Qualcomm

RF360
Europe GmbH

SAW components

SAW Rx filter

WCDMA / LTE band 5

Series/type:	B8808
Ordering code:	B39881B8808P810
Date:	March 01, 2016
Version:	2.5

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

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1 Application

- RF SAW filter for mobile telephone Band 5 system receive path(Rx).
- Suitable for diversity applications.
- 50Ω / 50Ω unbalanced to unbalance operation
- Usable pass band 25MHz

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)

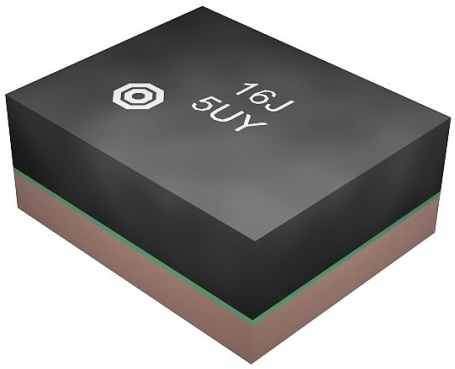

Figure 1: Picture of component with example of product marking.

3 Package

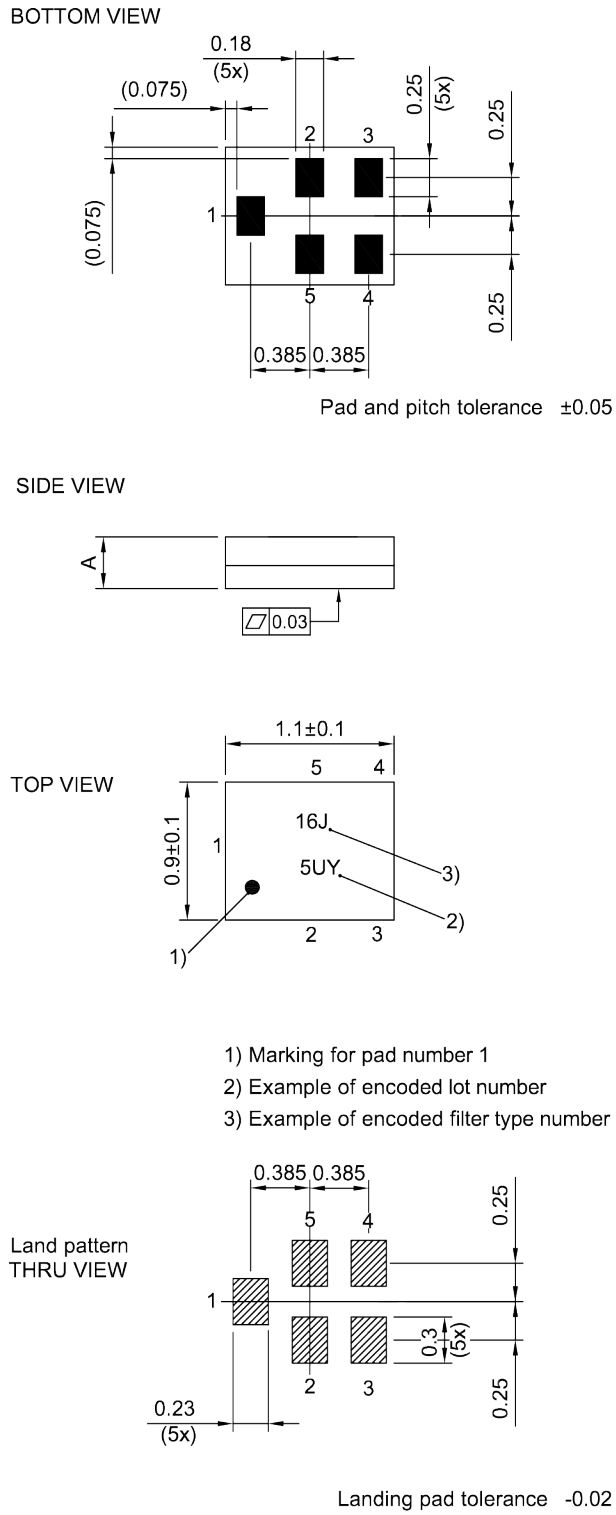

Figure 2: Drawing of package with package height A = 0.45 mm (max.). See Simplified drawings (p. 19).

