



RF360
Europe GmbH

Data sheet

Micro-acoustic extractor GNSS

Series/type: B8666

Ordering code: B39162B8666L210

Date: January 30, 2019

Version: 2.16

DCN: 80-PA243-252 Rev. B

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RF360 Europe GmbH
A Qualcomm – TDK Joint Venture

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1 Application

- Premium-performance BeiDou/GPS/Glonass Extractor with single ended 50 Ω ports
- Ultra-low-loss acoustic structure
- Advanced fully-integrated multiplexer structure (no external matching needed)
- Using common antenna for BeiDou/GPS/Glonass and Cellular bands
- Placed between antenna and cellular front-end switches and filters
- Usable GNSS pass bands: 1559.05 -1563.144 MHz, 1574.42-1576.42 MHz, 1597.55-1605.89 MHz
- Usable CELL pass bands: 566 – 1510.9 MHz, 1710 – 2690 MHz, 3400 – 3800 MHz
- No switches and control lines required

2 Features

- Package size 1.7 mm × 1.3 mm
- Package height 0.5 mm
- Approximate weight 2 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

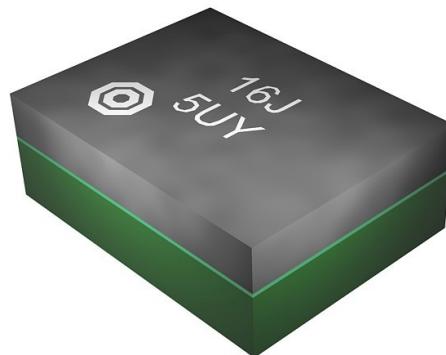
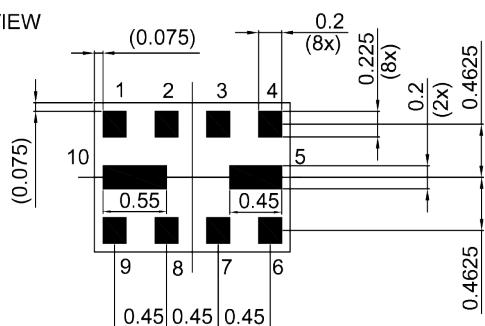


Figure 1: Picture of component with example of product marking.

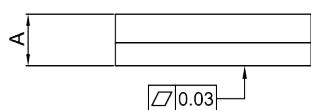
3 Package

BOTTOM VIEW

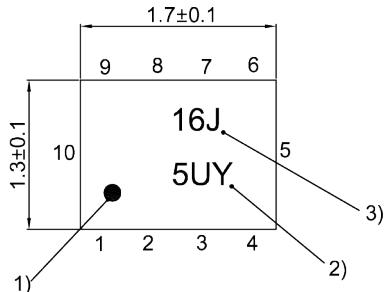


Pad and pitch tolerance ± 0.05

SIDE VIEW

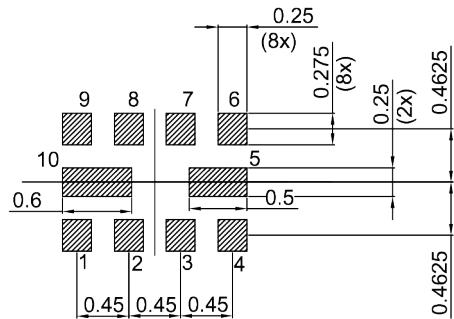


TOP VIEW



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

Land pattern
THRU VIEW



Landing pad tolerance -0.02

Figure 2: Drawing of package with package height A = 0.6 mm (max.). See Sec. Package information (p. 24).

