SAW Components

GPS/GLONASS Extractor Filter

Automotive telematics

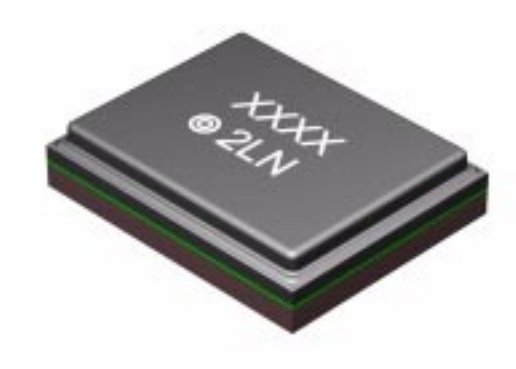
Series/type:	**B4340**
Ordering code:	**B39162B4340P810**
Date:	August 13, 2014
Version:	2.0

GPS/GLONASS Extractor Filter 832 / 1469.4 / 1575.42 / 1601.72 / 2200

Data sheet SMD

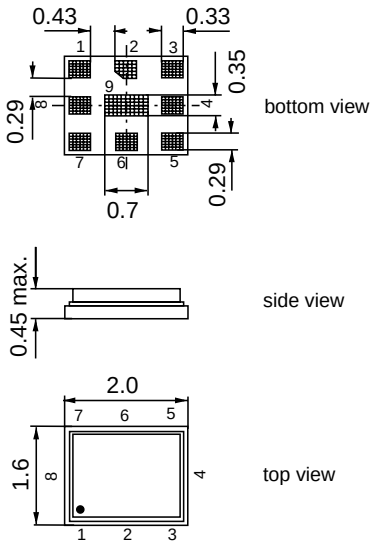
Application

- Low loss GPS/GLONASS Extractor
- Using common antenna for GPS/GLONASS and NON-GPS/GLONASS bands (Cellular, PCS, WCD-MA bands)
- Low insertion attenuation in GPS/GLONASS and NON-GPS/GLONASS bands
- Low amplitude ripple
- Low group delay ripple



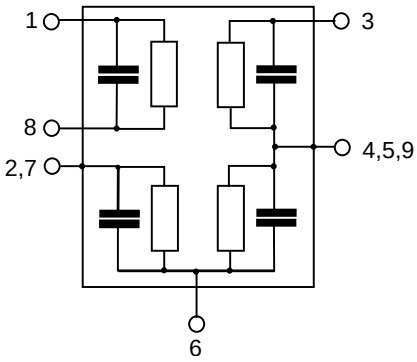
Features

- Package size 2.0 x 1.6 mm²
- Package height max. 0.45 mm
- RoHS compatible
- Approximate weight 0.005 g
- Package for **S**urface **M**ount **T**echnology (**SMT**)
- Ni, Au-plated terminals
- **E**lectrostatic **S**ensitive **D**evice (**ESD**)
- AEC-Q200 qualified component family (operable temperature range of –40 ˚C to +85 ˚C)



Pin configuration

- 6 ANT input
- 1 GPS/GLONASS output
- 3 NON-GPS/GLONASS output
- 2, 4, 5, 7, 8, 9 To be grounded



Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C

GPS/GLONASS terminating impedance: Z_{GPGL} = 50 Ω

ANT terminating impedance: Z_{ANT} = 50 Ω || 6.8nH

NON-GPS/GLONASS terminating impedance: Z_{NON} = 50 Ω + 3.3nH and || 1.3pF

Characteristics GPS/GLONASS		min.	typ. @ 25 ˚C	max.	
Maximum insertion attenuation	α_{max}				
1574.42 ... 1576.42 MHz		—	1.6	2.4	dB
1565.42 ... 1585.42 MHz		—	2.1	3.3	dB
1597.55 ... 1605.89 MHz		—	2.4	3.3	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1574.42 ... 1576.42 MHz		—	0.4	1.1	dB
1565.42 ... 1585.42 MHz		—	0.8	2.2	dB
1597.55 ... 1605.89 MHz		—	0.8	2.2	dB
Group delay ripple[1)] (p-p)	$\Delta\tau$				
1597.55 ... 1605.89 MHz		—	4	—	ns
VSWR (Antenna port)					
1574.42 ... 1576.42 MHz		—	1.7	2.0	
1565.42 ... 1585.42 MHz		—	1.5	2.0	
1597.55 ... 1605.89 MHz		—	1.5	2.0	
VSWR (GPS/GLONASS port)					
1574.42 ... 1576.42 MHz		—	1.5	2.0	
1565.42 ... 1585.42 MHz		—	1.4	2.0	
1597.55 ... 1605.89 MHz		—	1.4	2.0	
Attenuation ANT-GPS/GLONASS	α				
50.0 ... 824.0 MHz		31	34	—	dB
824.0 ... 960.0 MHz		33	36	—	dB
1427.9 ... 1510.9 MHz		35	41	—	dB
1710.0 ... 1995.0 MHz		35	39	—	dB
2110.0 ... 2170.0 MHz		35	40	—	dB
2400.0 ... 2500.0 MHz		35	40	—	dB
2500.0 ... 2690.0 MHz		35	40	—	dB

