SAW Components

SAW RX filter

GSM850 / WCDMA band V / Cellular

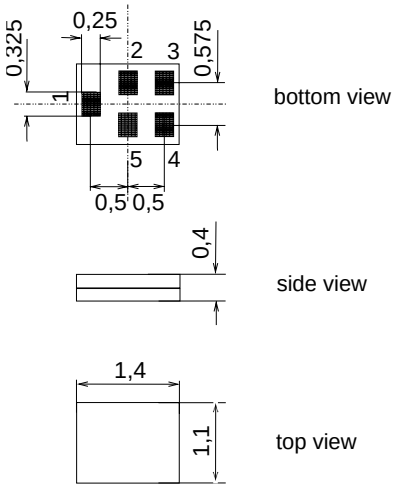
Series/type:	**B9456**
Ordering code:	**B39881B9456P810**
Date:	December 07, 2009
Version:	2.0

Application

- Low-loss RF filter for mobile telephone GSM850, Cellular and WCDMA band V systems, receive path (RX)
- Suitable for diversity applications
- Very high TX suppression
- Useable passband 25 MHz
- Unbalanced to balanced operation
- Impedance transformation from 50 Ω to 100 Ω
- Suitable to GPRS class 1 to 12

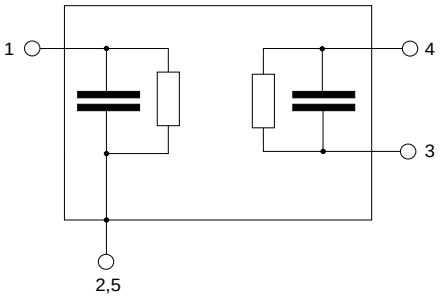
Features

- Package size 1.4 x1.1 x 0.4 mm³
- Package code QCS5I
- RoHS compatible
- Approximate weight 0.003 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)



Pin configuration

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



Characteristics

Temperature range for specification: T = -30 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω (unbalanced)
Terminating load impedance: Z_L =100 Ω (balanced)

						B9456			
						min.	typ. @ 25 ˚C	max.	
Center frequency					f_C	—	881.5	—	MHz
Maximum insertion attenuation									
	869.0	...	894.0	MHz	α_{max}	—	2.0	2.6	dB
@$f_{Carrier\ Bd\ V\ RX}$	871.4	...	891.6	MHz	α_{WCDMA} [1]	—	1.7	2.3	dB
Amplitude ripple (p-p)									
	869.0	...	894.0	MHz	$\Delta\alpha$	—	0.7	1.3	dB
Error Vector Magnitude [2]									
@$f_{Carrier\ Bd\ V\ RX}$	871.4	...	891.6	MHz	EVM	—	2.0	3.2	%
Input VSWR									
	869.0	...	894.0	MHz		—	1.6	2.0	
Output VSWR									
	869.0	...	894.0	MHz		—	1.6	2.0	
Output amplitude balance ($\lvert S_{31}/S_{21}\rvert$)									
	869.0	...	894.0	MHz		- 1	-0.5/0.3	+ 1	dB
Output phase balance ($\phi(S_{31})-\phi(S_{21}))+180^\circ$									
	869.0	...	894.0	MHz		- 8	± 5	+ 8	°
Attenuation					α				
	DC	...	824.0	MHz		40	60	—	dB
	824.0	...	849.0	MHz		50	57	—	dB
@$f_{Carrier\ Bd\ V\ TX}$	826.4	...	846.6	MHz	α_{WCDMA} [1]	55	59	—	dB
	849.0	...	854.0	MHz		10	55	—	dB
	914.0	...	954.0	MHz		24 [3]	29	—	dB
	954.0	...	979.0	MHz		28	55	—	dB
	979.0	...	1693.0	MHz		35	48	—	dB
	1693.0	...	2607.0	MHz		40	60	—	dB
	1850.0	...	1910.0	MHz		50	60	—	dB
	2607.0	...	2682.0	MHz		45	50	—	dB
	2682.0	...	4345.0	MHz		40	60	—	dB
	4345.0	...	6000.0	MHz		45	60	—	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.
[3] -20/85 ˚C

Annotation for characteristics section

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

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

$f_{Carrier}$ according to 3GPP TS 25.101 (e.g. for band V RX passband, $f_{Carrier}$ ranges from 871.4 MHz (lowest RX channel) to 891.6 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:

