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RF360
Europe GmbH

Data sheet

SAW duplexer
LTE band 11

Series/type:	B8632
Ordering code:	B39142B8632P810

Date:	March 21, 2018
Version:	2.3

DCN: 80-PA243-315 Rev. A

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1   Application

- Multimode SAW duplexer for mobile telephone Cellular/ LTE Band 11 systems
- Low insertion attenuation
- Low amplitude ripple

2   Features

- Package size $1.8_{\pm0.1}$ mm × $1.4_{\pm0.1}$ mm
- Package height 0.475 mm (max.)
- Approximate weight 4 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

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3   Package

BOTTOM VIEW

0.35
(8x)

(0.075)

0.25
(7x)

0.7

0.5

0.5

1

2

3

8

-4

7

6

5

0.65   0.65
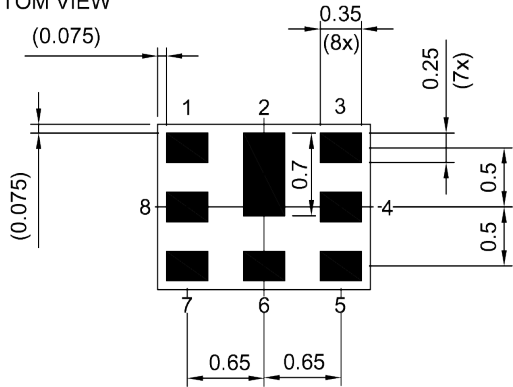
Pad and pitch tolerance   ±0.05

SIDE VIEW

A

0.03

TOP VIEW

1.8±0.1

7   6   5

1.4±0.1

8

16J

4

5UY

3)

1   2   3

2)

1)
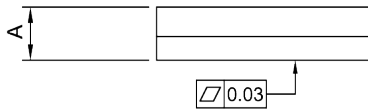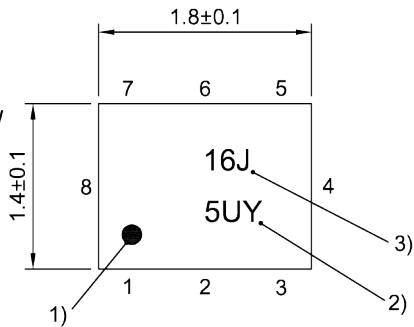
1) Marking for pad number 1
2) Example of encoded lot number
3) Example of encoded filter type number

Land pattern
THRU VIEW

0.4
(8x)

0.3
(7x)

7   6   5

0.5

8

0.75

-4

0.5

1   2   3

0.65   0.65
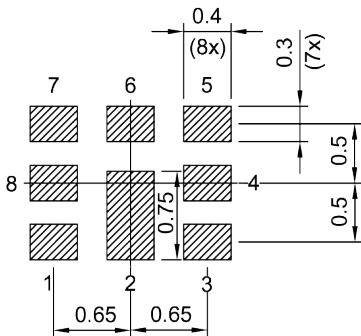
Landing pad tolerance   -0.02

Figure 1: Drawing of package with package height A = 0.475 mm (max.). See Sec. Package information (p. 23).

4   Pin configuration

■ 1   RX

■ 3   TX

■ 6   ANT

■ 2, 4, 5, 7, 8   Ground

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5 Matching circuit

- L_{p6} = 6.2 nH
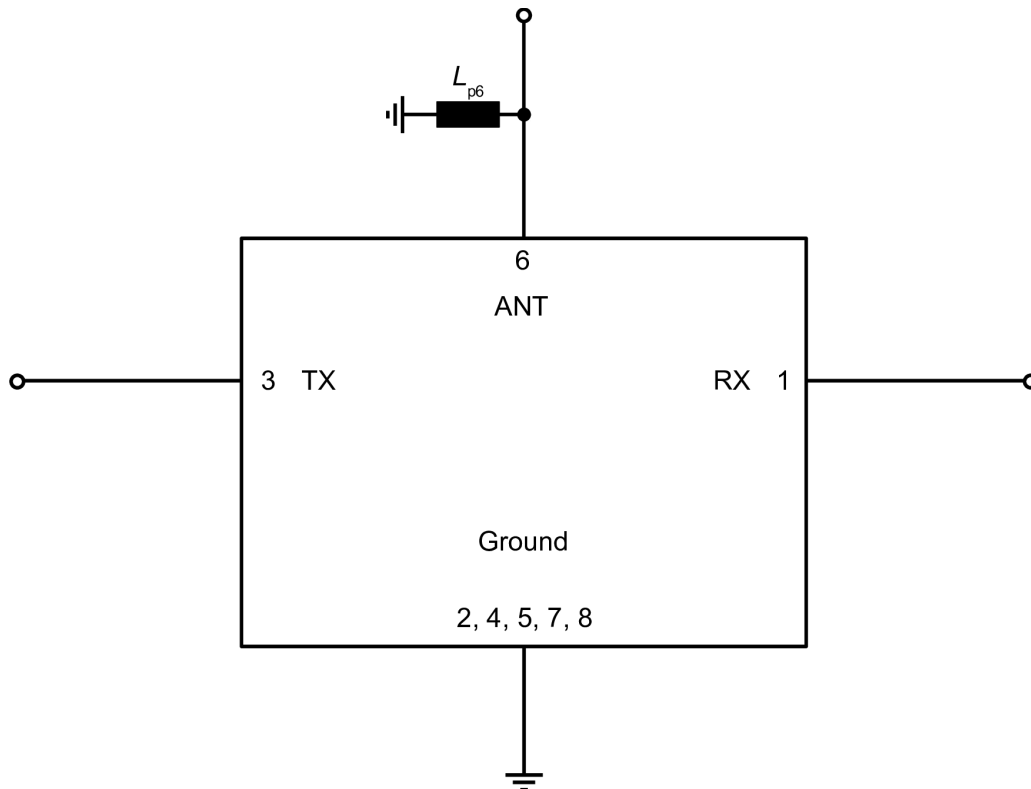
Figure 2: Schematic of matching circuit.

External shunt inductor for ESD protection is recommended at any ports towards antenna.

