



SAW components

SAW Tx filter

LTE / WCDMA band 1

Series/type:	B9872
Ordering code:	B39202B9872P810
Date:	April 25, 2016
Version:	2.1

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1 Application

- Low-loss RF filter for mobile telephone LTE / WCDMA Band 1 systems
- Impedance transform from 50 Ω to 50 Ω
- Unbalanced to unbalanced operation
- Low amplitude ripple
- High Rx-suppression
- Usable pass band: 60 MHz

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)

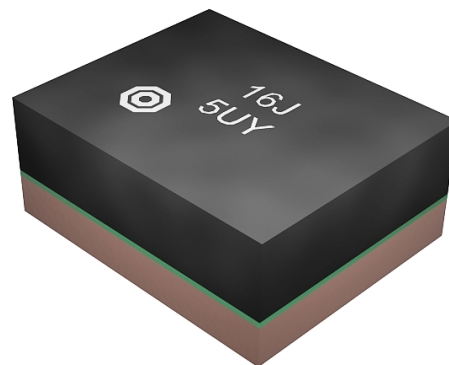
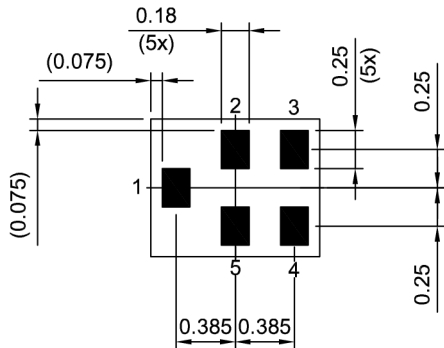


Figure 1: Picture of component with example of product marking.

