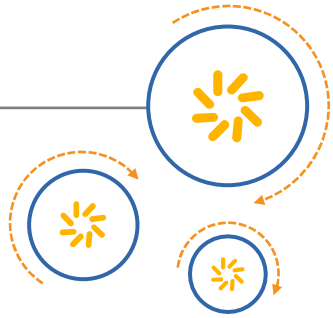
RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



SAW components

SAW Rx filter

Band 71 Rx filter

Series/type:	B8356
Ordering code:	B39631B8356P810
Date:	July 25, 2017
Version:	1.1

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Preliminary data sheet

Table of contents

Preliminary data sheet

1 Application

- Carrier Aggregation 600 MHz SE Secondary Rx FE filter
- Usable pass band 35 MHz
- Unbalanced to unbalanced operation
- Impedance transformation from 50 Ω to 50 Ω

2 Features

- Package size 1.8±0.1 mm × 1.4±0.1 mm
- Package height 0.475 mm (max.)
- Approximate weight 4 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

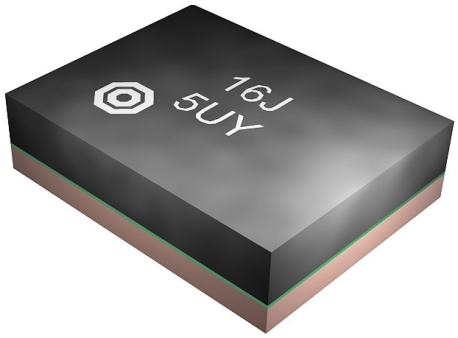

Figure 1: Picture of component with example of product marking.

3 Package

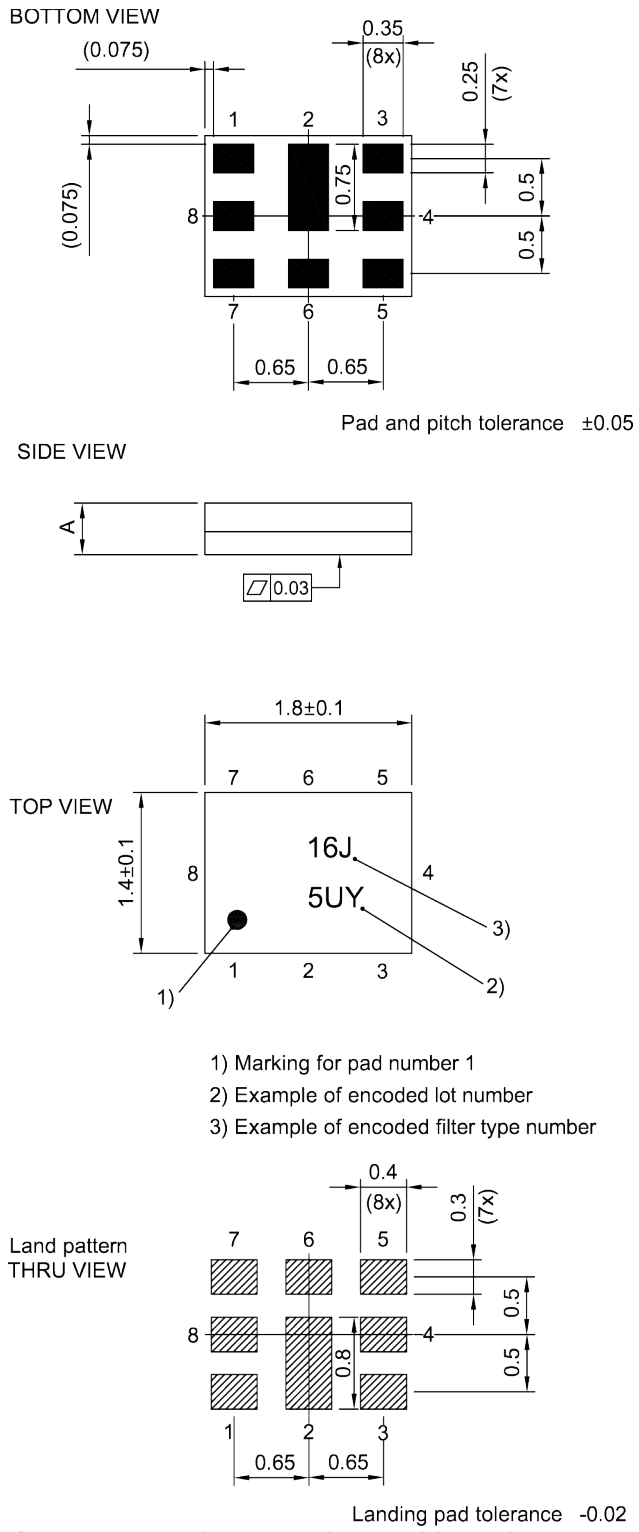

Figure 2: Drawing of package with package height A = 0.475 mm (max.). See Sec. Package information (p. 19).

