SAW Components

GPS/GLONASS Extractor

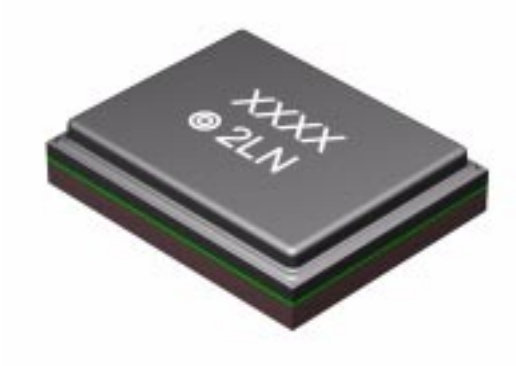
Automotive telematics

Series/type:	**B4322**
Ordering code:	**B39162B4322P810**
Date:	February 28, 2013
Version:	2.0

EPCOS AG is a TDK Group Company.

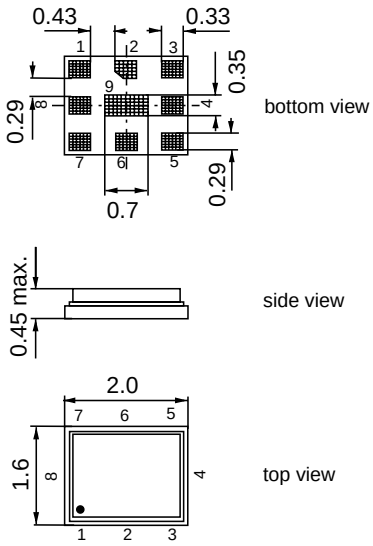
Application

- Low loss GPS/GLONASS Extractor for unbalanced to balanced GPS/GLONASS operation
- 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 groupdelay ripple



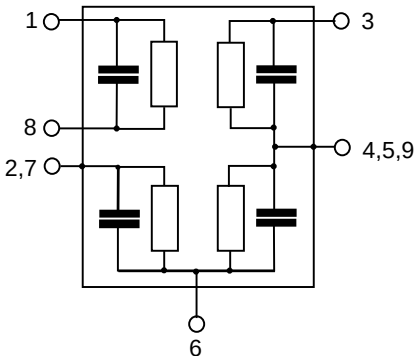
Features

- 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**)



Pin configuration

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



Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 8.2 nH and serial 1 nH
GPS/GLONASS terminating impedance: Z_{GNNS}= 100 Ω (balanced)

Characteristics GPS/GLONASS		min.	typ. @ 25 ˚C	max.	
Maximum insertion attenuation	α_{max}				
1574.42 ... 1576.42 MHz		—	1.6	2.0	dB
1597.55 ... 1605.89 MHz		—	1.8	2.6	dB
Amplitude ripple (p-p)	$\Delta\alpha$				
1574.42 ... 1576.42 MHz		—	0.2	0.8	dB
1597.55 ... 1605.89 MHz		—	0.6	1.5	dB
Group delay ripple[1)] (p-p)	$\Delta\tau$				
1597.55 ... 1605.89 MHz		—	9	12	ns
VSWR (Antenna port)					
1574.42 ... 1576.42 MHz		—	1.3	1.9	
1597.55 ... 1605.89 MHz		—	1.5	1.9	
VSWR (GPS/GLONASS port)					
1574.42 ... 1576.42 MHz		—	1.3	1.9	
1597.55 ... 1605.89 MHz		—	1.7	1.9	
Attenuation ANT-GPS/GLONASS	α				
50.0 ... 960.0 MHz		45	49	—	dB
1427.0 ... 1463.0 MHz		35	44	—	dB
1710.0 ... 1785.0 MHz		35	46	—	dB
1850.0 ... 1980.0 MHz		40	45	—	dB
2400.0 ... 2570.0 MHz		43	46	—	dB
Common mode suppression	S_{cs21}				
50.0 ... 960.0 MHz		42	49	—	dB
1427.0 ... 1463.0 MHz		35	45	—	dB
1710.0 ... 1785.0 MHz		35	43	—	dB
1850.0 ... 1980.0 MHz		40	44	—	dB
2400.0 ... 2570.0 MHz		40	47	—	dB
CMRR ($\lvert S_{21}-S_{31}\rvert$ / $\lvert S_{21}+S_{31}\rvert$)					
1574.42 ... 1576.42 MHz		18	29	—	dB
1597.55 ... 1605.89 MHz		18	26	—	dB

