellular systems, transmit path (TX)
- Useable passband: 25 MHz
- Unbalanced / unbalanced operation
- Impedance 50 Ω input and output
- Suitable for GPRS class 1 to 12



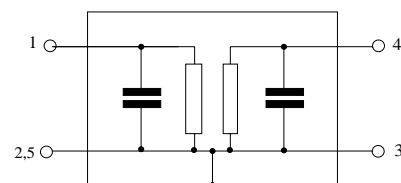
Features

- Package size 1.1 x 0.9 x 0.4 mm³
- RoHS compatible
- Approximate weight: 0.001g
- Package for **Surface Mount Technology (SMT)**
- Ni, gold-plated terminals
- **Electrostatic Sensitive Device (ESD)**
- **Moisture Sensitivity Level 3**



Pin configuration

- 1 Input unbalanced
- 4 Output unbalanced
- 2,3,5 To be grounded





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Characteristics

Temperature range for specification: $T = -20\text{ °C to }+85\text{ °C}$
 Terminating source impedance: $Z_S = 50\ \Omega$ (unbalanced)
 Terminating load impedance: $Z_L = 50\ \Omega$ (unbalanced)

						B9859			
						min.	typ. @ 25 °C	max.	
Center frequency		f_C				—	836.5	—	MHz
Maximum insertion attenuation									
@ $f_{\text{Carrier Bd 5 TX}}$	826.4 ... 846.6	MHz	α_{WCDMA} ¹⁾		—	1.2	1.6	dB	
	824.0 ... 849.0	MHz	α_{Cellular}		—	1.4	1.8	dB	
Amplitude ripple (p-p)									
	824.0 ... 849.0	MHz	$\Delta\alpha$		—	0.7	1.1	dB	
Error Vector Magnitude²⁾									
@ $f_{\text{Carrier Bd 5 TX}}$	826.4 ... 846.6	MHz	EVM		—	2.1	3.0	%	
Input VSWR									
	824.0 ... 849.0	MHz			—	1.9	2.1		
Output VSWR									
	824.0 ... 849.0	MHz			—	1.8	2.1		
Attenuation									
	DC ... 804.0	MHz	α		25	31	—	dB	
	860.0 ... 869.0	MHz			1	7	—	dB	
	869.0 ... 895.0	MHz	α_{Cellular}		26	30	—	dB	
@ $f_{\text{Carrier Bd 5 RX}}$	871.4 ... 891.6	MHz	α_{WCDMA} ¹⁾		28	32	—	dB	
	895.0 ... 1210.0	MHz			20	23	—	dB	
	1210.0 ... 1648.0	MHz			25	30	—	dB	
	1648.0 ... 1698.0	MHz			28	32	—	dB	
	1698.0 ... 2480.0	MHz			25	29	—	dB	
	2480.0 ... 2547.0	MHz			20	28	—	dB	
	2547.0 ... 6000.0	MHz			15	23	—	dB	

1) Attenuation of WCDMA signal ("Powertransferfunction"). Please refer to annotation on page (4).

2) Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.



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Annotation for characteristics section

Attenuation of WCDMA signal ("Powertransferfunction", α_{WCDMA}) is determined by

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

$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for Passband, $f_{Carrier}$ ranges from 826.4 MHz (lowest Tx channel) to 846.6 MHz (highest Tx 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:

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

Maximum ratings

Operable temperature range	T	-40/+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	P _{IN}	15	dBm	2000h CW signal @ 55°

