



RF360  
Europe GmbH

## SAW Components

### SAW RF Filter

Series/type:	B8331
Ordering code:	B39931B8331P810
Date:	November 09, 2015
Version:	2.0

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Data sheet

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## 1 Application

- Low-loss RF filter for HEMS.
- Usable pass band 5.9MHz.

## 2 Features

- 
- Package size 1.4 mm × 1.1 mm.
- Package height 0.45 mm.
- Approximate weight 0.003 g.
- RoHS compatible.
- Package for Surface Mount Technology (SMT).
- Ni, gold-plated terminals.
- Electrostatic Sensitive Device (ESD).
- Moisture Sensitivity Level 3 (MSL3).

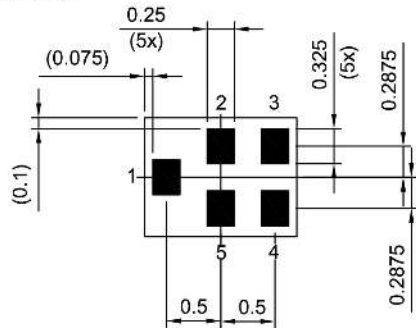


**Figure 1:** Picture of component with example of marking.

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**3 Package**

BOTTOM VIEW



Pad and pitch tolerance ±0.05

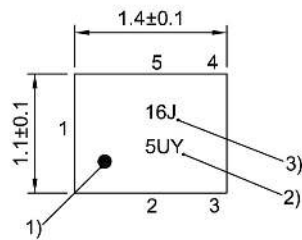
**4 Pin configuration**

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

SIDE VIEW

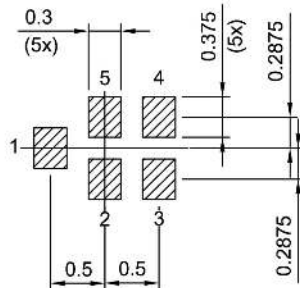


TOP VIEW



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

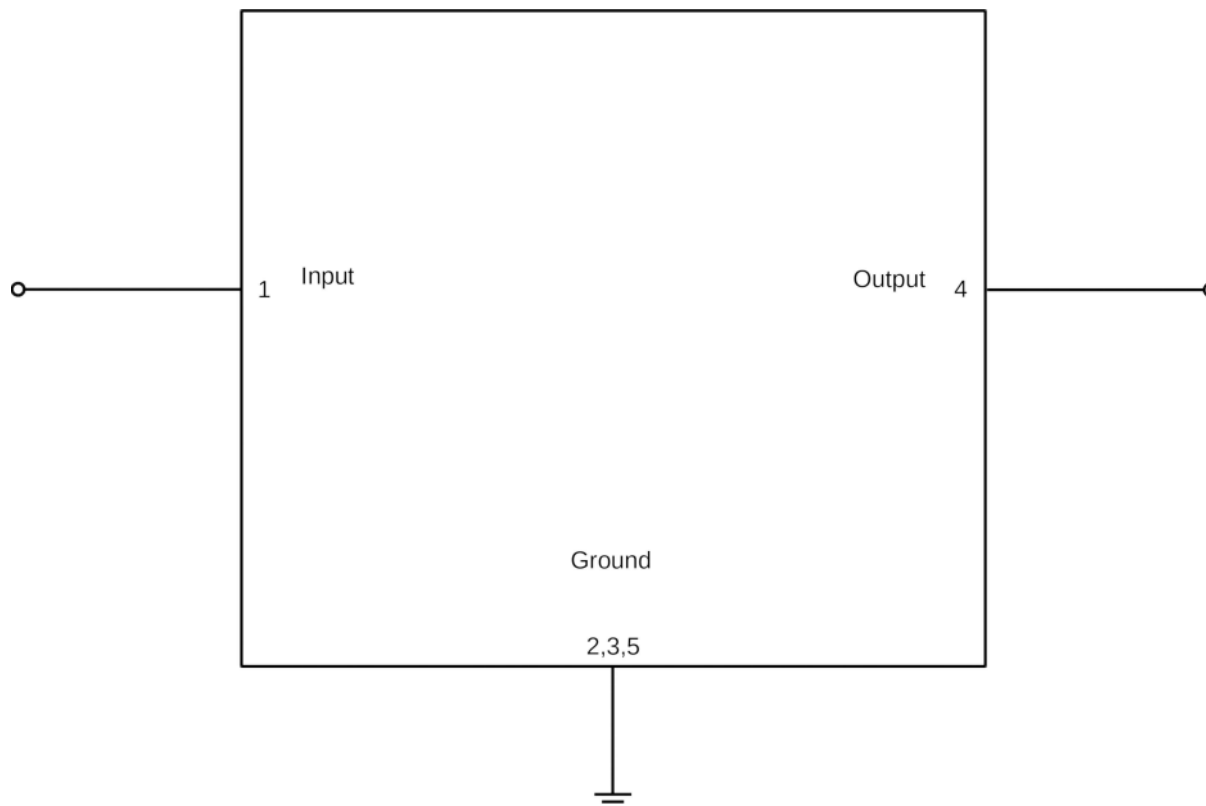
Land pattern THRU VIEW



Landing pad tolerance -0.02

**Figure 2:** Drawing of package with package height A = 0.45 mm (max.). See Simplified drawings (p. 16).

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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  $T = -40\text{ °C to }+85\text{ °C}$ 

 Input terminating impedance  $Z_{IN} = 50\ \Omega$ 

 Output terminating impedance  $Z_{OUT} = 50\ \Omega$ 

Characteristics			min.	typ. @+25 °C	max.	
<b>Center frequency</b>		$f_C$	—	925.15	—	MHz
<b>Maximum insertion attenuation</b>	922.2... 928.1	MHz	$\alpha_{max}$	—	1.8	2.7
						dB
<b>Amplitude ripple (p-p)</b>	922.2... 928.1	MHz	$\Delta\alpha$	—	0.3	1.2
						dB
<b>Maximum VSWR</b>			$VSWR_{max}$			
@ input port	922.2... 928.1	MHz	—	1.4	2.2	
@ output port	922.2... 928.1	MHz	—	1.5	2.2	
<b>Minimum attenuation</b>			$\alpha_{min}$			
	50... 815	MHz	50	64	—	dB
	815... 860	MHz	50	61	—	dB
	860... 890	MHz	40	57	—	dB
	890... 915	MHz	15	20	—	dB
	945... 960	MHz	18	26	—	dB
	960... 1150	MHz	33	39	—	dB
	1150... 1856	MHz	40	52	—	dB
	1856... 2500	MHz	40	47	—	dB



