SAW Components

SAW Rx 2in1 filter

GSM 850 / GSM 900

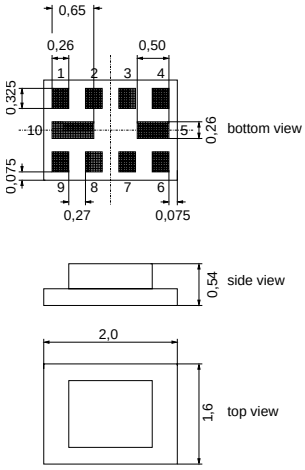
Series/type:	**B9304**
Ordering code:	**B39941B9304G110**
Date:	April 24, 2006
Version:	2.0

Application

- Low-loss 2-in-1 RF filter for mobile telephone GSM850 and GSM900 bands, receive path (RX)
- Impedance transformation from 50 Ω to 100 Ω for both filters
- Unbalanced to balanced operation for both filters
- Very low insertion attenuation
- Low amplitude ripple
- Usable passband:
  Filter 1 (GSM850): 25 MHz
  Filter 2 (GSM900): 35 MHz
- Suitable for GPRS class 1 to 12

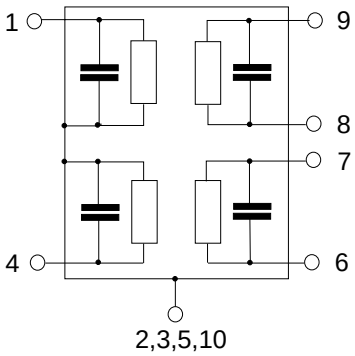
Features

- Package size 2.0 x1.6 x 0.68 mm^3
- Package code QCS10H
- RoHS compatible
- Approximate weight 0.008 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 [Filter 1]
- 4 Input [Filter 2]
- 6,7 Output, balanced [Filter 2]
- 8,9 Output, balanced [Filter 1]
- 2,3,5,10 To be grounded



Characteristics of Filter 1 (GSM850)

Temperature range for specification: T = –10 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 100 Ω

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	881.5	—	MHz
Maximum insertion attenuation	α_{max}				
869.0 ... 894.0 MHz		—	1.3	2.1[1]	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
869.0 ... 894.0 MHz		—	0.7	1.4	dB
Input VSWR					
869.0 ... 894.0 MHz		—	1.7	2.1	
Output VSWR					
869.0 ... 894.0 MHz		—	1.8	2.2	
Output amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
869.0 ... 894.0 MHz		–1.0	–0.5/0.5	1.0	dB
Output phase balance ($\phi(S_{31}) - \phi(S_{21})+180^\circ$)					
869.0 ... 894.0 MHz		–5	–2.0/2.0	5	°
Common mode suppression	S_{cs21}				
869.0 ... 894.0 MHz		20	27	—	dB
824.0 ... 995.0 MHz		20	25	—	dB
1648.0 ... 1990.0 MHz		20	40	—	dB
3296.0 ... 3980.0 MHz		20	33	—	dB
Inter band isolation	α				
925.0 ... 960.0 MHz		35	44	—	dB
Attenuation	α				
0.3 ... 480.0 MHz		45	54	—	dB
480.0 ... 824.0 MHz		30	35	—	dB
824.0 ... 849.0 MHz		23	35	—	dB
914.0 ... 1738.0 MHz		23	25	—	dB
1738.0 ... 2400.0 MHz		30	52	—	dB
2400.0 ... 2500.0 MHz		40	50	—	dB
2500.0 ... 6000.0 MHz		30	45	—	dB
6000.0 ... 12750.0[2] MHz		20	32	—	dB

