SAW Components

SAW Rx 2in1 filter

GSM 1800 / GSM 900

Series/type:	**B9810**
Ordering code:	**B39182B9810P810**
Date:	August 18, 2010
Version:	2.0

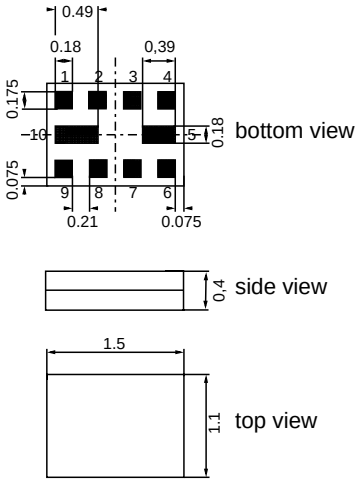
Data sheet SMD

Application

- Low-loss 2in1 RF filter for mobile telephone GSM 900 and GSM 1800 systems, receive path (Rx)
- Usable passband:
  Filter 1 (GSM 1800): 75 MHz
  Filter 2 (GSM 900): 35 MHz
- Unbalanced to balanced operation for all filters
- Impedance transformation from 50 Ω to 150 Ω for both filters
- Low amplitude ripple
- Suitable for GPRS class 1 to 12

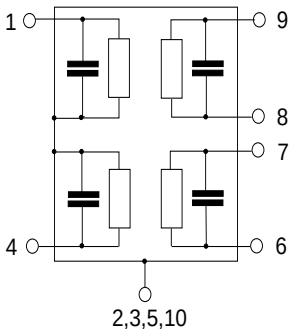
Features

- Package size 1.5 x1.1 x 0.4 mm³
- Approx. weight 0.003g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, gold-plated terminals
- RoHS compatible
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- **M**oisture **S**ensitive **L**evel 3



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	Case ground



Data sheet SMD

Characteristics of filter 1 (GSM 1800)

Temperature range for specification: T = -20 ˚C to +75 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 150 Ω || 15 nH (balanced)

		min.	typ. @25˚C	max.	
Center frequency	f_C	—	1842.5	—	MHz
Maximum insertion attenuation	α_{max}				
1805.0 ... 1880.0 MHz		—	1.4 [1]	2.4 [2]	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1805.0 ... 1880.0 MHz		—	0.7	1.5 [3]	dB
Input VSWR					
1805.0 ... 1880.0 MHz		—	1.7	2.0	
Output VSWR					
1805.0 ... 1880.0 MHz		—	1.7	2.0	
Output amplitude balance ($\lvert S_{31}/S_{21}\rvert$)					
1805.0 ... 1880.0 MHz		-1.2	+/-0.8	+1.2	dB
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)					
1805.0 ... 1880.0 MHz		-10	+/-6	+10	˚
Attenuation	α				
10.0 ... 940.0 MHz		45	50	—	dB
940.0 ... 1705.0 MHz		28	40	—	dB
1705.0 ... 1785.0 MHz		12 [4]	16	—	dB
1920.0 ... 1980.0 MHz		17 [5]	23	—	dB
1980.0 ... 2030.0 MHz		25	30	—	dB
2030.0 ... 2400.0 MHz		28	33	—	dB
2400.0 ... 2500.0 MHz		32	37	—	dB
2500.0 ... 2775.0 MHz		28	31	—	dB
2775.0 ... 2880.0 MHz		38	46	—	dB
2880.0 ... 3610.0 MHz		28	44	—	dB
3610.0 ... 3760.0 MHz		38	43	—	dB
3760.0 ... 5415.0 MHz		28	36	—	dB
5415.0 ... 5640.0 MHz		32	36	—	dB
5640.0 ... 6000.0 MHz		28	35	—	dB