[1)] Measured with an aperture of 0.5 MHz

Characteristics

Temperature range for specification: T = –40 ˚C to +85 ˚C
ANT terminating impedance: Z_{ANT}= 50 Ω || 8.2 nH and serial 1 nH
NON-GPS/GLONASS terminating imp.: Z_{NON}= 50 Ω || 12 nH and serial 2.1 nH

Characteristics NON-GPS/GLONASS		min.	typ. @ 25 ˚C	max.	
Maximum insertion attenuation	α_{max}				
729.0 ... 824.0 MHz		—	0.9	1.3	dB
824.0 ... 960.0 MHz		—	0.9	1.2	dB
1805.0 ... 1910.0 MHz		—	1.5	1.7	dB
2110.0 ... 2170.0 MHz		—	1.5	1.8	dB
2620.0 ... 2690.0 MHz		—	1.3	1.5	dB
VSWR (Antenna port)					
729.0 ... 824.0 MHz		—	1.3	2.0	
824.0 ... 960.0 MHz		—	1.6	2.0	
1805.0 ... 1910.0 MHz		—	1.6	2.0	
2110.0 ... 2170.0 MHz		—	1.5	2.0	
2620.0 ... 2690.0 MHz		—	1.9	2.0	
VSWR (NON-GPS/GLONASS port)					
729.0 ... 824.0 MHz		—	1.3	2.0	
824.0 ... 960.0 MHz		—	1.6	2.0	
1805.0 ... 1910.0 MHz		—	1.7	2.0	
2110.0 ... 2170.0 MHz		—	1.5	2.0	
2620.0 ... 2690.0 MHz		—	1.7	2.0	
Isolation between NON and GPS/GLONASS	α				
50.0 ... 960.0 MHz		44	47	—	dB
1427.0 ... 1463.0 MHz		35	40	—	dB
1710.0 ... 1785.0 MHz		35	45	—	dB
1850.0 ... 1980.0 MHz		38	42	—	dB
2400.0 ... 2570.0 MHz		36	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				
699 ... 915 MHz	P_{IN}	33.0	dBm	duty cycle 1:8
1427.9 ... 1453 MHz	P_{IN}	23.0	dBm	cw
1710 ... 1980 MHz	P_{IN}	33.0	dBm	cw
2110 ... 2690 MHz	P_{IN}	33.0	dBm	cw

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.

