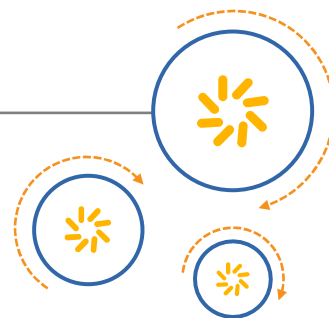




RF360 Europe GmbH
A Qualcomm – TDK Joint Venture

SAW components

BAW filter

WLAN 2G; Bluetooth

Series/type:	B4346
Ordering code:	B39242B4346P810
Date:	February 02, 2018
Version:	2.1

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SAW components	B4346
BAW filter	2442 MHz

Data sheet

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SAW components	B4346
BAW filter	2442 MHz

Data sheet

Table of contents

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

SAW components

B4346

BAW filter

2442 MHz

Data sheet

1 Application

- Low-loss BAW RF single filter for Bluetooth/WLAN with LTE Band 7 / Band 40 / Band 41 coexistence for Automotive telematics
- Usable pass band 79.0 MHz
- Excellent insertion loss
- High out of band selectivity
- Filter impedance 50 Ω
- Excellent B7 attenuation

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 2 mg
- 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 3: -40 °C to +85 °C)

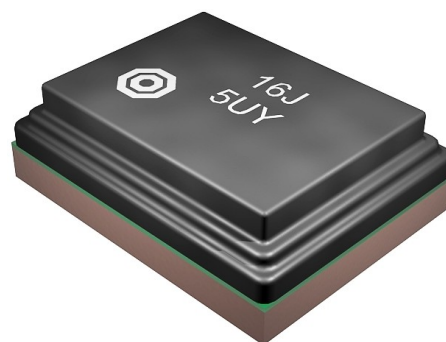


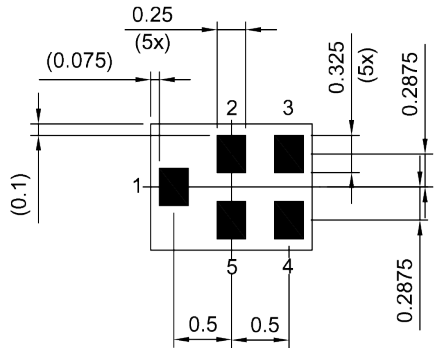
Figure 1: Picture of component with example of product marking.

SAW components	B4346
BAW filter	2442 MHz

Data sheet

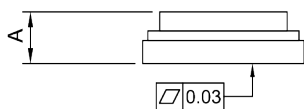
3 Package

BOTTOM VIEW

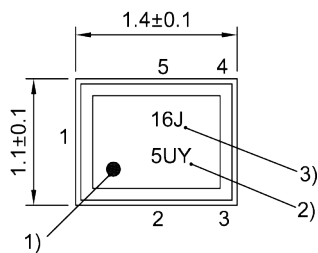


Pad and pitch tolerance ±0.05

SIDE VIEW

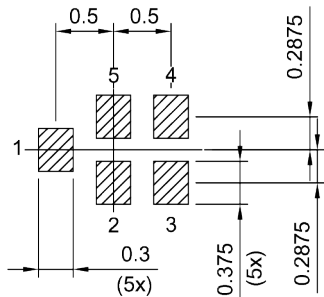


TOP VIEW



- 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. 17).

