



RF360
Europe GmbH

Data sheet

BAW filter
TD-LTE band 41

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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 \times $1.1_{\pm 0.1}$ 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)

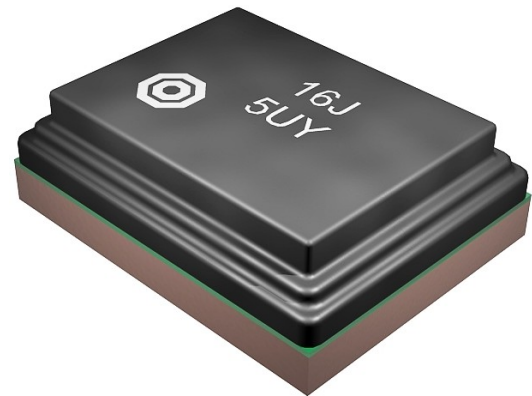
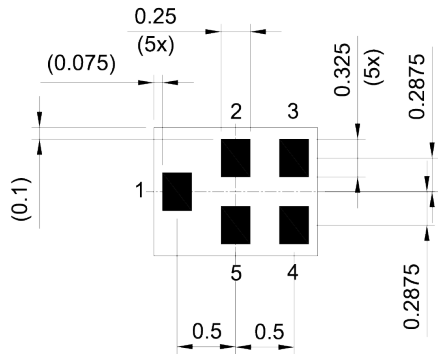


Figure 1: Picture of component with example of product marking.

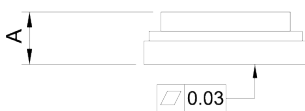
3 Package

BOTTOM VIEW

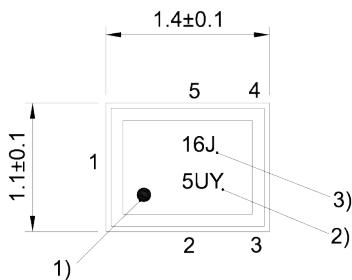


Pad and pitch tolerance ± 0.05

SIDE VIEW

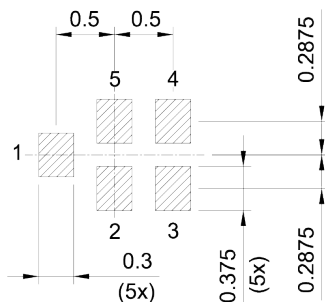


TOP VIEW



- 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).

4 Pin configuration

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

5 Matching circuit

■ $L_{s1} = 2.2 \text{ nH}$

■ $L_{s4} = 2.1 \text{ nH}$

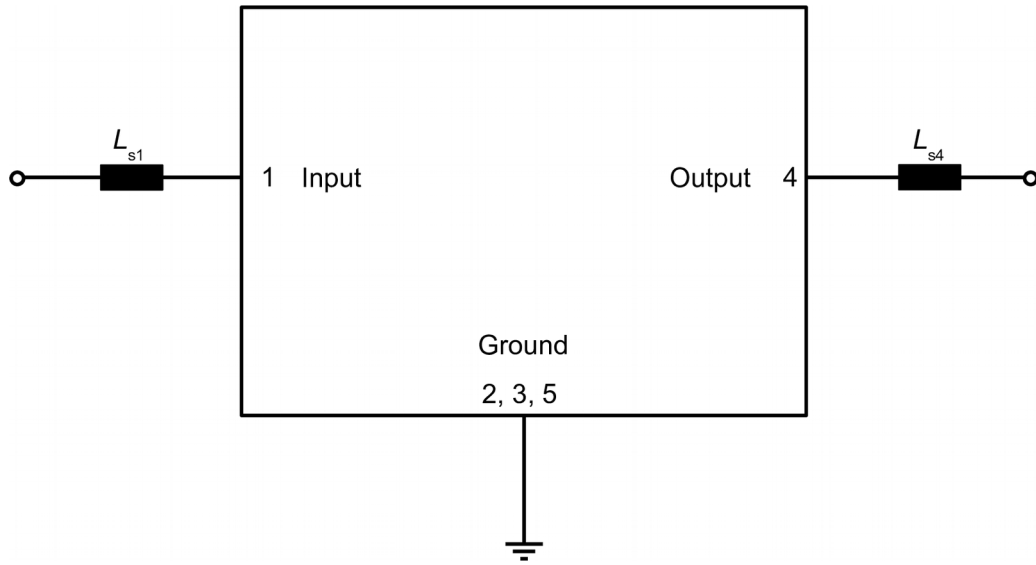


Figure 3: Schematic of matching circuit.