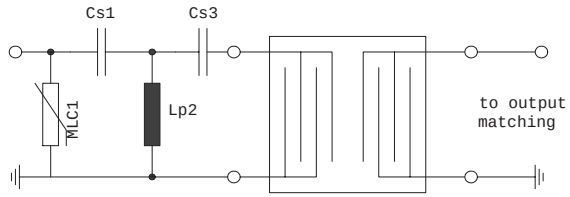


Fig. 1 MLC varistor plus ESD matching

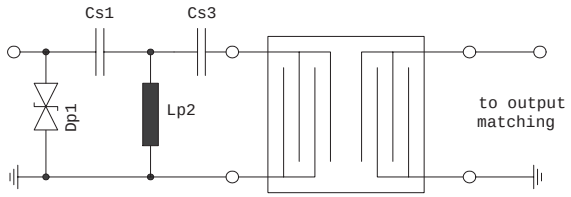


Fig. 2 Suppressor diode plus ESD matching

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

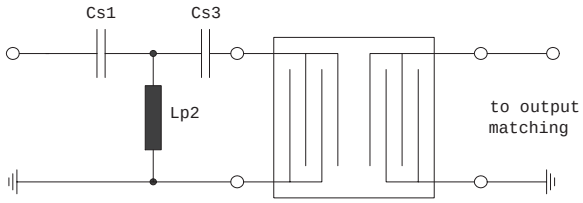


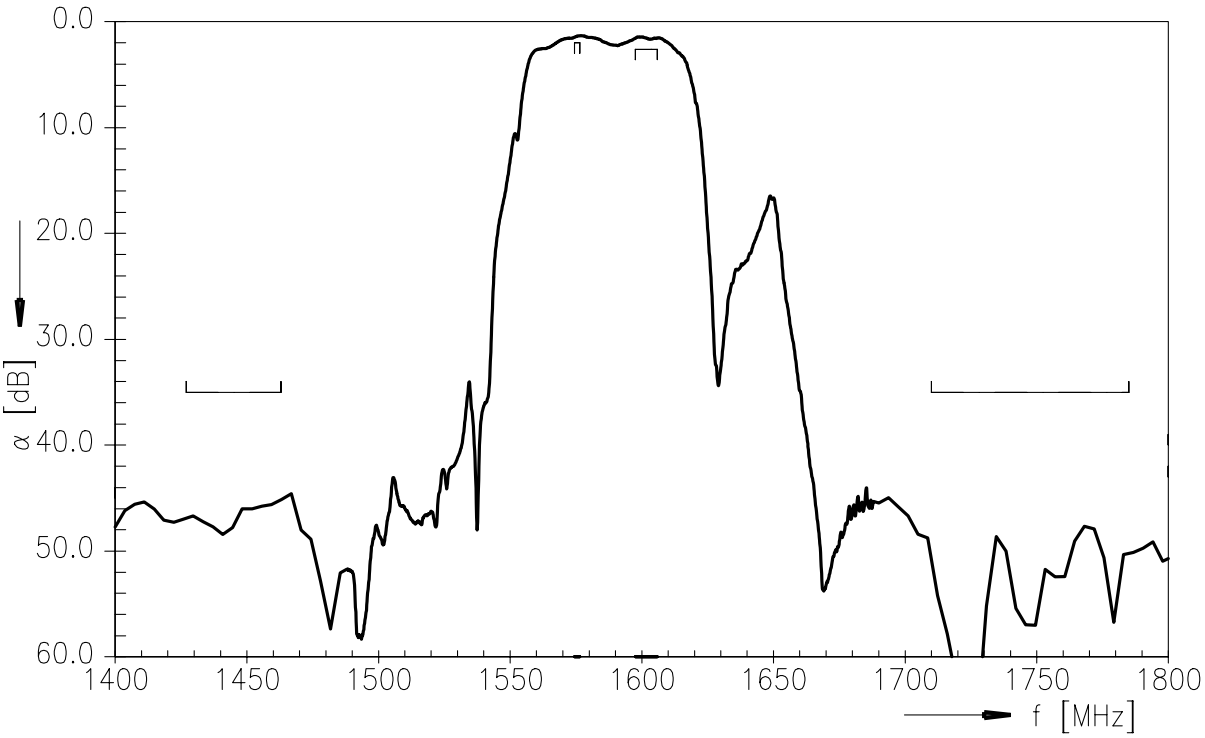
Fig. 3 3rd order high-pass structure for basic ESD protection

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.

