Qualcomm

RF360
Europe GmbH

Data sheet

BAW filter
TD-LTE band 41

Part number:	B2648
Ordering code:	B39262B2648P810
Date:	October 06, 2020
Version:	2.3

DCN: 80-PA243-500 Rev. D

RF360 Europe GmbH, Anzinger Str. 13, München, Germany

Table of contents

1 Application

- TD-LTE band 41:
  2593 MHz (pass band 194 MHz)
- Low-loss BAW RF single filter

2 Features

- Package size $1.4_{\pm 0.1}$ mm × $1.1_{\pm 0.1}$ mm
- Package height 0.45 mm (max.)
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Filter surface passivated
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 2a (MSL2a)
- AEC-Q200 qualified component family
  (Grade 1: −40 °C to +125 °C)

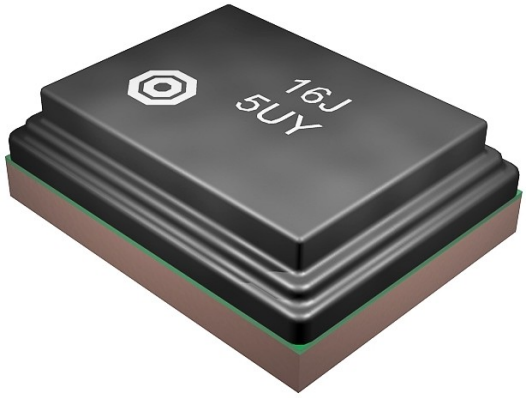

Figure 1: Picture of component with example of product marking.

3 Package

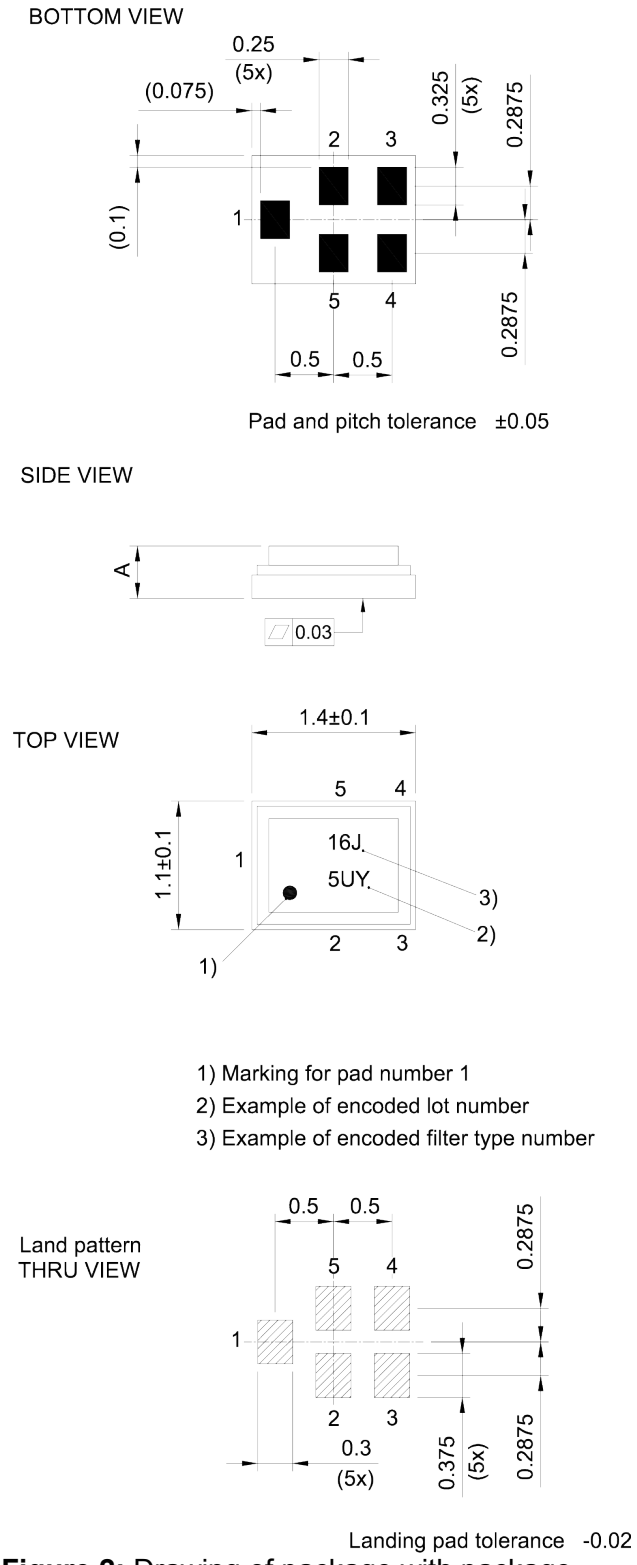

Figure 2: Drawing of package with package height A = 0.45 mm (max.). See Sec. Package information (p. 18).

