

RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



SAW components

SAW duplexer

LTE band 13

Series/type: B8034
Ordering code: B39781B8034P810

Date: April 20, 2016
Version: 2.0

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SAW components

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SAW components	B8034
SAW duplexer	751 / 782 MHz

Data sheet

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Data sheet

1 Application

- Low-loss SAW duplexer for mobile telephone LTE Band 13 systems, also suitable for CDMA applications
- NS07 rejection, public safety frequency band
- High isolation
- Single-ended duplexer
- Near zero temperature drift

2 Features

- Package size $2.5 \pm 0.1 \text{ mm} \times 2.0 \pm 0.1 \text{ mm}$
- Package height 0.5 mm (max.)
- Approximate weight 9 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

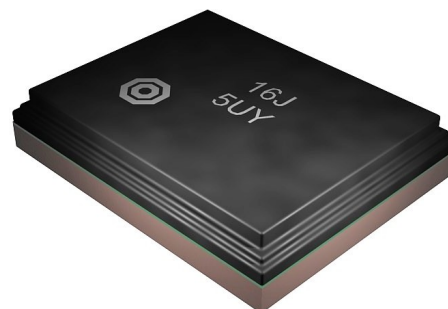
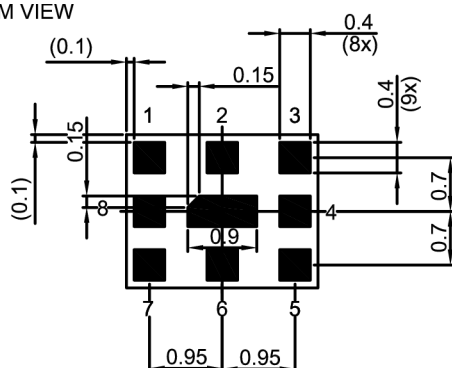
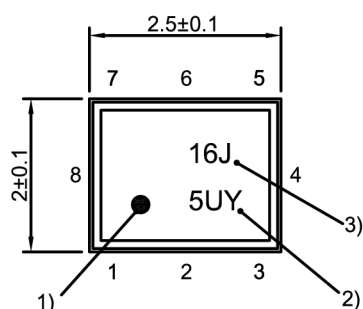
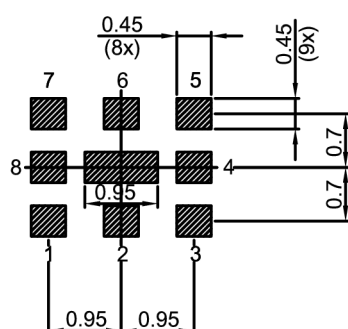


Figure 1: Picture of component with example of product marking.

Data sheet
3 Package
BOTTOM VIEW

 Pad and pitch tolerance ± 0.05
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
4 Pin configuration

- 1 RX
- 3 TX
- 6 ANT
- 2, 4, 5, 7, 8, 9 Ground

Figure 2: Drawing of package with package height A = 0.5 mm (max.). See Sec. Package information (p. 21).

