



RF360
Europe GmbH

SAW components

SAW filter for smallcells and femtocells

Band 20 Downlink

Series/type: B9631
Ordering code: B39811B9631P810

Date: January 29, 2016
Version: 2.0

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SAW filter for smallcells and femtocells	806 MHz

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1 Application

- Low-loss RF filter for smallcells systems (Band 20)
- Usable pass band 30MHz

2 Features

- Package size 1.4±0.1 mm × 1.1±0.1 mm
- Package height 0.45 mm (max.)
- Approximate weight 0.003 g
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 2a (MSL2a)

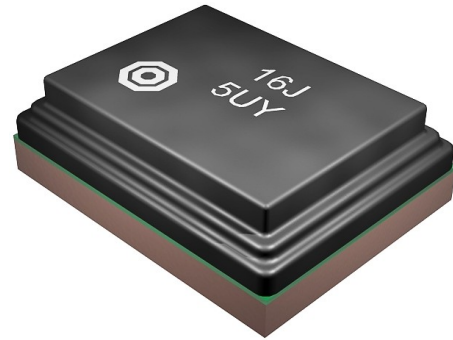
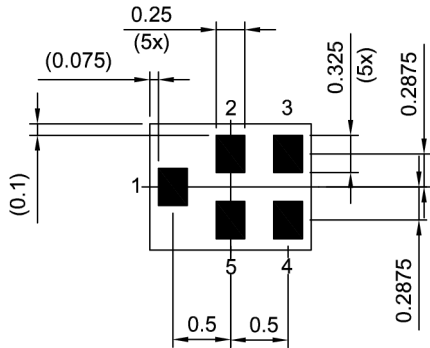


Figure 1: Picture of component with example of product marking.

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3 Package

BOTTOM VIEW

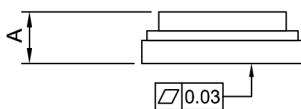


Pad and pitch tolerance ±0.05

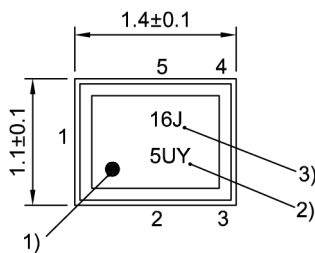
4 Pin configuration

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

SIDE VIEW

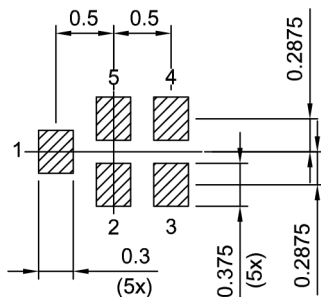


TOP VIEW



- 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 Simplified drawings (p. 16).