4 Pin configuration

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

5 Matching circuit

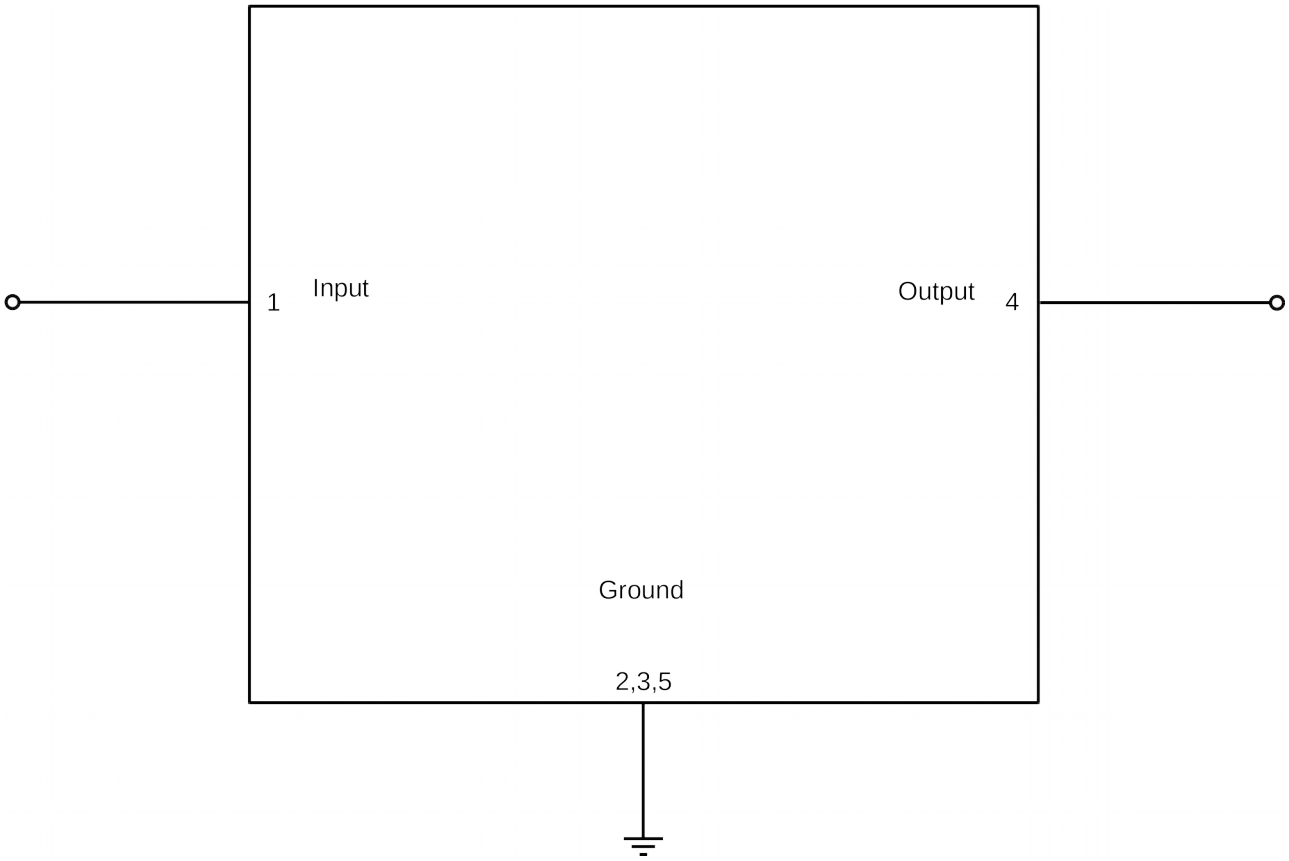

Figure 3: Schematic of matching circuit. No external matching components required.

6 Characteristics

Temperature range for specification T_{SPEC} = −30 °C ... +90 °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	—	881.5	—	MHz
Maximum insertion attenuation								
		869... 894	MHz	α_{max}	—	1.6	2.2	dB
	@$f_{carrier}$	871.4... 891.6	MHz	$\alpha_{WCDMA,max}$ [1]	—	1.5	1.8	dB
Amplitude ripple (p-p)				$\Delta\alpha$				
		869... 894	MHz		—	0.5	1.1	dB
Maximum VSWR				$VSWR_{max}$				
@ input port		869... 894	MHz		—	1.5	2.0	
@ output port		869... 894	MHz		—	1.5	2.0	
Maximum error vector magnitude				EVM_{max} [2]				
		871.4... 891.6	MHz		—	2.0	6.0	%
Minimum attenuation								
		10... 824	MHz	α_{min}	46	49	—	dB
		824... 849	MHz	α_{min}	46	49	—	dB
	@$f_{carrier}$	826.4... 846.6	MHz	$\alpha_{WCDMA,min}$ [1]	50	54	—	dB
		849... 854	MHz	α_{min}	30	52	—	dB
		909... 979	MHz	α_{min}	9	14	—	dB
		979... 1710	MHz	α_{min}	35	45	—	dB
		1710... 1785	MHz	α_{min}	41	44	—	dB
		1850... 1910	MHz	α_{min}	40	43	—	dB
		1920... 1980	MHz	α_{min}	40	43	—	dB
		2400... 2500	MHz	α_{min}	37	40	—	dB
		2607... 2682	MHz	α_{min}	35	40	—	dB
		4900... 5950	MHz	α_{min}	23	25	—	dB

[1] Attenuation of WCDMA signal ("power transfer function"). Please refer to definition of Power Transfer Function (PTF) of WCDMA signal (p. 18).
[2] Error Vector Magnitude (EVM) based on definition given in 3GPP TS 25.141.

7 Maximum ratings

Storage temperature	T_{STG} = −40 °C ... +85 °C[1)]	
DC voltage	V_{DC} = 5.0 V (max.)[2)]	
ESD voltage		
	V_{ESD}[3)] 100 V (max.)	Machine model.
	V_{ESD}[4)] 300 V (max.)	Human body model.
	V_{ESD}[5)] 600 V (max.)	Charged device model.
Input power @ input port: 824 ... 849 MHz	P_{IN} = 15 dBm	Continuous wave for 2000 h @ 55 °C.

1) Extended upperlimit: 96h@125°C acc. to IEC 60068-2-2 Bb.
2) 168h Damp Heat Steady State acc. to IEC 60068-2-67 Cy.
3) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
4) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
5) According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

