

RF360 Europe GmbH  
A Qualcomm – TDK Joint Venture

## SAW components

SAW Tx post PA filter  
Femtocell  
TD-LTE band 40a (2300-2370MHz)

Series/type:	B8355
Ordering code:	B39232B8355P810
Date:	November 23, 2017
Version:	2.0

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**SAW components****B8355****SAW Tx post PA filter****2335MHz**

Data sheet

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<b>SAW components</b>	<b>B8355</b>
<b>SAW Tx post PA filter</b>	<b>2335MHz</b>

Data sheet

**Table of contents**

1 <a href="#">Application</a> .....	4
2 <a href="#">Features</a> .....	4
3 <a href="#">Package</a> .....	5
4 <a href="#">Pin configuration</a> .....	5
5 <a href="#">Matching circuit</a> .....	6
6 <a href="#">Characteristics</a> .....	7
7 <a href="#">Maximum ratings</a> .....	9
8 <a href="#">Transmission coefficient</a> .....	10
9 <a href="#">Reflection coefficients</a> .....	11
10 <a href="#">Packing material</a> .....	12
11 <a href="#">Marking</a> .....	15
12 <a href="#">Soldering profile</a> .....	16
13 <a href="#">Annotations</a> .....	17
14 <a href="#">Cautions and warnings</a> .....	18
<a href="#">Important notes</a> .....	19

## SAW components

B8355

## SAW Tx post PA filter

2335MHz

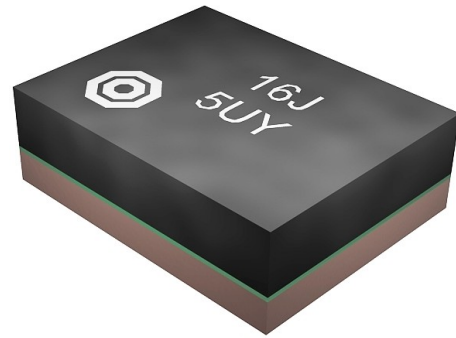
Data sheet

## 1 Application

- Low-loss RF filter for femtocell systems (LTE Band 40a)
- Usable pass band 70MHz

## 2 Features

- Package size  $1.4\pm 0.1$  mm  $\times$   $1.1\pm 0.1$  mm
- Package height 0.45 mm (max.)
- Approximate weight 3 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)



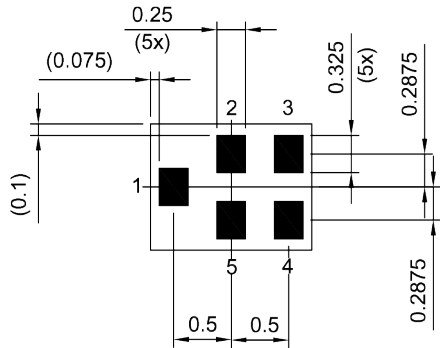
**Figure 1:** Picture of component with example of product marking.

**SAW components** **B8355**  
**SAW Tx post PA filter** **2335MHz**

Data sheet

**3 Package**

BOTTOM VIEW

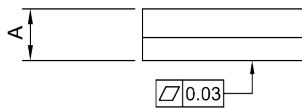


Pad and pitch tolerance ±0.05

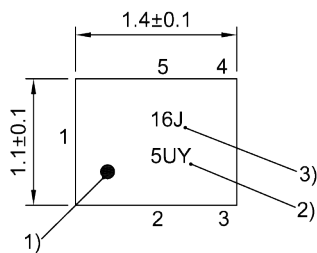
**4 Pin configuration**

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

SIDE VIEW

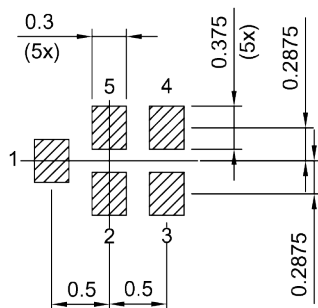


TOP VIEW



- 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 Sec. Package information (p. 18).

