



**RF360
Europe GmbH**

SAW components

SAW diplexer

Automotive telematics
TD-SCDMA bands 34 & 39

Series/type: B4384
Ordering code: B39202B4384P810

Date: March 07, 2016
Version: 2.0

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Data sheet

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Data sheet

1 Application

- Low-loss 2in1 RF filter for TD-SCDMA band 34 and TD-SCDMA band 39 systems
- TD-SCDMA B34: 15MHz
- TD-SCDMA B39: 40MHz
- Low amplitude ripple

2 Features

- Package size $1.5 \pm 0.1 \text{ mm} \times 1.1 \pm 0.1 \text{ mm}$
- Package height 0.45 mm (max.)
- Package code QCS10W
- Approximate weight 3 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Filter surface passivated
- AEC-Q200 qualified component family (operable temperature range -40°C to $+85^\circ\text{C}$)
- Electrostatic Sensitive Device (ESD)

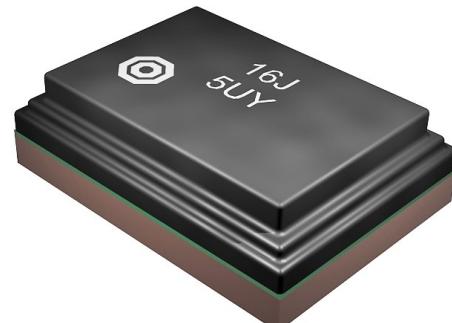
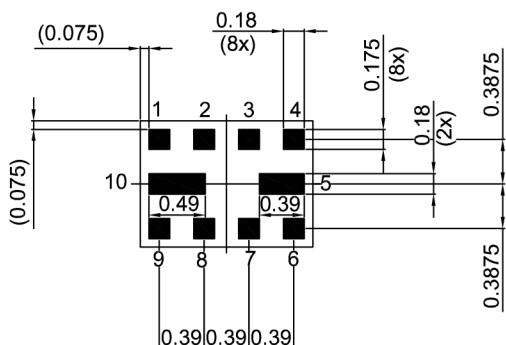


Figure 1: Picture of component with example of product marking.

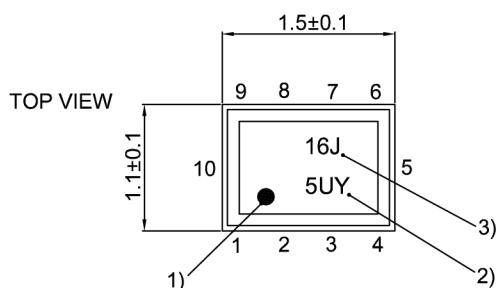
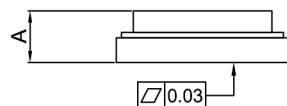
Data sheet

3 Package

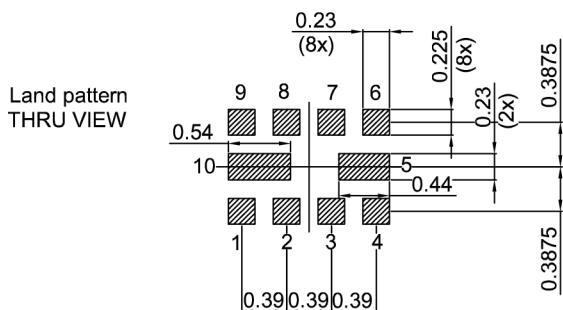
BOTTOM VIEW

Pad and pitch tolerance ± 0.05

SIDE VIEW



- 1) Marking for pad number 1
- 2) Example of encoded lot number
- 3) Example of encoded filter type number



Landing pad tolerance -0.02

Figure 2: Drawing of package with package height A = 0.45 mm (max.). See Simplified drawings (p. 18).

4 Pin configuration

- 1 Input (B34 & B39)
- 6 Output (B34)
- 9 Output (B39)
- 2, 3, 4, 5, 7, 8, 10 Ground