4 Pin configuration

- 1 ANT
- 4 BeiDou/GPS/Glonass(GNSS)
- 9 CELL
- 2, 3, 5, 6, 7, 8, 10 Ground

5 Matching circuit

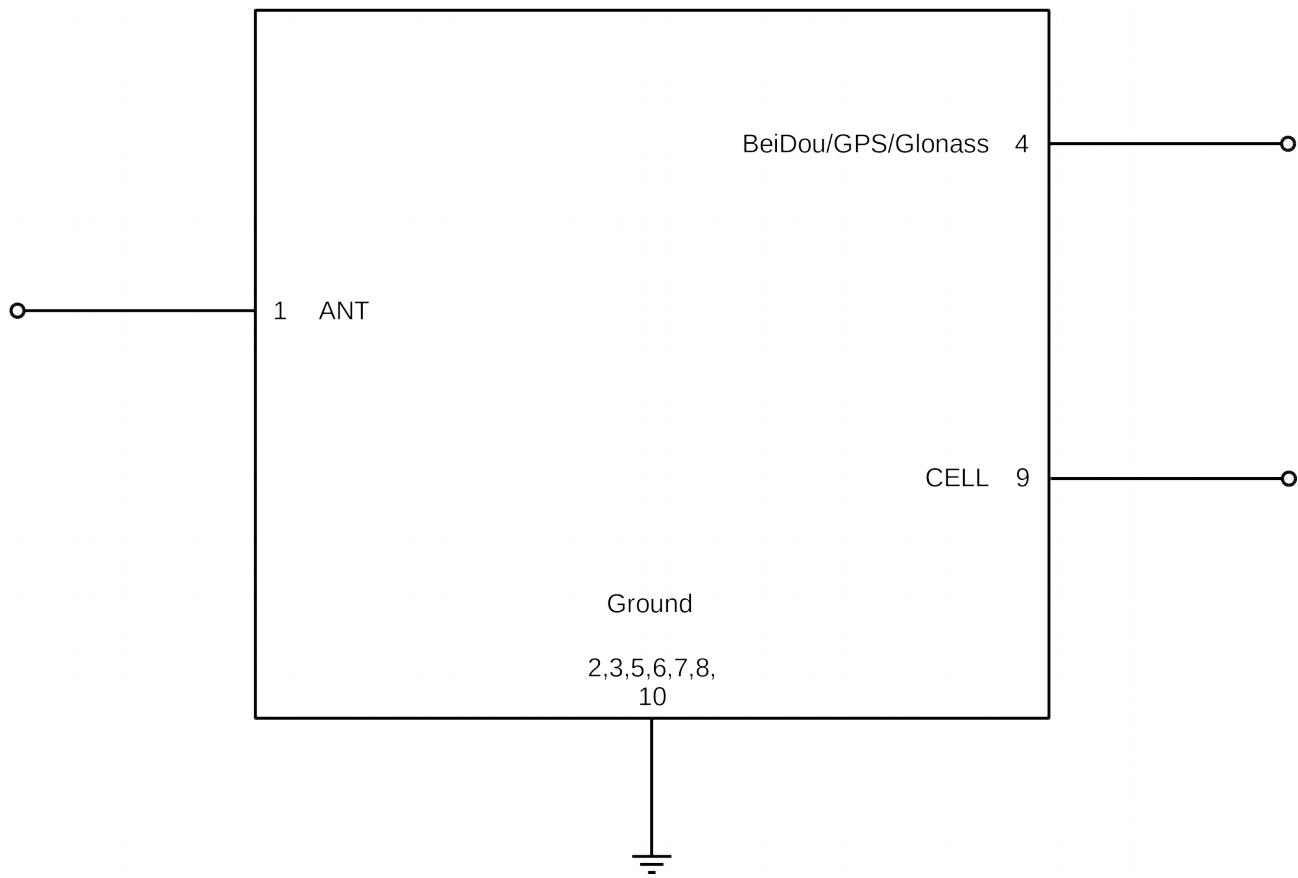


Figure 3: Schematic of matching circuit. No external matching components required.

6 Characteristics ANT – GNSS

Temperature range for specification	T_{SPEC}	= -30 °C ... +85 °C
ANT terminating impedance	Z_{ANT}	= 50 Ω
GNSS terminating impedance	Z_{GNSS}	= 50 Ω
CELL terminating impedance	Z_{CELL}	= 50 Ω

Characteristics ANT – GNSS		min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Insertion loss	1559.052... 1563.144 MHz	—	1.2	2.6	dB
	1574.42... 1576.42 MHz	—	0.8	1.5	dB
	1597.55... 1605.89 MHz	—	1.5	3.5	dB
Attenuation	100... 777 MHz	33	38	—	dB
	777... 787 MHz	33	47	—	dB
	787... 960 MHz	33	44	—	dB
	1427.9... 1462.9 MHz	32	41	—	dB
	1710... 1910 MHz	34	40	—	dB
	1910... 2025 MHz	33	39	—	dB
	2110... 2170 MHz	30	38	—	dB
	2300... 2500 MHz	30	38	—	dB
	2500... 2690 MHz	29	36	—	dB
	3400... 3800 MHz	—	27	—	dB
VSWR	@ ANT port	1559.052... 1563.144 MHz	—	1.2	2.0
			—	1.3	2.0
			—	1.4	2.0
	@ GNSS port	1559.052... 1563.144 MHz	—	1.3	2.1
			—	1.3	2.0
			—	1.3	2.0

7 Characteristics ANT – CELL

Temperature range for specification	T_{SPEC}	= -30 °C ... +85 °C
ANT terminating impedance	Z_{ANT}	= 50 Ω
GNSS terminating impedance	Z_{GNSS}	= 50 Ω
CELL terminating impedance	Z_{CELL}	= 50 Ω

Characteristics ANT – CELL		min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Insertion loss		α			
566... 626	MHz	—	2.1	3.2	dB
699... 824	MHz	—	0.95	1.9	dB
824... 960	MHz	—	0.65	1.5	dB
1427.9... 1510.9	MHz	—	0.7	1.7	dB
1710... 1850	MHz	—	1.2	1.8	dB
1850... 2025	MHz	—	1.1	1.7	dB
2110... 2170	MHz	—	1.2	1.9	dB
2300... 2400	MHz	—	1.0	1.6	dB
2400... 2690	MHz	—	0.8	1.5	dB
3400... 3600	MHz	—	1.1	—	dB
3600... 3800	MHz	—	1.3	—	dB
Attenuation		α			
1559.052... 1563.144	MHz	5	10	—	dB
1574.42... 1576.42	MHz	11	19	—	dB
1597.55... 1605.89	MHz	5	13	—	dB
VSWR		VSWR			
@ ANT port					
566... 626	MHz	—	1.6	2.3	
699... 824	MHz	—	1.1	2.0	
824... 960	MHz	—	1.1	2.0	
1427.9... 1510.9	MHz	—	1.6	2.1	
1710... 2025	MHz	—	1.3	2.0	
2110... 2170	MHz	—	1.3	2.0	
2300... 2400	MHz	—	1.3	2.0	
2400... 2690	MHz	—	1.2	2.0	
3400... 3600	MHz	—	1.7	—	
3600... 3800	MHz	—	1.8	—	
@ CELL port					
566... 626	MHz	—	1.4	2.2	
699... 824	MHz	—	1.2	2.0	
824... 960	MHz	—	1.1	2.0	
1427.9... 1510.9	MHz	—	1.6	2.1	
1710... 2025	MHz	—	1.5	2.1	
2110... 2170	MHz	—	1.4	2.0	
2300... 2400	MHz	—	1.4	2.0	
2400... 2690	MHz	—	1.3	2.0	

Characteristics ANT – CELL

			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
3400 ... 3600	MHz		—	1.7	—	
3600 ... 3800	MHz		—	1.9	—	

8 Characteristics GNSS – CELL

Temperature range for specification	T_{SPEC}	= -30 °C ... +85 °C
ANT terminating impedance	Z_{ANT}	= 50 Ω
GNSS terminating impedance	Z_{GNSS}	= 50 Ω
CELL terminating impedance	Z_{CELL}	= 50 Ω

Characteristics GNSS – CELL		min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Isolation	α				
566 ... 777	MHz	34	48	—	dB
777 ... 787	MHz	34	48	—	dB
787 ... 960	MHz	34	45	—	dB
1427.9 ... 1462.9	MHz	31	40	—	dB
1710 ... 1990	MHz	36	44	—	dB
2110 ... 2170	MHz	37	45	—	dB
2400 ... 2690	MHz	32	40	—	dB
3400 ... 3800	MHz	—	31	—	dB

9 Maximum ratings

Storage temperature	$T_{STG}^{1)} = -40^{\circ}\text{C} \dots +85^{\circ}\text{C}$	
DC voltage	$ V_{DC} = 5.0 \text{ V (max.)}^{2)}$	
ESD voltage		
	$V_{ESD}^{3)} = 50 \text{ V (max.)}$	Machine model.
	$V_{ESD}^{4)} = 350 \text{ V (max.)}$	Human body model.
	$V_{ESD}^{5)} = 600 \text{ V (max.)}$	Charged device model.
Input power	P_{IN}	
@ CELL port: 566 ... 626 MHz	28 dBm	Continuous wave for 5000 h @ 55 °C.
@ CELL port: 699 ... 915 MHz	27 dBm	Continuous wave for 5000 h @ 55 °C.
@ CELL port: 824 ... 849 MHz	35 dBm	GSM signal duty cycle 1:8 for 5000 h @ 55 °C. Effective power in On-state.
@ CELL port: 880 ... 915 MHz	35 dBm	GSM signal duty cycle 1:8 for 5000 h @ 55 °C. Effective power in On-state.
@ CELL port: 1710 ... 1785 MHz	33 dBm	GSM signal duty cycle 1:8 for 5000 h @ 55 °C.
@ CELL port: 1710 ... 2690 MHz	27 dBm	Continuous wave for 5000 h @ 55 °C.
@ CELL port: 1850 ... 1910 MHz	33 dBm	GSM signal duty cycle 1:8 for 5000 h @ 55 °C. Effective power in On-state.