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						
		$\alpha_{WLAN}^{2)}$				
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	$T_{OP} = -40\text{ °C} \dots +125\text{ °C}$	
Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +125\text{ °C}$	
DC voltage	$ V_{DC} ^{2)} = 0\text{ 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

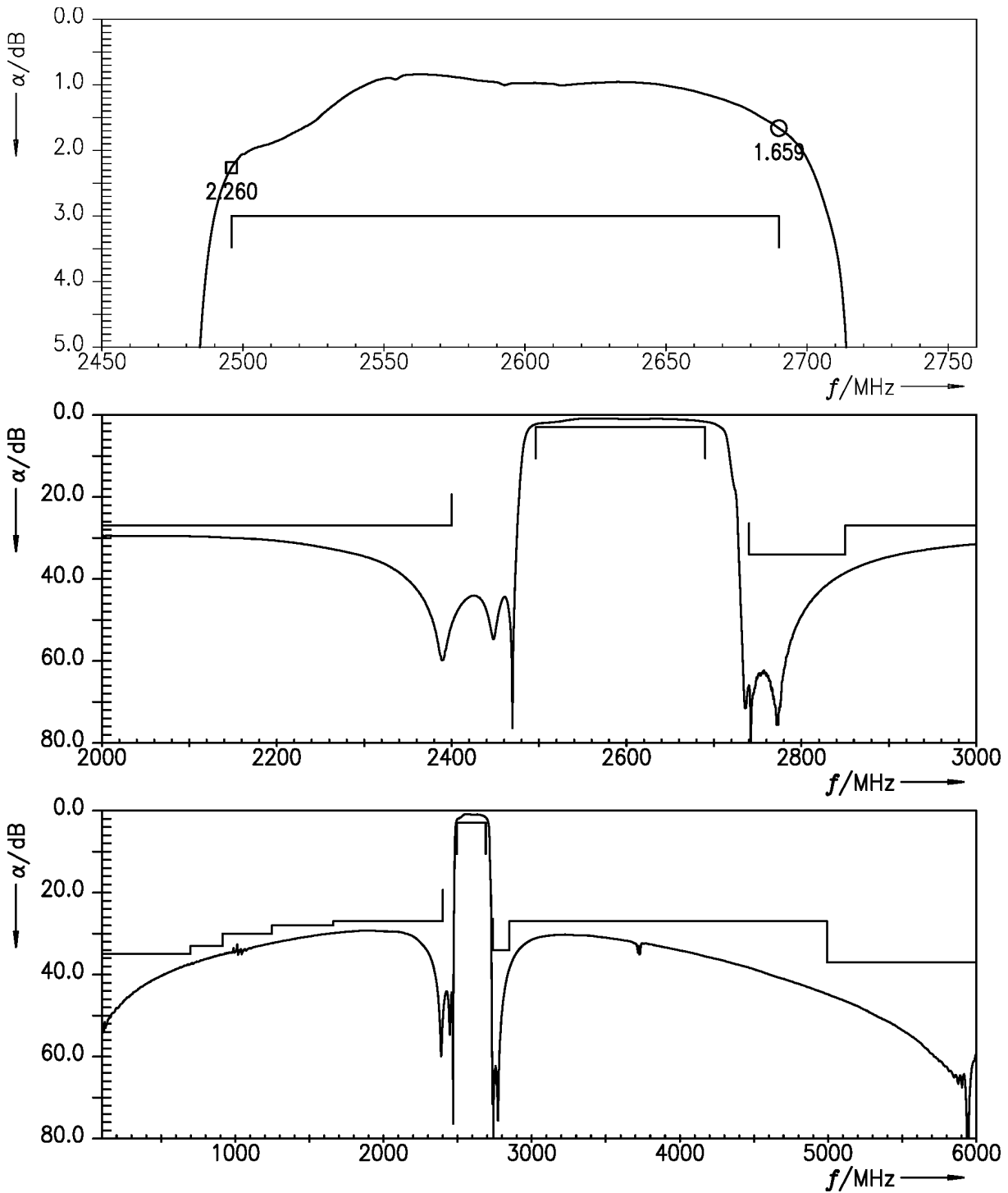


Figure 4: Attenuation.