Data sheet

5 Matching circuit

■ $L_{p1} = 4.6 \text{ nH}$

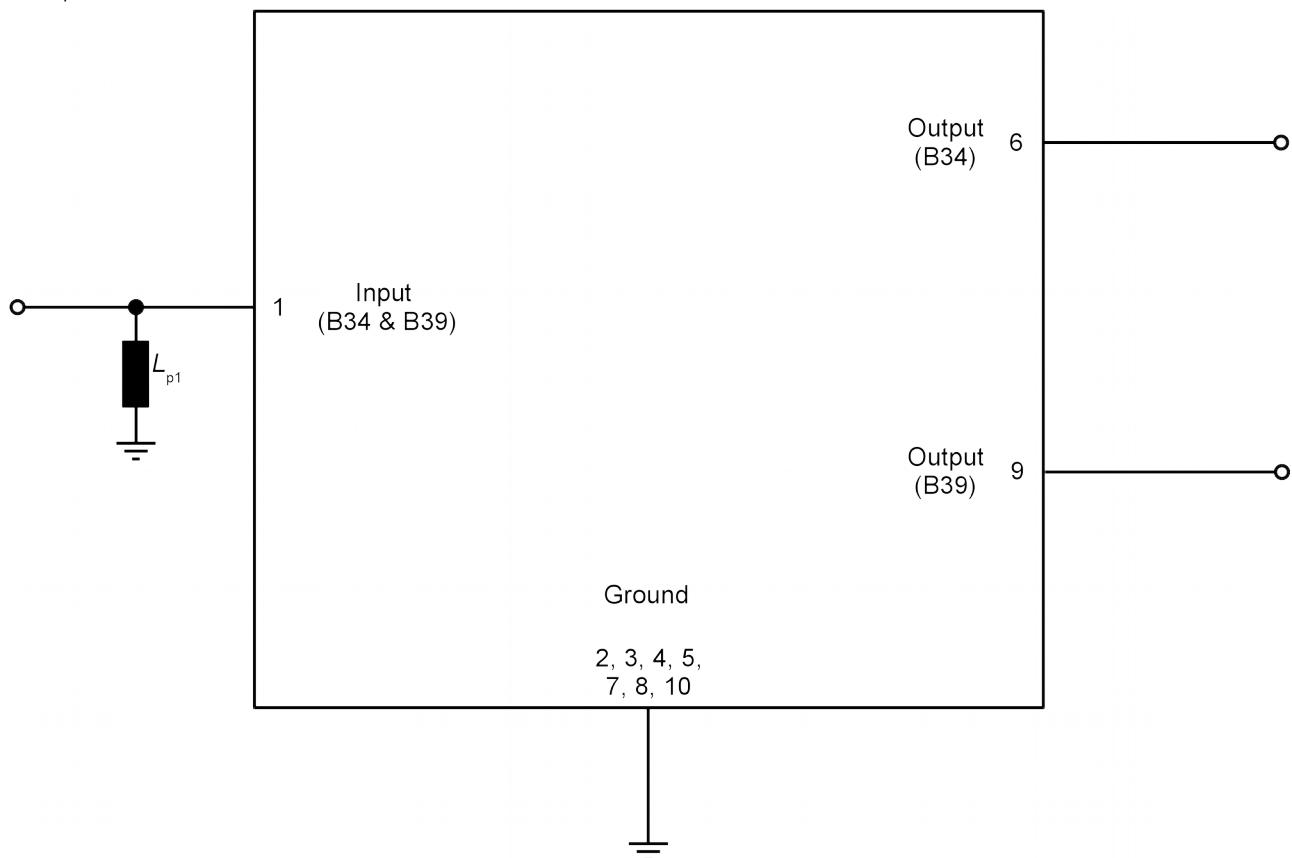


Figure 3: Schematic of matching circuit.

Data sheet

6 Characteristics TD-SCDMA B34

Temperature range for specification

 $T_{\text{SPEC}} = -30 \text{ }^{\circ}\text{C} \dots +85 \text{ }^{\circ}\text{C}$

B34 B39 input terminating impedance

 $Z_{\text{B34 B39 IN}} = 50 \Omega$ with par. 4.6 nH¹⁾

B34 output terminating impedance

 $Z_{\text{B34 OUT}} = 50 \Omega$

B39 output terminating impedance

 $Z_{\text{B39 OUT}} = 50 \Omega$

Characteristics TD-SCDMA B34			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency		f_c	—	2017.5	—	MHz
Maximum insertion attenuation		α_{max}	—	1.7	2.3	dB
Amplitude ripple (p-p)		$\Delta\alpha$	—	0.4	0.9	dB
Maximum VSWR		VSWR_{max}	—	—	—	
@ B34 B39 input port	2010... 2025	MHz	—	1.4	1.9	
@ B34 output port	2010... 2025	MHz	—	1.4	1.9	
Minimum attenuation		α_{min}	—	—	—	
	50... 1000	MHz	35	38	—	dB
	1000... 1850	MHz	30	34	—	dB
	1850... 1930	MHz	33	38	—	dB
	1930... 1950	MHz	30	35	—	dB
	1950... 1980	MHz	7	18	—	dB
	2050... 2075	MHz	2.8	10	—	dB
	2075... 2100	MHz	27	33	—	dB
	2100... 2800	MHz	33	38	—	dB
	2800... 4100	MHz	35	40	—	dB
	4100... 4900	MHz	29	36	—	dB
	4900... 6000	MHz	23	30	—	dB

¹⁾ See Matching circuit (p. 5).

Data sheet

7 Characteristics TD-SCDMA B39

Temperature range for specification

 $T_{\text{SPEC}} = -30 \text{ }^{\circ}\text{C} \dots +85 \text{ }^{\circ}\text{C}$

B34 B39 input terminating impedance

 $Z_{\text{B34 B39 IN}} = 50 \Omega$ with par. 4.6 nH¹⁾

B34 output terminating impedance

 $Z_{\text{B34 OUT}} = 50 \Omega$

B39 output terminating impedance

 $Z_{\text{B39 OUT}} = 50 \Omega$

Characteristics TD-SCDMA B39			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency	f_c	—	1900	—	MHz	
Maximum insertion attenuation	α_{max}	—	1.9	2.4	dB	
Amplitude ripple (p-p)	$\Delta\alpha$	—	0.6	1.2	dB	
Maximum VSWR	VSWR_{max}	—	—	—	—	
@ B34 B39 input port	1880... 1920 MHz	—	1.6	2.0	—	
@ B39 output port	1880... 1920 MHz	—	1.7	2.0	—	
Minimum attenuation	α_{min}	—	—	—	—	
50... 925 MHz	31	34	—	—	dB	
925... 960 MHz	31	34	—	—	dB	
960... 1805 MHz	25	29	—	—	dB	
1805... 1840 MHz	27	35	—	—	dB	
1840... 1850 MHz	26	34	—	—	dB	
1982... 2005 MHz	28	32	—	—	dB	
2005... 2800 MHz	28	33	—	—	dB	
2800... 3700 MHz	32	38	—	—	dB	
3700... 5400 MHz	20	27	—	—	dB	
5400... 6000 MHz	16	24	—	—	dB	

¹⁾ See Matching circuit (p. 5).

