



RF360
Europe GmbH

SAW components

SAW Rx filter

LTE band 30

Series/type: B8848
Ordering code: B39242B8848P810

Date: July 19, 2016
Version: 2.7

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SAW Rx filter	2355 MHz

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1 Application

- RF SAW filter for mobile telephone LTE Band 30 system, receive path (Rx)
- Suitable for diversity applications
- Impedance 50Ω for input and output
- Unbalanced to unbalanced operation
- Usable pass band 10MHz

2 Features

- Package size 1.1±0.1 mm × 0.9±0.1 mm
- Package height 0.45 mm (max.)
- Approximate weight 1 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

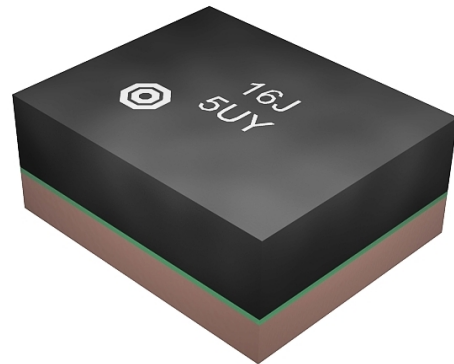
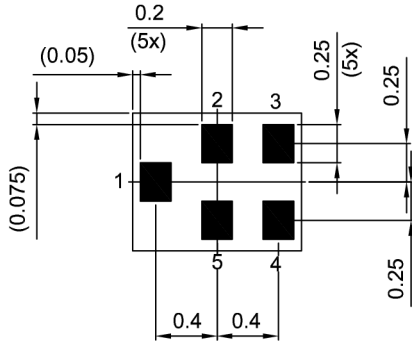


Figure 1: Picture of component with example of product marking.

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3 Package

BOTTOM VIEW

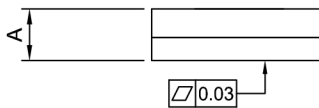


Pad and pitch tolerance ±0.05

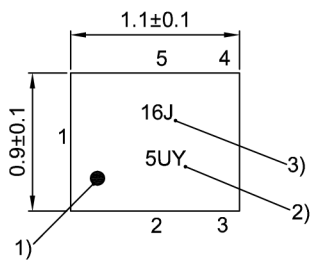
4 Pin configuration

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

SIDE VIEW

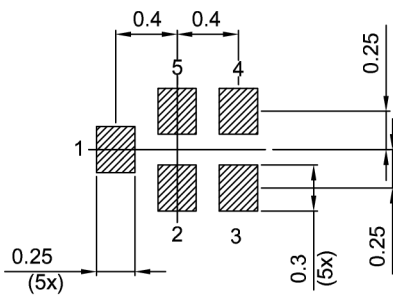


TOP VIEW



- 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).

