RF360 Europe GmbH

A Qualcomm – TDK Joint Venture

Data sheet

BAW filter

TD-LTE band 41

Series/type:	B8894
Ordering code:	B39262B8894L210
Date:	November 27, 2018
Version:	2.0

Table of contents

1 Application

- TD-LTE Band 41 post PA Tx BAW filter for High Power User Equipment (HPUE) application
- Usable pass band : 194.0 MHz
- Unbalanced to unbalanced operation
- Filter impedance 50 Ω

2 Features

- Package size $1.4_{\pm 0.1}$ mm × $1.1_{\pm 0.1}$ mm
- Package height 0.7 mm (max.)
- Approximate weight 2 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

3 Package

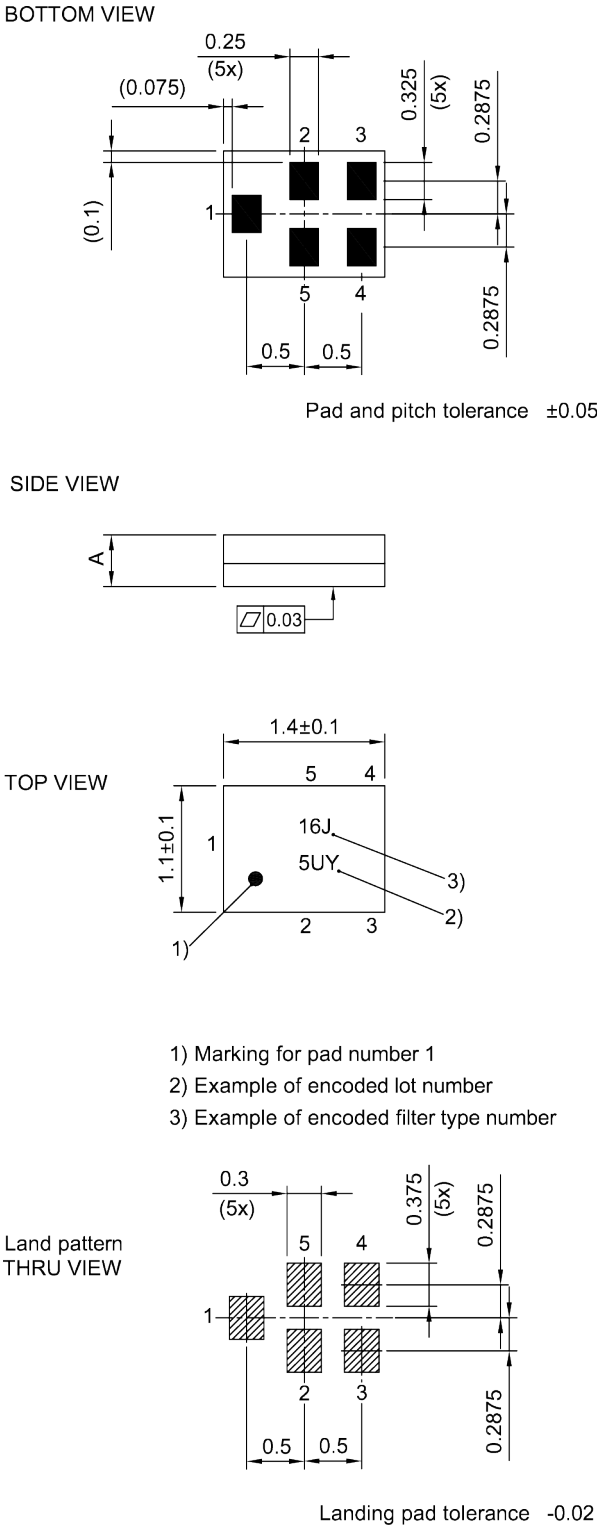

Figure 1: Drawing of package with package height A = 0.7 mm (max.). See Sec. Package information (p. 19).