Data sheet

8 Maximum ratings

Operable temperature	$T_{OP} = -40 \text{ }^{\circ}\text{C} \dots +85 \text{ }^{\circ}\text{C}$	
Storage temperature	$T_{STG} = -40 \text{ }^{\circ}\text{C} \dots +85 \text{ }^{\circ}\text{C}$	
DC voltage	$V_{DC} = 0 \text{ V}$	
Input power	P_{IN}	
@ B34 B39 input port: 1880 ... 1920 MHz	10 dBm	Continuous wave for 100000 h @ 85 °C.
@ B34 B39 input port: 2010 ... 2025 MHz	10 dBm	Continuous wave for 100000 h @ 85 °C.

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9 Transmission coefficient TD-SCDMA B34

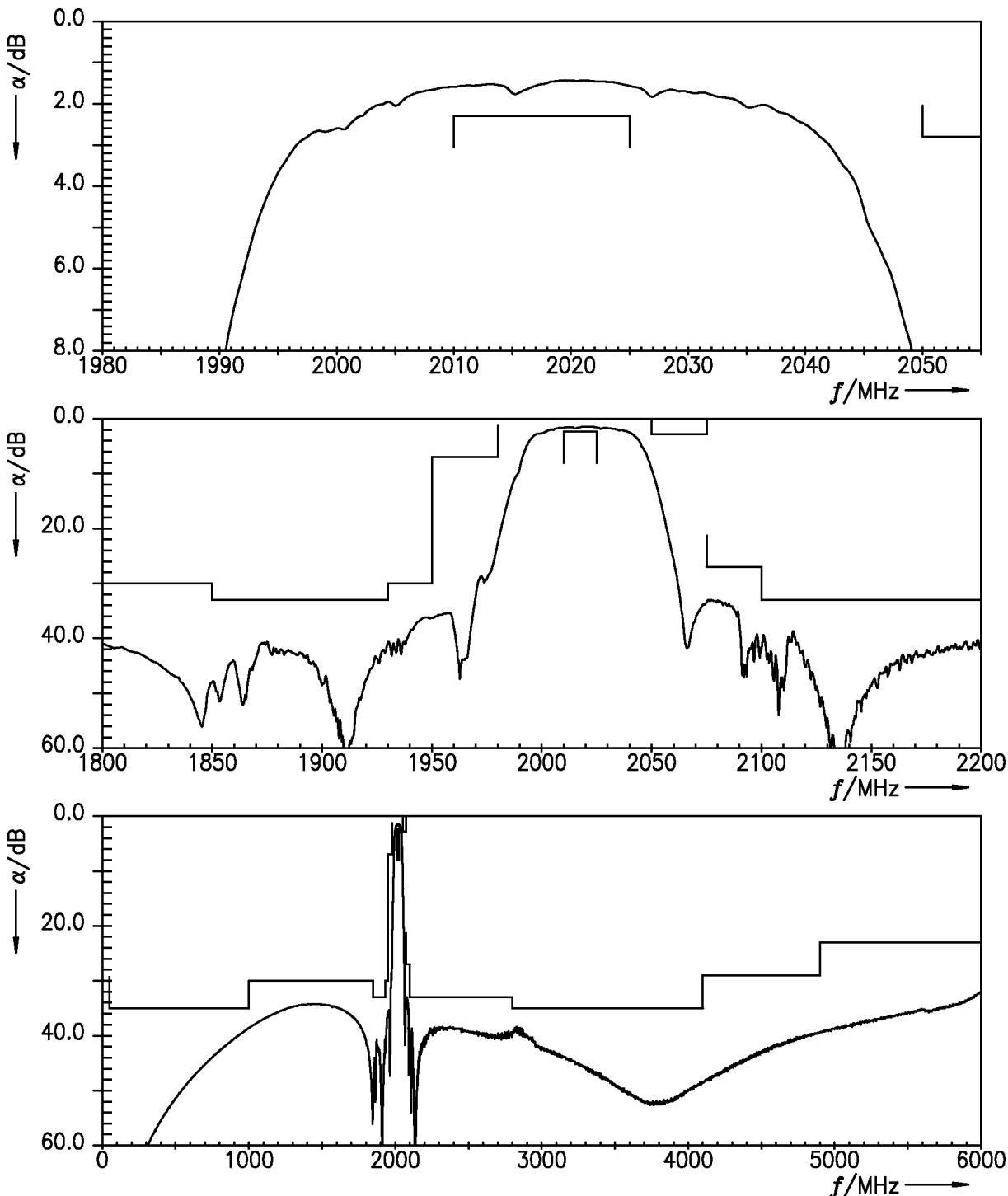


Figure 4: Attenuation TD-SCDMA B34.