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6 Characteristics

6.1 TX – ANT

Temperature range for specification	T_{SPEC} = −30 °C ... +90 °C
TX terminating impedance	Z_{TX} = 50 Ω
ANT terminating impedance	Z_{ANT} = 50 Ω // 6.2 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	—	1437.9	—	MHz
Maximum insertion attenuation		$α_{max}$				
	1427.9... 1447.9 MHz		—	1.4	1.9	dB
Amplitude ripple (p-p)		$Δα$				
	1427.9... 1447.9 MHz		—	0.3	1.0	dB
Maximum VSWR		$VSWR_{max}$				
@ TX port	1427.9... 1447.9 MHz		—	1.5	2.0	
@ ANT port	1427.9... 1447.9 MHz		—	1.4	2.0	
Minimum attenuation		$α_{min}$				
	10... 1390 MHz		29	32	—	dB
	1390... 1409 MHz		5	9	—	dB
	1475.9... 1495.9 MHz		45	54	—	dB
	1559... 1563 MHz		40	47	—	dB
	1565.42... 1573.374 MHz		35	47	—	dB
	1573.374... 1577.466 MHz		40	47	—	dB
	1577.466... 1585.42 MHz		35	47	—	dB
	1597.5515... 1605.887 MHz		40	48	—	dB
	1607... 1680 MHz		25	48	—	dB
	1844.9... 1879.9 MHz		30	43	—	dB
	1884.5... 1919.6 MHz		15	42	—	dB
	2010... 2025 MHz		30	42	—	dB
	2110... 2170 MHz		30	39	—	dB
	2400... 2483.5 MHz		29	34	—	dB
	2855.8... 2905.8 MHz		25	29	—	dB
	4283.7... 4358.7 MHz		18	23	—	dB
	4900... 5850 MHz		15	22	—	dB

[1] See Sec. Matching circuit (p. 6).

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6.2 ANT – RX

Temperature range for specification	T_{SPEC}	= −30 °C ... +90 °C
TX terminating impedance	Z_{TX}	= 50 Ω
ANT terminating impedance	Z_{ANT}	= 50 Ω // 6.2 nH[1]
RX terminating impedance	Z_{RX}	= 50 Ω

Characteristics ANT – RX				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	1485.9	—	MHz
Maximum insertion attenuation			α_{max}				
	1475.9... 1495.9	MHz		—	1.7	2.3[2]	dB
	1475.9... 1495.9	MHz		—	1.7	2.4	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	1475.9... 1495.9	MHz		—	0.7	1.1	dB
Maximum VSWR			$VSWR_{max}$				
@ ANT port	1475.9... 1495.9	MHz		—	1.5	2.0	
@ RX port	1475.9... 1495.9	MHz		—	1.5	2.0	
Minimum attenuation			α_{min}				
	10... 1427.9	MHz		40	48	—	dB
	48	MHz		60	97	—	dB
	814... 849	MHz		40	49	—	dB
	1427.9... 1447.9	MHz		45	51	—	dB
	1452... 1460	MHz		5	11	—	dB
	1581... 6000	MHz		25	30	—	dB
	2400... 2500	MHz		40	46	—	dB
	4427.7... 4487.7	MHz		34	42	—	dB
	4900... 5950	MHz		25	29	—	dB

[1]   See Sec. Matching circuit (p. 6).
[2]   Valid for temperature T = −30 °C...+85 °C.

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6.3 TX – RX

Temperature range for specification	T_{SPEC}	= −30 °C ... +90 °C
TX terminating impedance	Z_{TX}	= 50 Ω
ANT terminating impedance	Z_{ANT}	= 50 Ω // 6.2 nH[1]
RX terminating impedance	Z_{RX}	= 50 Ω

Characteristics TX – RX		min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Minimum isolation	α_{min}				
1427.9 ... 1447.9 MHz		55	60	—	dB
1475.9 ... 1495.9 MHz		50	57	—	dB
1574 ... 1577 MHz		30	61	—	dB
2855.8 ... 2905.8 MHz		30	50	—	dB
4283.7 ... 4358.7 MHz		25	45	—	dB

[1] See Sec. Matching circuit (p. 6).

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6.4 Linearity

Temperature range for specification T_{SPEC} = −30 °C ... +90 °C
TX terminating impedance Z_{TX} = 50 Ω
ANT terminating impedance Z_{ANT} = 50 Ω // 6.2 nH[1]
RX terminating impedance Z_{RX} = 50 Ω

Characteristics			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
IMD product levels						
IMD2[2]						
Blocker 1	48	MHz	—	−135	−109	dBm
Blocker 3	2923.8	MHz	—	−109	−95	dBm
IMD3[2]						
Blocker 2	1389.9	MHz	—	−99	−86	dBm
Blocker 4	4361.7	MHz	—	−111	−91	dBm

[1] See Sec. Matching circuit (p. 6).
[2] IMD product level limits for power levels P_{TX} = 21.5 dBm (antenna port output power) and $P_{blocker}$ = -15 dBm (antenna port input power).

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7   Maximum ratings

Storage temperature	T_{STG} [1] = −40 °C ... +85 °C	
DC voltage	$|V_{DC}|$ = 5.0 V (max.)[2]	
ESD voltage		
	V_{ESD} [3] = 50 V (max.)	Machine model.
	V_{ESD} [4] = 150 V (max.)	Human body model.
	V_{ESD} [5] = 600 V (max.)	Charged device model.
Input power	P_{IN}	
@ TX port: 1427.9 ... 1447.9 MHz	29 dBm	Continuous wave for 5000 h @ 50 °C.
@ TX port: other frequency ranges	10 dBm	Continuous wave for 5000 h @ 50 °C.

[1]   Not valid for packaging material. Storage temperature for packaging material is −25 °C to +40 °C.
[2]   168h Damp Heat Steady State acc. 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.