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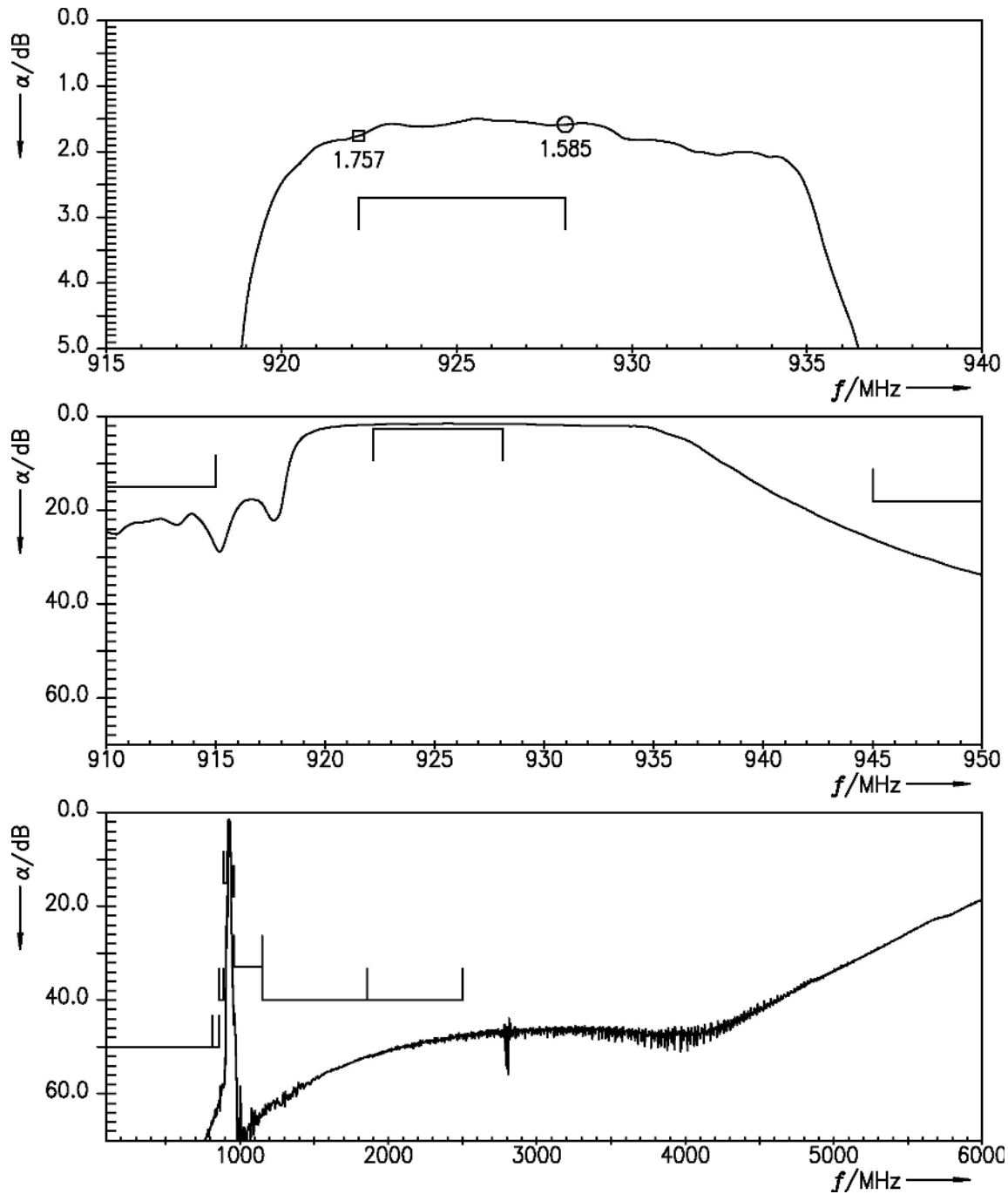
**7 Maximum ratings**

Storage temperature	$T_{STG} = -40\text{ °C to }+85\text{ °C}$	
DC voltage	$V_{DC} = 0\text{ V}$	
ESD voltage	$V_{ESD}^{1)} = 100\text{ V}$	Machine model.
Input power @ input port: 922.2 ... 928.1 MHz	$P_{IN} = 16\text{ dBm}$	Continuous wave for 50000 h @ 55 °C.

<sup>1)</sup> According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

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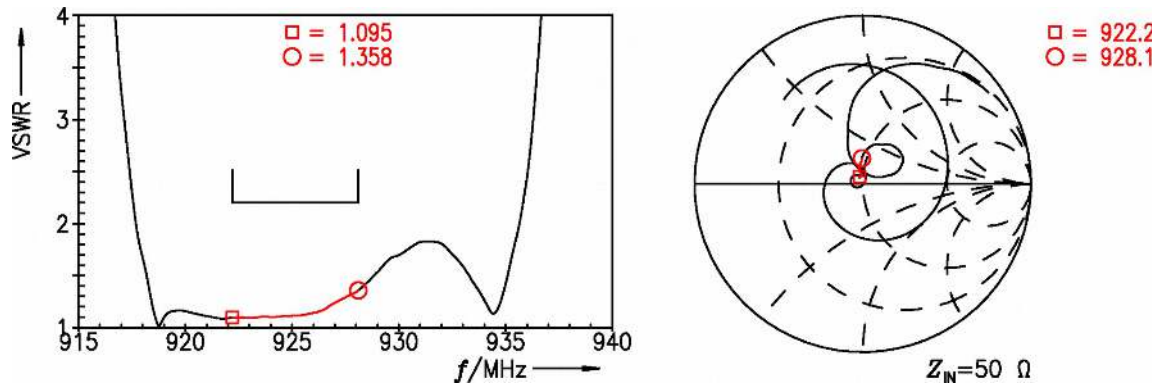
**8 Transmission coefficient**