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3 Package

BOTTOM VIEW

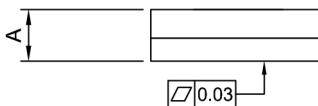


Pad and pitch tolerance ± 0.05

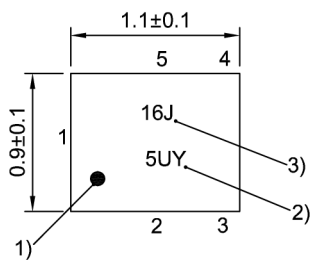
4 Pin configuration

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

SIDE VIEW

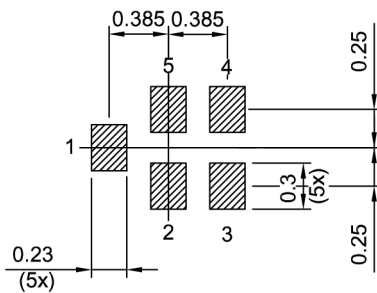


TOP VIEW



- 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

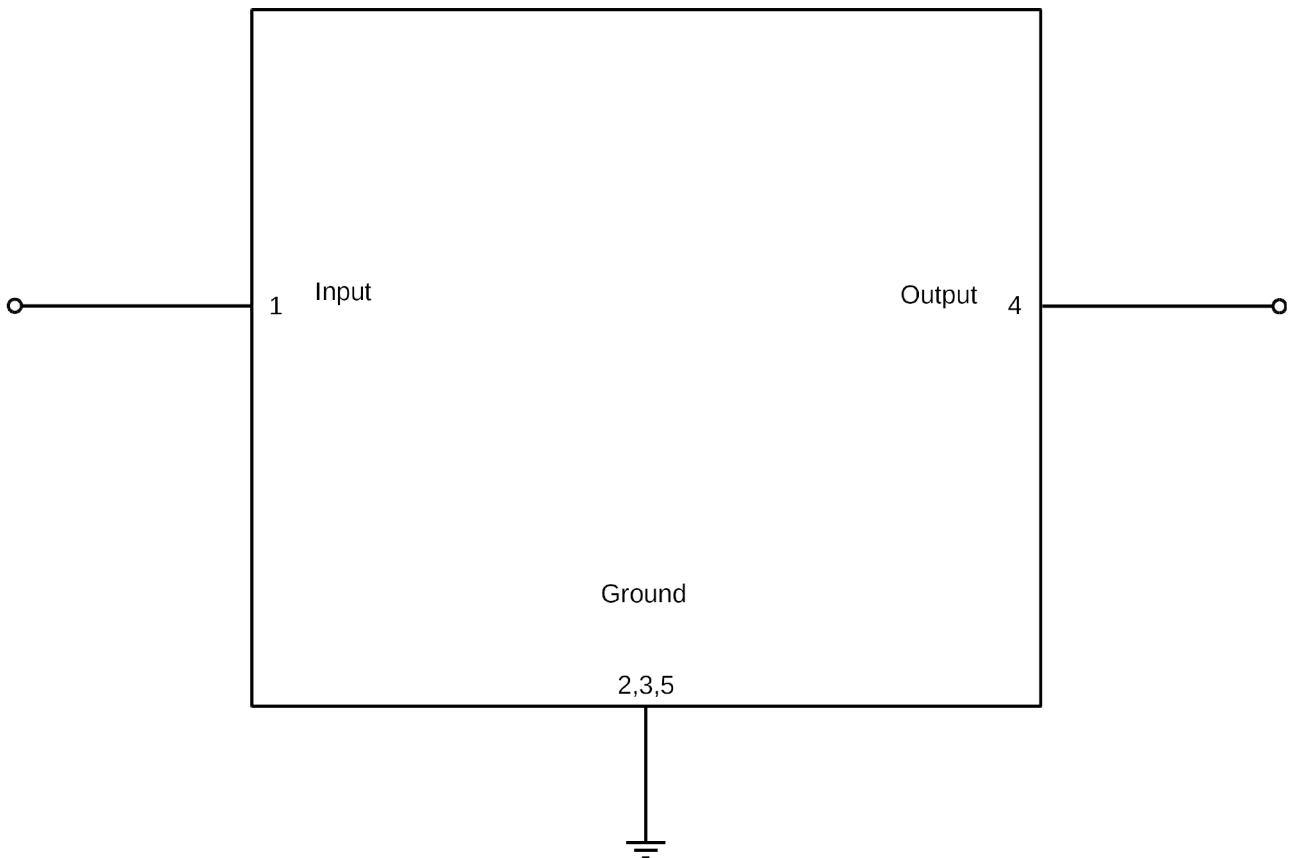


Figure 3: Schematic of matching circuit. No external matching components required.

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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	—	1950	—	MHz
Maximum insertion attenuation	α_{max}	—	1.7	3.3	dB
	1920... 1980 MHz				
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.0	2.5	dB
	1920... 1980 MHz				
Maximum VSWR	$VSWR_{max}$	—	1.6	2.2	
@ input port	1920... 1980 MHz				
@ output port	1920... 1980 MHz				
Minimum attenuation	α_{min}				
	50... 960 MHz	35	40	—	dB
	960... 1575 MHz	32	41	—	dB
	1575... 1576 MHz	37	44	—	dB
	1576... 1700 MHz	30	40	—	dB
	1700... 1880 MHz	25	30	—	dB
	2025... 2110 MHz	20	24	—	dB
	2110... 2170 MHz	30	40	—	dB
	2170... 2400 MHz	30	38	—	dB
	2400... 2500 MHz	32	40	—	dB
	2500... 6000 MHz	26	31	—	dB

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7 Maximum ratings

Storage temperature	$T_{STG} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$V_{DC} = 5.0\text{ V (max.)}^{1)}$	
ESD voltage	$V_{ESD}^{2)} = 50\text{ V (max.)}$	Machine model.
Input power @ input port: 1920 ... 1980 MHz	$P_{IN} = 10\text{ dBm}$	Continuous wave.

¹⁾ 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy.

