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RF360 Europe GmbH

A Qualcomm – TDK Joint Venture

SAW Components

BAW Bandpass Filter

WLAN 2G / Bluetooth

Series/type:	B8840
Ordering code:	B39242B8840P810
DCN:	80-PA243-33 Rev. A
Date:	February 3, 2017
Version:	2.7

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

SAW Components

BAW Bandpass Filter

WLAN 2G / Bluetooth

Series/type:	B8840
Ordering code:	B39242B8840P810
Date:	May 12, 2016
Version:	2.7

Table of contents

Data sheet

1 Application

- Low-loss BAW RF single filter for Bluetooth/WLAN with LTE Band 7 / Band 40 / Band 41 coexistence.
- Usable passband 79.0 MHz.
- Unbalanced to unbalanced operation.
- Filter impedance 50 Ω.
- High out of band selectivity.
- Excellent insertion loss.

2 Features

- Package size 1.1 mm × 0.9 mm.
- Package height 0.41+/-0.04 mm.
- Approximate weight 0.0012 g.
- RoHS compatible.
- Package for Surface Mount Technology (SMT).
- Ni, gold-plated terminals.
- Electrostatic Sensitive Device (ESD).
- Moisture Sensitivity Level 3 (MSL3).

3 Package

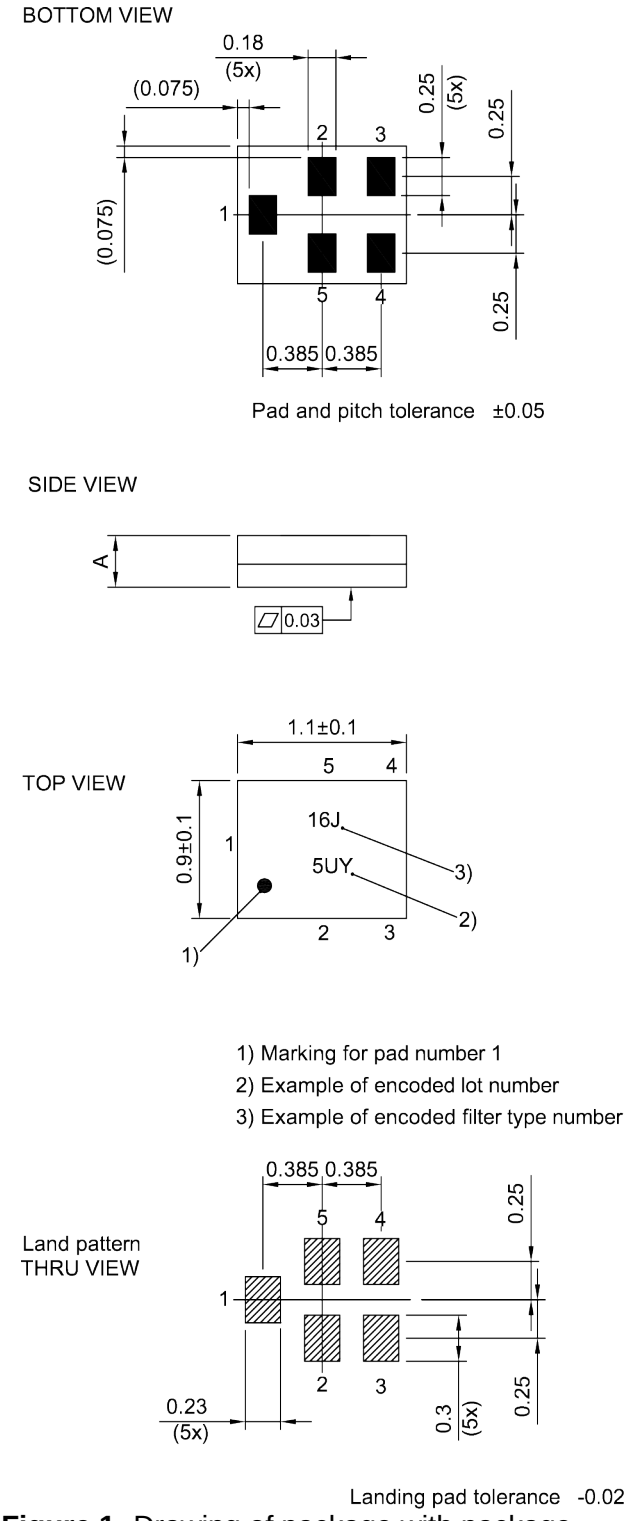

Figure 1: Drawing of package with package height A = 0.41+/-0.04 mm. See Simplified drawings (p. 17).