1) Measured with an aperture of 2 MHz

Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C

GPS/GLONASS terminating impedance: Z_{GPGL} = 50 Ω

ANT terminating impedance: Z_{ANT} = 50 Ω || 6.8nH

NON-GPS/GLONASS terminating impedance: Z_{NON} = 50 Ω + 3.3nH and || 1.3pF

Characteristics NON-GPS/GLONASS			min.	typ. @ 25 ˚C	max.	
Maximum insertion attenuation	α_{max}					
704.0 ... 824.0 MHz			—	1.0	1.6	dB
824.0 ... 960.0 MHz			—	0.9	1.3	dB
1427.9 ... 1462.9 MHz			—	0.9	1.2	dB
1475.9 ... 1510.9 MHz			—	1.0	1.3	dB
1710.0 ... 1995.0 MHz			—	1.4	1.8	dB
2110.0 ... 2170.0 MHz			—	1.4	1.8	dB
2400.0 ... 2483.5 MHz			—	1.0	1.4	dB
2500.0 ... 2690.0 MHz			—	0.9	1.2	dB
VSWR (Antenna port)						
704.0 ... 824.0 MHz			—	1.5	2.0	
824.0 ... 960.0 MHz			—	1.5	2.0	
1427.9 ... 1462.9 MHz			—	1.8	2.4	
1475.9 ... 1510.9 MHz			—	1.9	2.3	
1710.0 ... 1995.0 MHz			—	1.7	2.0	
2110.0 ... 2170.0 MHz			—	1.7	2.0	
2400.0 ... 2483.5 MHz			—	1.5	1.9	
2500.0 ... 2690.0 MHz			—	1.5	2.0	
VSWR (NON-GPS/GLONASS port)						
704.0 ... 824.0 MHz			—	1.7	2.0	
824.0 ... 960.0 MHz			—	1.7	2.0	
1427.9 ... 1462.9 MHz			—	1.7	2.4	
1475.9 ... 1510.9 MHz			—	1.8	2.3	
1710.0 ... 1995.0 MHz			—	1.8	2.1	
2110.0 ... 2170.0 MHz			—	1.8	2.1	
2400.0 ... 2483.5 MHz			—	1.5	1.9	
2500.0 ... 2690.0 MHz			—	1.5	2.0	

Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C

GPS/GLONASS terminating impedance: Z_{GPGL} = 50 Ω

ANT terminating impedance: Z_{ANT} = 50 Ω || 6.8nH

NON-GPS/GLONASS terminating impedance: Z_{NON} = 50 Ω + 3.3nH and || 1.3pF

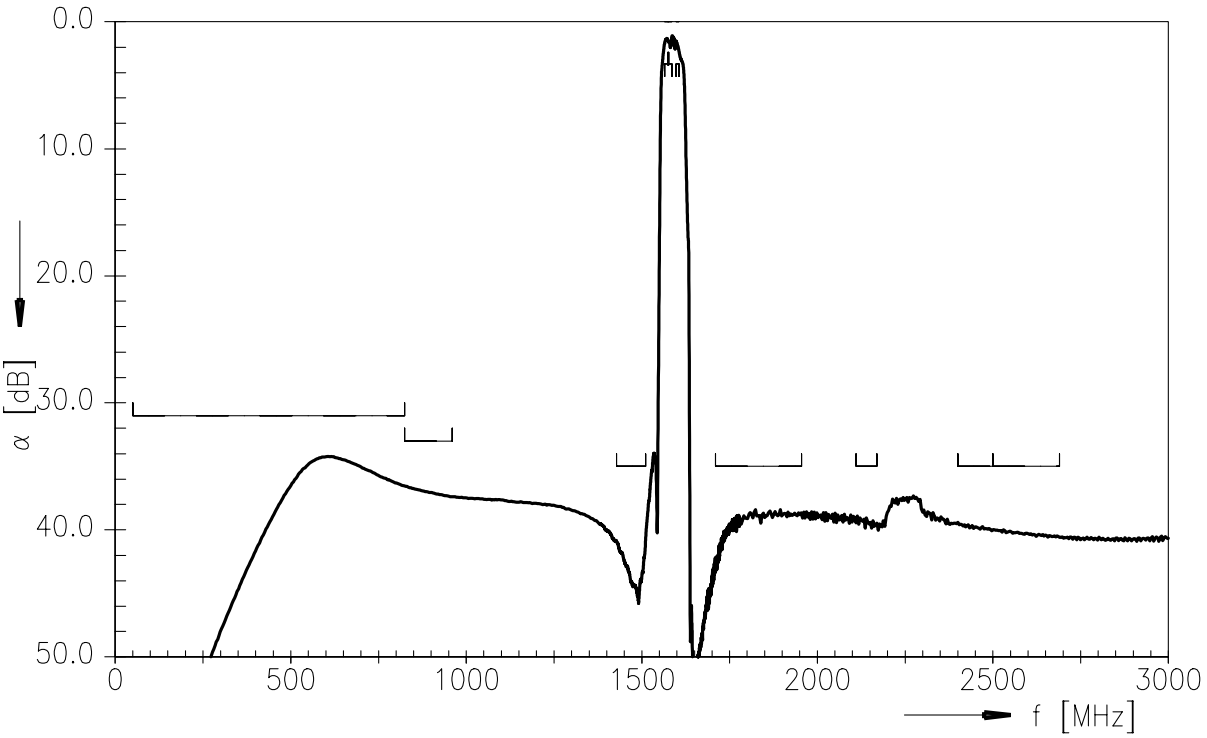
Isolation between NON and GPS/GLONASS			min.	typ. @ 25 ˚C	max.	
704.0	... 824.0	MHz	33	35	—	dB
824.0	... 960.0	MHz	33	36	—	dB
1427.9	... 1510.9	MHz	35	40	—	dB
1710.0	... 1995.0	MHz	35	40	—	dB
2110.0	... 2170.0	MHz	35	40	—	dB
2400.0	... 2483.5	MHz	35	40	—	dB
2500.0	... 2690.0	MHz	35	40	—	dB

Maximum rating

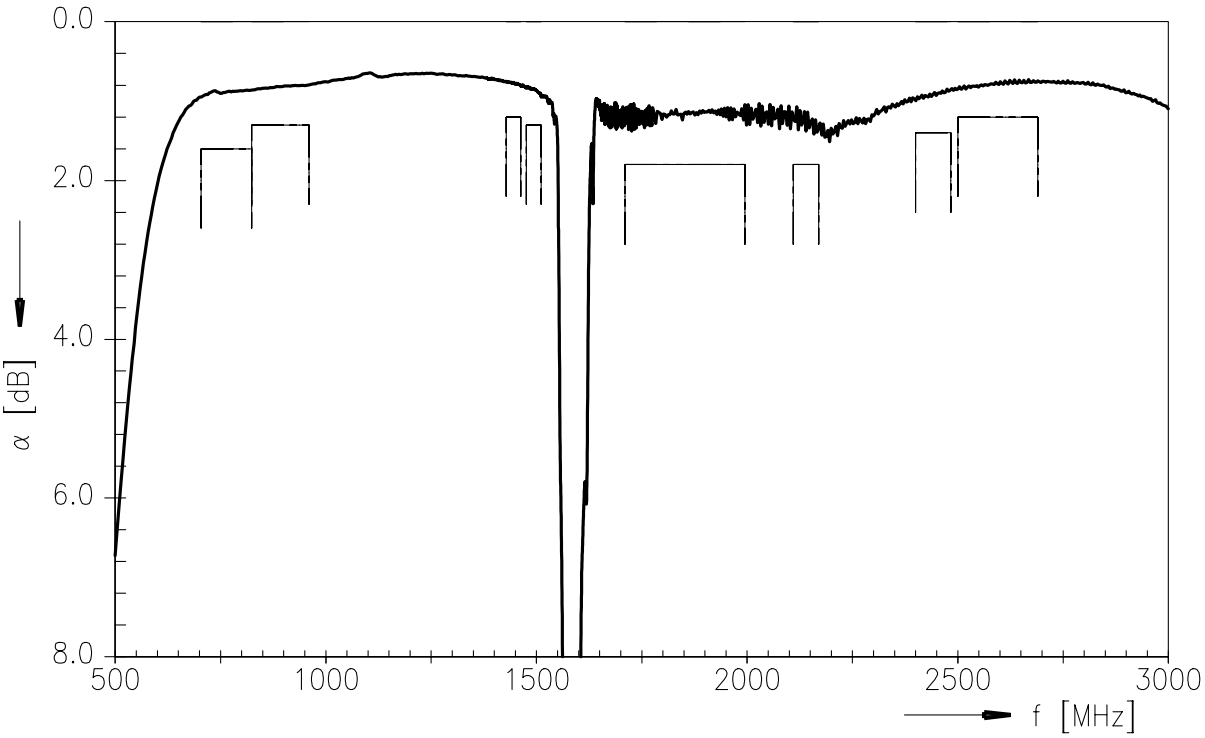
Operable temperature range	T	–40/+85	˚C	
Storage temperature range	T_{stg}	–40/+85	˚C	
DC voltage	V_{DC}	0	V	
Input power				
704.00 ... 915.00 MHz	P_{IN}	31	dBm	effective power in the on-state
1427.9 ... 1462.9 MHz	P_{IN}	31	dBm	effective power in the on-state
1710.0 ... 2690.0 MHz	P_{IN}	31	dBm	effective power in the on-state