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8 Transmission coefficients

8.1 TX – ANT
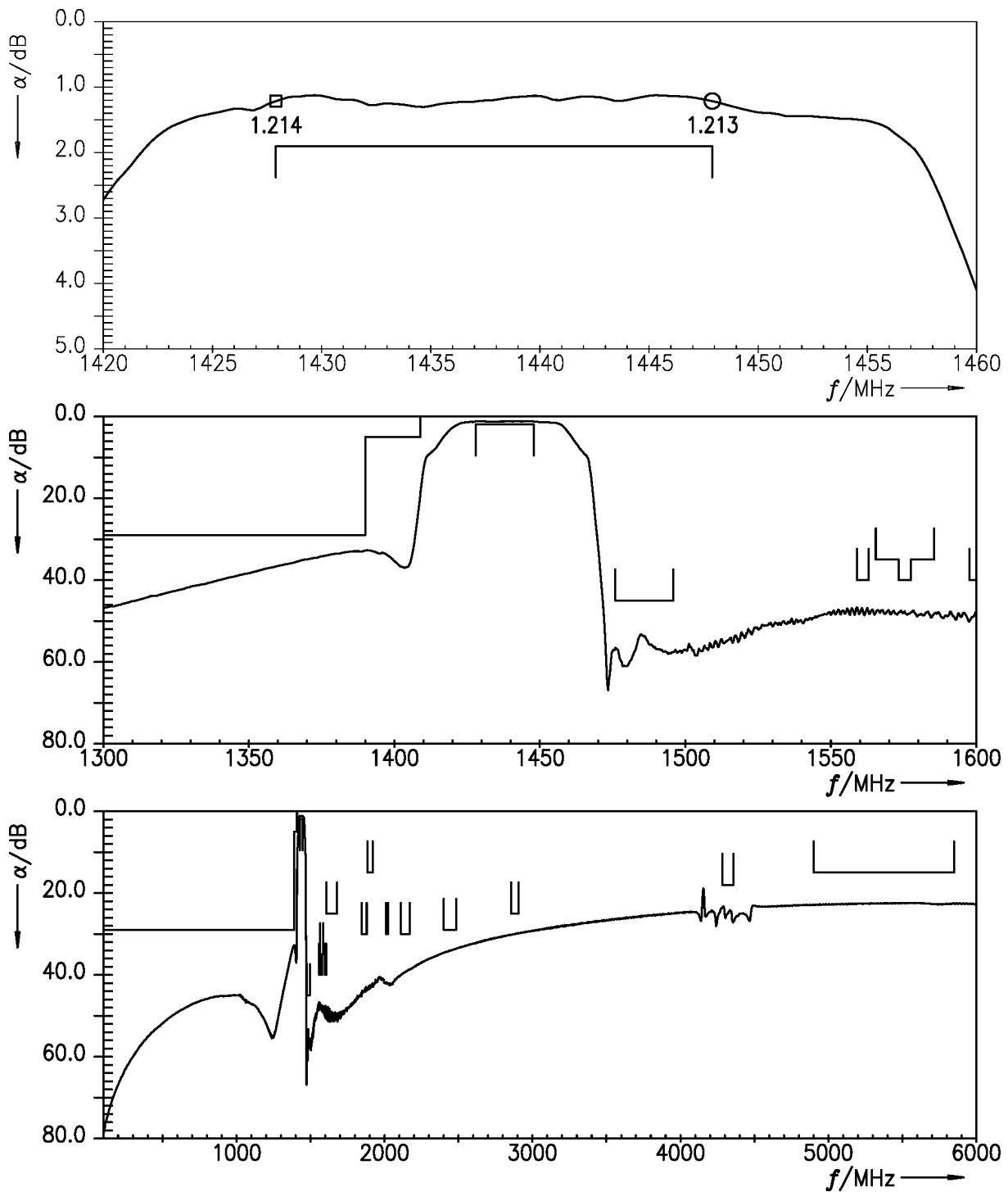
Figure 3: Attenuation TX – ANT.

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8.2 ANT – RX
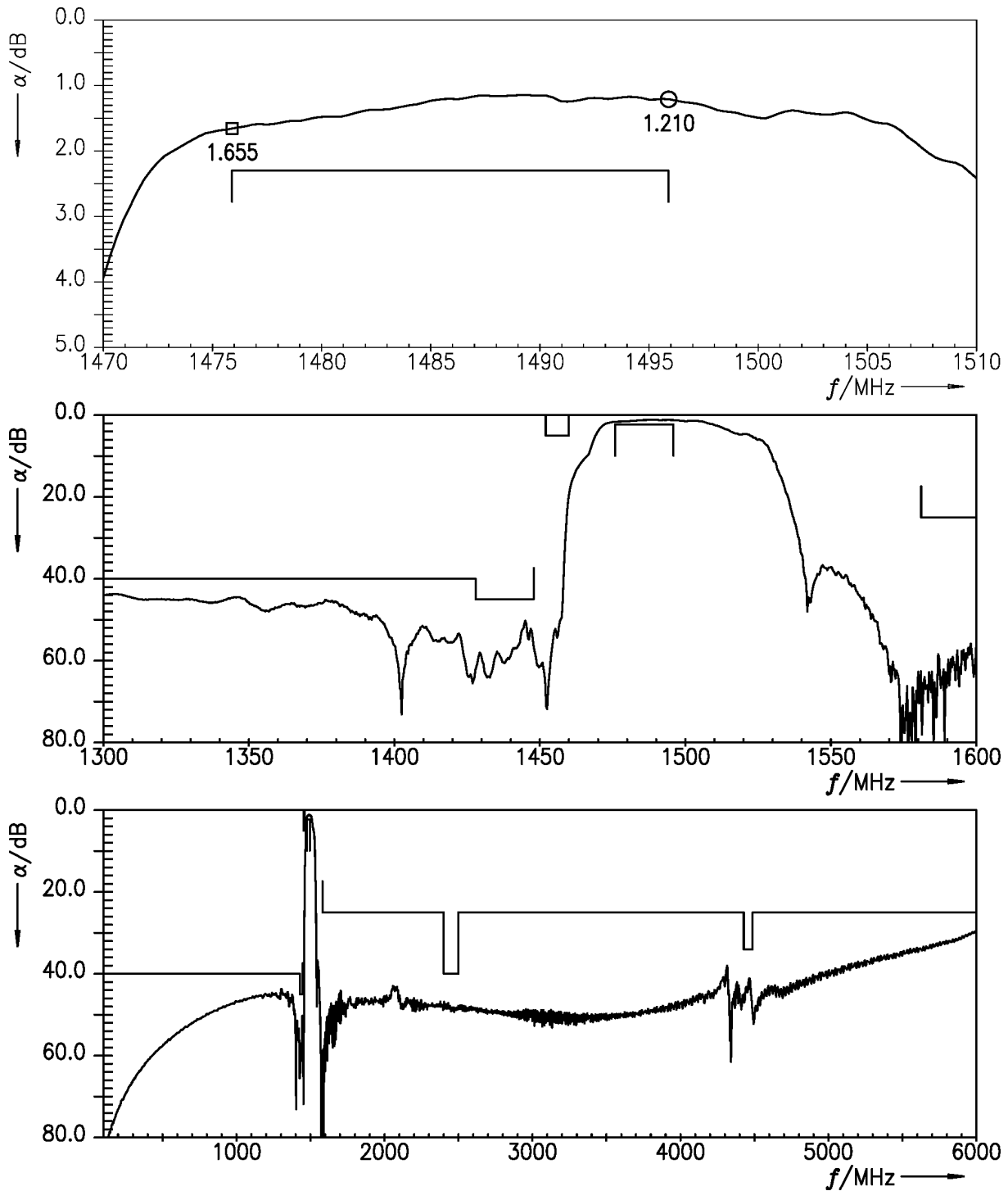
Figure 4: Attenuation ANT – RX.