Data sheet

## 5 Matching circuit

■  $L_{p1} = 4.7 \text{ nH}$

■  $L_{p4} = 5.1 \text{ nH}$

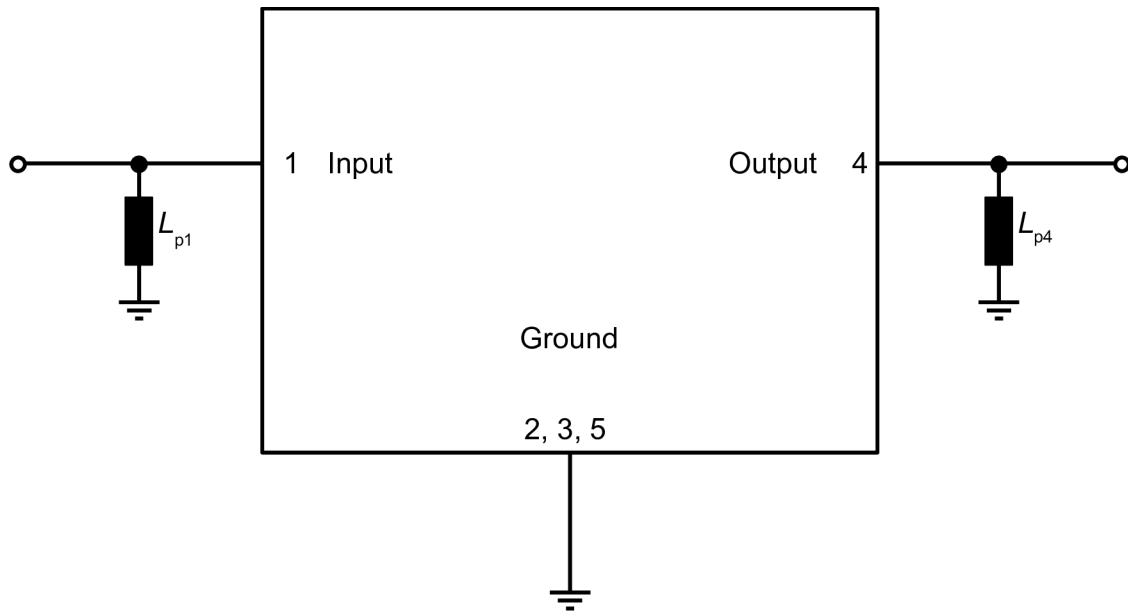


Figure 3: Schematic of matching circuit.

## SAW components

B8355

## SAW Tx post PA filter

2335MHz

Data sheet

## 6 Characteristics

Temperature range for specification

$$T_{\text{SPEC}} = -10\text{ °C} \dots +85\text{ °C}$$

Input terminating impedance

$$Z_{\text{IN}} = 50\ \Omega \text{ with par. } 4.7\ \text{nH}^{1)}$$

Output terminating impedance

$$Z_{\text{OUT}} = 50\ \Omega \text{ with par. } 5.1\ \text{nH}^{1)}$$

Characteristics				min. for $T_{\text{SPEC}}$	typ. @ +25 °C	max. for $T_{\text{SPEC}}$	
<b>Center frequency</b>			$f_{\text{C}}$	—	2335	—	MHz
<b>Maximum insertion attenuation</b>	2300... 2370	MHz	$\alpha_{\text{max}}$	—	2.0	2.4	dB
<b>Amplitude ripple (p-p)</b>	2300... 2370	MHz	$\Delta\alpha$	—	0.8	1.2	dB
	2300... 2370	MHz	$\Delta\alpha^{2)}$	—	0.4	0.6	dB
<b>Maximum VSWR</b>			VSWR <sub>max</sub>				
@ input port	2300... 2370	MHz		—	1.6	2.1	
@ output port	2300... 2370	MHz		—	1.7	2.1	
<b>Minimum attenuation</b>			$\alpha_{\text{min}}$				
	50... 2215	MHz		34	37	—	dB
	1574... 1577	MHz		34	37	—	dB
	1577... 1680	MHz		34	37	—	dB
	1845... 1880	MHz		35	38	—	dB
	2110... 2170	MHz		40	43	—	dB
	2215... 2240	MHz		30	60	—	dB
	2401... 2420	MHz		10	29	—	dB
	2420... 2460	MHz		45	53	—	dB
	2460... 2500	MHz		40	46	—	dB
	2500... 3450	MHz		38	41	—	dB
	3450... 4750	MHz		37	45	—	dB
	4750... 6335	MHz		30	48	—	dB
	6335... 7380	MHz		20	30	—	dB
	7380... 7990	MHz		30	48	—	dB