²⁾ According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

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8 Transmission coefficient

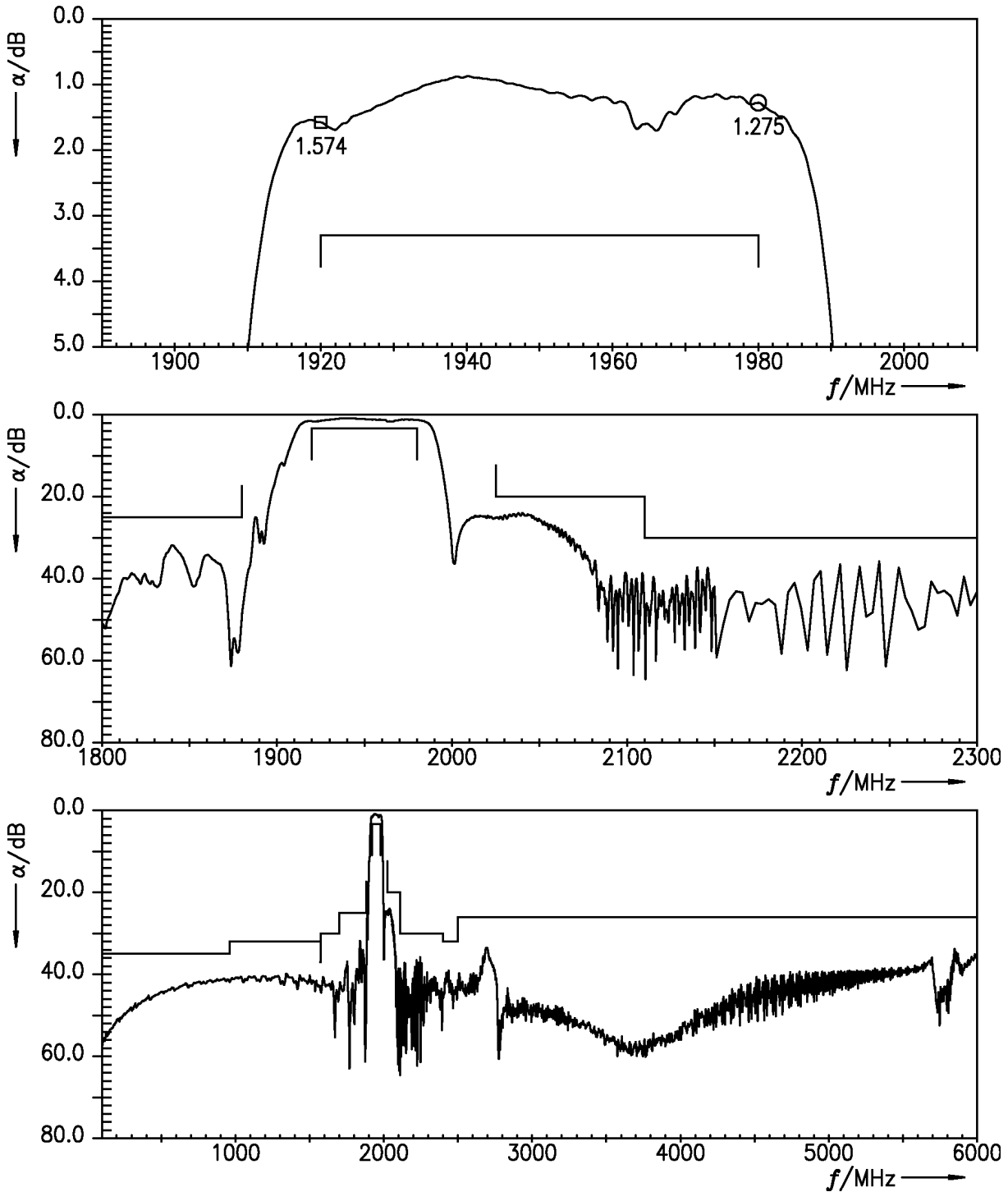


Figure 4: Attenuation.

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9 Reflection coefficients

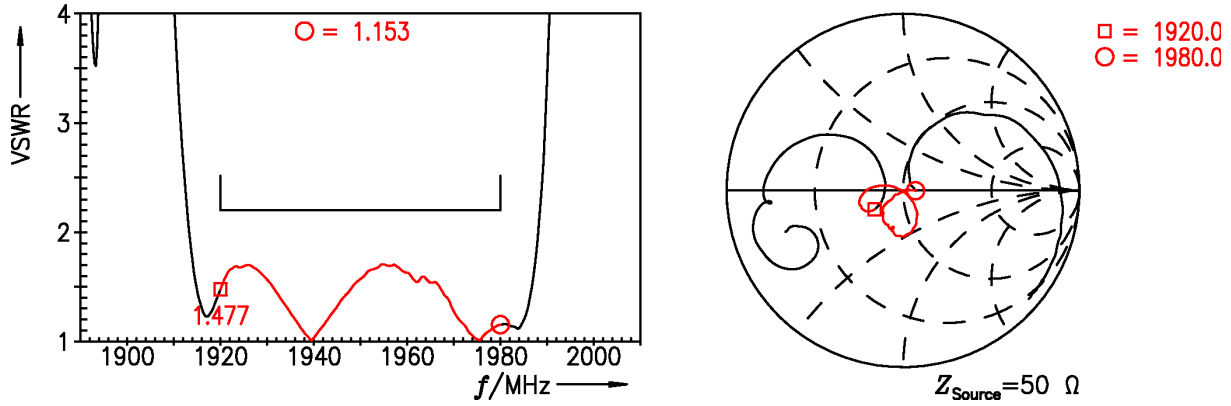


Figure 5: Reflection coefficient at IN port.