ANT - GPS/GLONASS (transfer function passband)

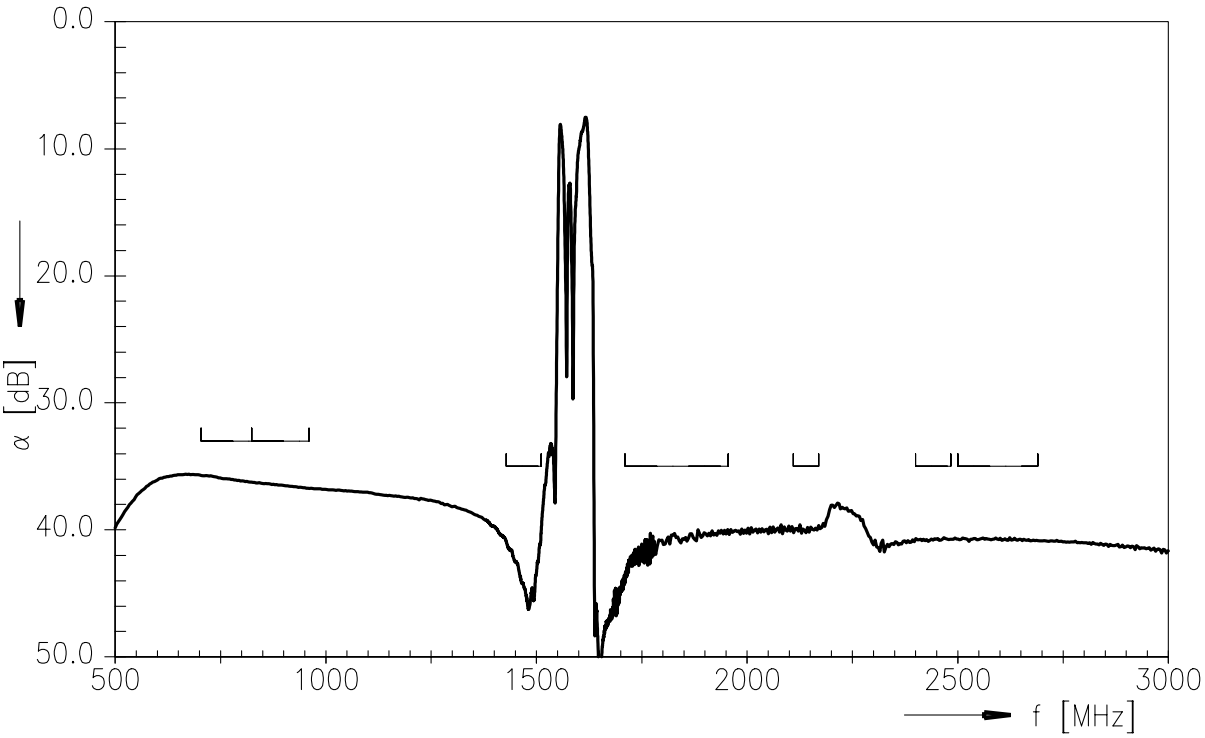
ANT - GPS/GLONASS (transfer function wideband)



