



RF360  
Europe GmbH

## SAW components

### SAW Rx filter

M2M  
LTE band 31

Series/type:	B8359
Ordering code:	B39471B8359P810
Date:	September 07, 2017
Version:	2.0

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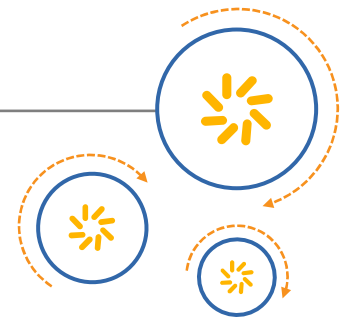
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**SAW components****B8359****SAW Rx filter****465 MHz**

Data sheet

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<b>SAW components</b>	<b>B8359</b>
<b>SAW Rx filter</b>	<b>465 MHz</b>

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## SAW components

B8359

## SAW Rx filter

465 MHz

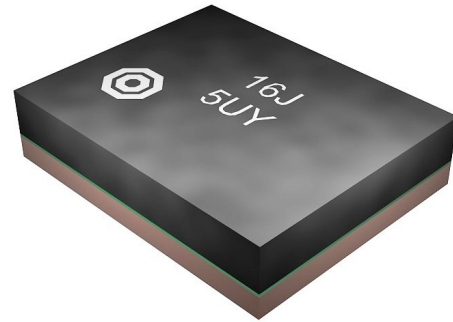
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## 1 Application

- Low-loss SAW Rx filter for LTE Band 31 systems
- High out-of-band rejection
- Usable pass band: 5 MHz
- Single-ended to balanced conversion

## 2 Features

- Package size  $2.0 \pm 0.1 \text{ mm} \times 1.6 \pm 0.1 \text{ mm}$
- Package height 0.47 mm (max.)
- Approximate weight 5 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)



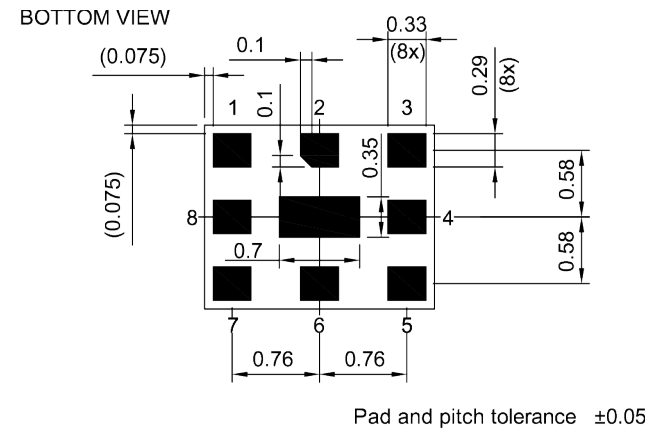
**Figure 1:** Picture of component with example of product marking.

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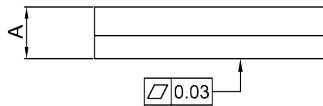
**3 Package**