<sup>1)</sup> See Sec. Matching circuit (p. 6).

<sup>2)</sup> Over any channel with band width of 5 MHz.

## SAW components

B8355

## SAW Tx post PA filter

2335MHz

## Data sheet

Temperature range for specification	$T_{SPEC}$	= -40 °C ... +85 °C
Input terminating impedance	$Z_{IN}$	= 50 $\Omega$ with par. 4.7 nH <sup>1)</sup>
Output terminating impedance	$Z_{OUT}$	= 50 $\Omega$ with par. 5.1 nH <sup>1)</sup>

Characteristics			min. for $T_{SPEC}$	typ. @ +25 °C	max. for $T_{SPEC}$	
<b>Center frequency</b>		$f_C$	—	2335	—	MHz
<b>Maximum insertion attenuation</b>	2300... 2370	MHz	—	2.0	2.9	dB
<b>Amplitude ripple (p-p)</b>	2300... 2370	MHz	—	0.8	1.7	dB
<b>Maximum VSWR</b>						
@ input port	2300... 2370	MHz	—	1.6	2.3	
@ output port	2300... 2370	MHz	—	1.7	2.3	
<b>Minimum attenuation</b>						
	50... 2215	MHz	34	37	—	dB
	1574... 1577	MHz	34	37	—	dB
	1577... 1680	MHz	34	37	—	dB
	1845... 1880	MHz	35	38	—	dB
	2110... 2170	MHz	40	43	—	dB
	2215... 2240	MHz	30	60	—	dB
	2401... 2420	MHz	5	29	—	dB
	2420... 2460	MHz	40	53	—	dB
	2460... 2500	MHz	40	46	—	dB
	2500... 3450	MHz	38	41	—	dB
	3450... 4750	MHz	37	45	—	dB
	4750... 6335	MHz	30	48	—	dB
	6335... 7380	MHz	20	30	—	dB
	7380... 7990	MHz	30	48	—	dB

<sup>1)</sup> See Sec. Matching circuit (p. 6).



## SAW components

B8355

## SAW Tx post PA filter

2335MHz

Data sheet

## 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}$	
ESD voltage		
	$V_{ESD}^{3)} = 50\text{ V}$	Machine model.
	$V_{ESD}^{4)} = 300\text{ V}$	Human body model.
Input power @ input port: 2300 ... 2370 MHz	$P_{IN} = 26\text{ dBm}^{5), 6)}$	$P_{IN}$ 26dBm average ON-state power 70% DC – 37dBm peak. 5 MHz LTE uplink signal for 27000 h @ 55 °C. Source and load impedance 50Ω.