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5 Matching circuit

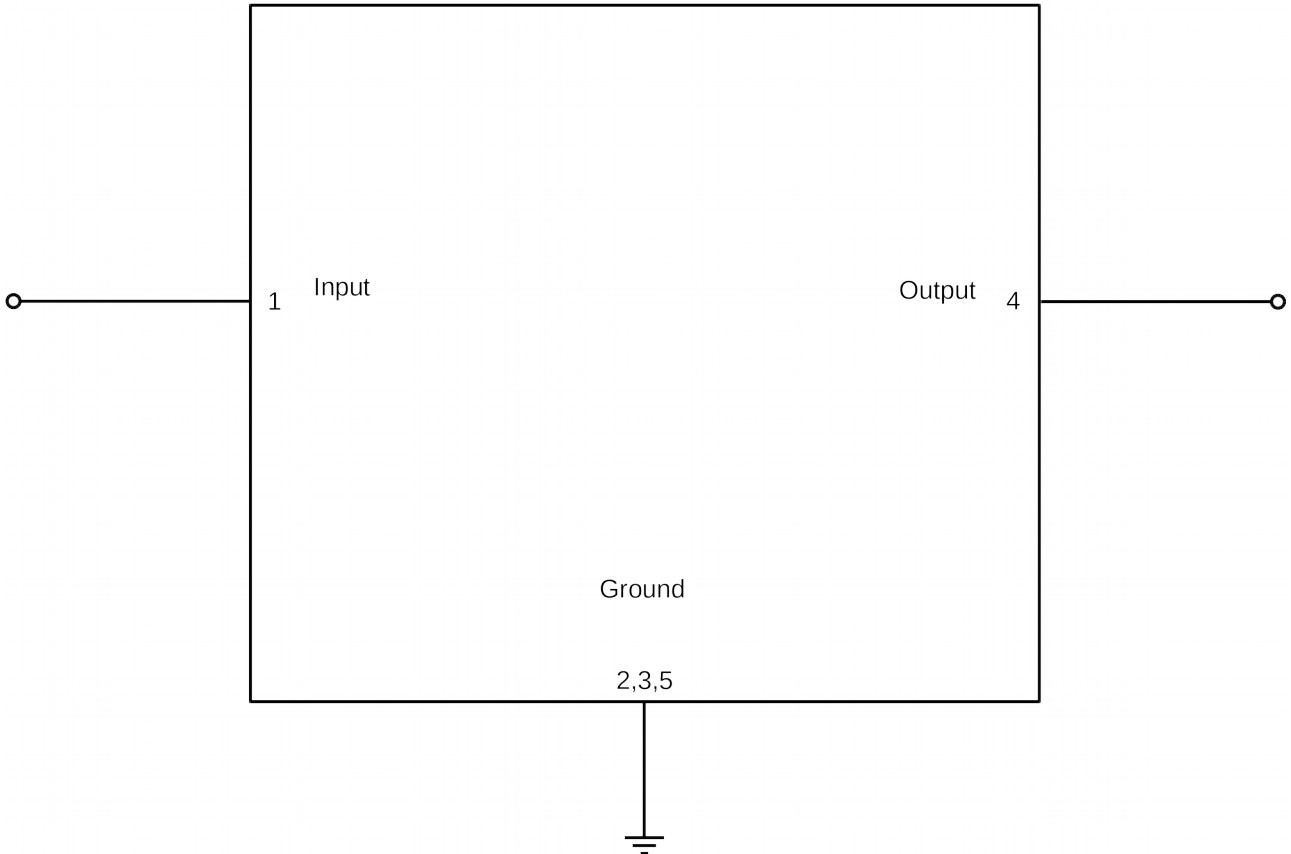


Figure 3: Schematic of matching circuit. No external matching components required.

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6 Characteristics

Temperature range for specification	T	= -10 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 50 Ω
Output terminating impedance	Z_{OUT}	= 50 Ω

Characteristics		min.	typ. @+25 °C	max.	
Center frequency	f_c	—	806	—	MHz
Maximum insertion attenuation	α_{max}	—	2.1	3.7	dB
	791... 821 MHz				
Amplitude ripple (p-p)	$\Delta\alpha$	—	1.2	2.8	dB
	791... 821 MHz				
Maximum VSWR	VSWR _{max}				
@ input port	791... 821 MHz	—	1.7	2.1	
@ output port	791... 821 MHz	—	1.7	2.1	
Maximum error vector magnitude	EVM _{max} ¹⁾	—	2.6	5.0	%
	793.4... 818.6 MHz				
Minimum attenuation	α_{min}				
	100... 750 MHz	30	42	—	dB
	832... 862 MHz	30	36	—	dB
	880... 915 MHz	28	40	—	dB
	925... 960 MHz	30	40	—	dB
	1574... 1785 MHz	40	50	—	dB
	1710... 1785 MHz	40	52	—	dB
	1805... 1880 MHz	40	52	—	dB
	1920... 1980 MHz	39	45	—	dB
	2110... 2170 MHz	36	44	—	dB
	2400... 2500 MHz	30	37	—	dB
	2700... 4000 MHz	30	38	—	dB
	5150... 5850 MHz	25	34	—	dB

¹⁾ Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

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7 Maximum ratings

Operable temperature	$T_{OP} = -40\text{ °C} \dots +85\text{ °C}$	
Storage temperature	$T_{STG} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$V_{DC} = 0\text{ V (max.)}$	
ESD voltage	$V_{ESD}^{1)} = 100\text{ V (max.)}$	Machine model, 10 pulses.
Input power @ input port: 791 ... 821 MHz	$P_{IN} = 15\text{ dBm}$	LTE 5MHz downlink, 50000 h ²⁾ @ 55 °C.

¹⁾ According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

²⁾ Time to failure (TTF) according to accelerated power durability simulations acc. to wear out models.

