



RF360
Europe GmbH

Data sheet

Micro-acoustic filter
BeiDou + GPS + GLONASS

Series/type:	B8878
Ordering code:	B39162B8878P810
Date:	June 19, 2019
Version:	2.2

DCN: 80-PA243-100 Rev. B

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1 Application

- Low-loss RF BeiDou + GPS + GLONASS filter
- Simultaneous usage of BeiDou, GPS and GLONASS bands
- Usable passbands: 2.0 MHz for GPS, 4.092 MHz for BeiDou and 8.34 MHz for GLONASS
- Very low insertion attenuation
- High out of band selectivity
- Filter impedance 50 Ω
- Unbalanced to unbalanced operation
- No matching network required for operation at 50 Ω

2 Features

- RoHS compatible
- Package size 1.1 mm \times 0.9 mm
- Package height 0.45 mm (max.)
- Approximate weight 1 mg
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

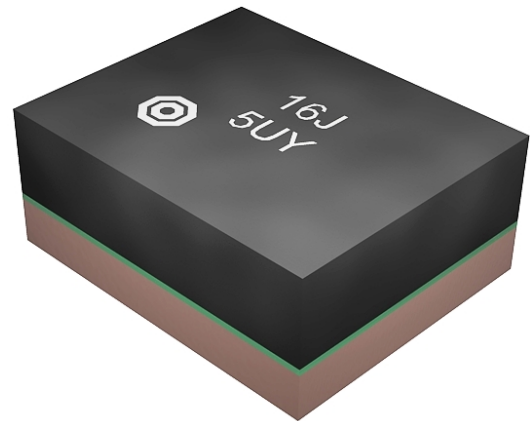
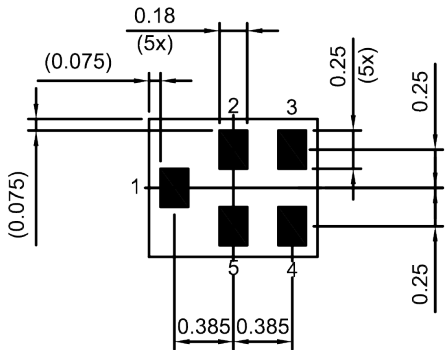


Figure 1: Picture of component with example of product marking.

3 Package

BOTTOM VIEW



Pad and pitch tolerance ±0.05

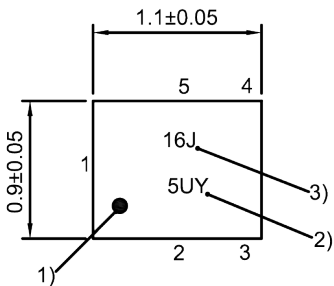
4 Pin configuration

- 1 Input
- 4 Output
- 2, 3, 5 Ground

SIDE VIEW

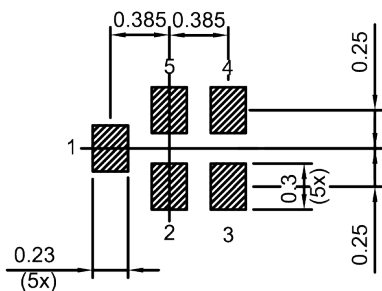


TOP VIEW



- 1) Marking for pad number 1
- 2) Encoded lot number
- 3) Please refer to caption below

Land pattern THRU VIEW



Landing pad tolerance -0.02

Figure 2: Drawing of package with package height A = 0.45 mm (max.). See Sec. Package information (p. 18).

5 Matching circuit

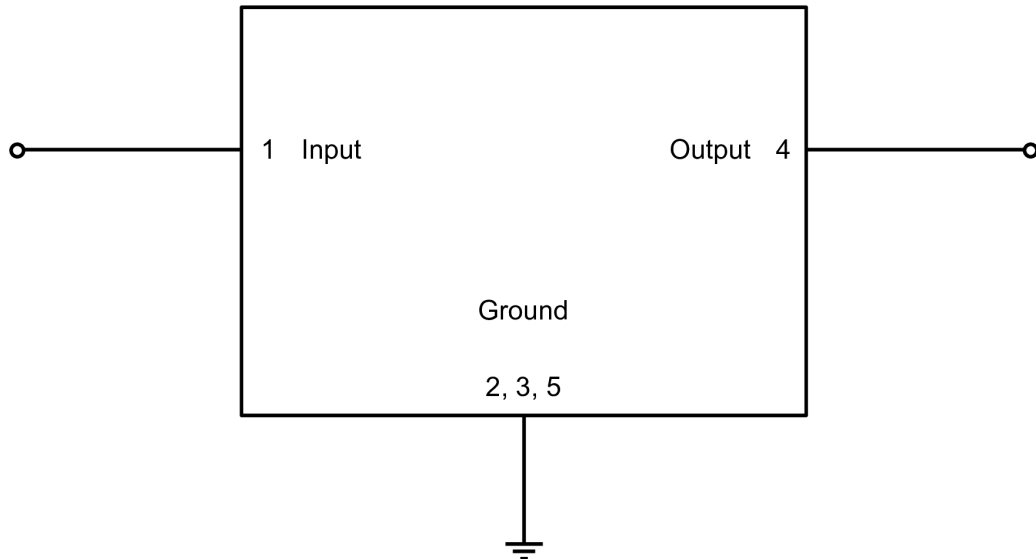


Figure 3: Schematic of matching circuit. No external matching components required.