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



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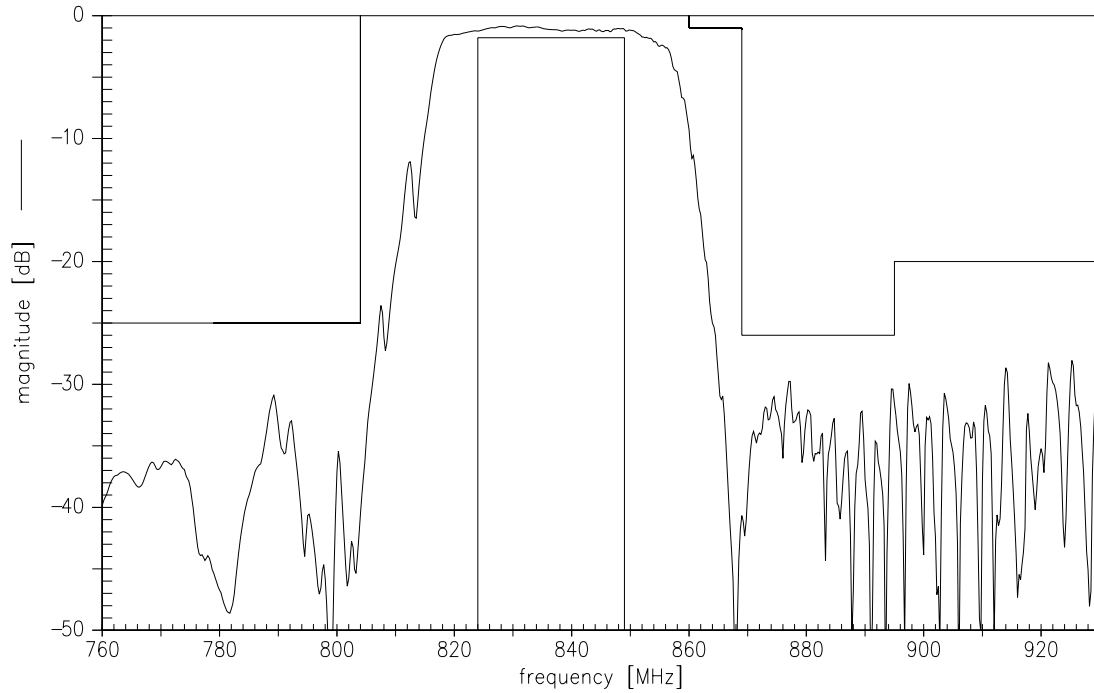
SAW TX Filter

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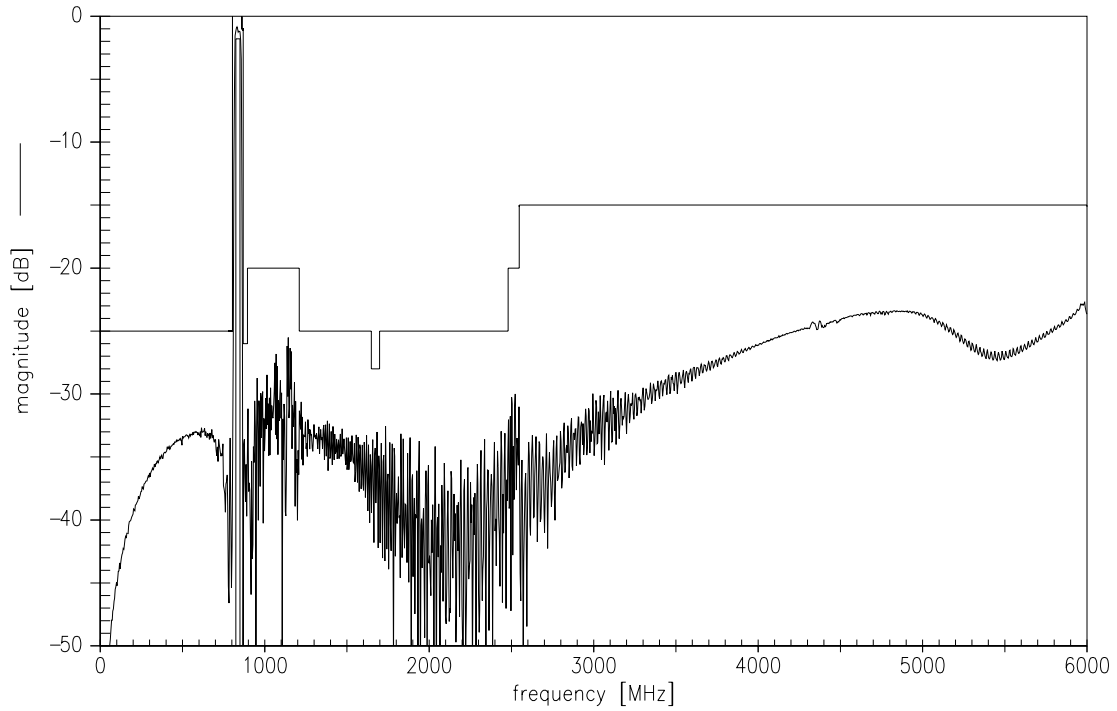
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Transfer function for CW signals



Transfer function (wideband)