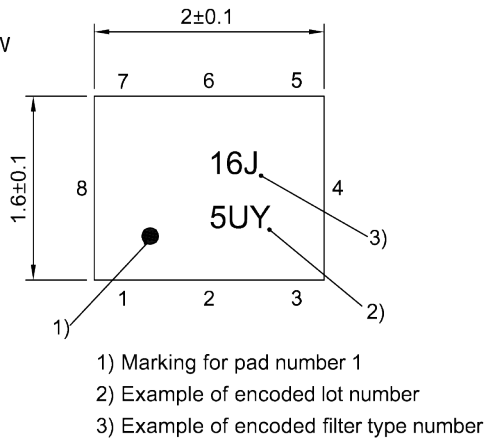
**4 Pin configuration**

- 1            Input
- 3, 4        Output balanced
- 2, 5, 6, 7, 8, 9    Ground

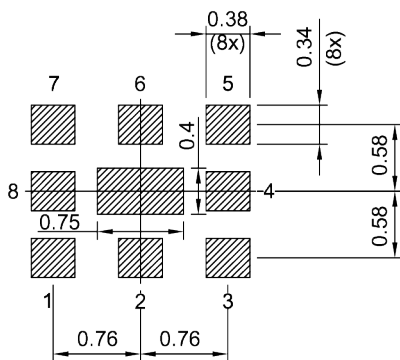
**SIDE VIEW**



**TOP VIEW**



**Land pattern THRU VIEW**

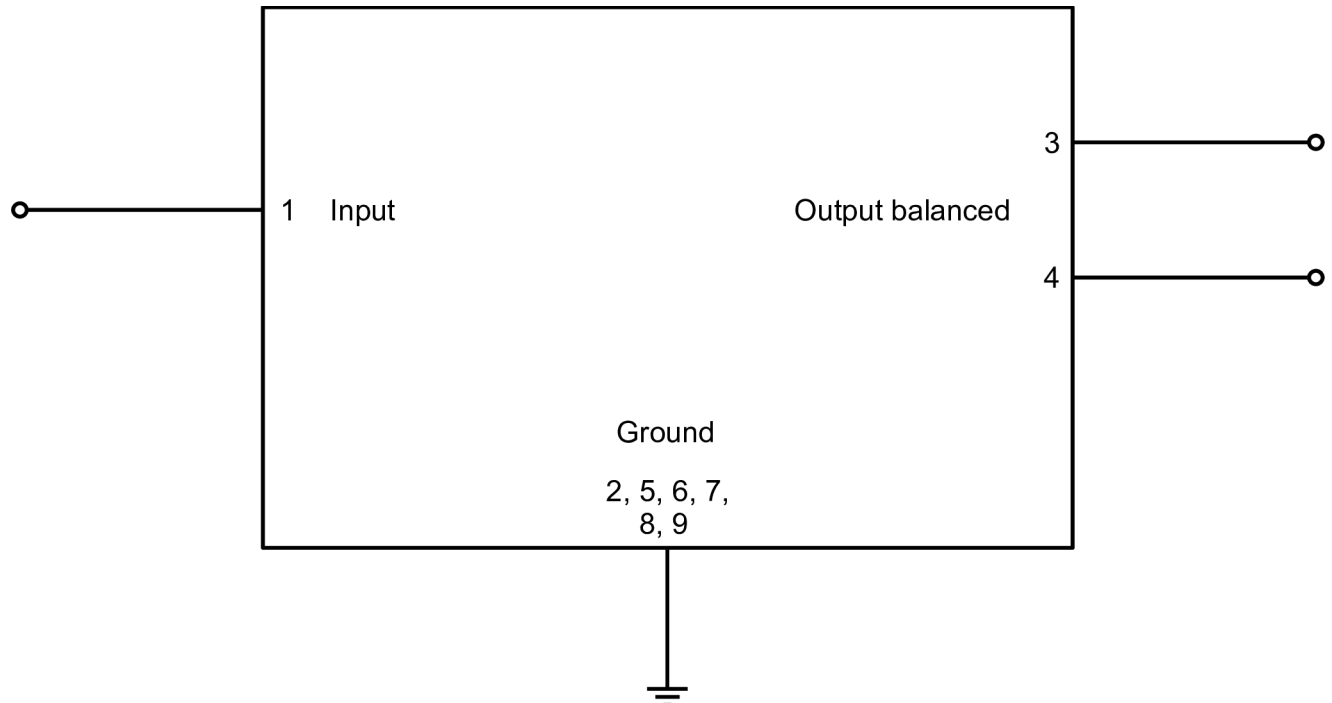


Landing pad tolerance -0.02

**Figure 2:** Drawing of package with package height A = 0.47 mm (max.). See Sec. Package information (p. 18).

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## 5 Matching circuit



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



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## 6 Characteristics

Temperature range for specification	$T_{SPEC}$	= -30 °C ... +85 °C
Input terminating impedance	$Z_{IN}$	= 50 $\Omega$
Output terminating impedance	$Z_{OUT}$	= 100 $\Omega$

Characteristics <sup>1)</sup>		min. for $T_{SPEC}$	typ. @ +25 °C	max. for $T_{SPEC}$	
<b>Center frequency</b>	$f_C$	—	465	—	MHz
<b>Maximum insertion attenuation</b>	$\alpha_{max}$	—	1.9	3.0	dB
462.5... 467.5 MHz					
<b>Amplitude ripple (p-p)</b>	$\Delta\alpha$	—	0.5	1.6	dB
462.5... 467.5 MHz					
<b>Maximum VSWR</b>	$VSWR_{max}$	—	1.9	2.5	
@ input port					
@ output port		—	2.0	2.5	
<b>Variation of amplitude imbalance</b>	$\Delta_{var}$	-1.0	0.2	1.0	dB
462.5... 467.5 MHz					
<b>Variation of phase imbalance</b>	$\Theta_{var}$	-10	1.0	10	°
462.5... 467.5 MHz					
<b>Minimum attenuation</b>	$\alpha_{min}$	43	51	—	dB
50... 451 MHz					
452.5... 457.5 MHz		43	48	—	
475... 480 MHz		33	37	—	
481... 4000 MHz		40	49	—	dB

<sup>1)</sup> T is the ambient temperature of the PCB at component position. Specified min/max values are valid for an input power of up to 20 dBm.