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

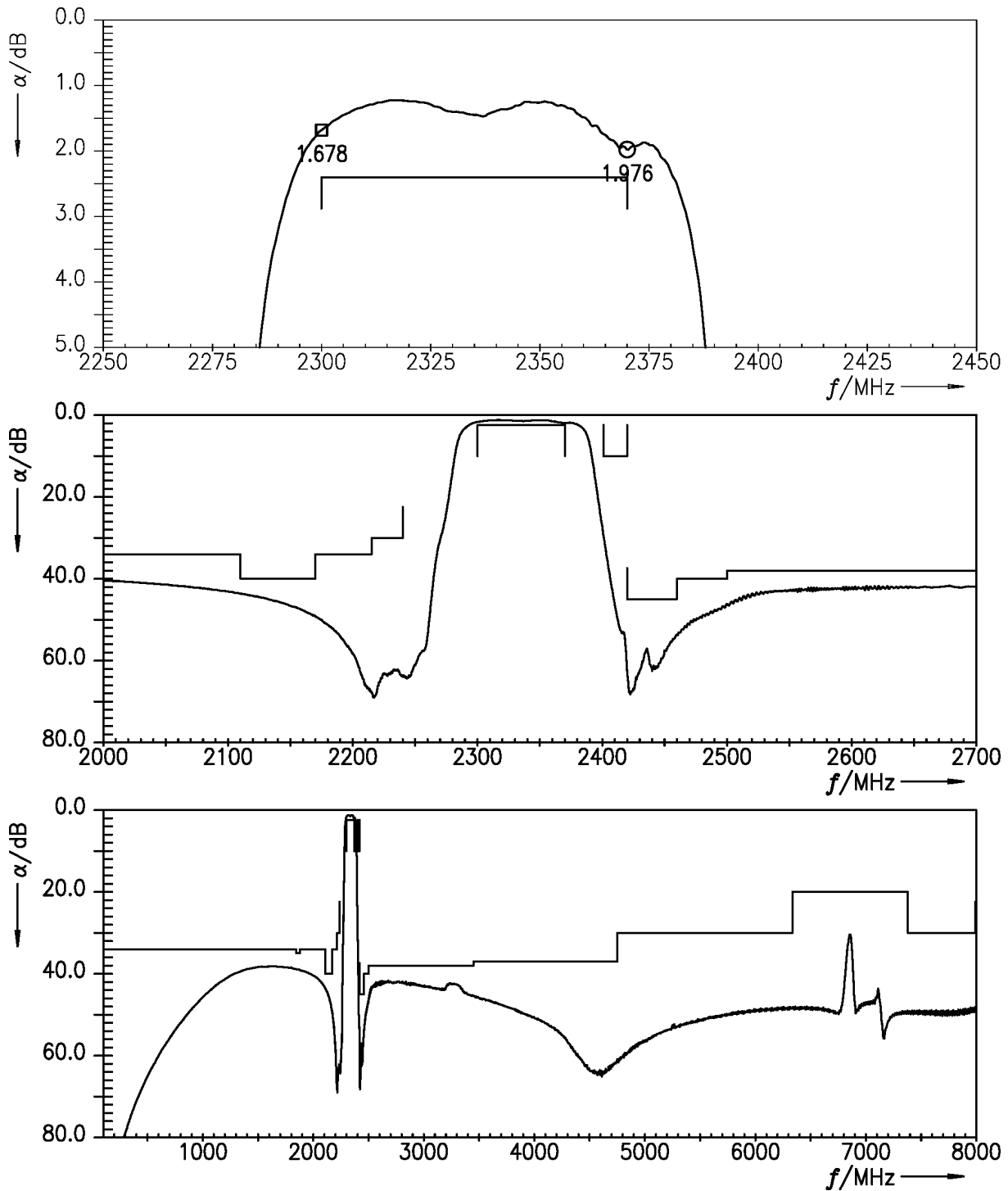
<sup>5)</sup> Expected lifetime according to accelerated power durability tests, and wear out models.

<sup>6)</sup>  $T_{SPEC}$  is the ambient temperature of the PCB at component position. Specified min./max values from section 6 "characteristics" for maximum input power 26dBm are valid for temperature up to 58°C.