4 Pin configuration

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

5 Matching circuit

- L_{p3} = 10 nH
- L_{s6} = 11 nH

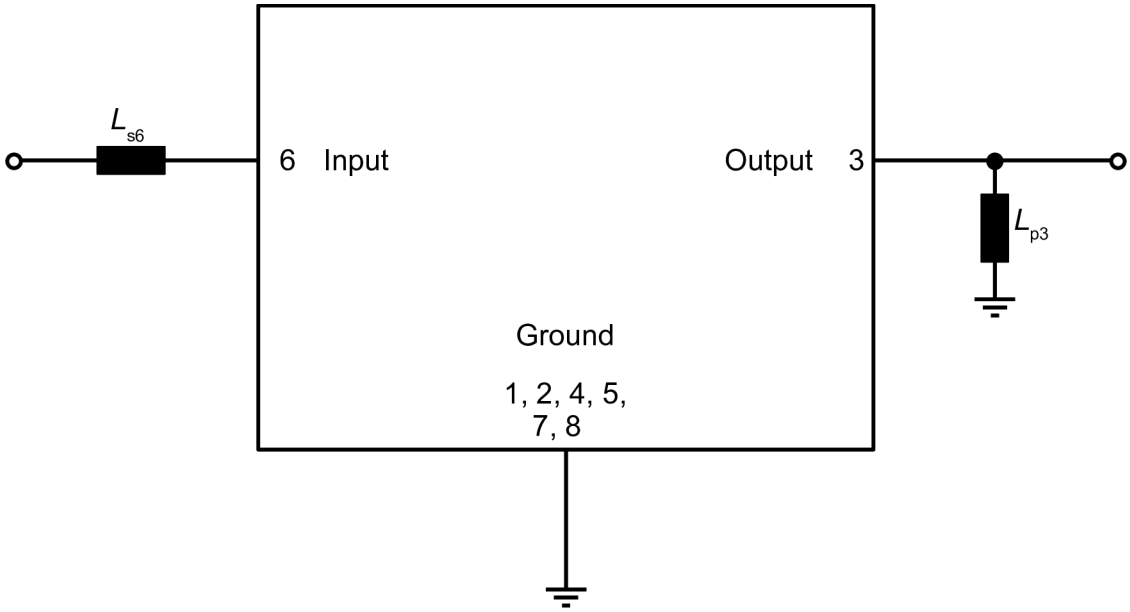

Figure 3: Schematic of matching circuit.

External shunt inductor for ESD protection is recommended at any ports towards antenna.

6 Characteristics

Temperature range for specification T_{SPEC} = −30 °C ... +85 °C
Input terminating impedance Z_{IN} = 50 Ω with ser. 11 nH[1)]
Output terminating impedance Z_{OUT} = 50 Ω with par. 10 nH[1)]

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	634.5	—	MHz
Maximum insertion attenuation			α_{max}				
	617.34 ... 651.66	MHz		—	1.5	2.0	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	617.34 ... 651.66	MHz		—	0.5	1.5	dB
Maximum VSWR			$VSWR_{max}$				
@ input port	617.34 ... 651.66	MHz		—	1.7	2.2	
@ output port	617.34 ... 651.66	MHz		—	1.7	2.2	
Average attenuation			$\alpha_{WLAN,avg}$ [2)]				
	657.5625 ... 662.4375	MHz		15	25	—	dB
Minimum attenuation			α_{min}				
	1.0 ... 608	MHz		30	37	—	dB
	35 ... 55	MHz		50	85	—	dB
	205 ... 218	MHz		40	71	—	dB
	308.5 ... 326	MHz		40	64	—	dB
	532 ... 557	MHz		30	60	—	dB
	663 ... 698	MHz		39	42	—	dB
	709 ... 740	MHz		30	50	—	dB
	712 ... 737	MHz		30	50	—	dB
	737 ... 8000	MHz		20	35	—	dB
	793 ... 805	MHz		35	61	—	dB
	816 ... 818	MHz		40	67	—	dB
	1058 ... 1138	MHz		30	48	—	dB
	1163 ... 1204	MHz		35	48	—	dB
	1233 ... 1281	MHz		35	49	—	dB
	1234 ... 1304	MHz		30	49	—	dB
	1280 ... 1350	MHz		40	50	—	dB
	1461 ... 1484	MHz		35	51	—	dB
	1653 ... 1698	MHz		30	50	—	dB
	1710 ... 1755	MHz		30	51	—	dB
	1850 ... 1910	MHz		30	52	—	dB
	1851 ... 1956	MHz		30	52	—	dB
	1943 ... 2048	MHz		40	52	—	dB
	2305 ... 2315	MHz		30	55	—	dB
	2327 ... 2407	MHz		30	54	—	dB

Characteristics			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
	2400... 2500	MHz	30	55	—	dB
	2468... 2608	MHz	30	55	—	dB
	2922... 2967	MHz	30	50	—	dB
	4900... 5950	MHz	20	43	—	dB
	5553... 5868	MHz	20	44	—	dB
	6170... 6520	MHz	20	35	—	dB

1) See Sec. Matching circuit (p. 6).
2) Average over each WLAN channel with band width of 4.875 MHz.