4 Pin configuration

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

5 Matching circuit

- L_{p1} = 3.0 nH
- L_{p4} = 2.4 nH

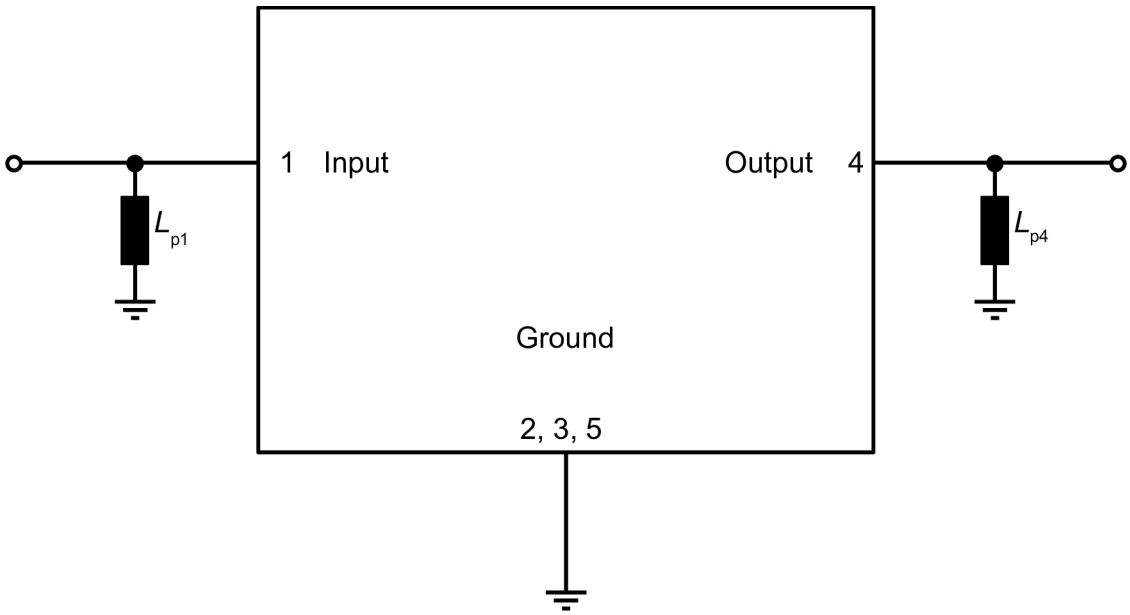

Figure 2: Schematic of matching circuit.

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 par. 3.0 nH[1)]
Output terminating impedance Z_{OUT} = 50 Ω with par. 2.4 nH[1)]

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	2593	—	MHz
Maximum insertion attenuation			α_{max}				
	2496... 2511	MHz		—	1.4	2.2	dB
	2511... 2545	MHz		—	1.2	1.9	dB
	2545... 2575	MHz		—	1.1	1.9	dB
	2555... 2655	MHz		—	1.3	1.9	dB
	2655... 2690	MHz		—	1.2	1.9	dB
Amplitude ripple (p-p)			Δα				
	2496... 2690	MHz		—	0.4	1.4	dB
Maximum VSWR			$VSWR_{max}$				
@ input port	2496... 2690	MHz		—	1.4	2.0	
@ output port	2496... 2690	MHz		—	1.4	2.0	
Average attenuation			$\alpha_{WLAN,avg}$ [2)]				
WiFi Ch1	2403... 2421	MHz		29	35	—	dB
WiFi Ch2	2408... 2426	MHz		35	37	—	dB
WiFi Ch3	2413... 2431	MHz		35	38	—	dB
WiFi Ch4	2418... 2436	MHz		34	36	—	dB
WiFi Ch5	2423... 2441	MHz		33	36	—	dB
WiFi Ch6	2428... 2446	MHz		32	36	—	dB
WiFi Ch7	2433... 2451	MHz		33	37	—	dB
WiFi Ch8	2438... 2456	MHz		33	39	—	dB
WiFi Ch9	2443... 2461	MHz		32	40	—	dB
WiFi Ch10	2448... 2466	MHz		34	41	—	dB
WiFi Ch11	2453... 2471	MHz		15	37	—	dB
WiFi Ch12	2458... 2476	MHz		9	17	—	dB
WiFi Ch13	2463... 2481	MHz		5	10	—	dB
Minimum attenuation			α_{min}				
	10... 700	MHz		49	51	—	dB
	703... 748	MHz		47	49	—	dB
	814... 849	MHz		43	46	—	dB
	880... 915	MHz		41	43	—	dB
	920... 925	MHz		41	43	—	dB
	1565... 1615	MHz		33	38	—	dB
	1616... 2400	MHz		3	4	—	dB
	1710... 1785	MHz		19	23	—	dB
	1805... 1880	MHz		13	16	—	dB

Characteristics			**min.** for T_{SPEC}	**typ.** @ +25 °C	**max.** for T_{SPEC}	
	1850... 1915 MHz		11	15	—	dB
	1880... 1920 MHz		11	14	—	dB
	1920... 1980 MHz		9	11	—	dB
	2215... 2240 MHz		3	4	—	dB
	2300... 2400 MHz		7	9	—	dB
	2750... 3400 MHz		5	8	—	dB
	3400... 3600 MHz		16	18	—	dB
	4992... 5380 MHz		33	39	—	dB
	5150... 5950 MHz		27	33	—	dB
	7488... 7990 MHz		18	26	—	dB
Harmonic generation (P_{out}=31 dBm CW signal)						
2 f_C	2496... 2690 MHz		—	−30	—	dBm

1) See Sec. Matching circuit (p. 6).
2) Average over each WLAN channel with band width of 18 MHz.