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



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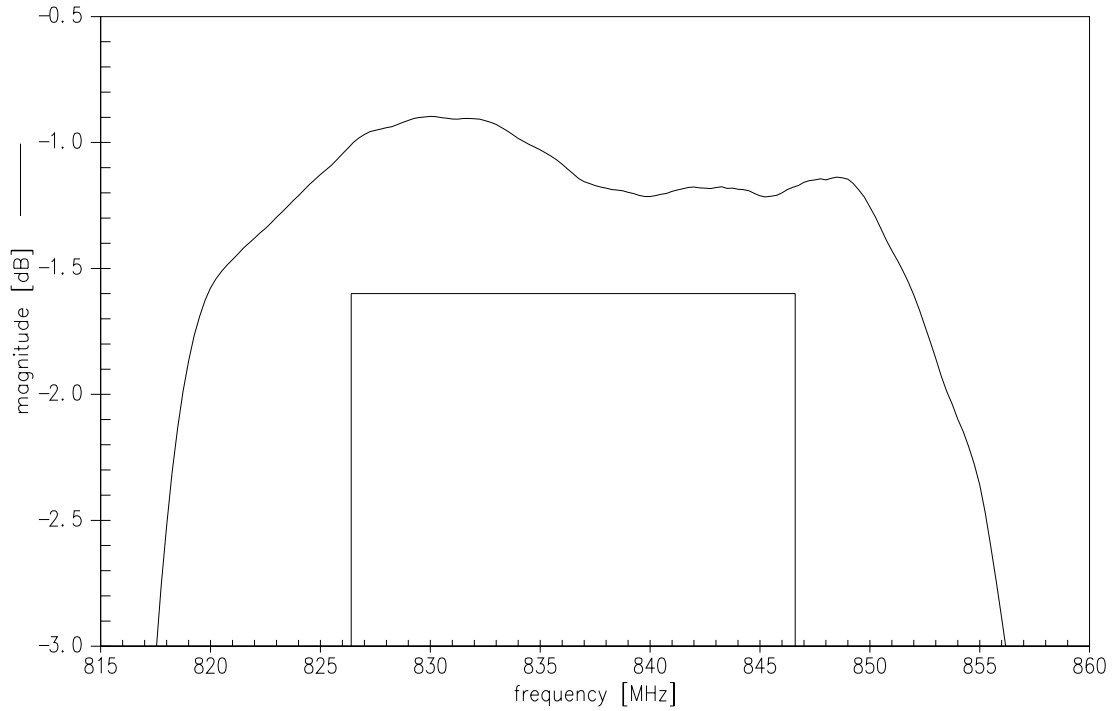
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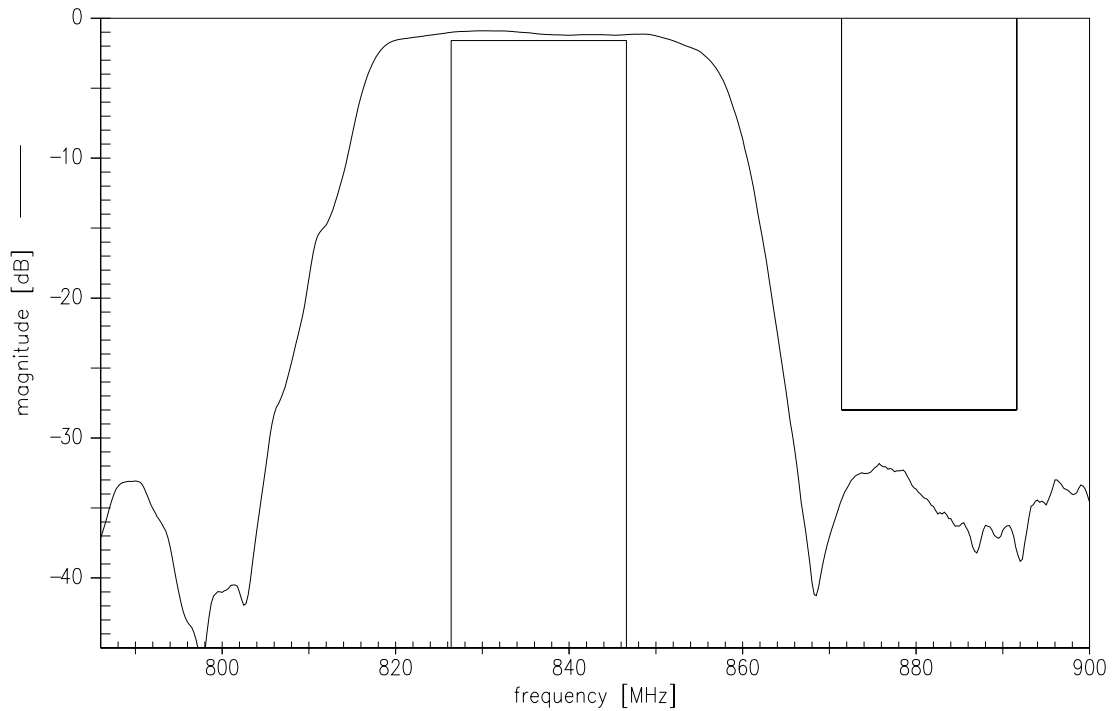
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Transfer function for WCDMA signals (Powertransferfunction vs. carrier frequency)