ANT - NON (transfer function)

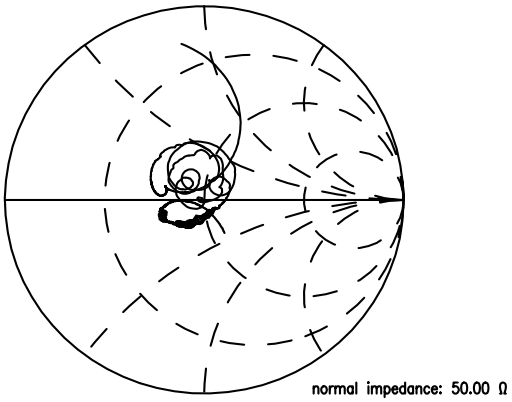


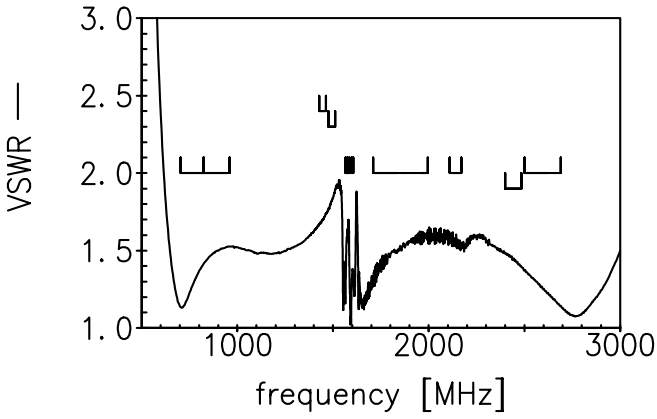
GPS - NON (isolation, transfer function)