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8 Transmission coefficient

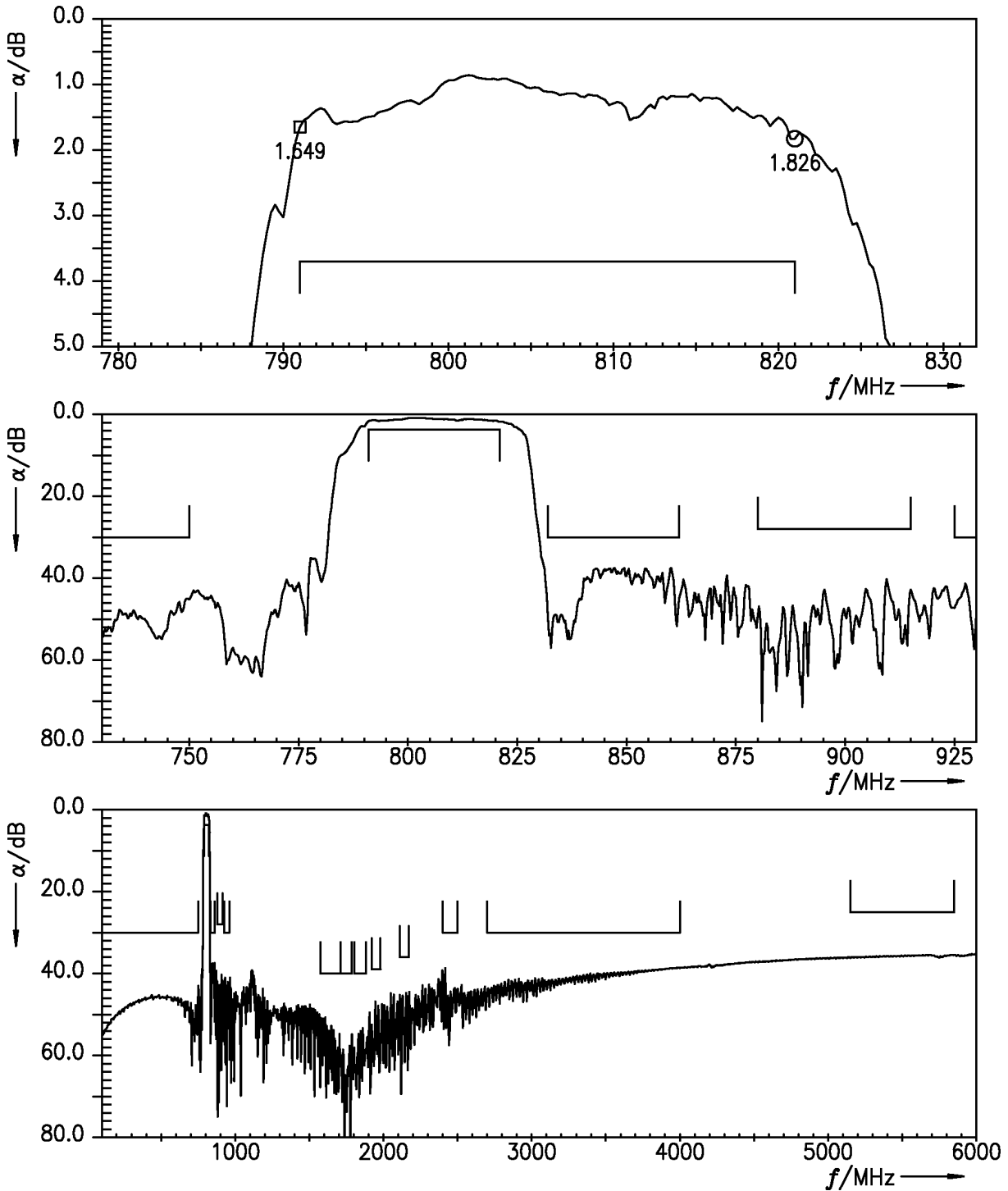


Figure 4: Attenuation.