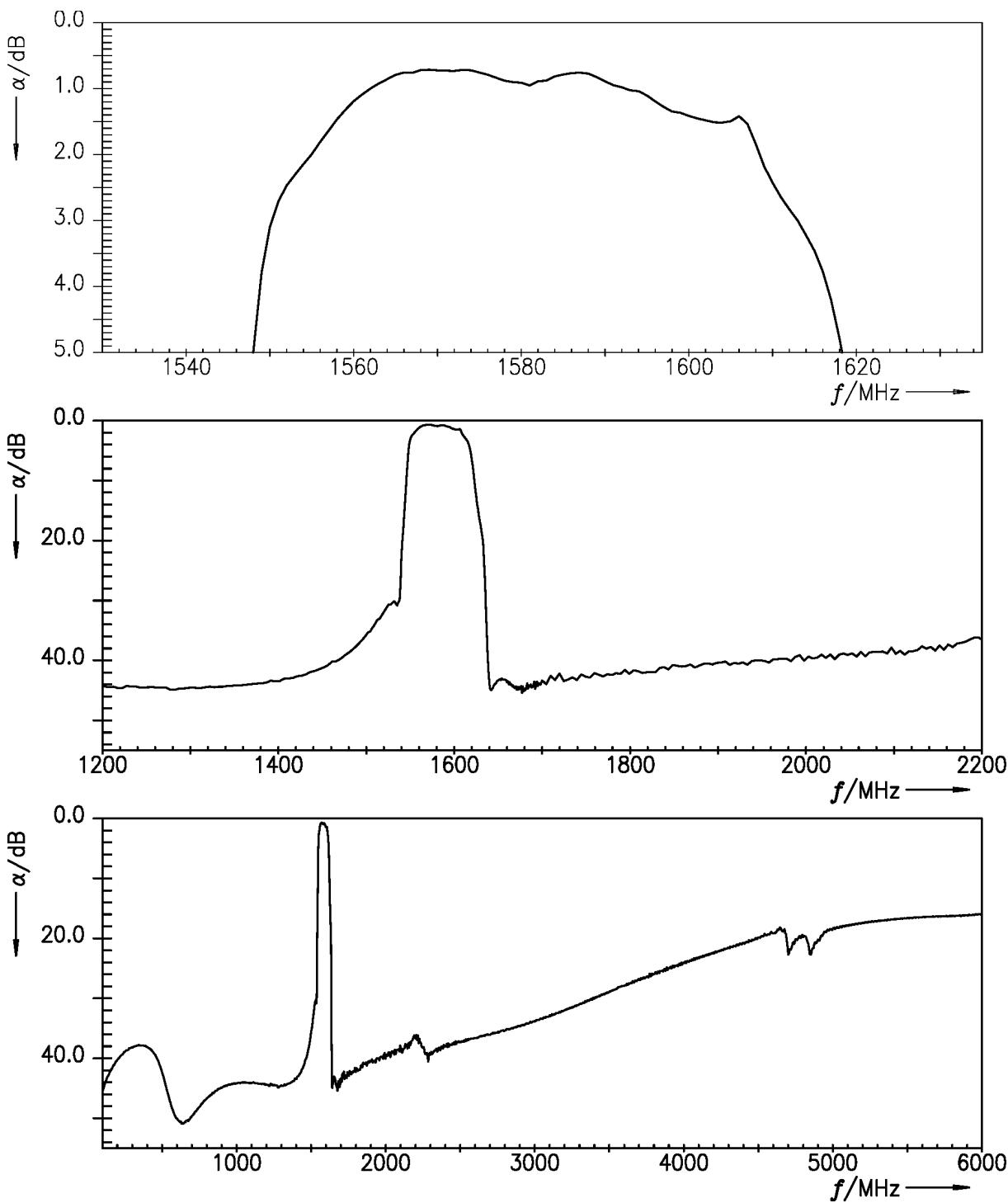
¹⁾ Not valid for packaging material. Storage temperature for packaging material is -25°C to $+40^{\circ}\text{C}$.

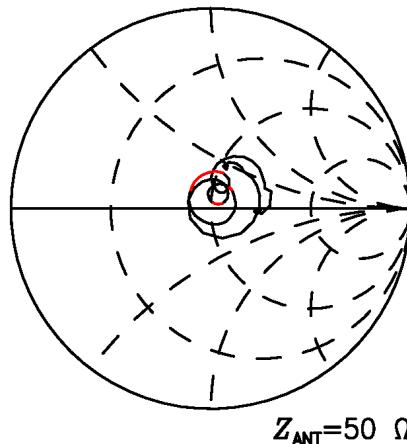
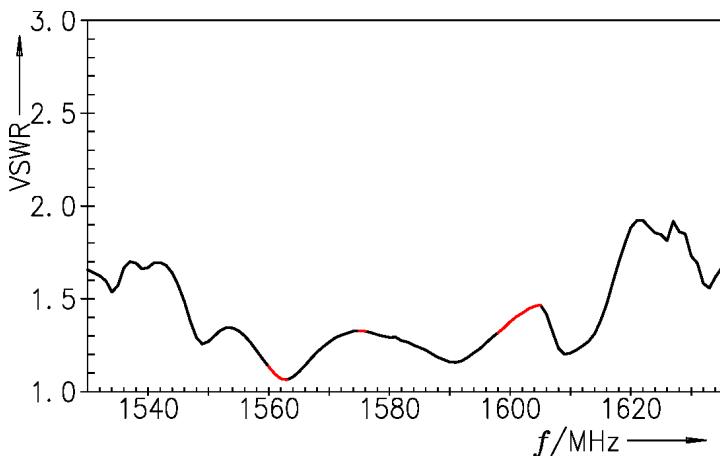
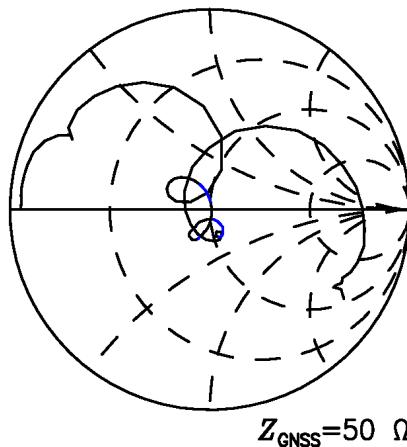
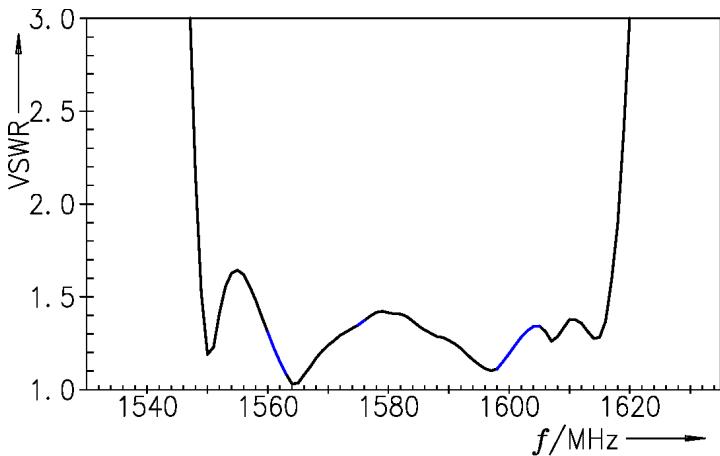
²⁾ 168h Damp Heat Steady State acc. to IEC60068-2-67 Cy.