6 Characteristics

Temperature range for specification	T_{SPEC}	= -30 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 50 Ω
Output terminating impedance	Z_{OUT}	= 50 Ω

Characteristics		min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency	f_c	—	1582.47	—	MHz
Insertion Loss	α				
	1559.052... 1563.144 MHz	—	1.2	1.7 ¹⁾	dB
	1559.052... 1563.144 MHz	—	1.2	2.0	dB
	1574.42... 1576.42 MHz	—	0.9	1.2 ¹⁾	dB
	1574.42... 1576.42 MHz	—	0.9	1.3	dB
	1597.55... 1605.89 MHz	—	1.1	1.6 ¹⁾	dB
	1597.55... 1605.89 MHz	—	1.1	1.8	dB
Group delay ripple (p-p)	τ				
	1597.55... 1605.89 MHz	—	6.0	12	ns
VSWR	VSWR				
@ input port	1559.052... 1563.144 MHz	—	1.7	2.0	
	1574.42... 1576.42 MHz	—	1.2	1.9	
	1597.55... 1605.89 MHz	—	1.4	1.9	
@ output port	1559.052... 1563.144 MHz	—	1.6	2.0	
	1574.42... 1576.42 MHz	—	1.2	1.9	
	1597.55... 1605.89 MHz	—	1.3	1.9	
Attenuation	α				
	777... 798 MHz	41	47	—	dB
	814... 915 MHz	41	47	—	dB
	1427... 1463 MHz	40	45	—	dB
	1695... 1710 MHz	36	47	—	dB
	1710... 1785 MHz	40	51	—	dB
	1850... 1980 MHz	40	48	—	dB
	2000... 2025 MHz	40	47	—	dB
	2300... 2400 MHz	46	53	—	dB
	2401... 2483 MHz	46	56	—	dB
	2496... 2690 MHz	46	55	—	dB
	3400... 3800 MHz	36	39	—	dB
	4400... 4900 MHz	22	39	—	dB
	5150... 5925 MHz	25	32	—	dB

¹⁾ Valid for temperature $T = +10$ °C...+65 °C.

7 Maximum ratings

Storage temperature	$T_{STG}^{2)} = -40\text{ °C} \dots +85\text{ °C}^{1)}$	
DC voltage	$ V_{DC} = 5.0\text{ V (max.)}^{3)}$	
ESD voltage	$V_{ESD}^{4)} = 50\text{ V (max.)}$	Machine model.
Input power		
@ input port: 915 MHz	$P_{IN} = 23\text{ dBm}$	GSM signal duty cycle 1:8 for 5000 h @ 50 °C. Effective power in On-state.
@ input port: 1463 MHz	$P_{IN} = 15\text{ dBm}$	Continuous wave for 5000 h @ 50 °C
@ input port: 1695 MHz	$P_{IN} = 15\text{ dBm}$	Continuous wave for 5000 h @ 50 °C

¹⁾ Extended upperlimit: 96h@125°C acc. to IEC 60068-2-2 Bb.

²⁾ Not valid for packaging material. Storage temperature for packaging material is -25 °C to +40 °C.

³⁾ 168h Damp Heat Steady State acc. IEC 60068-2-67 Cy.