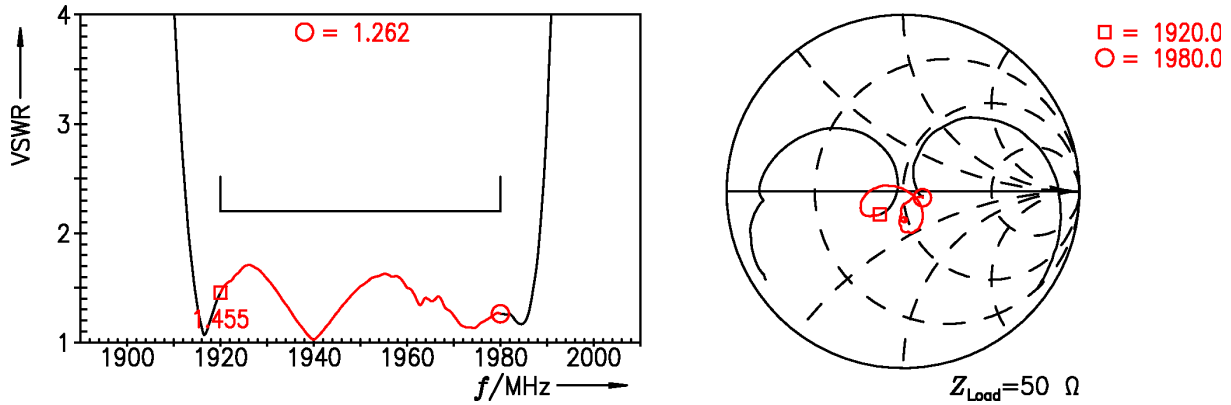


Figure 6: Reflection coefficient at OUT port.

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10 Packing material

10.1 Tape

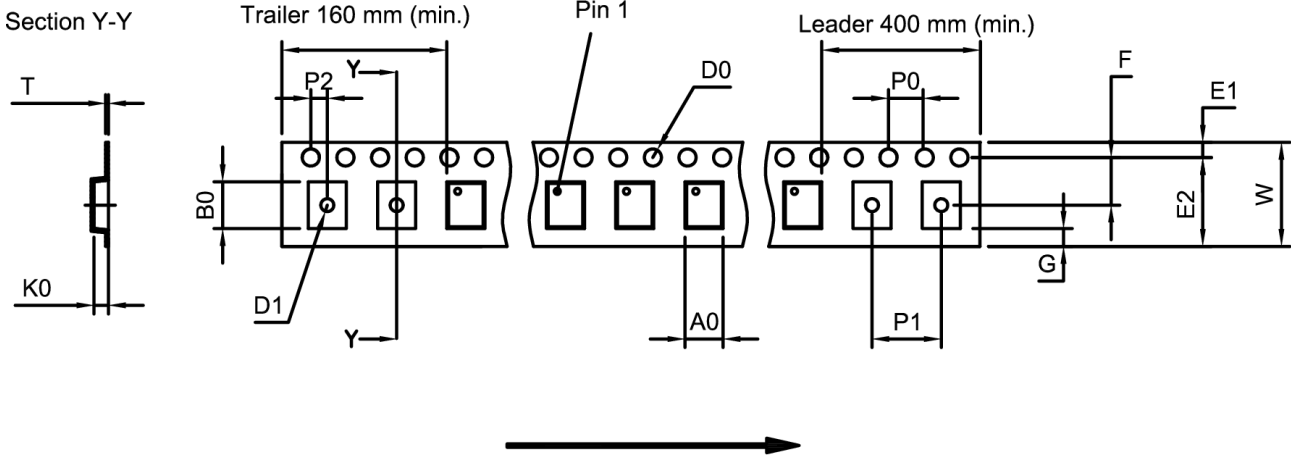


Figure 7: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A ₀	1.02±0.05 mm	E ₂	6.25 mm (min.)	P ₁	2.0±0.1 mm
B ₀	1.22±0.05 mm	F	3.5±0.05 mm	P ₂	2.0±0.05 mm
D ₀	1.55±0.05 mm	G	–	T	0.25±0.03 mm
D ₁	0.55±0.1 mm	K ₀	0.6±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.