Data sheet

5 Matching circuit

■ $L_{p6} = 13 \text{ nH}$

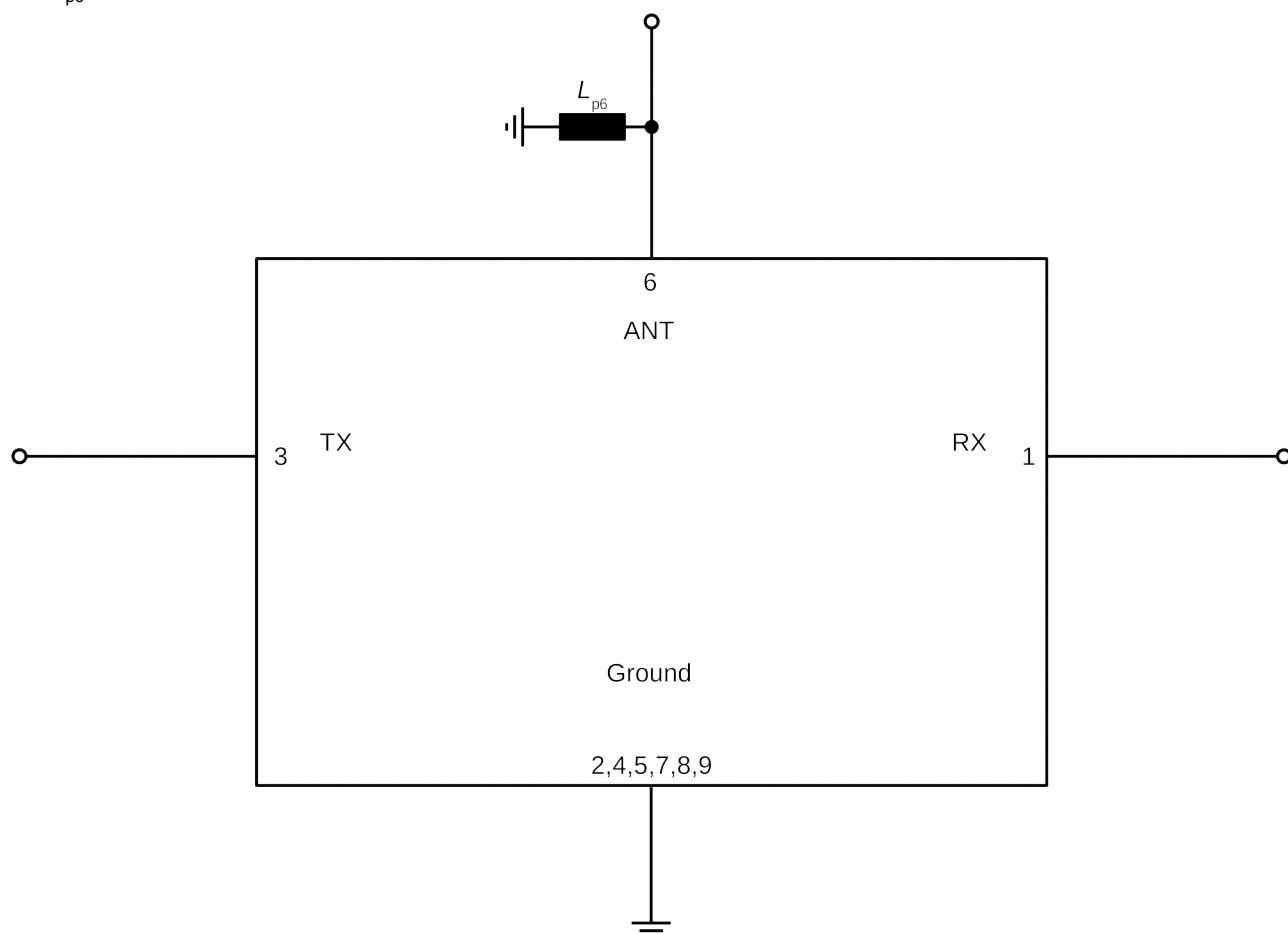


Figure 3: Schematic of matching circuit.

SAW components	B8034
SAW duplexer	751 / 782 MHz

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6 Characteristics

6.1 TX – ANT

Temperature range for specification	T_{SPEC}	= -20 °C ... +90 °C
TX terminating impedance	Z_{TX}	= 50 Ω
ANT terminating impedance	Z_{ANT}	= 50 Ω with par. 13 nH ¹⁾
RX terminating impedance	Z_{RX}	= 50 Ω

Characteristics TX – ANT			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency		f_{C}	—	782	—	MHz
Maximum insertion attenuation		α_{max}	—	2.3 ²⁾	3.5 ²⁾	dB
	777.5... 786.5	MHz	—	2.3 ²⁾	3.5 ²⁾	dB
Amplitude ripple (p-p)		$\Delta\alpha^{3)}$	—	1.2	2.6	dB
	777.5... 786.5	MHz	—	1.2	2.6	dB
Maximum VSWR		VSWR _{max}	—	1.4	2.0	
@ TX port	777.5... 786.5	MHz	—	1.4	2.0	
@ ANT port	777.5... 786.5	MHz	—	1.4	2.0	
Minimum attenuation		α_{min}				
	10... 716	MHz	40	43	—	dB
	716... 728	MHz	40	47	—	dB
	728... 746	MHz	45	50	—	dB
	746... 756	MHz	50	56	—	dB
	758... 768	MHz	40	53	—	dB
NS07	768... 775	MHz	20 ⁴⁾	26 ⁴⁾	—	dB
	793... 805	MHz	20	36	—	dB
	869... 894	MHz	40	46	—	dB
	1226... 1250	MHz	45	55	—	dB
	1554... 1565	MHz	45	55	—	dB
	1565... 1607	MHz	45	54	—	dB
	1710... 2170	MHz	40	49	—	dB
	2331... 2361	MHz	35	45	—	dB
	2400... 2484	MHz	35	44	—	dB
	3108... 3148	MHz	30	40	—	dB
	4900... 5950	MHz	17	23	—	dB

¹⁾ See Sec. Matching circuit (p. 5).

²⁾ Integrated over 1RB.

³⁾ Over any channel with band width of 5 MHz.

⁴⁾ Relative to integrated insertion loss in 777.5 – 786.5MHz over 1RB.

Data sheet

6.2 ANT – RX

Temperature range for specification

$$T_{\text{SPEC}} = -20\text{ °C} \dots +90\text{ °C}$$

TX terminating impedance

$$Z_{\text{TX}} = 50\ \Omega$$

ANT terminating impedance

$$Z_{\text{ANT}} = 50\ \Omega \text{ with par. } 13\text{ nH}^{1)}$$

RX terminating impedance

$$Z_{\text{RX}} = 50\ \Omega$$

Characteristics ANT – RX			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Center frequency		f_{C}	—	751	—	MHz
Maximum insertion attenuation		α_{max}	—	1.1	1.7	dB
	746... 756	MHz				
Amplitude ripple (p-p)		$\Delta\alpha^{2)}$	—	0.2	1.0	dB
	746... 756	MHz				
Maximum VSWR		VSWR_{max}	—	1.5	2.0	
@ ANT port	746... 756	MHz				
@ RX port	746... 756	MHz		1.5	2.0	
Minimum attenuation		α_{min}				
	10... 686	MHz	40	43	—	dB
	686... 728	MHz	28	33	—	dB
	771... 772	MHz	27	32	—	dB
	777... 787	MHz	50	58	—	dB
	1523... 1543	MHz	35	42	—	dB
	1710... 1755	MHz	35	41	—	dB
	1850... 1910	MHz	35	41	—	dB
	2238... 2268	MHz	35	41	—	dB
	2400... 2500	MHz	34	40	—	dB
	4900... 5950	MHz	12	17	—	dB

¹⁾ See Sec. Matching circuit (p. 5).

²⁾ Over any channel with band width of 5 MHz.

Data sheet

6.3 TX – RX

Temperature range for specification

$$T_{\text{SPEC}} = -20\text{ °C} \dots +90\text{ °C}$$

TX terminating impedance

$$Z_{\text{TX}} = 50\ \Omega$$

ANT terminating impedance

$$Z_{\text{ANT}} = 50\ \Omega \text{ with par. } 13\text{ nH}^{1)}$$

RX terminating impedance

$$Z_{\text{RX}} = 50\ \Omega$$

Characteristics TX – RX
Minimum isolation
 α_{min}

		min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
746... 752	MHz	54	57	—	dB
752... 756	MHz	57	62	—	dB
777... 787	MHz	55	60	—	dB
1552... 1574	MHz	30	60	—	dB
2328... 2361	MHz	30	56	—	dB
3104... 3148	MHz	30	52	—	dB

¹⁾ See Sec. Matching circuit (p. 5).

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7 Maximum ratings

Storage temperature	$T_{STG} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$V_{DC} = 0\text{ V (max.)}^{1)}$	
ESD voltage		
	$V_{ESD}^{2)} = 100\text{ V (max.)}$	Machine model.
	$V_{ESD}^{3)} = 300\text{ V (max.)}$	Human body model.
	$V_{ESD}^{4)} = 600\text{ V (max.)}$	Charged device model.
Input power	P_{IN}	
@ TX port: 777.5 ... 786.5 MHz	29 dBm	Continuous wave for 5000 h @ 50 °C.
@ TX port: other frequency range(s)	10 dBm	Continuous wave for 5000 h @ 50 °C.