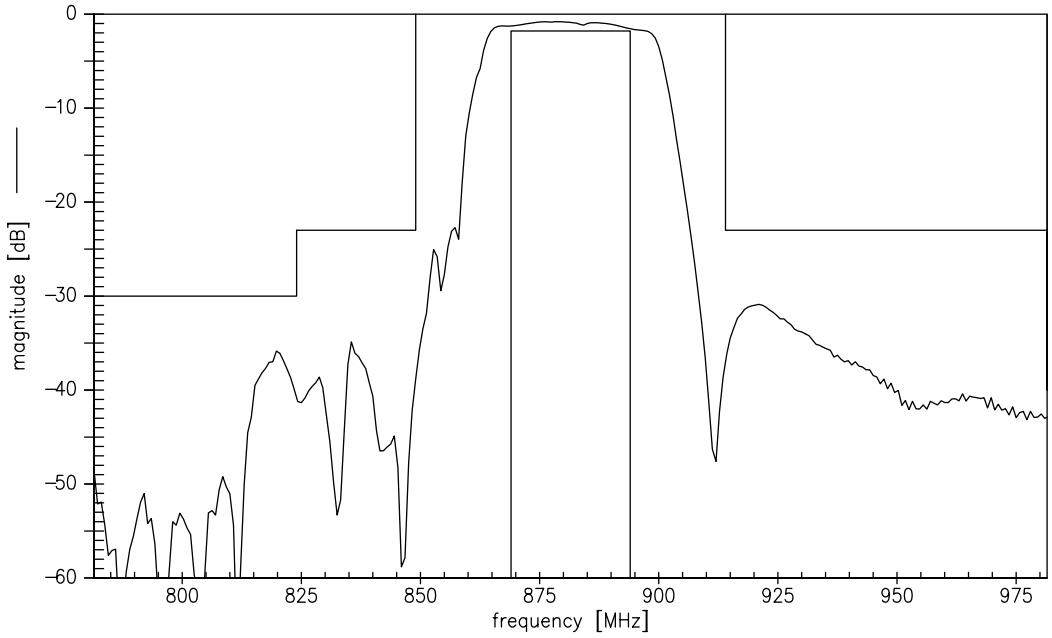
[1] 2.5 dB max at -30 ˚C ... -10 ˚C and 85 ˚C ... 95 ˚C
[2] values based on measurement data on PCB layout given in document “Test PWB and electrical verification methods”, dated 11.04.2005; they may vary with different PCB layout

Maximum ratings

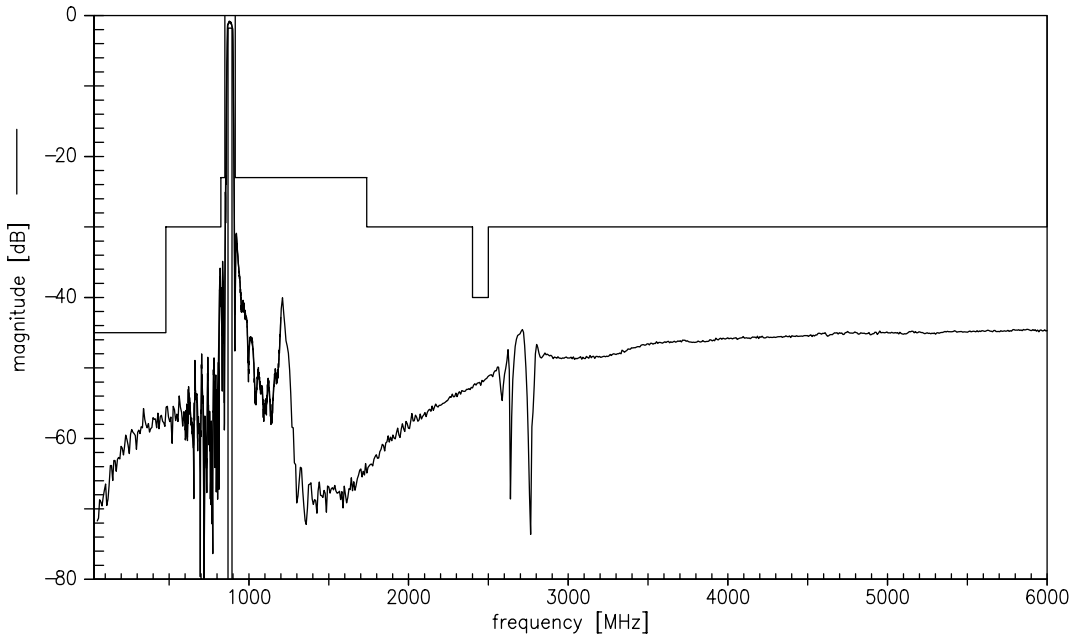
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 10 pulses
Input power at				
GSM850, GSM900	P_{IN}	15	dBm	peak power of GSM signal
GSM1800, GSM1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function