8 Transmission coefficient

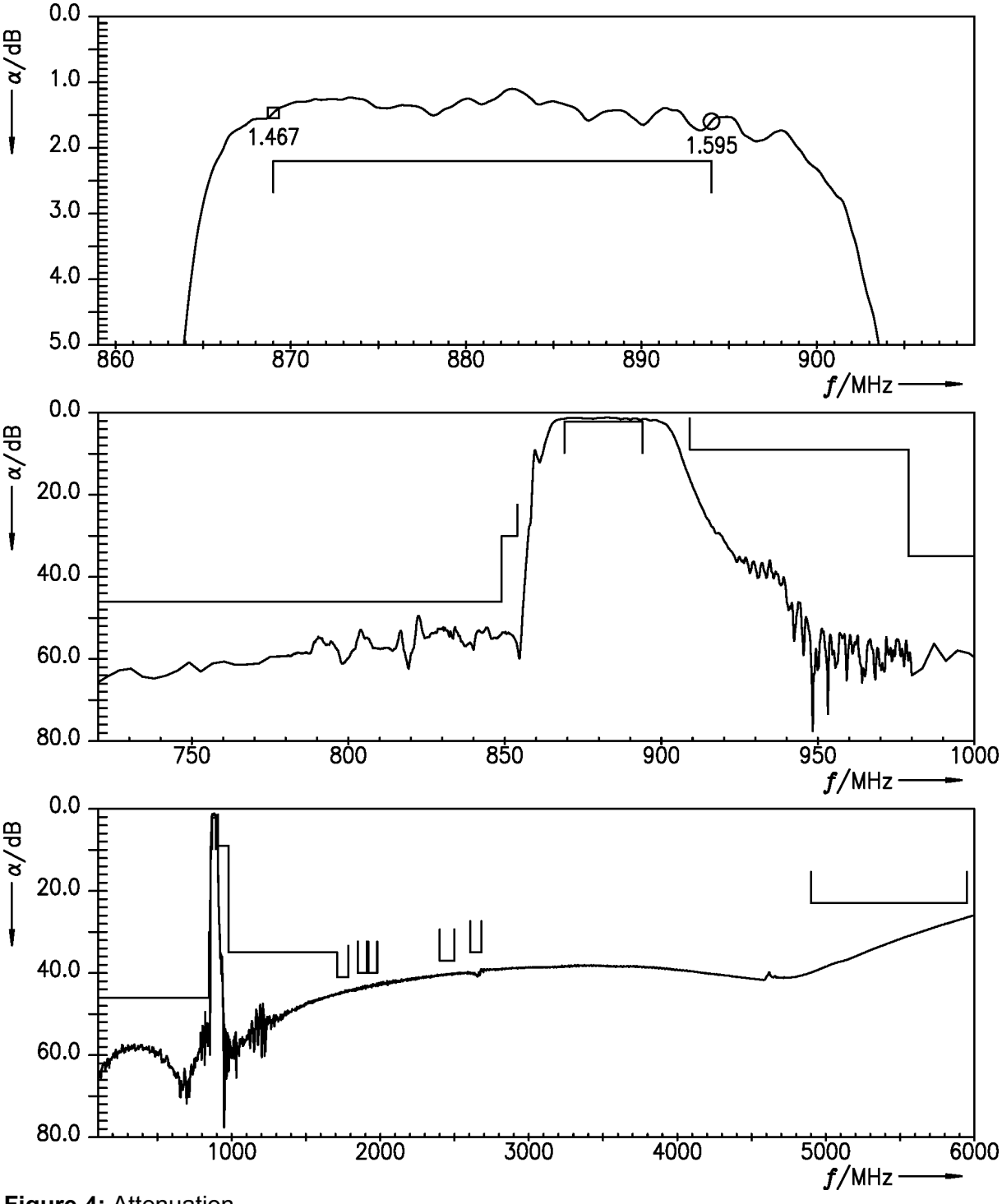

Figure 4: Attenuation.

9 Reflection coefficients

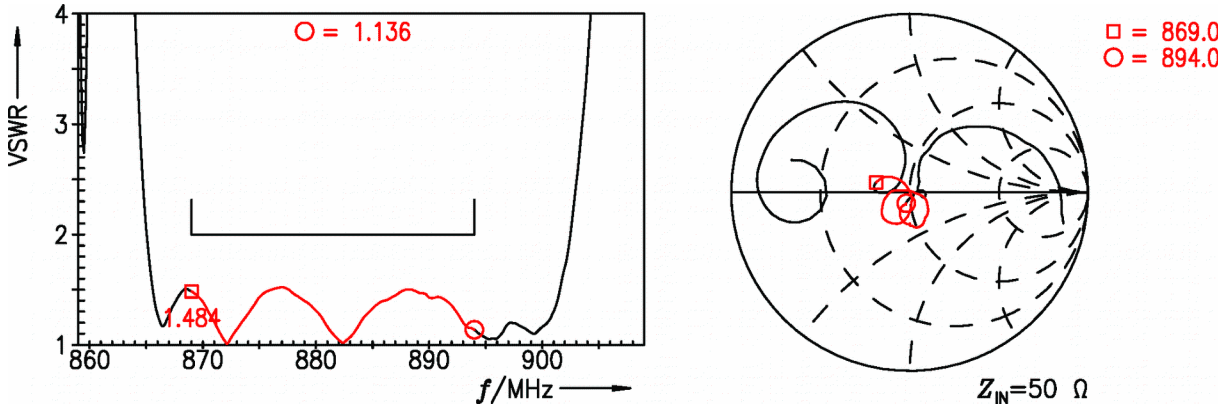

Figure 5: Reflection coefficient at IN port.

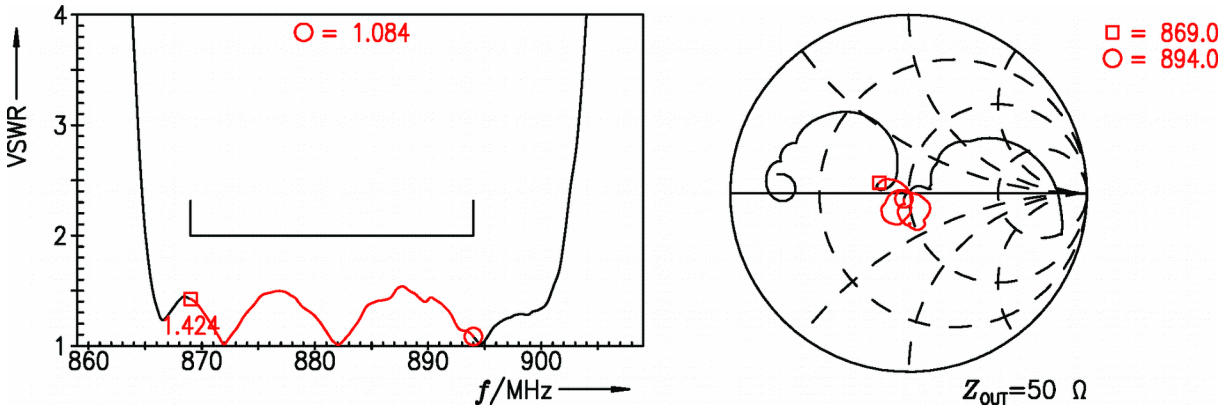

Figure 6: Reflection coefficient at OUT port.