4 Pin configuration

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

SAW components

B4346

BAW filter

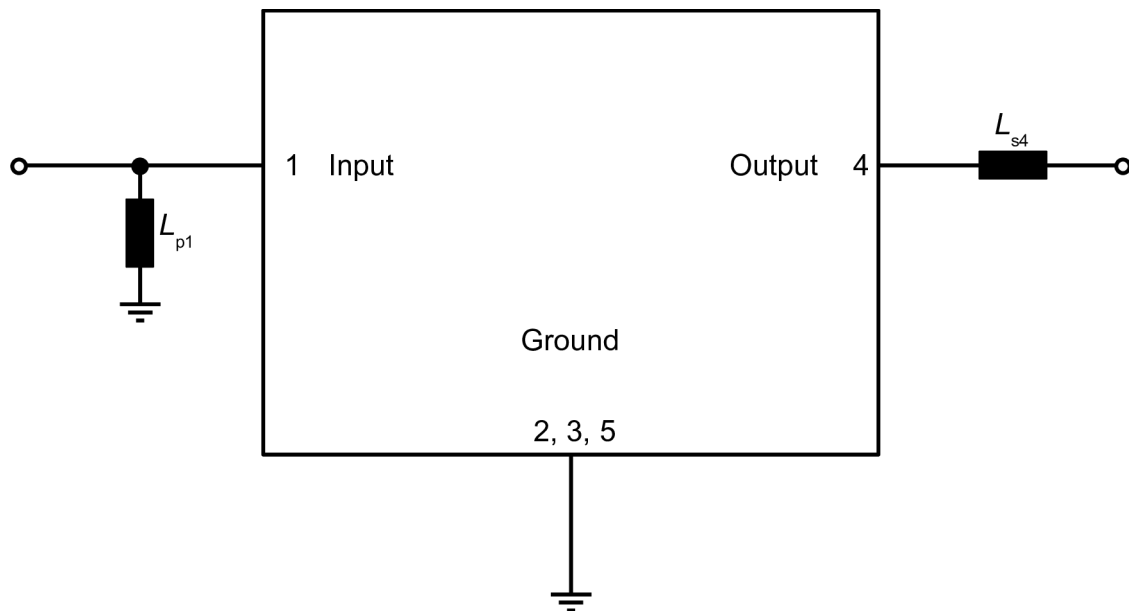
2442 MHz

Data sheet

5 Matching circuit

$$\blacksquare L_{p1} = 10 \text{ nH}$$

$$\blacksquare L_{s4} = 1.2 \text{ nH}$$

**Figure 3:** Schematic of matching circuit.

SAW components

B4346

BAW filter

2442 MHz

Data sheet

6 Characteristics

Temperature range for specification

 T_{SPEC} = -40 °C ... +85 °C

Input terminating impedance

 Z_{IN} = 50 Ω with par. 10 nH¹⁾

Output terminating impedance

 Z_{OUT} = 50 Ω with ser. 1.2 nH¹⁾

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency							
			f_{C}	—	2442	—	MHz
Maximum insertion attenuation – WLAN							
			$\alpha_{\text{WLAN,max}}$ ²⁾				
WLAN Channel 1	2403.1 ... 2420.9	MHz		—	1.9	2.7	dB
WLAN Channel 2	2408.1 ... 2425.9	MHz		—	1.7	2.2	dB
WLAN Channel 3-11	2413.1 ... 2470.9	MHz		—	1.4	2.0	dB
WLAN Channel 12	2458.1 ... 2475.9	MHz		—	1.6	2.2	dB
WLAN Channel 13	2463.1 ... 2480.9	MHz		—	1.8	2.7	dB
Maximum insertion attenuation – BT							
			$\alpha_{\text{BT,max}}$ ³⁾				
Bluetooth	2401.5 ... 2480.5	MHz		—	1.5	2.0	dB
Maximum VSWR							
			VSWR _{max}				
@ input port	2403.1 ... 2475.9	MHz		—	1.6	2.3	
	2463.1 ... 2480.9	MHz		—	1.8	2.5	
@ output port	2403.1 ... 2475.9	MHz		—	1.6	2.3	
	2463.1 ... 2480.9	MHz		—	1.8	2.3	
Minimum attenuation							
	100 ... 1805	MHz	α_{min}	32	37	—	dB
	1805 ... 2170	MHz	α_{min}	33	38	—	dB
	2300 ... 2360	MHz	α_{min}	35	40	—	dB
	2360 ... 2365	MHz	α_{min} ⁴⁾	38	42	—	dB
	2365 ... 2370	MHz	α_{min} ⁴⁾	40	43	—	dB
	2370 ... 2375	MHz	α_{min} ⁴⁾	35	45	—	dB
	2375 ... 2380	MHz	α_{min} ⁴⁾	15	42	—	dB
	2500 ... 2505	MHz	α_{min} ⁴⁾	43 ⁵⁾	62	—	dB
	2500 ... 2505	MHz	α_{min} ⁴⁾	26 ⁶⁾	62	—	dB
	2505 ... 2570	MHz	α_{min}	43	52	—	dB
	2570 ... 2620	MHz	α_{min}	42	47	—	dB
	2620 ... 2690	MHz	α_{min}	40	47	—	dB
	4800 ... 5850	MHz	α_{min}	20	28	—	dB

1) See Sec. Matching circuit (p. 6).