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## 7 Maximum ratings

Operable temperature	$T_{OP} = -40\text{ °C} \dots +85\text{ °C}$	
Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$ V_{DC} ^{2)} = 0\text{ V (max.)}$	
ESD voltage	$V_{ESD}^{3)} = 100\text{ V (max.)}$	Machine model.
Input power @ input port: 462.5 ... 467.5 MHz	$P_{IN} = 27\text{ dBm}^{4)}$	5 MHz LTE downlink signal (25 RB) for 5000 h @ 55 °C.

<sup>1)</sup> Not valid for packaging material. Storage temperature for packaging material is -25 °C to +40 °C.

<sup>2)</sup> In case of applied DC voltage blocking capacitors are mandatory.

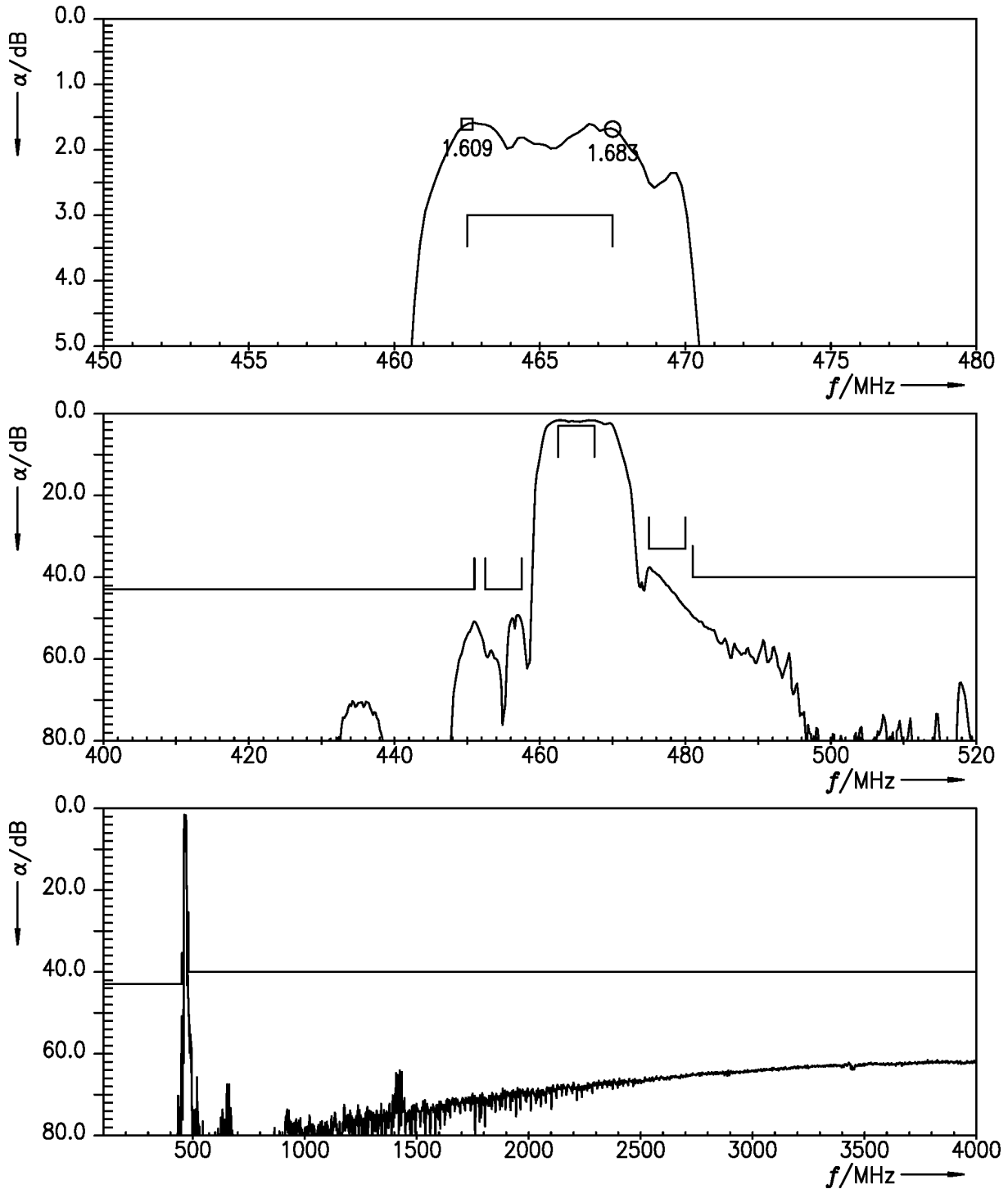
<sup>3)</sup> According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

<sup>4)</sup> Expected Lifetime according to accelerated power durability simulations and wear out models.