7 Maximum ratings

Storage temperature	T_{STG} [2] = −40 °C ... +85 °C[1]	
DC voltage	$\lvert V_{DC}\rvert$ [4] = 0 V (max.)[3]	
ESD voltage		
	V_{ESD} [5] = t.b.d. V (max.)	Machine model.
	V_{ESD} [6] = t.b.d. V (max.)	Human body model.
	V_{ESD} [7] = t.b.d. V (max.)	Charged device model.
Input power @ input port: 663 ... 698 MHz	P_{IN} = 15 dBm	Continuous wave for 2000 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) In case of applied DC voltage to RF port, a DC blocking capacitor at RF port is mandatory.
4) In case of applied DC voltage blocking capacitors are mandatory.
5) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
6) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
7) According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

8 Transmission coefficient

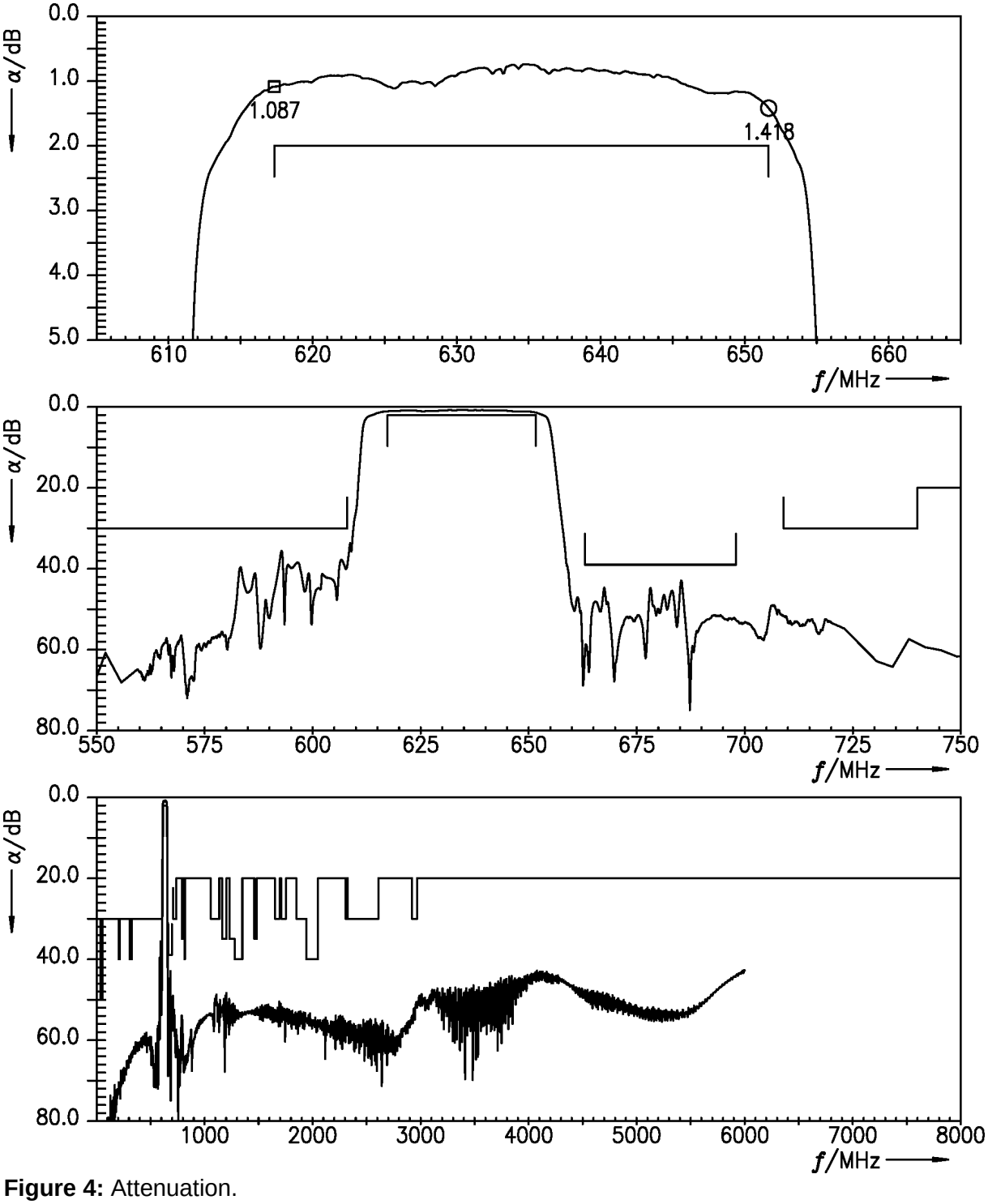

Figure 4: Attenuation.