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5 Matching circuit

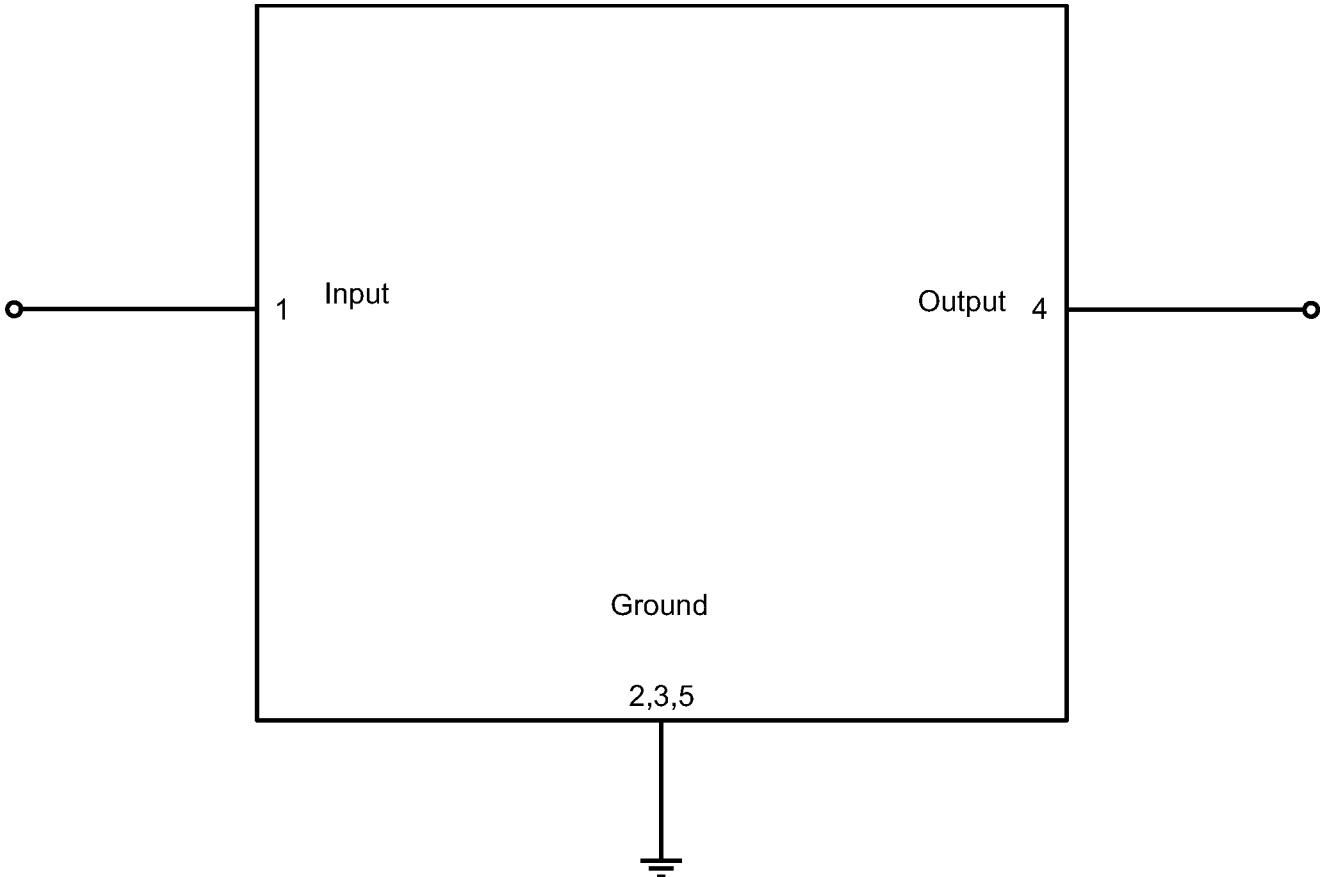


Figure 3: Schematic of matching circuit. No external matching components required.

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6 Characteristics

Temperature range for specification	T_{SPEC}	= -30 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 50 Ω
Output terminating impedance	Z_{OUT}	= 50 Ω

Characteristics			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency		f_C	—	2355	—	MHz
Average insertion attenuation	2350... 2360	MHz	—	1.9	—	dB ¹⁾
Maximum insertion attenuation	2350... 2360	MHz	—	2.2	2.6	dB
	2350... 2360	MHz	—	2.0	2.5	dB _{INT}
Amplitude ripple (p-p)		$\Delta\alpha$	—	0.4	0.8	dB
Maximum VSWR		VSWR _{max}				
@ input port	2350... 2360	MHz	—	1.5	1.6	
@ output port	2350... 2360	MHz	—	1.5	1.6	
Minimum attenuation						
	10... 2305	MHz	33	38	—	dB
	2305... 2315	MHz	43	45.5	—	dB
	2336.2... 2341.3	MHz	2	3	—	dB
	2336.2... 2341.3	MHz	2.5	4	—	dB _{INT}
	2400... 2500	MHz	36	46	—	dB
	2400... 2500	MHz	47	51	—	dB _{INT}
	2500... 2570	MHz	40	43	—	dB
	4900... 5950	MHz	24	29	—	dB
	6960... 6990	MHz	17	23	—	dB
	7050... 7080	MHz	16	23	—	dB

¹⁾ Averaged over pass band.

²⁾ Please refer to definition of α_{INT} in section Integrated rejection (p. 16).

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7 Maximum ratings

Storage temperature	$T_{STG}^{2)} = -40\text{ °C} \dots +85\text{ °C}^{1)}$	
DC voltage	$V_{DC} = 5.0\text{ V (max.)}^{3)}$	
ESD voltage		
	$V_{ESD}^{4)} = 125\text{ V (max.)}$	Machine model.
	$V_{ESD}^{5)} = 225\text{ V (max.)}$	Human body model.
	$V_{ESD}^{6)} = 600\text{ V (max.)}$	Charged device model.
Input power	P_{IN}	
@ input port: 2305 ... 2315 MHz	15 dBm	Continuous wave for 2000 h @ 55 °C.
@ input port: 2350 ... 2360 MHz	5.0 dBm	Continuous wave for 2000 h @ 55 °C.
@ input port: elsewhere	5.0 dBm	Continuous wave for 2000 h @ 55 °C.