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10 Reflection coefficients TD-SCDMA B34

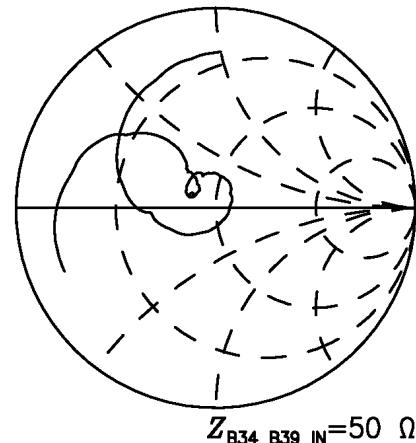
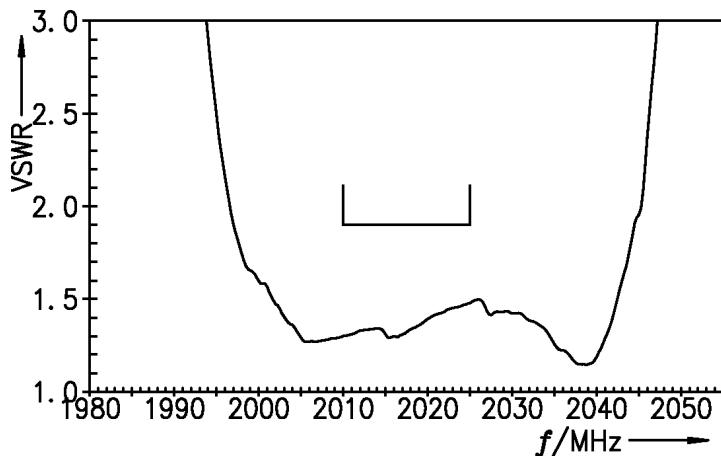


Figure 5: Reflection coefficient TD-SCDMA B34 at IN port.

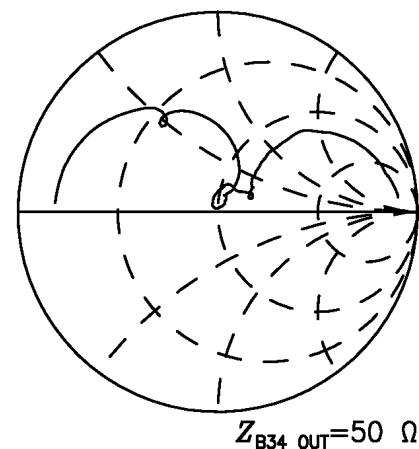
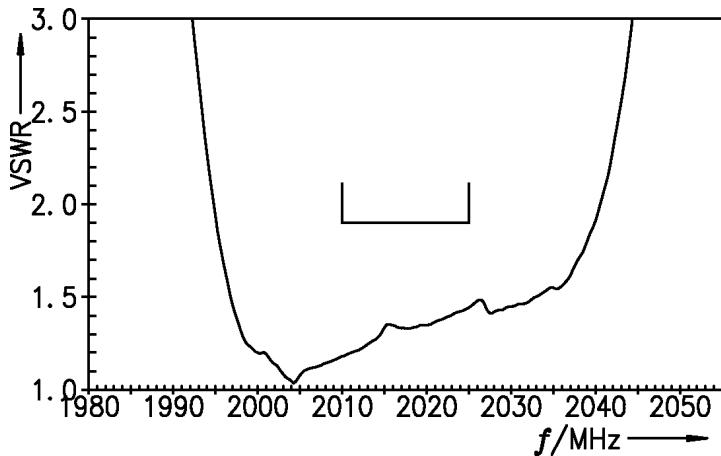


Figure 6: Reflection coefficient TD-SCDMA B34 at OUT port.

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11 Transmission coefficient TD-SCDMA B39