2) Average over each WLAN channel with band width of 17.8 MHz.

3) Averaged value over whole pass band with band width of 79 MHz due to frequency hopping in Bluetooth mode.

4) Averaged values of linear S-parameter over any 5MHz.

5) Valid for temperature $T = +25\text{ °C} \dots +85\text{ °C}$.6) Valid for temperature $T = -40\text{ °C} \dots +25\text{ °C}$.

SAW components	B4346
BAW filter	2442 MHz

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}$	
Input power	P_{IN}	
@ input port: 2403.1 ... 2480.9 MHz	25 dBm	Continuous wave for 5000 h @ 85 °C. Source and load impedance 50Ω.
@ output port: 2403.1 ... 2480.9 MHz	22 dBm	Continuous wave for 5000 h @ 85 °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.

SAW components	B4346
BAW filter	2442 MHz

Data sheet

8 Transmission coefficient

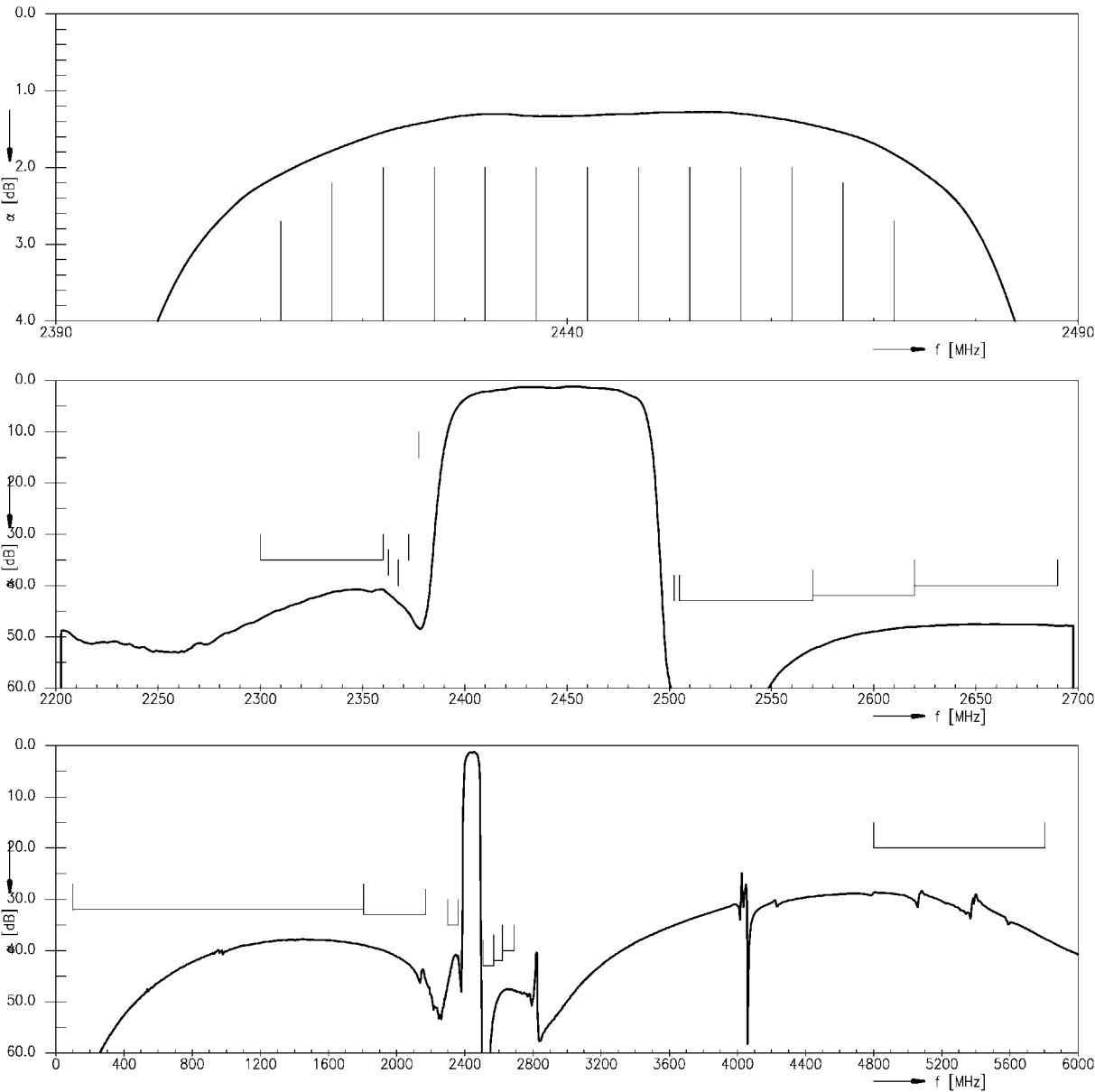


Figure 4: Attenuation.

SAW components	B4346
BAW filter	2442 MHz

Data sheet

9 Reflection coefficients

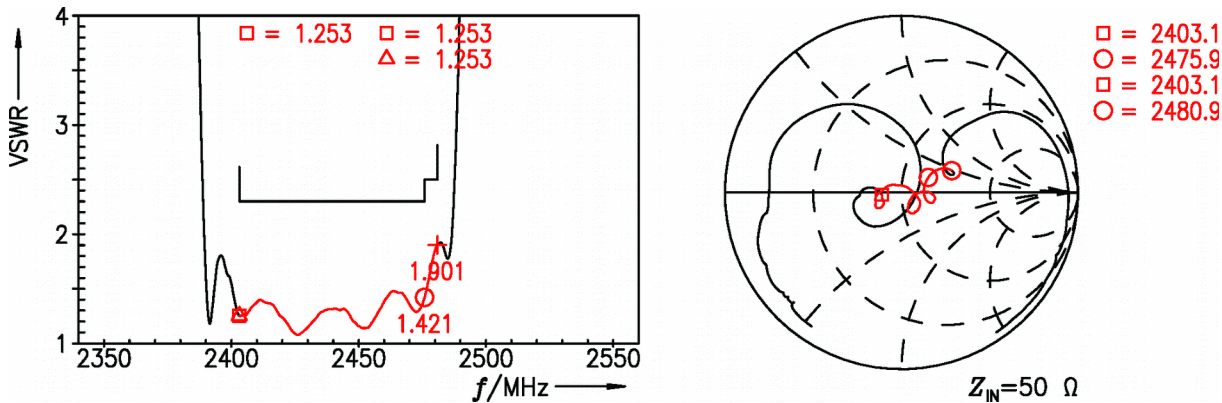


Figure 5: Reflection coefficient at IN port.

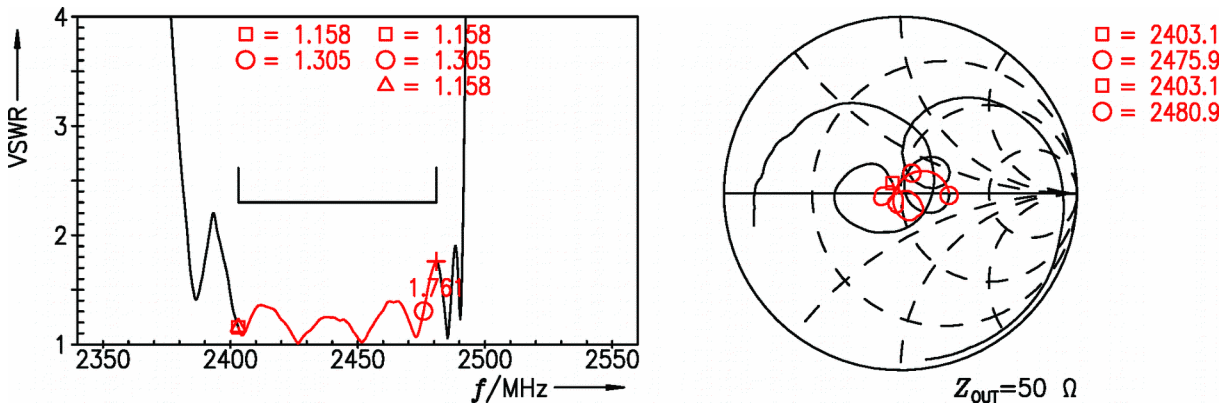


Figure 6: Reflection coefficient at OUT port.