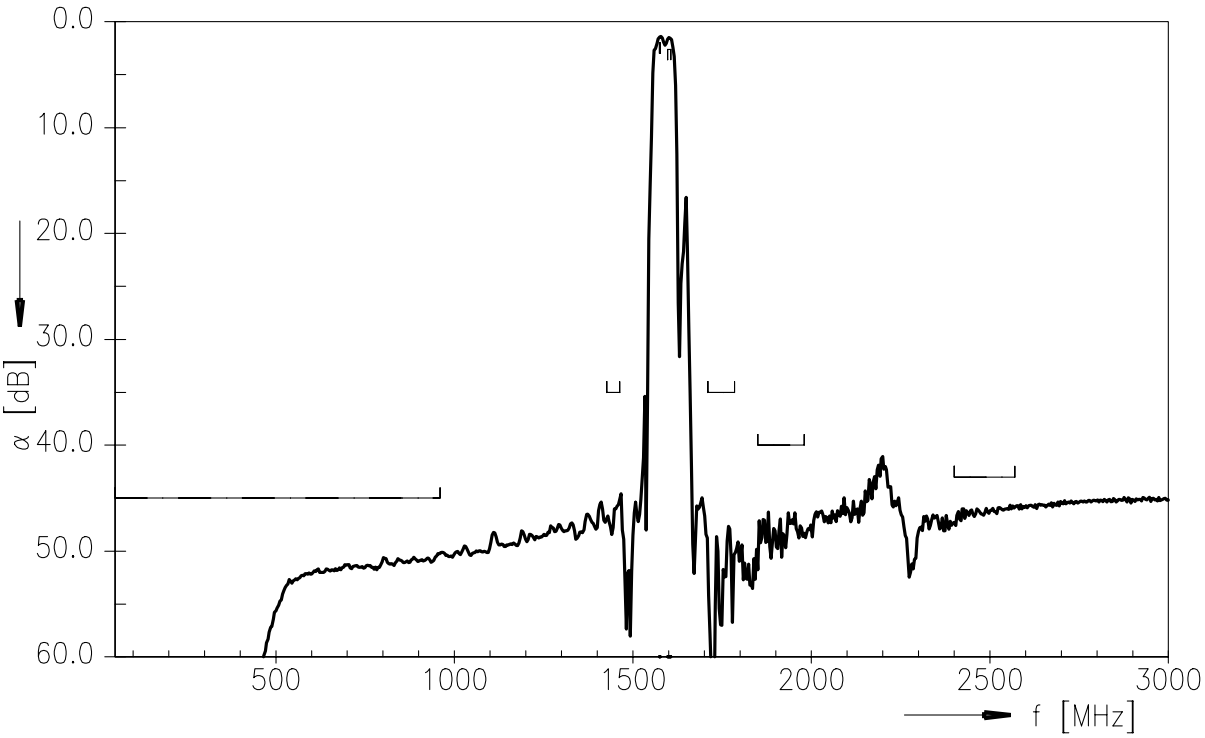
Effectiveness of the applied ESD protection has to be checked according to relevant industry standards or customer specific requirements

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”.

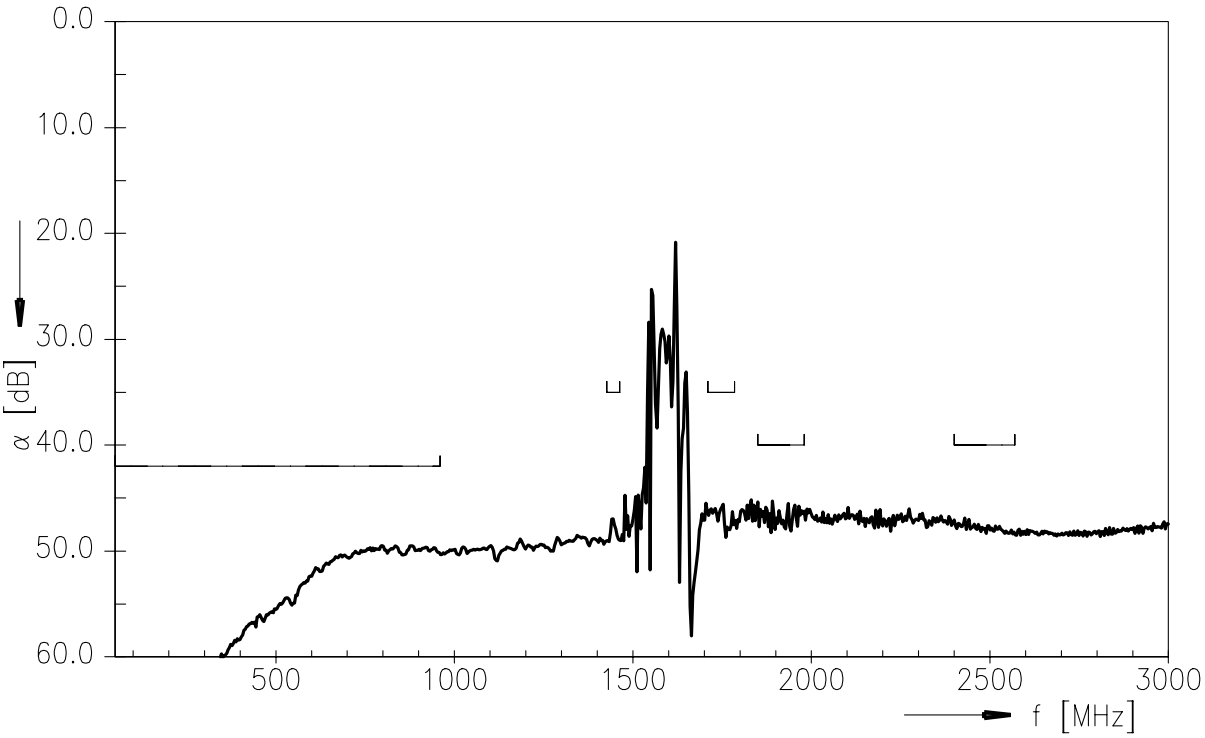
Transfer function ANT - GPS/GLONASS (narrow band, differential mode, S_{ds21})