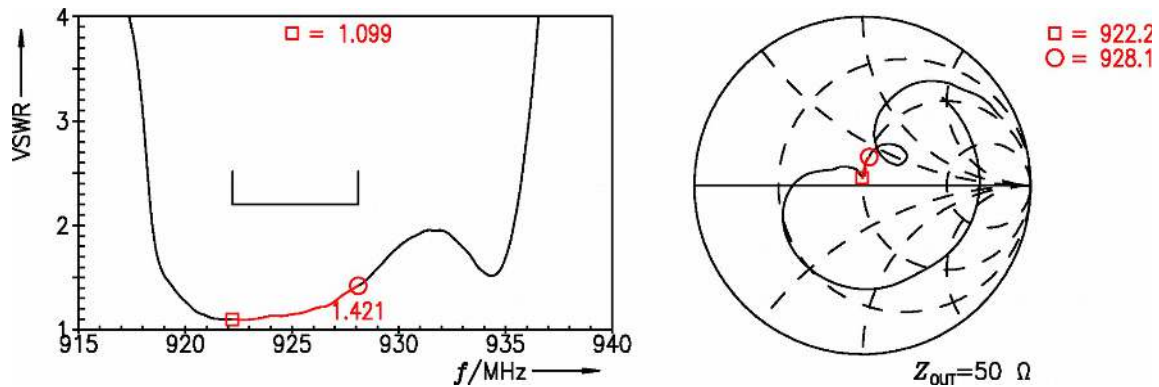
**Figure 4:** Attenuation.

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**9 Reflection coefficients**