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9 Reflection coefficients

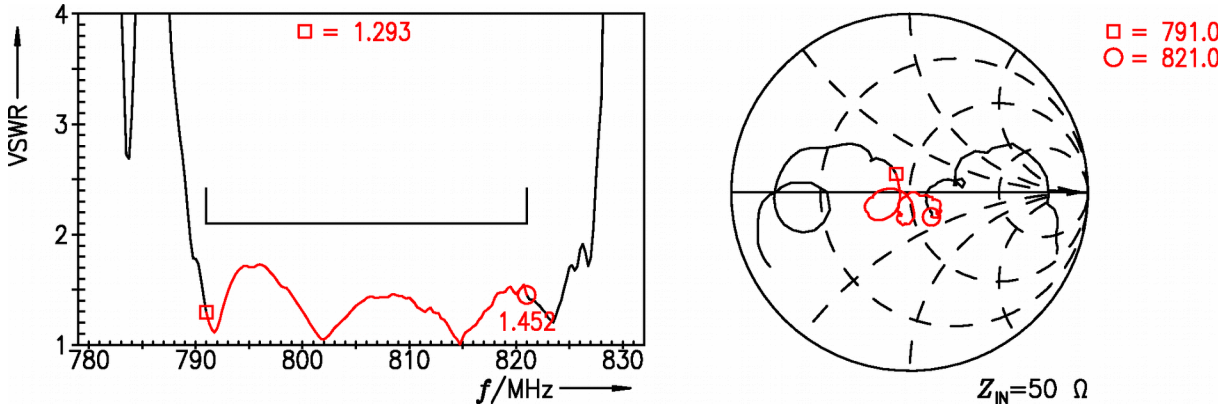


Figure 5: Reflection coefficient at IN port.

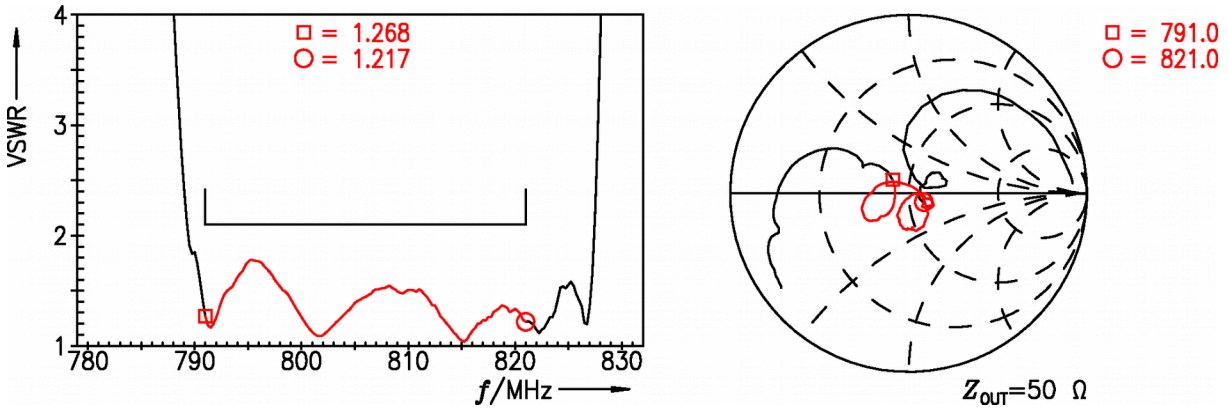


Figure 6: Reflection coefficient at OUT port.

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10 EVM

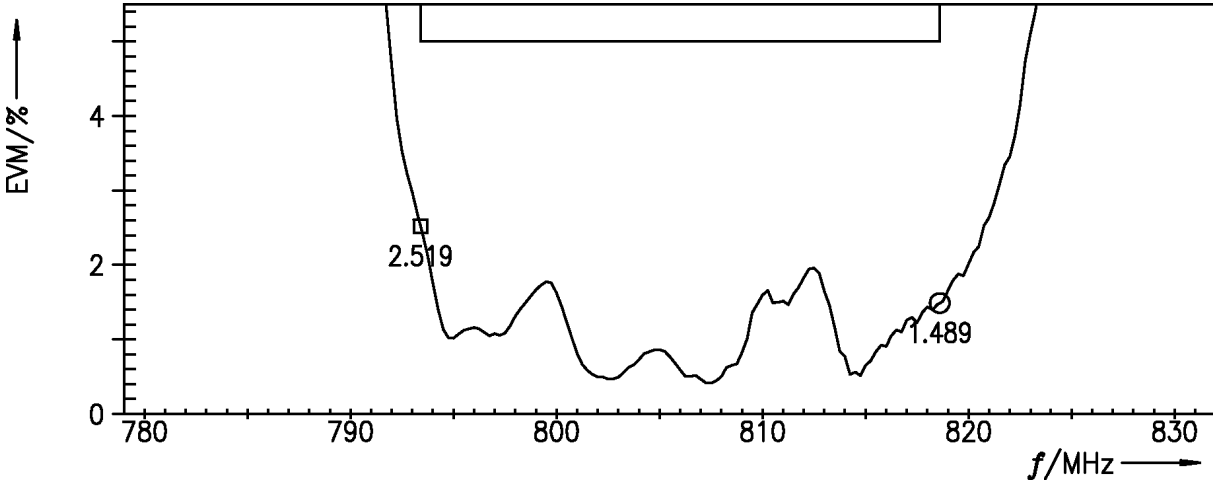


Figure 7: Error vector magnitude.