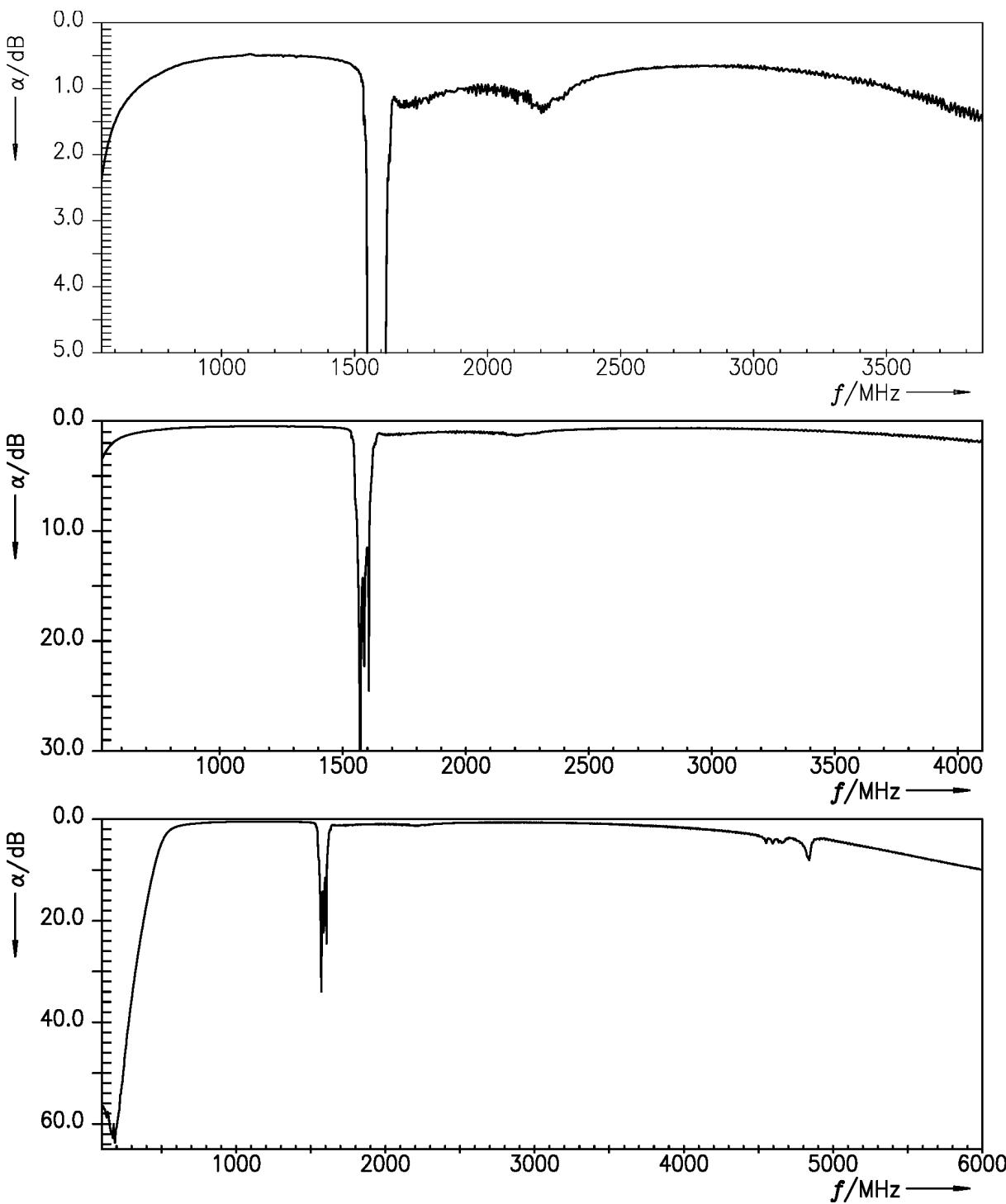
³⁾ According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

⁴⁾ According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.

⁵⁾ According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

10 Transmission coefficient ANT – GNSS**Figure 4:** Attenuation ANT – GNSS.

11 Reflection coefficients ANT – GNSS**Figure 5:** Reflection coefficient at ANT port.**Figure 6:** Reflection coefficient at GNSS port.