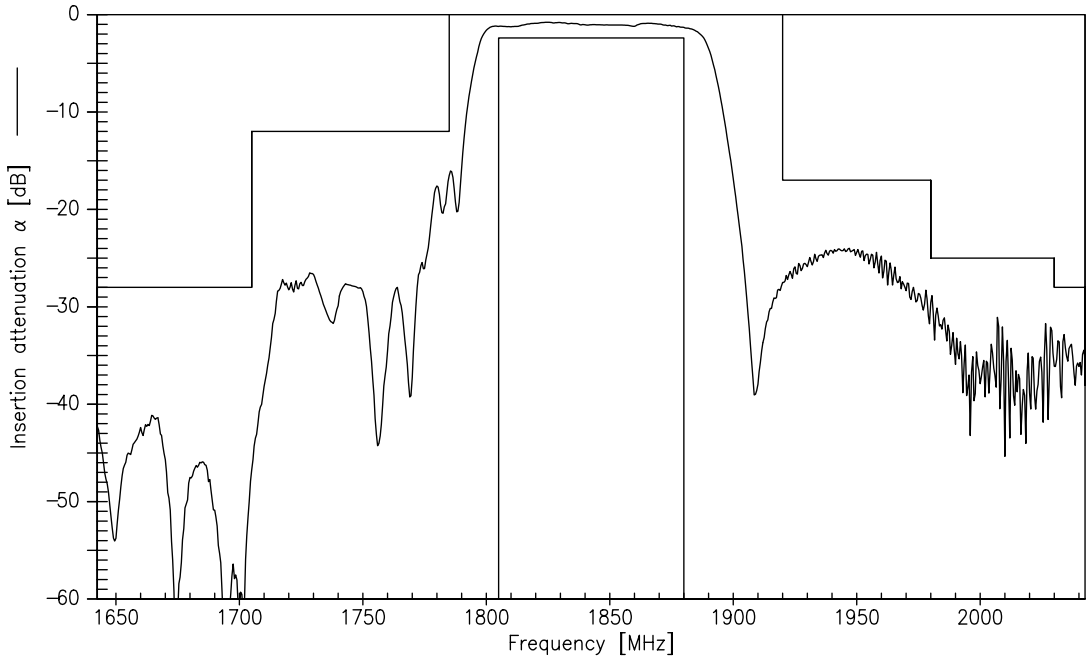
[1] Typical value excluding PCB losses of 0.24 dB.
[2] 2.0 dB at 25 ˚c
[3] 1.4 dB at 25 ˚c
[4] 14.0 dB at 25 ˚c
[5] 20.0 dB at 25 ˚c

Maximum ratings of filter 1

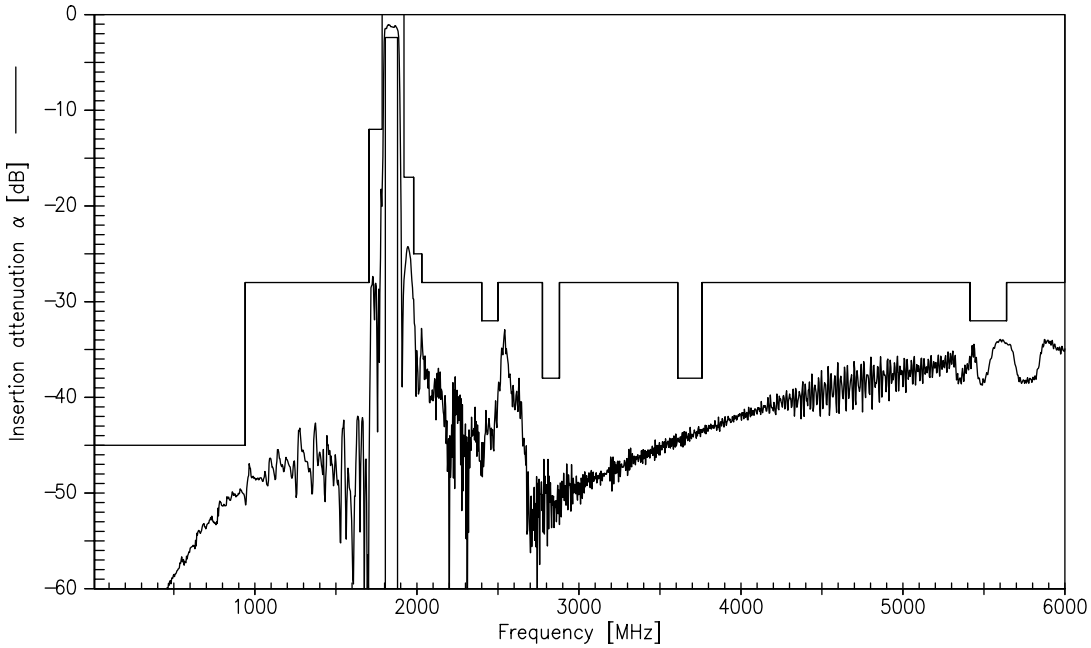
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	50[1)]	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function of filter 1 - narrowband