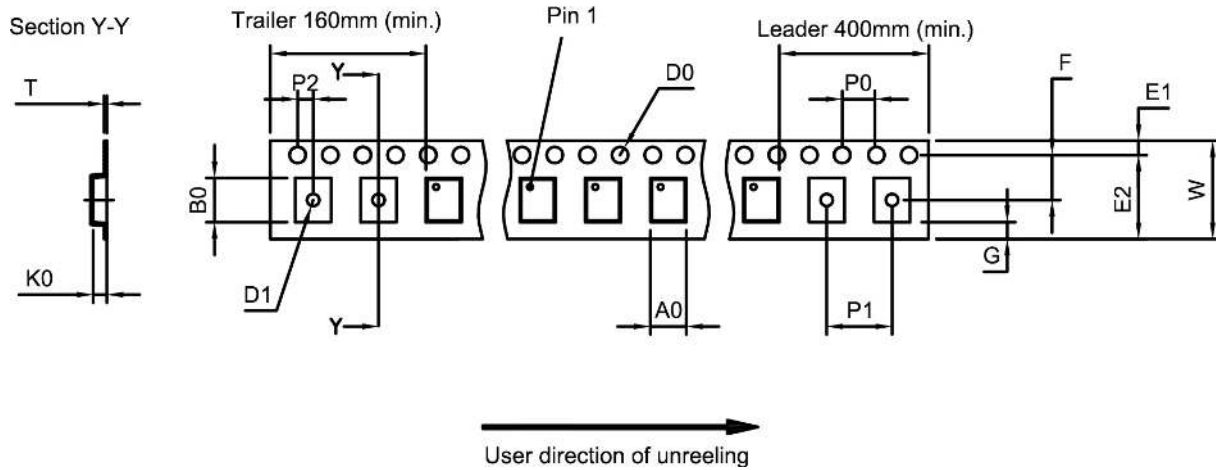


**Figure 5:** Reflection coefficient at IN port.



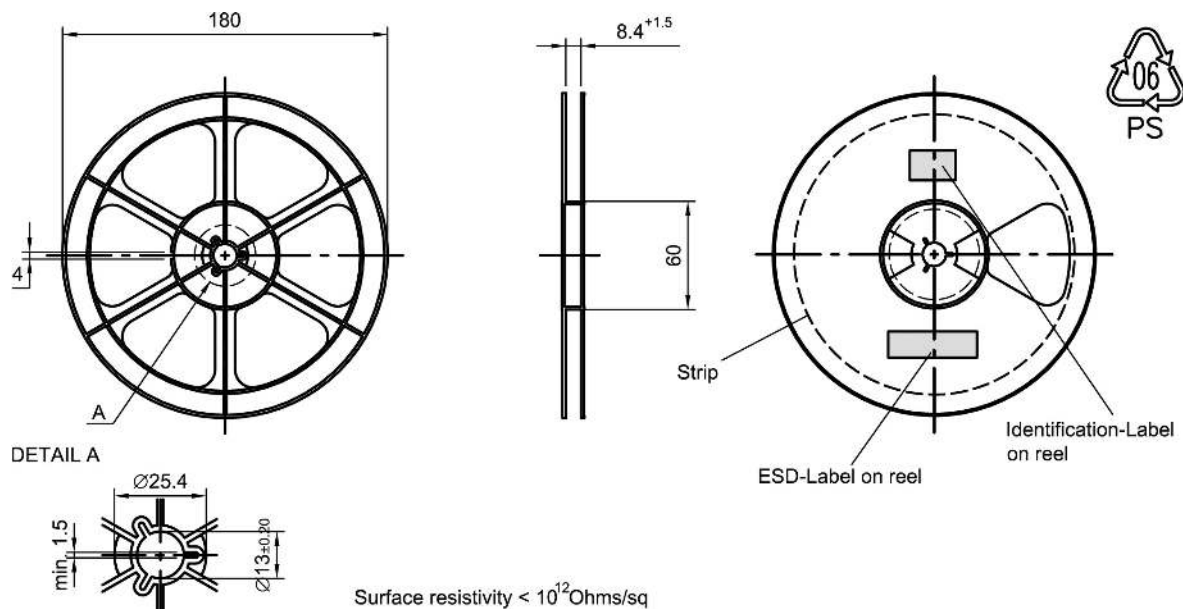
**Figure 6:** Reflection coefficient at OUT port.

Data sheet

**10 Packing material**
**10.1 Tape**

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

$A_0$	$1.27 \pm 0.05$ mm	$E_2$	6.25 mm (min.)	$P_1$	$4.0 \pm 0.1$ mm
$B_0$	$1.57 \pm 0.05$ mm	F	$3.5 \pm 0.05$ mm	$P_2$	$2.0 \pm 0.05$ mm