4 Pin configuration

- 1 Input (to PA (unbalanced))
- 4 Output (to ANT (unbalanced))
- 2, 3, 5 Ground

5 Matching circuit

■ L_{p1} = 12 nH ■ L_{p4} = 10 nH

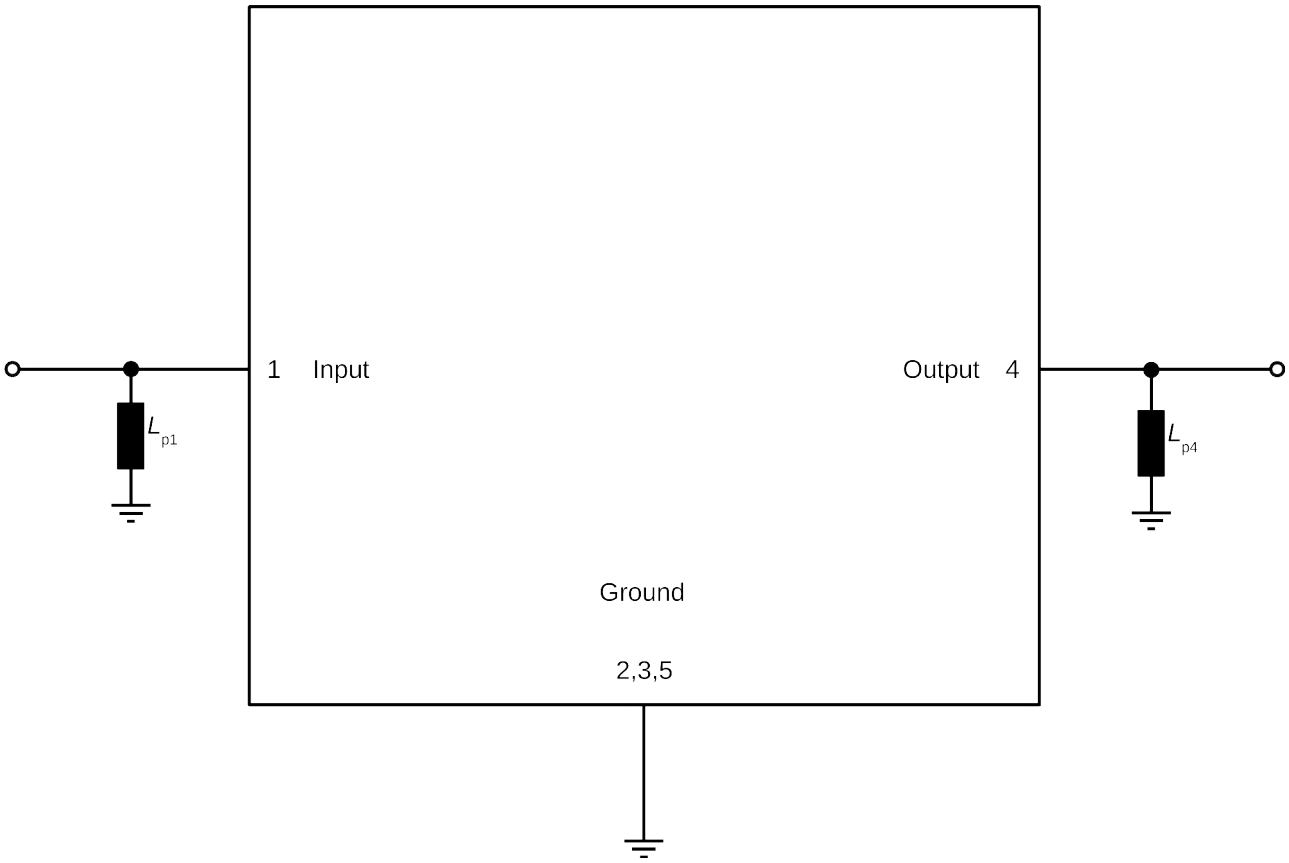

Figure 2: Schematic of matching circuit.

6 Characteristics

Temperature range for specification T = −30 °C to +85 °C
Input terminating impedance Z_{IN} = 50 Ω with par. 12 nH
Output terminating impedance Z_{OUT} = 50 Ω with par. 10 nH

Characteristics				min.	typ. @+25 °C	max.	
Center frequency			f_C	—	2442	—	MHz
Maximum insertion attenuation - WLAN			α_{max}				
Channel 1	2403.1 ... 2420.9	MHz		—	1.90[1)]	2.80[1)]	dB
Channel 2	2408.1 ... 2425.9	MHz		—	1.55[1)]	2.30[1)]	dB
Channel 3-10	2413.1 ... 2465.9	MHz		—	1.45[1)]	1.75[1)]	dB
Channel 11	2453.1 ... 2470.9	MHz		—	1.30[1)]	1.75[1)]	dB
Channel 12	2458.1 ... 2475.9	MHz		—	1.40[1)]	2.20[1)]	dB
Channel 13	2463.1 ... 2480.9	MHz		—	1.90[1)]	2.90[1)]	dB
Amplitude ripple (p-p) - WLAN			Δα				
Channel 1	2403.1 ... 2420.9	MHz		—	1.80	3.00	dB
Channel 2	2408.1 ... 2425.9	MHz		—	1.10	2.30	dB
Channel 3	2413.1 ... 2430.9	MHz		—	0.90	1.70	dB
Channel 4-10	2418.1 ... 2465.9	MHz		—	0.50	1.40	dB
Channel 11	2453.1 ... 2470.9	MHz		—	0.80	2.10	dB
Channel 12	2458.1 ... 2475.9	MHz		—	0.90	2.10	dB
Channel 13	2463.1 ... 2480.9	MHz		—	1.50	2.70[2)]	dB
VSWR			VSWR				
Channel 1-12	2403.1 ... 2475.9	MHz		—	1.65	2.4	
Channel 13	2463.1 ... 2480.9	MHz		—	1.65	2.7[2)]	
Attenuation			α				
	100 ... 1805	MHz		31.0	33.0	—	dB
	1805 ... 2170	MHz		33.0	37.0	—	dB
	2300 ... 2360	MHz		45.0[3)]	49.0[3)]	—	dB
	2360 ... 2365	MHz		44.0[3)]	51.0[3)]	—	dB
	2365 ... 2370	MHz		43.0[3)]	51.0[3)]	—	dB
	2370 ... 2380	MHz		13.0[3)]	43.0[3)]	—	dB
	2496 ... 2501	MHz		19.0[3), 4)]	51.0[3)]	—	dB
	2496 ... 2501	MHz		19.0[2), 3)]	51.0[2), 3)]	—	dB
	2500 ... 2505	MHz		45.0[3), 4)]	59.0[3)]	—	dB
	2505 ... 2550	MHz		47.0[3)]	52.0[3)]	—	dB
	2550 ... 2570	MHz		43.0[3)]	47.0[3)]	—	dB