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**8 Transmission coefficient**



**Figure 4:** Attenuation.

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9 Reflection coefficients

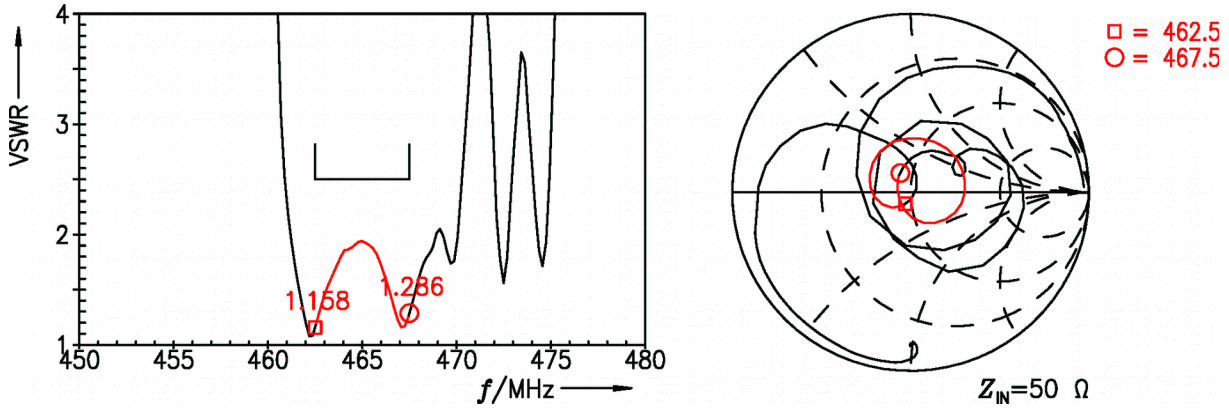


Figure 5: Reflection coefficient at IN port.

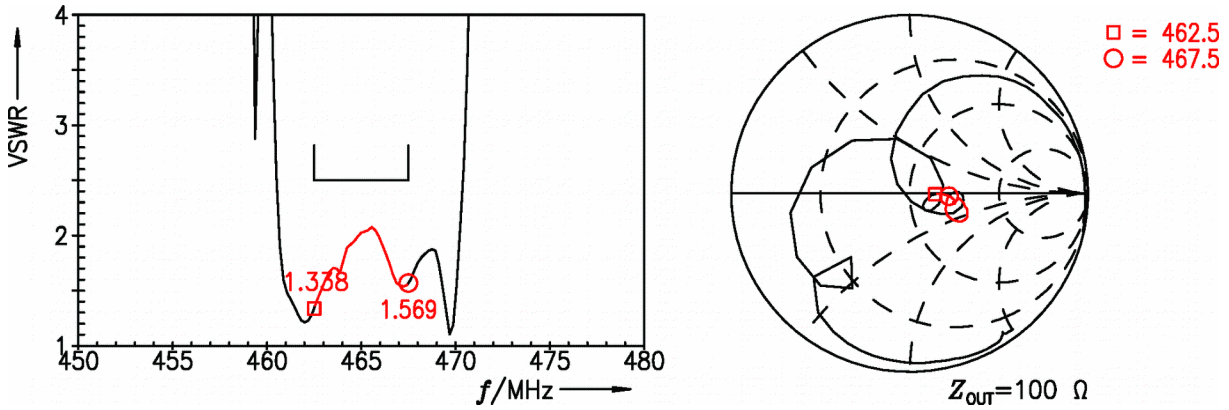


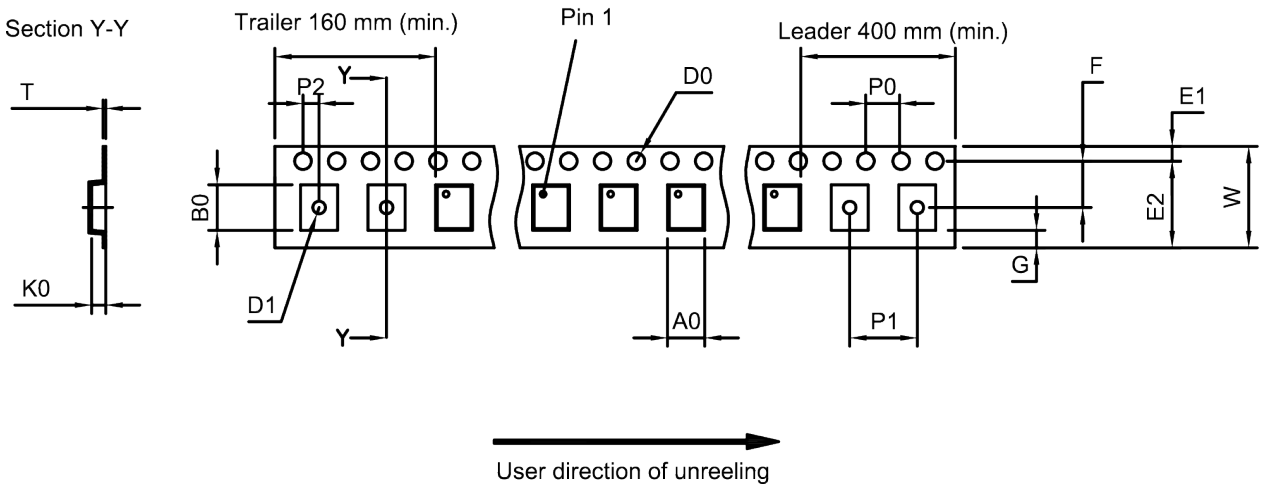
Figure 6: Reflection coefficient at OUT port.