10.2 Reel with diameter of 180 mm

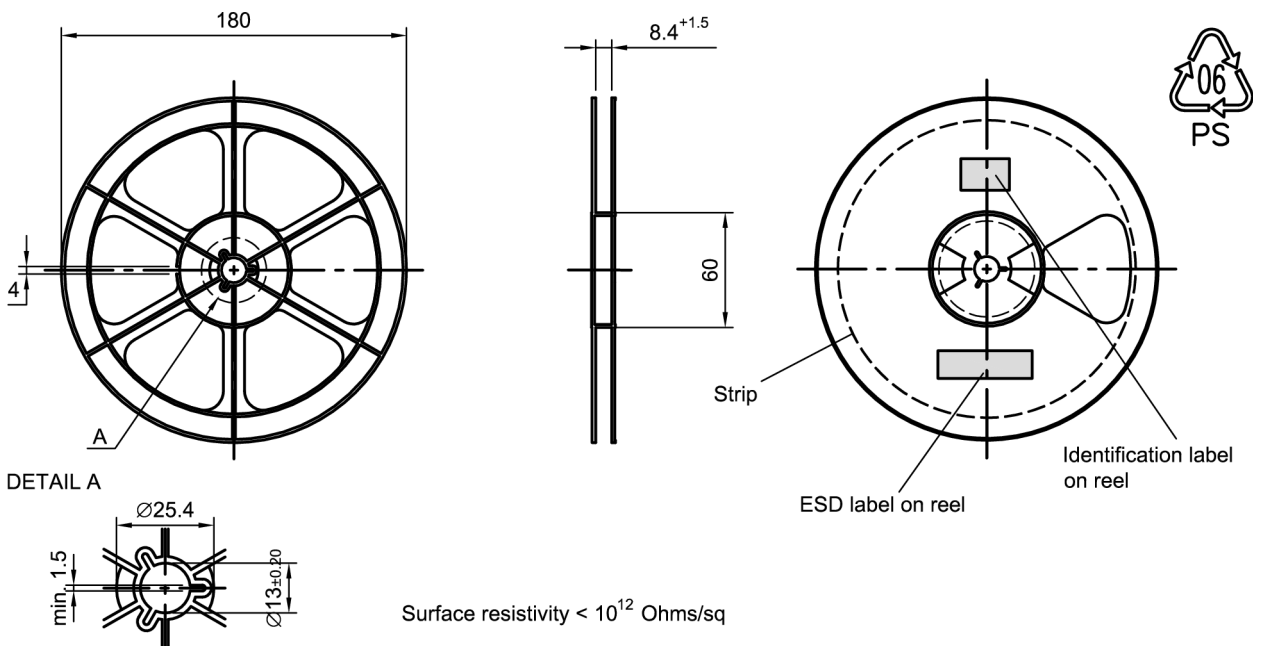


Figure 8: Drawing of reel (first-angle projection) with diameter of 180 mm.

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Dimensions [mm]
 X = 220±5
 Y = 235±5
 Sealing area 10±3

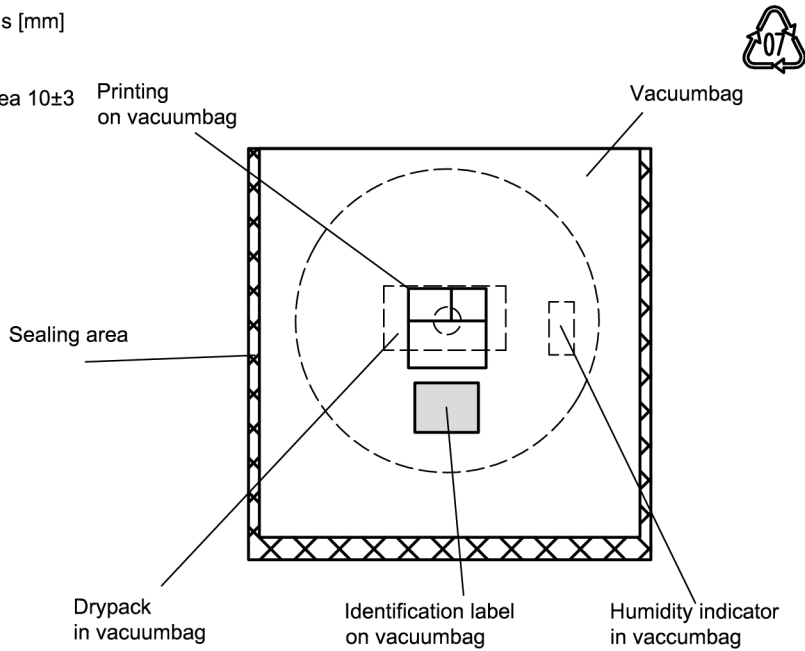


Figure 9: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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