¹⁾ DC resistance at RX output might be less than 100Mohm at elevated temperatures. Hence, we recommend usage of blocking capacitors.

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

³⁾ According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.

⁴⁾ According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

Data sheet

8 Transmission coefficients

8.1 TX – ANT

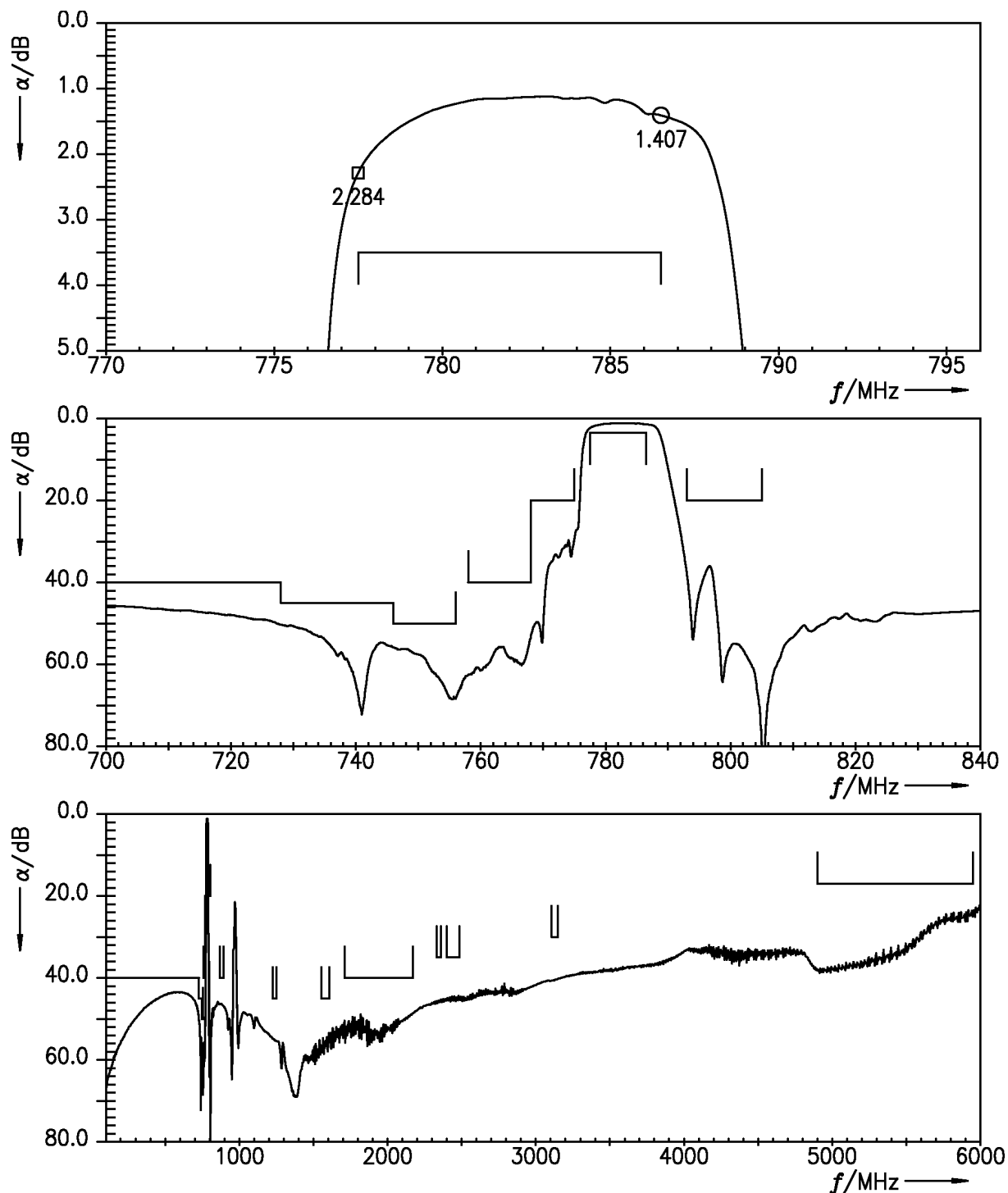


Figure 4: Attenuation TX – ANT.