9 Transmission coefficient (WLAN)

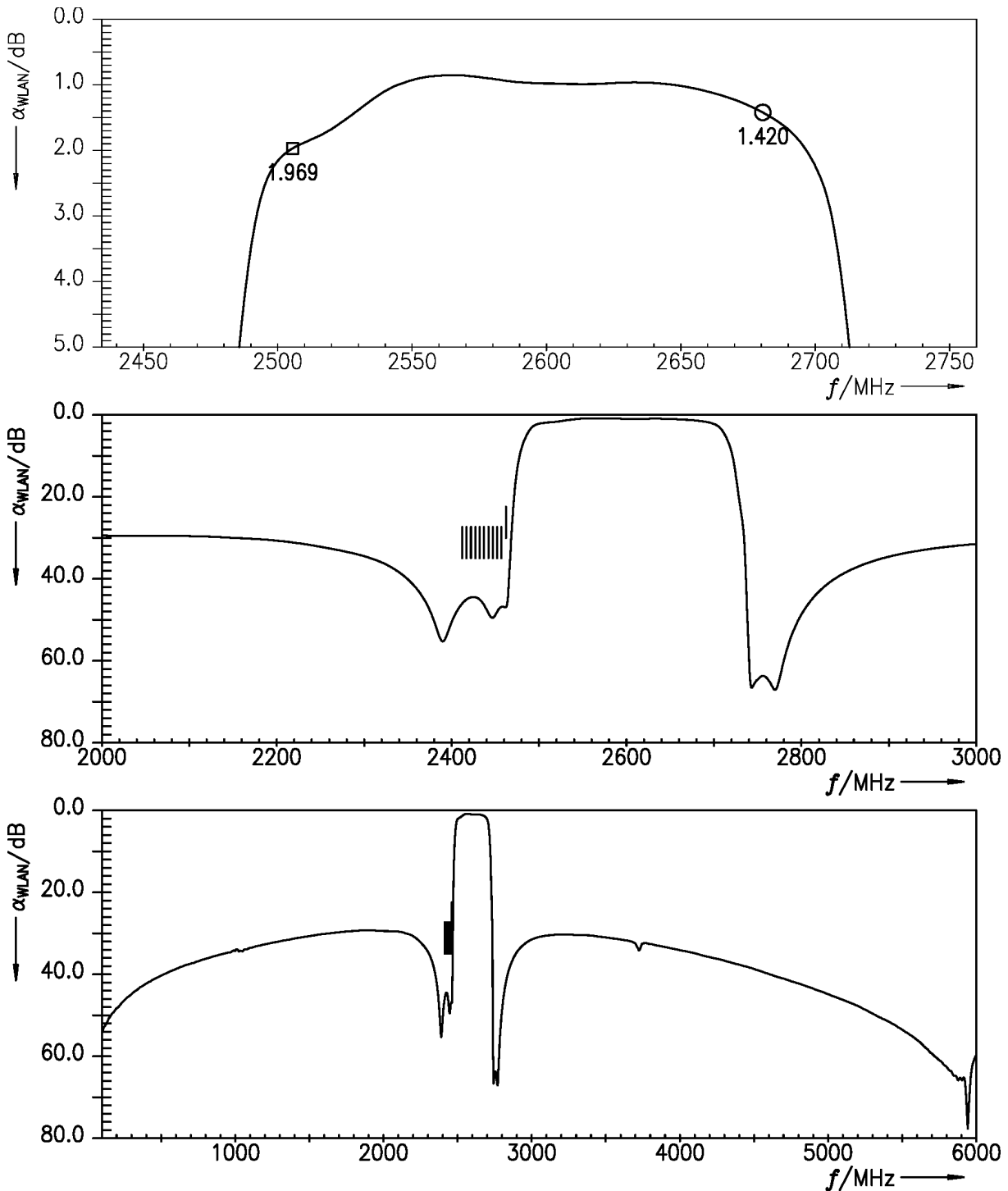


Figure 5: Attenuation (WLAN) (integration window = 19 MHz).