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8.3 TX – RX

Figure 5: Isolation TX – RX.

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9   Reflection coefficients

Figure 6: Reflection coefficient at TX port.
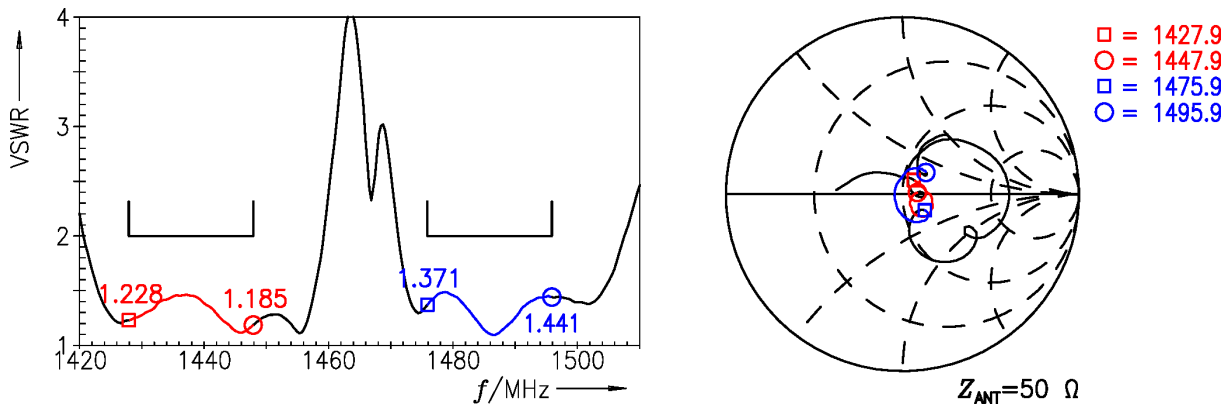
Figure 7: Reflection coefficient at ANT port.
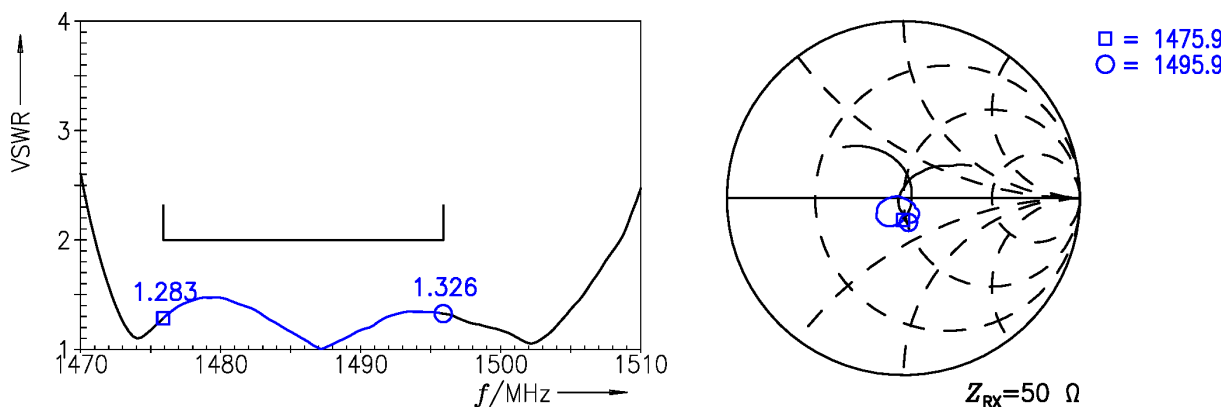
Figure 8: Reflection coefficient at RX port.