⁴⁾ According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

8 Transmission coefficient

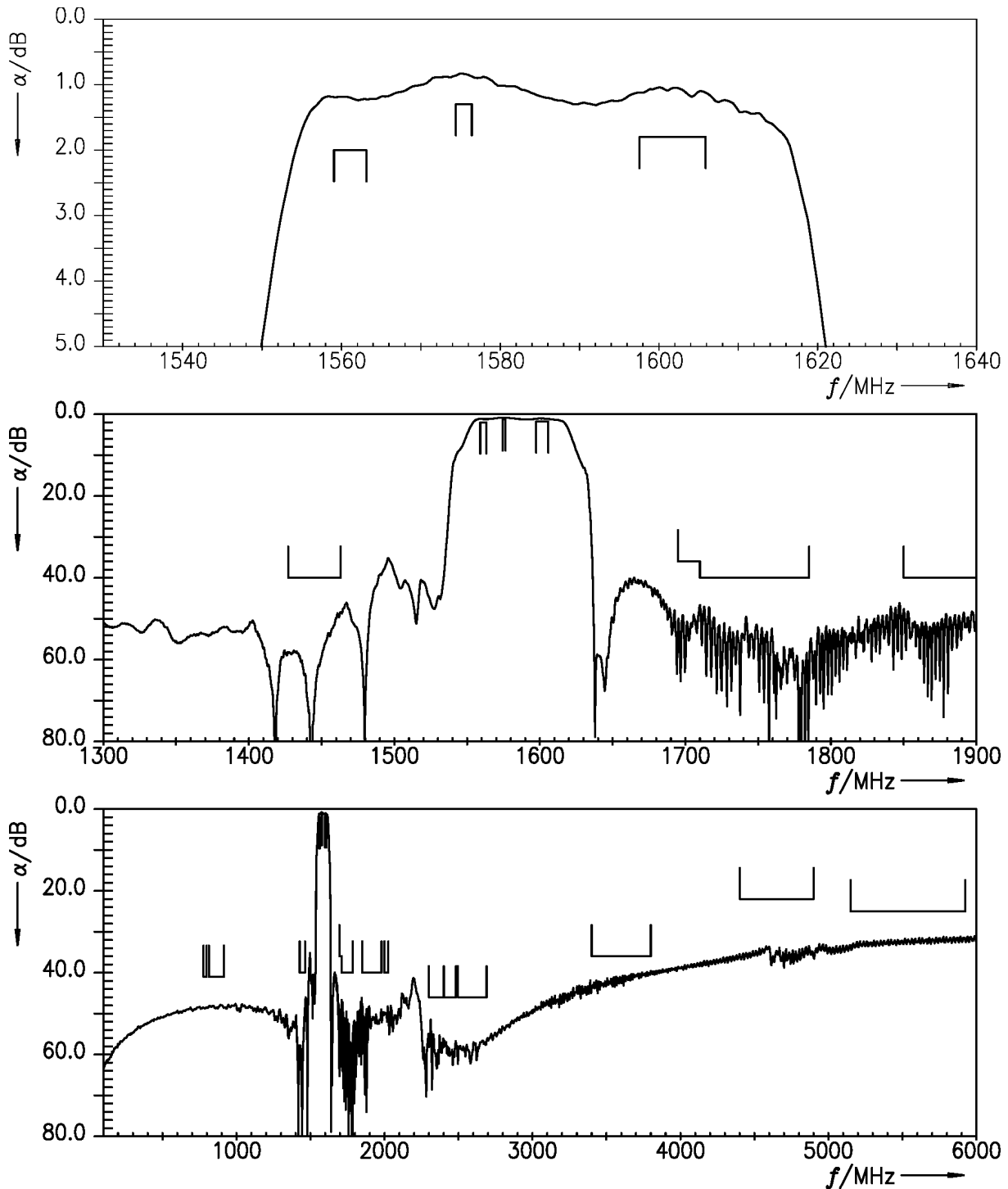


Figure 4: Attenuation.

9 Reflection coefficients

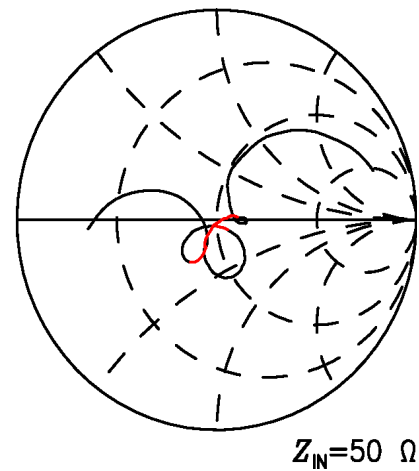
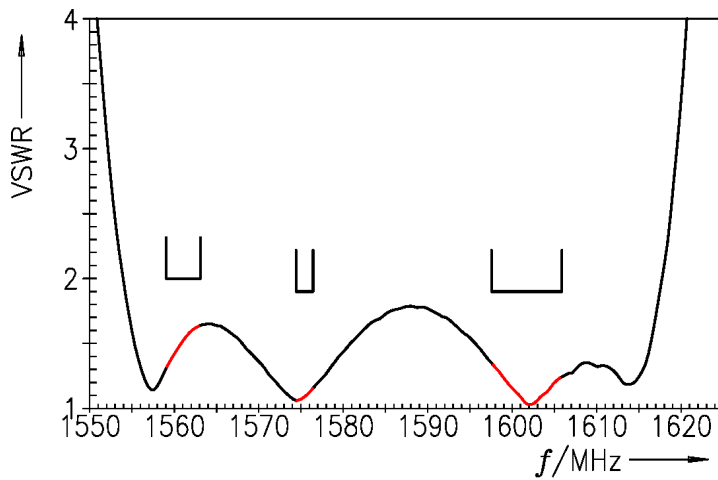


Figure 5: Reflection coefficient at input port.