10 Reflection coefficients

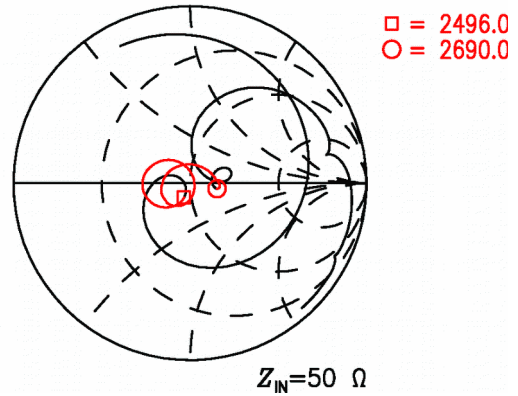
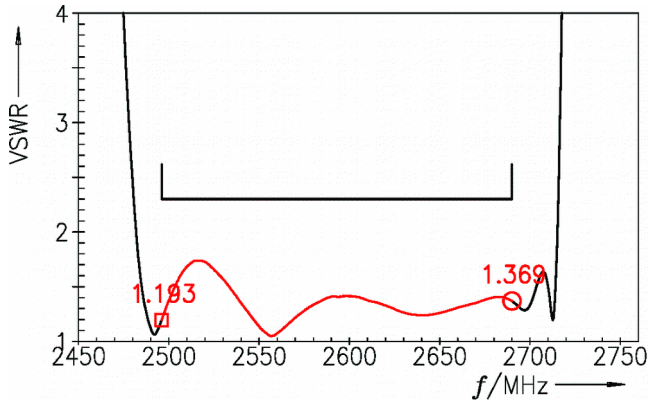


Figure 6: Reflection coefficient at input port.

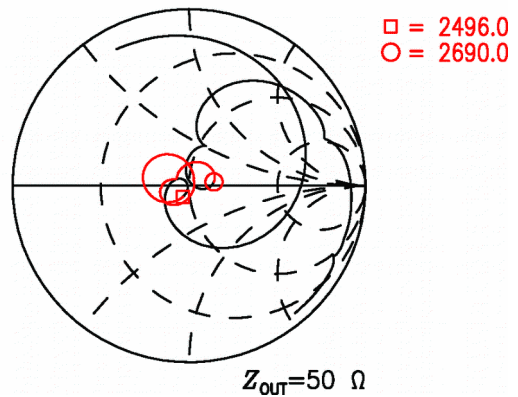
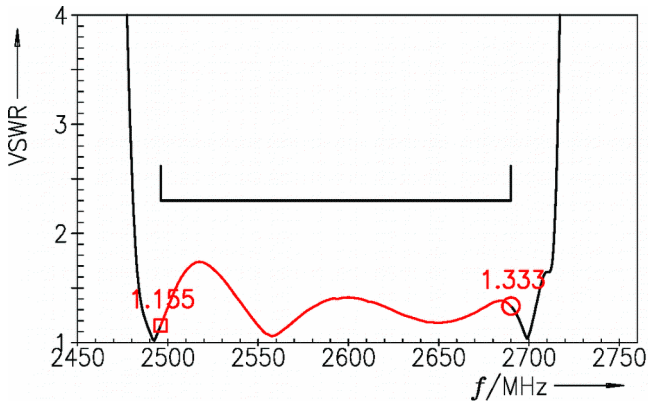


Figure 7: Reflection coefficient at output port.