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10   Packing material

10.1   Tape
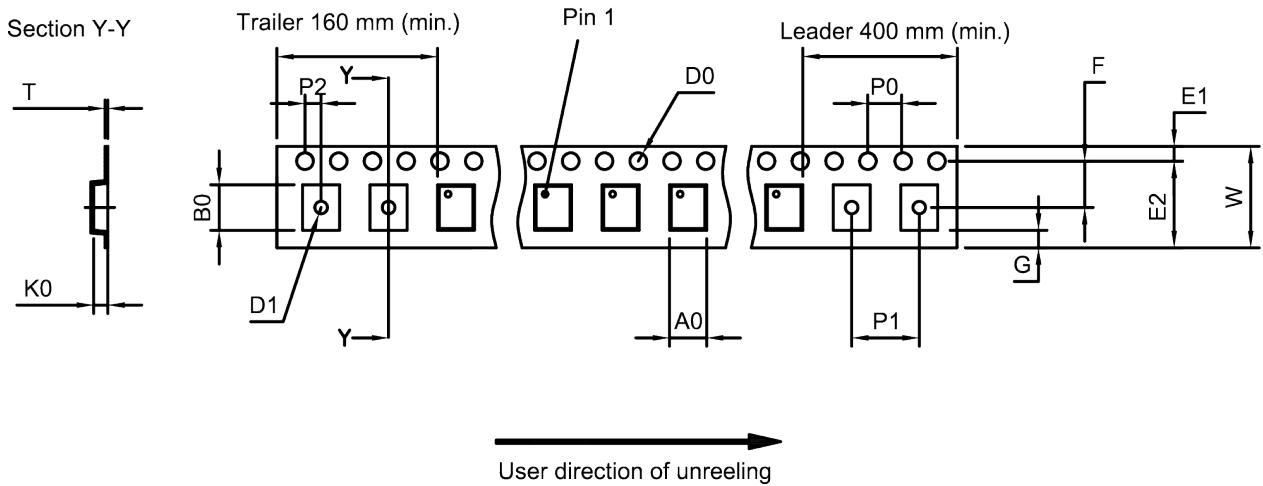
Figure 9: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.
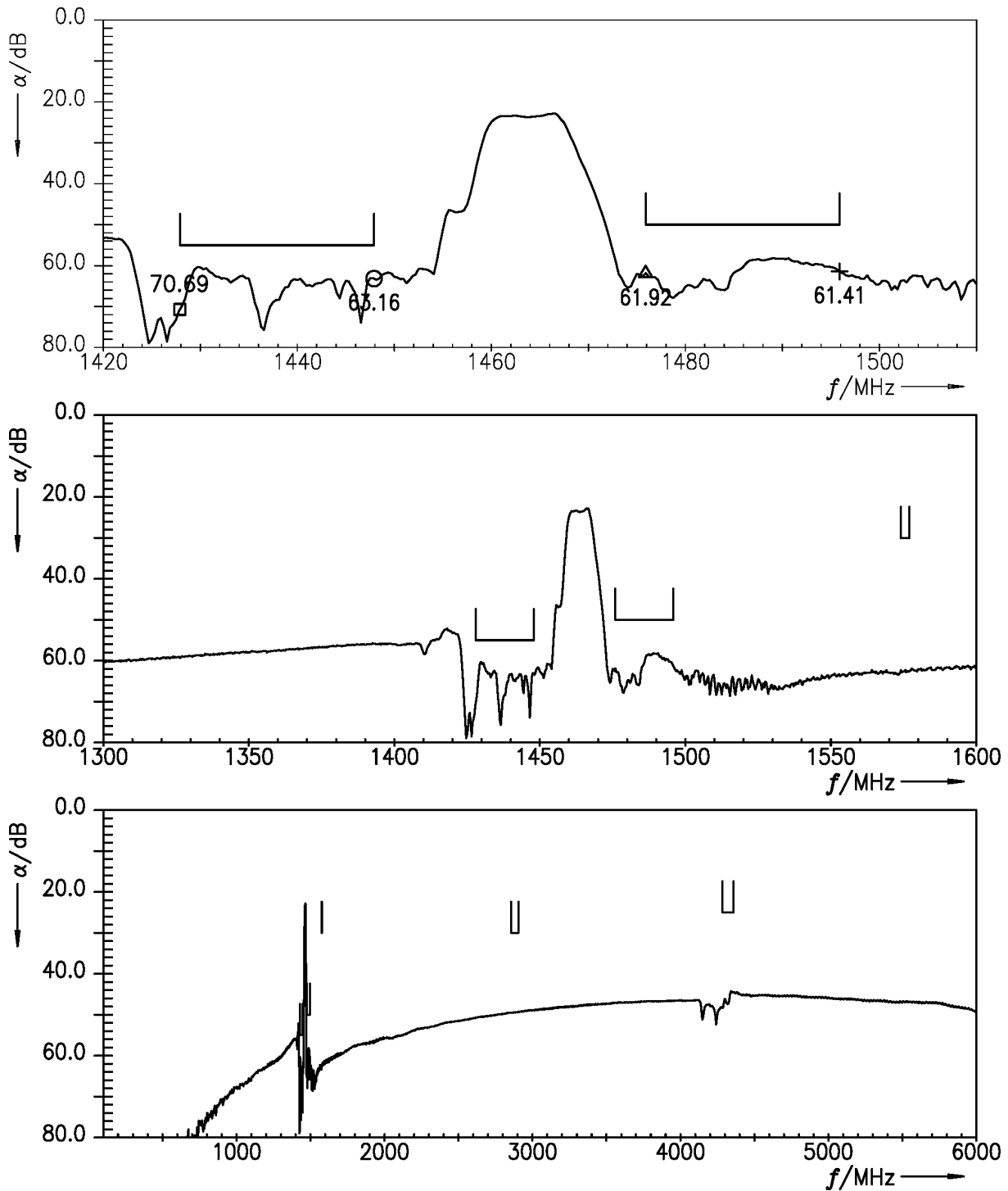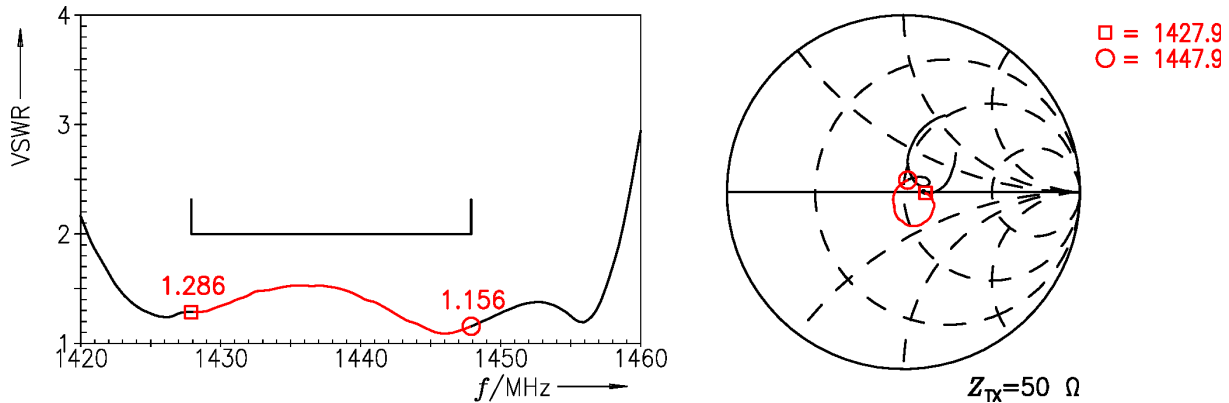
A_0	1.6±0.05 mm	E_2	6.25 mm (min.)	P_1	4.0±0.1 mm
B_0	2.0±0.05 mm	F	3.5±0.05 mm	P_2	2.0±0.05 mm
D_0	1.5+0.1/–0 mm	G	0.75 mm (min.)	T	0.25±0.03 mm
D_1	0.8+0.1/–0 mm	K_0	0.64±0.05 mm	W	8.0+0.3/–0.1 mm
E_1	1.75±0.1 mm	P_0	4.0±0.1 mm		

Table 1: Tape dimensions.

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10.2 Reel with diameter of 180 mm