10 Power transfer function (WCDMA)

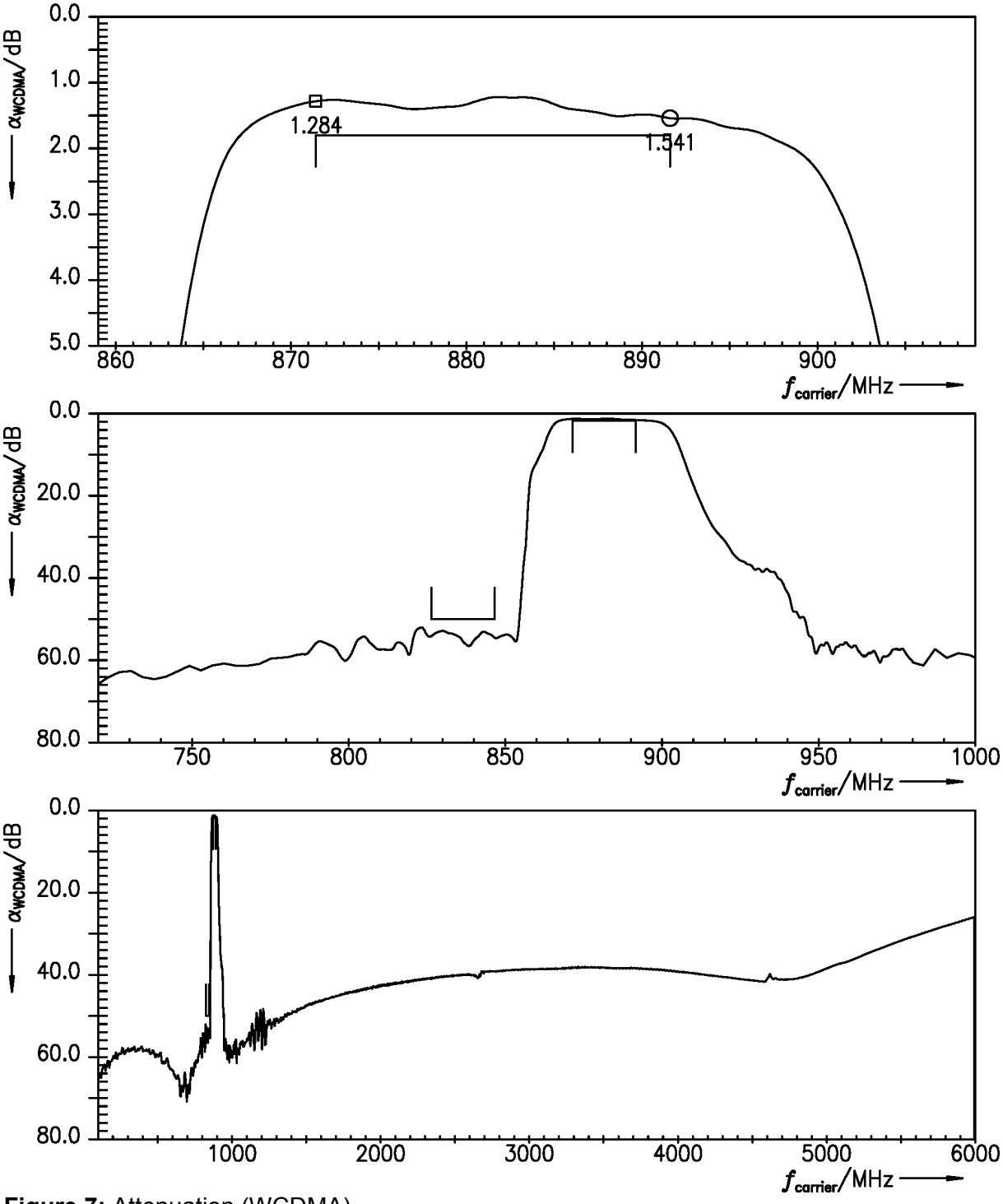

Figure 7: Attenuation (WCDMA).