Data sheet

10 Packing material

10.1 Tape

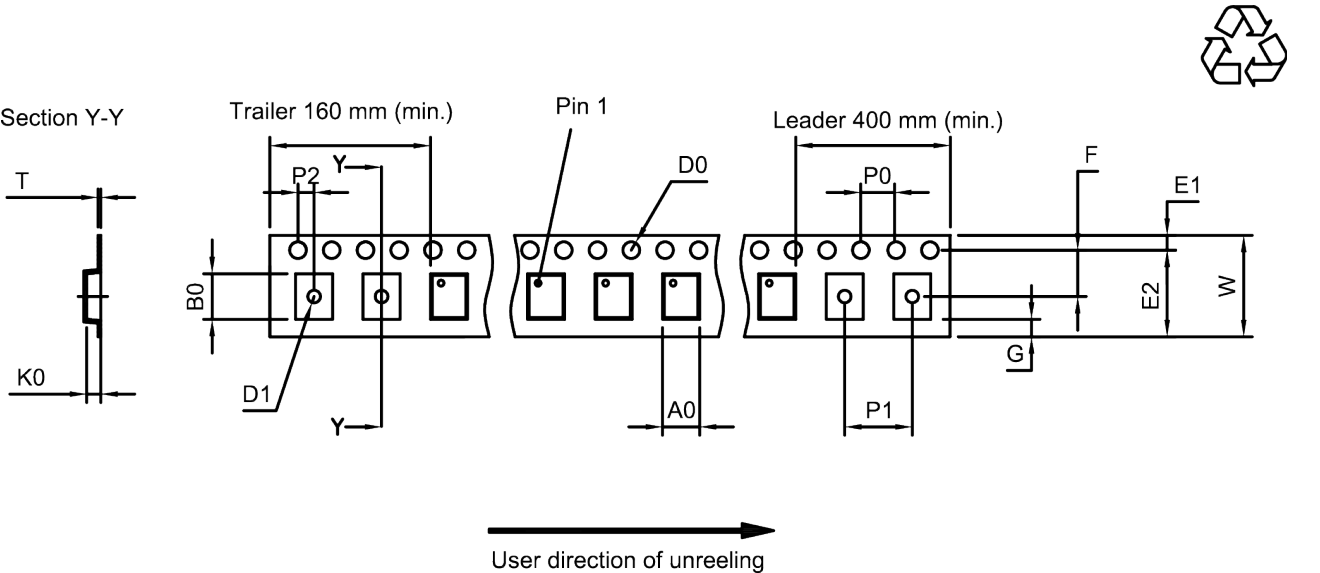


Figure 7: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

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.