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**10 Packing material**

**10.1 Tape**



**Figure 7:** Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A <sub>0</sub>	1.8±0.05 mm	E <sub>2</sub>	6.25 mm (min.)	P <sub>1</sub>	4.0±0.1 mm
B <sub>0</sub>	2.25±0.05 mm	F	3.5±0.05 mm	P <sub>2</sub>	2.0±0.05 mm
D <sub>0</sub>	1.5+0.1/-0 mm	G	0.75 mm (min.)	T	0.25±0.03 mm
D <sub>1</sub>	1.0 mm (min.)	K <sub>0</sub>	0.6±0.05 mm	W	8.0+0.3/-0.1 mm
E <sub>1</sub>	1.75±0.1 mm	P <sub>0</sub>	4.0±0.1 mm		

**Table 1:** Tape dimensions.

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10.2 Reel with diameter of 180 mm

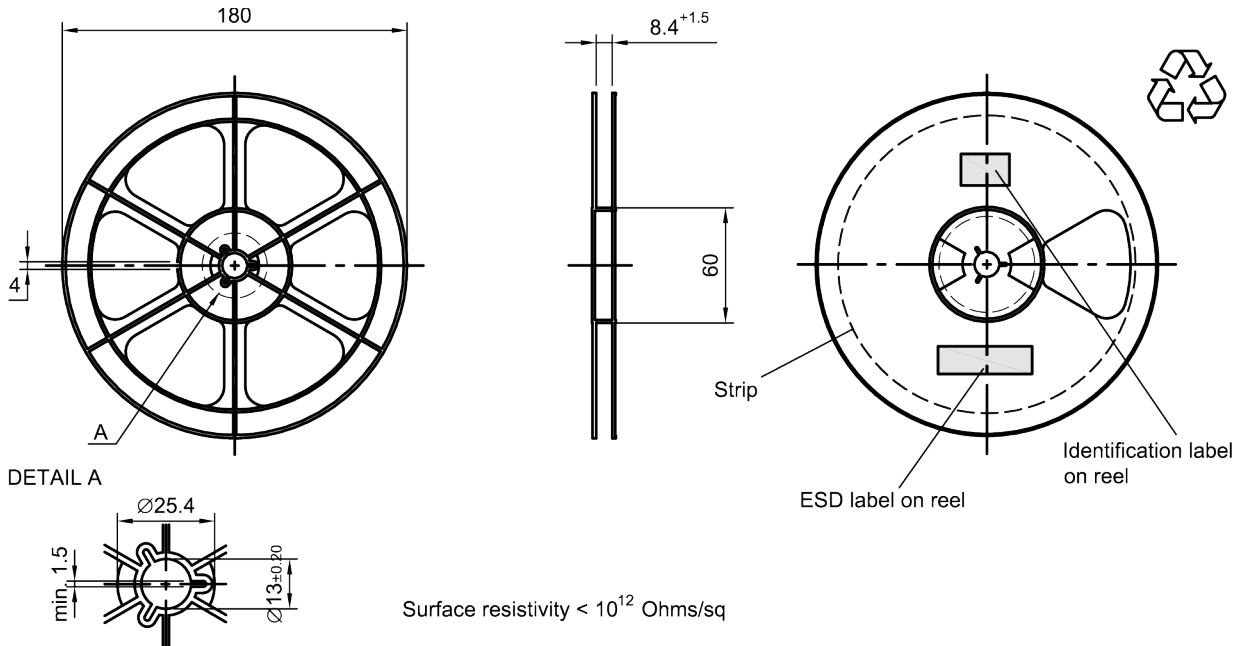


Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

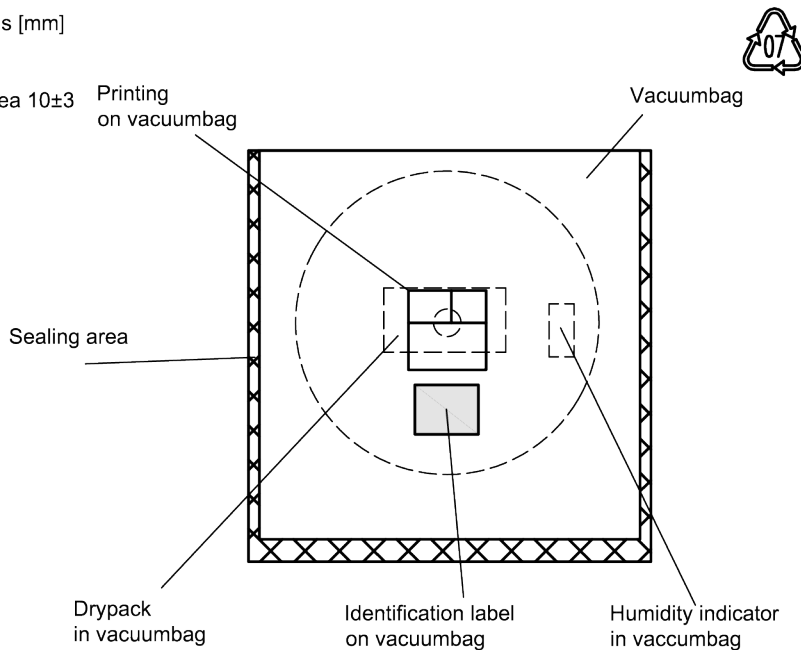


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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