<b>SAW components</b>	<b>B8355</b>
<b>SAW Tx post PA filter</b>	<b>2335MHz</b>

Data sheet

**8 Transmission coefficient**



**Figure 4:** Attenuation.

Data sheet

9 Reflection coefficients

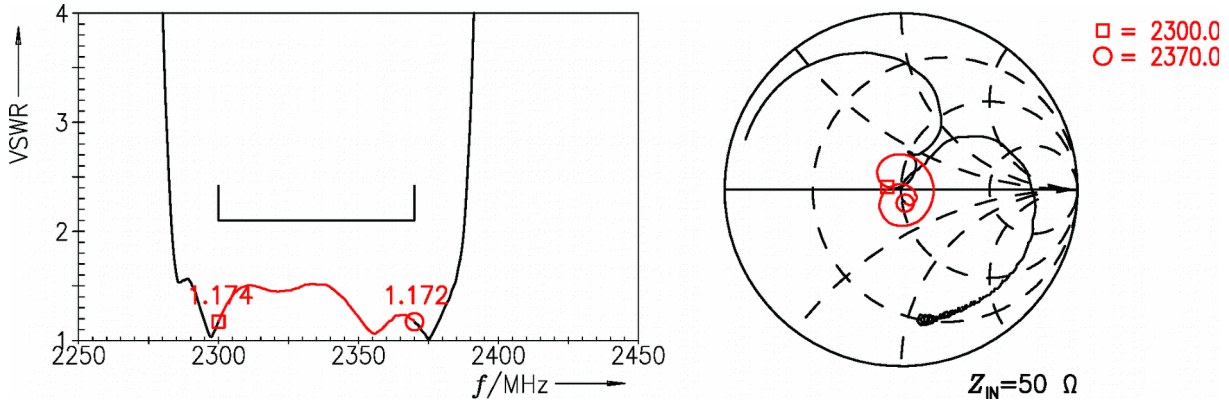


Figure 5: Reflection coefficient at IN port.