$D_0$	$1.5^{+0.1/-0}$ mm	G	0.75 mm (min.)	T	$0.25 \pm 0.03$ mm
$D_1$	$0.5 \pm 0.1$ mm	$K_0$	$0.62 \pm 0.05$ mm	W	$8.0^{+0.3/-0.1}$ mm
$E_1$	$1.75 \pm 0.1$ mm	$P_0$	$4.0 \pm 0.1$ 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.

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Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10 ±3

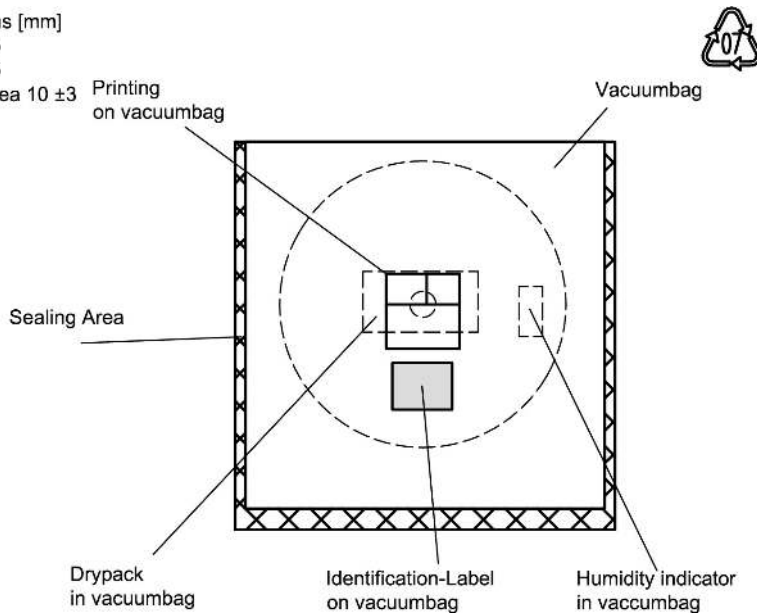


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

Dimensions [mm]

