



RF360
Europe GmbH

Data sheet

SAW duplexer
LTE / 5G band 71

Part number:	B1266
Ordering code:	B39681B1266P810
Date:	December 03, 2021
Version:	2.5

DCN: 80-PA243-377 Rev. F

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Table of contents

1 [Application](#)..... 4
2 [Features](#)..... 4
3 [Package](#)..... 5
4 [Pin configuration](#)..... 5
5 [Matching circuit](#)..... 6
6 [Characteristics](#)..... 7
7 [Maximum ratings](#)..... 12
8 [Transmission coefficients](#)..... 13
9 [Reflection coefficients](#)..... 16
10 [Packing material](#)..... 17
11 [Marking](#)..... 21
12 [Soldering profile](#)..... 22
13 [Annotations](#)..... 23
14 [Cautions and warnings](#)..... 24
15 [Important notes](#)..... 25

1 Application

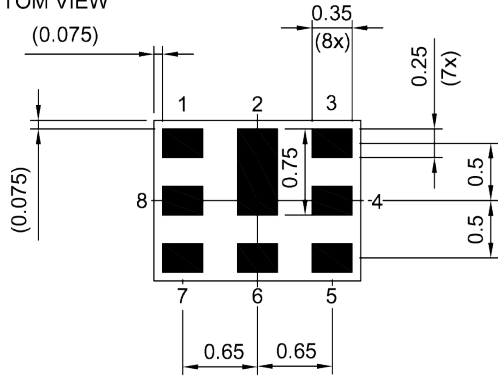
- Duplexer for 4G and 5G band 71
- LTE band 71 uplink: 680.5 MHz (pass band 35 MHz)
- LTE band 71 downlink: 634.5 MHz (pass band 35 MHz)

2 Features

- Package size $1.8_{\pm 0.1}$ mm \times $1.4_{\pm 0.1}$ 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)

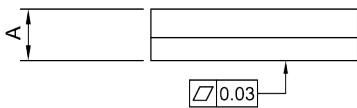
3 Package

BOTTOM VIEW

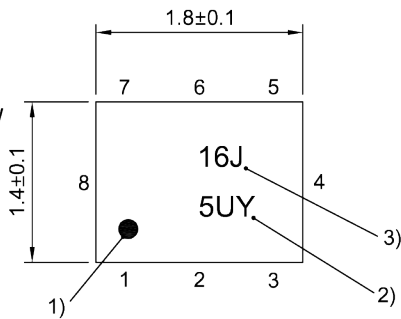


Pad and pitch tolerance ± 0.05

SIDE VIEW

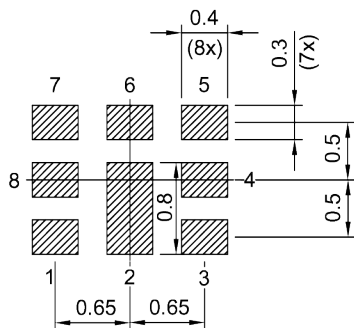


TOP VIEW



- 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

Figure 1: Drawing of package with package height $A = 0.475$ mm (max.). See Sec. Package information (p. 24).

4 Pin configuration

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

5 Matching circuit

- $L_{p6} = 18 \text{ nH}$

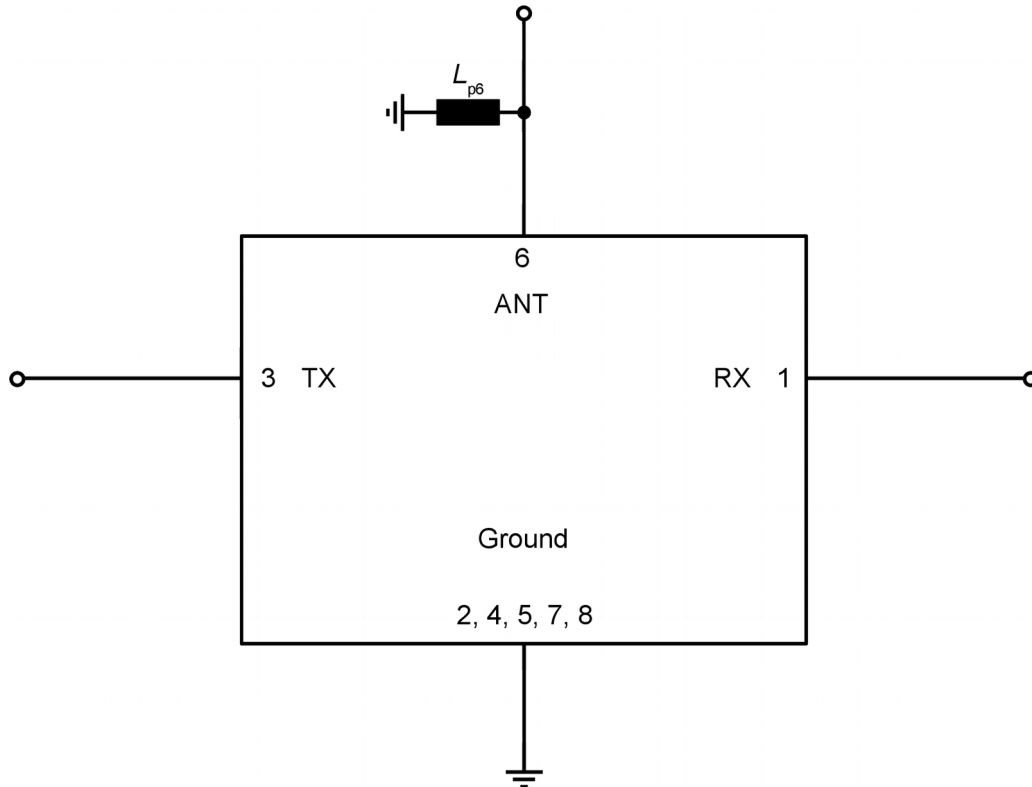


Figure 2: Schematic of matching circuit.