- 1) Extended upper limit: 96h@125°C acc. to IEC60068-2-2 Bb.
- 2) Not valid for packaging material. Storage temperature for packaging material -25 to +40 °C.
- 3) 168h Damp Heat Steady State acc. to IEC60068-2-67 Cy.
- 4) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
- 5) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
- 6) According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

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8 Transmission coefficient

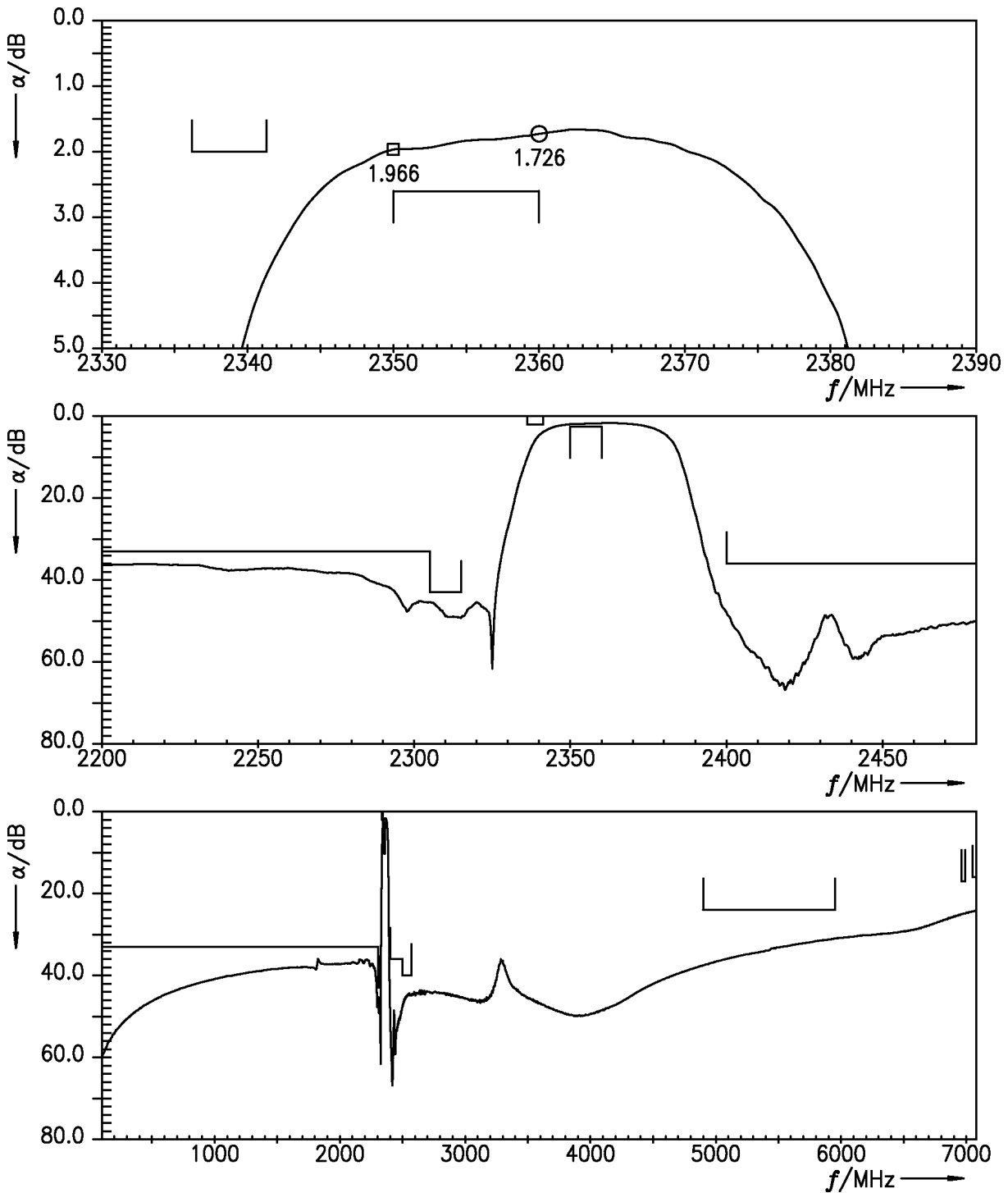


Figure 4: Attenuation.