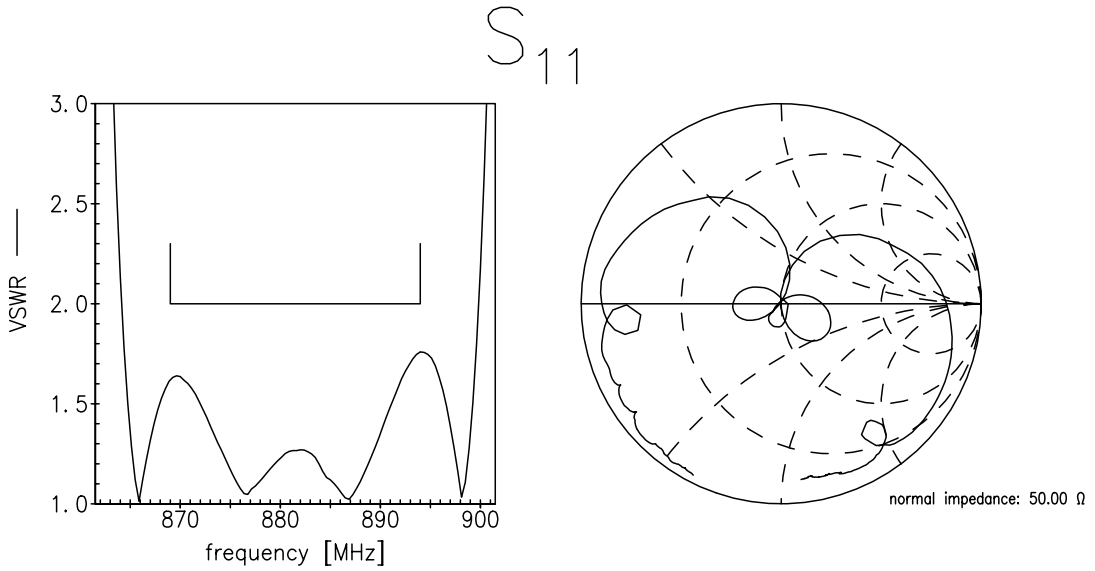


Transfer function (wideband)

