SAW components

BAW filter
WLAN 2G; Bluetooth

Series/type:	B4346
Ordering code:	B39242B4346P810
Date:	April 13, 2016
Version:	2.0

Table of contents

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

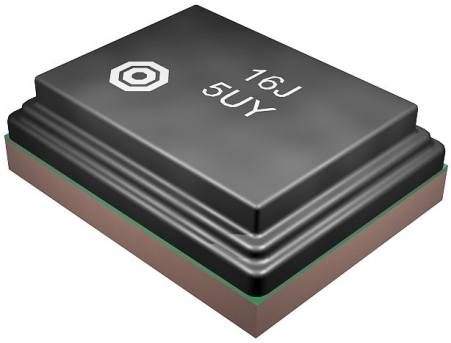

Figure 1: Picture of component with example of product marking.

2 Features

- Package size 1.4±0.1 mm × 1.1±0.1 mm
- Package height 0.45 mm (max.)
- Package code QCU5D
- Approximate weight 2 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Filter surface passivated
- AEC-Q200 qualified component family (operable temperature range −40 °C to +85 °C)
- Electrostatic Sensitive Device (ESD)

3 Package

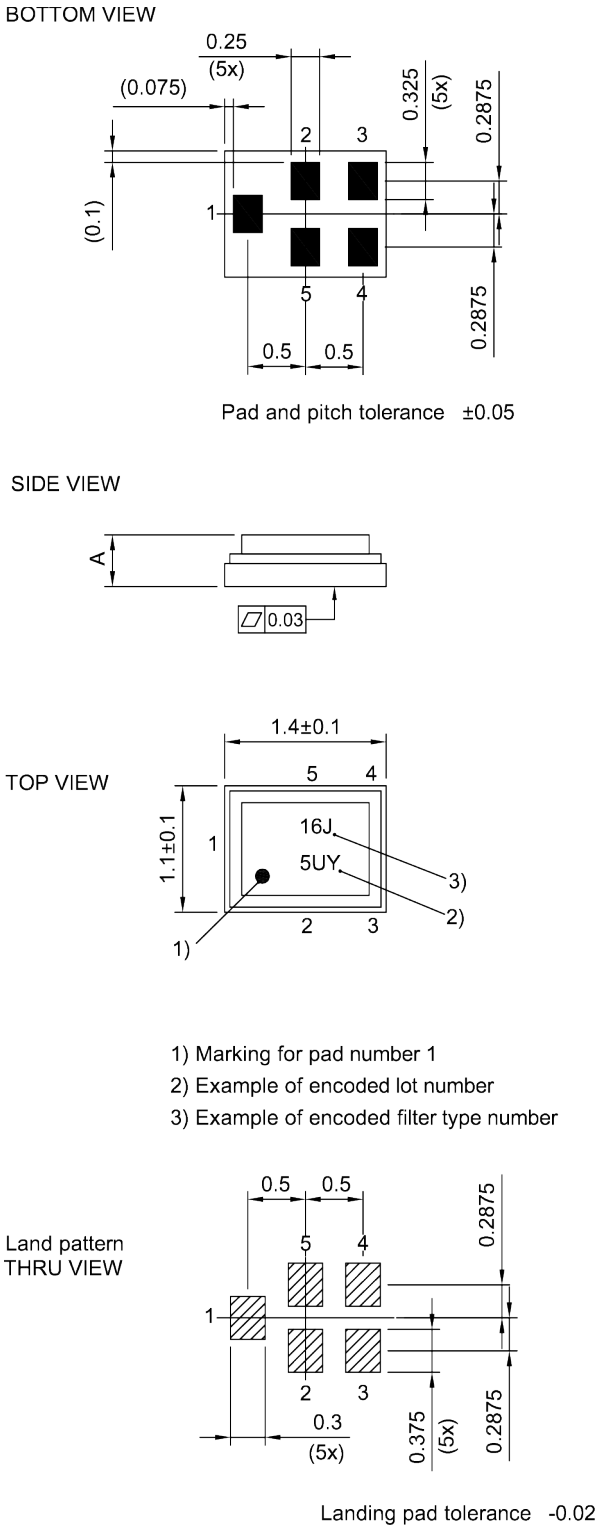

Figure 2: Drawing of package with package height A = 0.45 mm (max.). See Sec. Package information (p. 15).