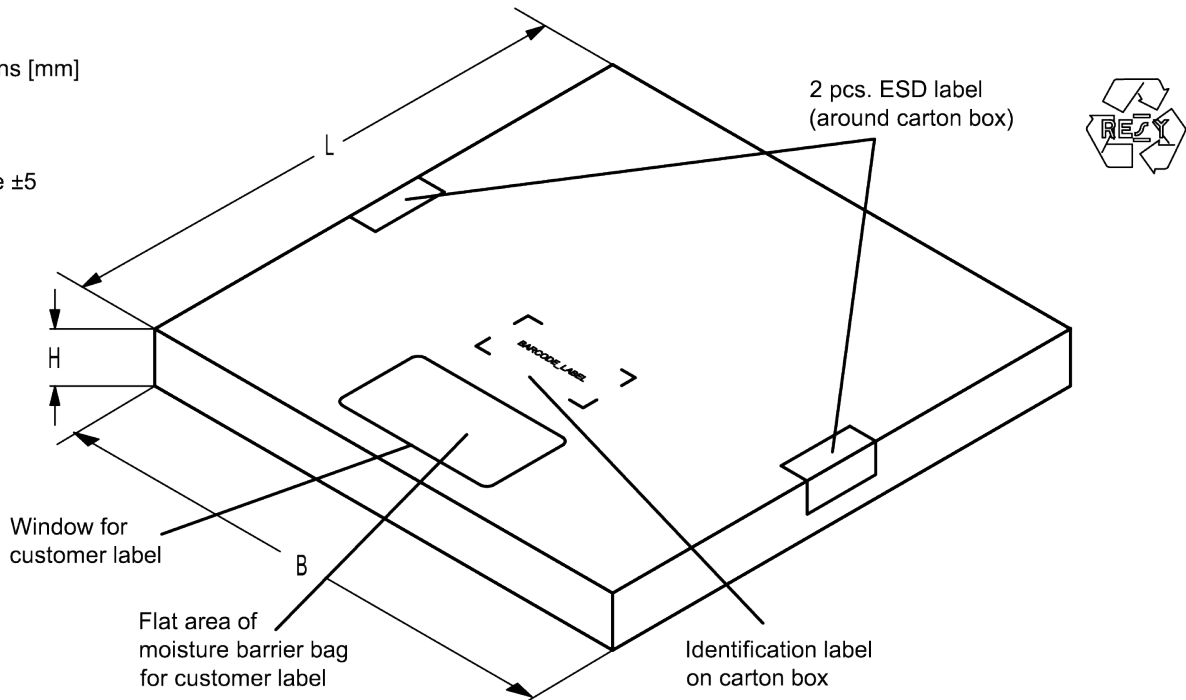


Figure 10: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

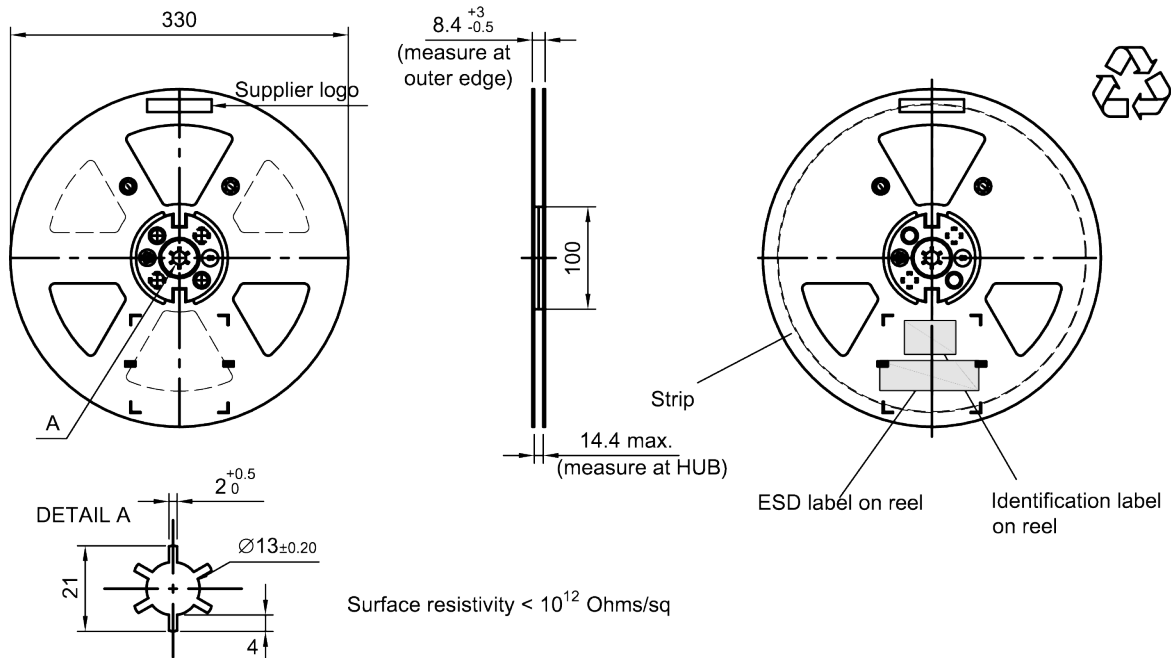