12 Transmission coefficient ANT – CELL**Figure 7:** Attenuation ANT – CELL.

13 Reflection coefficients ANT – CELL

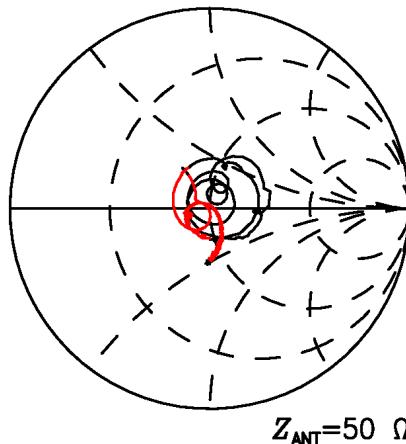
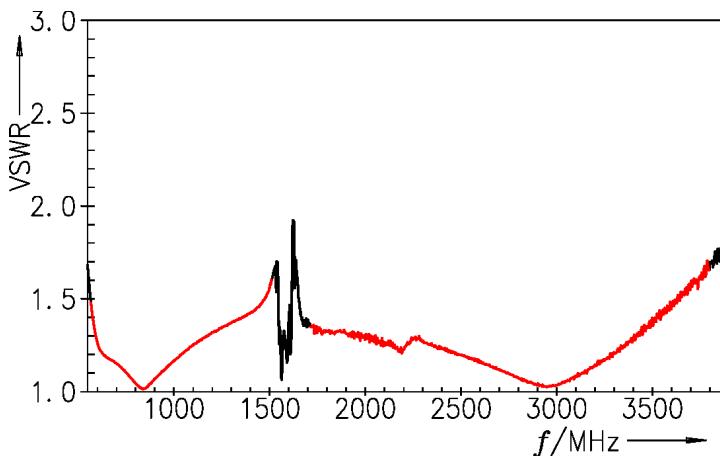


Figure 8: Reflection coefficient at ANT port.

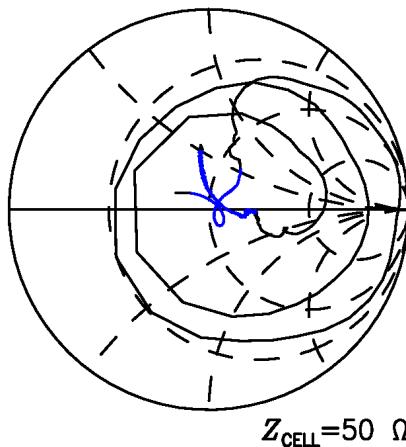
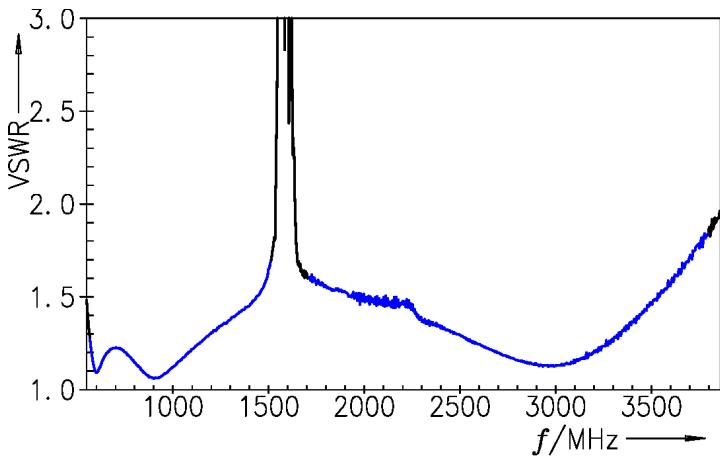


Figure 9: Reflection coefficient at CELL port.

14 Transmission coefficient GNSS – CELL

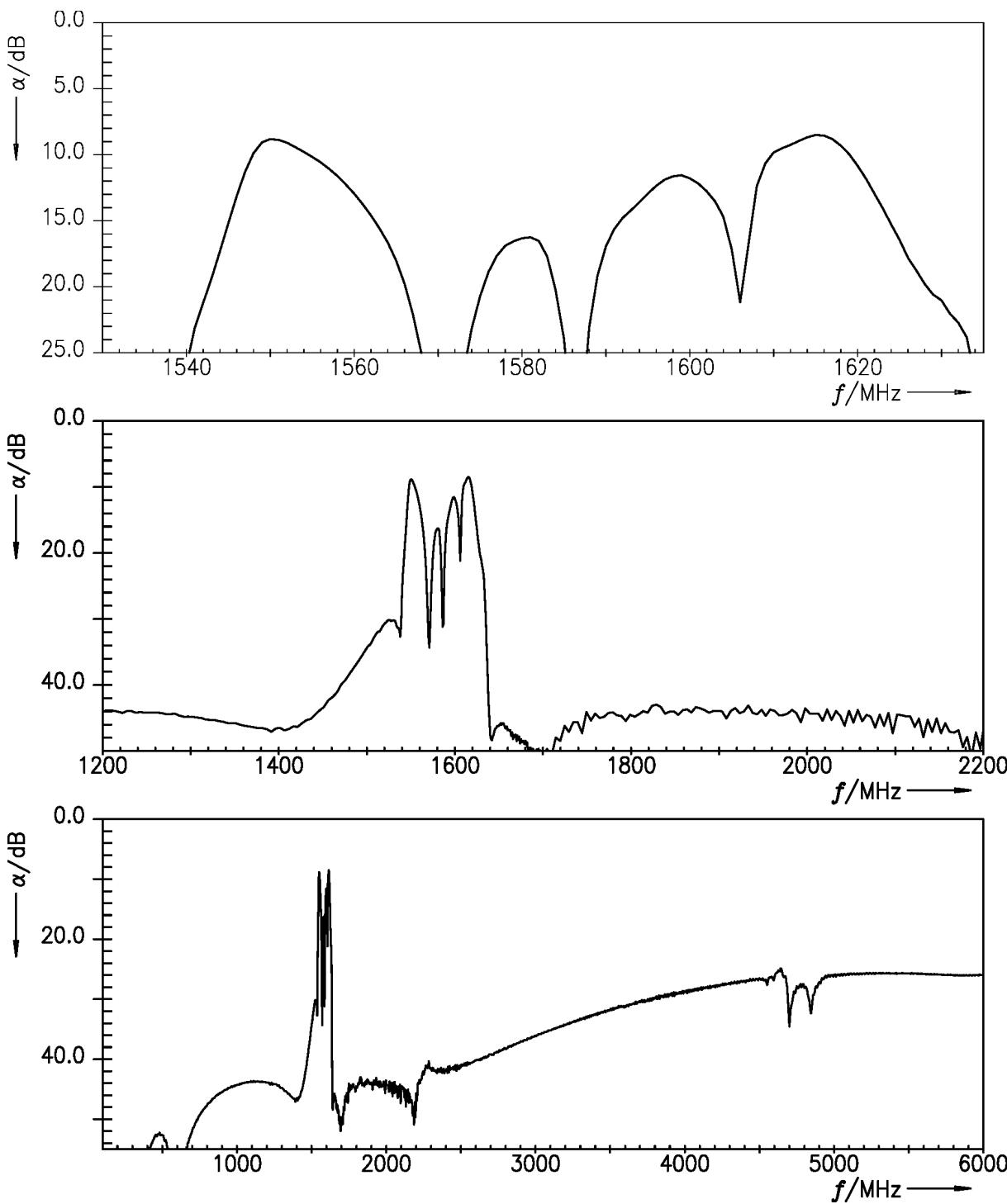


Figure 10: Cross-isolation GNSS – CELL.