SAW components	B4346
BAW filter	2442 MHz

Data sheet

10.2 Reel with diameter of 180 mm

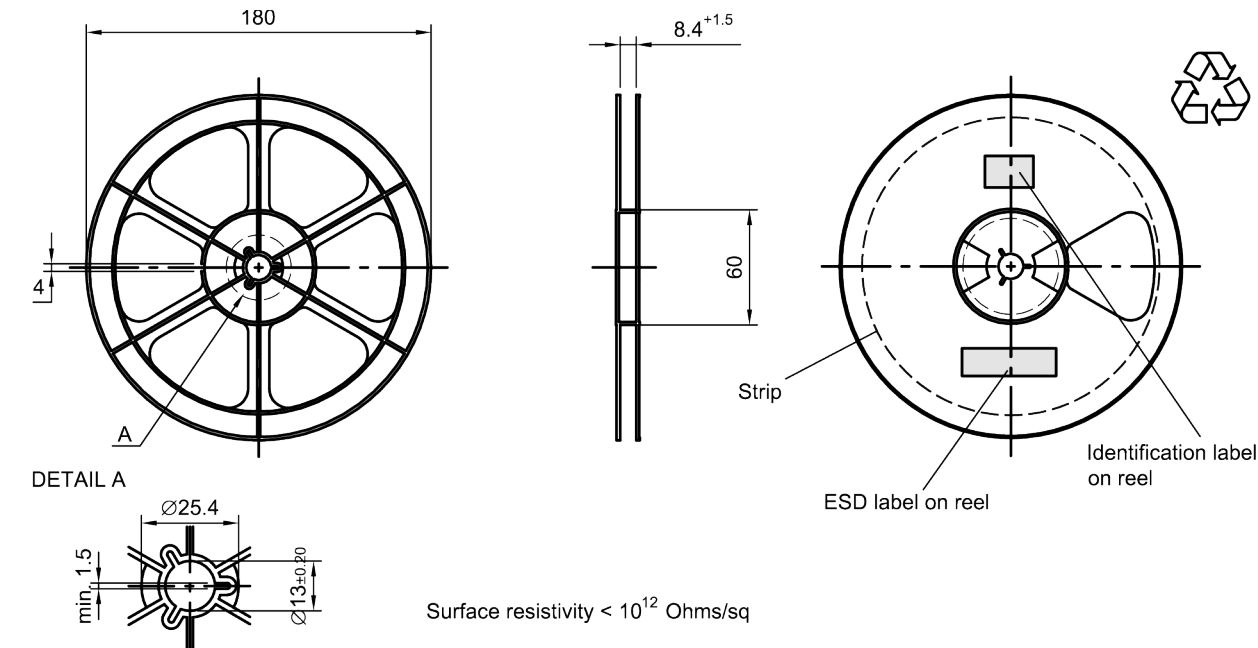


Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

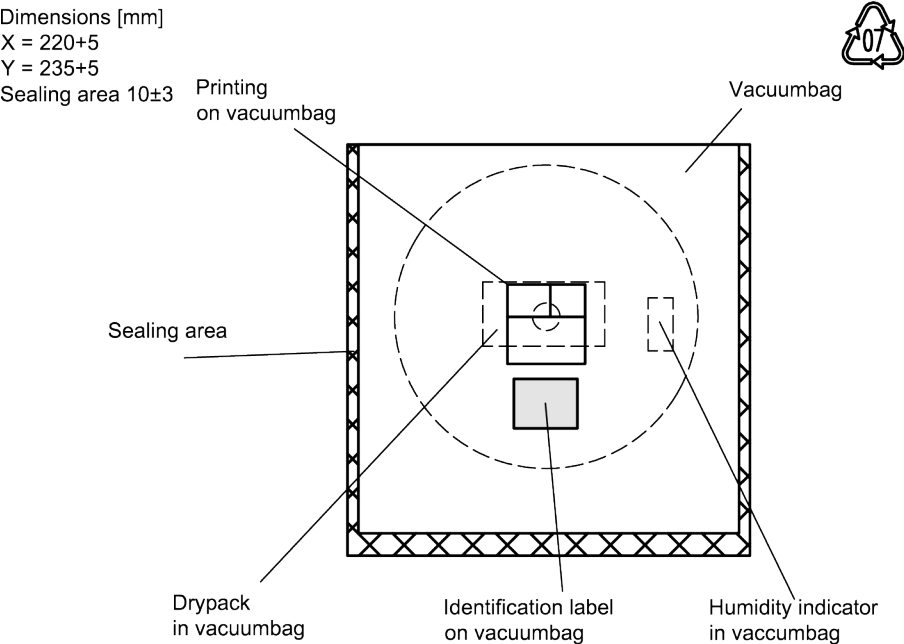


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

SAW components	B4346
BAW filter	2442 MHz

Data sheet

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

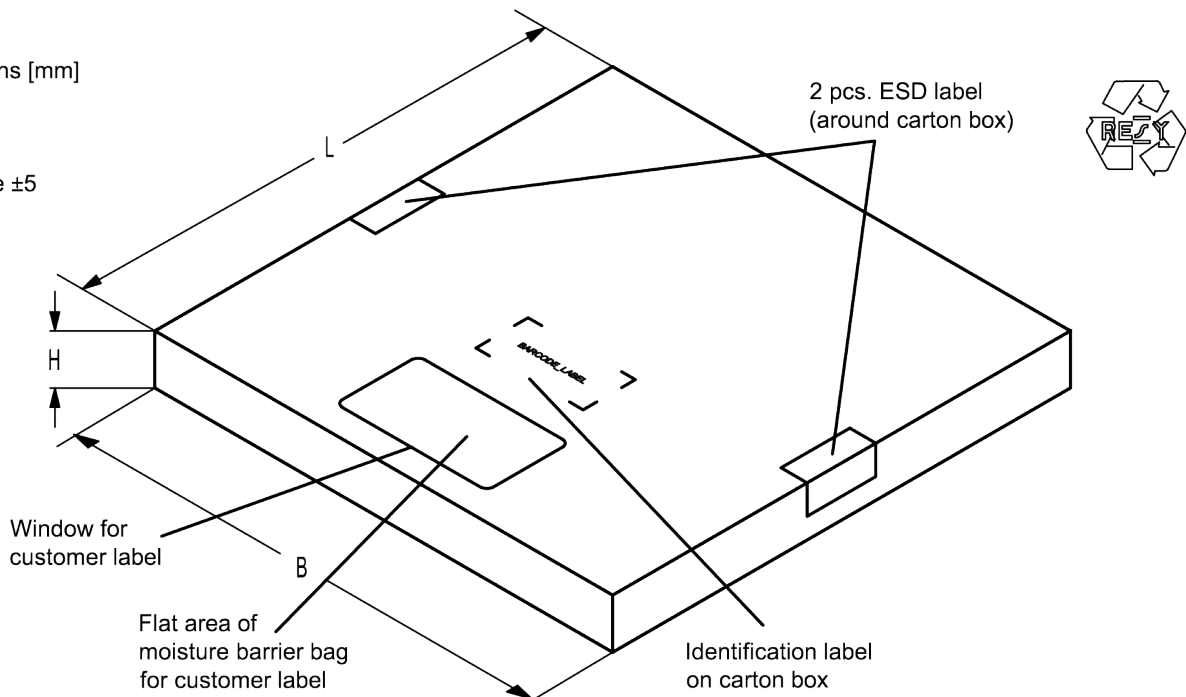


Figure 10: Drawing of folding box for reel with diameter of 180 mm.

SAW components

B4346

BAW filter

2442 MHz

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.
16J	=>	1234
$1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0$	=	1234

The BASE32 code for product type B4346 is 47T.

■ 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.