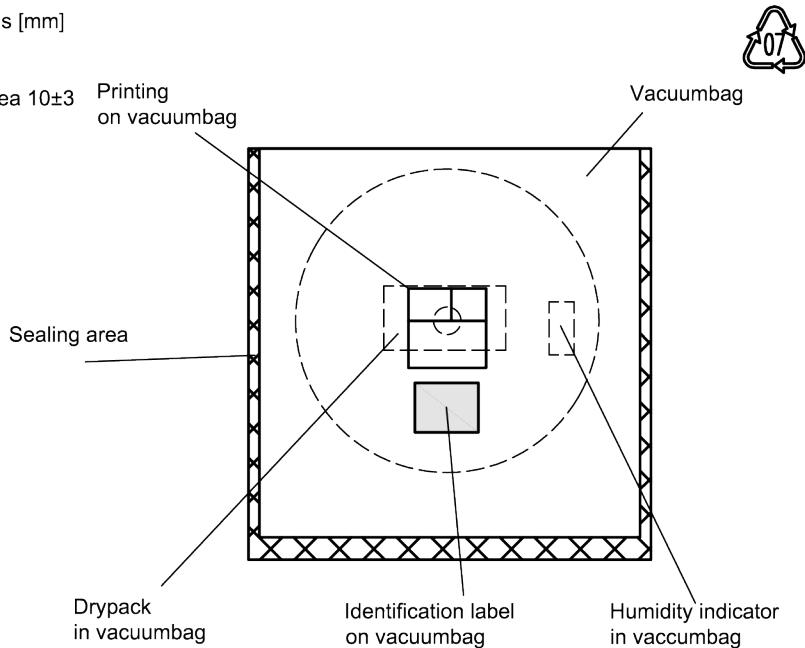


Figure 11: Drawing of reel (first-angle projection) with diameter of 330 mm.