4 Pin configuration

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

5 Matching circuit

■ L_{p1} = 10 nH ■ L_{s4} = 1.2 nH

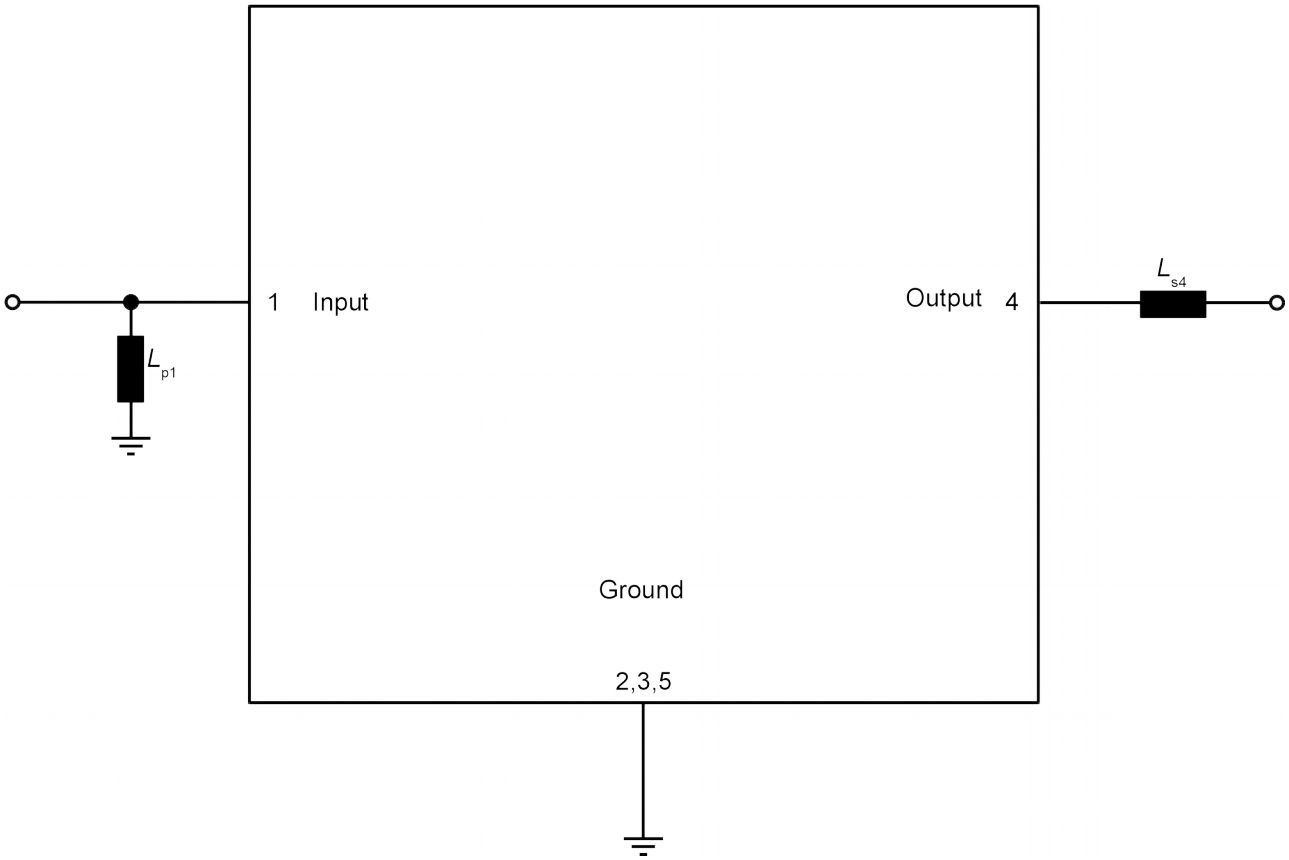

Figure 3: Schematic of matching circuit.