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

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 // 18 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	—	680.5	—	MHz
Maximum insertion attenuation							
	663... 698	MHz	$\alpha_{INT,max}^{2)}$	—	1.4	2.0	dB
	663.34... 697.66	MHz	α_{max}	—	1.8	2.5 ³⁾	dB
	663.34... 697.66	MHz	α_{max}	—	1.8	2.7	dB
Amplitude ripple (p-p)			$\Delta\alpha^{4)}$				
	663.34... 697.66	MHz		—	0.7	1.7	dB
Maximum VSWR			$VSWR_{max}$				
@ TX port	663.34... 697.66	MHz		—	1.3	2.0	
@ ANT port	663.34... 697.66	MHz		—	1.4	2.0	
Minimum attenuation			α_{min}				
	10... 608	MHz		30	47	—	dB
	608... 614	MHz		50	54	—	dB
	617.34... 651.66	MHz		48	59	—	dB
	717... 728	MHz		20 ⁵⁾	27	—	dB
	717... 728	MHz		15	27	—	dB
	722... 729	MHz		10	47	—	dB
	729... 746	MHz		45	62	—	dB
	746... 768	MHz		45	62	—	dB
	768... 805	MHz		40	57	—	dB
	824... 849	MHz		30	41	—	dB
	859... 894	MHz		40	46	—	dB
	1164... 1250	MHz		40	47	—	dB
	1326... 1396	MHz		30	47	—	dB
	1559... 1563	MHz		45	57	—	dB
	1565.42... 1573.374	MHz		45	57	—	dB
	1573.374... 1577.644	MHz		45	57	—	dB
	1577.644... 1585.42	MHz		45	57	—	dB
	1597.551... 1605.886	MHz		45	58	—	dB
	1710... 1755	MHz		30	57	—	dB
	1805... 1880	MHz		30	55	—	dB
	1930... 1990	MHz		45	55	—	dB
	1989... 2094	MHz		45	53	—	dB
	2110... 2200	MHz		40	57	—	dB

Characteristics TX – ANT			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
2400... 2484	MHz		35	57	—	dB
2496... 2690	MHz		40	53	—	dB
2652... 2792	MHz		40	52	—	dB
3300... 3800	MHz		28	36	—	dB
3300... 4200	MHz		22	30	—	dB
4400... 5000	MHz		10	16	—	dB
4900... 5950	MHz		10	15	—	dB

- 1) See Sec. Matching circuit (p. 6).
- 2) Integrated attenuation α_{INT} : Averaged power $|S_{ij}|^2$ over the center 4.5 MHz of LTE 5 MHz (25 RB) channels.
- 3) Valid for typical temperature $T = +25$ °C.
- 4) Over any 5 MHz.
- 5) Valid for temperature $T = +25$ °C...+90 °C.

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 // 18 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	—	634.5	—	MHz
Maximum insertion attenuation							
	617... 652	MHz	$\alpha_{INT,max}^{2)}$	—	1.4	2.1	dB
	617.34... 651.66	MHz	α_{max}	—	1.9	2.5 ³⁾	dB
	617.34... 651.66	MHz	α_{max}	—	1.9	3.0	dB
Amplitude ripple (p-p)			$\Delta\alpha^{4)}$				
	617.34... 651.66	MHz		—	0.8	2.2	dB
Maximum VSWR			VSWR _{max}				
@ ANT port	617.34... 651.66	MHz		—	1.5	2.0	
@ RX port	617.34... 651.66	MHz		—	1.5	2.0	
Average attenuation			α_{avg}				
	2.0... 608	MHz		30 ⁵⁾	35 ⁵⁾	—	dB
	608... 614	MHz		4 ⁵⁾	12 ⁵⁾	—	dB
	657.56... 662.44	MHz		10 ⁶⁾	30 ⁶⁾	—	dB
Minimum attenuation			α_{min}				
	35... 55	MHz		50	65	—	dB
	663.34... 697.66	MHz		45	51	—	dB
	709... 740	MHz		20	40	—	dB
	776... 793	MHz		33	37	—	dB
	793... 805	MHz		33	37	—	dB
	824... 849	MHz		33	37	—	dB
	1058... 1138	MHz		25	37	—	dB
	1163... 1204	MHz		30	38	—	dB
	1233... 1281	MHz		30	36	—	dB
	1461... 1484	MHz		34	42	—	dB
	1653... 1698	MHz		25	42	—	dB
	1710... 1755	MHz		35	40	—	dB
	1710... 1785	MHz		35	40	—	dB
	1850... 1920	MHz		37	42	—	dB
	1851... 1956	MHz		37	42	—	dB
	2305... 2315	MHz		20	50	—	dB
	2327... 2407	MHz		20	50	—	dB
	2400... 2500	MHz		40	53	—	dB
	2468... 2608	MHz		20	51	—	dB
	2922... 2967	MHz		20	48	—	dB

Characteristics ANT – RX	min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
4037... 4162 MHz	20	39	—	dB
4317... 4472 MHz	20	38	—	dB
4900... 5950 MHz	20	28	—	dB

- 1) See Sec. Matching circuit (p. 6).
- 2) Integrated attenuation α_{INT} : Averaged power $|S_{ij}|^2$ over the center 4.5 MHz of LTE 5 MHz (25 RB) channels.
- 3) Valid for typical temperature $T = +25$ °C.
- 4) Over any 5 MHz.
- 5) Over any channel with band width of 6MHz.
- 6) Over any channel with band width of 4.875MHz.