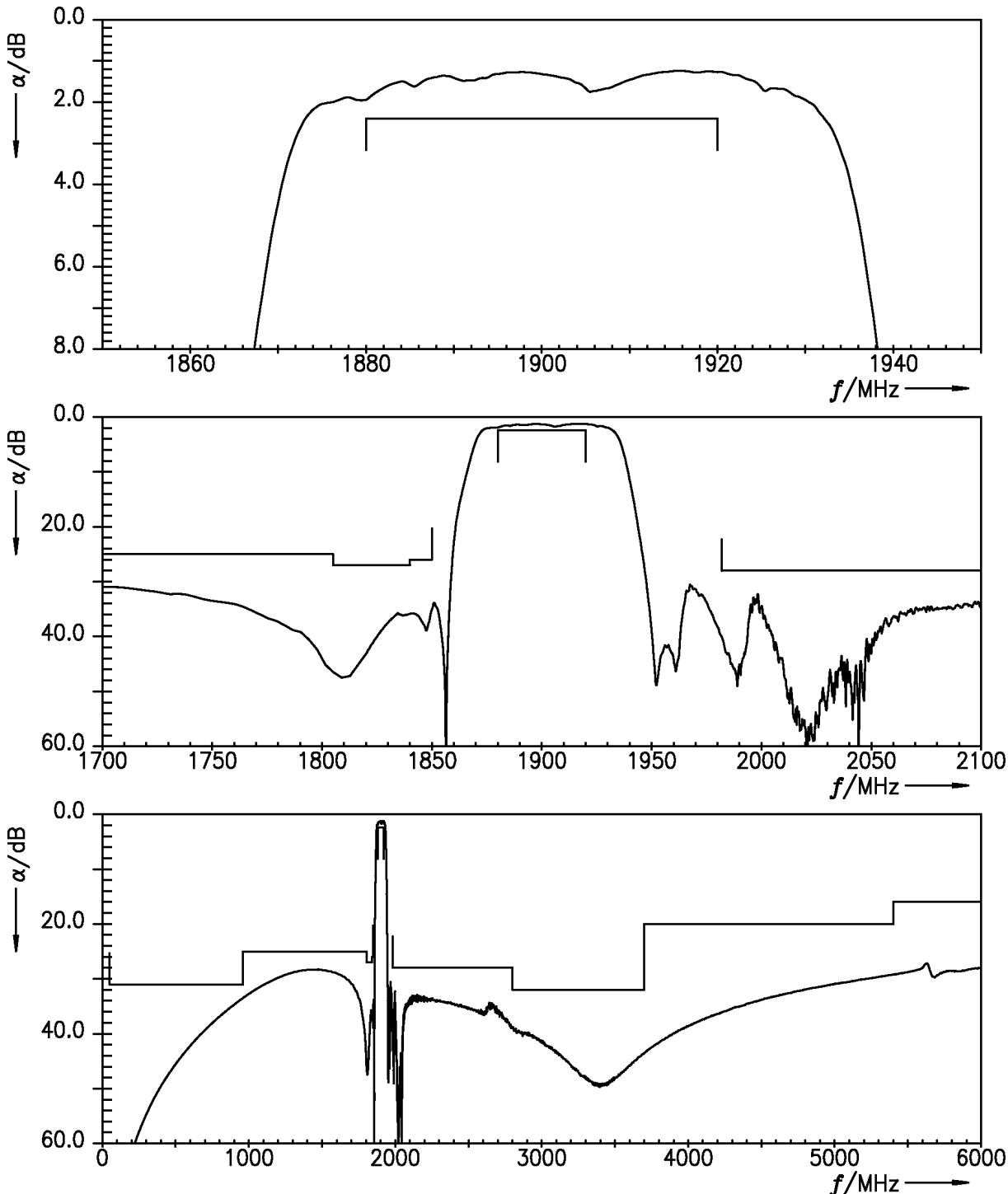


Figure 7: Attenuation TD-SCDMA B39.

Data sheet

12 Reflection coefficients TD-SCDMA B39

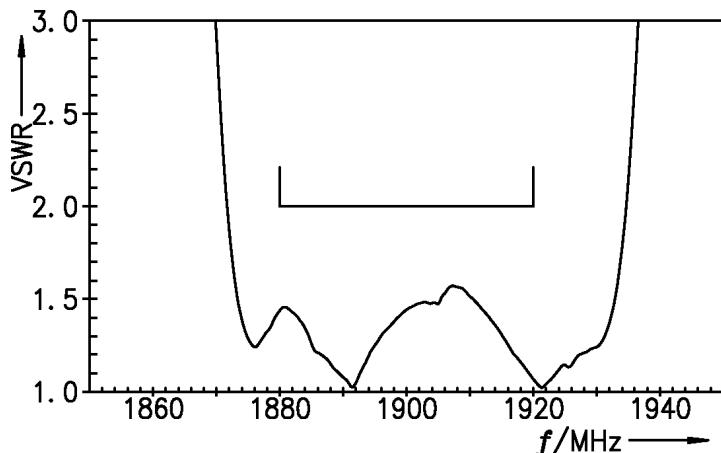


Figure 8: Reflection coefficient TD-SCDMA B39 at IN port.

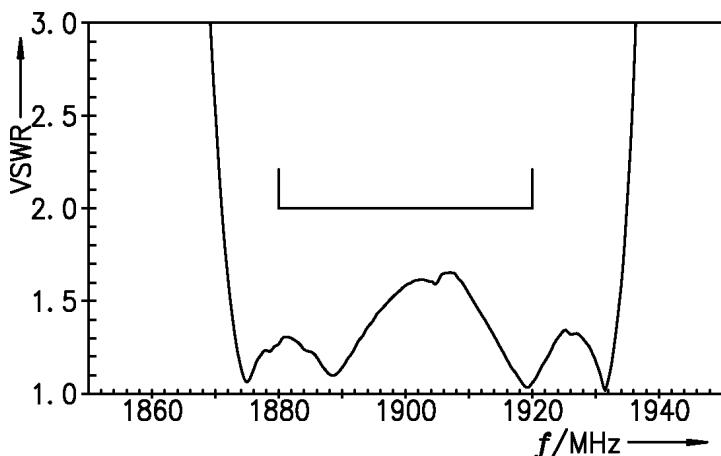
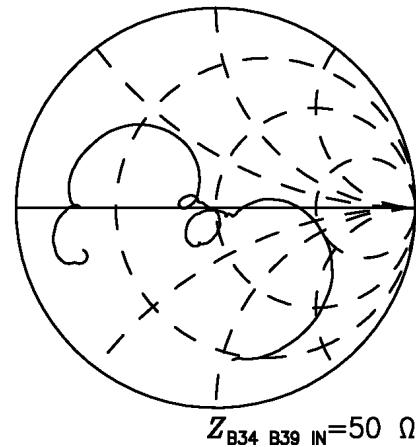
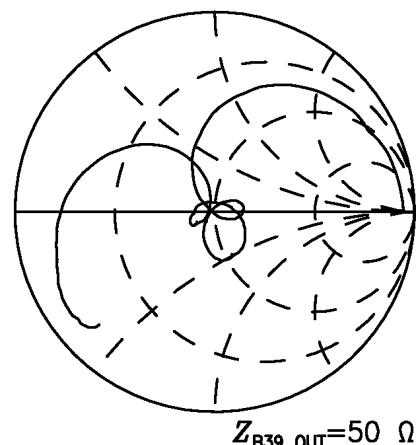