Characteristics			min.	typ. @+25 °C	max.	
	2570... 2620	MHz	41.0[3)]	45.0[3)]	—	dB
	2620... 2690	MHz	40.0[3)]	43.0[3)]	—	dB
	4800... 5805	MHz	30.0	36.0	—	dB
	7200... 7500	MHz	17.0	25.0	—	dB

1) Averaged value within each Wifi channel width of 17.8 MHz.
2) +25°C.
3) Averaged values of linear S-parameter over any 5MHz.
4) +25°C to +85°C.

7 Maximum ratings

Storage temperature	T_{STG} =	−40 °C to +90 °C	
DC voltage	V_{DC} =	5.0 V[4)]	
ESD voltage			
	V_{ESD}[1)]	50 V	Machine model.
	V_{ESD}[2)]	300 V	Human body model.
	V_{ESD}[3)]	600 V	Charged device model.
Input power @ input port (WLAN channel 1 to channel 13)	P_{IN} =	24 dBm	20MHz OFDM signal, 5000 h @ 65 °C.

1) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
2) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
3) According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.
4) 168h Damp Heat Steady State acc. To IEC60068-2-67 Cy.

8 Transmission coefficient

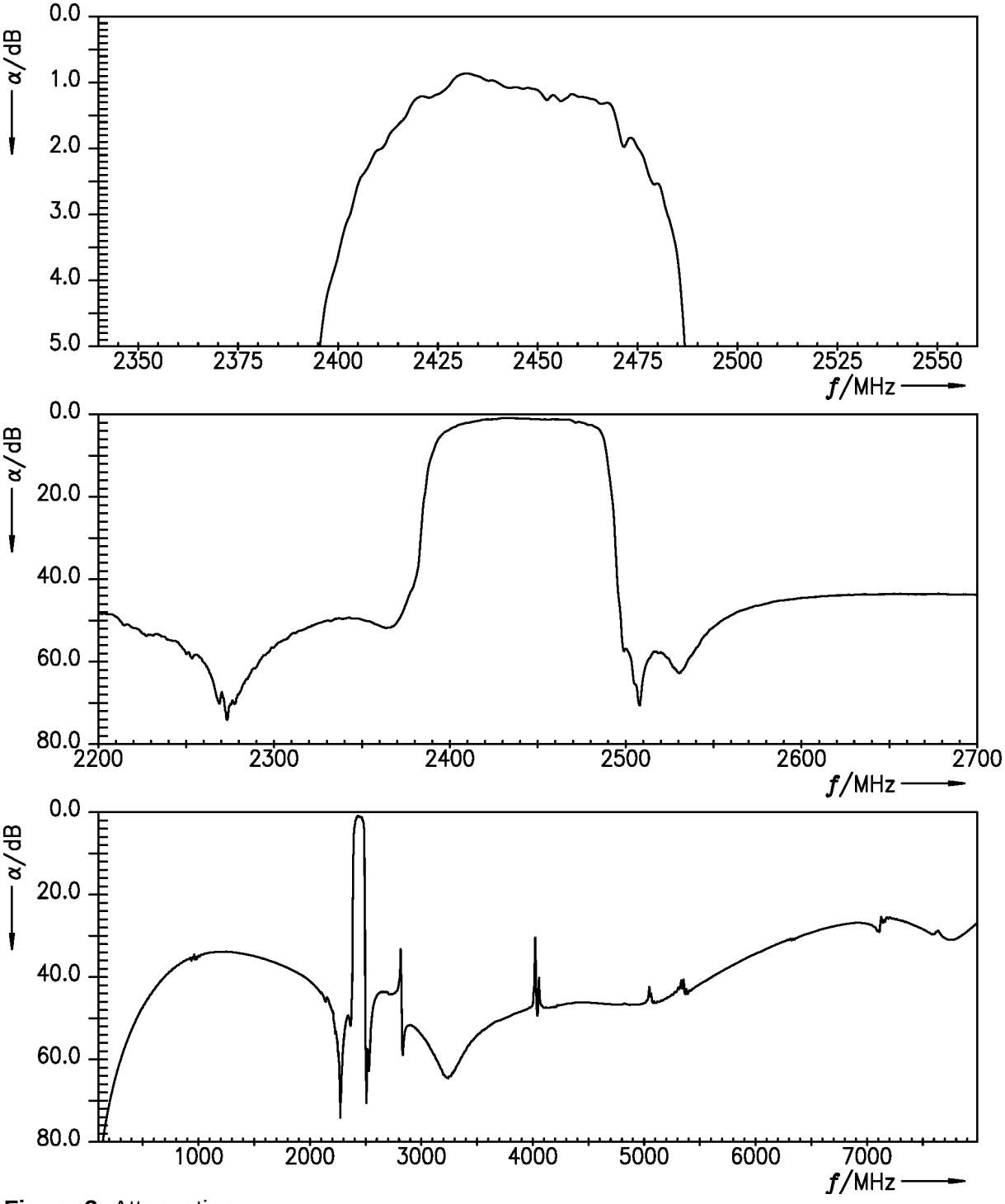

Figure 3: Attenuation.

9 Reflection coefficients

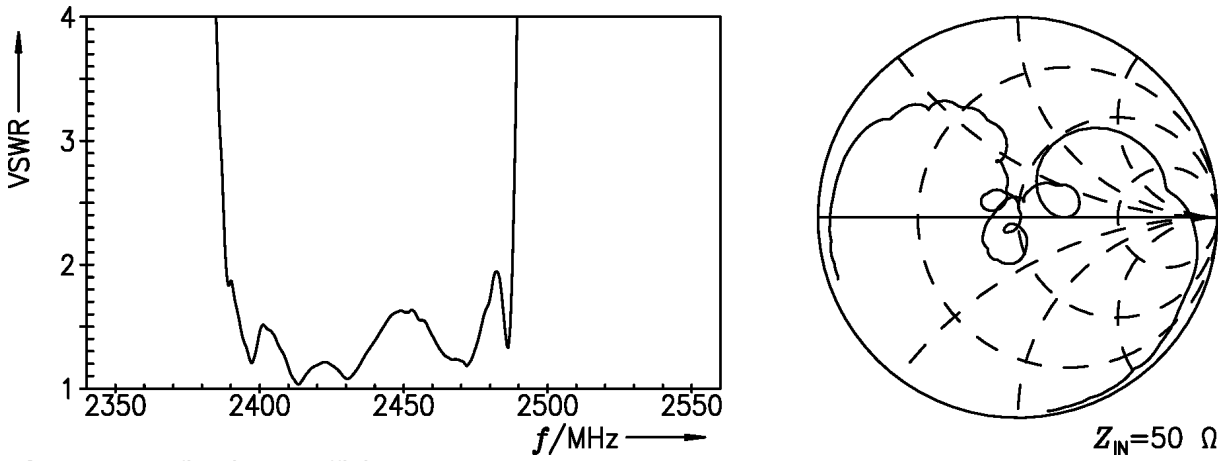

Figure 4: Reflection coefficient at IN port.

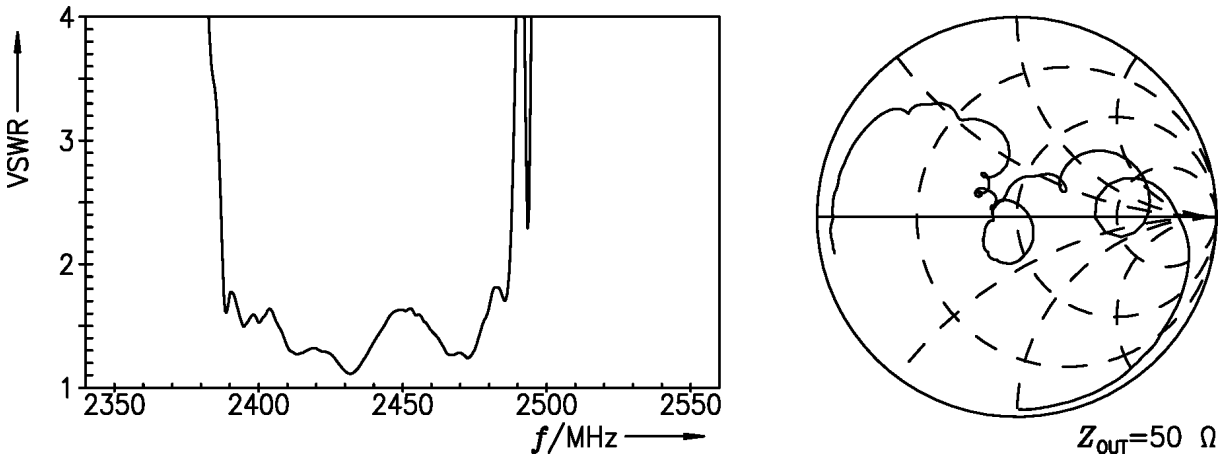

Figure 5: Reflection coefficient at OUT port.