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9 Reflection coefficients

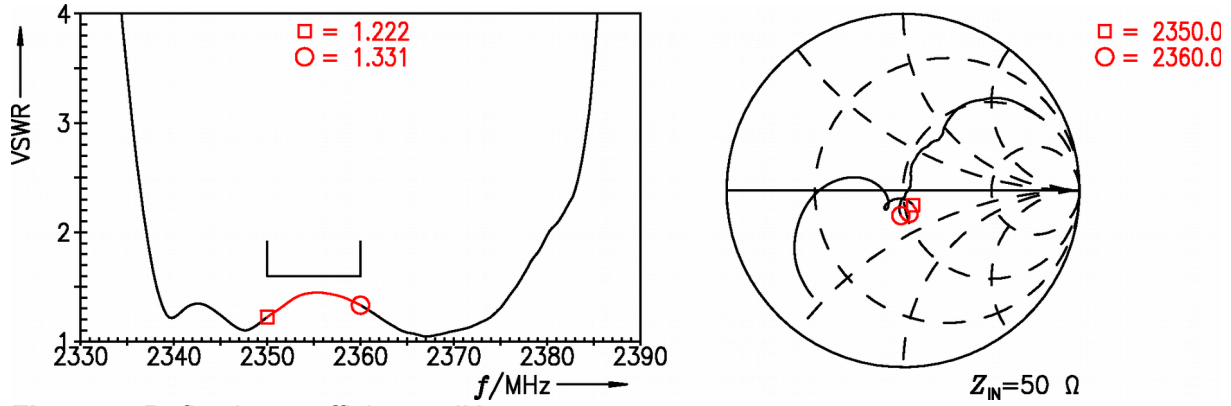


Figure 5: Reflection coefficient at IN port.

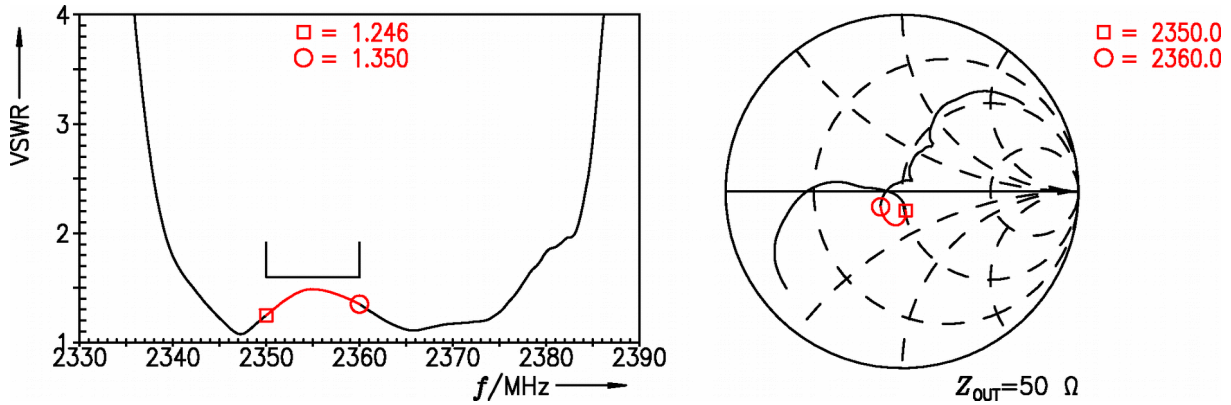


Figure 6: Reflection coefficient at OUT port.

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10 Packing material

10.1 Tape

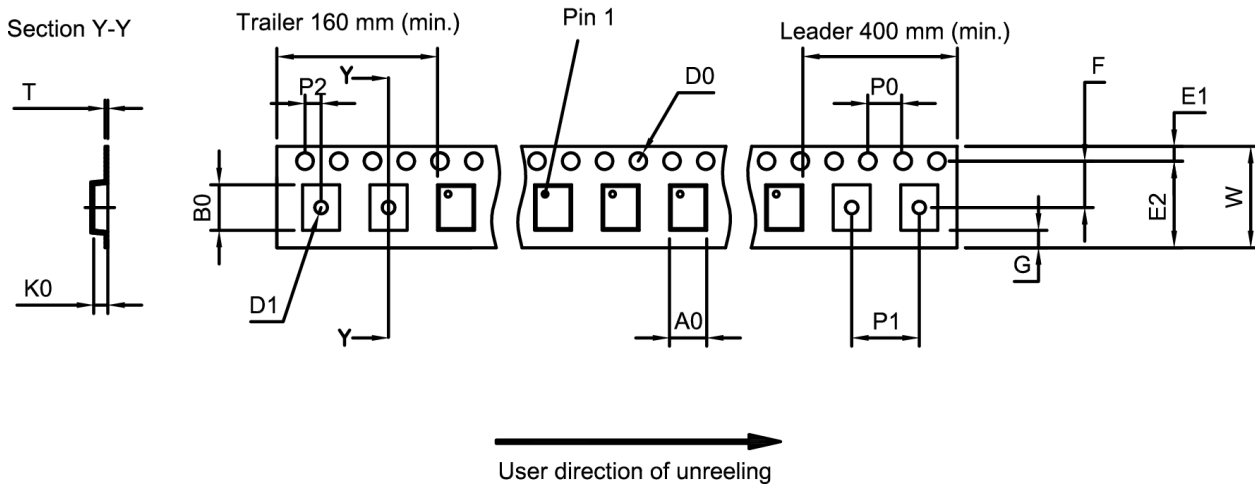


Figure 7: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A ₀	1.02±0.05 mm
B ₀	1.22±0.05 mm
D ₀	1.55±0.05 mm
D ₁	0.55±0.1 mm
E ₁	1.75±0.1 mm

E ₂	6.25 mm (min.)
F	3.5±0.05 mm
G	—
K ₀	0.6±0.05 mm
P ₀	4.0±0.1 mm

P ₁	2.0±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.