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 // 18 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}						
		617.34... 651.66	MHz	55	59	—	dB
		663.34... 697.66	MHz	55	58	—	dB
		1326... 1396	MHz	30	60	—	dB
		1989... 2094	MHz	30	55	—	dB
		2652... 2792	MHz	30	52	—	dB

¹⁾ See Sec. Matching circuit (p. 6).

7 Maximum ratings

Storage temperature	$T_{STG}^{2)} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$ V_{DC} ^{1)} = 0\text{ V (max.)}$	
ESD voltage		
	$V_{ESD}^{3)} = 200\text{ V (max.)}$	Machine model.
	$V_{ESD}^{4)} = 425\text{ V (max.)}$	Human body model.
	$V_{ESD}^{5)} = 700\text{ V (max.)}$	Charged device model.
Input power	P_{IN}	
@ TX port: 663.34 ... 697.66 MHz	30 dBm (max.)	5 MHz 5G NR (CP-OFDM) (1RB24) for 5000 h @ 50 °C.
@ TX port: 663.34 ... 697.66 MHz	31 dBm (max.)	<ul style="list-style-type: none"> ■ 5 MHz LTE uplink signal (1RB24) for 5000 h @ 50 °C. ■ Continuous wave for 5000 h @ 50 °C.
@ TX port: other frequency ranges	10 dBm (max.)	Continuous wave for 5000 h @ 50 °C.

- 1) In case of applied DC voltage blocking capacitors are mandatory.
 2) Not valid for packaging material. Storage temperature for packaging material is -25 °C to +40 °C.
 3) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
 4) According to JESD22-A114 (HBM – Human Body Model), 1 negative & 1 positive pulse.
 5) According to JESD22-C101 (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

8 Transmission coefficients

8.1 TX – ANT

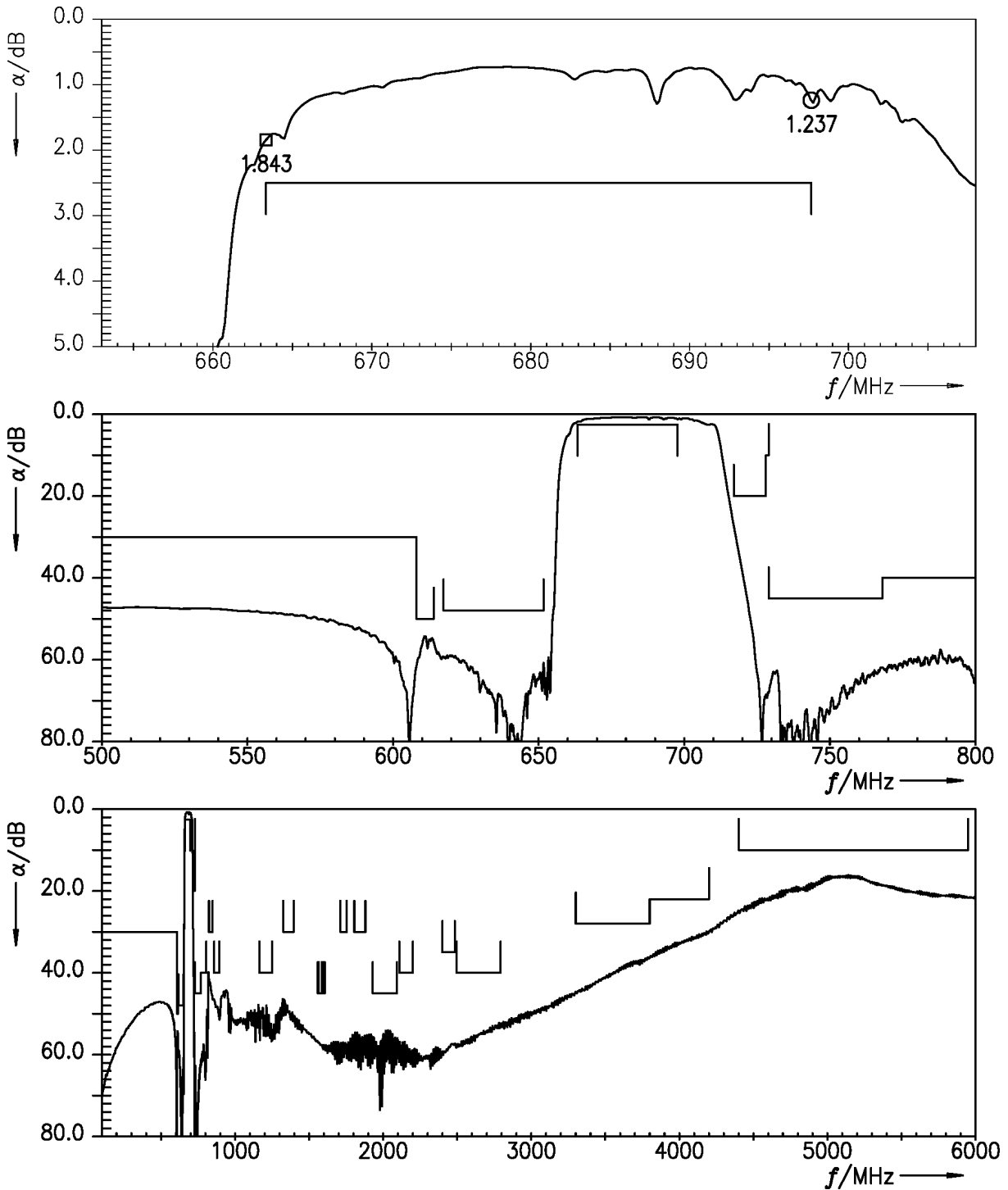


Figure 3: Attenuation TX – ANT.