6 Characteristics

Temperature range for specification T_{SPEC} = −40 °C ... +85 °C
Input terminating impedance Z_{IN} = 50 Ω with par. 10 nH[1)]
Output terminating impedance Z_{OUT} = 50 Ω with ser. 1.2 nH[1)]

Characteristics					min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency				f_C	—	2442	—	MHz
Maximum insertion attenuation								
Bluetooth		2401.5 ... 2480.5	MHz	α_{max} [3)]	—	1.5	2.0	dB
WLAN Channel 1	@$f_{carrier}$	2403.1 ... 2420.9	MHz	$\alpha_{WLAN,max}$ [2)]	—	1.9	2.7	dB
WLAN Channel 2	@$f_{carrier}$	2408.1 ... 2425.9	MHz	$\alpha_{WLAN,max}$ [2)]	—	1.7	2.2	dB
WLAN Channel 3-11	@$f_{carrier}$	2413.1 ... 2470.9	MHz	$\alpha_{WLAN,max}$ [2)]	—	1.4	2.0	dB
WLAN Channel 12	@$f_{carrier}$	2458.1 ... 2475.9	MHz	$\alpha_{WLAN,max}$ [2)]	—	1.6	2.2	dB
WLAN Channel 13	@$f_{carrier}$	2463.1 ... 2480.9	MHz	$\alpha_{WLAN,max}$ [2)]	—	1.8	2.7	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)]	26[5)]	62	—	dB
		2500 ... 2505	MHz	α_{min} [4)]	43[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. 5).
2) Average over each WLAN channel with band width of 17.8 MHz.
3) Averaged values over whole pass band due to frequency hopping in Bluetooth mode.
4) Averaged values of linear S-parameter over any 5MHz.
5) Valid for temperature T_{SPEC} = −40 °C...+25 °C.
6) Valid for temperature T_{SPEC} = +25 °C...+85 °C.

7 Maximum ratings

Storage temperature	T_{STG} = −40 °C ... +85 °C	
DC voltage	V_{DC} = 0 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.