4 Pin configuration

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

5 Matching circuit

- L_{s1} = 2.2 nH
- L_{s4} = 2.1 nH

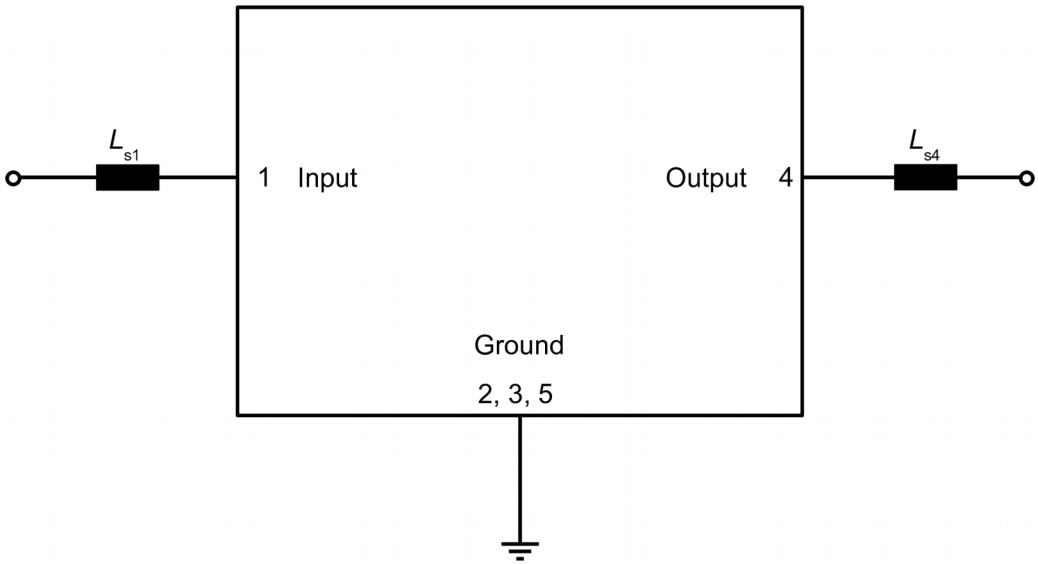

Figure 3: Schematic of matching circuit.

6 Characteristics

Temperature range for specification T_{SPEC} = −30 °C ... +85 °C
Input terminating impedance Z_{IN} = 50 Ω + 2.2 nH[1)]
Output terminating impedance Z_{OUT} = 50 Ω + 2.1 nH[1)]

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Maximum insertion attenuation			α_{max}				
	2496 ... 2500	MHz		—	2.3	3.0	dB
	2500 ... 2680	MHz		—	2.1	3.0	dB
	2680 ... 2690	MHz		—	2.6	3.0	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	2496 ... 2690	MHz		—	1.7	2.2	dB
Maximum VSWR			$VSWR_{max}$				
@ input port	2496 ... 2690	MHz		—	1.8	2.3	
@ output port	2496 ... 2690	MHz		—	1.8	2.3	
Attenuation			α_{WLAN} [2)]				
WLAN ch1	2402.5 ... 2421.5	MHz		35	50	—	dB
WLAN ch2	2407.5 ... 2426.5	MHz		35	46	—	dB
WLAN ch3	2412.5 ... 2431.5	MHz		35	46	—	dB
WLAN ch4	2417.5 ... 2436.5	MHz		35	46	—	dB
WLAN ch5	2422.5 ... 2441.5	MHz		35	45	—	dB
WLAN ch6	2427.5 ... 2446.5	MHz		35	45	—	dB
WLAN ch7	2432.5 ... 2451.5	MHz		35	46	—	dB
WLAN ch8	2437.5 ... 2456.5	MHz		35	47	—	dB
WLAN ch9	2442.5 ... 2461.5	MHz		35	49	—	dB
WLAN ch10	2447.5 ... 2466.5	MHz		35	50	—	dB
WLAN ch11	2452.5 ... 2471.5	MHz		30	40	—	dB
Minimum attenuation			α_{min}				
	10 ... 699	MHz		35	39	—	dB
	699 ... 916	MHz		33	36	—	dB
	916 ... 1248	MHz		30	33	—	dB
	1248 ... 1660	MHz		28	30	—	dB
	1660 ... 2400	MHz		27	29	—	dB
	2740 ... 2850	MHz		34	38	—	dB
	2850 ... 4992	MHz		27	30	—	dB
	4992 ... 7488	MHz		37	42	—	dB

1) See Sec. Matching circuit (p. 6).
2) Average over each WLAN channel with band width of 19 MHz.