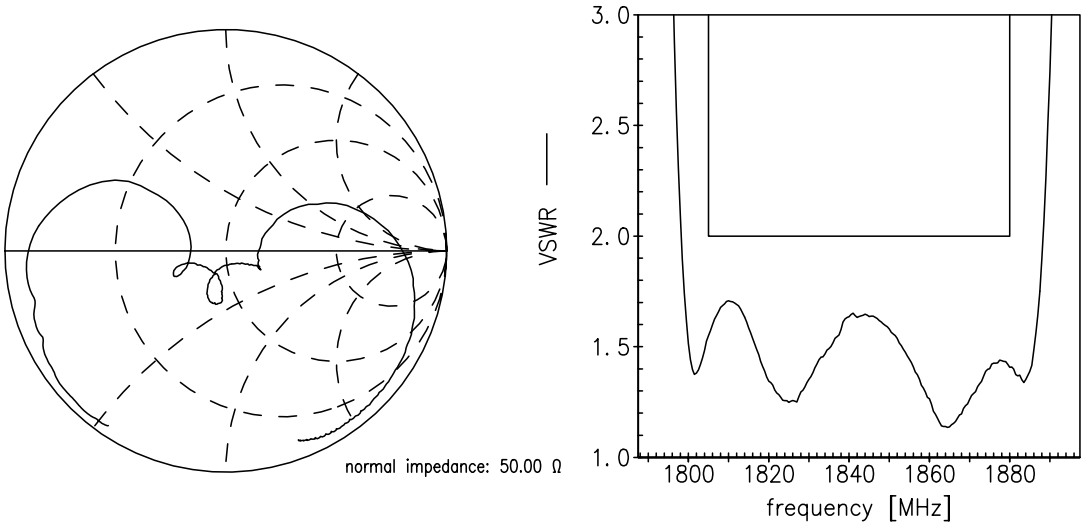


Transfer function of filter 1 - wideband

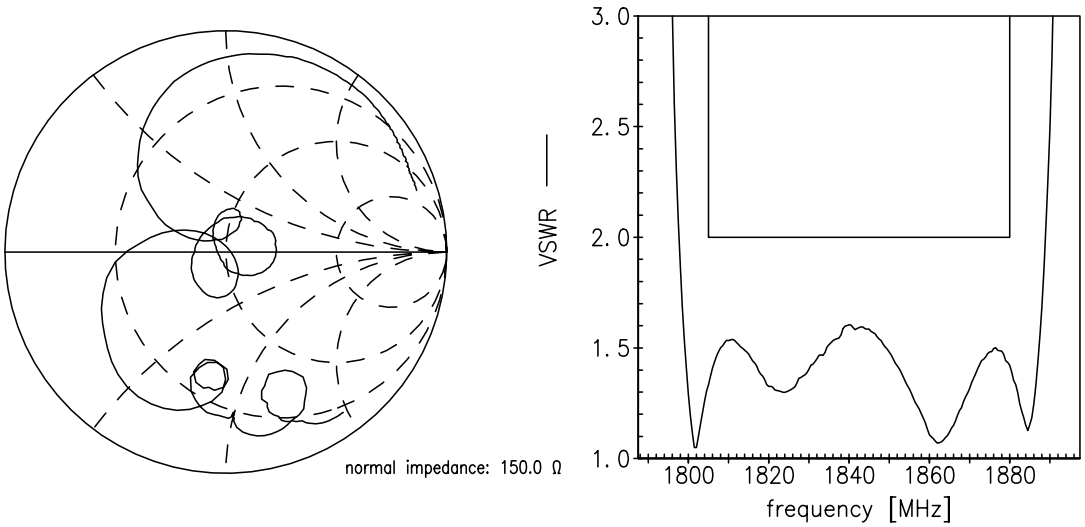


Smith Charts filter 1

S_{11} function



S_{22} function



Data sheet SMD

Characteristics of filter 2 (GSM 900)

Temperature range for specification: T = -20 ˚C to +75 ˚C
Terminating source impedance: Z_S = 50 Ω
Terminating load impedance: Z_L = 150 Ω || 72 nH (balanced)

		min.	typ. @25˚C	max.	
Center frequency	f_C	—	942.5	—	MHz
Maximum insertion attenuation	α_{max}				
925.0 ... 960.0 MHz		—	1.2 [1]	2.3 [2]	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
925.0 ... 960.0 MHz		—	0.5	1.5 [3]	dB
Input VSWR					
925.0 ... 960.0 MHz		—	1.6	2.0	