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11 Packing material

11.1 Tape

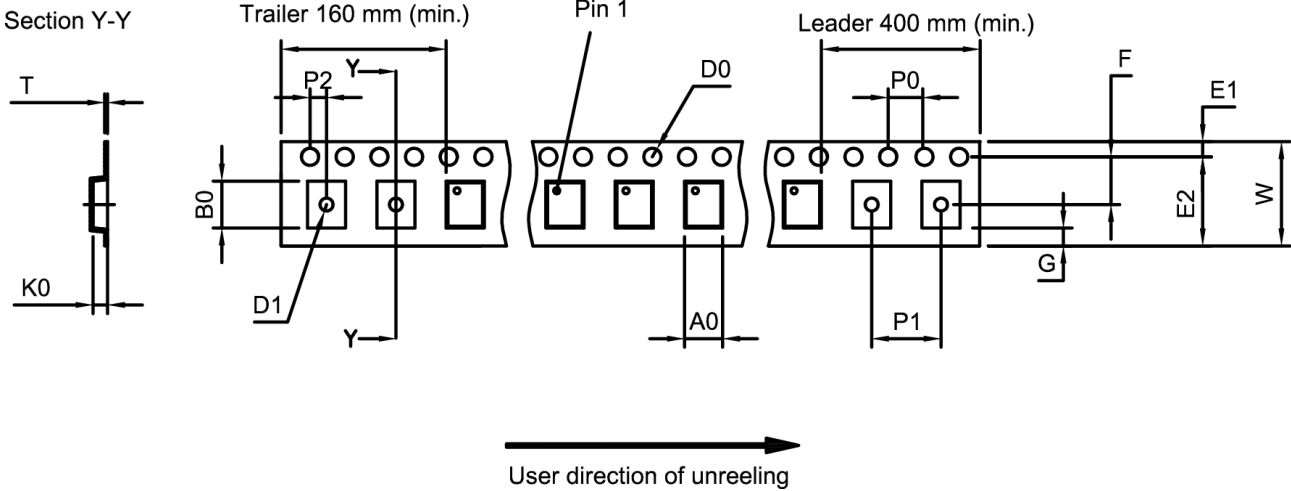


Figure 8: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A ₀	1.27 \pm 0.05 mm	E ₂	6.25 mm (min.)	P ₁	4.0 \pm 0.1 mm
B ₀	1.57 \pm 0.05 mm	F	3.5 \pm 0.05 mm	P ₂	2.0 \pm 0.05 mm
D ₀	1.5 \pm 0.1/-0 mm	G	0.75 mm (min.)	T	0.25 \pm 0.03 mm
D ₁	0.5 \pm 0.1 mm	K ₀	0.62 \pm 0.05 mm	W	8.0 \pm 0.3/-0.1 mm
E ₁	1.75 \pm 0.1 mm	P ₀	4.0 \pm 0.1 mm		

Table 1: Tape dimensions.