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10.2 Reel with diameter of 180 mm

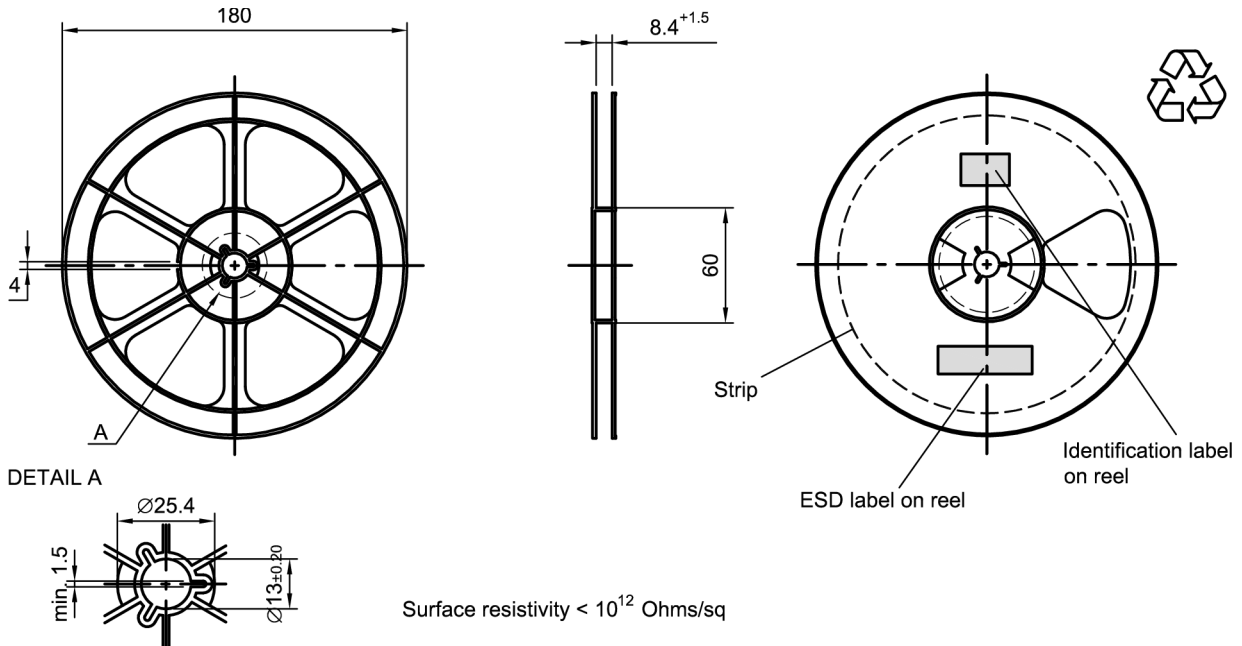


Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

Printing on vacuumbag

Vacuumbag

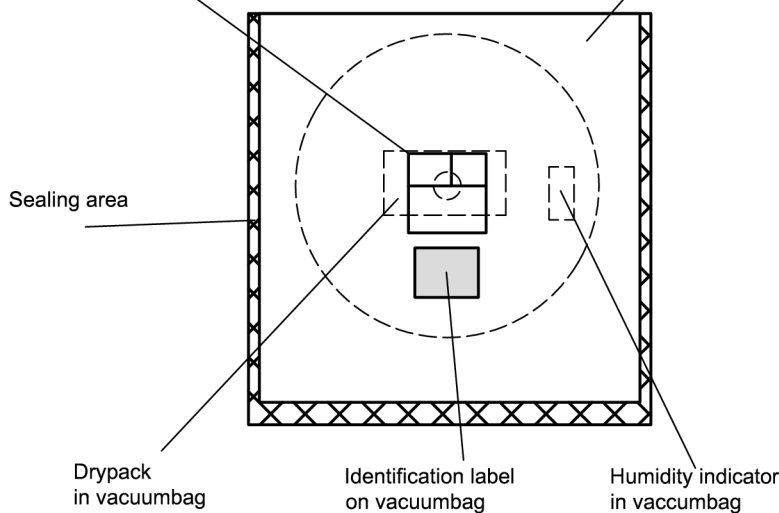


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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Dimensions [mm]