Data sheet

8.2 ANT – RX

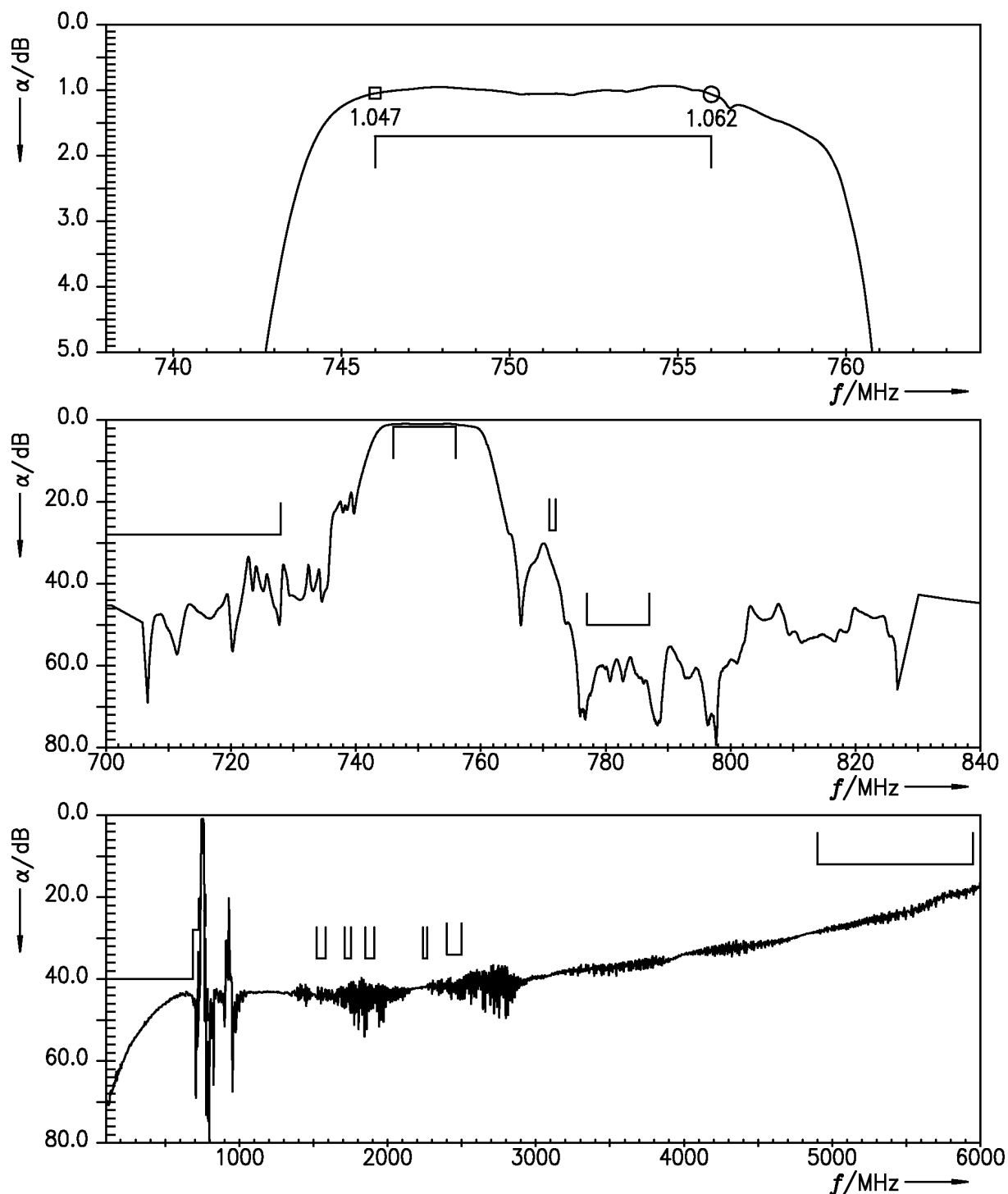


Figure 5: Attenuation ANT – RX.

Data sheet

8.3 TX – RX

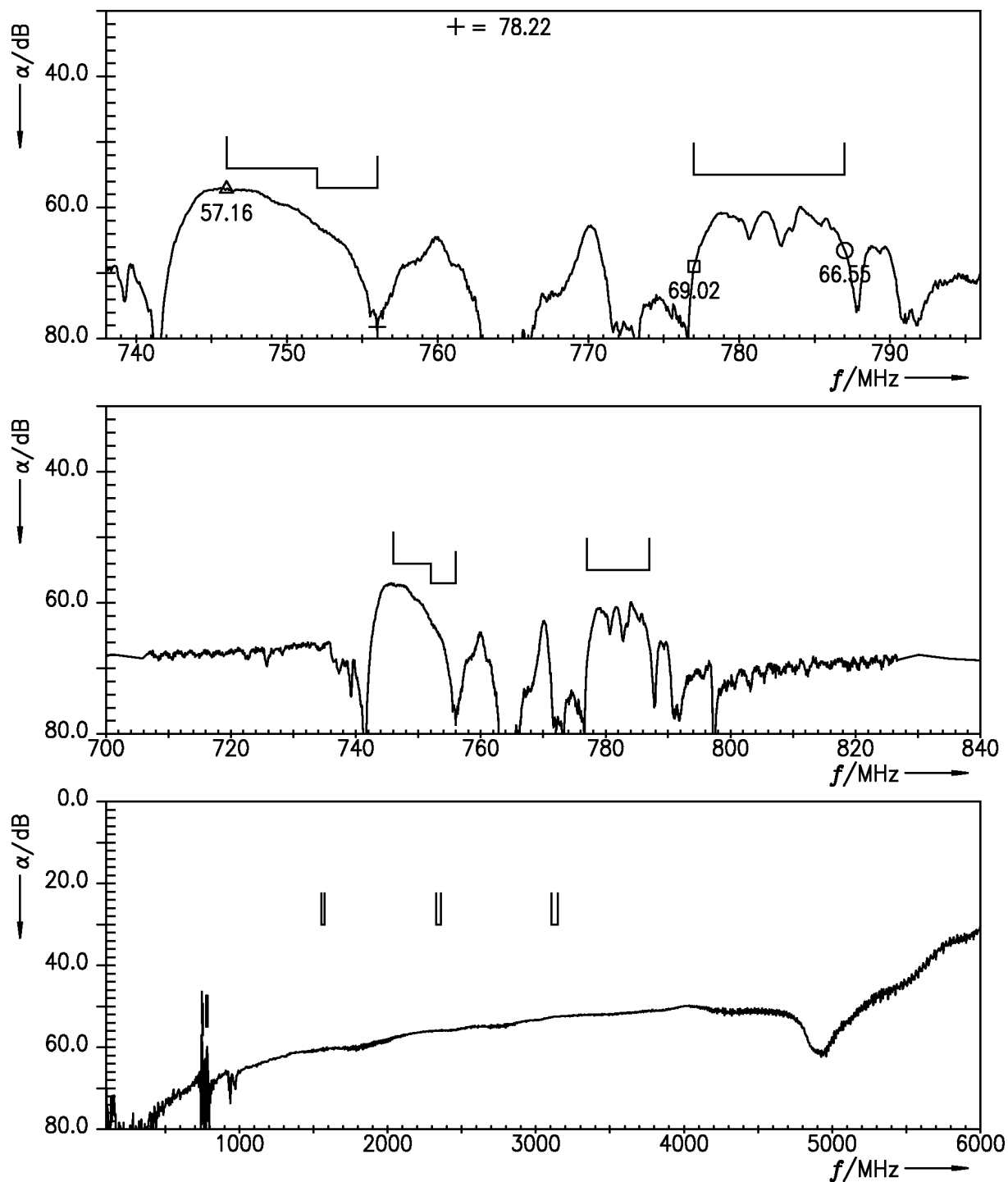


Figure 6: Isolation TX – RX.