11 EVM

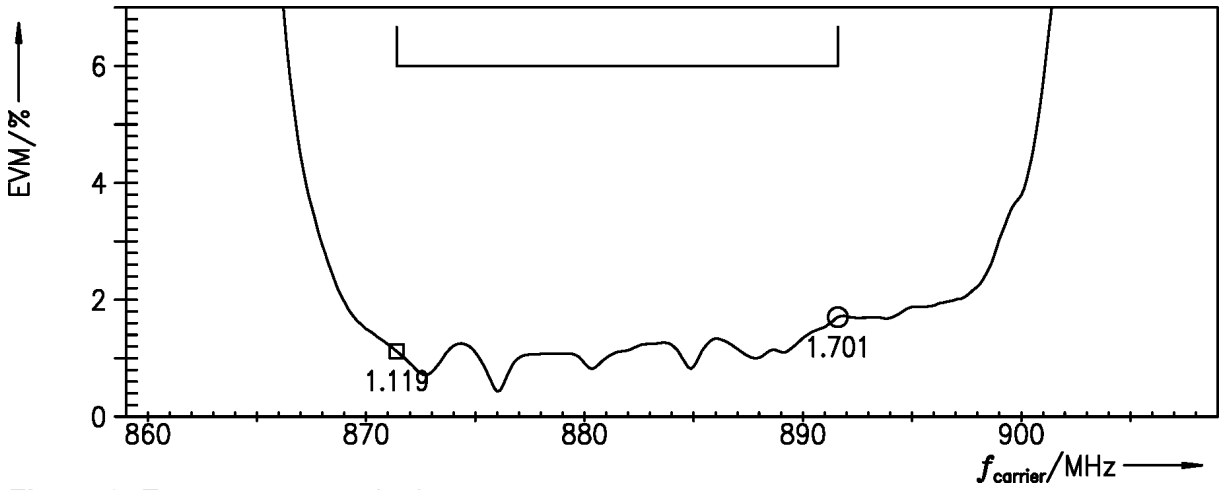

Figure 8: Error vector magnitude.

12 Packing material

12.1 Tape

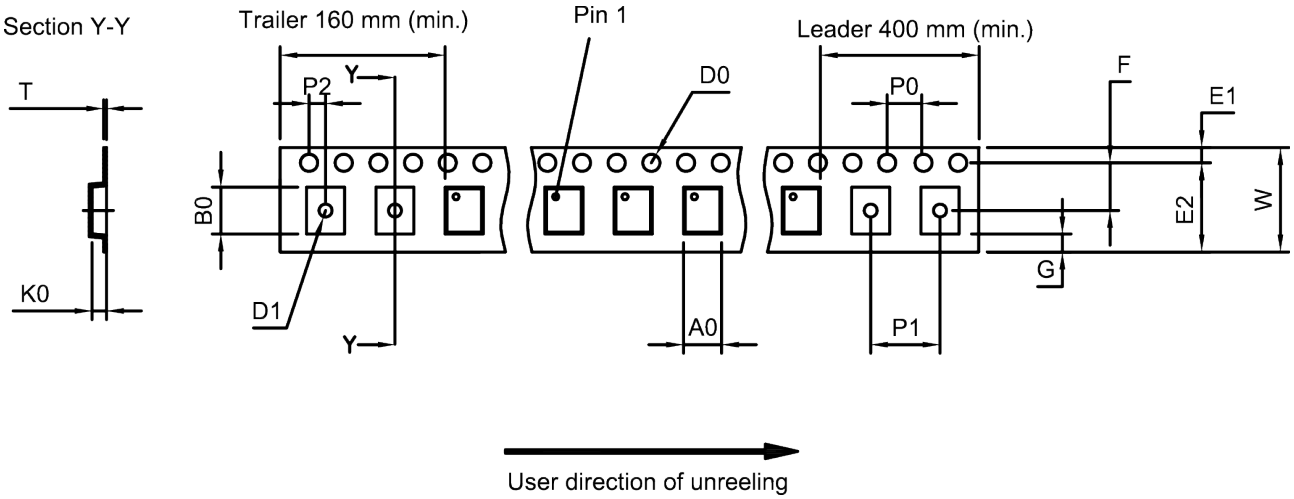

Figure 9: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	$1.02_{\pm 0.05}$ mm	E_2	6.25 mm (min.)	P_1	$2.0_{\pm 0.1}$ mm
B_0	$1.22_{\pm 0.05}$ mm	F	$3.5_{\pm 0.05}$ mm	P_2	$2.0_{\pm 0.05}$ mm
D_0	$1.55_{\pm 0.05}$ mm	G	–	T	$0.25_{\pm 0.03}$ mm
D_1	$0.55_{\pm 0.1}$ mm	K_0	$0.6_{\pm 0.05}$ mm	W	$8.0_{+0.3/-0.1}$ mm
E_1	$1.75_{\pm 0.1}$ mm	P_0	$4.0_{\pm 0.1}$ mm		

Table 1: Tape dimensions.

12.2 Reel with diameter of 180 mm

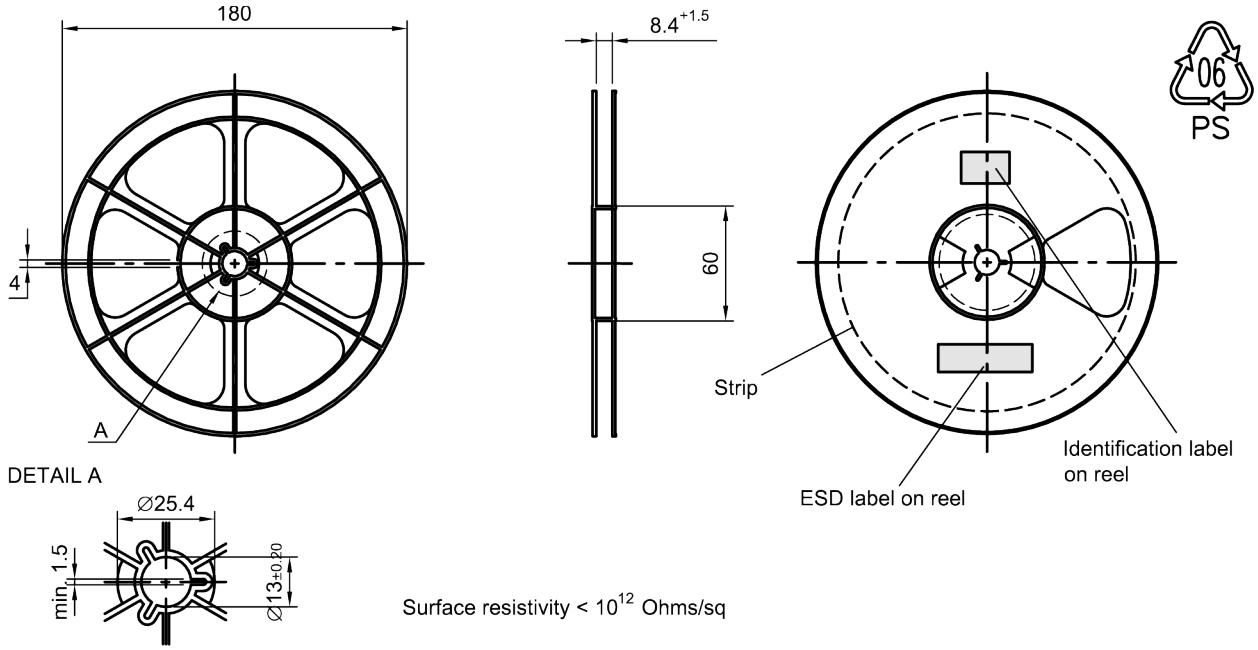

Figure 10: Drawing of reel (first-angle projection) with diameter of 180 mm.