L = 188

B = 188

H = 30

Tolerance ±5

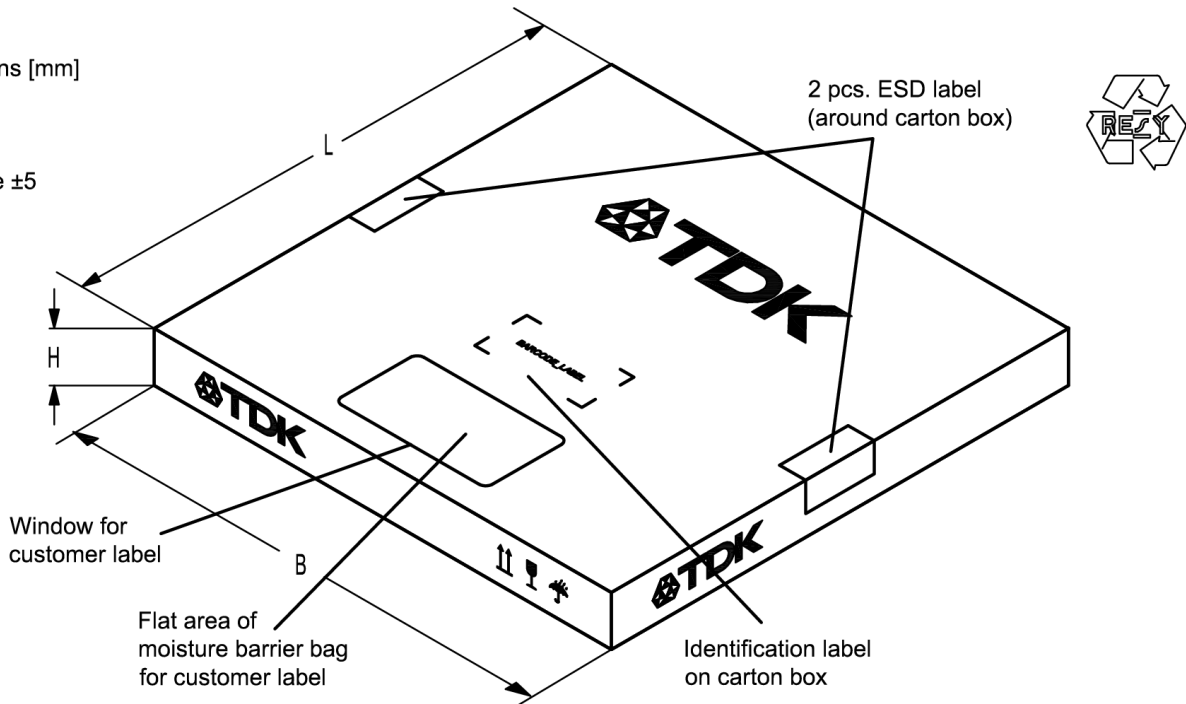


Figure 10: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

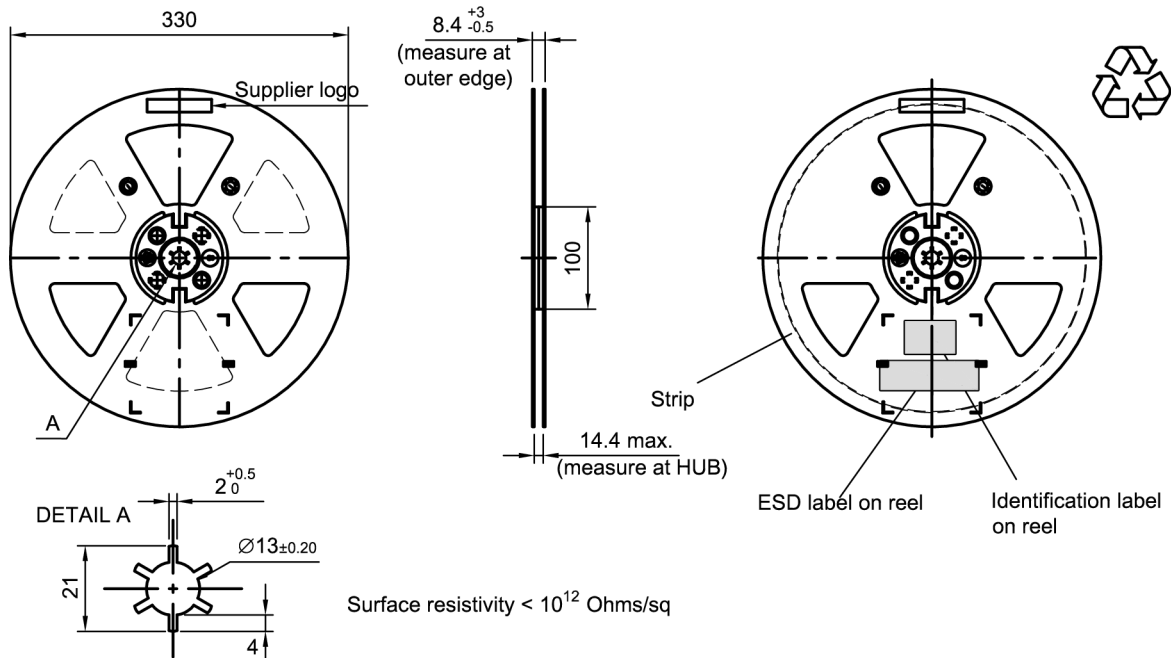


Figure 11: Drawing of reel (first-angle projection) with diameter of 330 mm.