15 Packing material

15.1 Tape

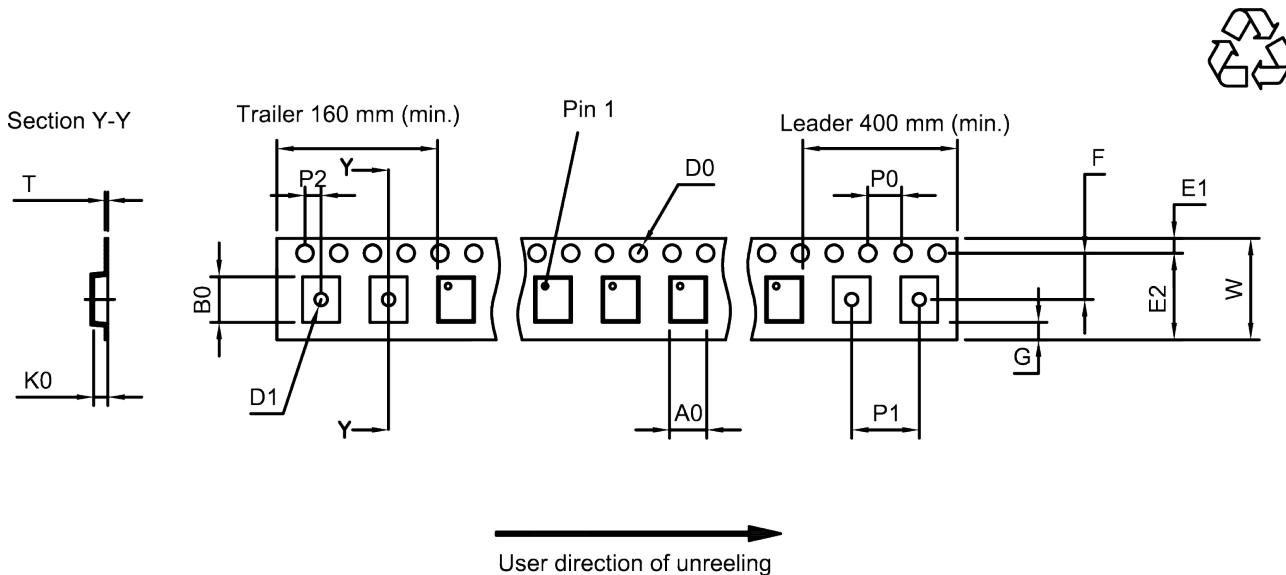


Figure 11: Drawing of tape (first-angle projection) is for illustration only and not to scale. Tape Dimensions in Table 1 are the valid dimensions for the tape.

A_0	1.52 ± 0.05 mm
B_0	1.94 ± 0.05 mm
D_0	1.55 ± 0.05 mm
D_1	0.50 ± 0.05 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	0.62 ± 0.05 mm
P_0	4.0 ± 0.1 mm

P_1	4.0 ± 0.1 mm
P_2	2.0 ± 0.1 mm
T	0.25 ± 0.03 mm
W	8.0 ± 0.3 mm

Table 1: Tape dimensions.

15.2 Reel with diameter of 180 mm

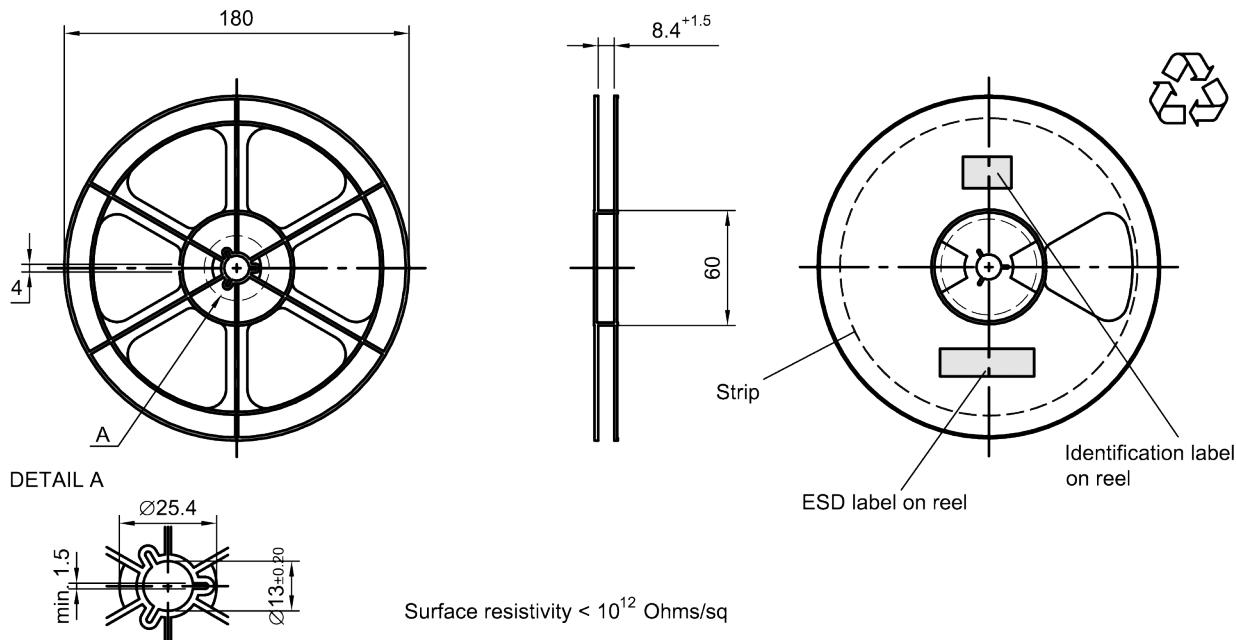


Figure 12: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

Printing on vacumbag

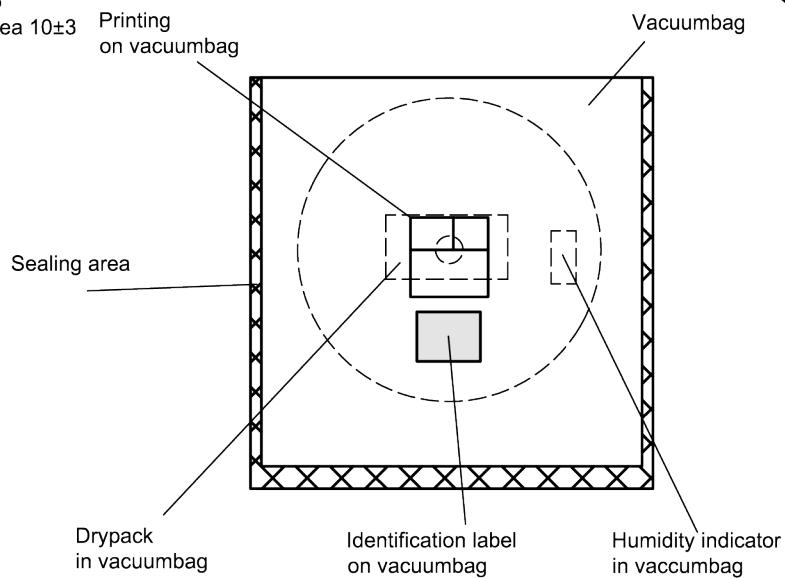


Figure 13: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

Dimensions [mm]