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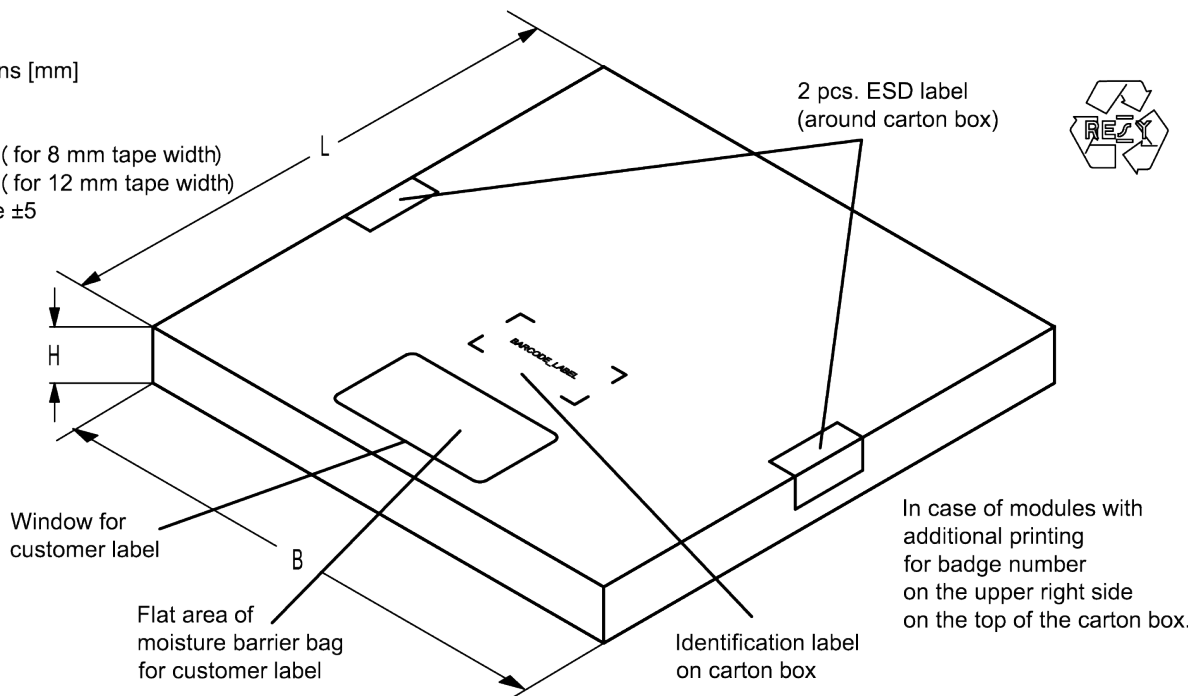
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Dimensions [mm]  
 X = 400+5  
 Y = 418+5  
 Sealing area 10±3



**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.



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## 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.
	<b>16J</b>	=	<b>1234</b>
	$1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0$	=	<b>1234</b>

The BASE32 code for product type B8359 is 857.

## ■ 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.
<b>5UY</b>	=	<b>12345</b>
$5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0$	=	<b>12345</b>

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.

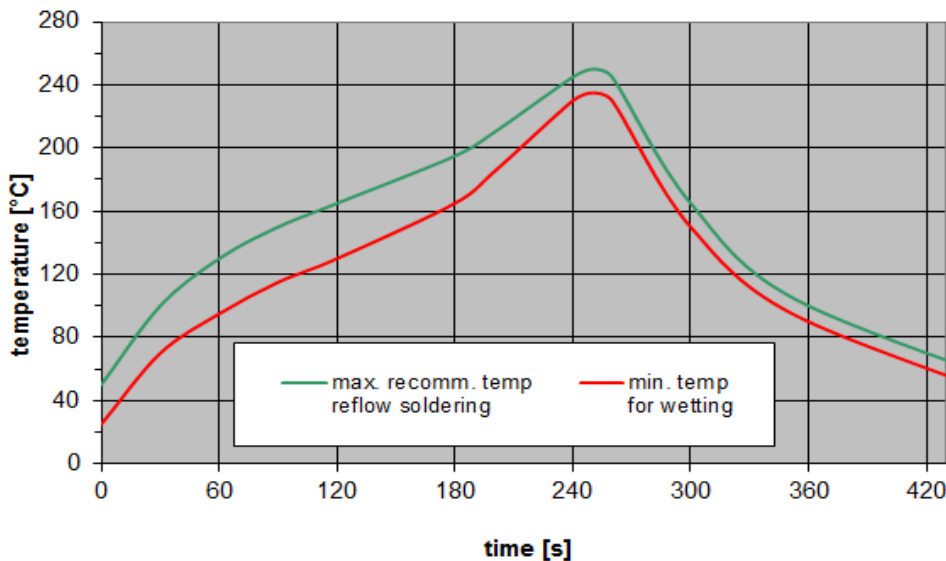
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## 12 Soldering profile

The recommended soldering process is in accordance with IEC 60068-2-58 – 3<sup>rd</sup> 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
$T \geq 255$ °C	–
peak temperature $T_{\text{peak}}$	250 °C +0/-5 °C
wetting temperature $T_{\text{min}}$	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.

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### 13 Annotations

#### 13.1 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>.

#### 13.2 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.

#### 13.3 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.

#### 13.4 Ordering codes and packing units

Ordering code	Packing unit
B39471B8359P810	15000 pcs
B39471B8359P810 5	5000 pcs

**Table 4:** Ordering codes and packing units.

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## **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](http://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.

## 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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