SAW components	B4346
BAW filter	2442 MHz

Data sheet

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).

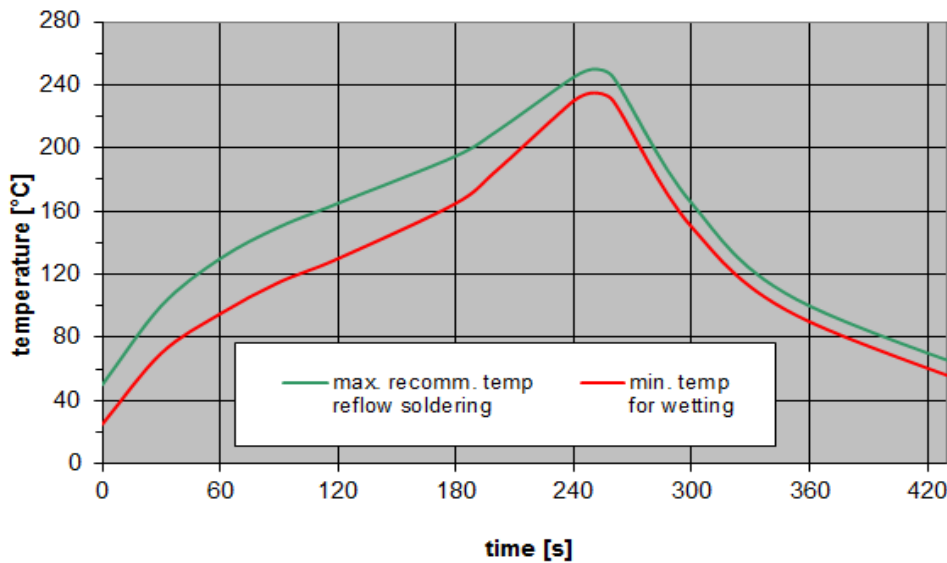


Figure 11: Recommended reflow profile for convection and infrared soldering – lead-free solder.

SAW components	B4346
BAW filter	2442 MHz

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.

SAW components**B4346****BAW filter****2442 MHz**

Data sheet

14 Cautions and warnings**14.1 Display of ordering codes for RF360 products**

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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).

Dimensions do not include burrs.

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

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