9 Reflection coefficients

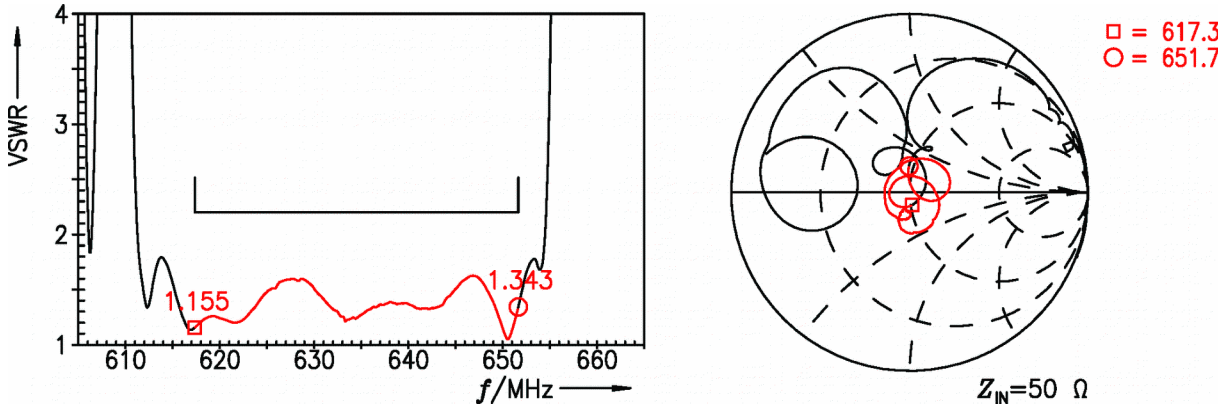

Figure 5: Reflection coefficient at IN port.

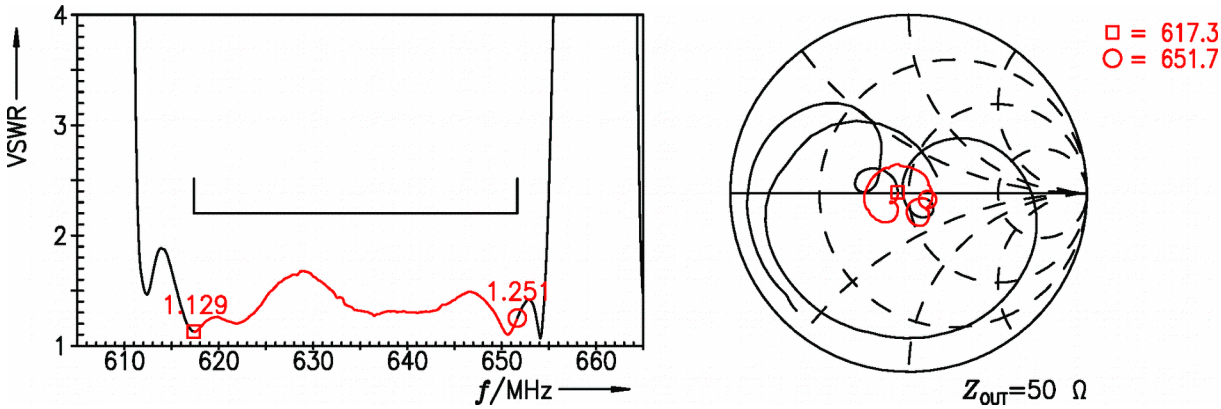

Figure 6: Reflection coefficient at OUT port.