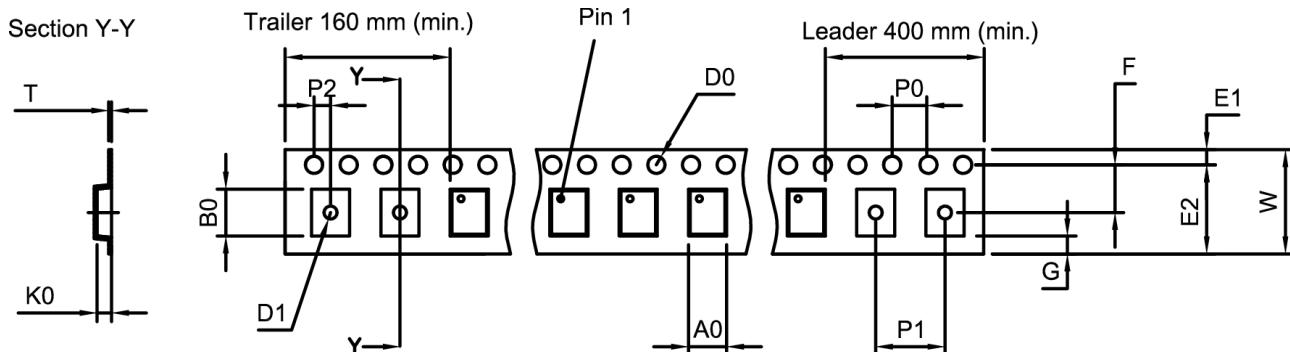
Figure 9: Reflection coefficient TD-SCDMA B39 at OUT port.



Data sheet

13 Packing material

13.1 Tape



User direction of unreeling

Figure 10: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A ₀	1.27 _{±0.05} mm
B ₀	1.67 _{±0.05} mm
D ₀	1.5 _{+0.1/-0} mm
D ₁	0.5 _{+0.1/-0} mm
E ₁	1.75 _{±0.1} mm
E ₂	6.25 mm (min.)
F	3.5 _{±0.05} mm
G	0.75 mm (min.)
K ₀	0.55 _{±0.05} mm
P ₀	4.0 _{±0.1} mm
P ₁	4.0 _{±0.1} mm
P ₂	2.0 _{±0.05} mm
T	0.25 _{±0.03} mm
W	8.0 _{+0.3/-0.1} mm

Table 1: Tape dimensions.