10 Packing material

10.1 Tape

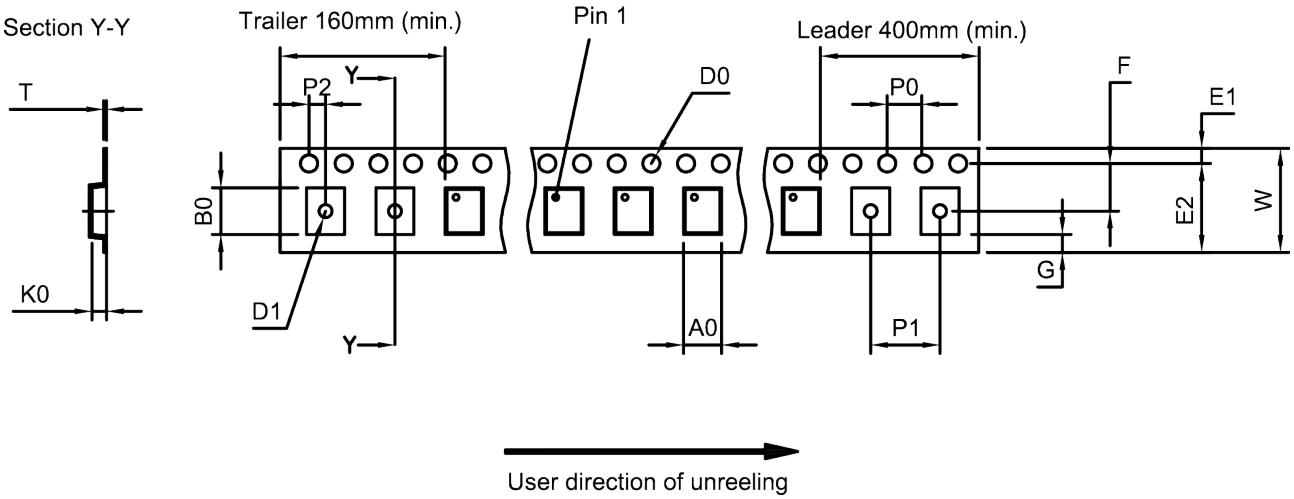

Figure 6: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	$1.02_{\pm 0.05}$ mm
B_0	$1.22_{\pm 0.05}$ mm
D_0	$1.55_{\pm 0.05}$ mm
D_1	$0.55_{\pm 0.1}$ mm
E_1	$1.75_{\pm 0.1}$ mm

E_2	6.25 mm (min.)
F	$3.5_{\pm 0.05}$ mm
G	–
K_0	$0.6_{\pm 0.05}$ mm
P_0	$4.0_{\pm 0.1}$ mm

P_1	$2.0_{\pm 0.1}$ 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.

10.2 Reel with diameter of 180 mm

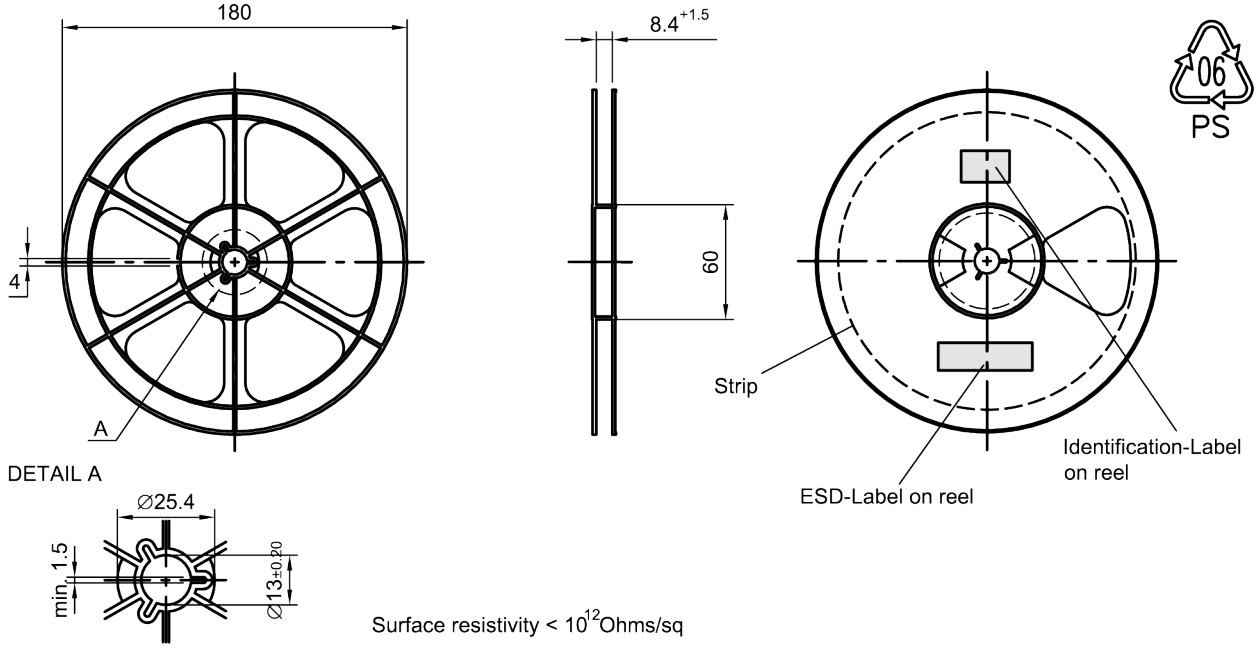

Figure 7: Drawing of reel (first-angle projection) with diameter of 180 mm.