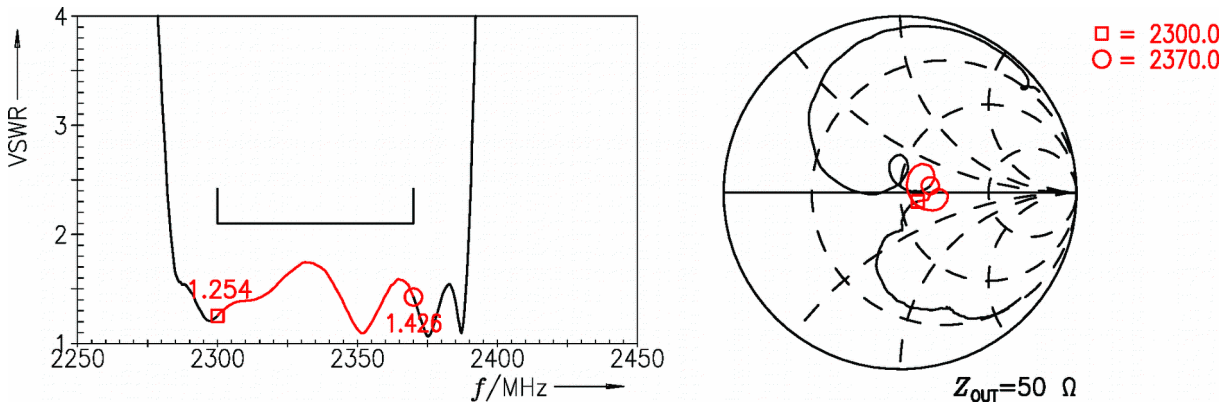


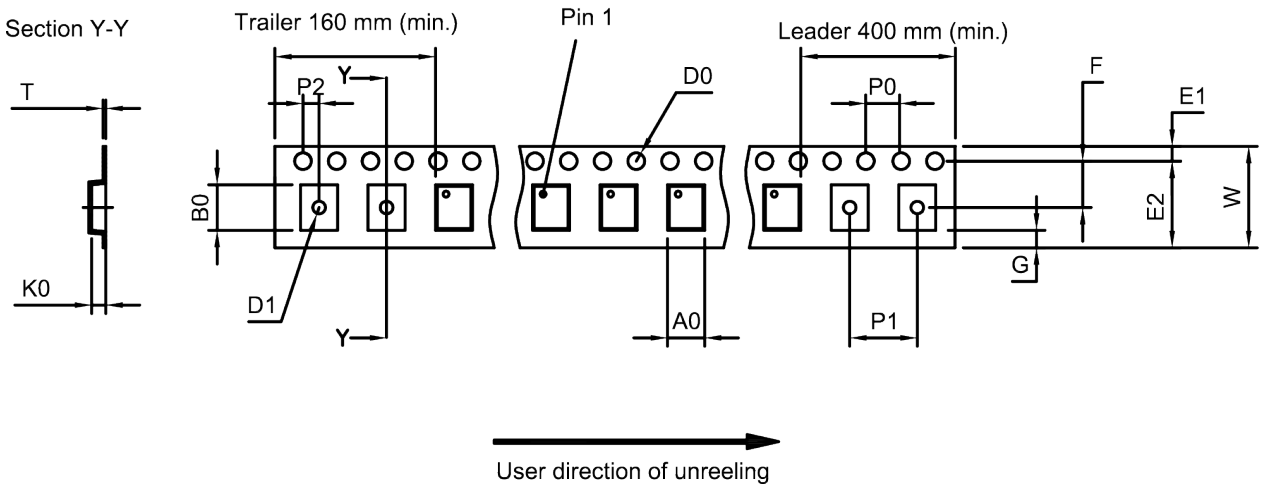
Figure 6: Reflection coefficient at OUT port.

**SAW components** **B8355**  
**SAW Tx post PA filter** **2335MHz**

Data sheet

**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>	1.27±0.05 mm	E <sub>2</sub>	6.25 mm (min.)	P <sub>1</sub>	4.0±0.1 mm
B <sub>0</sub>	1.57±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>	0.5±0.1 mm	K <sub>0</sub>	0.62±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.