13.2 Reel with diameter of 180 mm

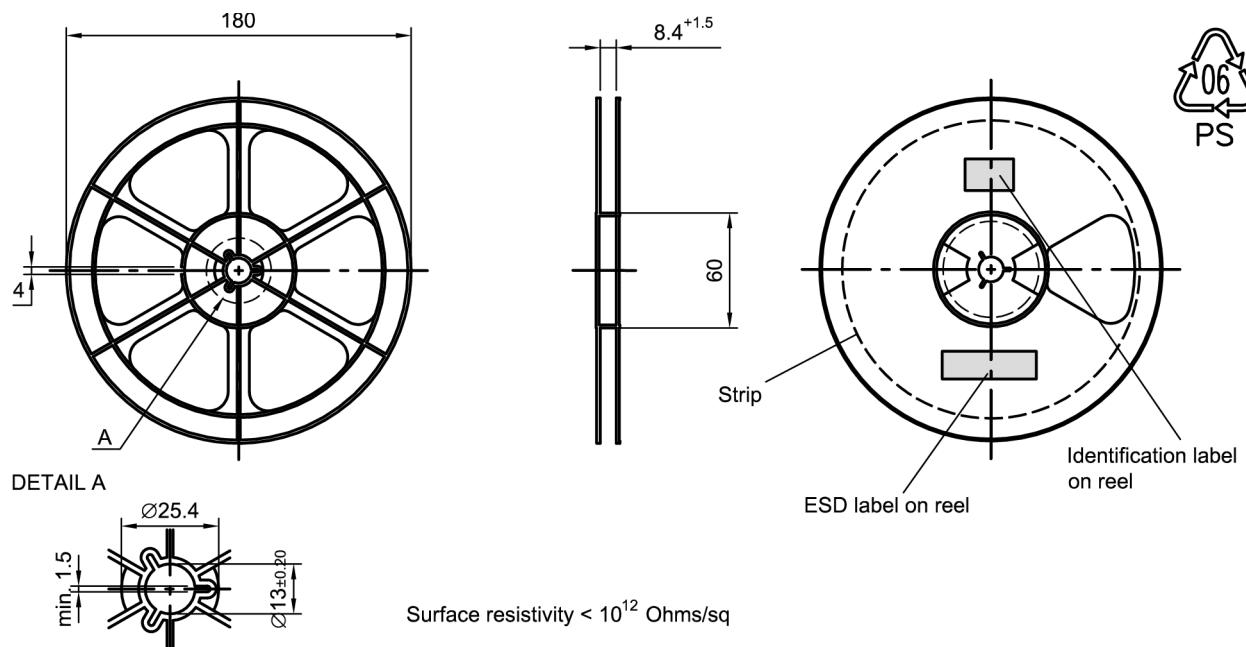


Figure 11: Drawing of reel (first-angle projection) with diameter of 180 mm.

Data sheet

Dimensions [mm]

X = 220±5

Y = 235±5

Sealing area 10±3

Printing
on vacumbag

Sealing area

Drypack
in vacumbagIdentification label
on vacumbag

Vacumbag

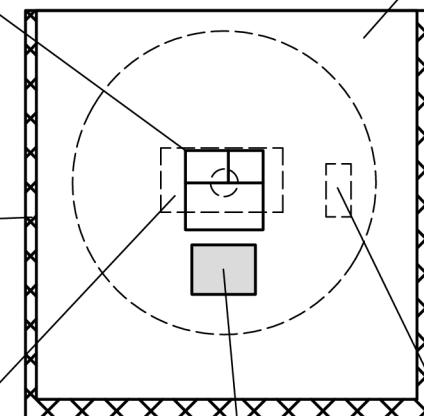
Humidity indicator
in vacumbag

Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

Dimensions [mm]

L = 188

B = 188

H = 30

Tolerance ±5

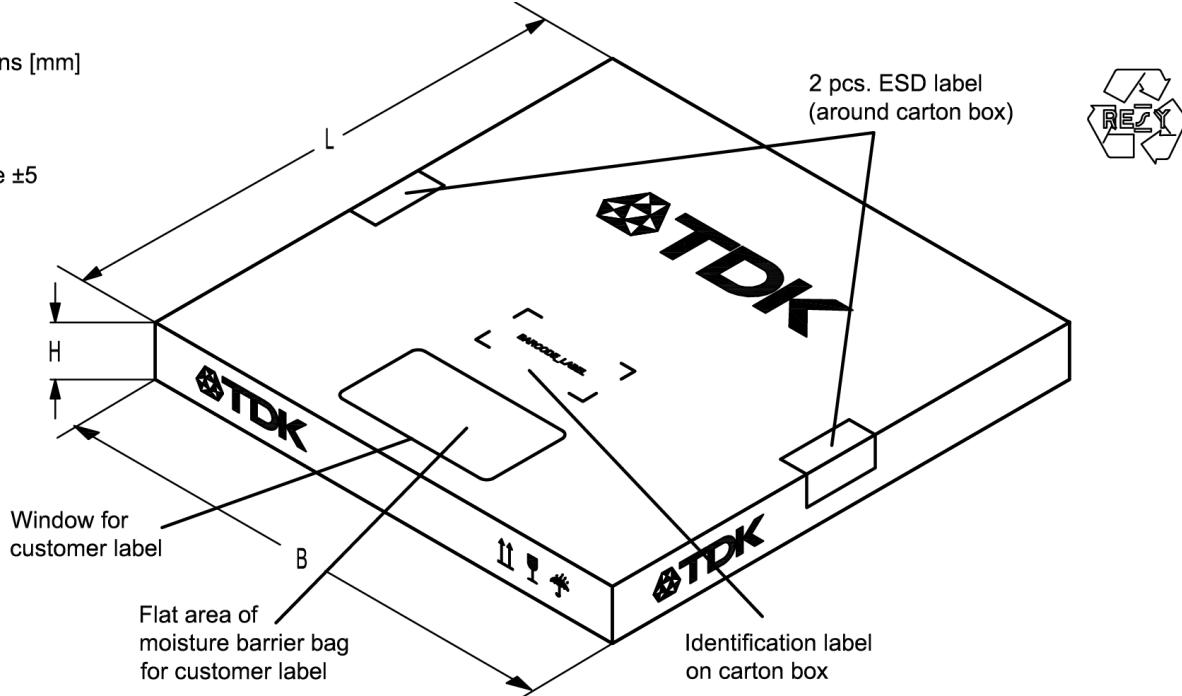


Figure 13: Drawing of folding box for reel with diameter of 180 mm.

14 Marking

Products are marked with product type number and lot number encoded according to Table 2:

■ Type number:

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The 4 digit type number of the ordering code, is encoded by a special BASE32 code into a 3 digit marking.

e.g., B3xxxxB1234xxxx,

Example of decoding type number marking on device

in decimal code.

16J

=>

1234

$1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0$

=

1234

The BASE32 code for product type B4384 is 490.