7 Maximum ratings

Operable temperature	T_{OP} = −40 °C ... +125 °C	
Storage temperature	T_{STG} [1] = −40 °C ... +125 °C	
DC voltage	$\lvert V_{DC} \rvert$ [2] = 0 V (max.)	
Input power	P_{IN}	
@ input port: 2496 ... 2690 MHz	31 dBm	5 MHz TD-LTE downlink signal duty cycle 43% for 5000 h @ 55 °C. Source and load impedance 50Ω.[3]
@ input port: other frequency ranges	10 dBm	5 MHz TD-LTE downlink signal duty cycle 43% for 5000 h @ 55 °C. Source and load impedance 50Ω.

1) Not valid for packaging material. Storage temperature for packaging material is −25 °C to +40 °C.
2) In case of applied DC voltage blocking capacitors are mandatory.
3) Expected lifetime according to accelerated power durability test, and wear out models.

8 Transmission coefficient

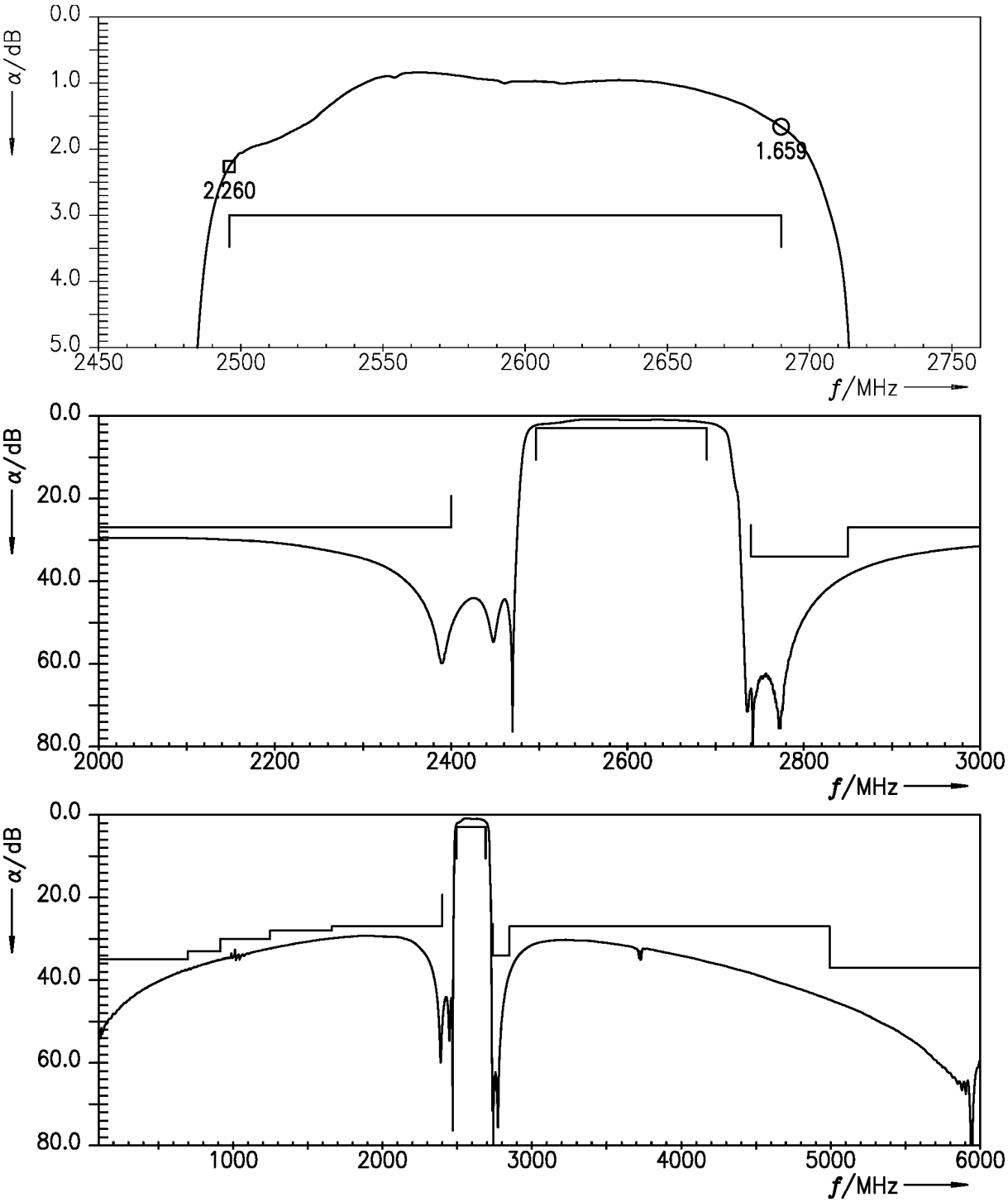

Figure 4: Attenuation.

9 Transmission coefficient (WLAN)

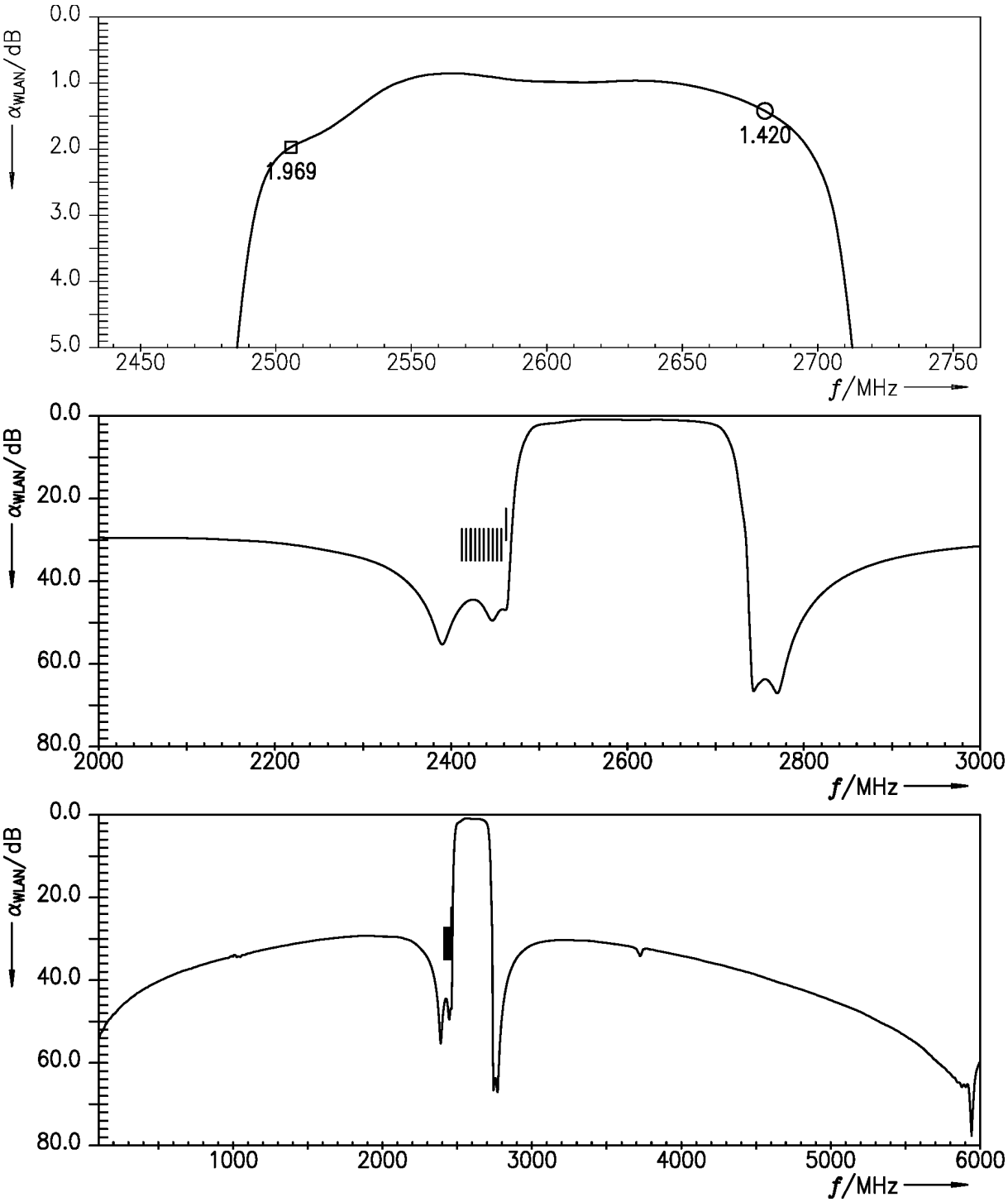

Figure 5: Attenuation (WLAN) (integration window = 19 MHz).