L = 188

B = 188

H = 30

Tolerance ± 5

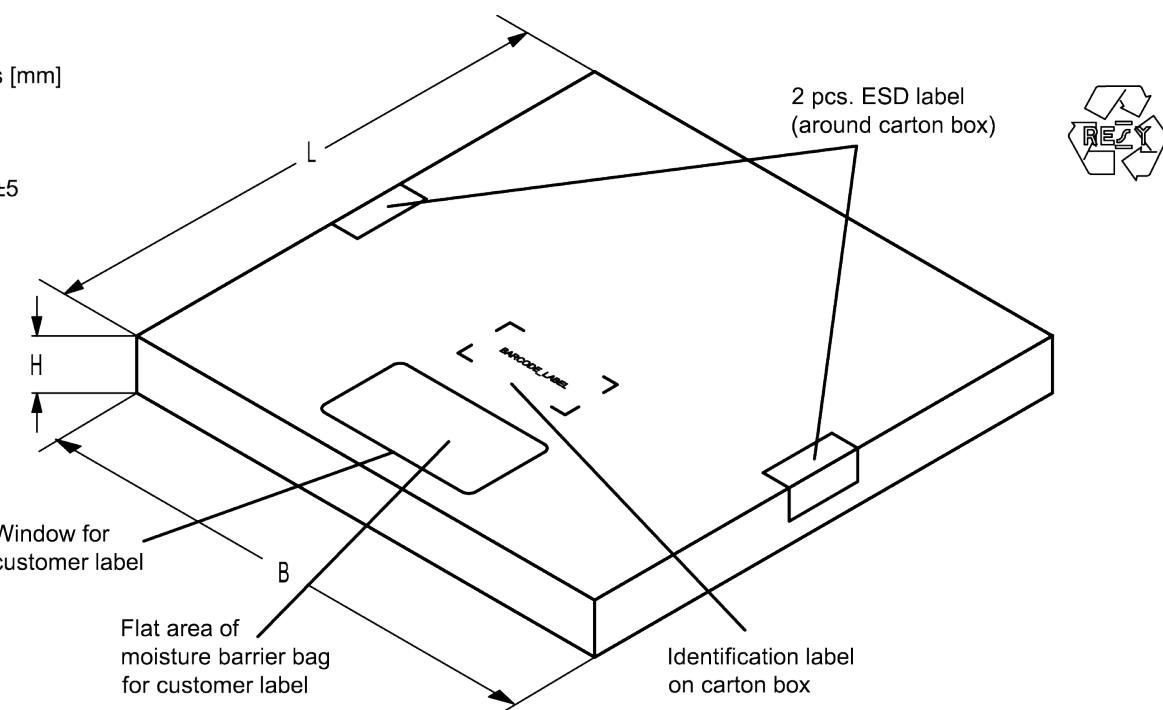


Figure 14: Drawing of folding box for reel with diameter of 180 mm.

15.3 Reel with diameter of 330 mm

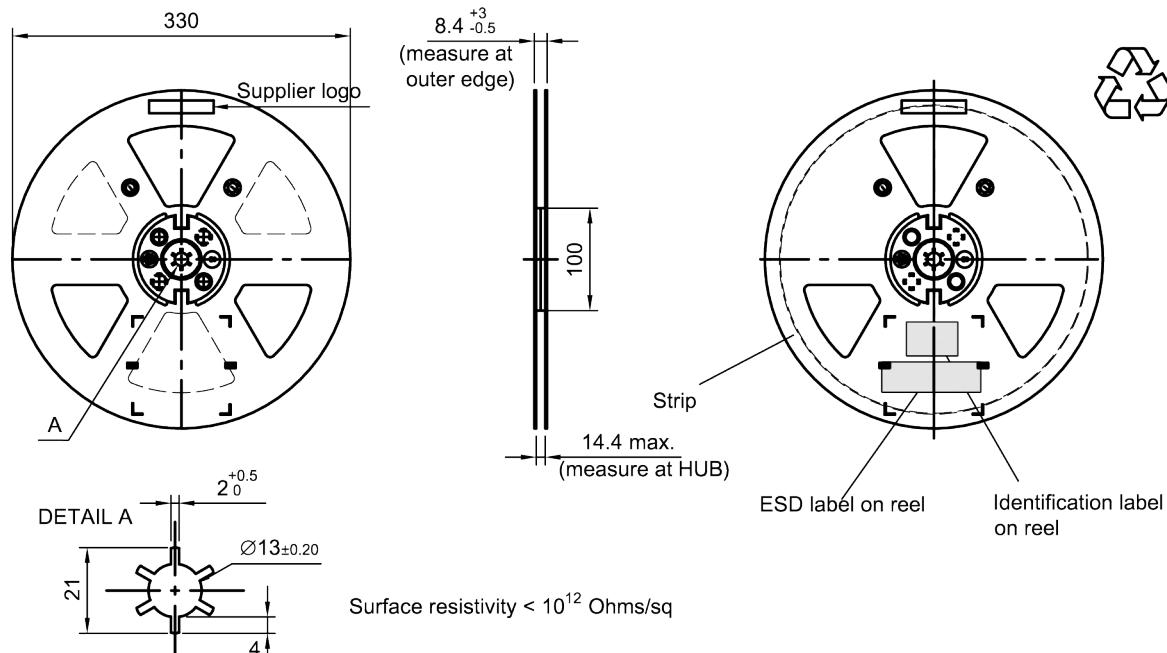


Figure 15: Drawing of reel (first-angle projection) with diameter of 330 mm.