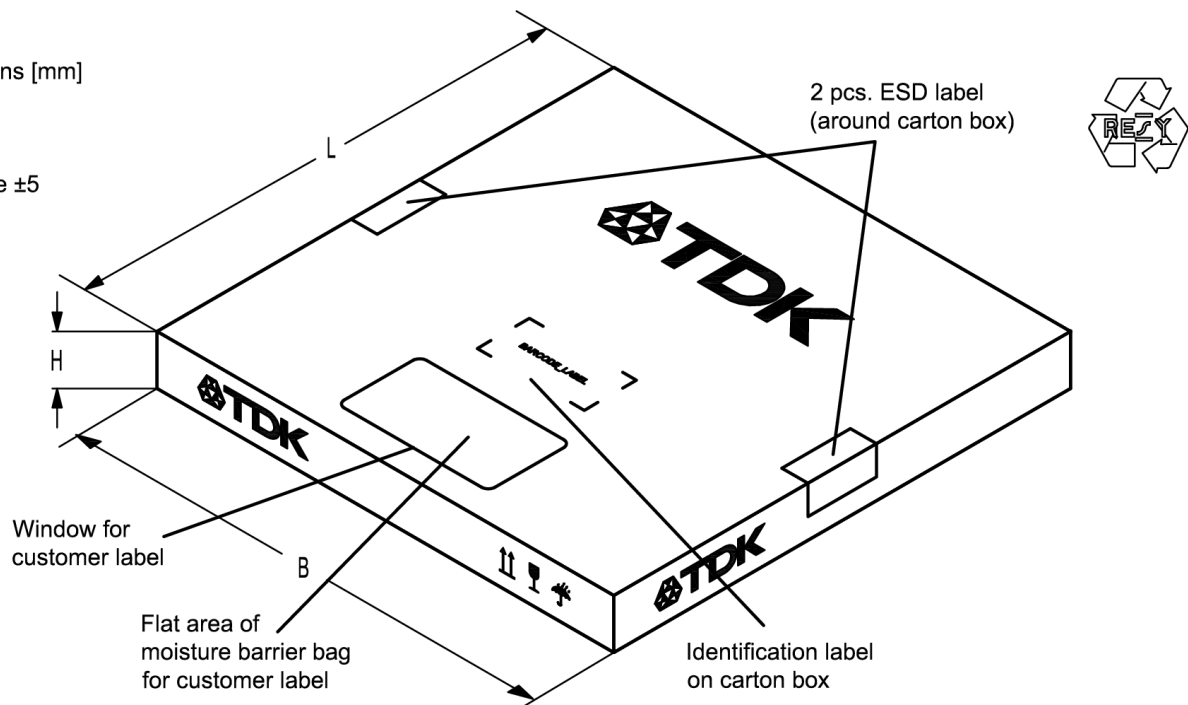


Figure 10: Drawing of folding box for reel with diameter of 180 mm.

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10.3 Reel with diameter of 330 mm