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Dimensions [mm]
 X = 400±5
 Y = 418±5
 Sealing area 10±3

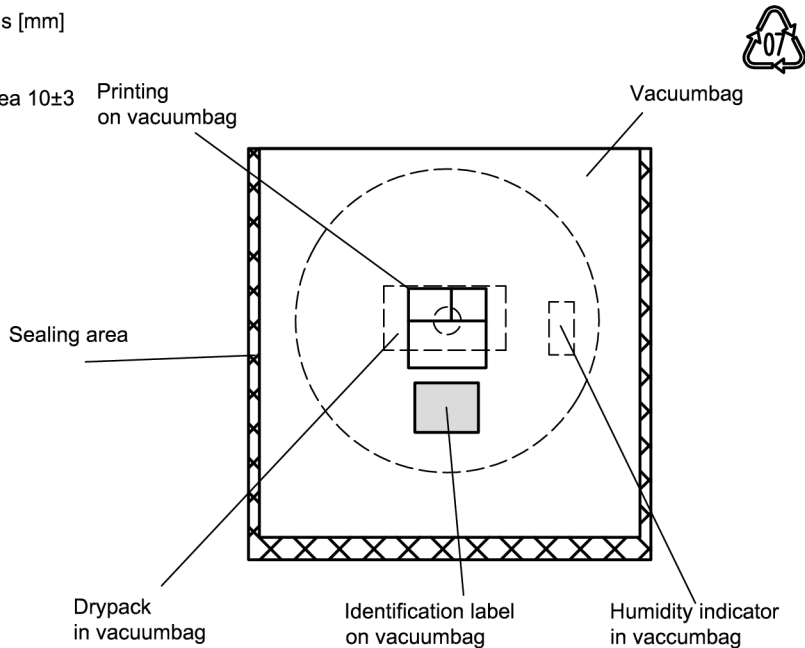


Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

Dimensions [mm]
 L = 335
 B = 338
 H = 36 (for 8 mm tape width)
 40 (for 12 mm tape width)
 Tolerance ±5