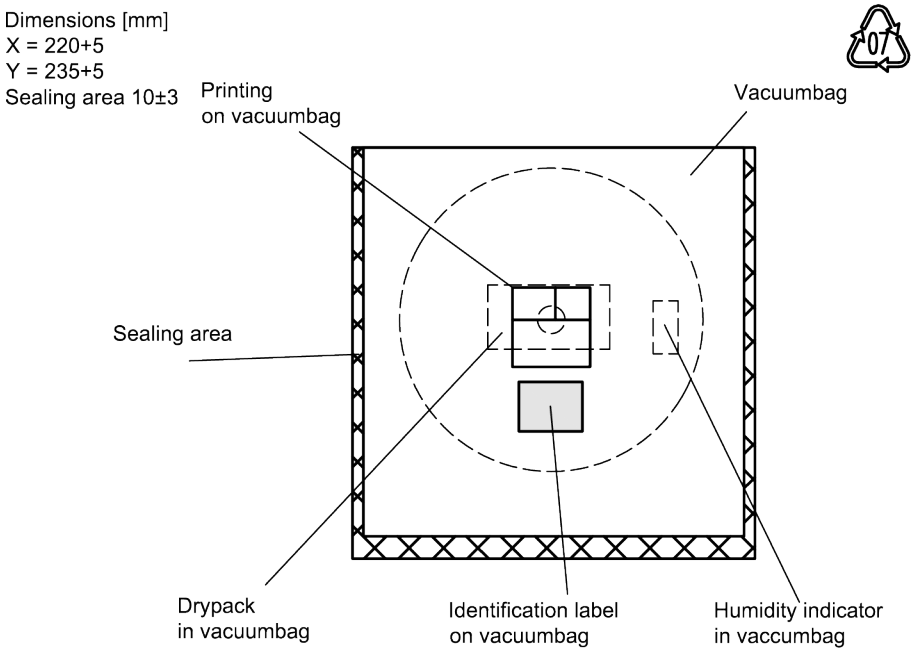

Figure 11: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

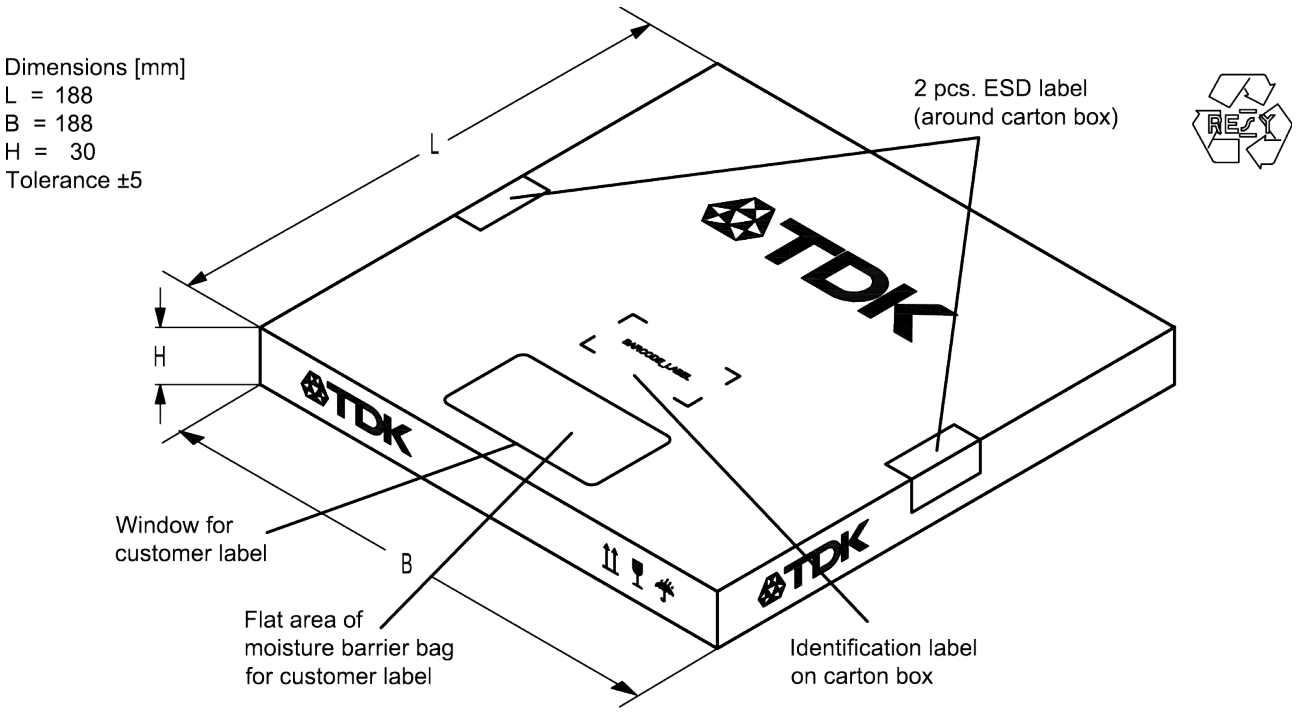

Figure 12: Drawing of folding box for reel with diameter of 180 mm.