7 Maximum ratings

Storage temperature	T_{STG} [1] = −40 °C ... +85 °C	
DC voltage	$\|V_{DC}\|$ = 5.0 V	
ESD voltage		
	V_{ESD} [2] = 275 V	Machine model.
	V_{ESD} [3] = 625 V	Human body model.
	V_{ESD} [4] = 2000 V	Charged device model.
Input power @ input port: 2496 ... 2690 MHz	P_{IN} = 33 dBm	5 MHz TD-LTE uplink signal for 5000 h @ 55 °C.

[1] Not valid for packaging material. Storage temperature for packaging material is −25 °C to +40 °C.
[2] According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
[3] According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
[4] According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

8 Transmission coefficient

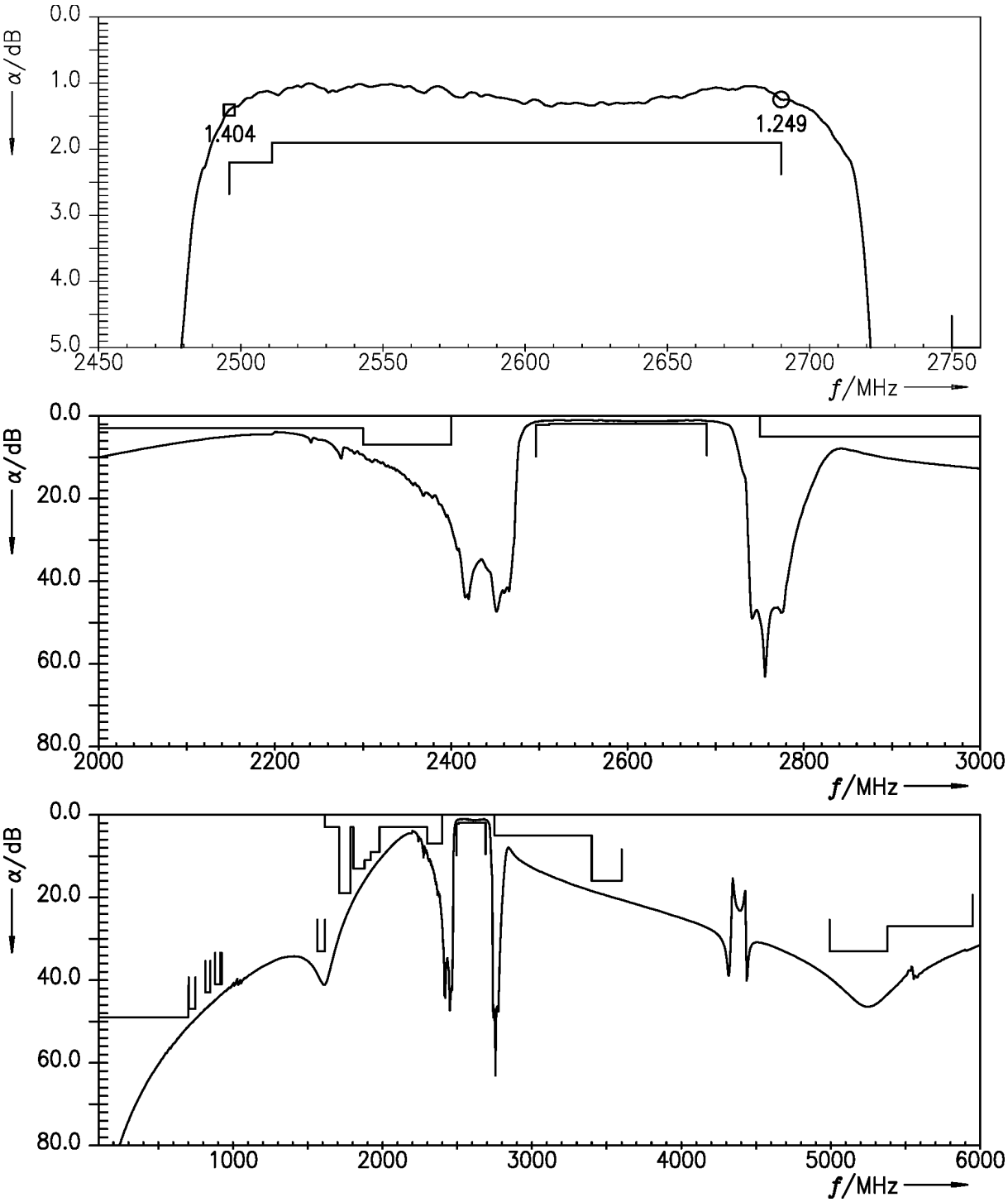

Figure 3: Attenuation .