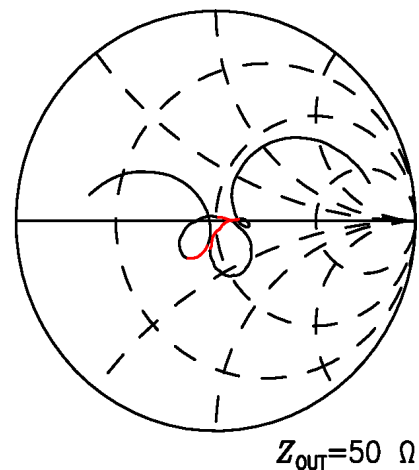
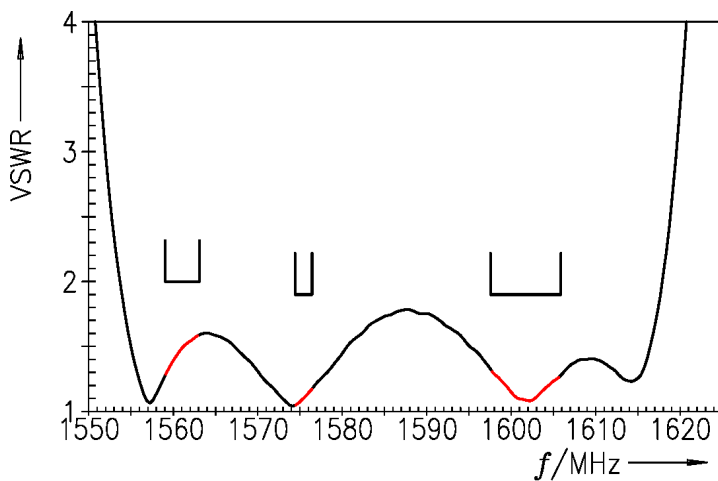


Figure 6: Reflection coefficient at output port.

10 Packing material

10.1 Tape

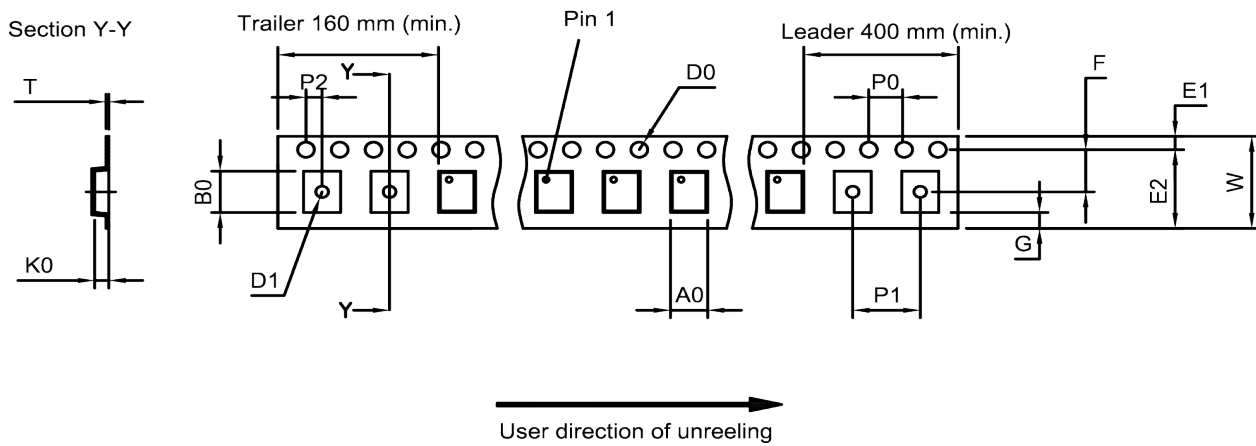


Figure 7: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A ₀	1.02±0.05 mm	E ₂	6.25 mm (min.)	P ₁	2.0±0.1 mm
B ₀	1.22±0.05 mm	F	3.5±0.05 mm	P ₂	2.0±0.05 mm
D ₀	1.55±0.05 mm	G	–	T	0.25±0.03 mm
D ₁	0.55±0.1 mm	K ₀	0.6±0.05 mm	W	8.0+0.3/-0.1 mm
E ₁	1.75±0.1 mm	P ₀	4.0±0.1 mm		

Table 1: Tape dimensions.