SAW components	B8355
SAW Tx post PA filter	2335MHz

Data sheet

10.2 Reel with diameter of 180 mm

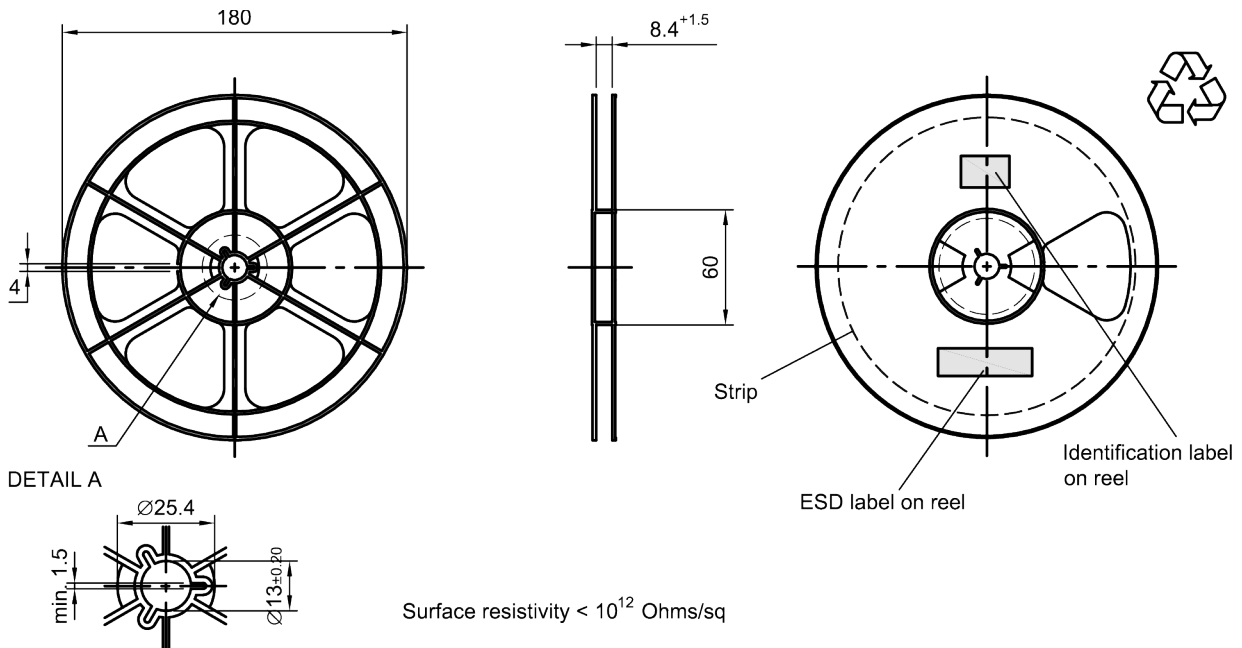


Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

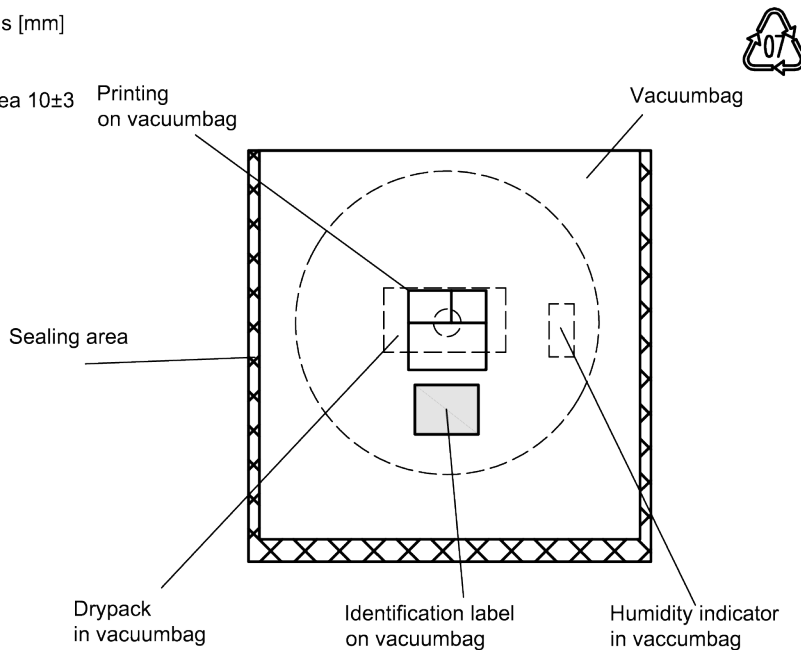
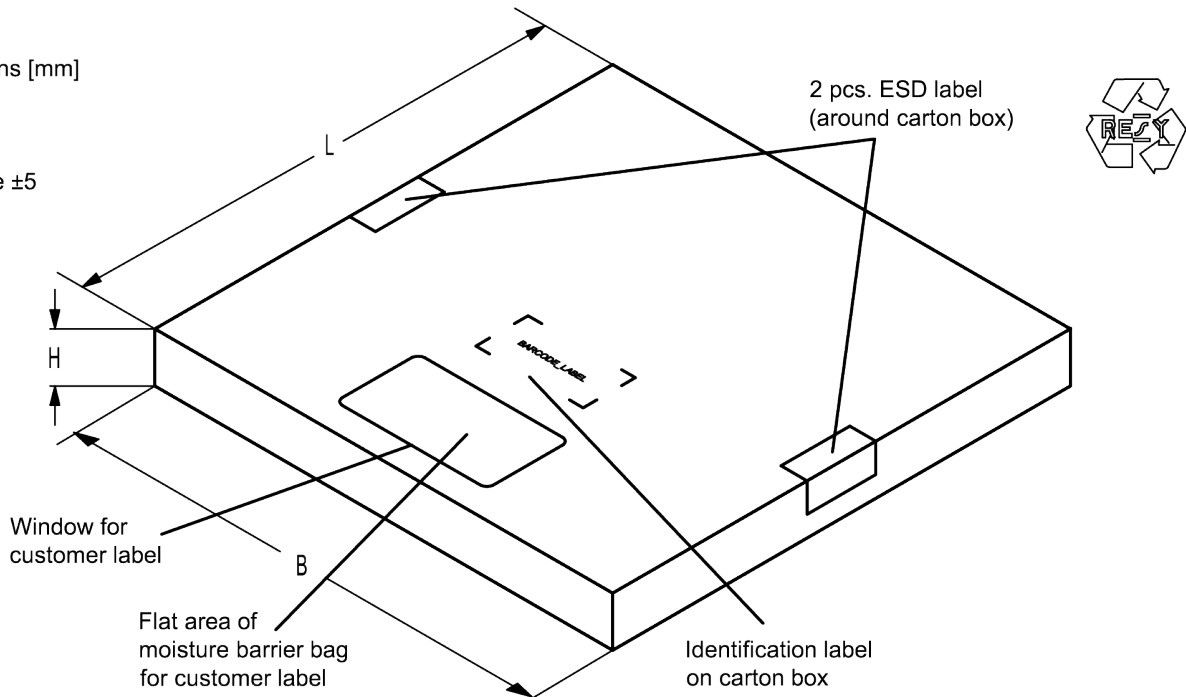