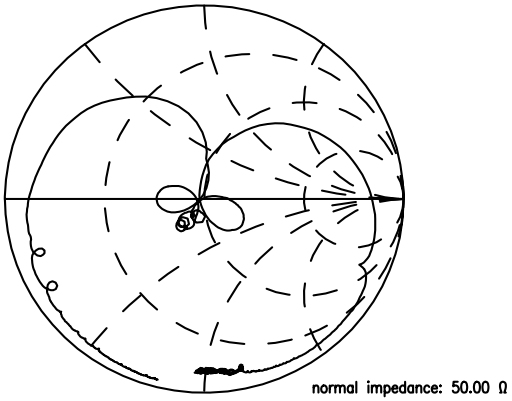
Smith chart

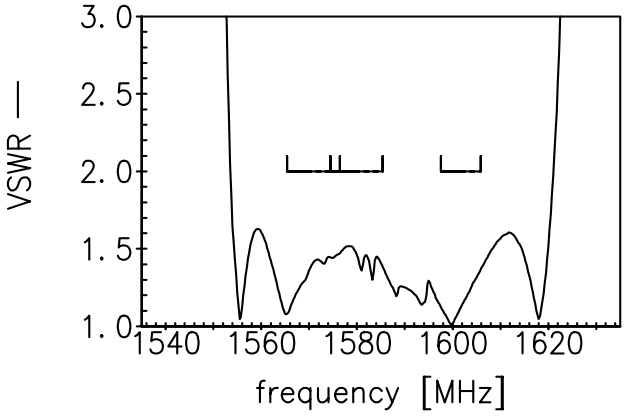
S_{11} ANT



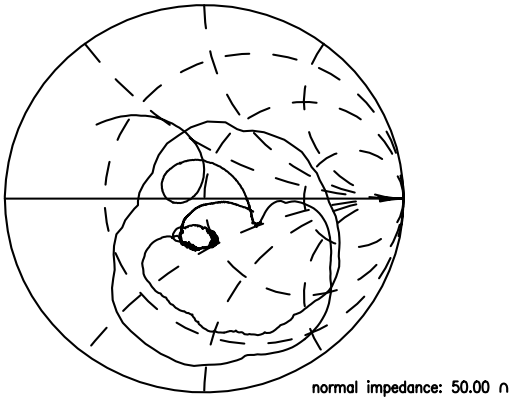


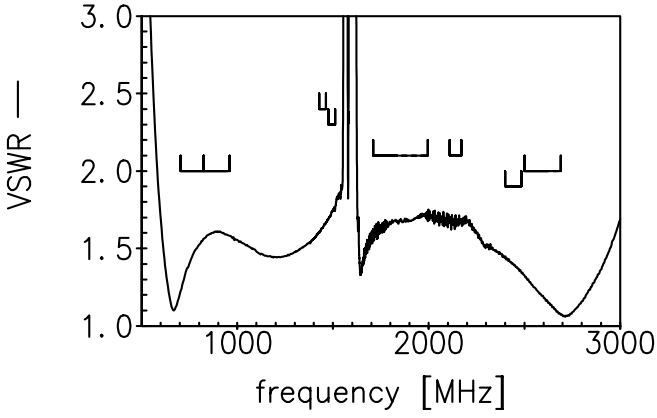
S_{22} GPS/GLONASS





S_{33} NON





ESD protection of SAW filters

SAW filters are **E**lectro **S**tatic **D**ischarge sensitive devices. To reduce the probability of damages caused by ESD, special matching topologies have to be applied.
In general, “ESD matching” has to be ensured at that filter port, where electrostatic discharge is expected.

Electrostatic discharges predominantly appear at the antenna input of RF receivers. Therefore only the input matching of the SAW filter has to be designed to short circuit or to block the ESD pulse.

Below three figures show recommended “ESD matching” topologies.

For wideband filters the high-pass ESD matching structure needs to be at least of 3rd order to ensure a proper matching for any impedance value of antenna and SAW filter input. The required component values have to be determined from case to case.

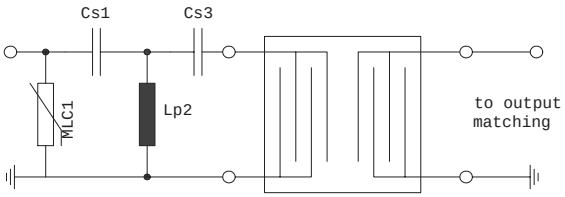


Fig. 1 MLC varistor plus ESD matching

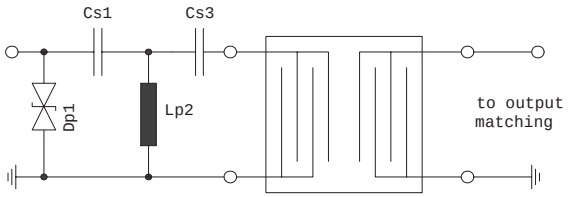


Fig. 2 Suppressor diode plus ESD matching

In cases where minor ESD occur, following simplified “ESD matching” topologies can be used alternatively.

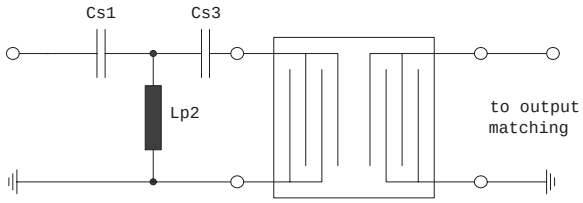


Fig. 3 3rd order high-pass structure for basic ESD protection

In all three figures the shunt inductor Lp2 could be replaced by a shorted microstrip with proper length and width. If this configuration is possible depends on the operating frequency and available pcb space.

Effectiveness of the applied ESD protection has to be checked according to relevant industry standards or customer specific requirements

For further information, please refer to EPCOS Application report:
“**ESD protection for SAW filters**”.
This report can be found under www.epcos.com/rke. Click on “Applications Notes”.

References

Type	B4340
Ordering code	B39162B4340P810
Marking and package	C61157-A8-A37
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B4340_NB_UN.s3p, B4340_WB_UN.s3p See file header for port/pin assignment.
Soldering profile	S_6001
RoHS compatible	RoHS-compatible means that products are compatible with the requirements according to Art. 4 (substance restrictions) of Directive 2011/65/EU of the European Parliament and of the Council of June 8th, 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("Directive") with due regard to the application of exemptions as per Annex III of the Directive in certain cases.
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