10.2 Reel with diameter of 180 mm

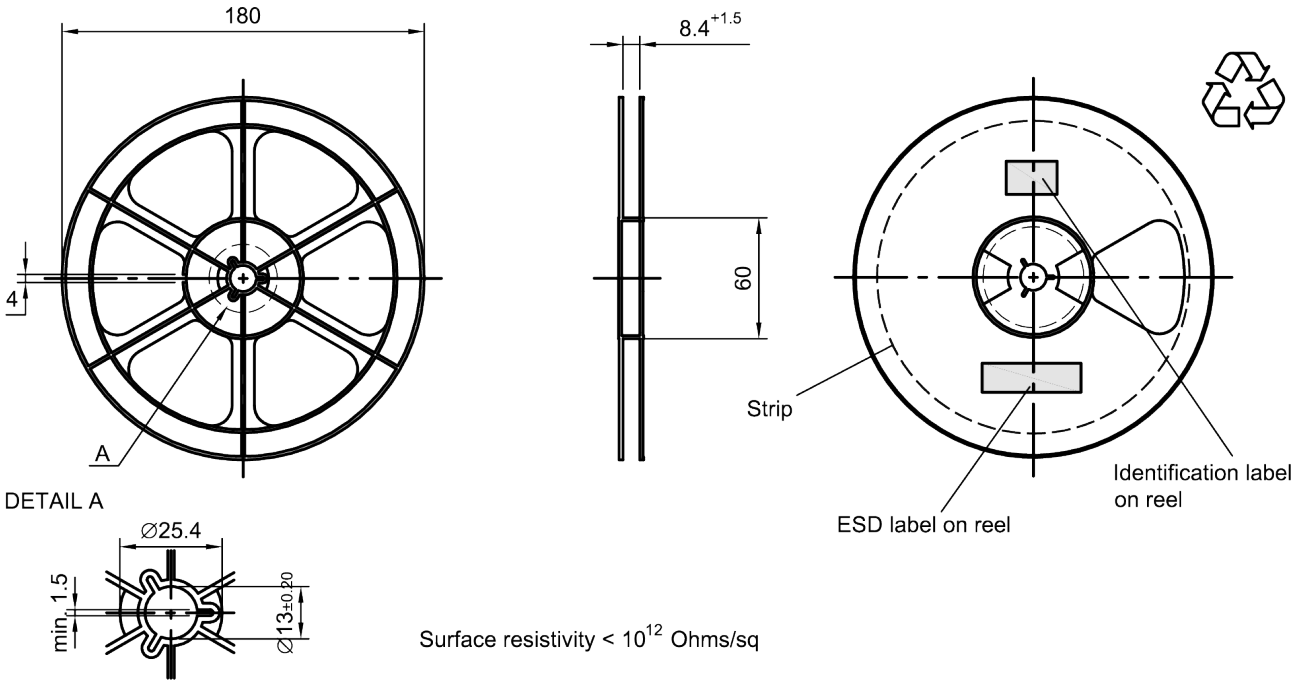


Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

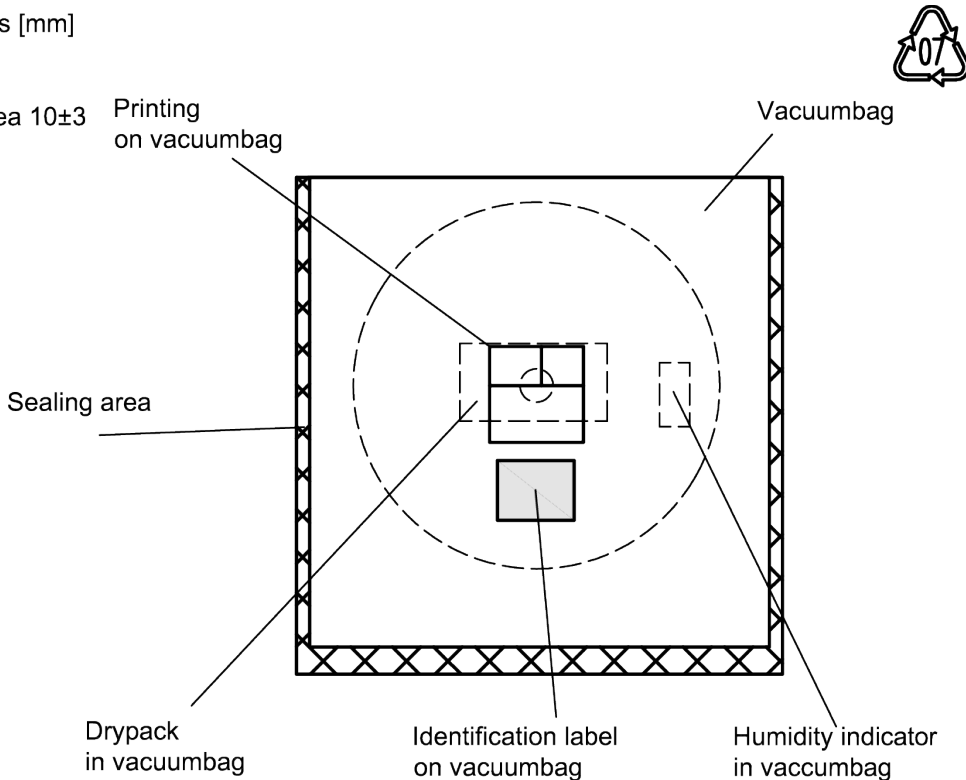


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

Dimensions [mm]
L = 188