■ Lot number:

The last 5 digits of the lot number, are encoded based on a special BASE47 code into a 3 digit marking.

e.g., **12345**,

Example of decoding lot number marking on device

in decimal code.

5UY

=>

12345

$5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0$

=

12345

Adopted BASE32 code for type number			
Decimal value	Base32 code	Decimal value	Base32 code
0	0	16	G
1	1	17	H
2	2	18	J
3	3	19	K
4	4	20	M
5	5	21	N
6	6	22	P
7	7	23	Q
8	8	24	R
9	9	25	S
10	A	26	T
11	B	27	V
12	C	28	W
13	D	29	X
14	E	30	Y
15	F	31	Z

Adopted BASE47 code for lot number			
Decimal value	Base47 code	Decimal value	Base47 code
0	0	24	R
1	1	25	S
2	2	26	T
3	3	27	U
4	4	28	V
5	5	29	W
6	6	30	X
7	7	31	Y
8	8	32	Z
9	9	33	b
10	A	34	d
11	B	35	f
12	C	36	h
13	D	37	n
14	E	38	r
15	F	39	t
16	G	40	v
17	H	41	\
18	J	42	?
19	K	43	{
20	L	44	}
21	M	45	<
22	N	46	>
23	P		

Table 2: Lists for encoding and decoding of marking.

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15 Soldering profile

The recommended soldering process is in accordance with IEC 60068-2-58 – 3rd edit and IPC/JEDEC J-STD-020B.

ramp rate	$\leq 3 \text{ K/s}$
preheat	125 °C to 220 °C, 150 s to 210 s, 0.4 K/s to 1.0 K/s
$T > 220 \text{ }^{\circ}\text{C}$	30 s to 70 s
$T > 230 \text{ }^{\circ}\text{C}$	min. 10 s
$T > 245 \text{ }^{\circ}\text{C}$	max. 20 s
$T \geq 255 \text{ }^{\circ}\text{C}$	–
peak temperature T_{peak}	250 °C +0/-5 °C
wetting temperature T_{min}	230 °C +5/-0 °C for 10 s ± 1 s
cooling rate	$\leq 3 \text{ K/s}$
soldering temperature T	measured at solder pads

Table 3: Characteristics of recommended soldering profile for lead-free solder (Sn95.5Ag3.8Cu0.7).

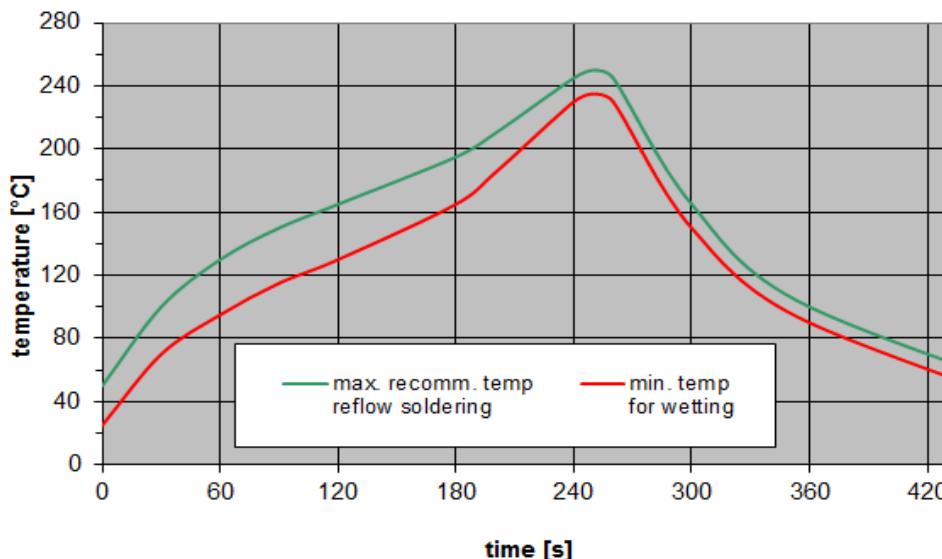


Figure 14: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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16 Annotations

16.1 Matching coils

See TDK inductor pdf-catalog <http://www.tdk.co.jp/tefe02/coil.htm#aname1> and Data Library for circuit simulation <http://www.tdk.co.jp/etvcl/index.htm>.

16.2 RoHS compatibility

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.

16.3 Scattering parameters (S-parameters)

The pin/port assignment is available in the headers of the S-parameter files. Please contact your local EPCOS sales office.

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17 Cautions and warnings

17.1 Display of ordering codes for EPCOS products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products. Detailed information can be found on the Internet under www.epcos.com/orderingcodes.

17.2 Material information

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our sales offices.

17.3 Moldability

Before using in overmolding environment, please contact your local EPCOS sales office.

17.4 Simplified drawings

Landing area

The printed circuit board (PCB) land pattern (landing area) shown is based on EPCOS internal development and empirical data and illustrated for example purposes, only. As customers' SMD assembly processes may have a plenty of variants and influence factors which are not under control or knowledge of EPCOS, additional careful process development on customer side is necessary and strongly recommended in order to achieve best soldering results tailored to the particular customer needs.

Dimensions

Unless otherwise specified all dimensions are understood using unit millimeter (mm).

Dimensions do not include burrs.

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

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105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

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moschip.ru_9