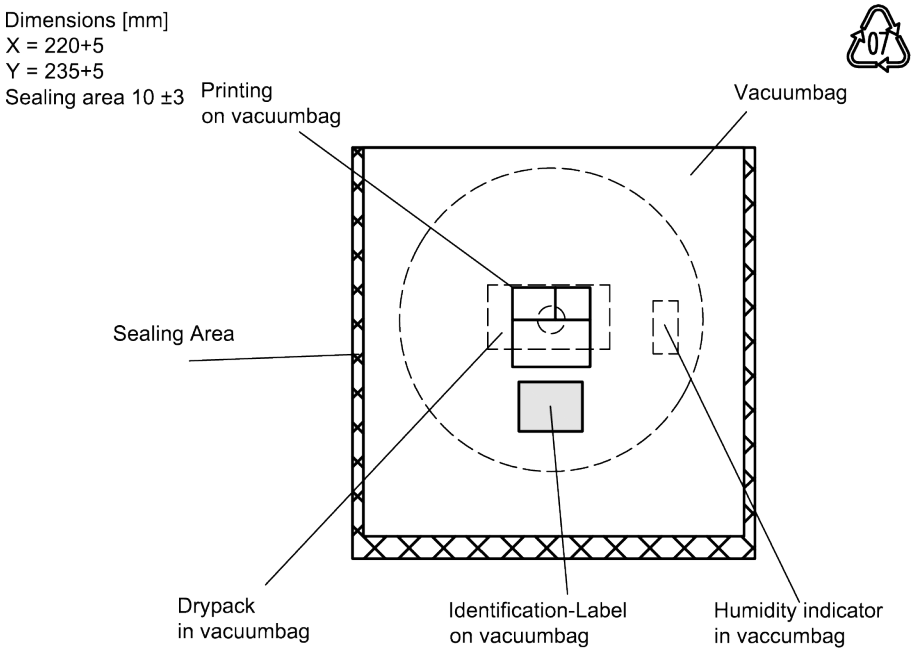

Figure 8: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

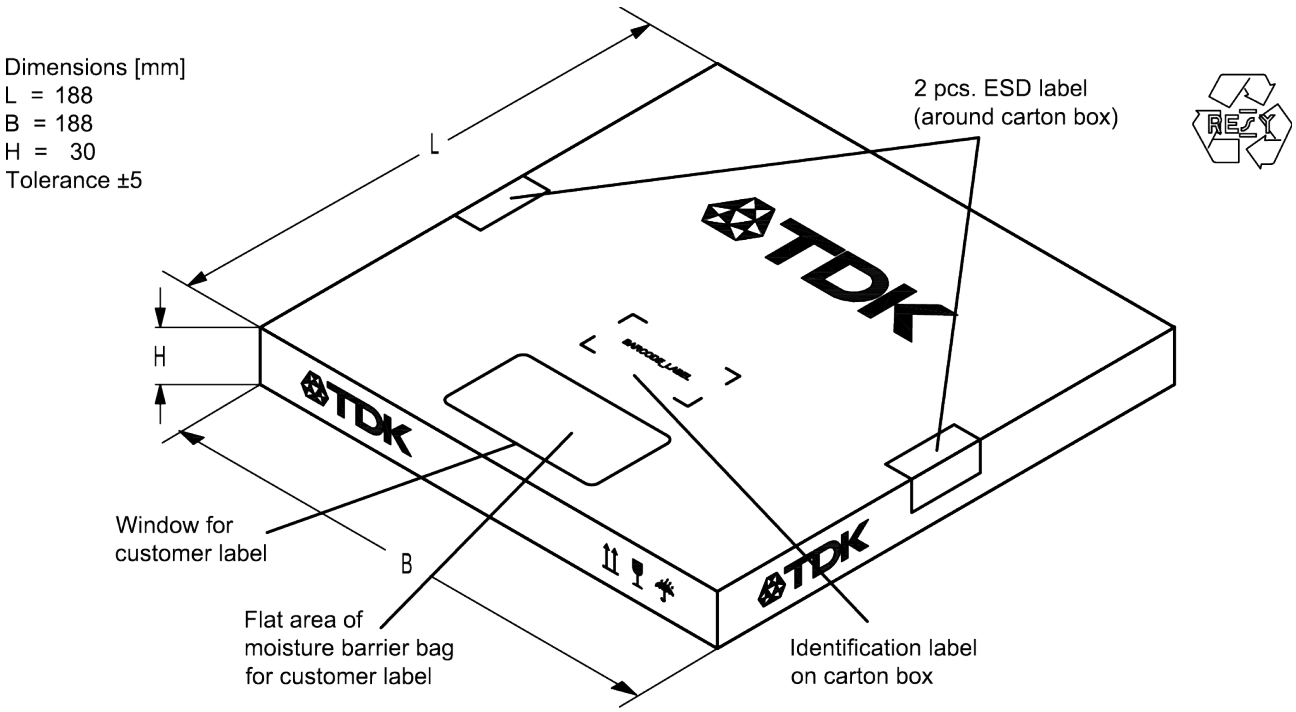