11.2 Reel with diameter of 180 mm

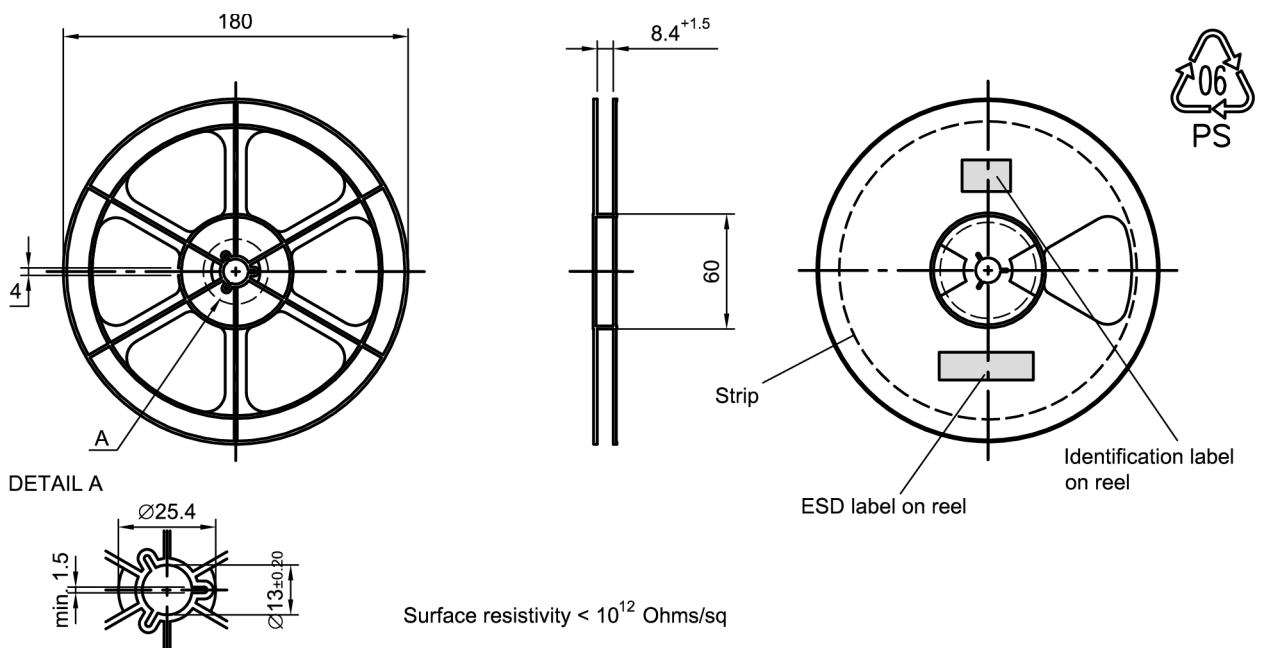


Figure 9: Drawing of reel (first-angle projection) with diameter of 180 mm.

Data sheet

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

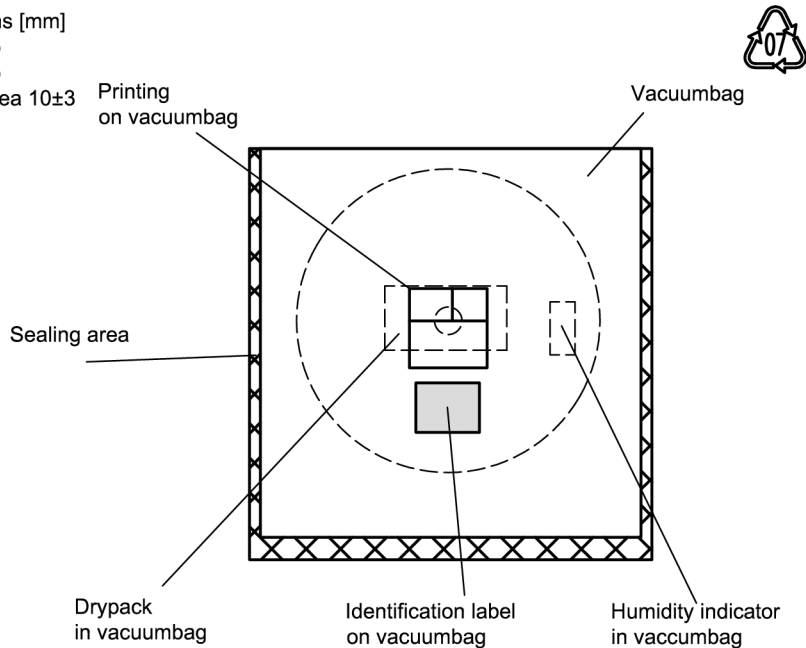


Figure 10: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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