10 Reflection coefficients

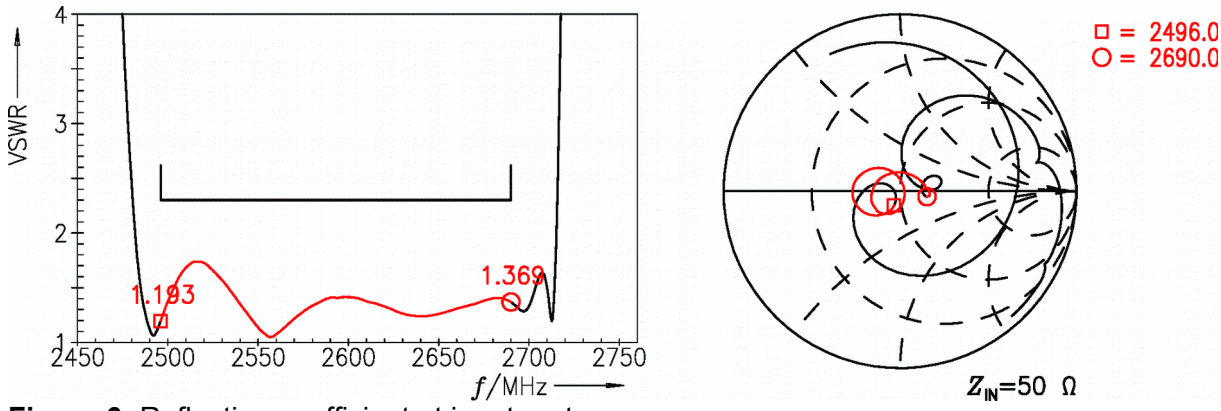

Figure 6: Reflection coefficient at input port.

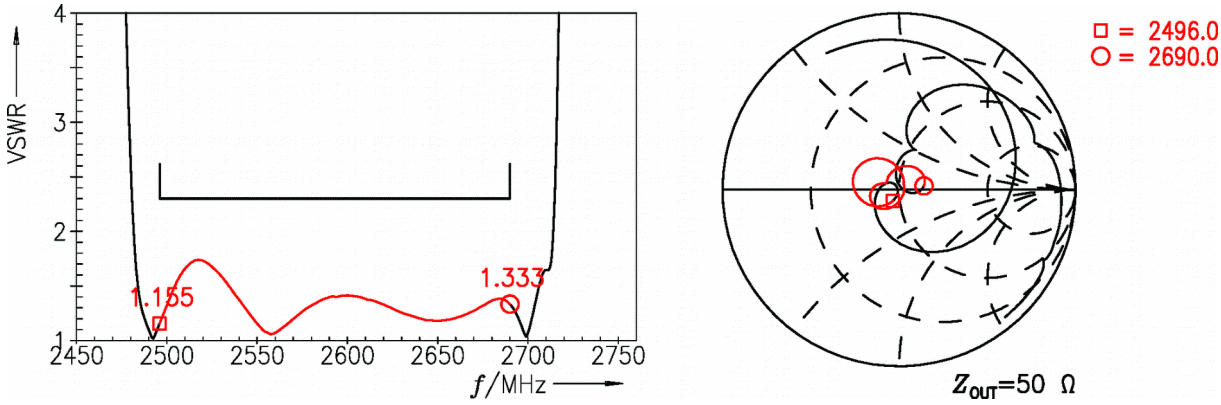

Figure 7: Reflection coefficient at output port.