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

<b>SAW components</b>	<b>B8355</b>
<b>SAW Tx post PA filter</b>	<b>2335MHz</b>

Data sheet

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



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

## SAW components

B8355

## SAW Tx post PA filter

2335MHz

Data sheet

## 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 B8355 is 853.

■ 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.

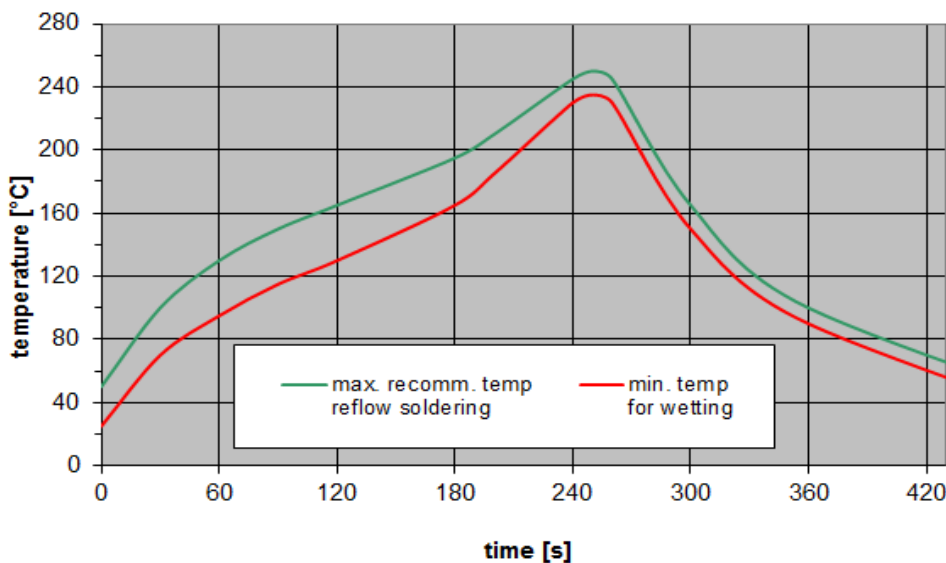
Data sheet

## 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
$T > 220$ °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 11:** Recommended reflow profile for convection and infrared soldering – lead-free solder.



Data sheet

### 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
B39232B8355P810	5000 pcs

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

Data sheet

## **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.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.rf360jv.com/material](http://www.rf360jv.com/material)). Should you have any more detailed questions, please contact our sales offices.
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