9 Reflection coefficients

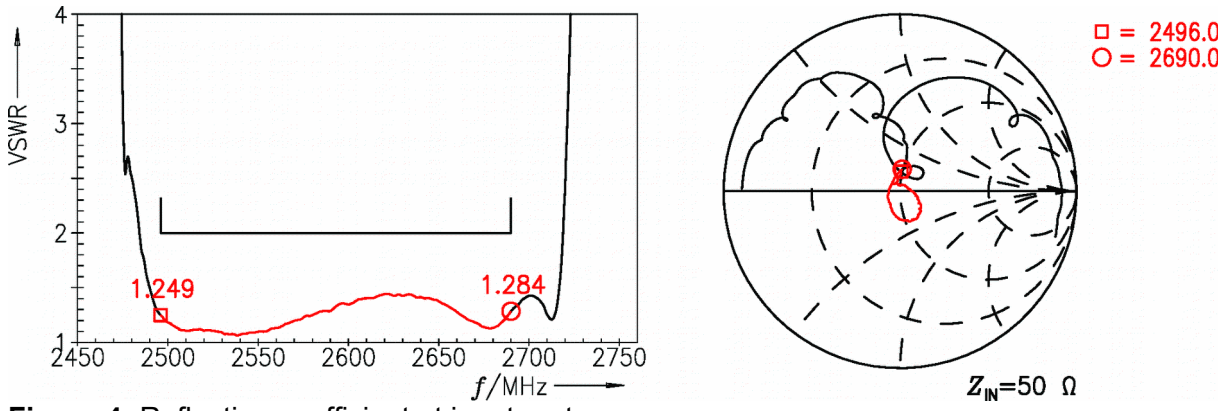

Figure 4: Reflection coefficient at input port.

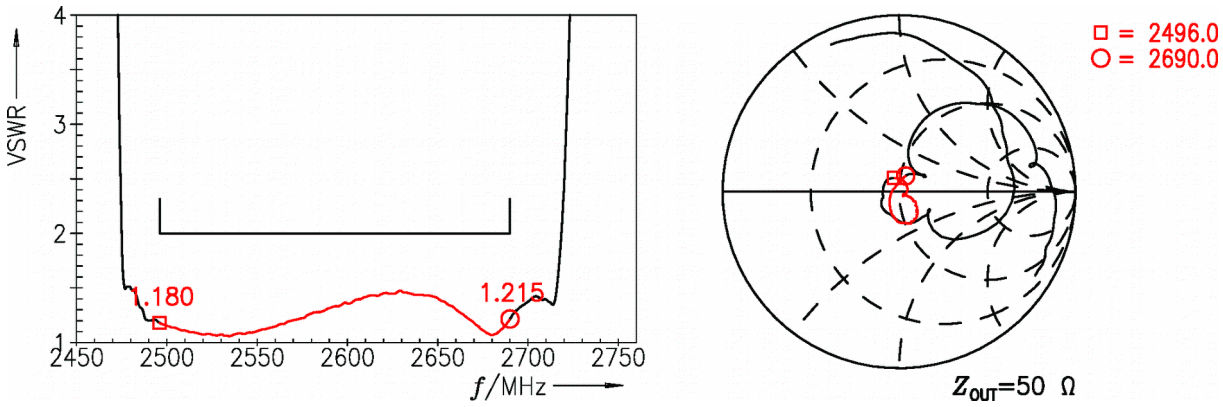

Figure 5: Reflection coefficient at output port.