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9 Reflection coefficients

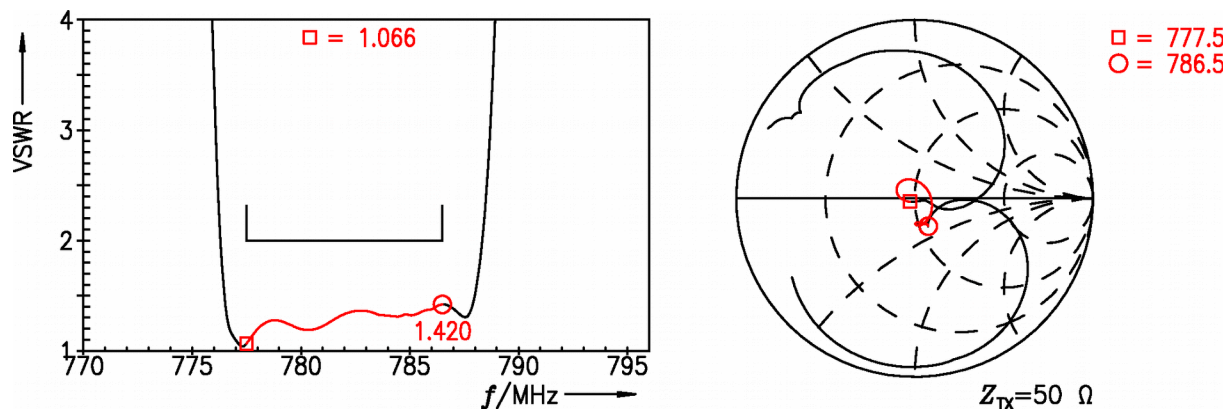


Figure 7: Reflection coefficient at TX port.

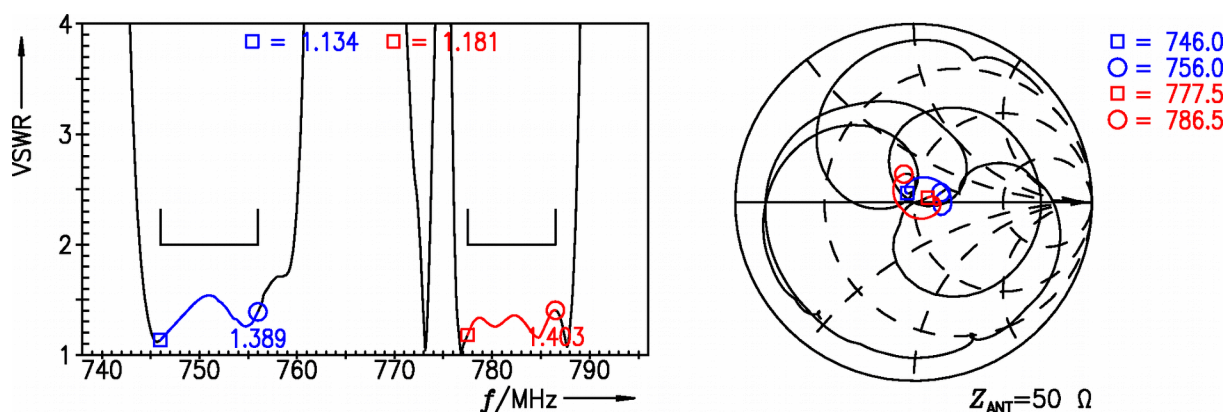


Figure 8: Reflection coefficient at ANT port (TX and RX frequencies).

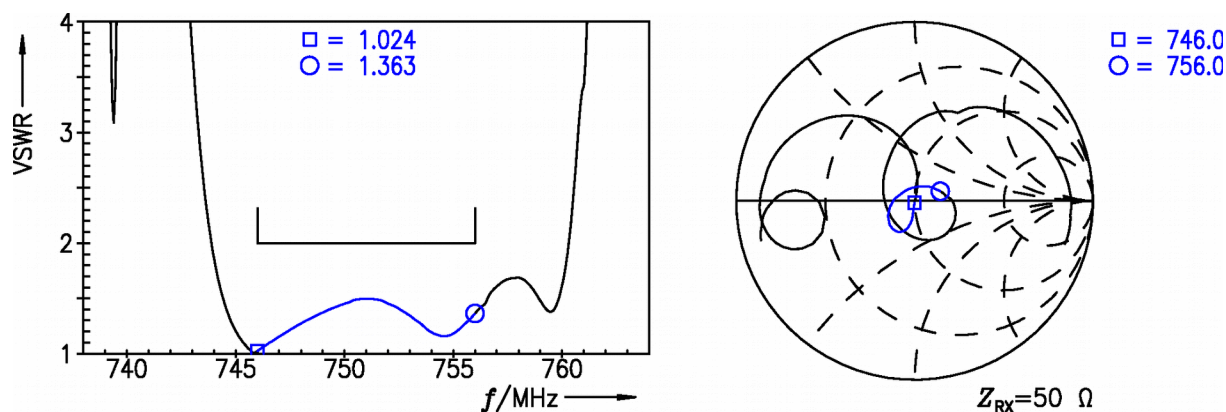


Figure 9: Reflection coefficient at RX port.