11 Packing material

11.1 Tape

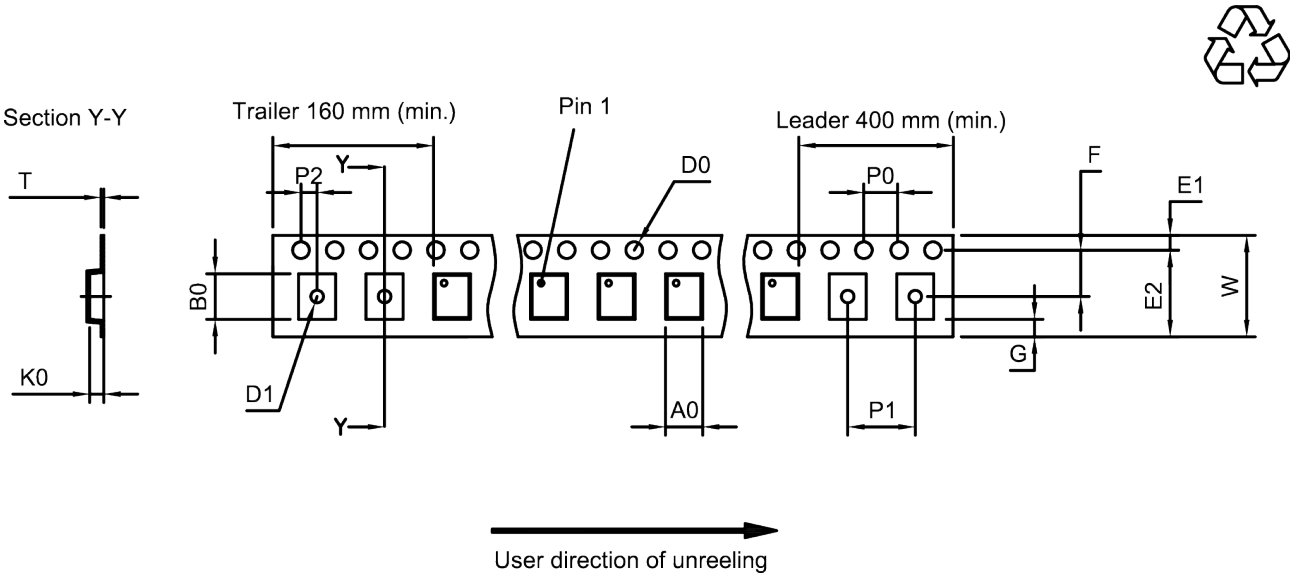

Figure 8: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A_0	$1.27_{\pm 0.05}$ mm
B_0	$1.57_{\pm 0.05}$ mm
D_0	$1.5^{+0.1/-0}$ mm
D_1	$0.5_{\pm 0.1}$ mm
E_1	$1.75_{\pm 0.1}$ mm

E_2	6.25 mm (min.)
F	$3.5_{\pm 0.05}$ mm
G	0.75 mm (min.)
K_0	$0.62_{\pm 0.05}$ mm
P_0	$4.0_{\pm 0.1}$ mm

P_1	$4.0_{\pm 0.1}$ mm
P_2	$2.0_{\pm 0.05}$ mm
T	$0.25_{\pm 0.03}$ mm
W	$8.0^{+0.3/-0.1}$ mm

Table 1: Tape dimensions.