Output VSWR					
925.0 ... 960.0 MHz		—	1.6	2.0	
Output amplitude balance ($\|S_{31}/S_{21}\|$)					
925.0 ... 960.0 MHz		-1.2	+/-0.8	+1.2	dB
Output phase balance ($\phi(S_{31})-\phi(S_{21})+180^\circ$)					
925.0 ... 960.0 MHz		-10	+/-3	+10	°
Attenuation	α				
10.0 ... 480.0 MHz		45	55	—	dB
480.0 ... 900.0 MHz		30	34	—	dB
900.0 ... 905.0 MHz		27	31	—	dB
905.0 ... 915.0 MHz		20 [4]	30	—	dB
980.0 ... 1000.0 MHz		25	28	—	dB
1000.0 ... 1850.0 MHz		28	31	—	dB
1850.0 ... 1920.0 MHz		40	44	—	dB
1920.0 ... 3700.0 MHz		35	39	—	dB
3700.0 ... 6000.0 MHz		33	37	—	dB

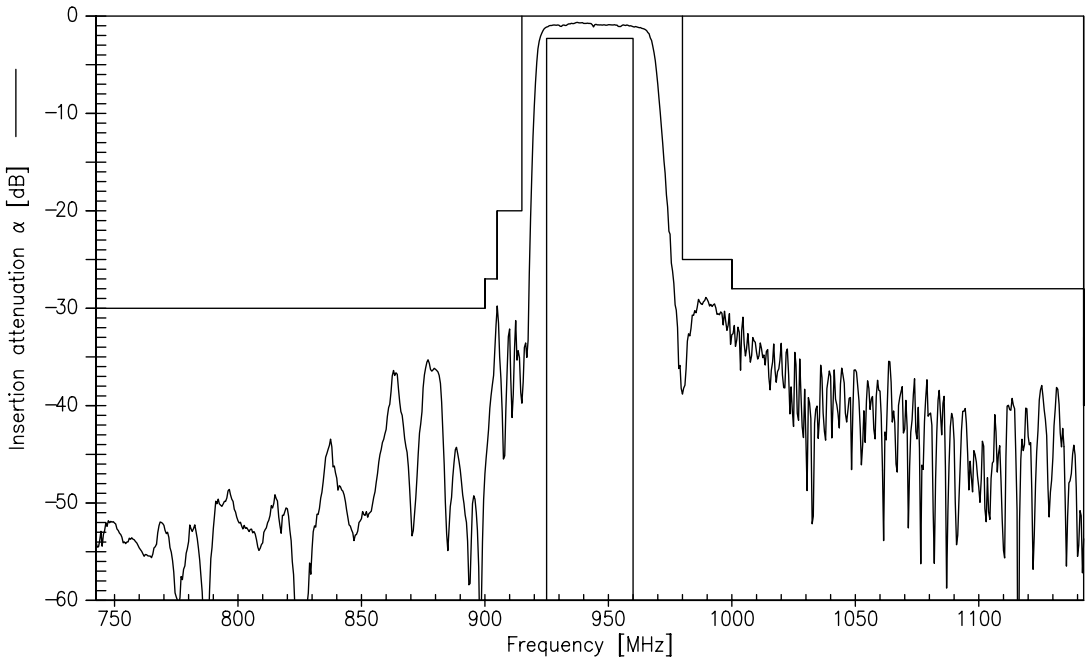
[1] Typical value excluding PCB losses.
[2] 1.9 dB at 25˚C
[3] 1.2 dB at 25˚C
[4] 23 dB at 25˚C