11 Packing material

11.1 Tape

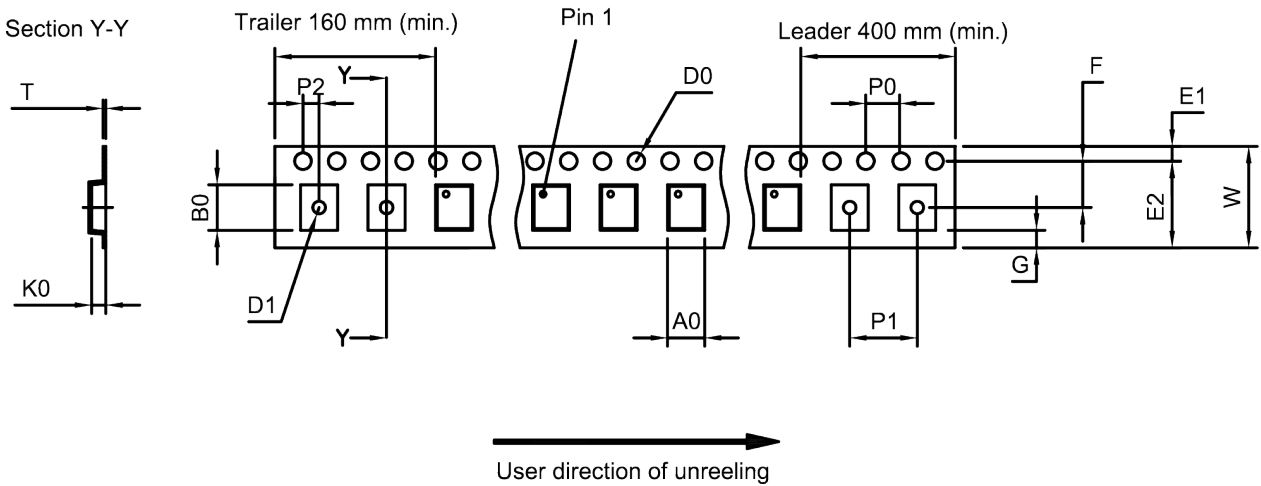


Figure 8: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A ₀	1.27±0.05 mm	E ₂	6.25 mm (min.)	P ₁	4.0±0.1 mm
B ₀	1.57±0.05 mm	F	3.5±0.05 mm	P ₂	2.0±0.05 mm
D ₀	1.5+0.1/-0 mm	G	0.75 mm (min.)	T	0.25±0.03 mm
D ₁	0.5±0.1 mm	K ₀	0.62±0.05 mm	W	8.0+0.3/-0.1 mm
E ₁	1.75±0.1 mm	P ₀	4.0±0.1 mm		

Table 1: Tape dimensions.