11.2 Reel with diameter of 180 mm

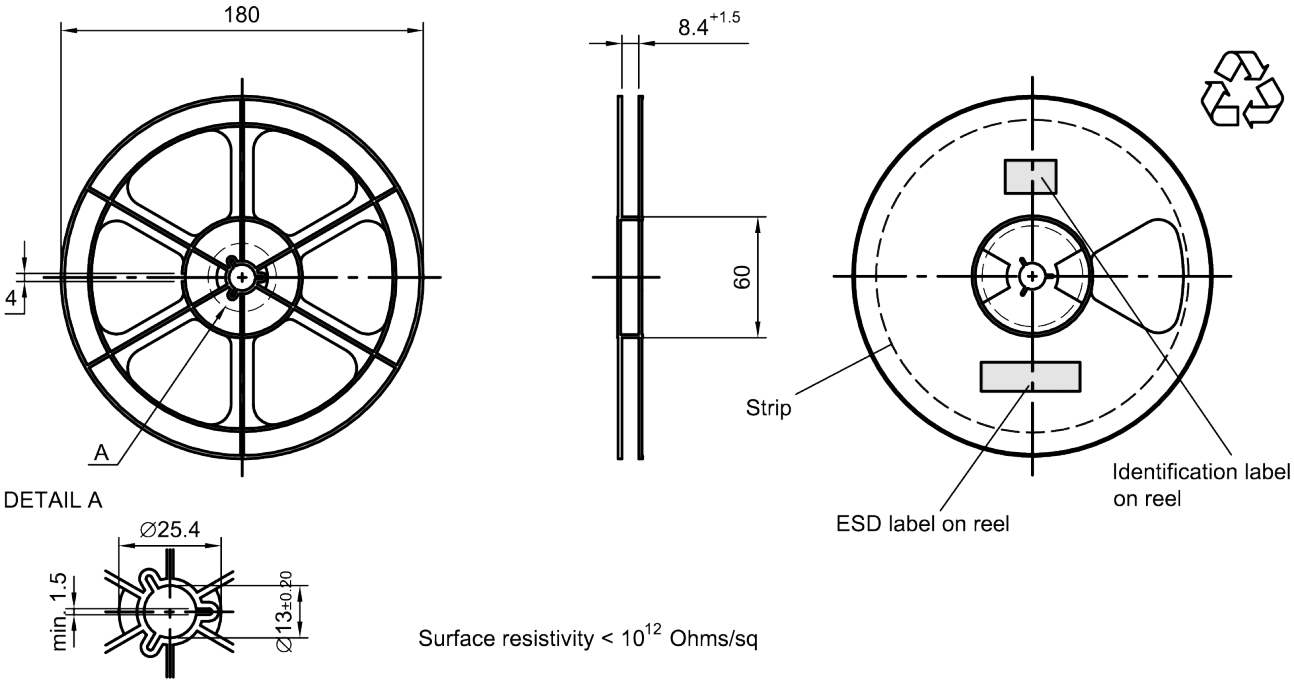

Figure 9: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]
X = 220+5
Y = 235+5
Sealing area 10±3