DETAIL A

$\varnothing 25.4$

min. 1.5

13 ± 0.20

Surface resistivity $< 10^{12}$ Ohms/sq

Strip

ESD label on reel

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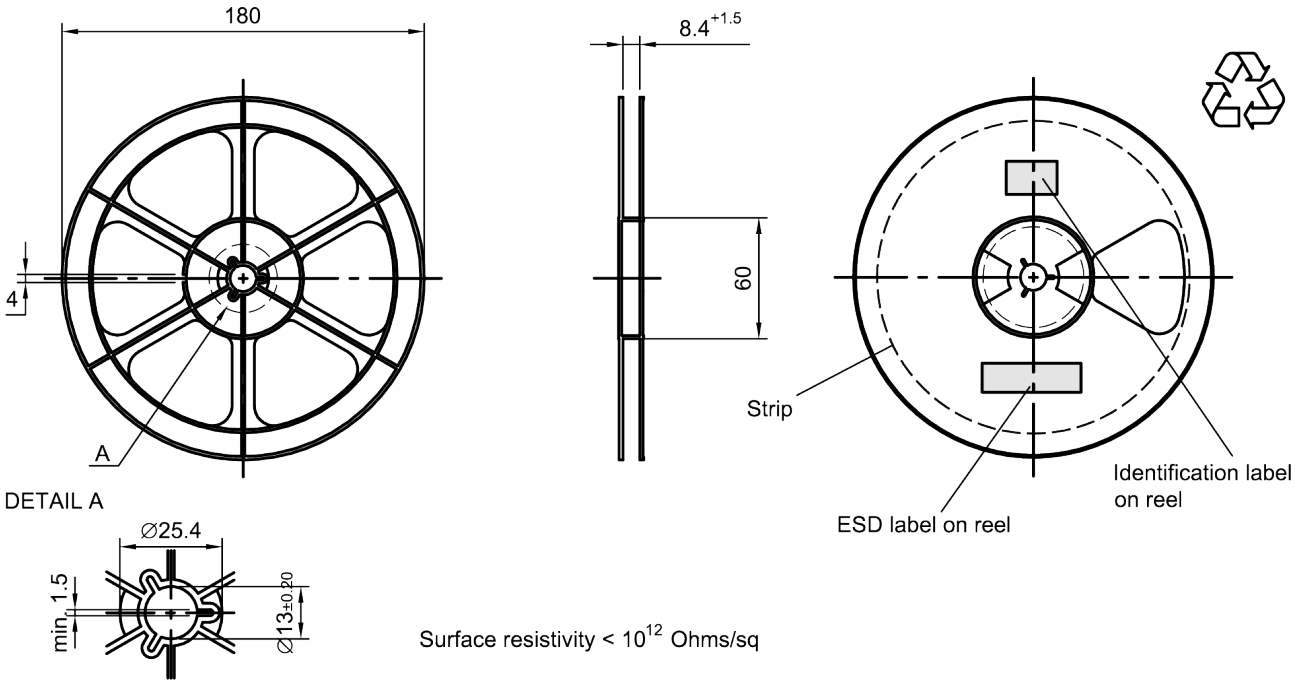
Figure 10: Drawing of reel (first-angle projection) with diameter of 180 mm.

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

Printing
on vacuumbag

Vacuumbag

Sealing area

Drypack
in vacuumbag

Identification label
on vacuumbag

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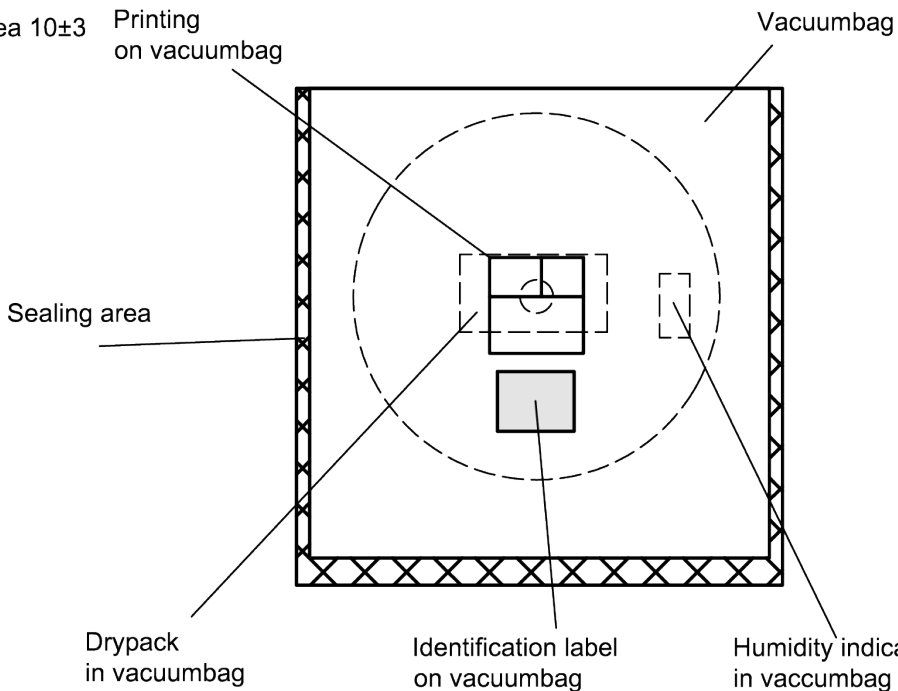
Figure 11: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

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

2 pcs. ESD label
(around carton box)

Window for
customer label

Flat area of
moisture barrier bag
for customer label

Identification label
on carton box
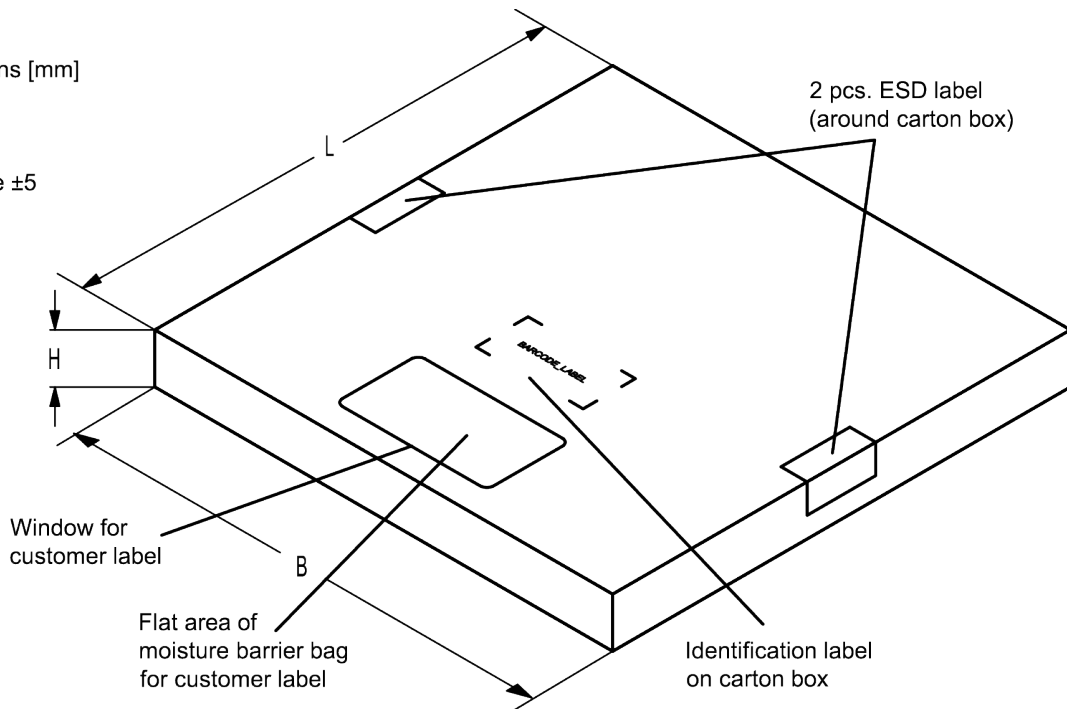
Figure 12: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