10 Packing material

10.1 Tape

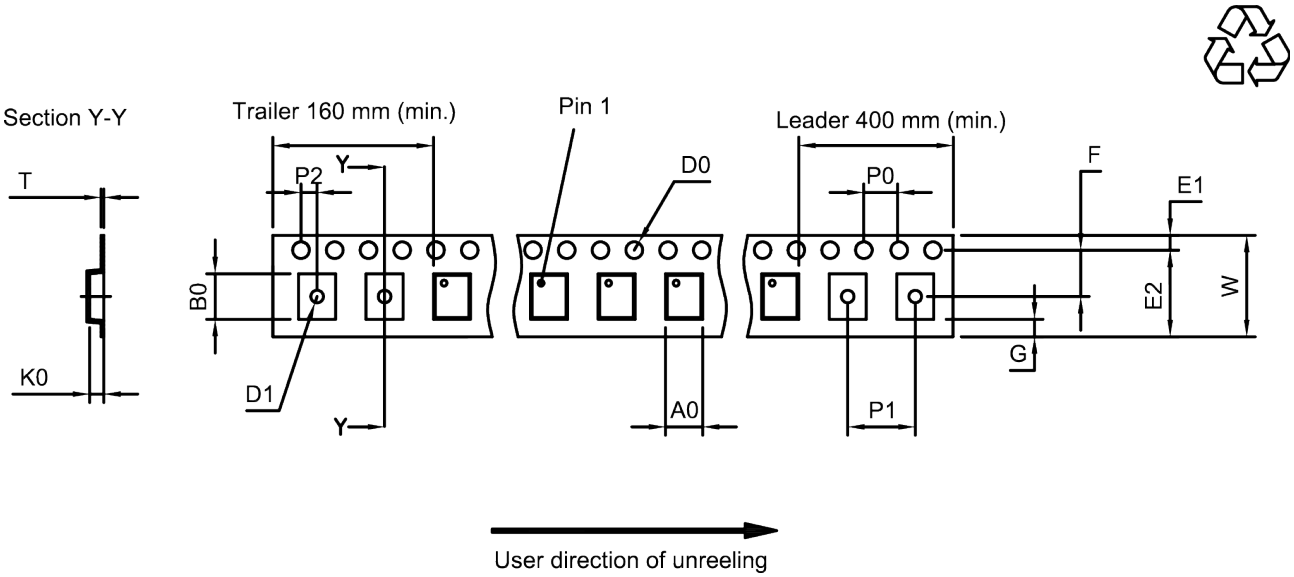

Figure 7: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	1.62±0.05 mm
B_0	2.04±0.05 mm
D_0	1.5±0.05 mm
D_1	0.8±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±0.05 mm
T	0.25±0.02 mm
W	8.0±0.1 mm

Table 1: Tape dimensions.