Maximum ratings of filter 2

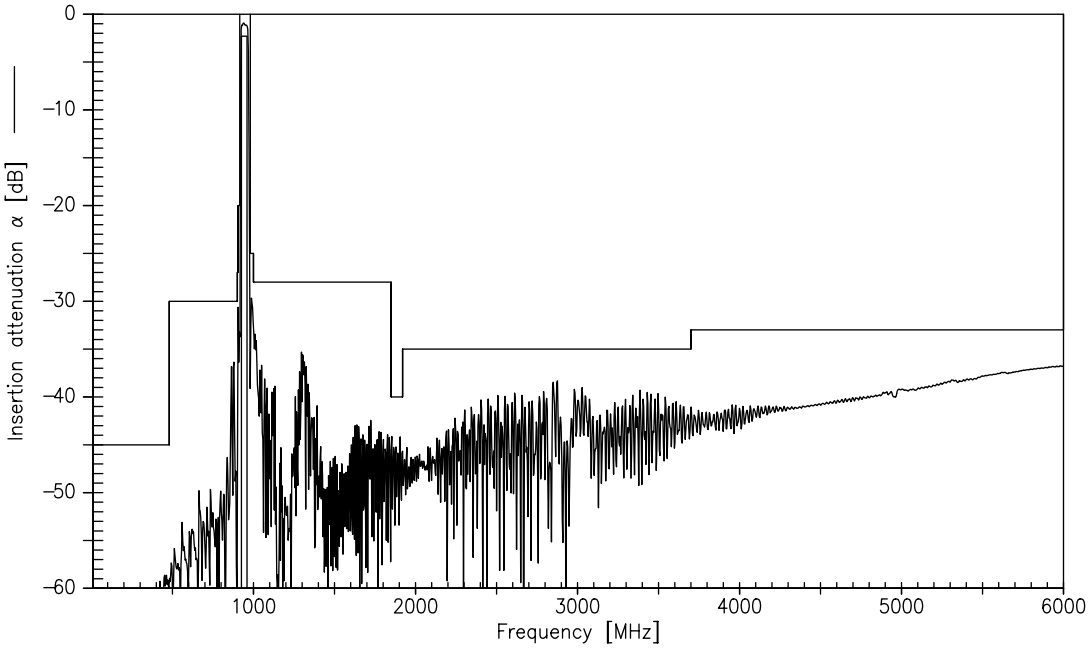
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	5	V	
ESD voltage	V_{ESD}	100[1)]	V	machine model, 1 pulse
Input power at				
GSM 850, GSM 900	P_{IN}	15	dBm	effective power in the on-state,
GSM 1800, GSM 1900	P_{IN}	15	dBm	duty cycle 4:8
Tx bands				