8.2 ANT – RX

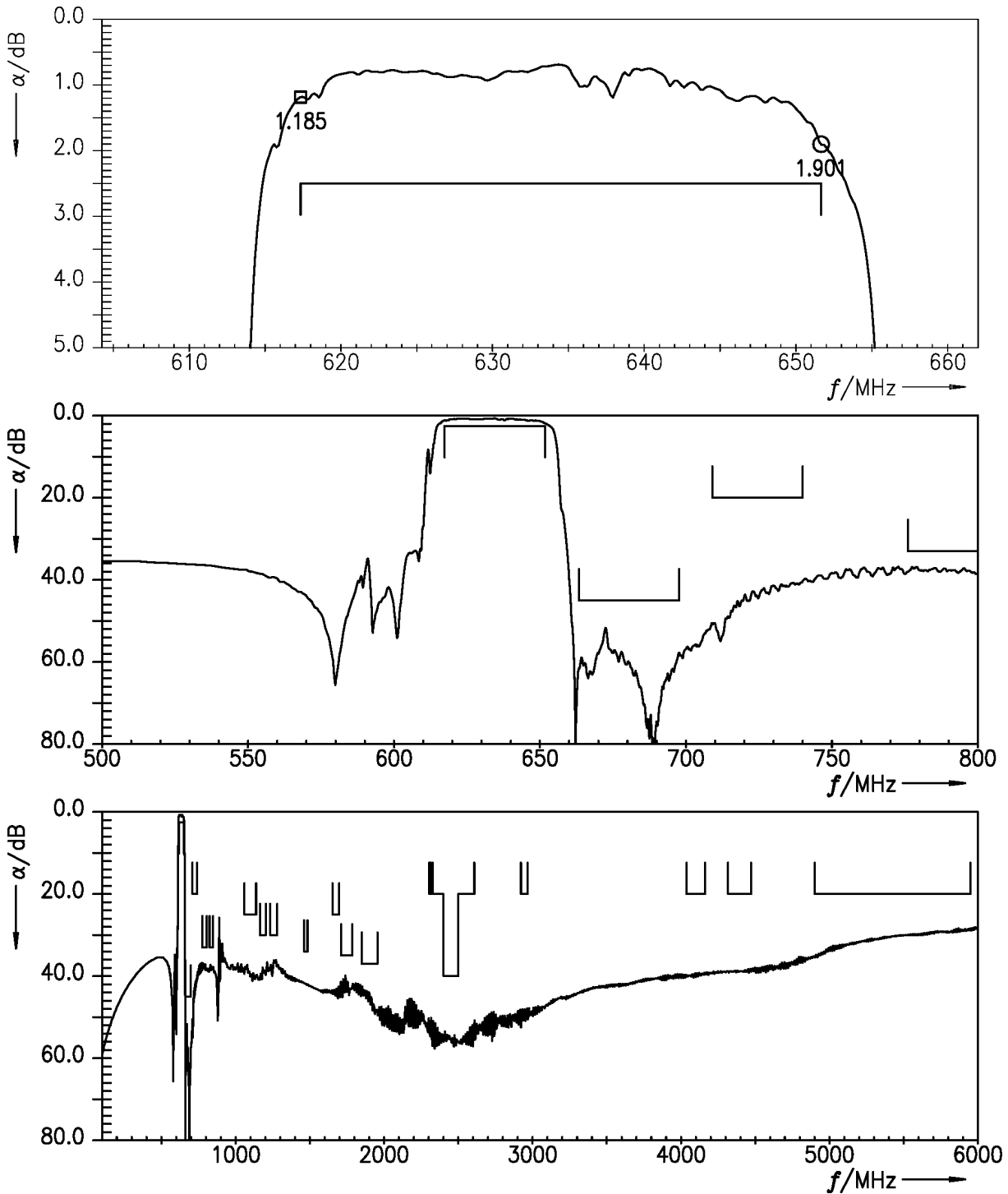


Figure 4: Attenuation ANT – RX.