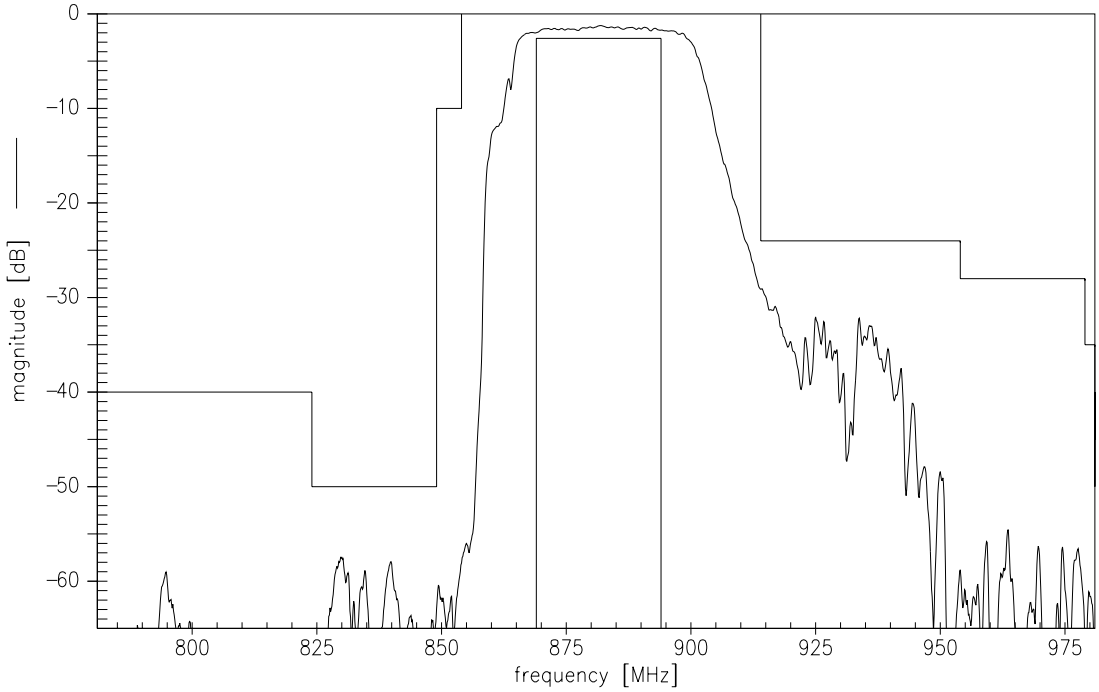
$$\int_{\infty}^{\infty} \left| H_{RRC}(f) \right|^2 df = 1$$

Maximum ratings

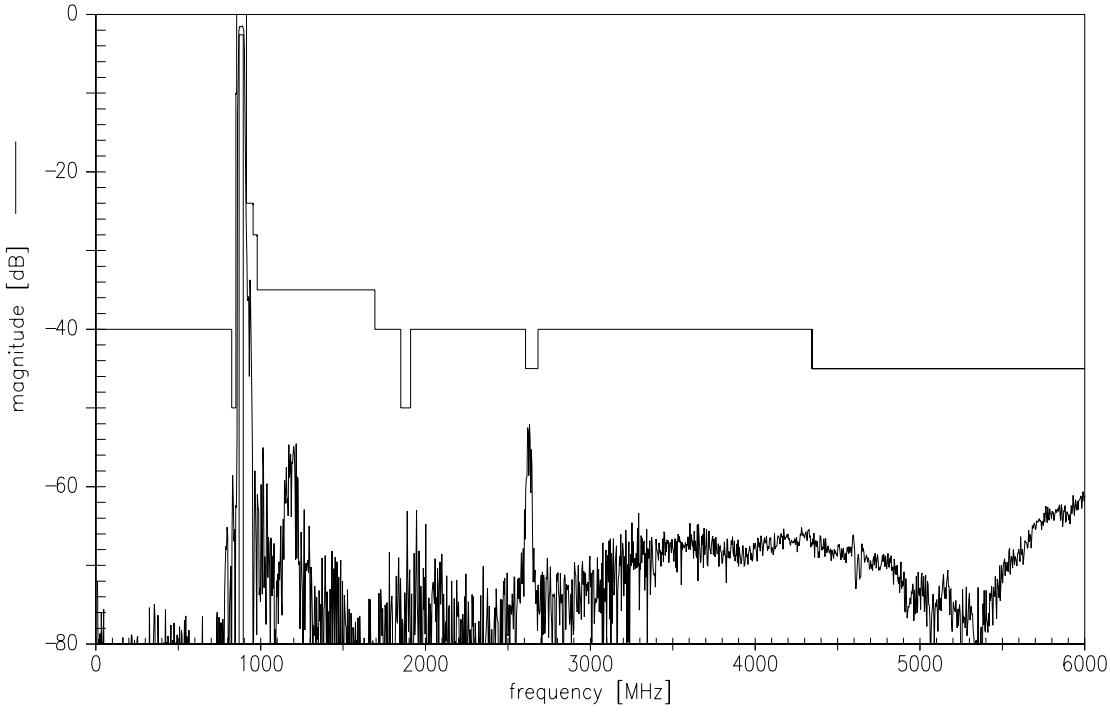
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 10 pulses
Input power	P_{IN}	19	dBm	10000h, 55˚C