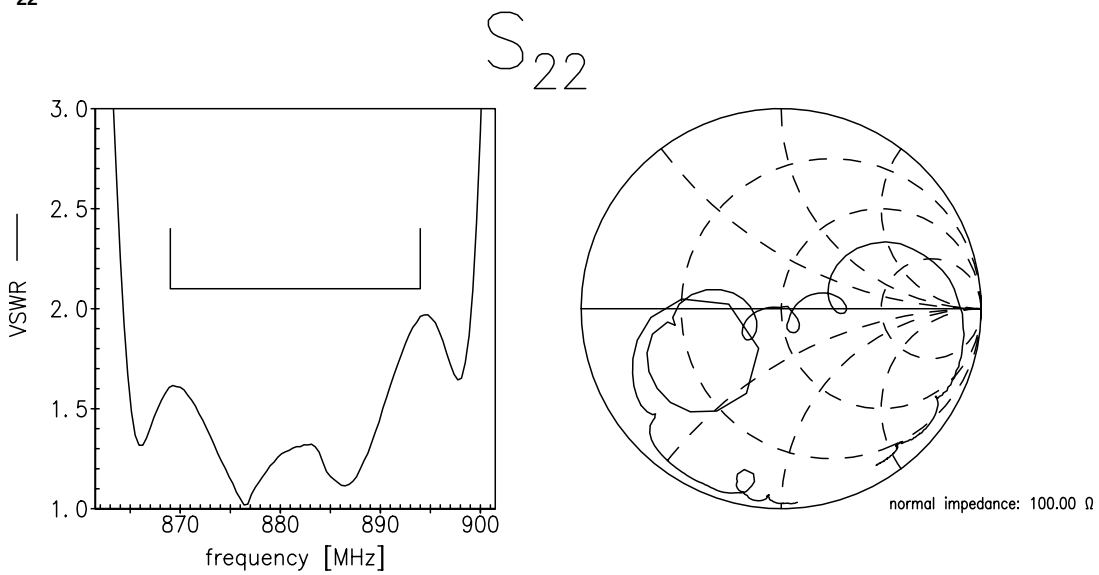


Smith charts

S_{11} function



S_{22} function



Characteristics of Filter 2 (GSM900)

Temperature range for specification: T = –10 ˚C to +85 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 100 Ω

		min.	typ. @ 25 ˚C	max.	
Center frequency	f_C	—	942.5	—	MHz
Maximum insertion attenuation	α_{max}				
925.0 ... 960.0 MHz		—	1.8	2.6[1)]	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
925.0 ... 960.0 MHz		—	1.1	1.7	dB
Input VSWR					
925.0 ... 960.0 MHz		—	1.9	2.3	
Output VSWR					
925.0 ... 960.0 MHz		—	2.0	2.4	
Output amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
925.0 ... 960.0 MHz		–1.2	–0.7/0.7	1.2	dB
Output phase balance ($\phi(S_{31}) - \phi(S_{21})+180^\circ$)					
925.0 ... 960.0 MHz		–5	–2.0/2.0	5	°
Common mode suppression	S_{cs21}				
925.0 ... 960.0 MHz		20	27	—	dB
824.0 ... 995.0 MHz		20	25	—	dB
1648.0 ... 1990.0 MHz		20	47	—	dB
3296.0 ... 3980.0 MHz		20	35	—	dB
Inter band isolation	α				
869.0 ... 894.0 MHz		35	40	—	dB
Attenuation	α				
0.3 ... 480.0 MHz		45	54	—	dB
480.0 ... 880.0 MHz		30	33	—	dB
880.0 ... 905.0 MHz		23	32	—	dB
905.0 ... 915.0 MHz		18	20	—	dB
980.0 ... 1850.0 MHz		23	30	—	dB
1850.0 ... 1920.0 MHz		30	47	—	dB
1920.0 ... 2400.0 MHz		25	45	—	dB
2400.0 ... 2500.0 MHz		40	45	—	dB
2500.0 ... 6000.0 MHz		30	40	—	dB
6000.0 ... 12750.0 MHz		20	26	—	dB

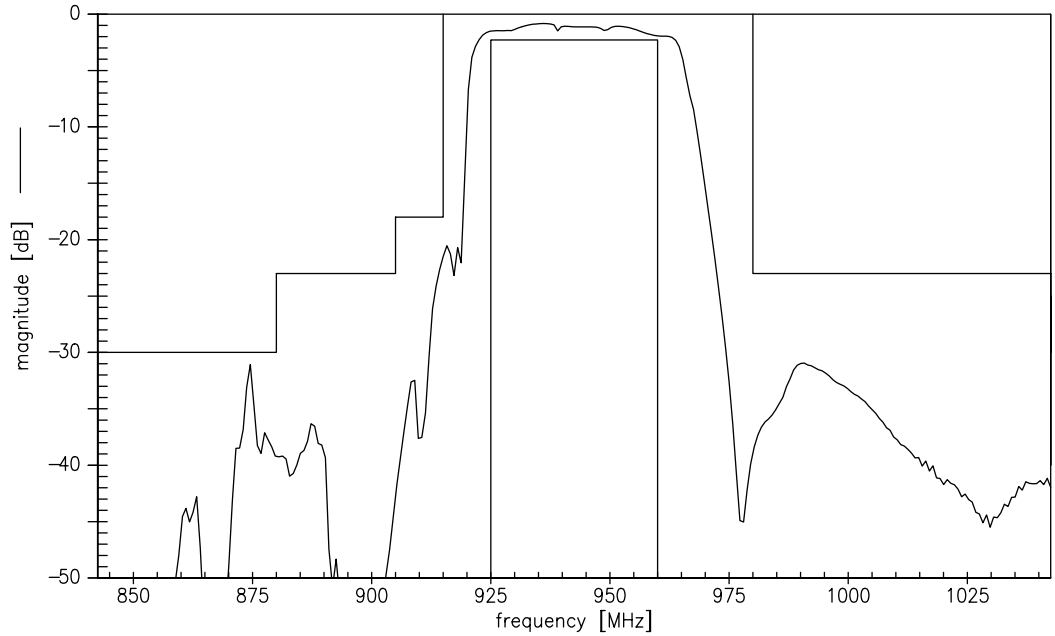
[1)] 3.3 dB max. at -30 ˚C ... -10 ˚C and 85 ˚C ... 95 ˚C