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10 Packing material

10.1 Tape

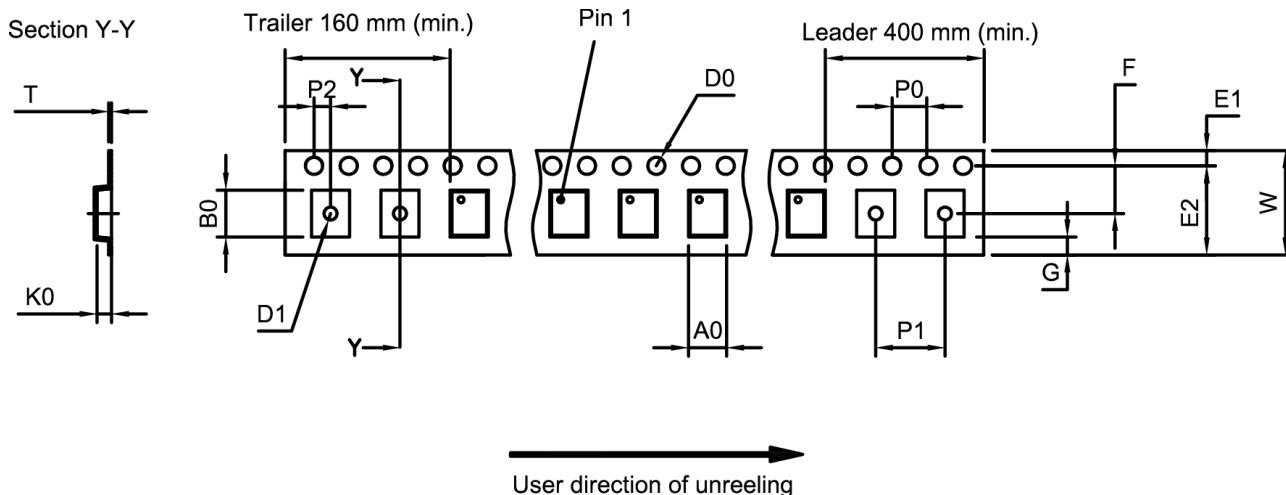


Figure 10: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	2.25 ± 0.05 mm	E_2	6.25 mm (min.)	P_1	4.0 ± 0.1 mm
B_0	2.75 ± 0.05 mm	F	3.5 ± 0.05 mm	P_2	2.0 ± 0.05 mm
D_0	$1.5 + 0.1 / - 0$ mm	G	0.75 mm (min.)	T	0.25 ± 0.03 mm
D_1	1.0 mm (min.)	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

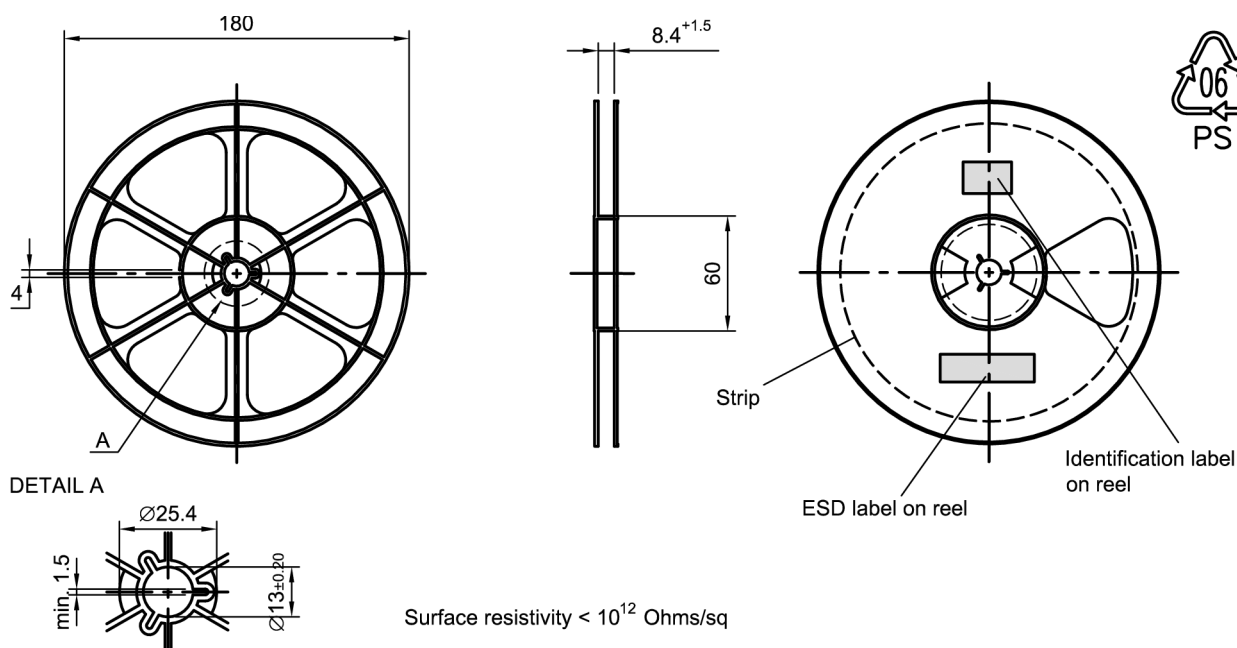


Figure 11: Drawing of reel (first-angle projection) with diameter of 180 mm.

Data sheet

Dimensions [mm]

X = 220±5

Y = 235±5

Sealing area 10±3

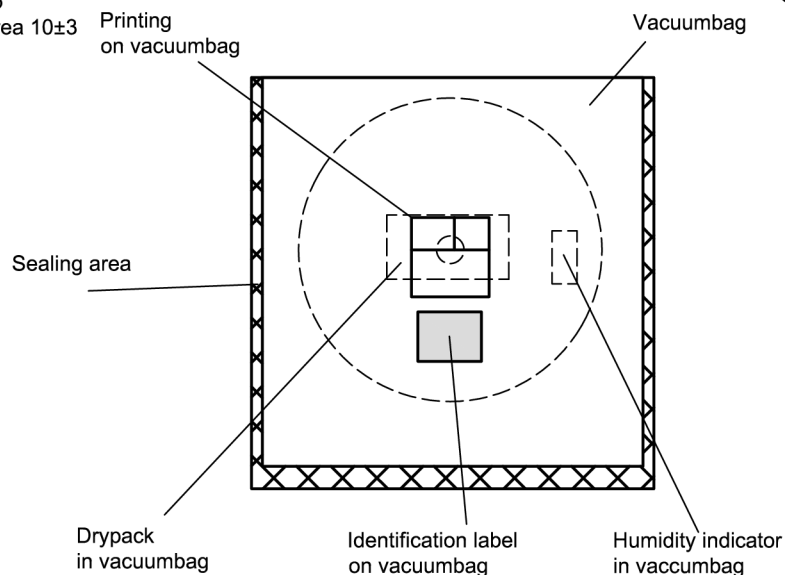


Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

Dimensions [mm]