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

Transfer function

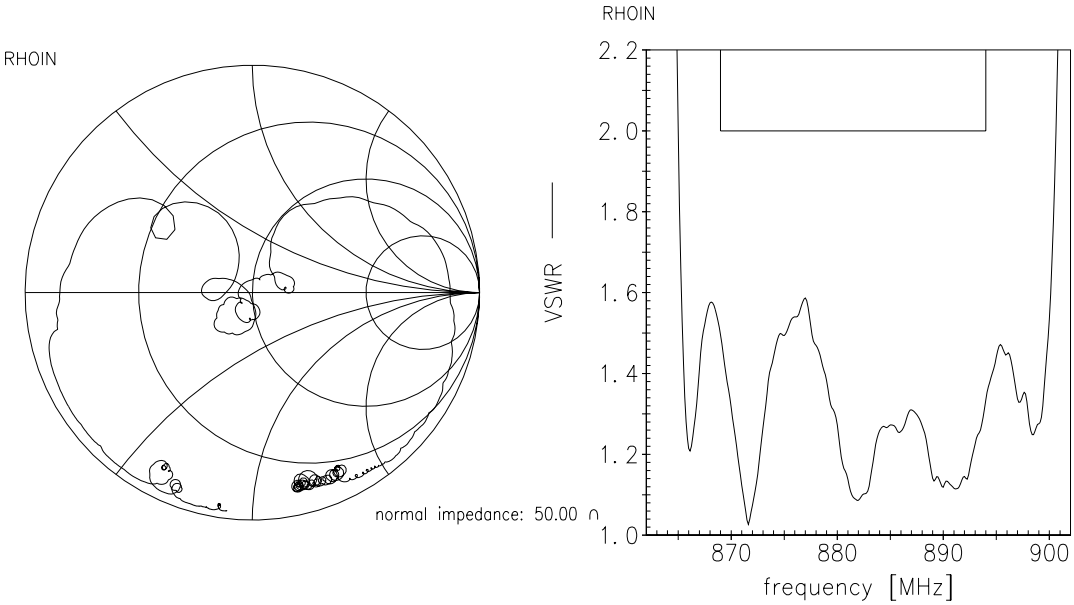


Transfer function (wideband)

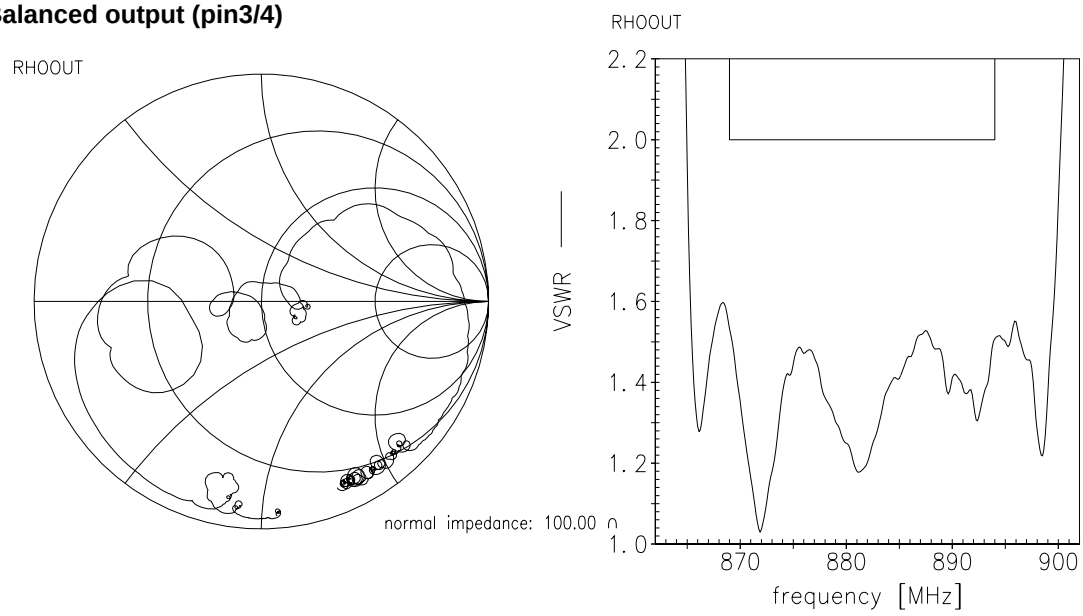


Smith charts

Unbalanced input (pin1)



Balanced output (pin3/4)



References

Type	B9456
Ordering code	B39881B9456P810
Marking and package	C61157-A8-A3
Packaging	F61074-V8237-Z000
Date codes	L_1126
S-parameters	B9456_NB.s2p B9456_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."

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