10.2 Reel with diameter of 180 mm

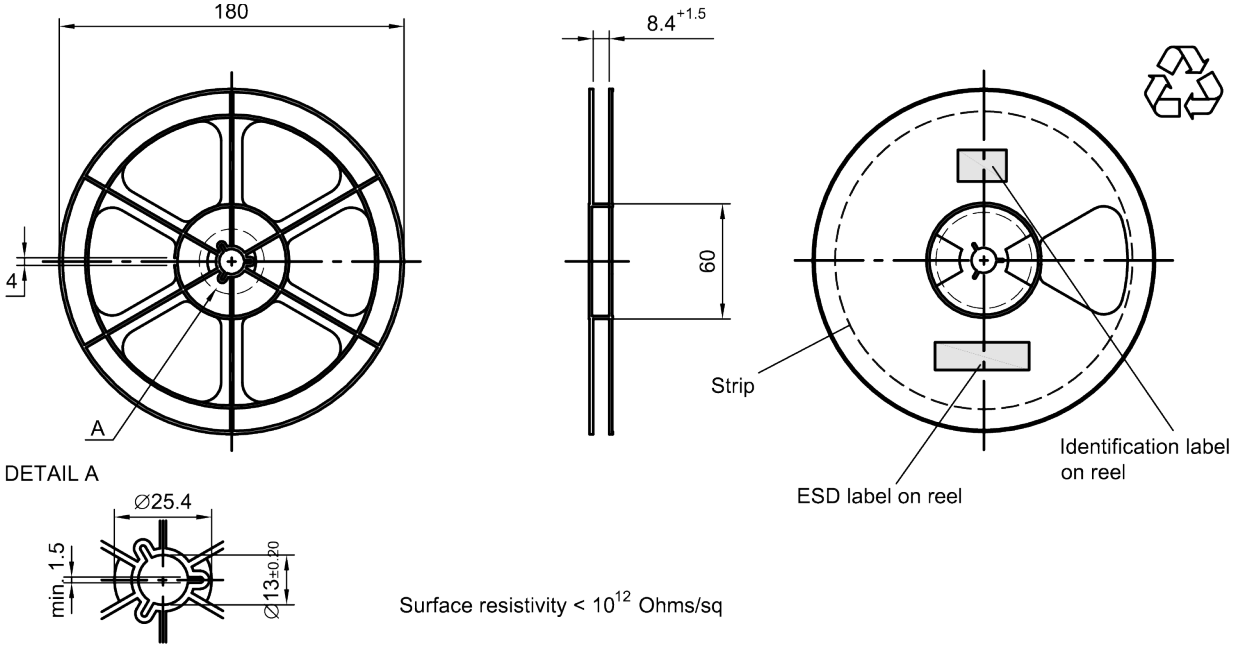

Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

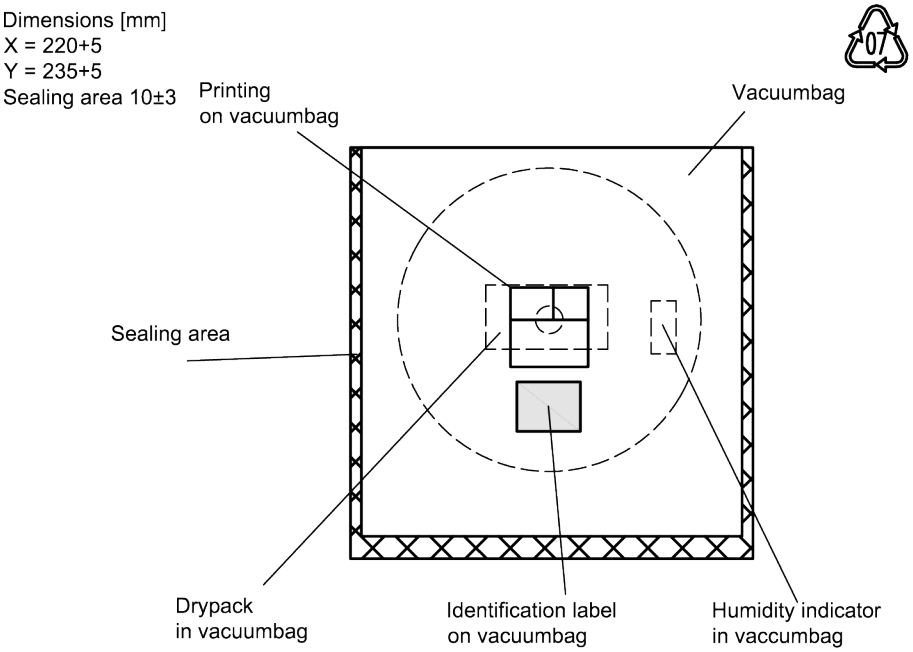

Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