Figure 9: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

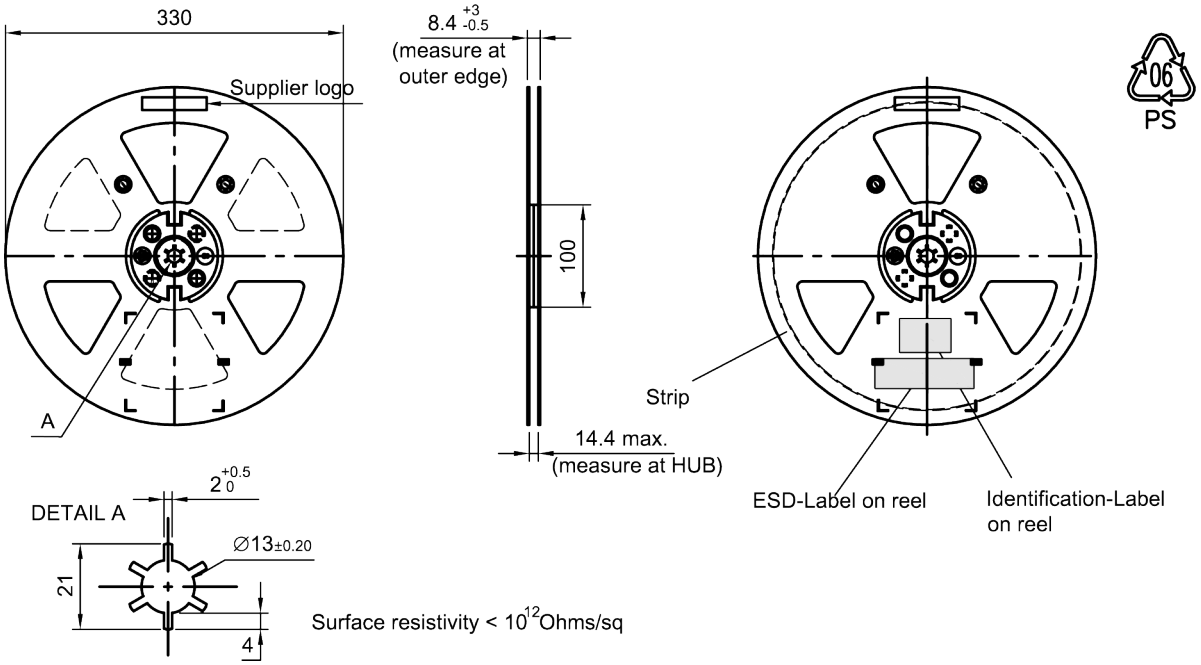

Figure 10: Drawing of reel (first-angle projection) with diameter of 330 mm.