B = 188
H = 30
Tolerance ±5

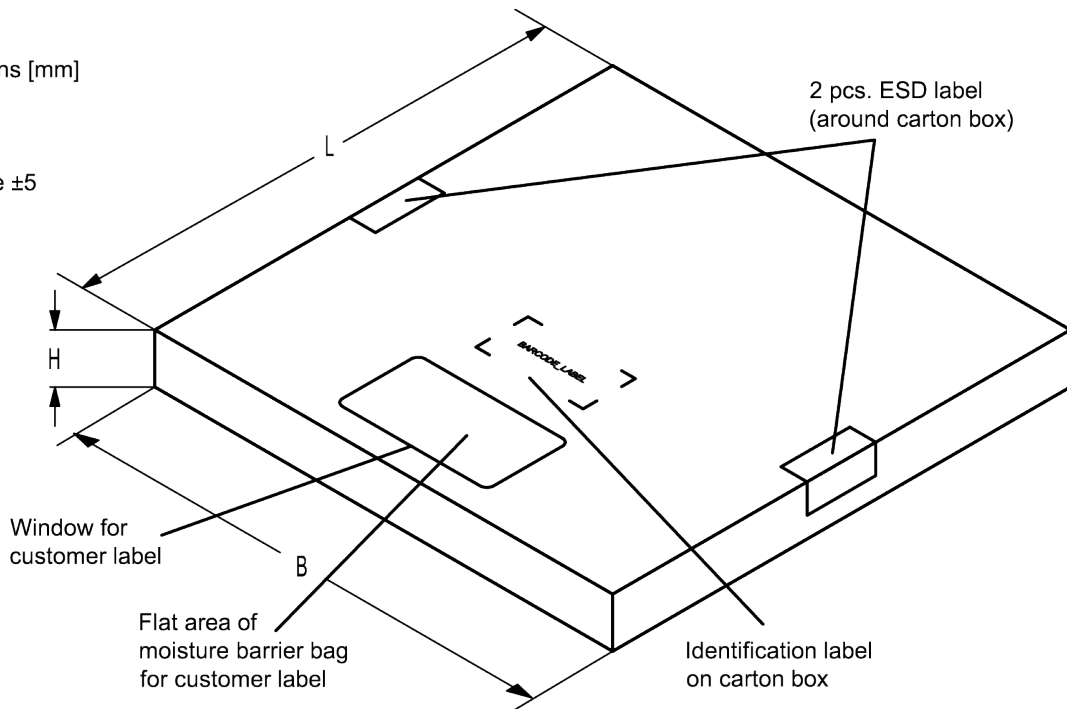


Figure 10: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

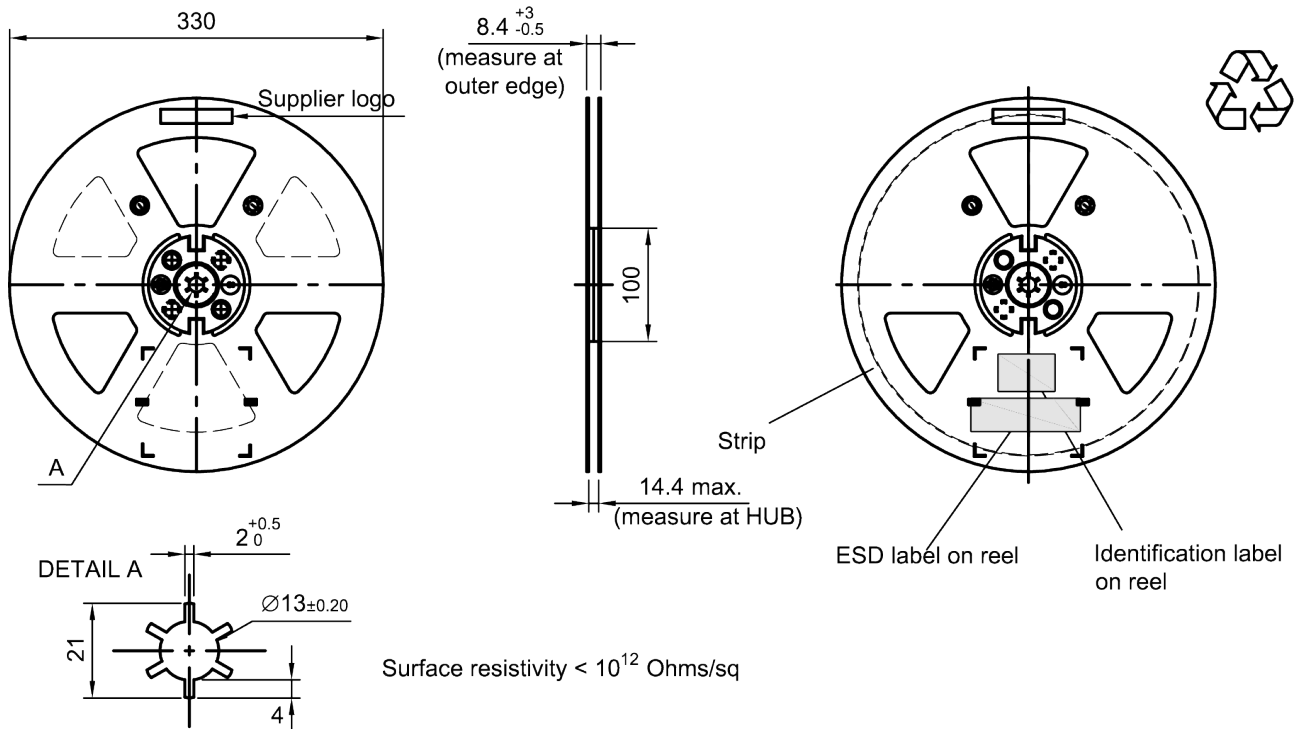


Figure 11: Drawing of reel (first-angle projection) with diameter of 330 mm.