10 Packing material

10.1 Tape

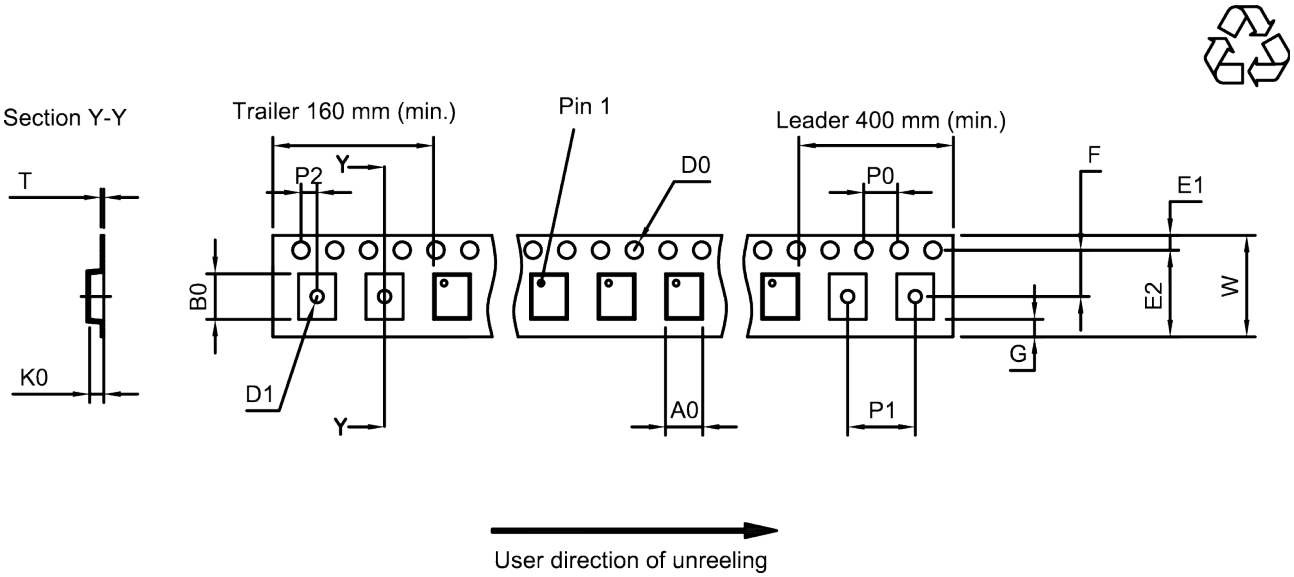

Figure 6: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A_0	1.32±0.05 mm
B_0	1.65±0.05 mm
D_0	1.5+0.1/−0 mm
D_1	0.6 mm (min.)
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	0.75±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±0.03 mm
W	8.0+0.3/−0.1 mm

Table 1: Tape dimensions.

10.2 Reel with diameter of 180 mm

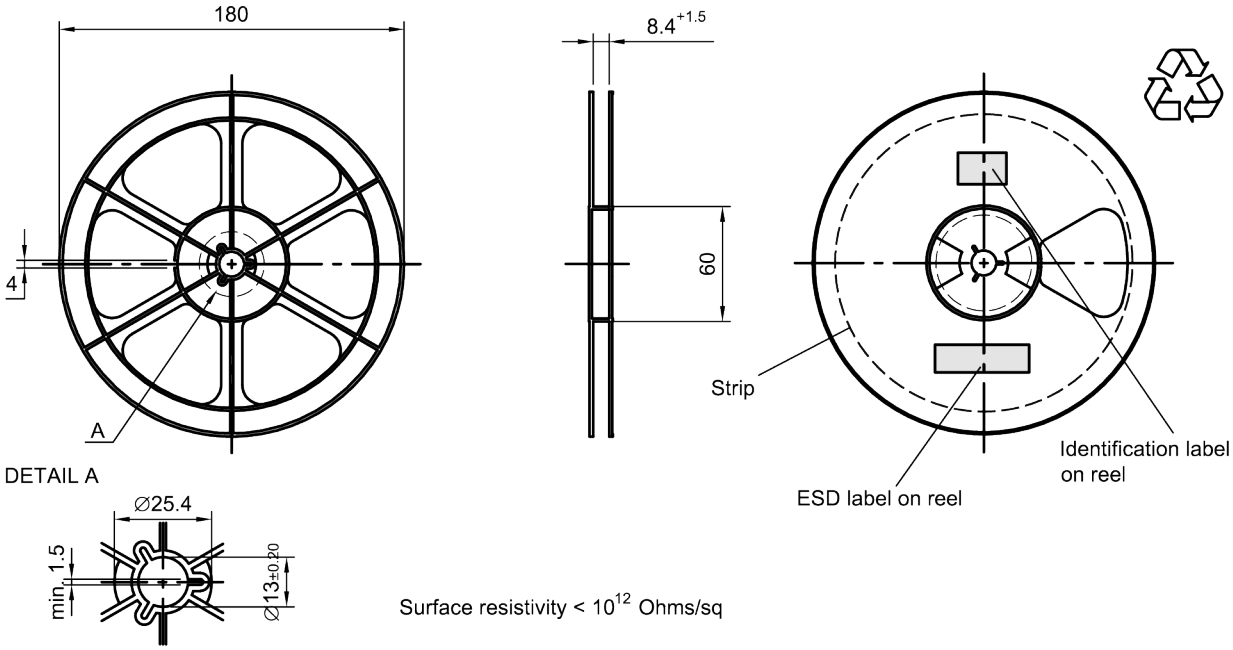

Figure 7: Drawing of reel (first-angle projection) with diameter of 180 mm.