8.3 TX – RX

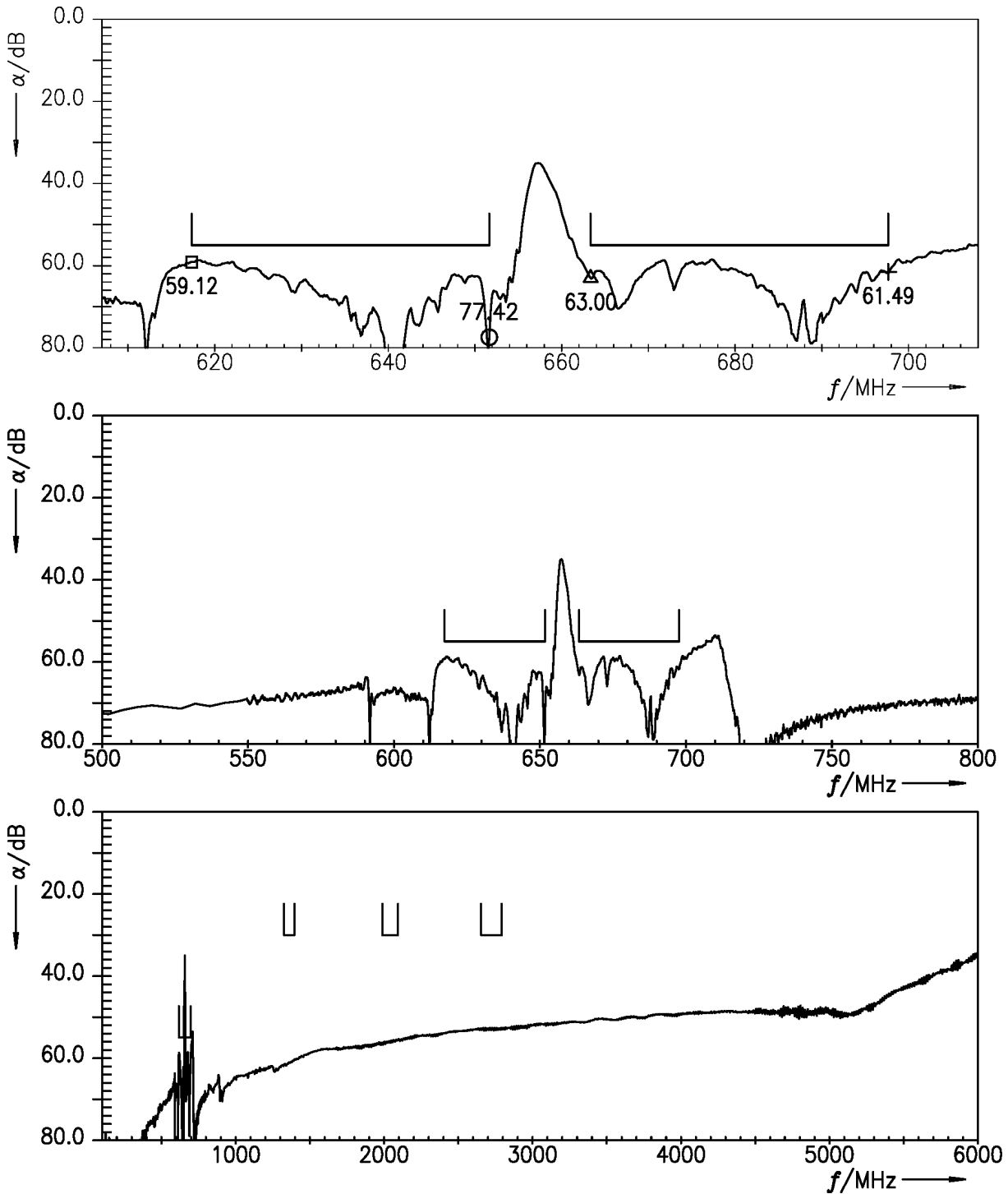


Figure 5: Isolation TX – RX.

9 Reflection coefficients

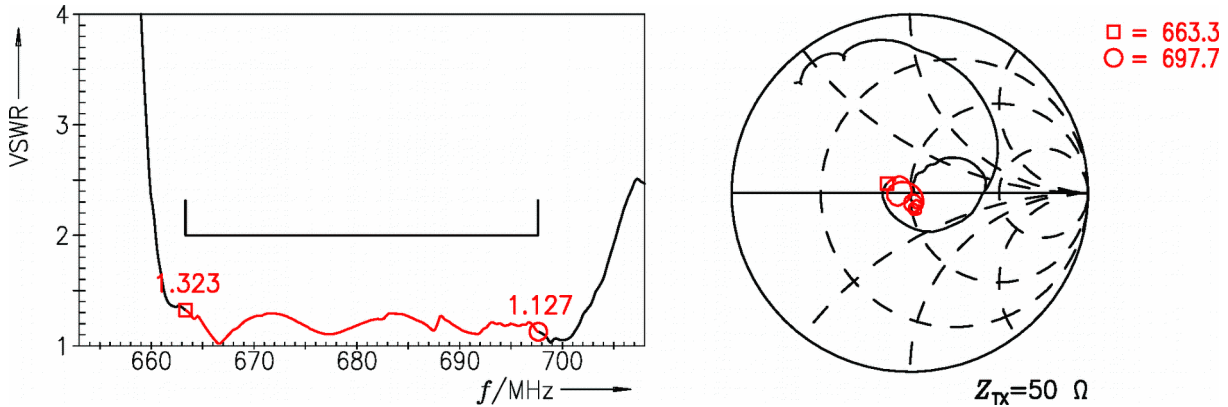


Figure 6: Reflection coefficient at TX port.