330

$8.4 ^{+3} _{-0.5}$
(measure at
outer edge)

Supplier logo

100

A

$2 ^{+0.5} _{0}$

DETAIL A

$\varnothing 13 \pm 0.20$

21

4

14.4 max.
(measure at HUB)

Strip

ESD label on reel

Identification label
on reel

Surface resistivity < 10^{12} Ohms/sq
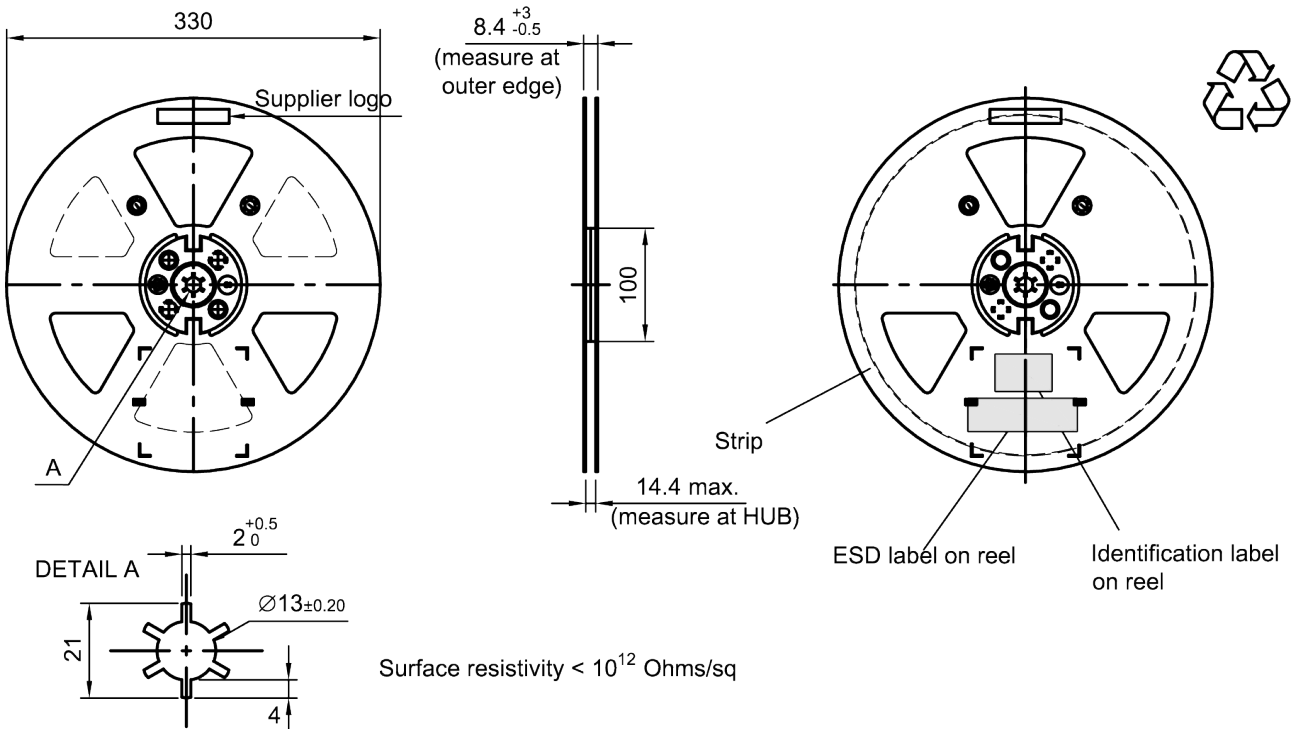
Figure 13: Drawing of reel (first-angle projection) with diameter of 330 mm.

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

Printing
on vacuumbag

Vacuumbag

Sealing area

Drypack
in vacuumbag

Identification label
on vacuumbag

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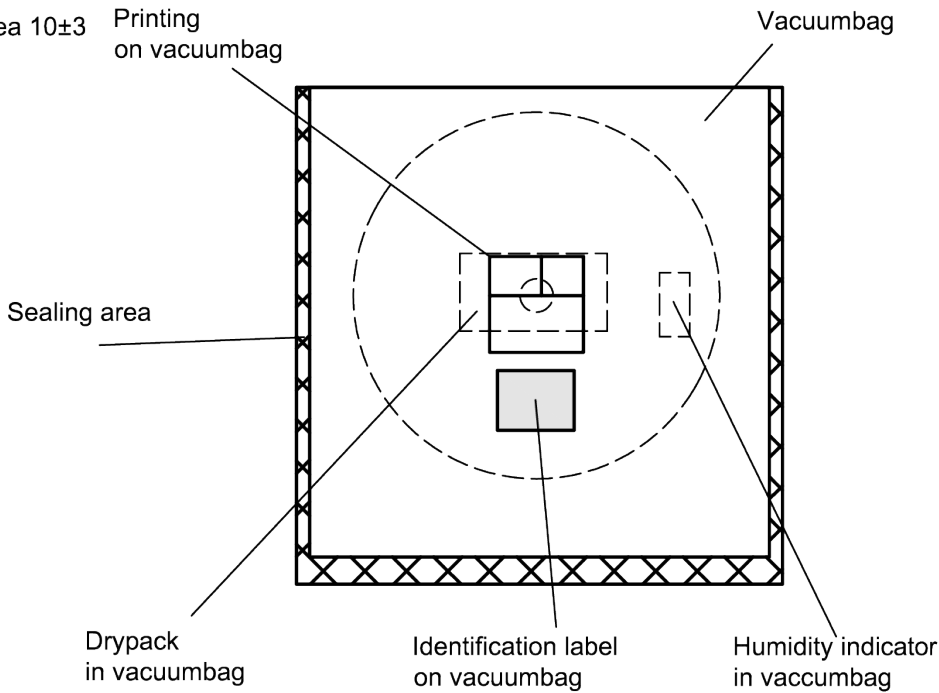
Figure 14: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

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

2 pcs. ESD label
(around carton box)