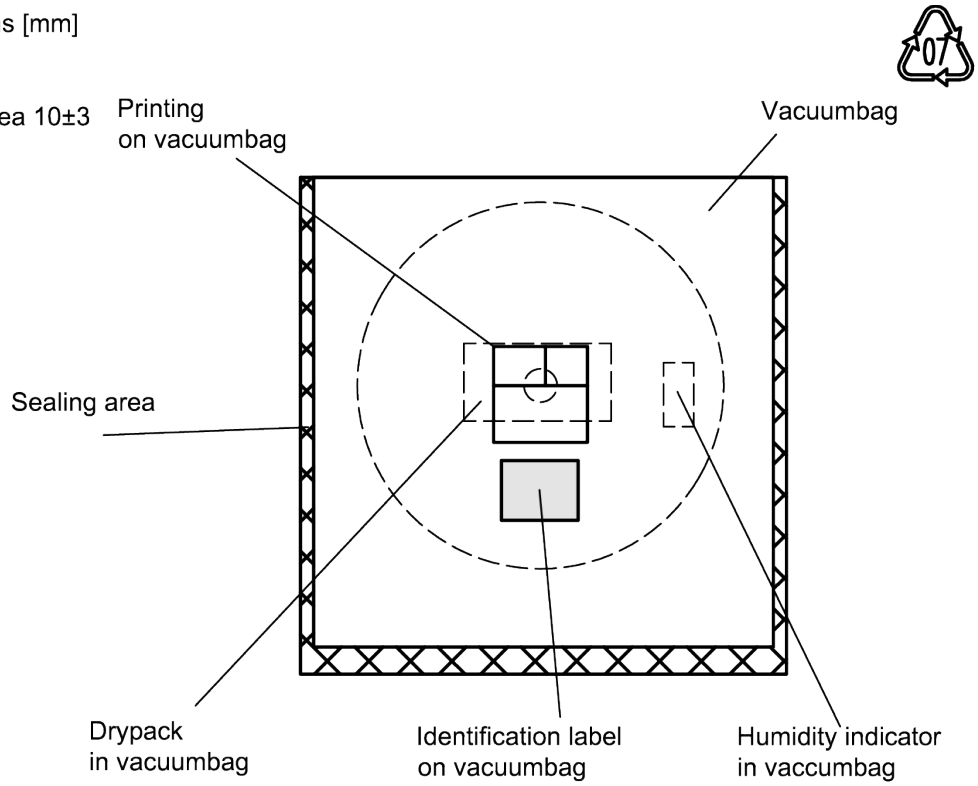

Figure 10: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

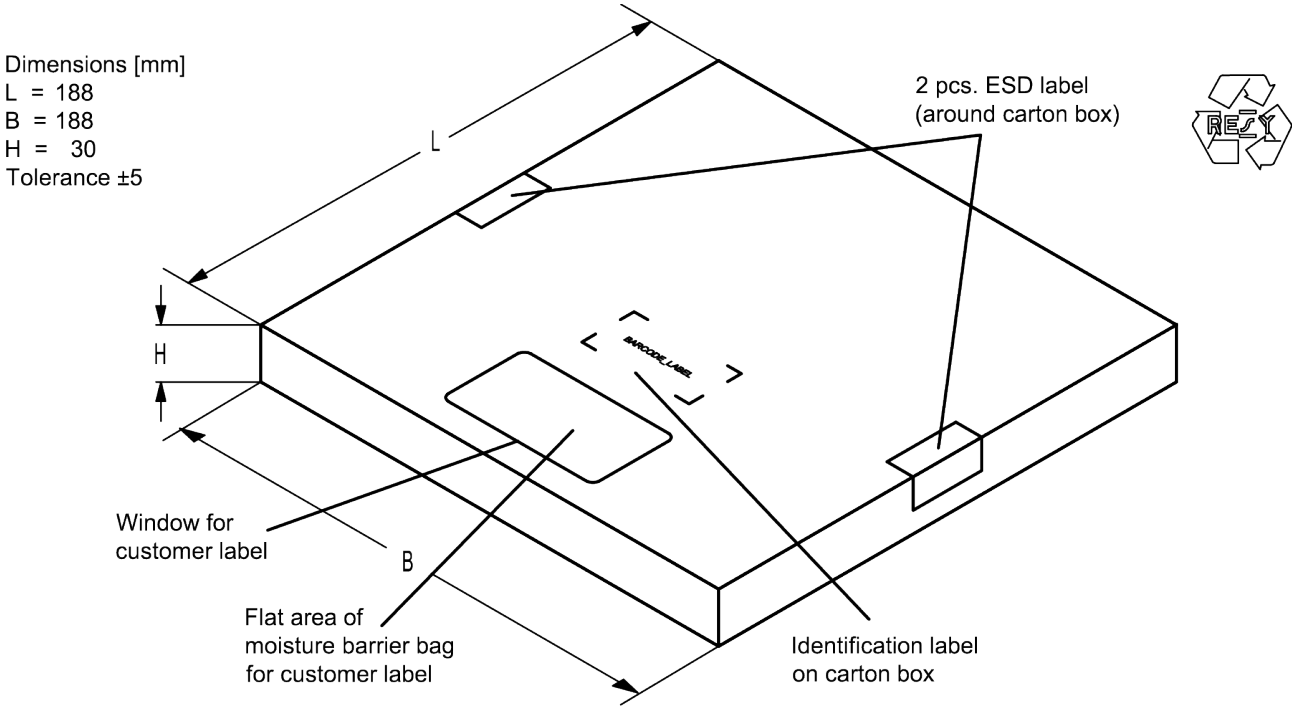

Figure 11: Drawing of folding box for reel with diameter of 180 mm.

12 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 B2648 is 2JR.

- 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.

13 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).

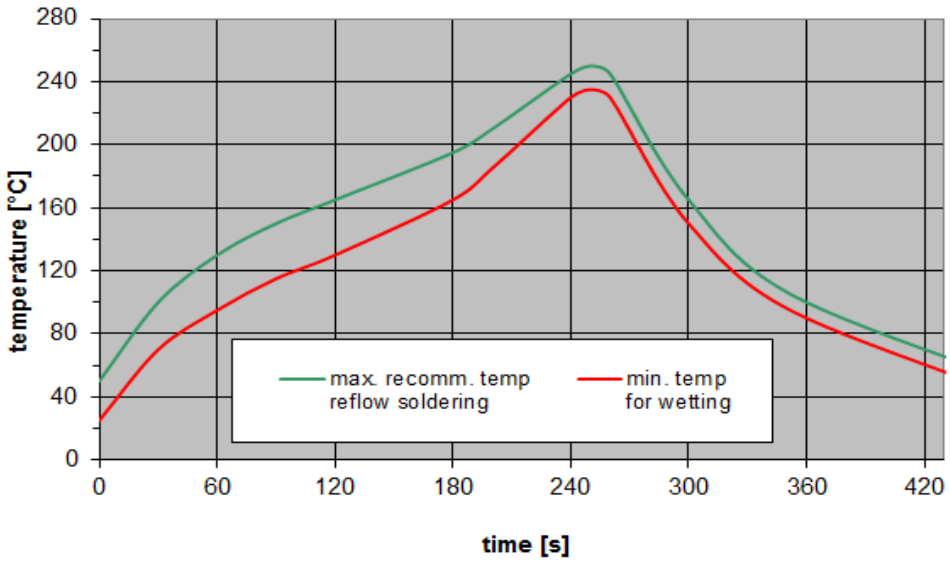

Figure 12: Recommended reflow profile for convection and infrared soldering – lead-free solder.

14 Annotations

14.1 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.

14.2 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.

15 Cautions and warnings

15.1 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 https://rffe.qualcomm.com/.

15.2 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.

15.3 Moldability

Before using in overmolding environment, please contact your local RF360 sales office.

15.4 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).

Dimensions do not include burrs.

Projection method

Unless otherwise specified first-angle projection is applied.

16 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 (https://rffe.qualcomm.com). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
   The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Qualcomm RF360:

B39262B2648P810