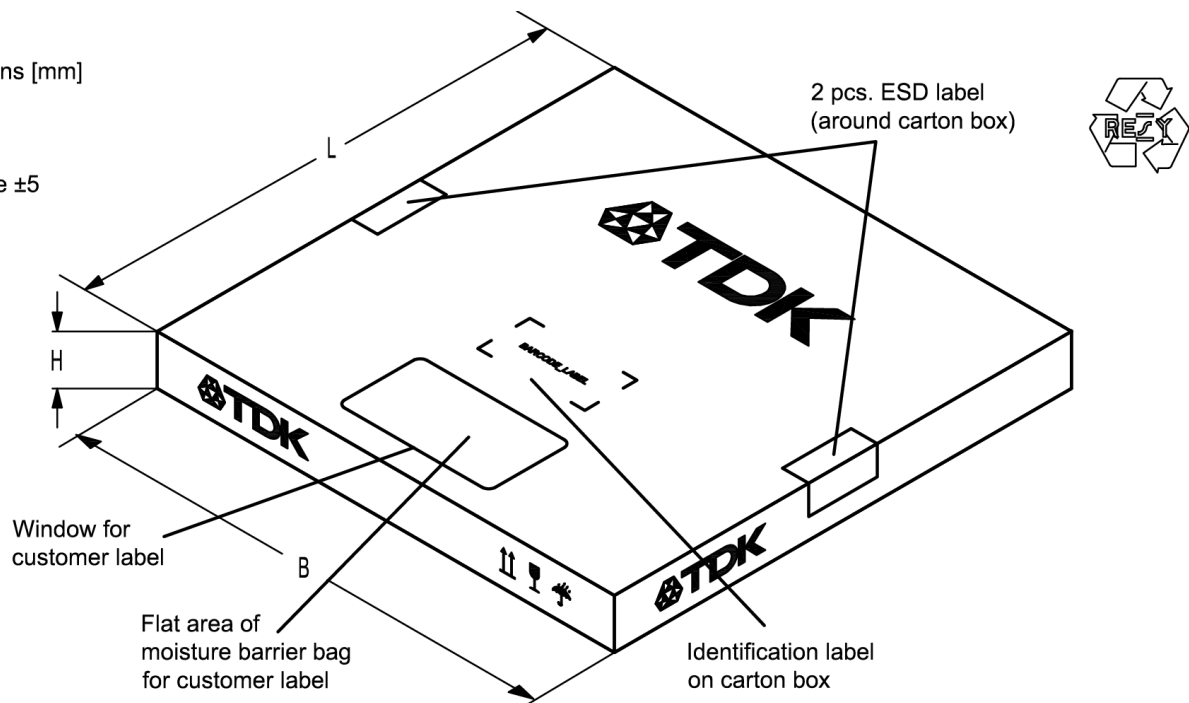


Figure 11: Drawing of folding box for reel with diameter of 180 mm.

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12 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.

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

The BASE32 code for product type B9631 is 9CZ.

■ 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.

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

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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13 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).

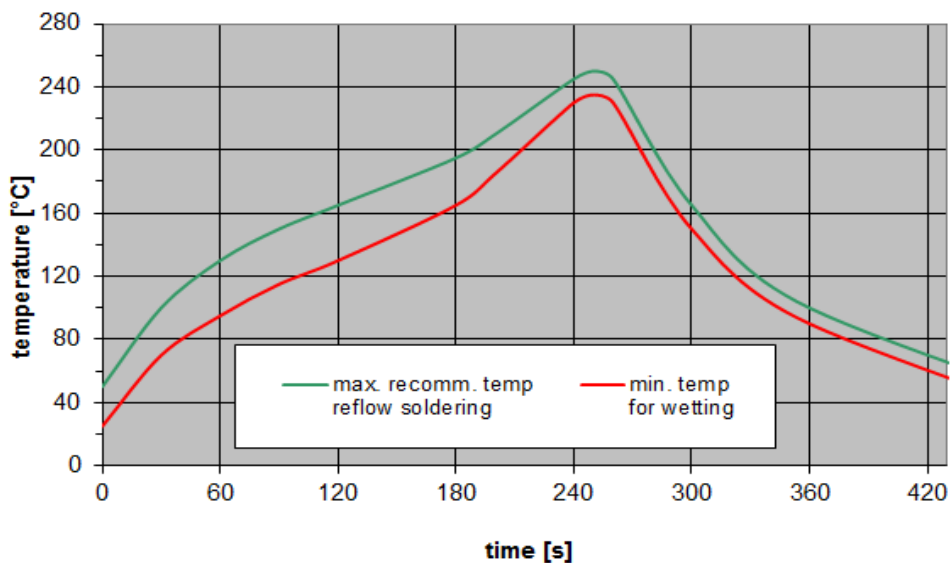


Figure 12: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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14 Annotations

14.1 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>.

14.2 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.

14.3 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.

14.4 Ordering codes and packing units

Ordering code	Packing unit
B39811B9631P810	5000 pcs

Table 4: Ordering codes and packing units.

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15 Cautions and warnings

15.1 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.

15.2 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.

15.3 Moldability

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

15.4 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).

Dimensions do not include burrs.

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

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