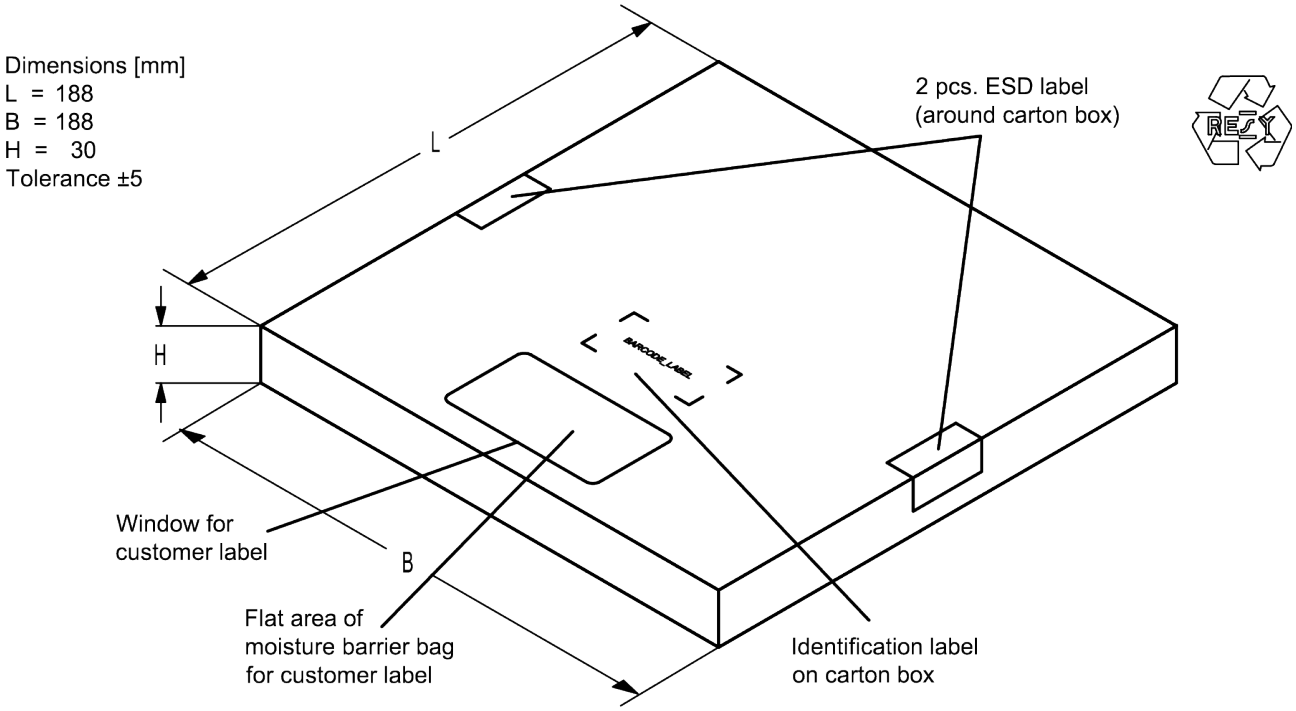

Figure 10: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

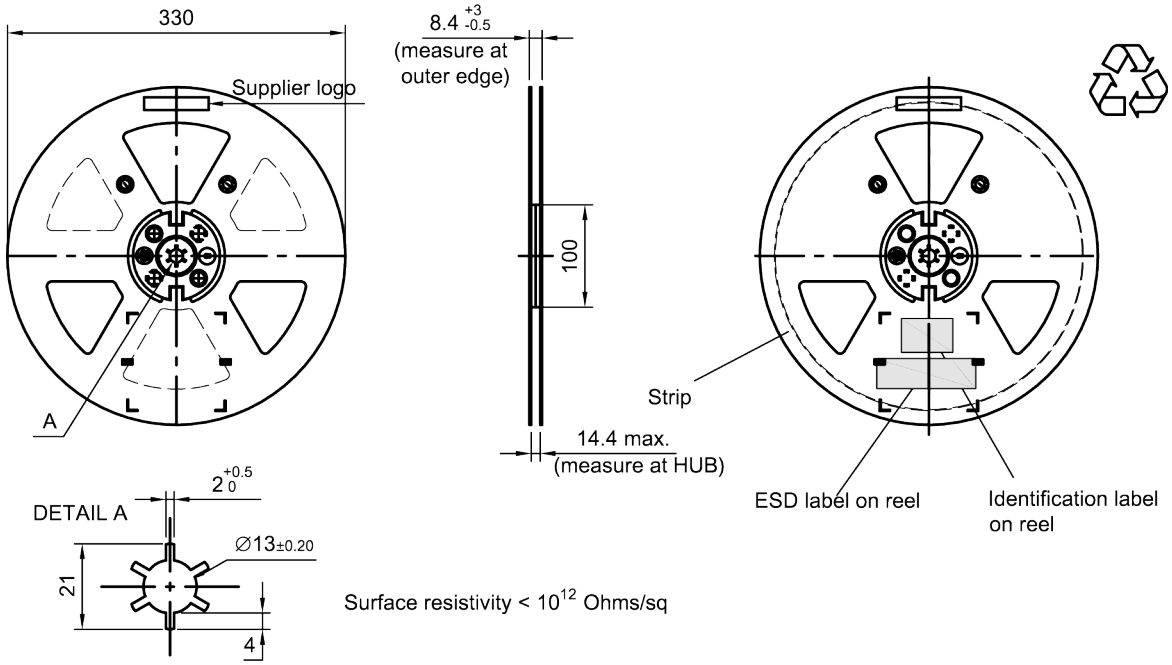

Figure 11: Drawing of reel (first-angle projection) with diameter of 330 mm.