Maximum ratings

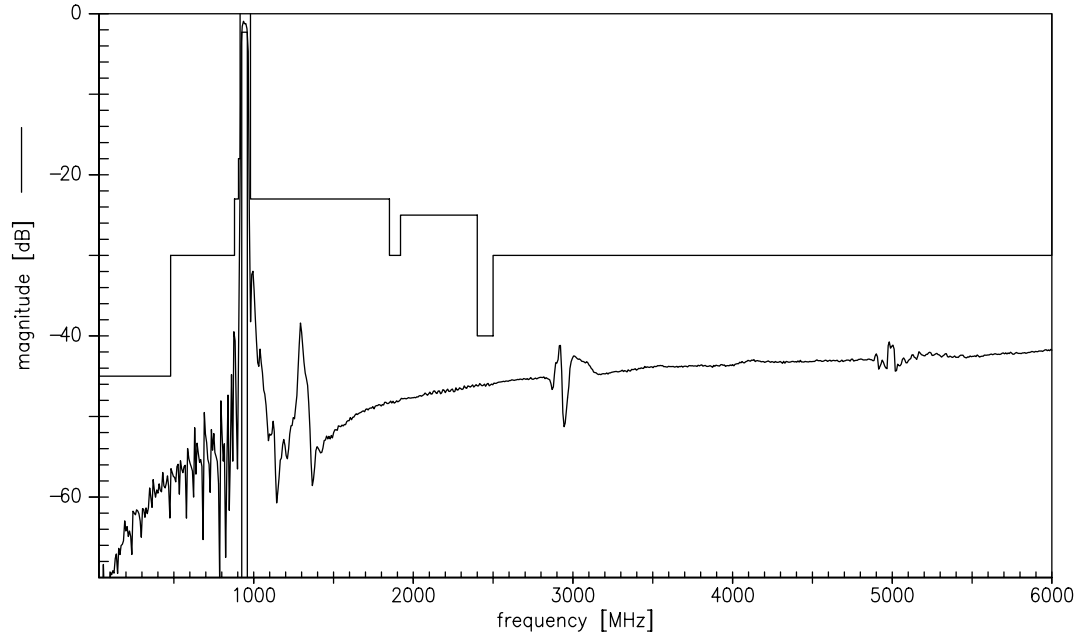
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 10 pulses
Input power at				
GSM850, GSM900	P_{IN}	15	dBm	peak power of GSM signal
GSM1800, GSM1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function