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

Transfer function of filter 2 - narrowband

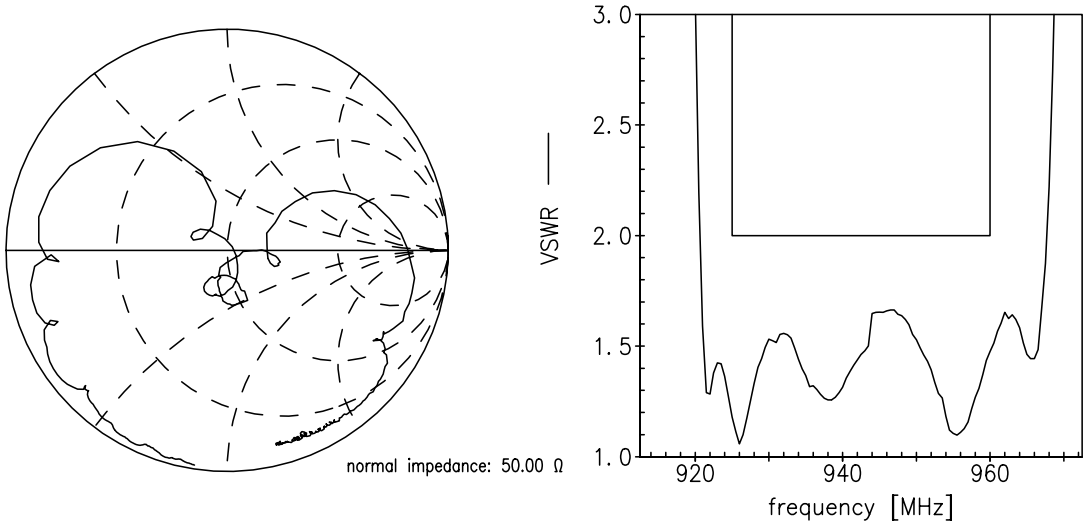


Transfer function of filter 2 - wideband

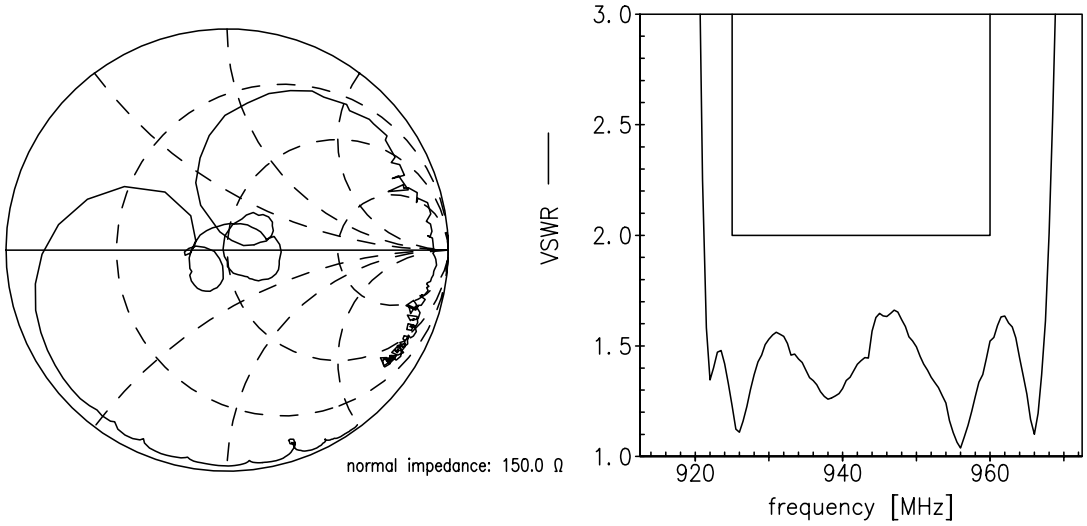


Smith Charts filter 2

S_{11} function



S_{22} function



References

Type	B9810
Ordering code	B39182B9810P810
Marking and package	C61157-A8-A18
Packaging	F61074-V8227-Z000
Date codes	L_1126
S-parameters	B9810_LB_NB.s3p, B9810_LB_WB.s3p B9810_UB_NB.s3p, B9810_UB_WB.s3p 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 http://www.tdk.co.jp/tefe02/coil.htm#aname1 http://www.tdk.co.jp/etvcl/index.htm for a large variety of matching coils.

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