8 Transmission coefficient

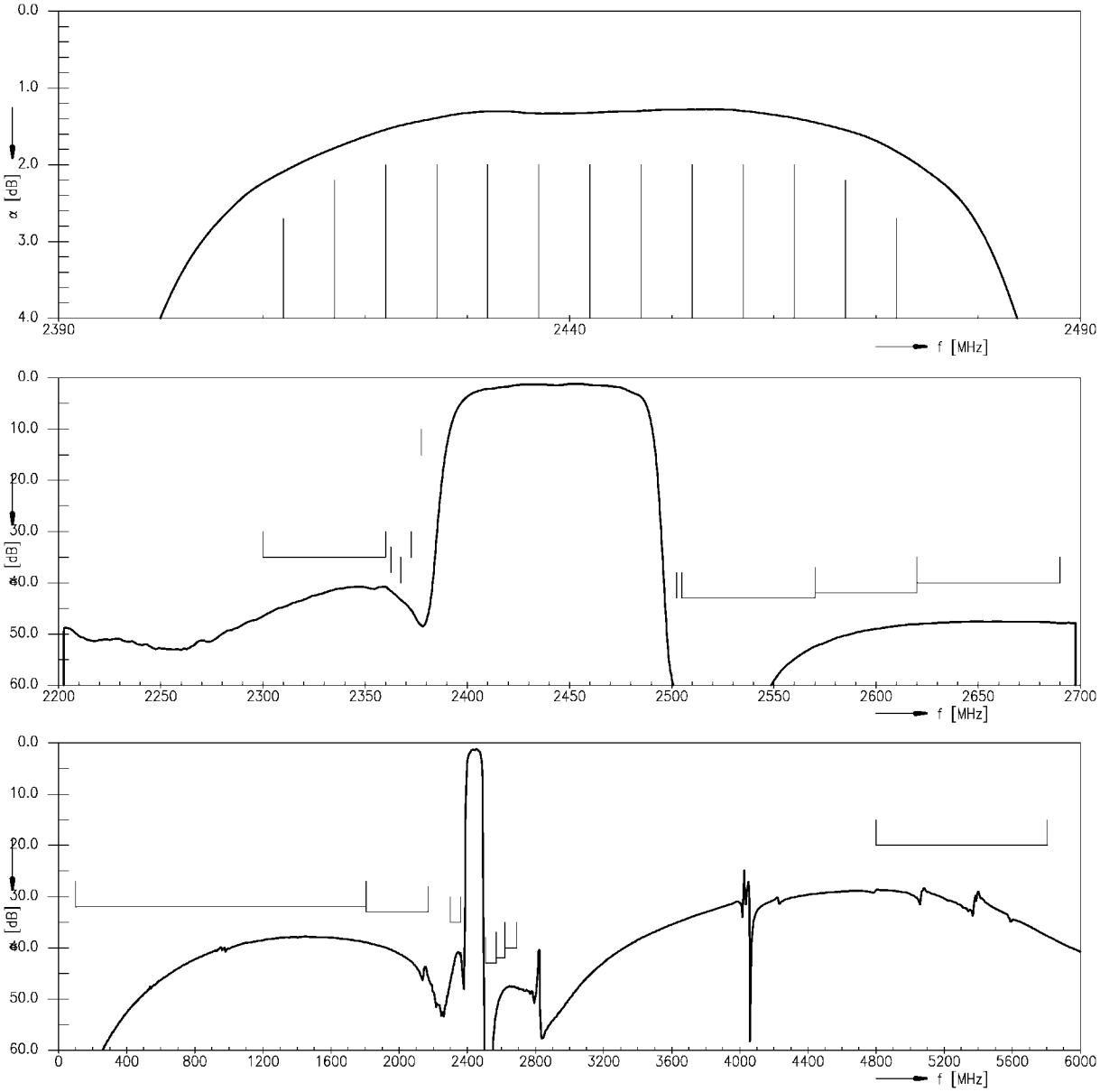

Figure 4: Attenuation.

9 Reflection coefficients

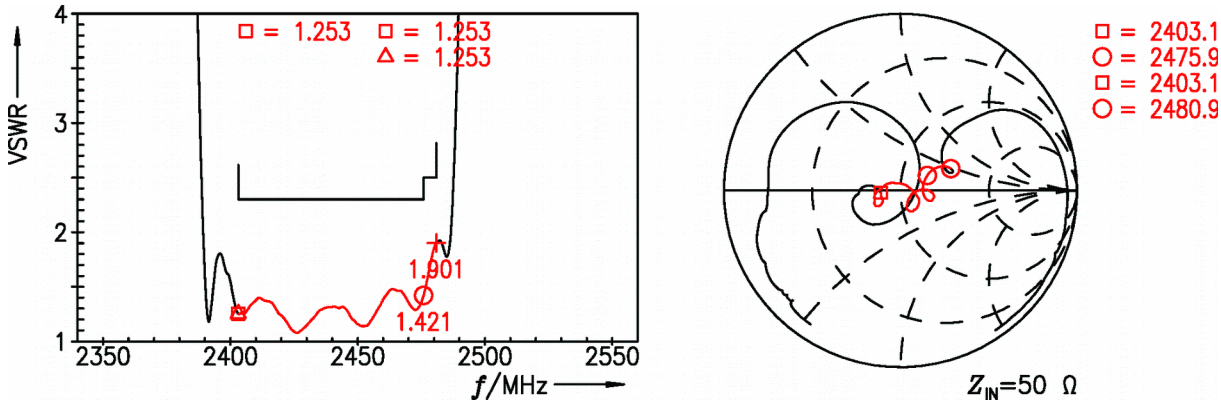

Figure 5: Reflection coefficient at IN port.

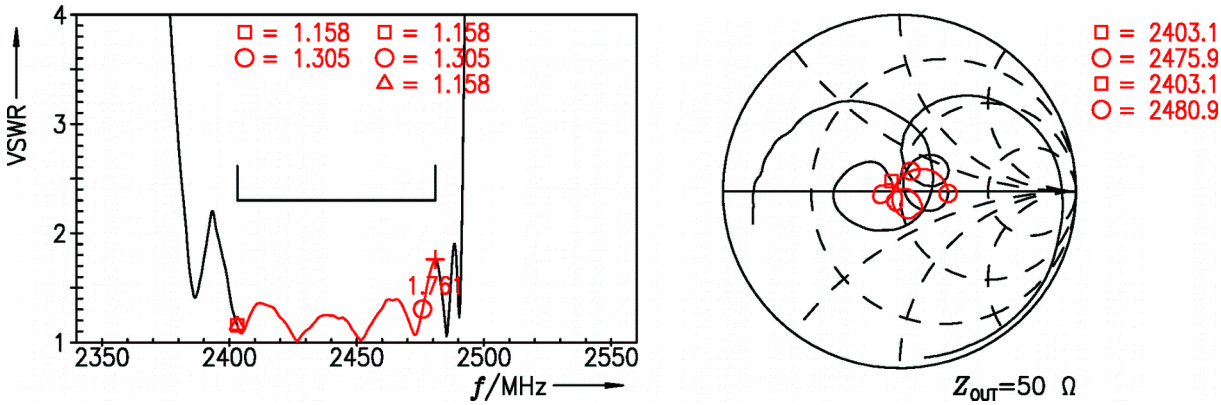

Figure 6: Reflection coefficient at OUT port.