Dimensions [mm]

X = 400+5

Y = 418+5

Sealing area 10±3

Printing
on vacuumbag

Vacuumbag



Sealing area

Drypack
in vacuumbag

Identification label
on vacuumbag

Humidity indicator
in vacuumbag

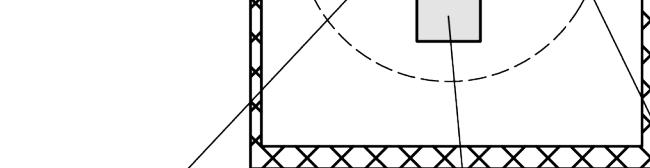


Figure 16: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

Dimensions [mm]

L = 335

B = 338

H = 36 (for 8 mm tape width)
40 (for 12 mm tape width)

Tolerance ±5

2 pcs. ESD label
(around carton box)



Window for
customer label

Flat area of
moisture barrier bag
for customer label

In case of modules with
additional printing
for badge number
on the upper right side
on the top of the carton box.

Identification label
on carton box

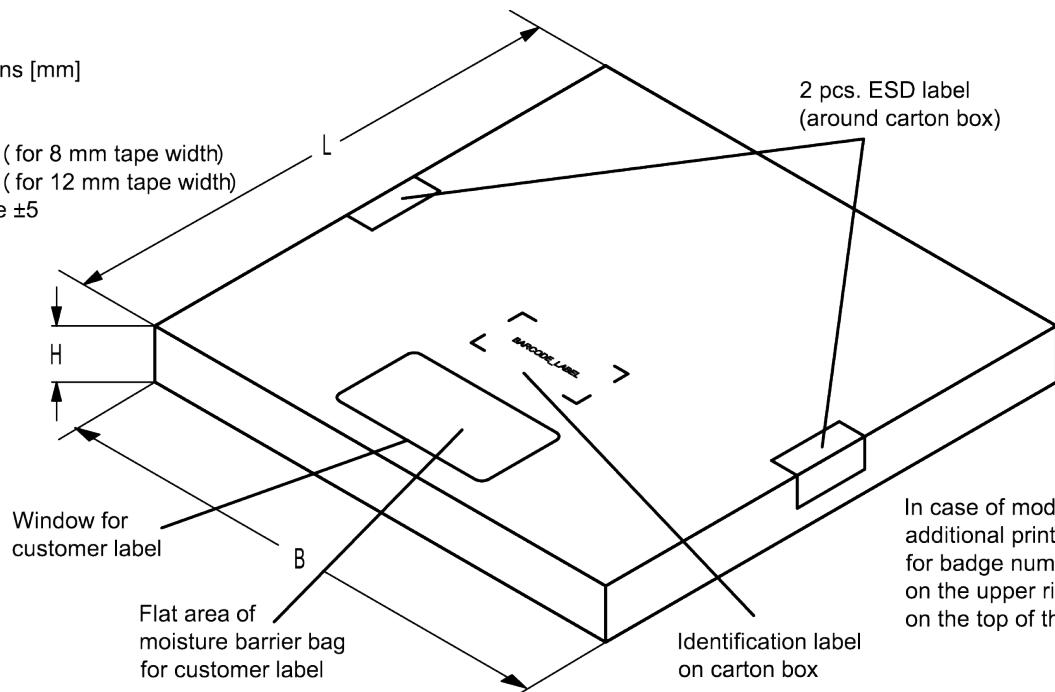


Figure 17: Drawing of folding box for reel with diameter of 330 mm.

16 Marking

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

■ Type number:

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

e.g., B3xxxxB**1234**xxxx,

Example of decoding type number marking on device
16J => **1234**
 $1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0$ = **1234**

The BASE32 code for product type B8666 is 8ET.

in decimal code.

■ 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
5UY => **12345**
 $5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0$ = **12345**

in decimal code.

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.

17 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).

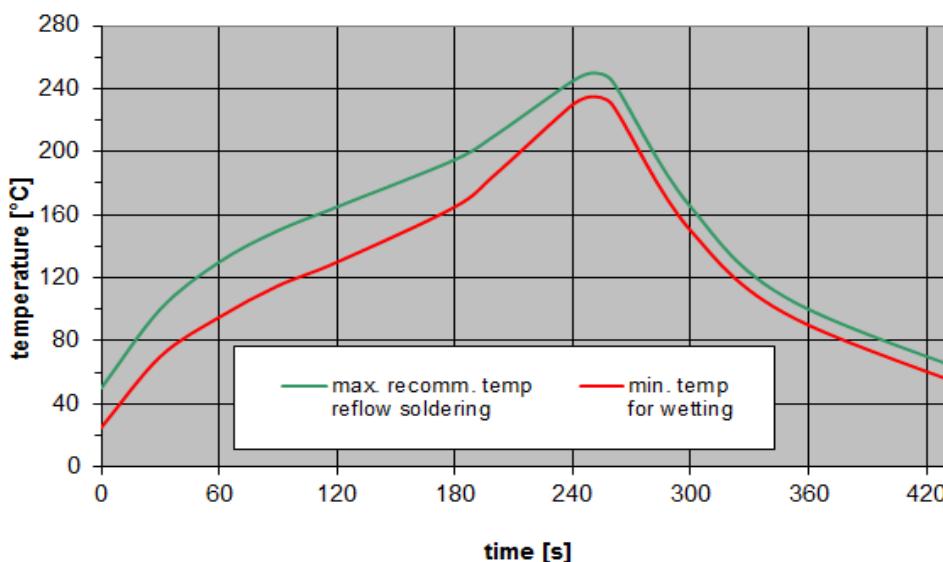


Figure 18: Recommended reflow profile for convection and infrared soldering – lead-free solder.

18 Annotations

18.1 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>.

18.2 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.

18.3 Scattering parameters (S-parameters)

The pin/port assignment is available in the headers of the S-parameter files. Please contact your local RF360 sales office.

18.4 Ordering codes and packing units

Ordering code	Packing unit
B39162B8666L210	15000 pcs
B39162B8666L210S 5	5000 pcs

Table 4: Ordering codes and packing units.

19 Cautions and warnings

19.1 Display of ordering codes for RF360 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 RF360, 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.rf360jv.com/orderingcodes.

19.2 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.

For information on recycling of tapes and reels please contact one of our sales offices.

19.3 Moldability

Before using in overmolding environment, please contact your local RF360 sales office.

19.4 Package information

Landing area

The printed circuit board (PCB) land pattern (landing area) shown is based on RF360 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 RF360, 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).

Projection method

Unless otherwise specified first-angle projection is applied.

20 Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out that **such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, RF360 Europe GmbH and its affiliates are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an RF360 product with the properties described in the product specification is suitable for use in a particular customer application.
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