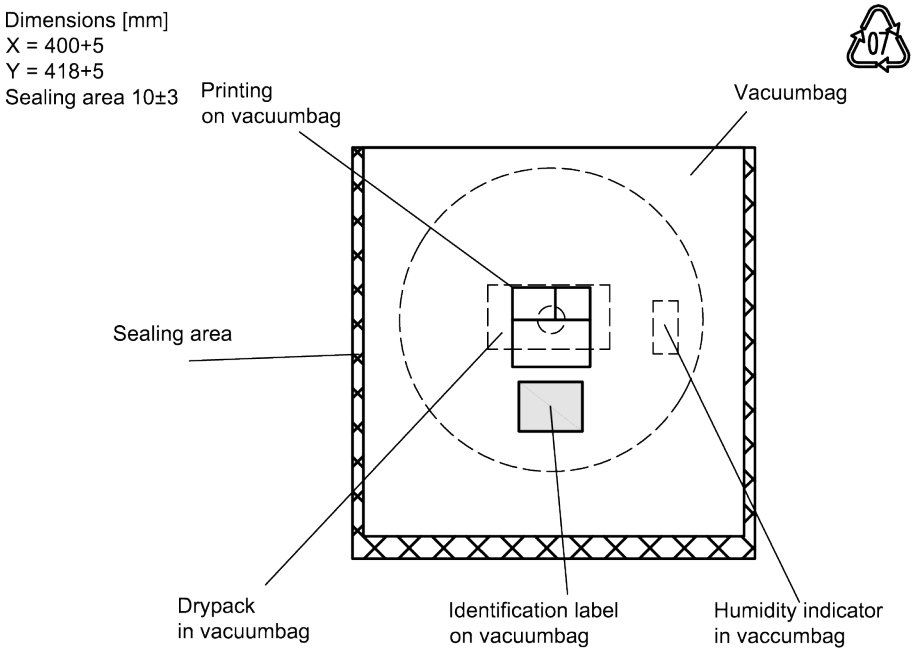

Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

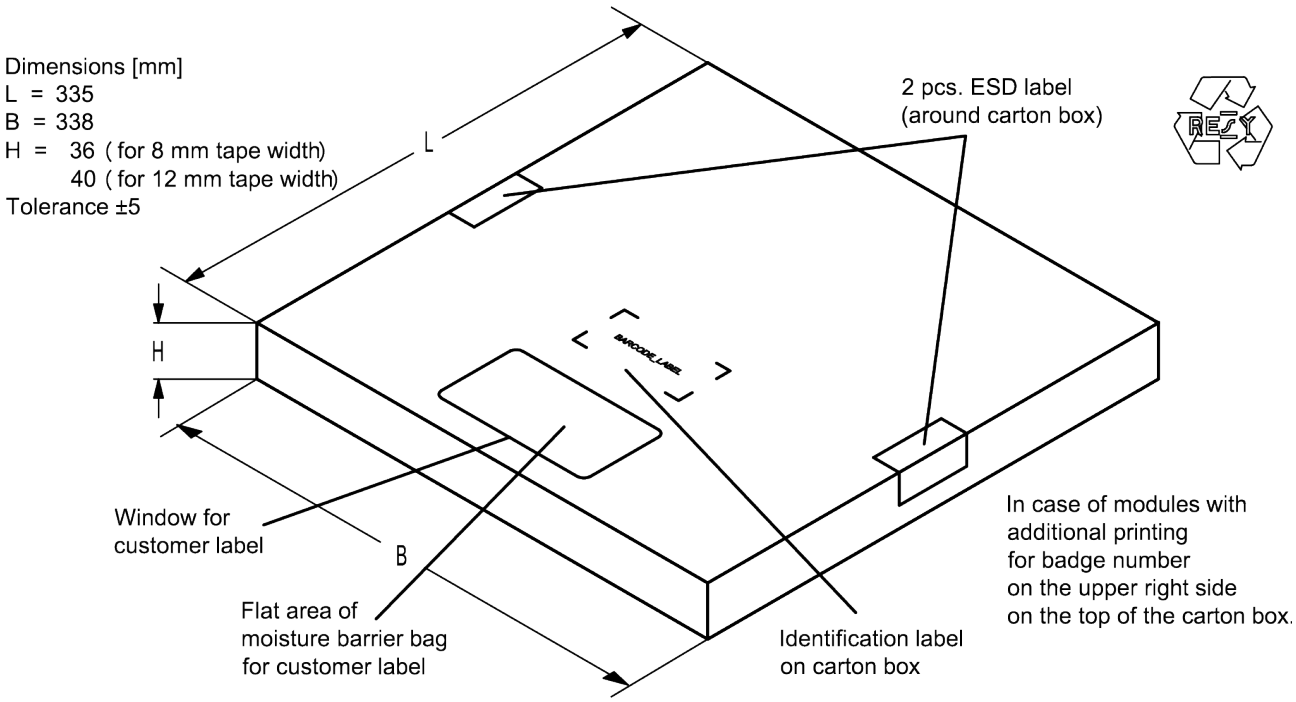

Figure 13: Drawing of folding box for reel with diameter of 330 mm.

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 x 32^2 + **6** x 32^1 + **18 (=J)** x 32^0 **=** **1234**
  The BASE32 code for product type B8356 is 854.

- 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 x 47^2 + **27 (=U)** x 47^1 + **31 (=Y)** x 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).

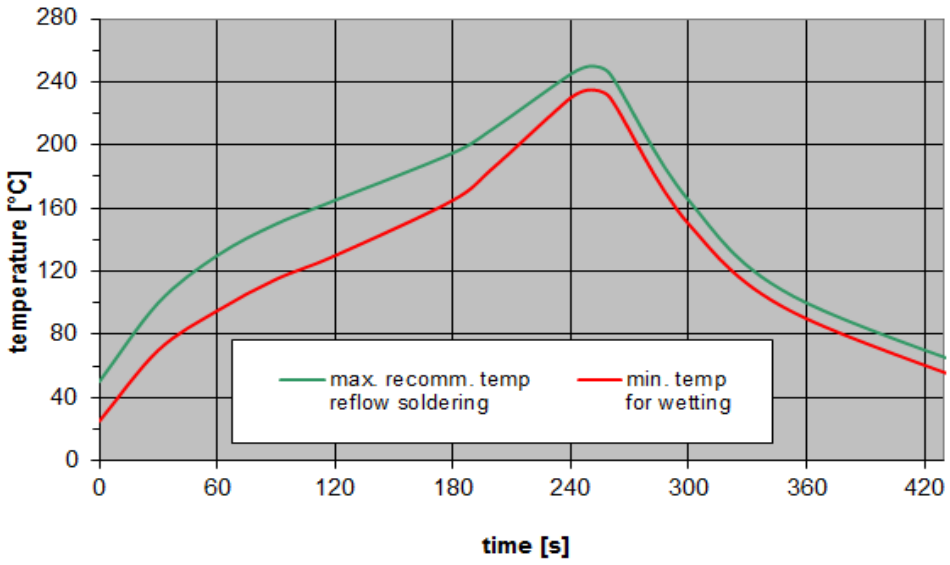

Figure 14: Recommended reflow profile for convection and infrared soldering – lead-free solder.

13 Annotations

13.1 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.

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 Revision history

Changes compared to previously issued iteration.

Version	Originator	Detailed specification changes	Date
1.0	C. Binninger	Preliminary datasheet.	Jul 19, 2017
1.1	C. Binninger	Preliminary datasheet.	Jul 25, 2017

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). Should you have any more detailed questions, please contact our sales offices.
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