11.2 Reel with diameter of 180 mm

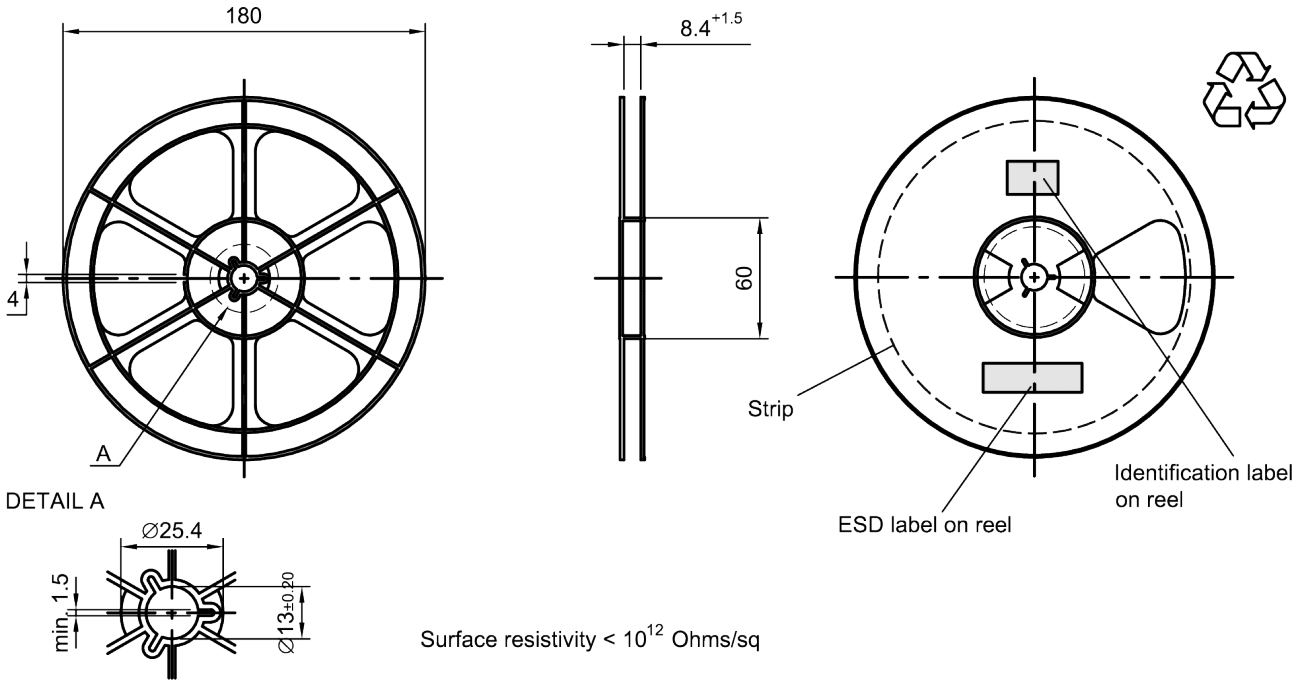


Figure 9: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

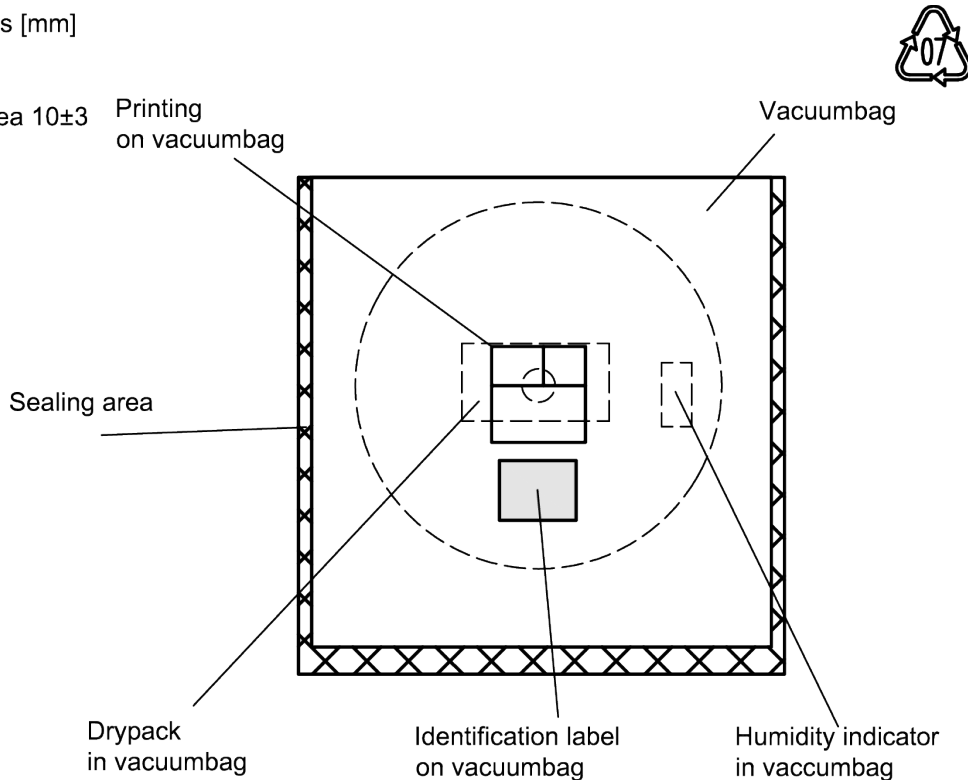


Figure 10: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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