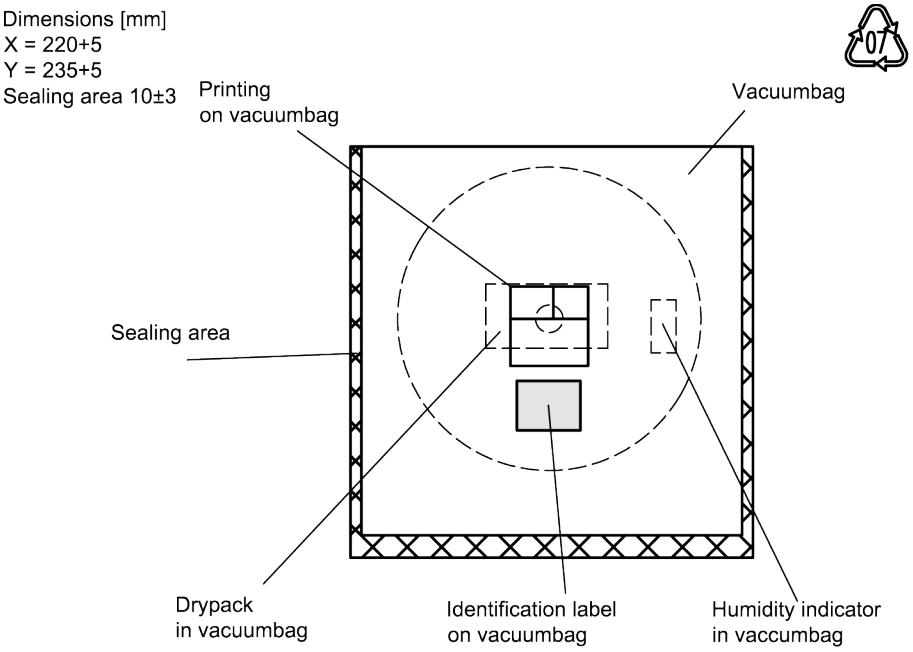

Figure 8: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

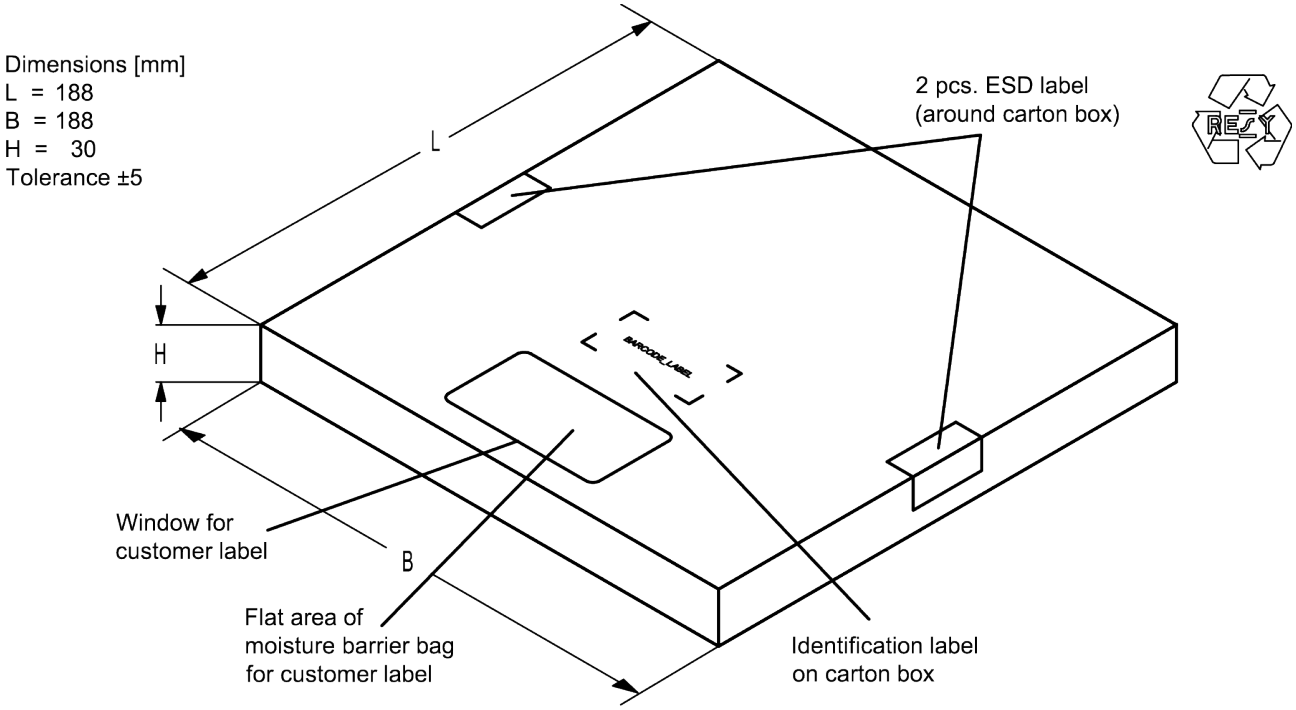