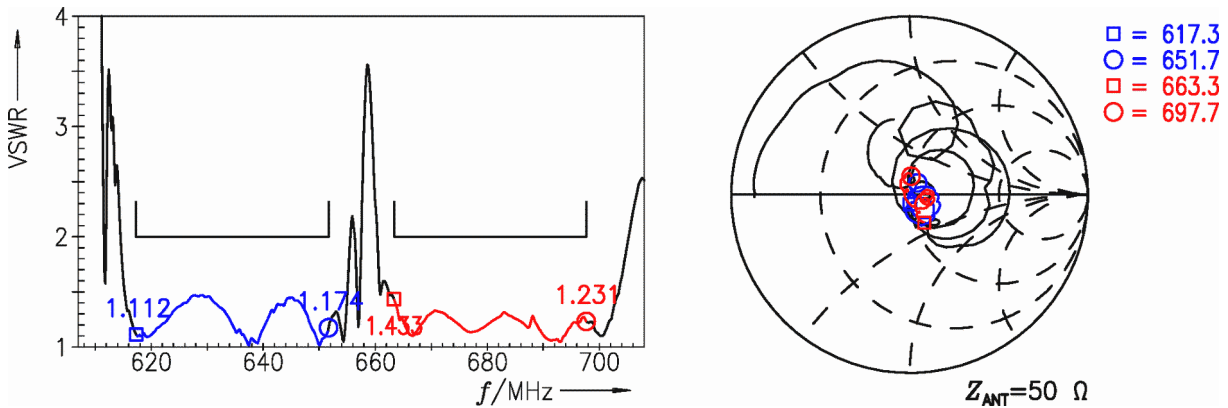


Figure 7: Reflection coefficient at ANT port (TX and RX frequencies).

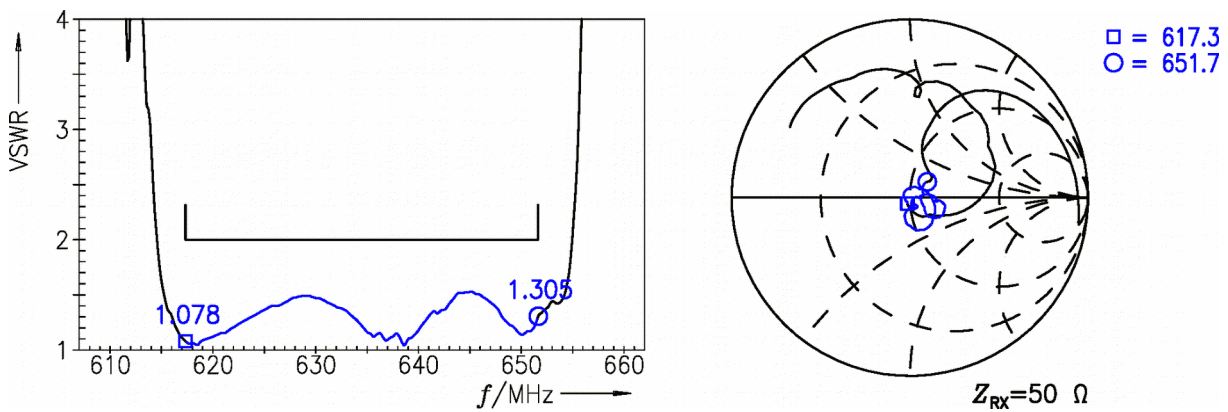


Figure 8: Reflection coefficient at RX port.

10 Packing material

10.1 Tape

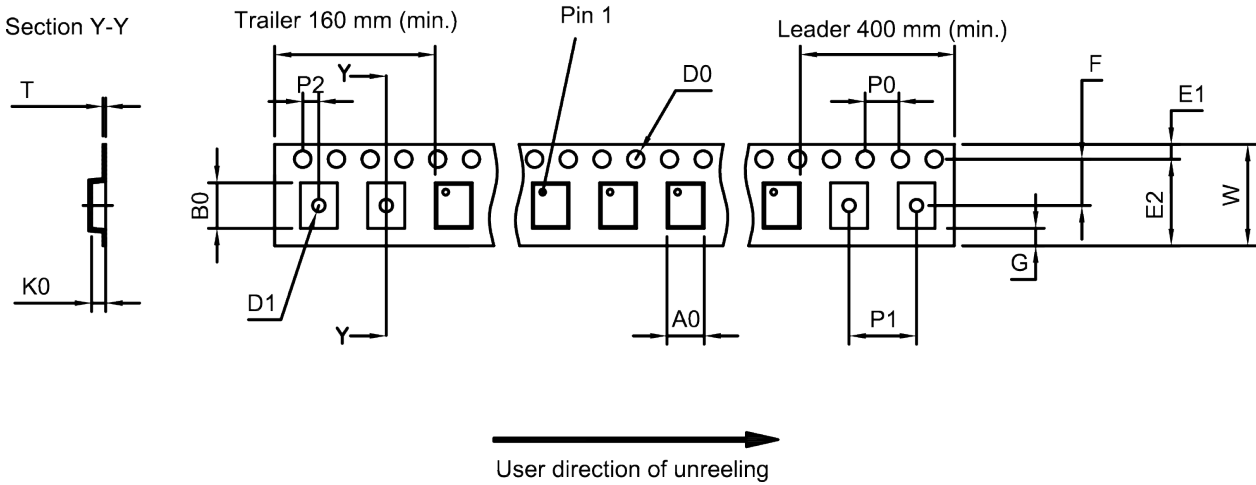


Figure 9: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

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.