12.3 Reel with diameter of 330 mm

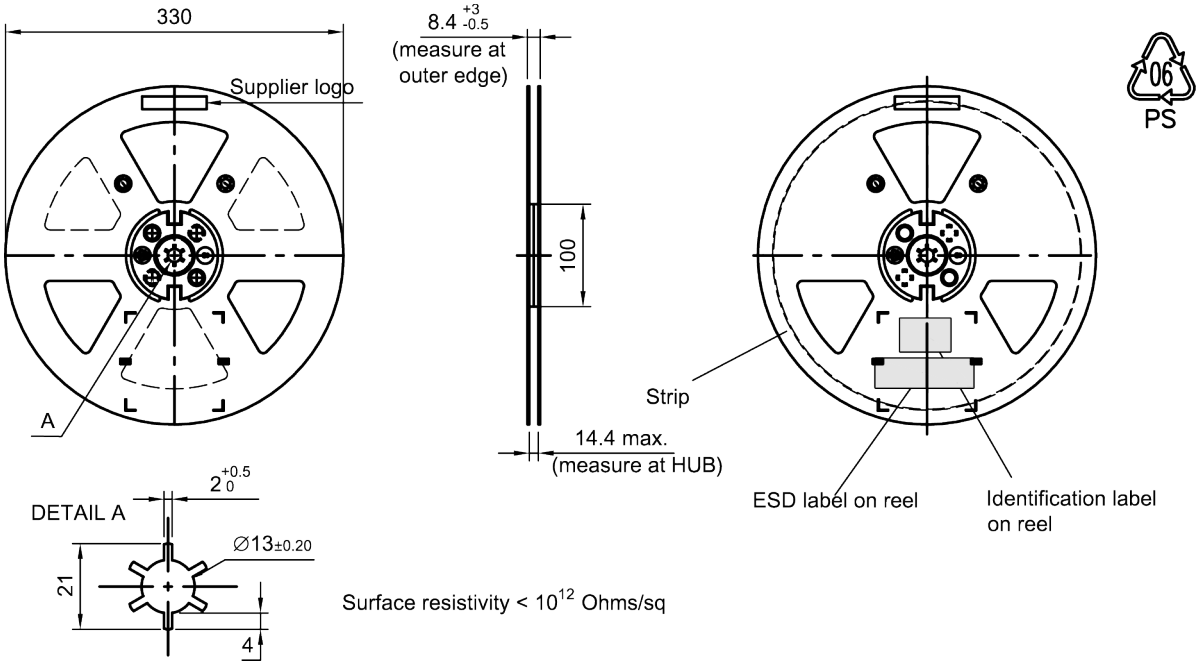

Figure 13: Drawing of reel (first-angle projection) with diameter of 330 mm.