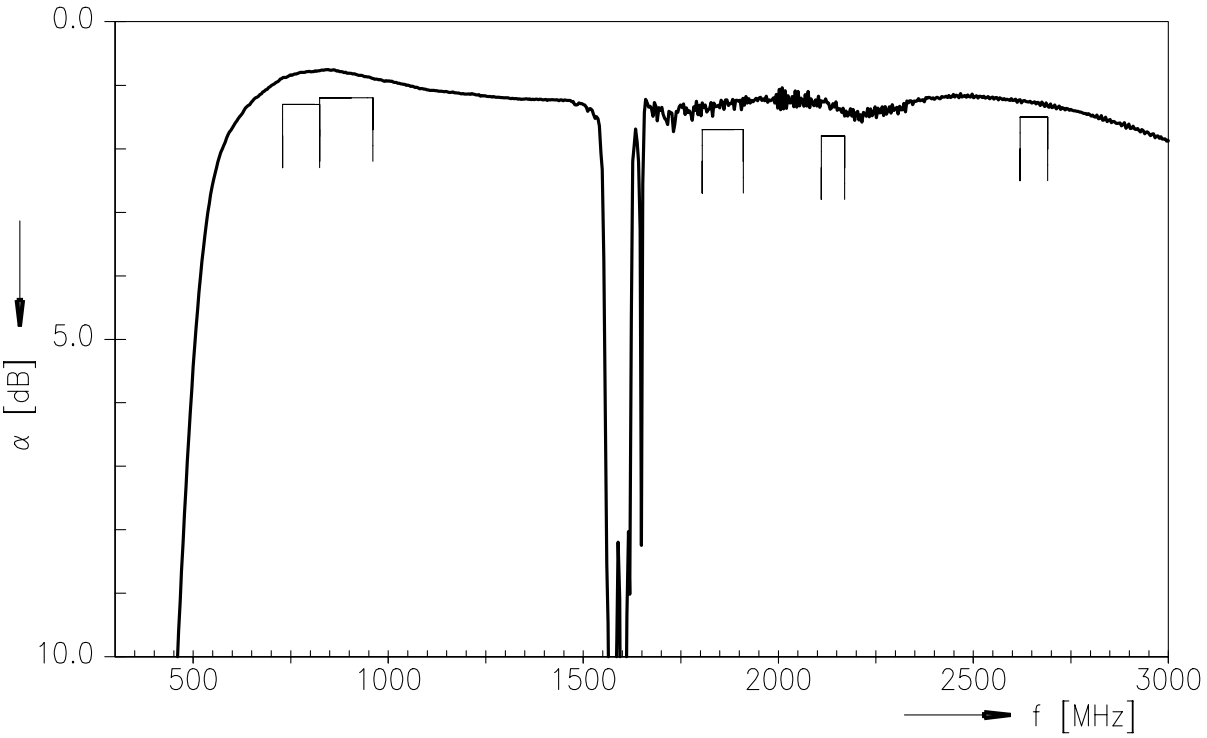
Transfer function ANT - GPS/GLONASS (wideband, differential mode, S_{ds21})