L = 188

B = 188

H = 30

Tolerance ±5

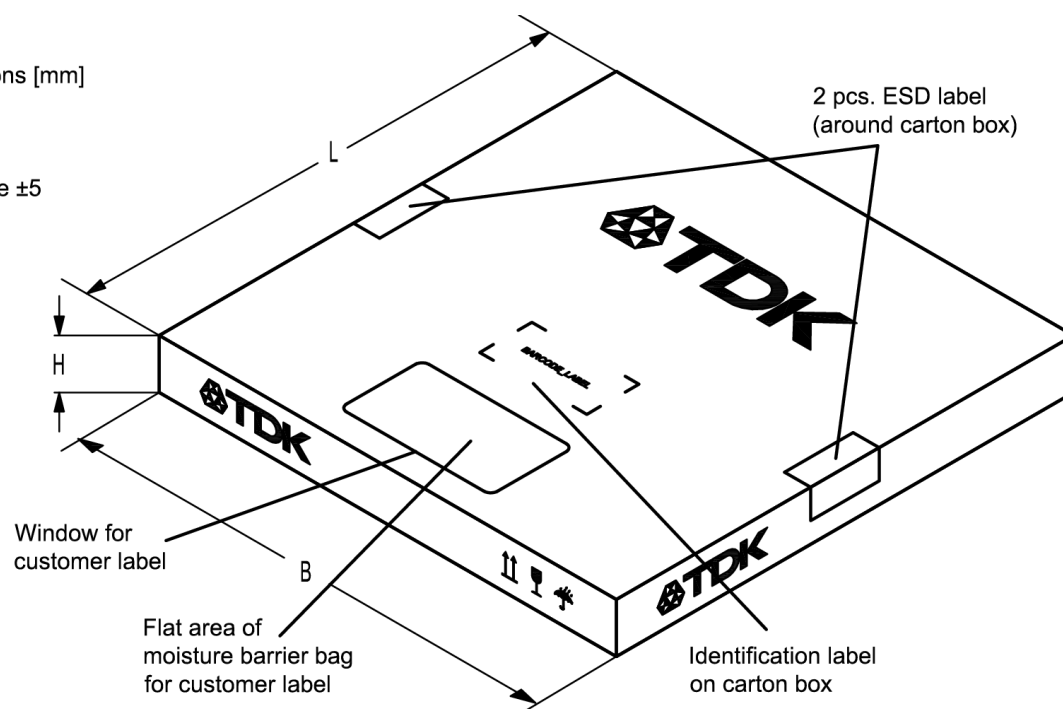


Figure 13: Drawing of folding box for reel with diameter of 180 mm.

Data sheet

10.3 Reel with diameter of 330 mm

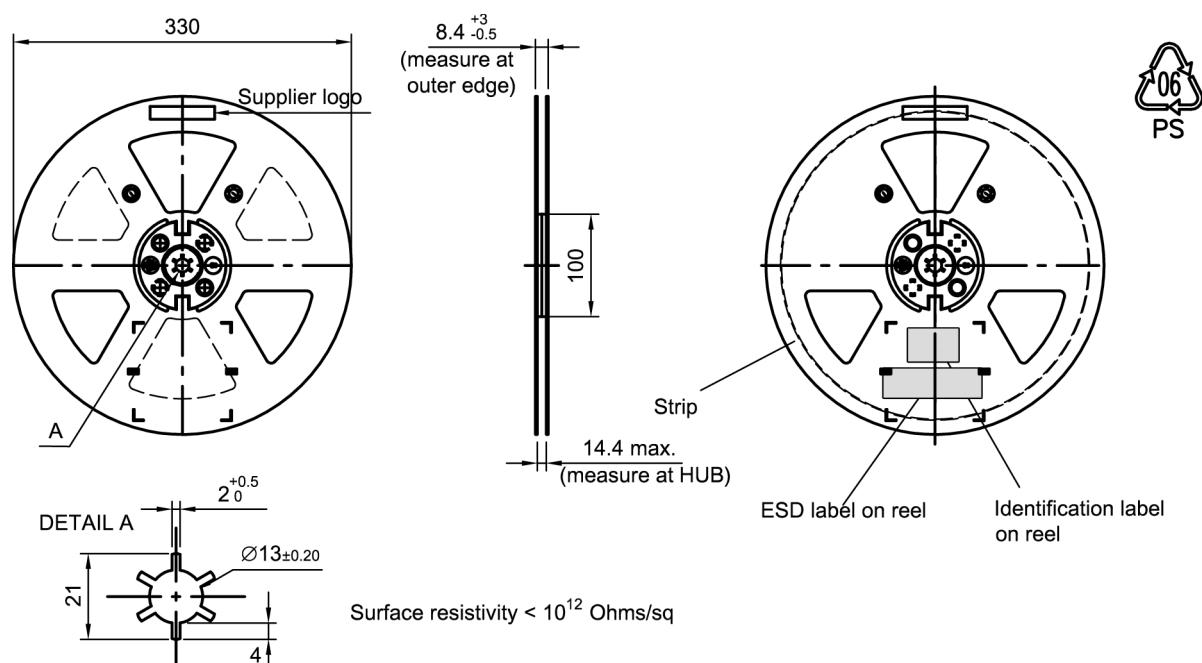


Figure 14: Drawing of reel (first-angle projection) with diameter of 330 mm.