10.2 Reel with diameter of 180 mm

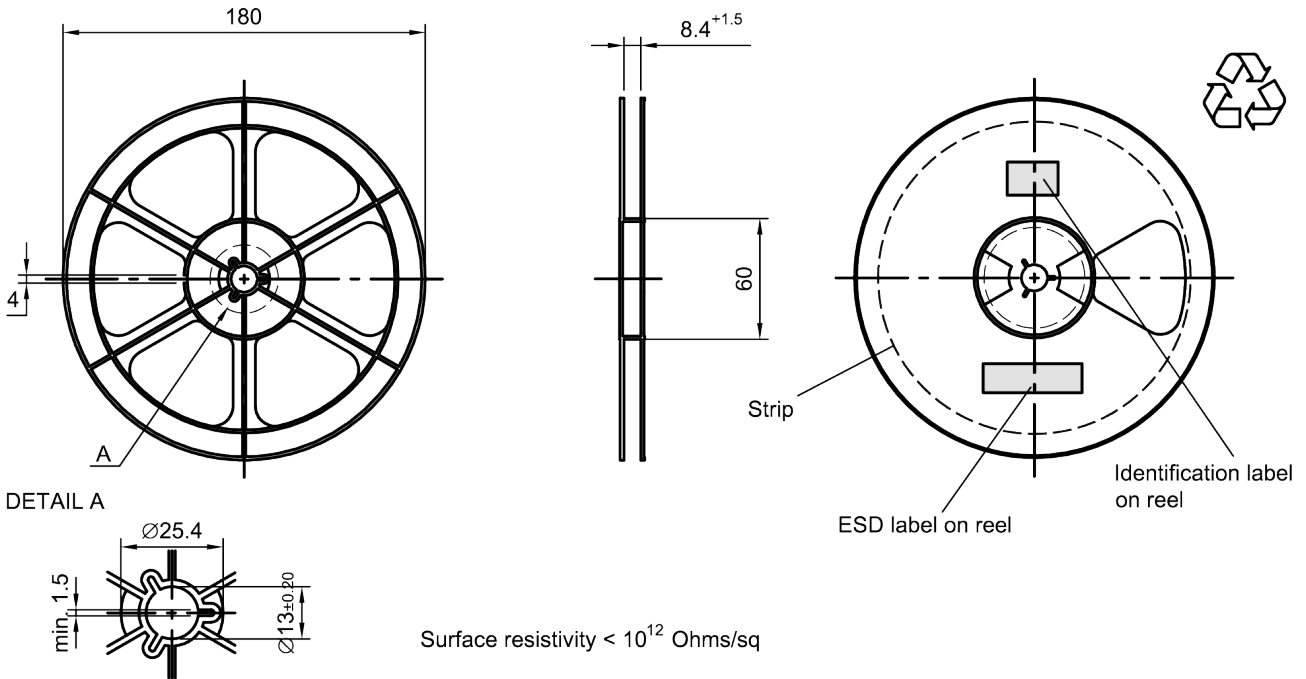


Figure 10: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

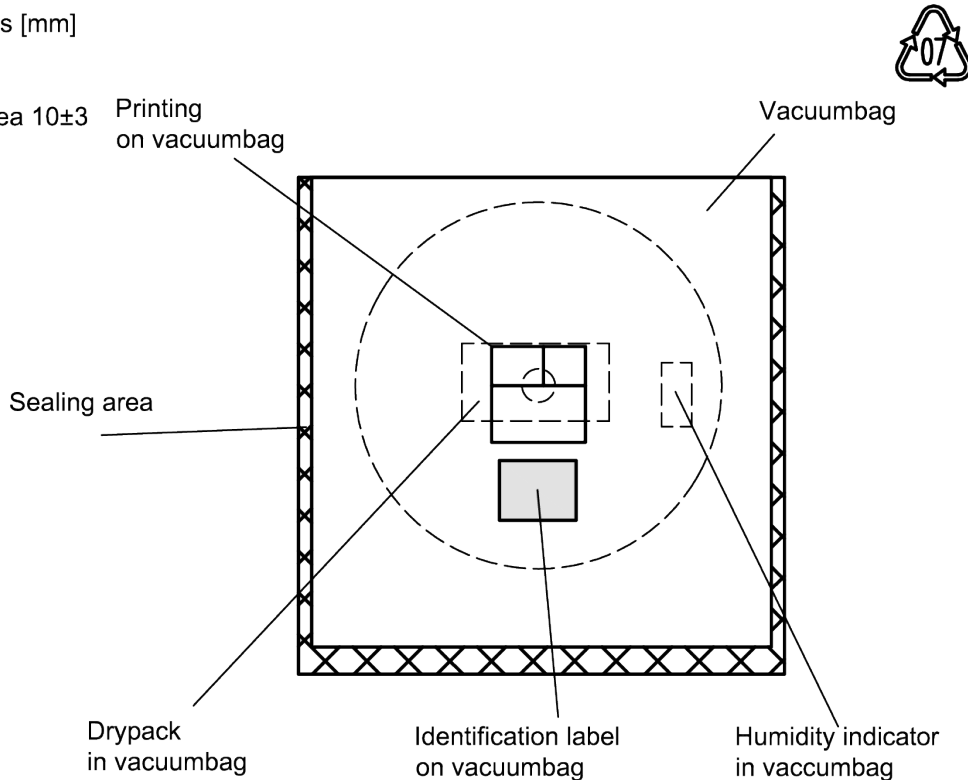


Figure 11: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