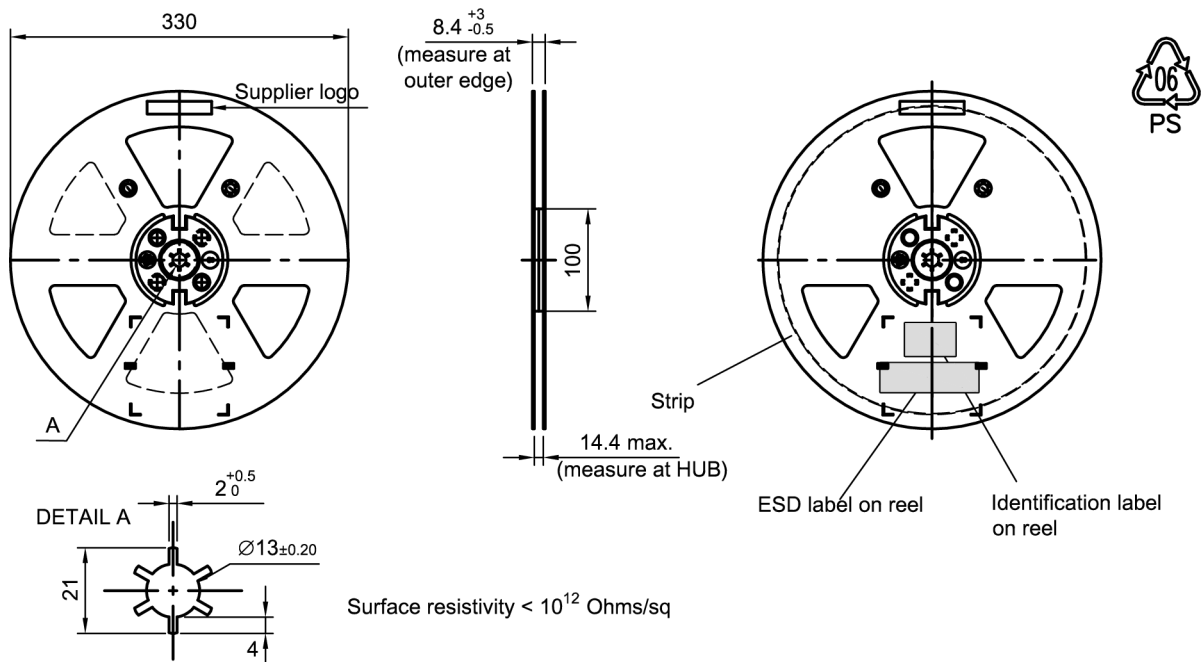


Figure 11: Drawing of reel (first-angle projection) with diameter of 330 mm.

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

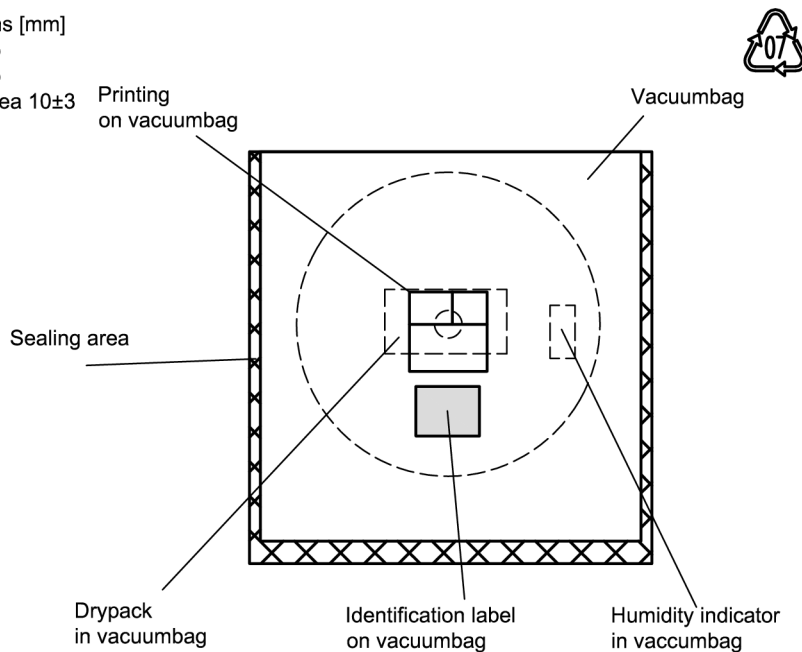
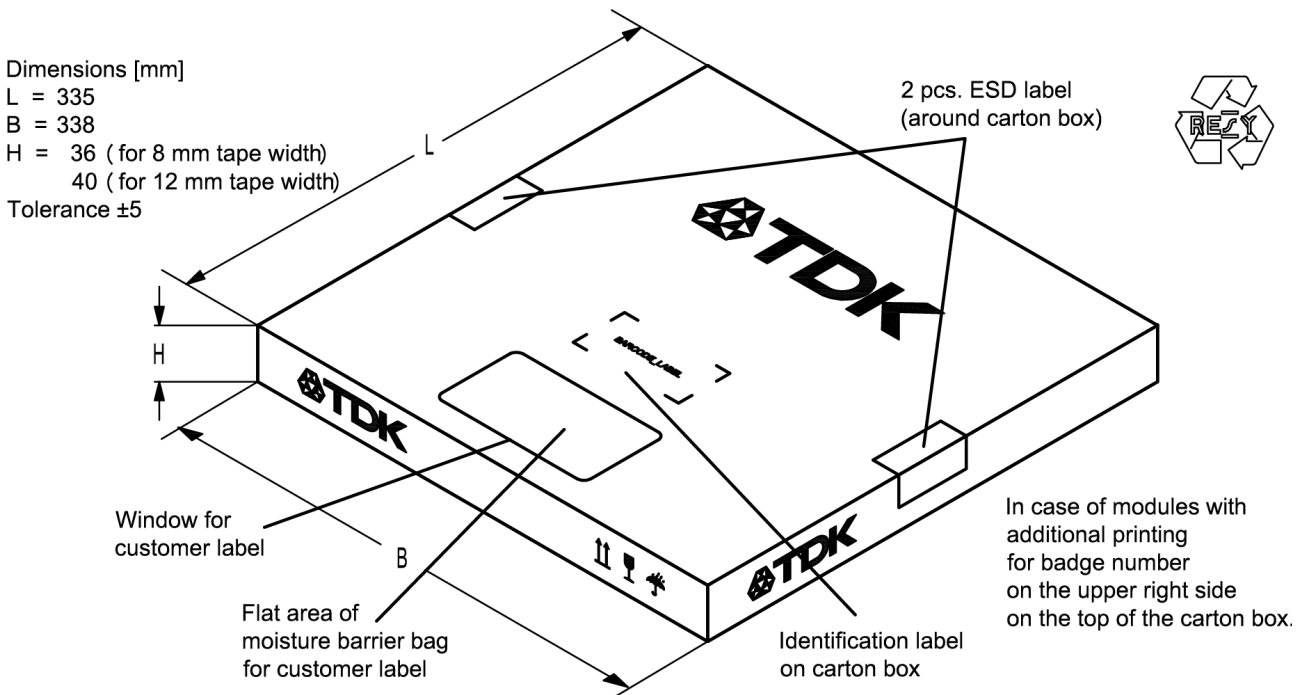


Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

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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:

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

The BASE32 code for product type B9872 is 9MG.

■ 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.
5UY	=>	12345
$5 \times 47^2 + 27 (=U) \times 47^1 + 31 (=Y) \times 47^0$	=	12345

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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 °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).

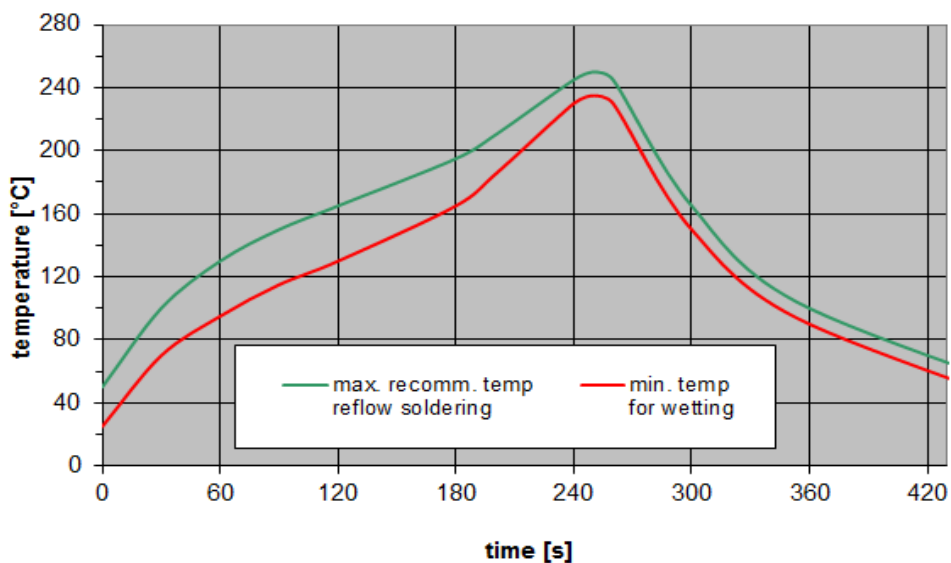


Figure 14: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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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 codes and packing units

Ordering code	Packing unit
B39202B9872P810	15000 pcs
B39202B9872P810S 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.

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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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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