10 Packing material

10.1 Tape

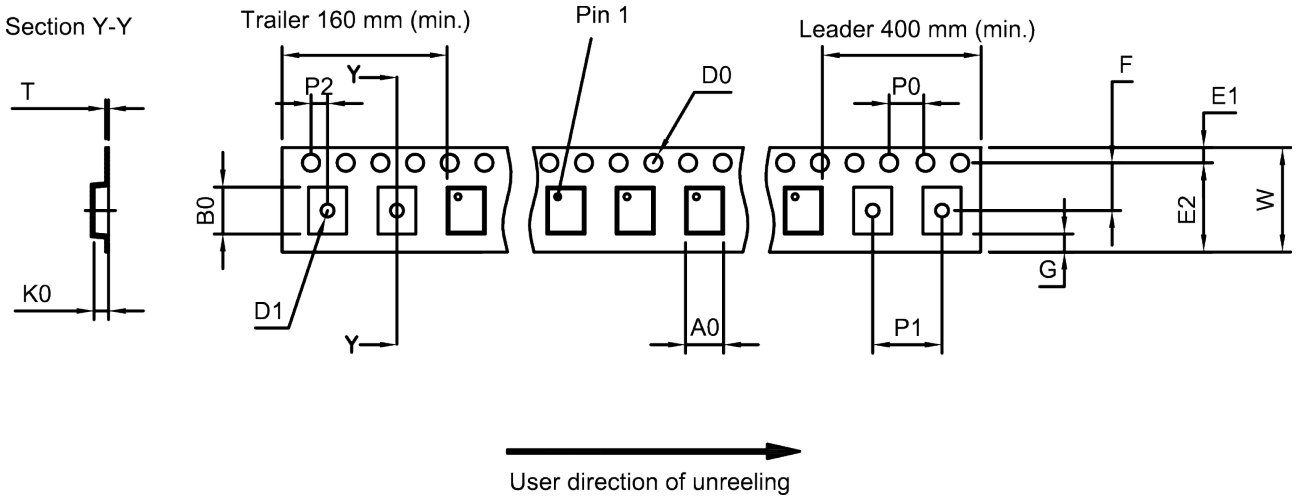

Figure 7: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	1.27±0.05 mm
B_0	1.57±0.05 mm
D_0	1.5+0.1/−0 mm
D_1	0.5±0.1 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±0.03 mm
W	8.0+0.3/−0.1 mm

Table 1: Tape dimensions.