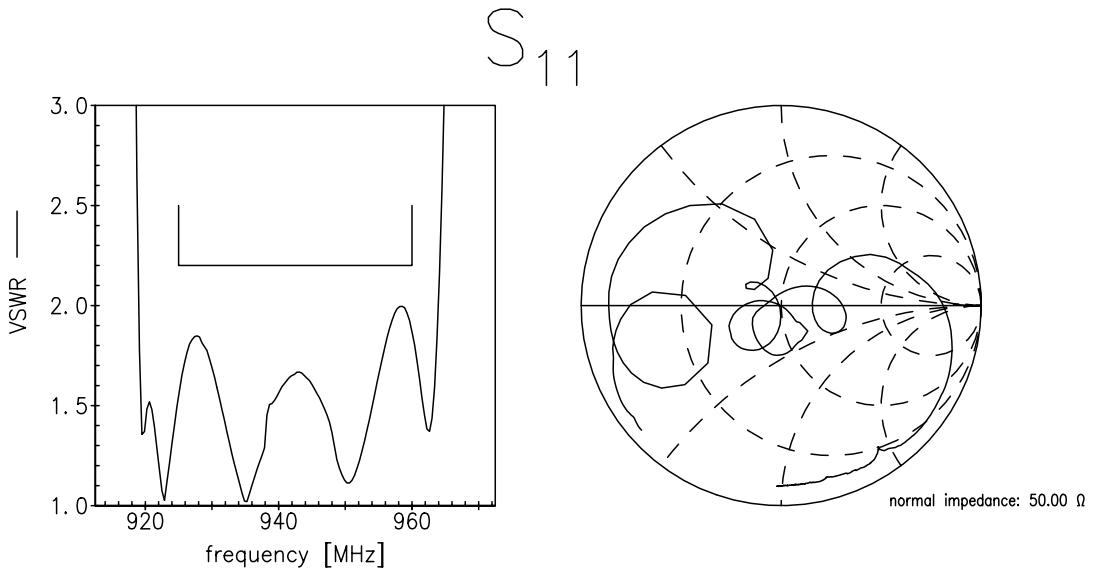


Transfer function (wideband)

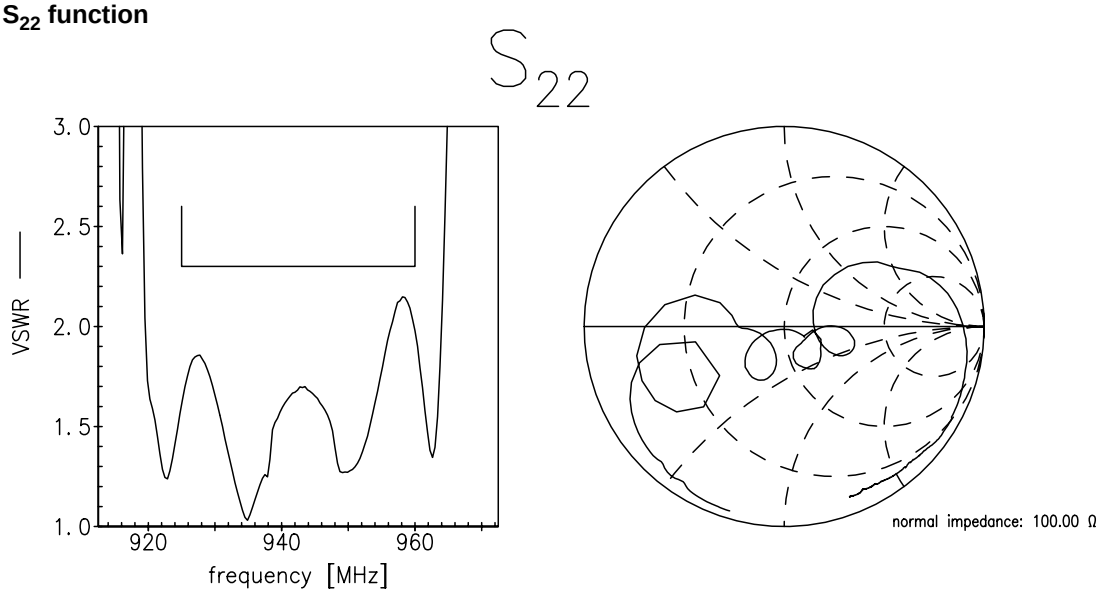


Smith charts

S_{11} function



S_{22} function



References

Type	B9304
Ordering code	B39941B9304G110
Marking and package	C61157-A7-A1
Packaging	F61074-V8252-Z000
Date codes	L_1126
S-parameters	B9304_LB_NB.s3p B9304_LB_WB.s3p B9304_UB_NB.s3p B9304_UB_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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