Dimensions [mm]

X = 400+5

Y = 418+5

Sealing area 10±3

Printing on vacuumbag

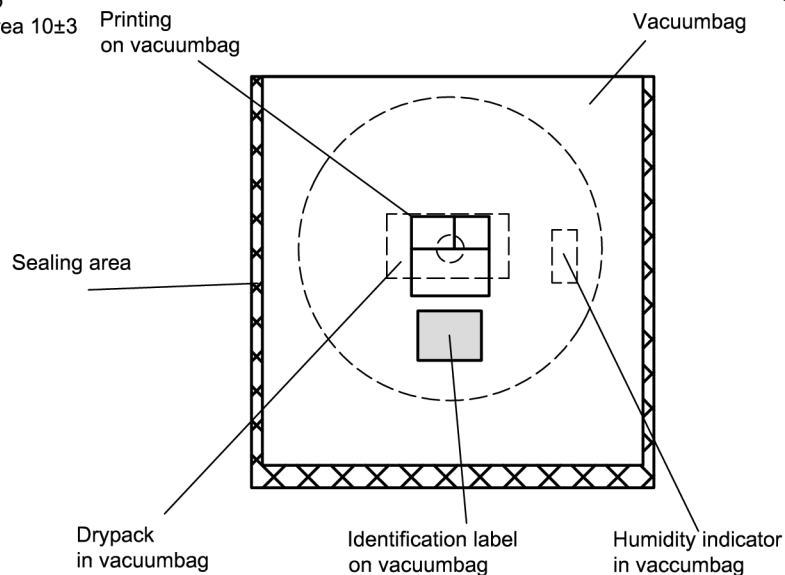


Figure 15: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

Data sheet

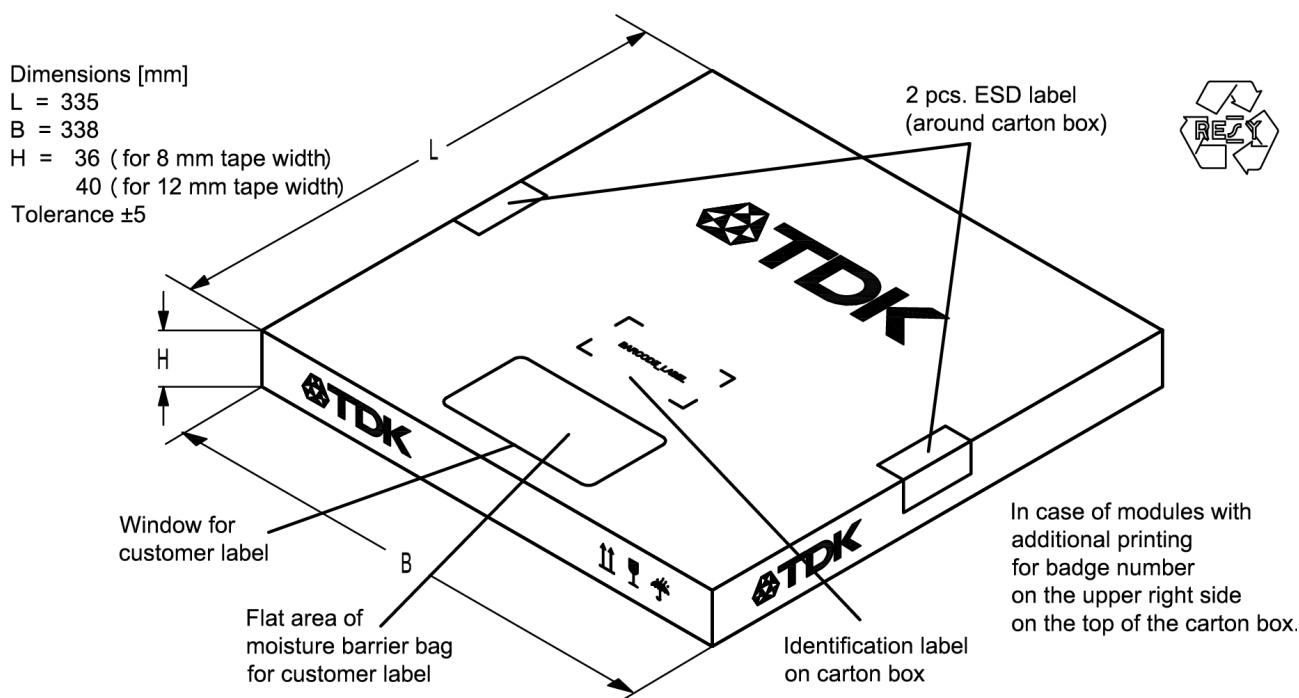


Figure 16: Drawing of folding box for reel with diameter of 330 mm.

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 B8034 is 7V2.

■ 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

Data sheet

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.

Data sheet

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).

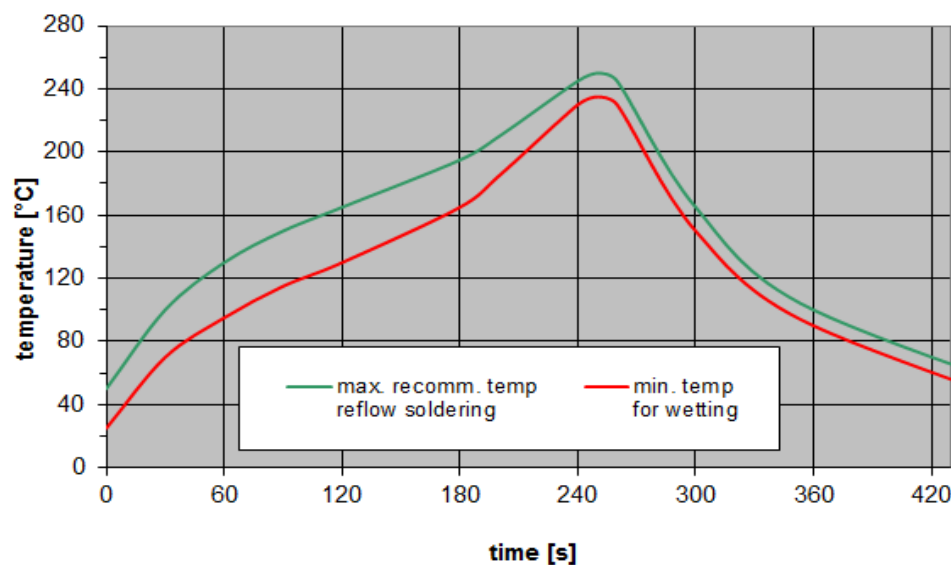


Figure 17: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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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
B39781B8034P810	15.000 pcs
B39781B8034P810S 5	5.000 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).

Dimensions do not include burrs.

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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