10.2 Reel with diameter of 180 mm

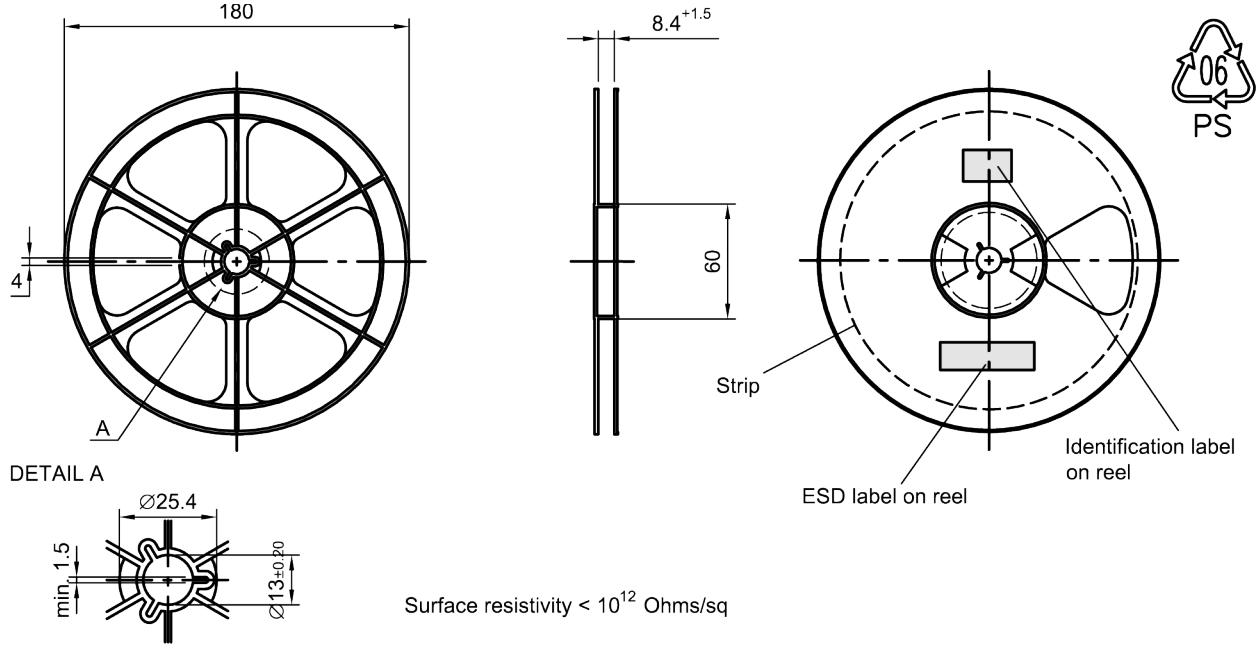

Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

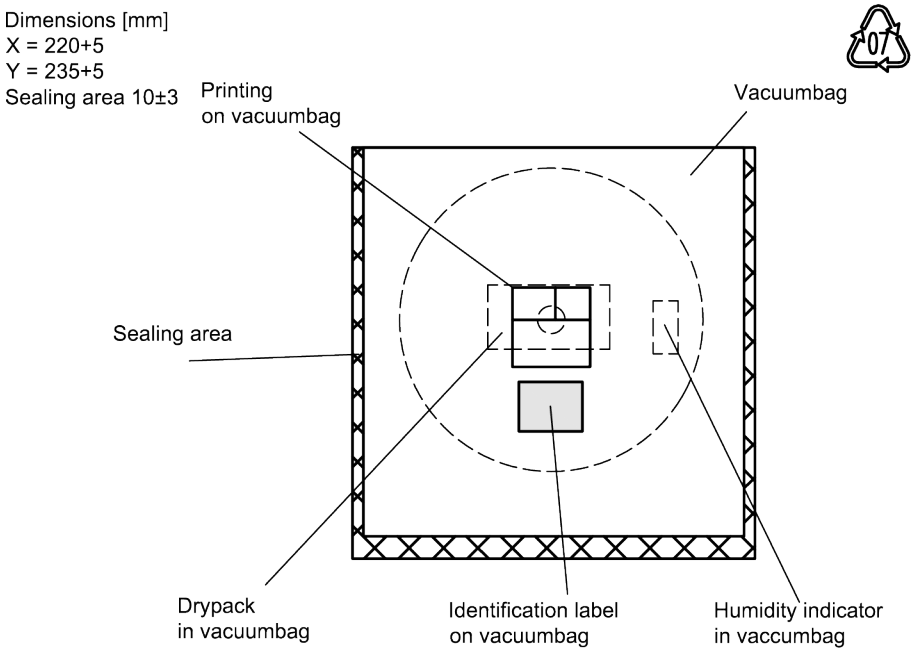

Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

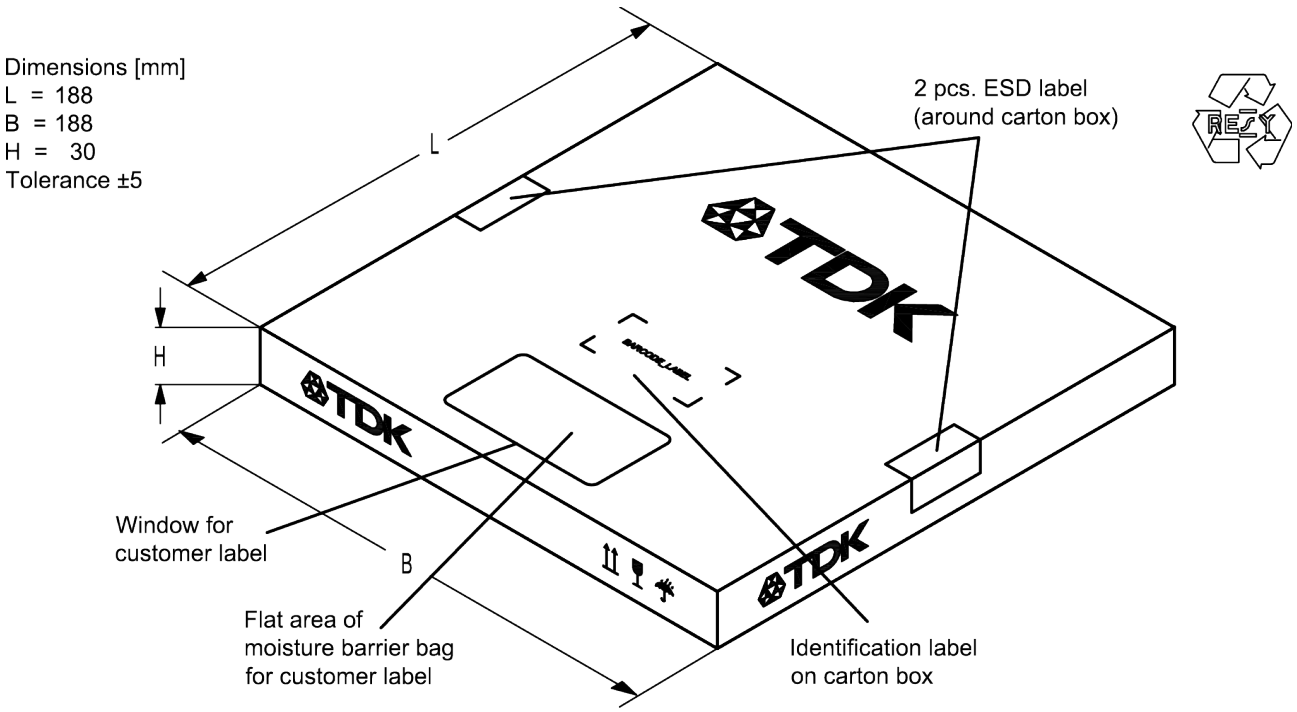

Figure 10: Drawing of folding box for reel with diameter of 180 mm.

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 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 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).

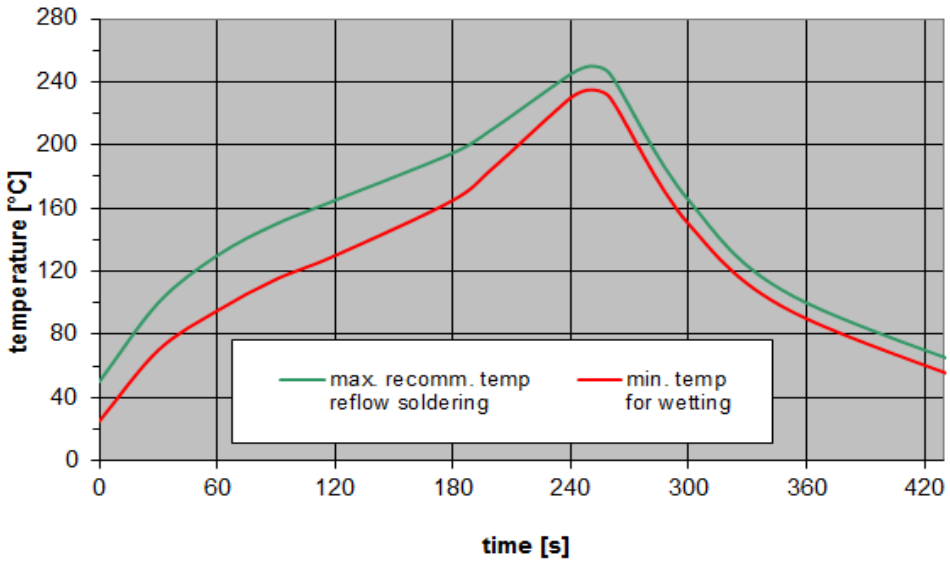

Figure 11: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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 EPCOS sales office.

14 Cautions and warnings

14.1 Display of ordering codes for EPCOS 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 EPCOS, 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.epcos.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.

14.3 Moldability

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

14.4 Package information

Landing area

The printed circuit board (PCB) land pattern (landing area) shown is based on EPCOS 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 EPCOS, 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.

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The following applies to all products named in this publication:

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