L = 188

B = 188

H = 30

Tolerance ±5

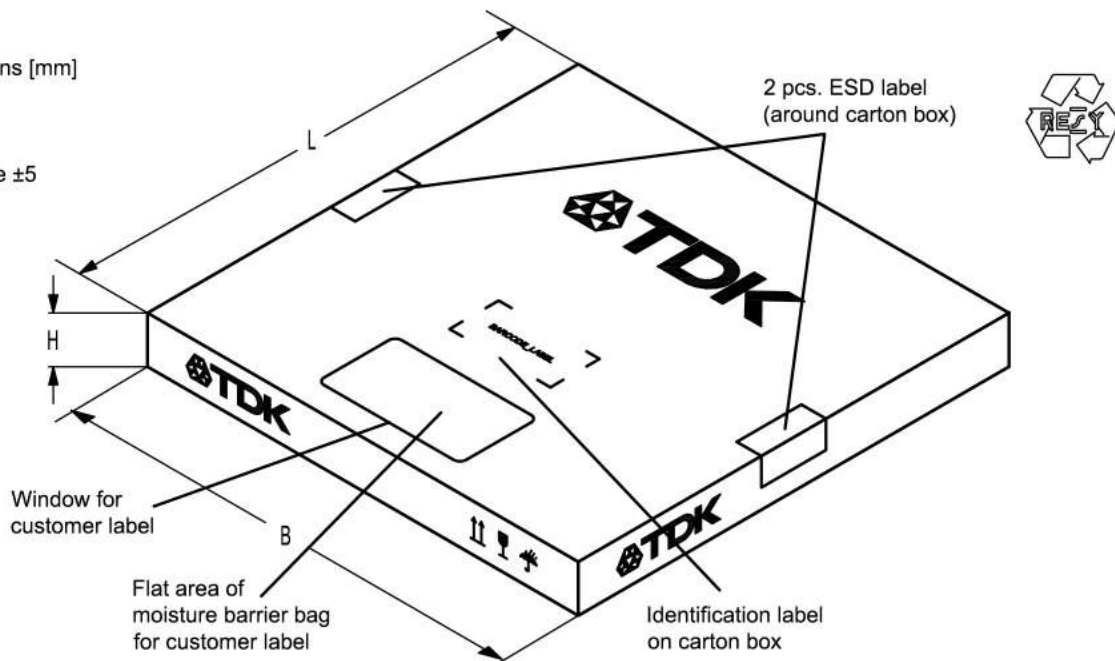
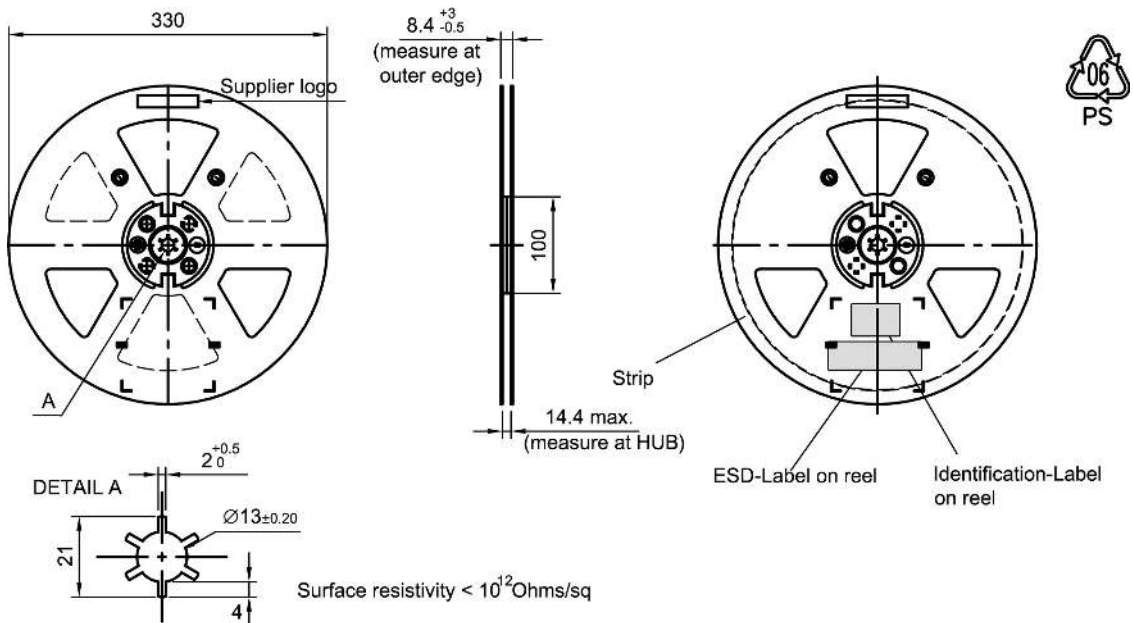


Figure 10: Drawing of folding box for reel with diameter of 180 mm.