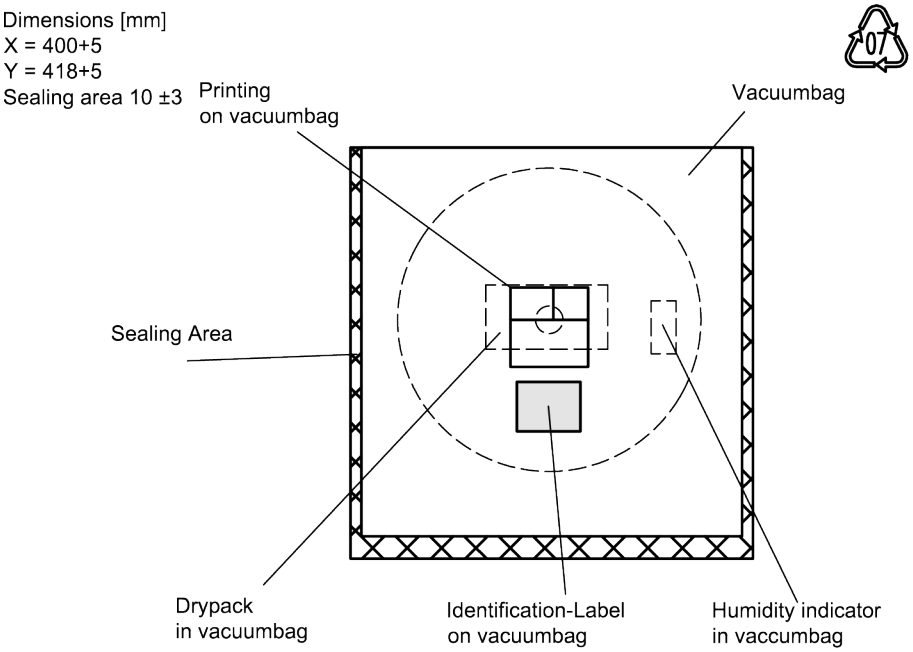

Figure 11: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

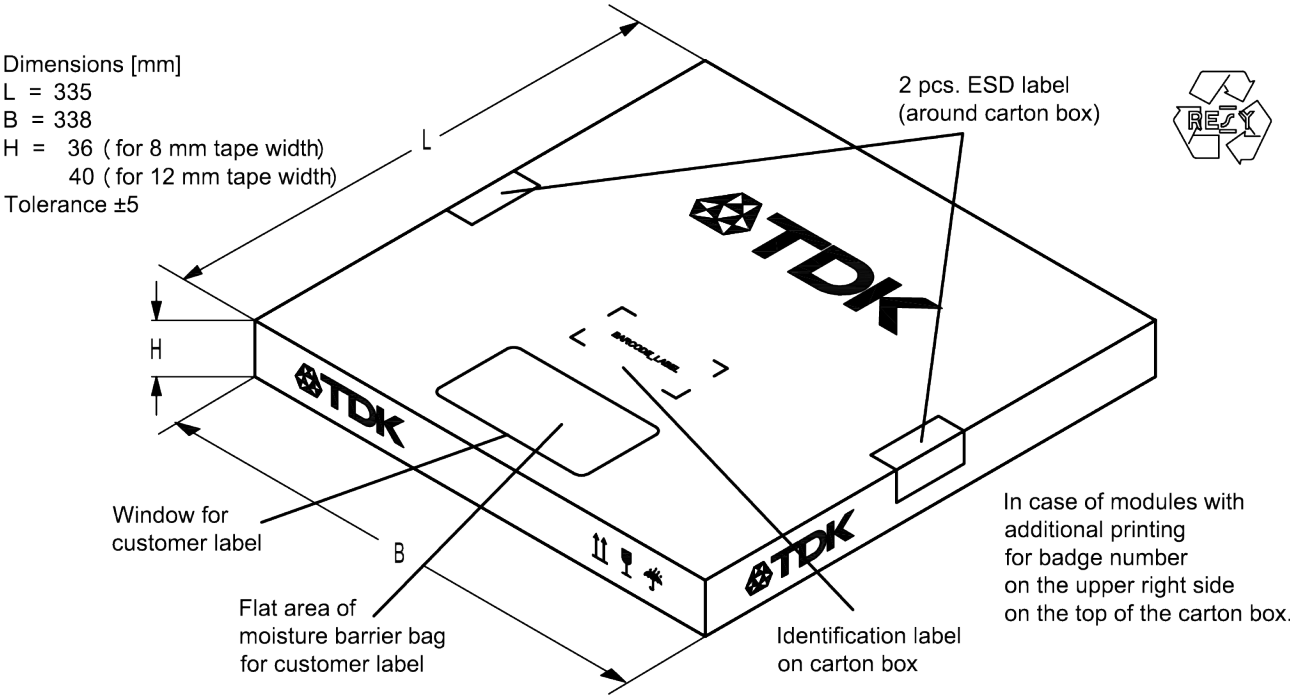

Figure 12: Drawing of folding box for reel with diameter of 330 mm.

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 B8840 is 8M8.

- 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).

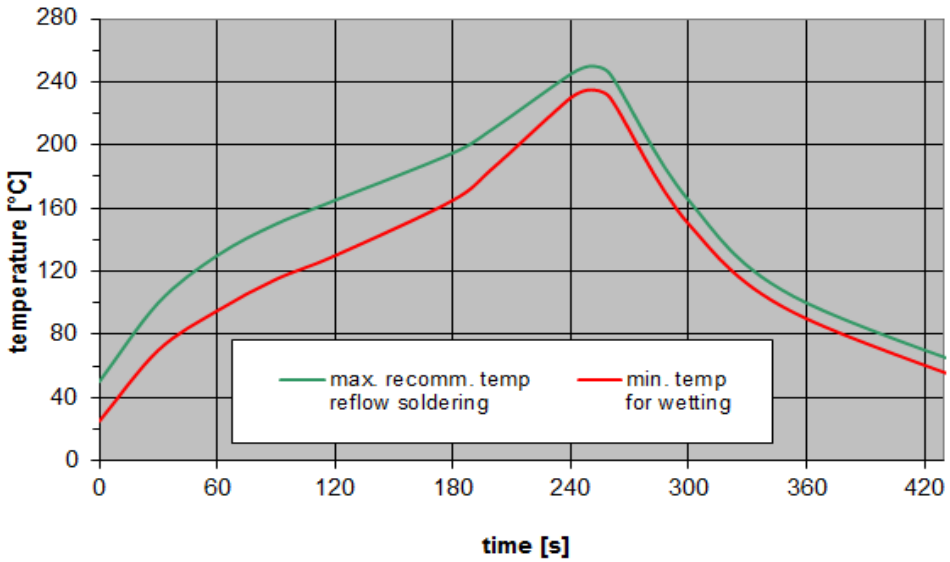

Figure 13: Recommended reflow profile for convection and infrared soldering – lead-free solder.

13 Annotations

13.1 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.

13.4 Ordering code and packing units

Ordering code	Packing units
B39242B8840P810	15000 pcs

Table 4: Ordering codes and packing units.

14 Cautions and warnings

14.1 Moldability

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

14.2 Simplified drawings

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).

Projection method

Unless otherwise specified first-angle projection is applied.

Contact and Important notes

For further information please contact your local EPCOS sales office or visit our web page at www.epcos.com.

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Systems, Acoustics, Waves Business Group
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