Dimensions [mm]
X = 400+5
Y = 418+5
Sealing area 10±3

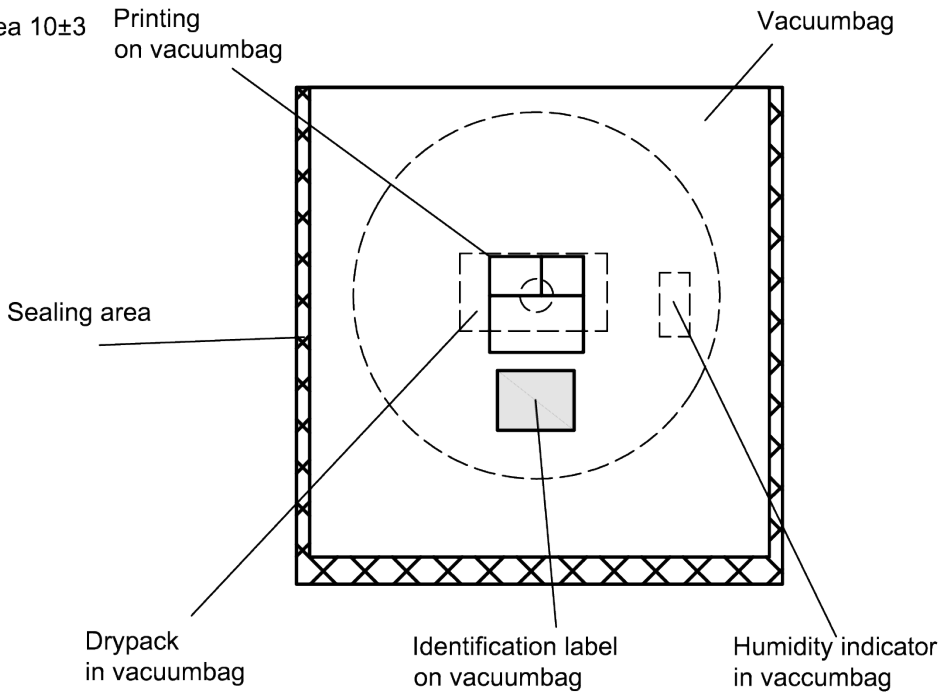


Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

Dimensions [mm]
L = 335
B = 338
H = 36 (for 8 mm tape width)
40 (for 12 mm tape width)
Tolerance ±5