Figure 9: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

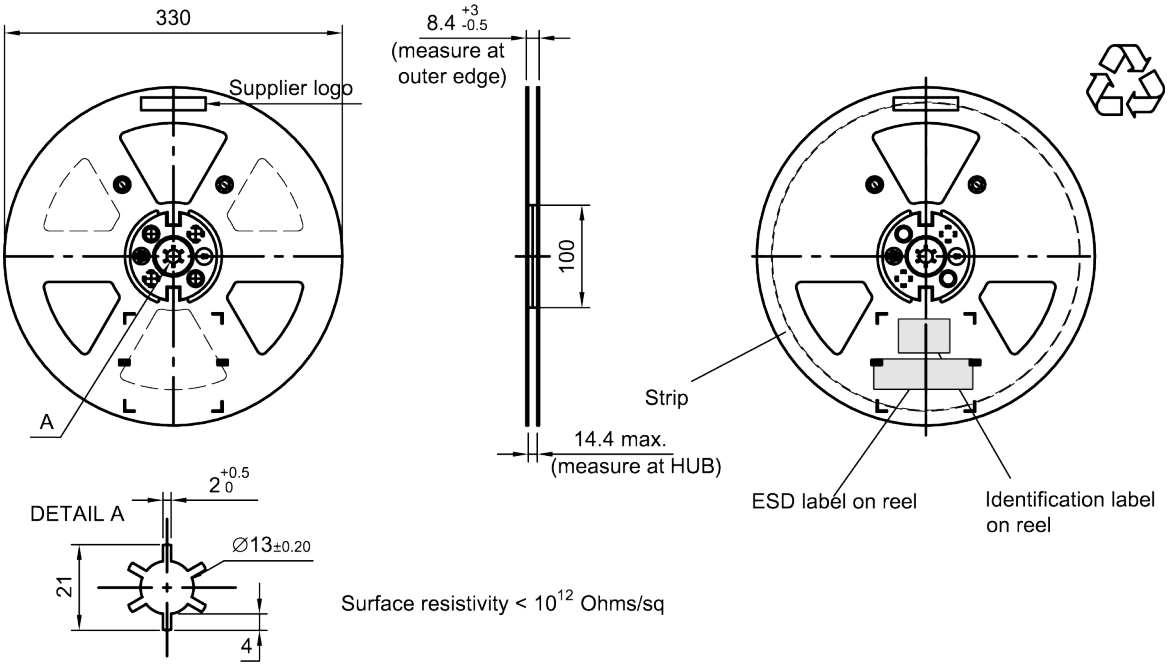

Figure 10: Drawing of reel (first-angle projection) with diameter of 330 mm.