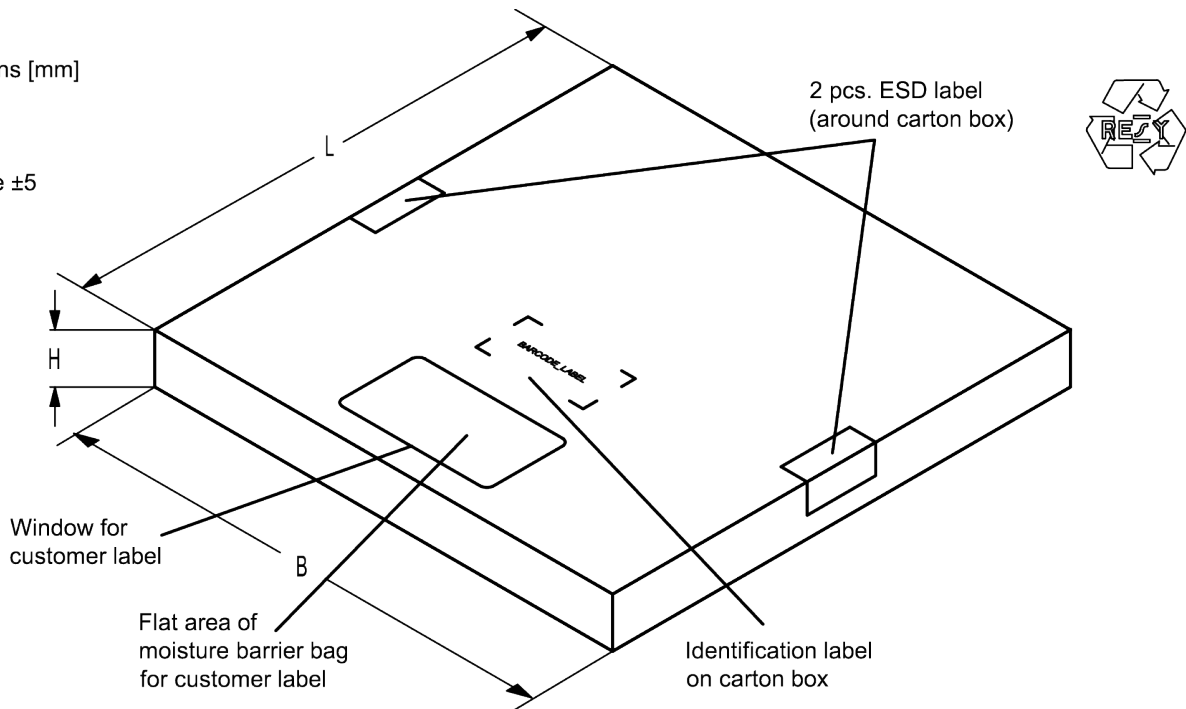


Figure 11: Drawing of folding box for reel with diameter of 180 mm.

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**
 $1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0 =$ **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**
 $5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0 =$ **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).

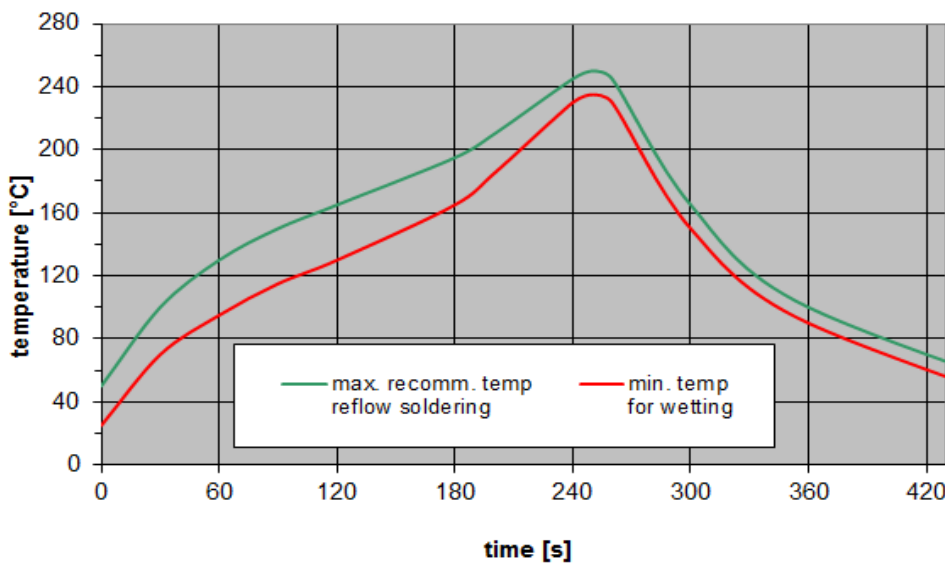


Figure 12: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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://rfe.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

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