Window for
customer label

Flat area of
moisture barrier bag
for customer label

Identification label
on carton box

In case of modules with
additional printing
for badge number
on the upper right side
on the top of the carton box.
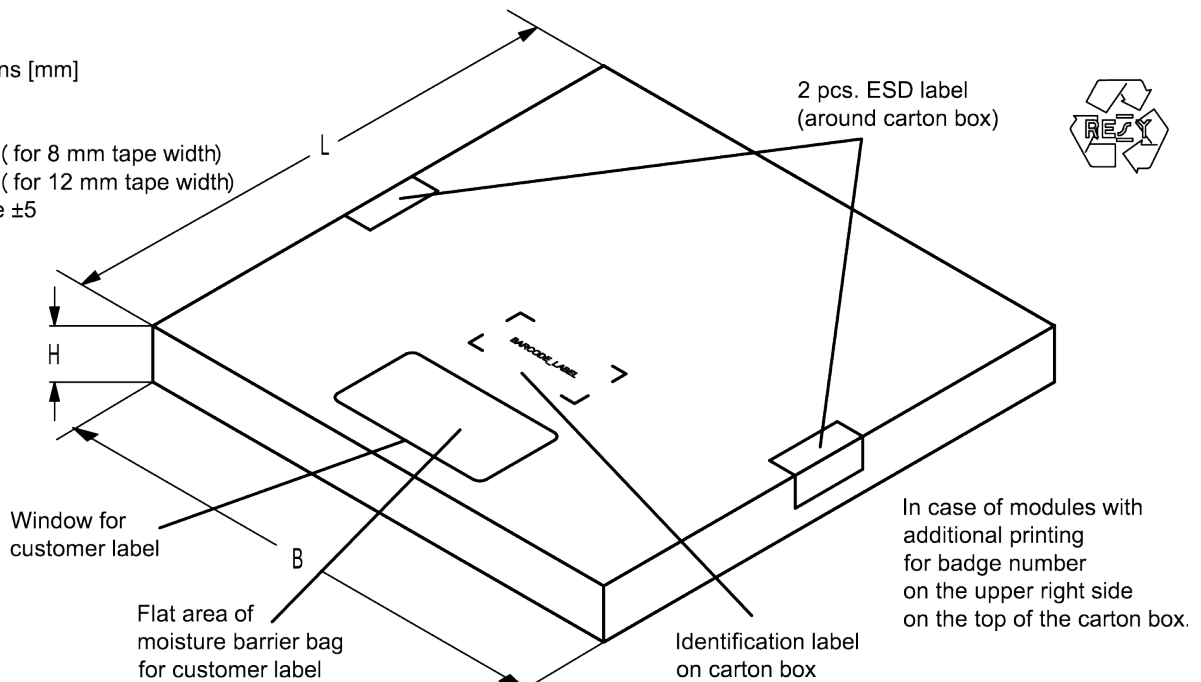
Figure 15: Drawing of folding box for reel with diameter of 330 mm.

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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, 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 B8632 is 8DR.

■ 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 |||| | Adopted BASE47 code for lot number ||||

Adopted BASE32 code for type number					Adopted BASE47 code for lot number			
Decimal value	Base32 code	Decimal value	Base32 code		Decimal value	Base47 code	Decimal value	Base47 code
0	0	16	G		0	0	24	R
1	1	17	H		1	1	25	S
2	2	18	J		2	2	26	T
3	3	19	K		3	3	27	U
4	4	20	M		4	4	28	V
5	5	21	N		5	5	29	W
6	6	22	P		6	6	30	X
7	7	23	Q		7	7	31	Y
8	8	24	R		8	8	32	Z
9	9	25	S		9	9	33	b
10	A	26	T		10	A	34	d
11	B	27	V		11	B	35	f
12	C	28	W		12	C	36	h
13	D	29	X		13	D	37	n
14	E	30	Y		14	E	38	r
15	F	31	Z		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
$T \geq 255$ °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

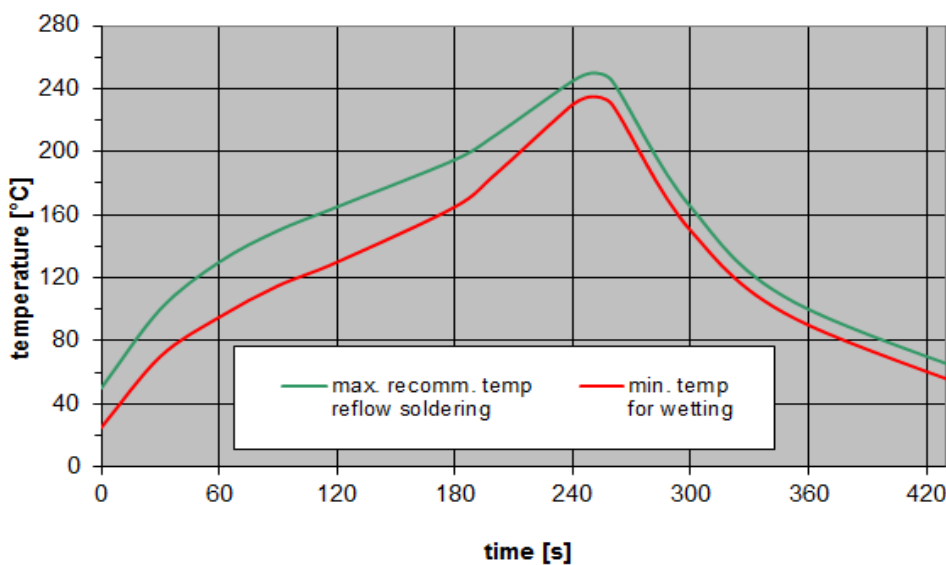**Table 3:** Characteristics of recommended soldering profile for lead-free solder (Sn95.5Ag3.8Cu0.7).

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

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13 Annotations

13.1 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.

13.2 Scattering parameters (S-parameters)

The pin/port assignment is available in the headers of the S-parameter files. Please contact your local RF360 sales office.

13.3 Ordering codes and packing units

Ordering code	Packing unit
B39142B8632P810	15000 pcs
B39142B8632P810S 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 RF360 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 RF360, 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.rf360jv.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 RF360 sales office.

14.4 Package information

Landing area

The printed circuit board (PCB) land pattern (landing area) shown is based on RF360 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 RF360, 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.

Please read **Cautions and warnings** and
Important notes at the end of this document.

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Qualcomm

RF360 Europe GmbH
A Qualcomm – TDK Joint Venture

15 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, RF360 Europe GmbH and its affiliates are 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 RF360 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.rf360jv.com/material). Should you have any more detailed questions, please contact our sales offices.

5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
    The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

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