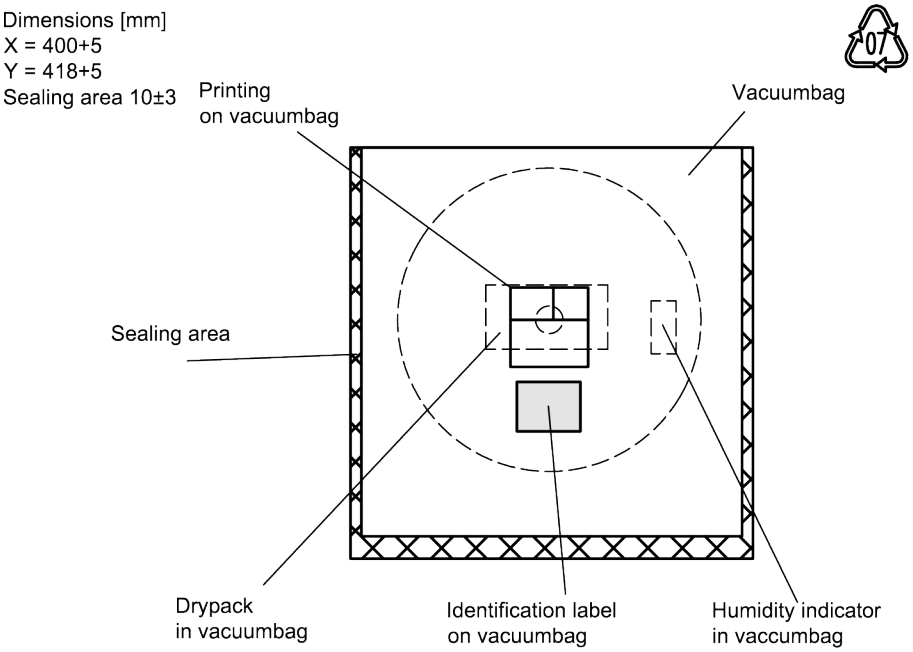

Figure 14: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

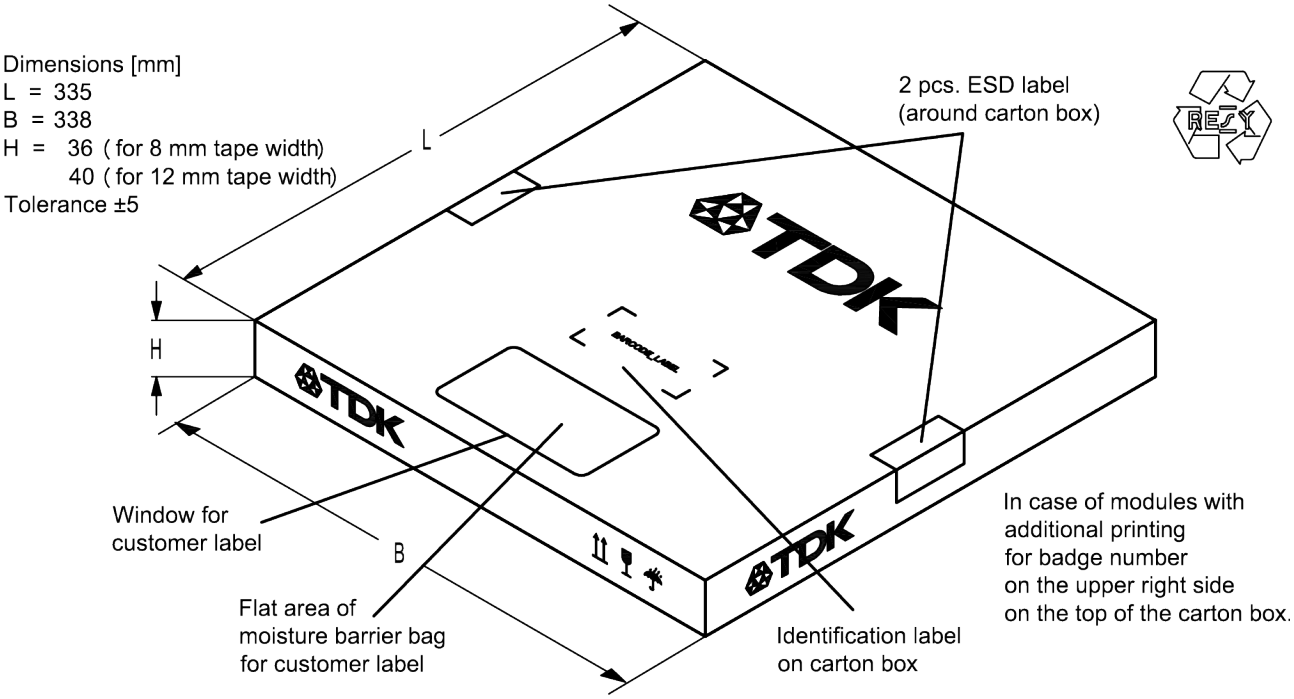

Figure 15: Drawing of folding box for reel with diameter of 330 mm.

13 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 B8808 is 8K8.

- 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.

14 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).

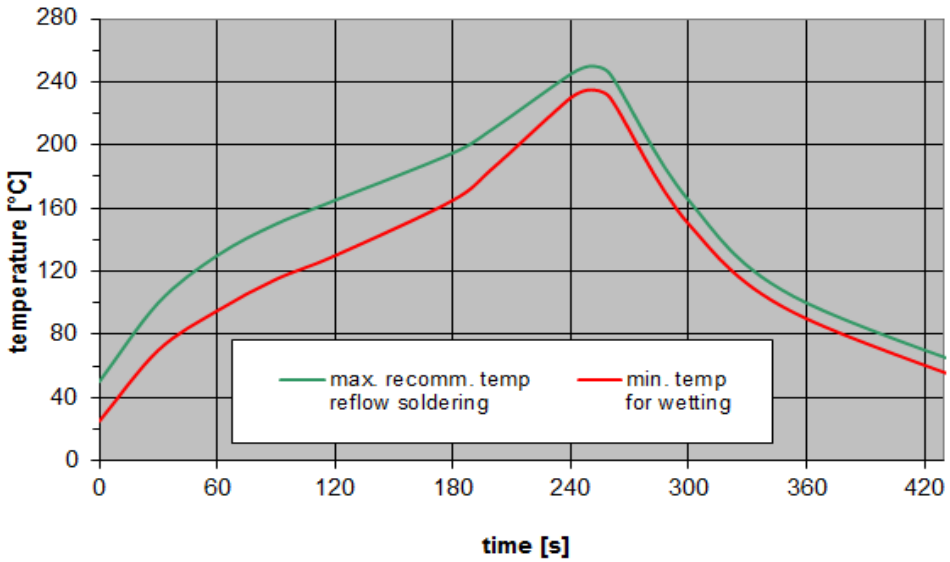

Figure 16: Recommended reflow profile for convection and infrared soldering – lead-free solder.

15 Annotations

15.1 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.

15.2 Power Transfer Function (PTF) of WCDMA signal

Attenuation of WCDMA signal, α_{WCDMA}, is defined by

$$\alpha_{\mathrm{WCDMA}}(f_{\mathrm{carrier}}) = 10\log_{10}\left|\frac{1}{\mathrm{PTF}(f_{\mathrm{carrier}})}\right| \mathrm{dB}$$

and

$$\mathrm{PTF}(f_{\mathrm{carrier}}) = \int_{-\infty}^{+\infty} \left|S_{21}(f)\, H_{\mathrm{RRC}}(f - f_{\mathrm{carrier}})\right|^2 \mathrm{d}f$$

with $f_{carrier}$ according to 3GPP TS 25.101 (e.g., for the WCDMA B8 pass band, $f_{carrier}$ ranges from 882.4 MHz to 912.6 MHz which correspond to the lowest and highest TX channels, respectively). $H_{RRC}(f)$ is the transfer function of the root-raised cosine transmit pulse shaping filter according to 3GPP TS 25.101 using the normalization

$$\int_{-\infty}^{+\infty} \left|H_{\mathrm{RRC}}(f)\right|^2 \mathrm{d}f = 1 \quad .$$

15.3 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.

15.4 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.

15.5 Ordering codes and packing units

Ordering code	Packing unit
B39881B8808P810 B39881B8808P810S 5	15000 pcs 5000 pcs

Table 4: Ordering codes and packing units.

16 Cautions and warnings

16.1 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**.

16.2 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.

16.3 Moldability

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

16.4 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).

Projection method

Unless otherwise specified first-angle projection is applied.

Important notes

The following applies to all products named in this publication:

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.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
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   The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
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