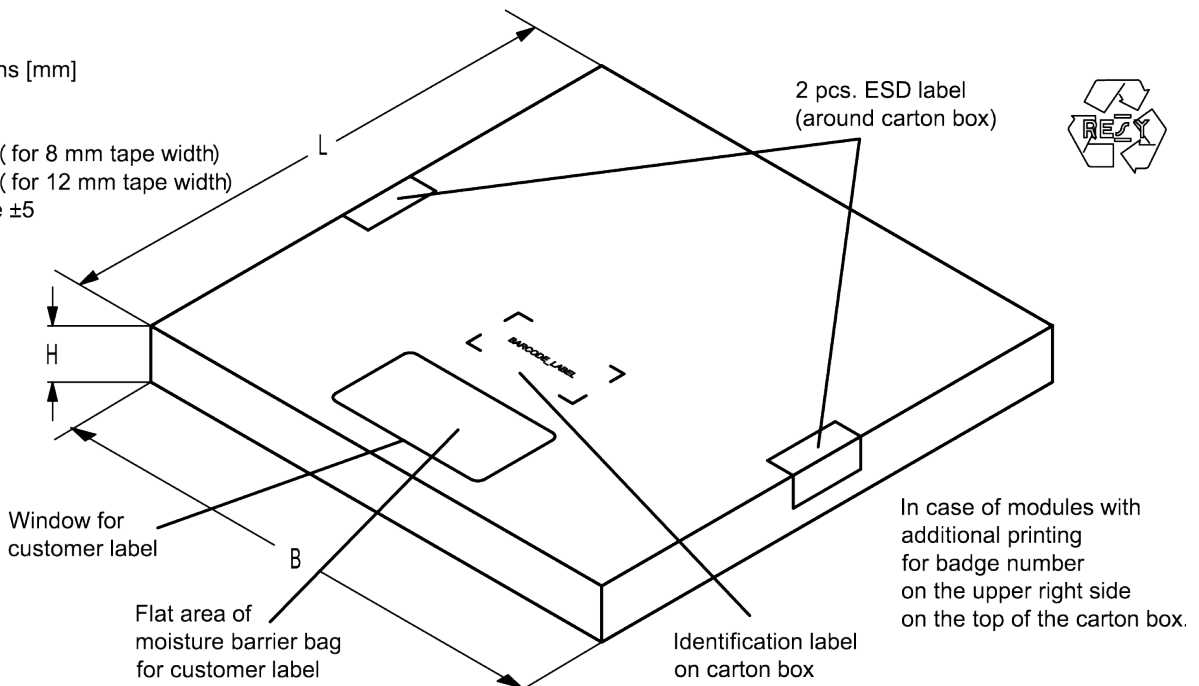


Figure 13: Drawing of folding box for reel with diameter of 330 mm.

11 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, e.g., B3xxxxB**1234**xxxx, is encoded by a special BASE32 code into a 3 digit marking.

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 B8878 is 8NE.

■ Lot number:

The last 5 digits of the lot number, e.g., **12345**, are encoded based on a special BASE47 code into a 3 digit marking.

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.

12 Soldering profile

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

ramp rate	≤ 3 K/s
preheat	125 °C to 220 °C, 150 s to 210 s, 0.4 K/s to 1.0 K/s
T > 220 °C	30 s to 70 s
T > 230 °C	min. 10 s
T > 245 °C	max. 20 s
T ≥ 255 °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	≤ 3 K/s
soldering temperature T	measured at solder pads

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

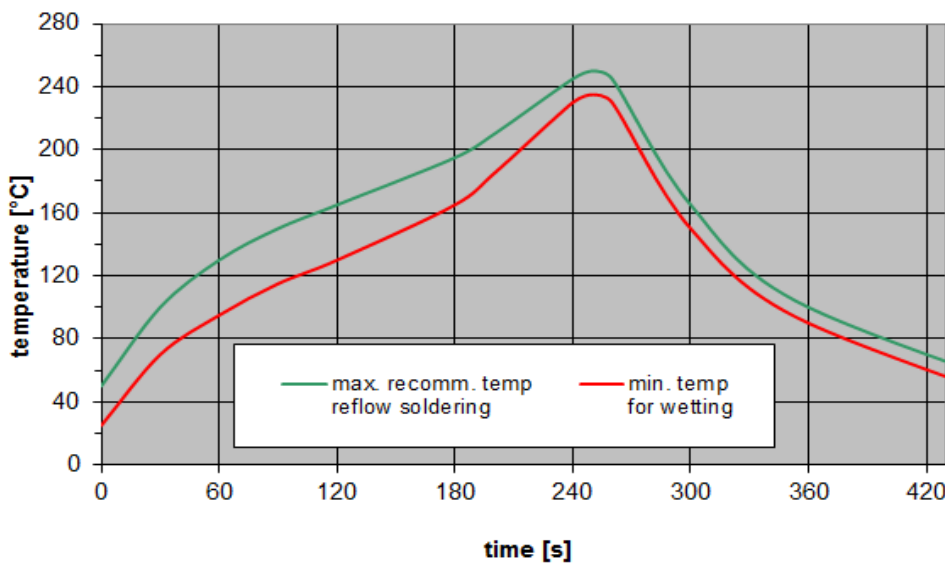


Figure 14: Recommended reflow profile for convection and infrared soldering – lead-free solder.

13 Annotations

13.1 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.

13.2 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.

13.3 Ordering codes and packing units

Ordering code	Packing unit
B39162B8878P810	15,000 pcs
B39162B8878P810S 5	5,000 pcs

Table 4: Ordering codes and packing units.

14 Cautions and warnings

14.1 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.

14.2 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.

14.3 Moldability

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

14.4 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.

15 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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3. **The warnings, cautions and product-specific notes must be observed.**
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