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**10.3 Reel with diameter of 330 mm**



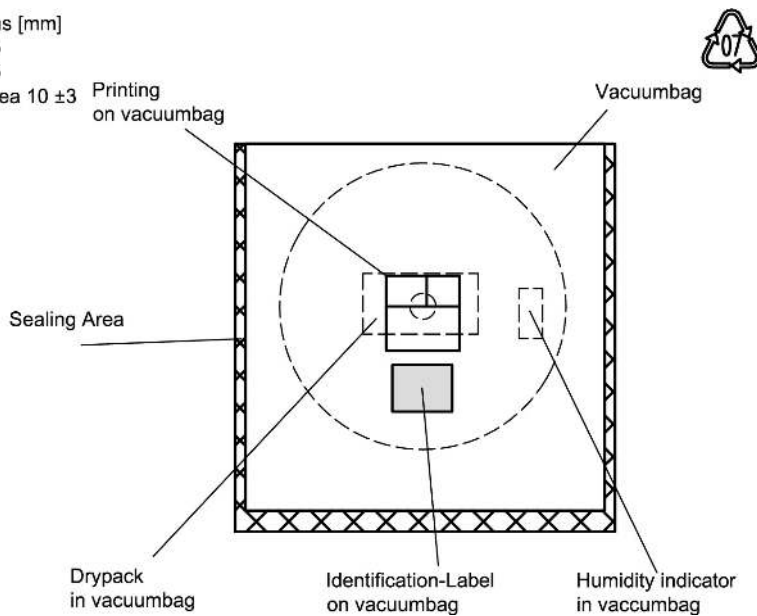
**Figure 11:** Drawing of reel (first-angle projection) with diameter of 330 mm.

Dimensions [mm]