Transfer function for WCDMA signals (Powertransferfunction vs. carrier frequency)



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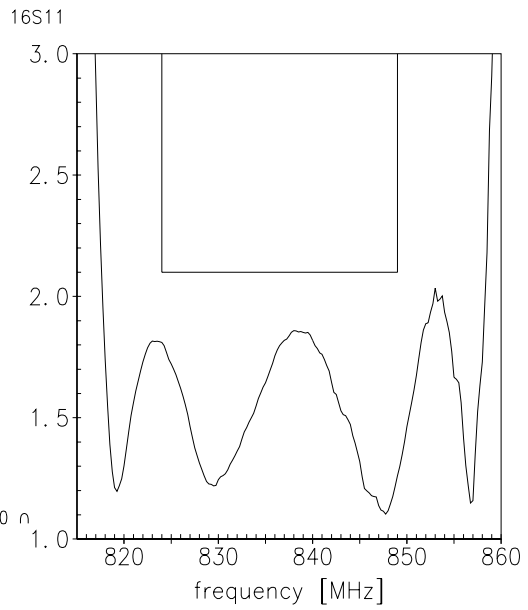
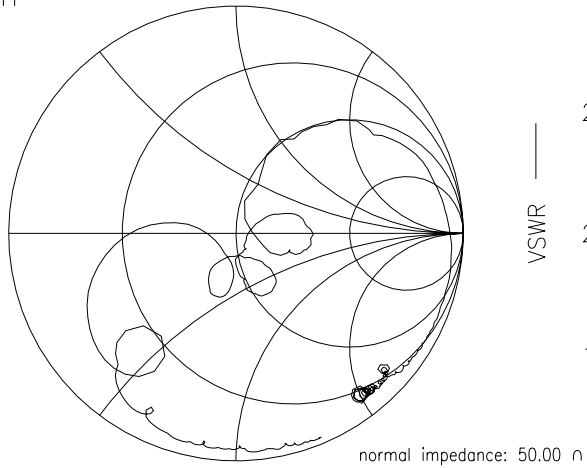
Data sheet



Smith charts

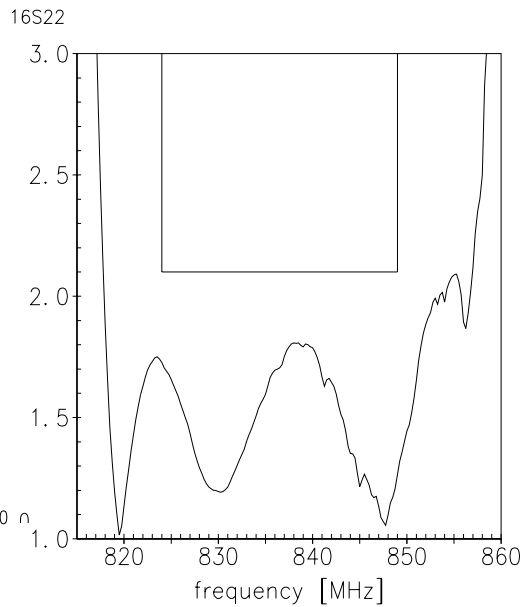
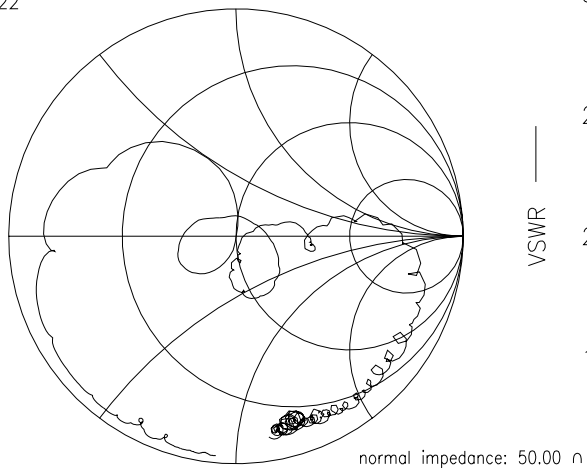
Unbalanced input (pin1)

S11



Unbalanced output (pin4)

S22



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**References**

Type	B9859
Ordering code	B39841B9859P810
Marking and package	C61157-A8-A30
Packaging	F61074-V8255-Z00
Date codes	L_1126
S-parameters	B9859_NB.s2p B9859_WB.s2p See file header for port/pin assignment table.
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.
Matching coils	See Inductor pdf-catalog http://www.tdk.co.jp/tefe02/coil.htm#aname1 and Data Library for circuit simulation http://www.tdk.co.jp/etvcl/index.htm for a large variety of matching coils.

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