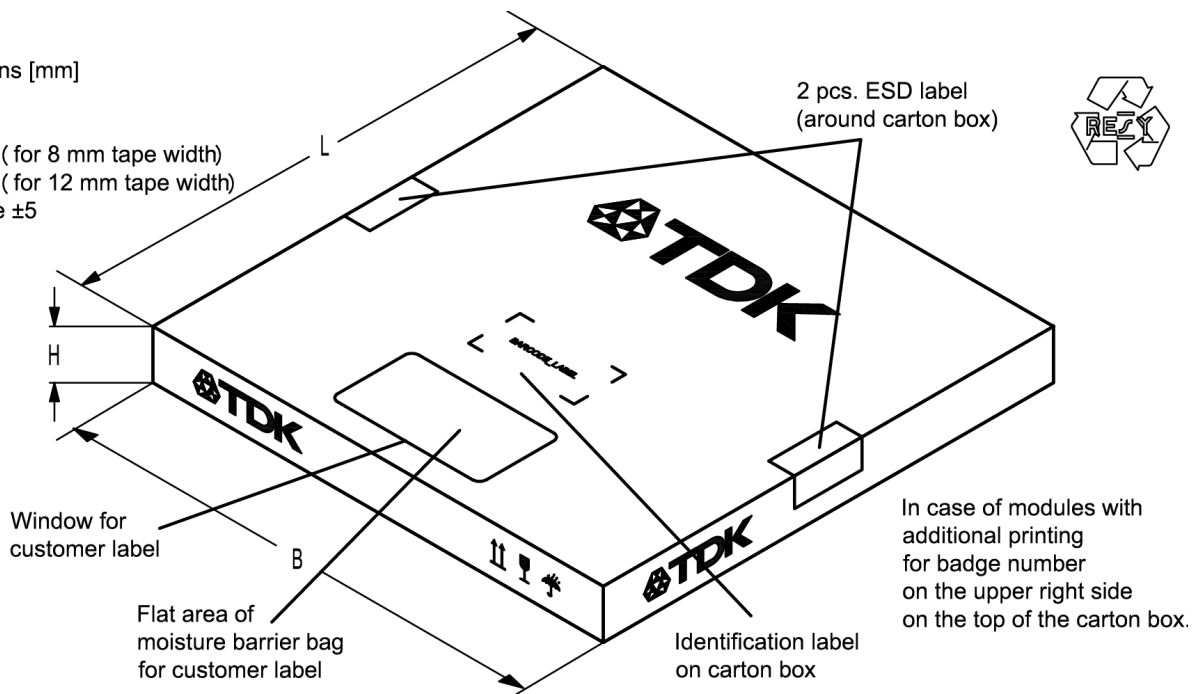


Figure 13: Drawing of folding box for reel with diameter of 330 mm.

11 Marking

Products are marked with product type number and lot number encoded according to Table 2:

■ Type number:

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The 4 digit type number of the ordering code, is encoded by a special BASE32 code into a 3 digit marking.

e.g., B3xxxxB**1234**xxxx,

Example of decoding type number marking on device

in decimal code.

$$\begin{aligned} & \mathbf{16J} & \Rightarrow & \mathbf{1234} \\ & \mathbf{1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0} & = & \mathbf{1234} \end{aligned}$$

The BASE32 code for product type B8848 is 8MG.

■ Lot number:

The last 5 digits of the lot number, are encoded based on a special BASE47 code into a 3 digit marking.

e.g., **12345**,

Example of decoding lot number marking on device

in decimal code.

$$\begin{aligned} & \mathbf{5UY} & \Rightarrow & \mathbf{12345} \\ & \mathbf{5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0} & = & \mathbf{12345} \end{aligned}$$

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.

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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
$T > 220\text{ °C}$	30 s to 70 s
$T > 230\text{ °C}$	min. 10 s
$T > 245\text{ °C}$	max. 20 s
$T \geq 255\text{ °C}$	–
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).

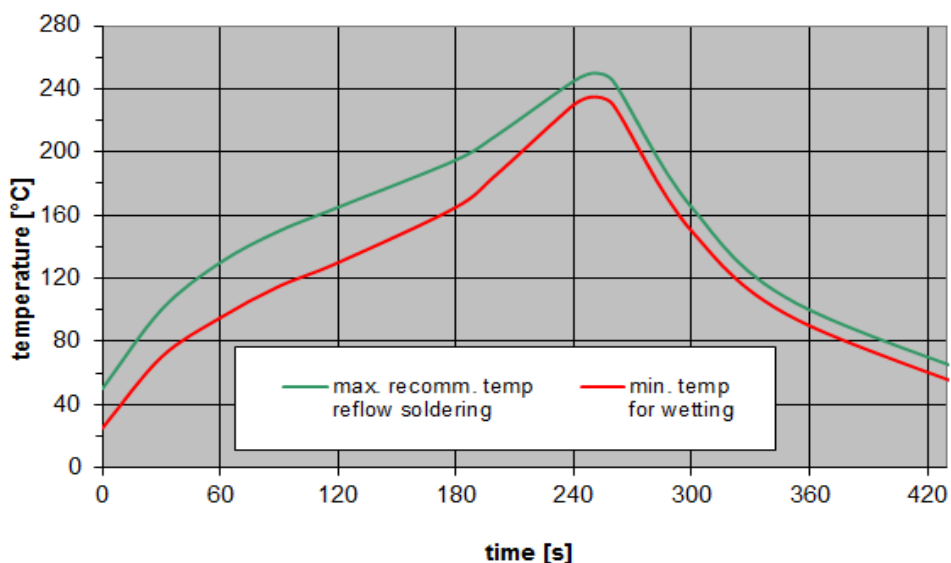


Figure 14: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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13 Annotations

13.1 Integrated rejection

Integrated rejection, α_{INT} , is defined by

$$\alpha_{INT} = 20 \log_{10} \left(\frac{\sum_{n=2}^N \frac{\text{Loss}(F_{n-1}) + \text{Loss}(F_n)}{2} \times (F_n - F_{n-1})}{F_N - F_1} \right)$$

where

$$H(f_n) = 1/|S_{21}|$$

and

N = Number of frequency sampling points, insertion loss pairs in channel.

13.2 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>.

13.3 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.

13.4 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.

13.5 Ordering codes and packing units

Ordering code	Packing unit
B39242B8848P810	15000 pcs
B39242B8848P810S 5	5000 pcs

Table 4: Ordering codes and packing units.

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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.

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 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).

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

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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, EPCOS is 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 EPCOS 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.**
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