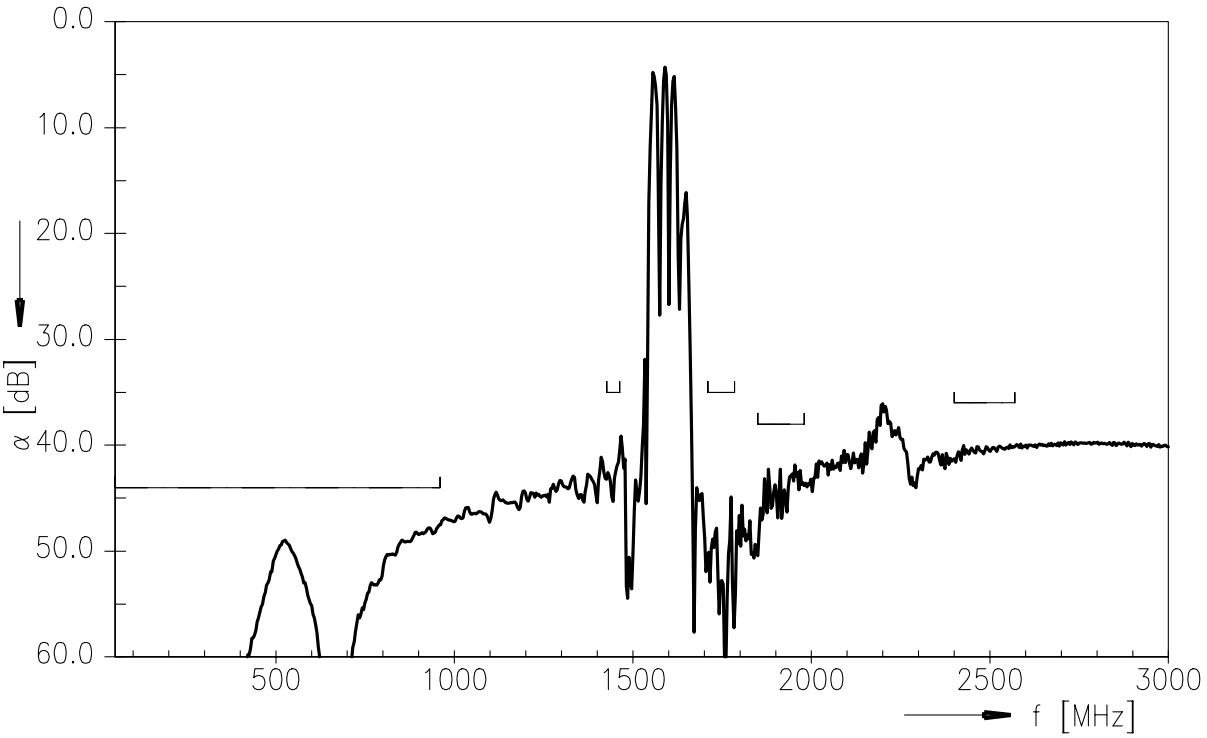
Transfer function ANT - GPS/GLONASS (wideband, common mode, S_{cs21})



Transfer function ANT - NON (S41)



Transfer function GPS/GLONASS - NON (isolation, differential mode S_{ds42})



References

Type	B4322
Ordering code	B39162B4322P810
Marking and package	C61157-A8-A37
Packaging	F61074-V8247-Z000
Date codes	L_1126
S-parameters	B4322_NB_UN.s4p, B4322_WB_UN.s4p see file header for port/pin assignment table
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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