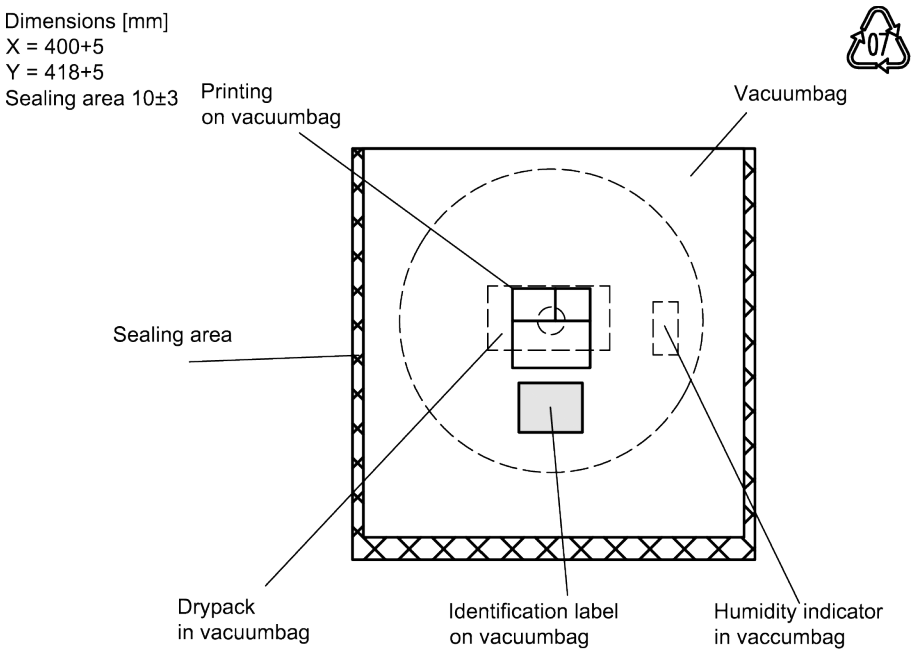

Figure 11: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

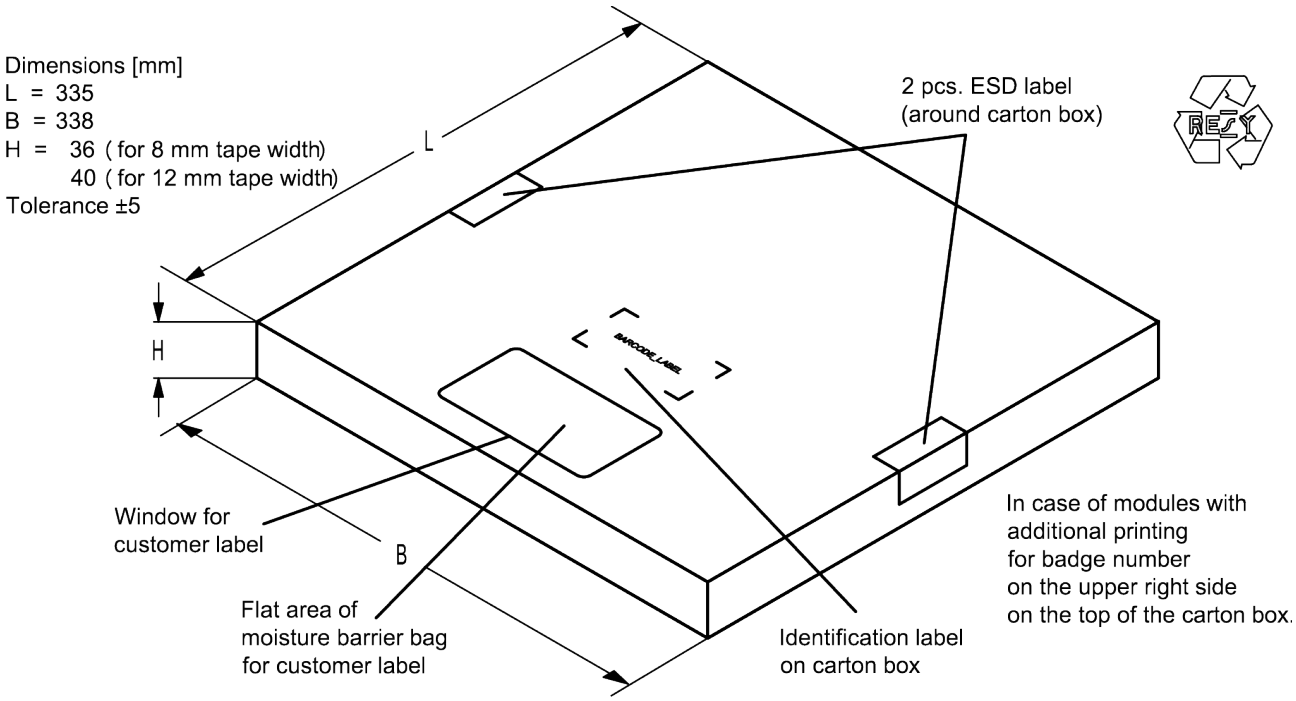

Figure 12: Drawing of folding box for reel with diameter of 330 mm.

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 B8894 is 8NY.

- 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).

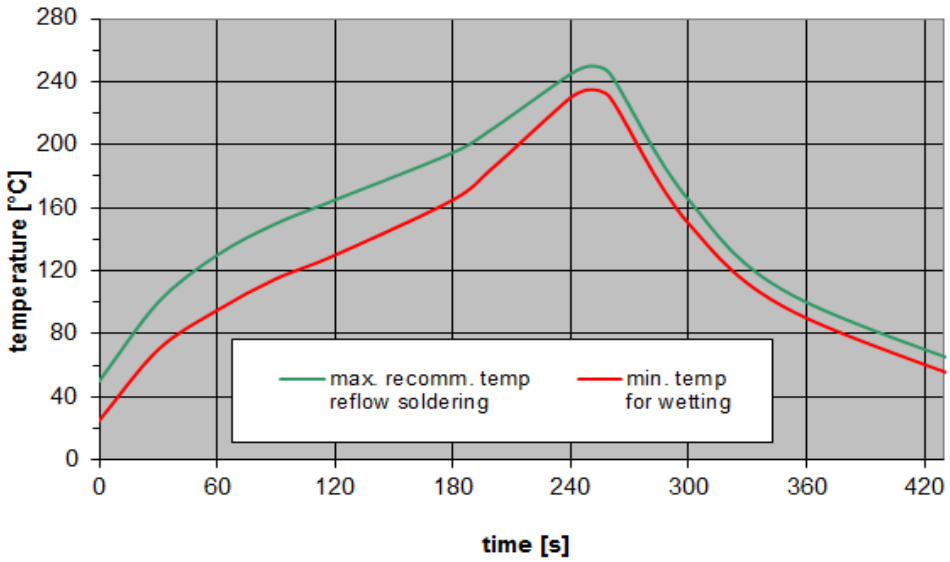

Figure 13: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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
B39262B8894L210	15000 pcs
B39262B8894L210S 5	5000 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.
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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