X = 400+5

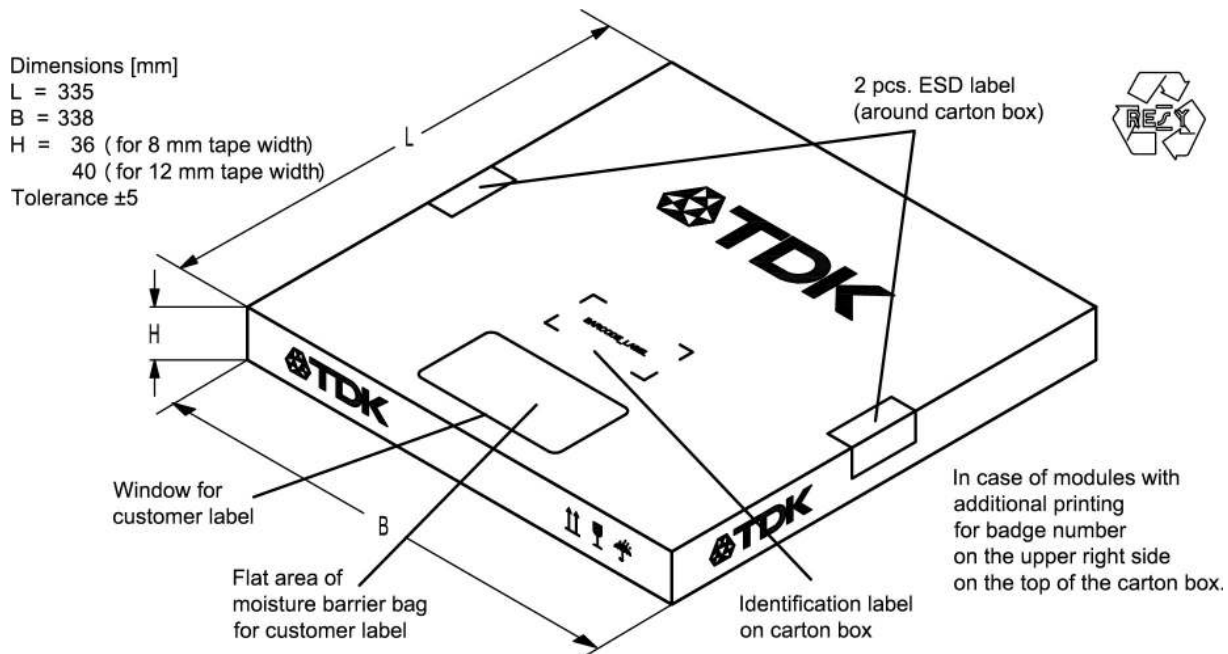
Y = 418+5

Sealing area 10 ± 3



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

Data sheet



**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.

<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 B8331 is 84B.

### ■ 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>

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Adopted BASE32 code for type number				Adopted BASE47 code for lot number			
Decimal value	Base32 code	Decimal value	Base32 code	Decimal value	Base47 code	Decimal value	Base47 code
0	0	16	G	0	0	24	R
1	1	17	H	1	1	25	S
2	2	18	J	2	2	26	T
3	3	19	K	3	3	27	U
4	4	20	M	4	4	28	V
5	5	21	N	5	5	29	W
6	6	22	P	6	6	30	X
7	7	23	Q	7	7	31	Y
8	8	24	R	8	8	32	Z
9	9	25	S	9	9	33	b
10	A	26	T	10	A	34	d
11	B	27	V	11	B	35	f
12	C	28	W	12	C	36	h
13	D	29	X	13	D	37	n
14	E	30	Y	14	E	38	r
15	F	31	Z	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.



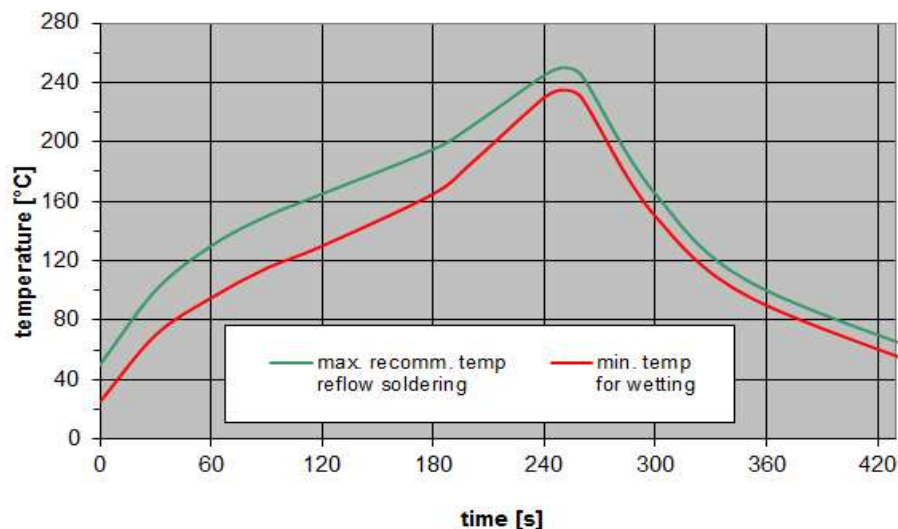
Data sheet

## 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
$T > 220\text{ °C}$	30 s to 70 s
$T > 230\text{ °C}$	min. 10 s
$T > 245\text{ °C}$	max. 20 s
$T \geq 255\text{ °C}$	–
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	≤ 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 EPCOS sales office.

#### 13.4 Ordering codes and packing units

Ordering code	Packing unit
B39931B8331P810	15000 pcs
B39931B8331P810S 5	5000 pcs

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

### 14 Cautions and warnings

#### 14.1 Display of ordering codes for EPCOS products

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#### 14.2 Moldability

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

#### 14.3 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).

##### Projection method

Unless otherwise specified first-angle projection is applied.

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**Contact and Important notes**

For further information please contact your local EPCOS sales office or visit our web page at [www.epcos.com](http://www.epcos.com).

**Published by EPCOS AG  
Systems, Acoustics, Waves Business Group  
P.O. Box 80 17 09, 81617 Munich, GERMANY**

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