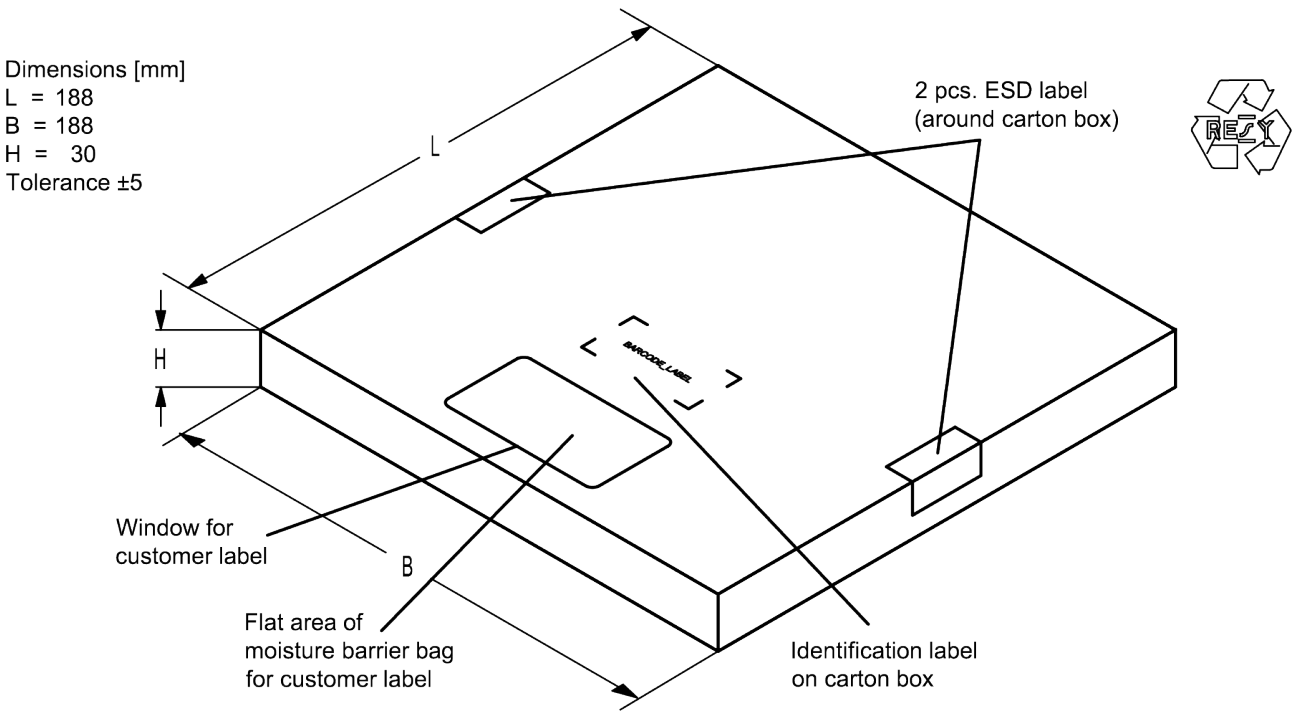


Figure 12: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

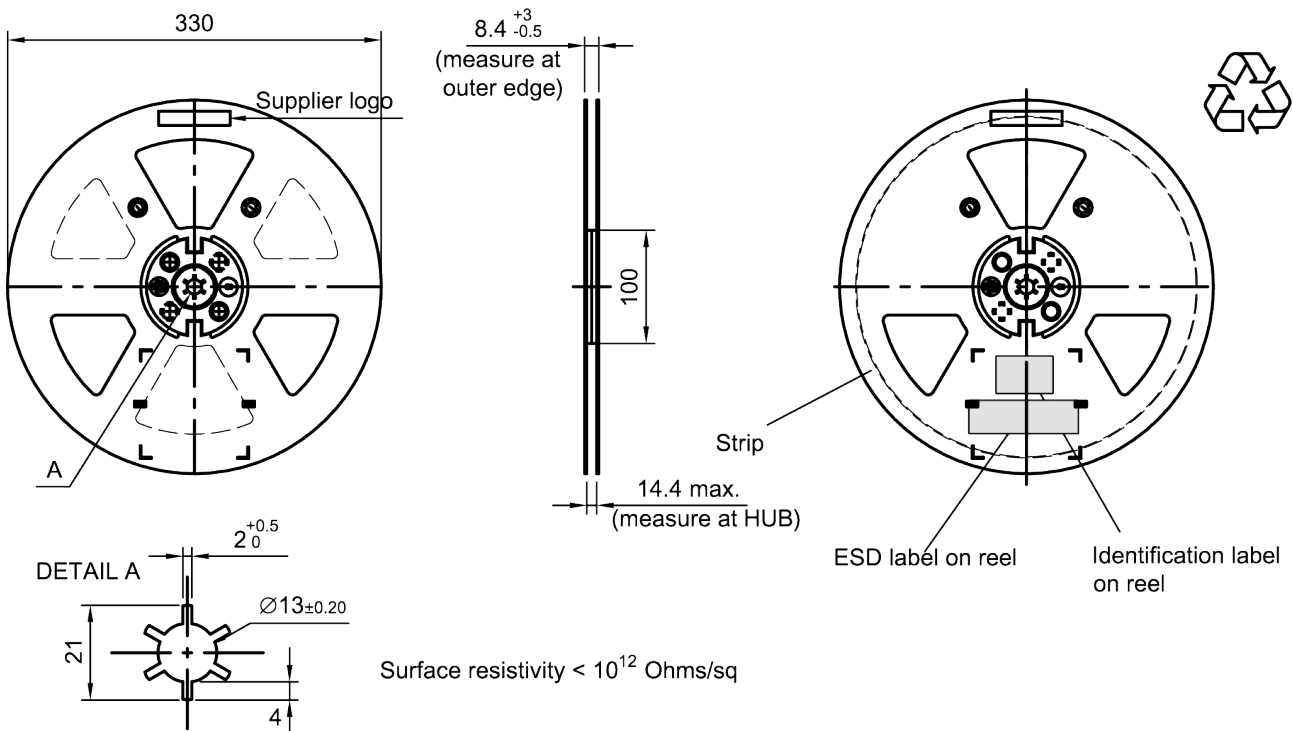


Figure 13: Drawing of reel (first-angle projection) with diameter of 330 mm.

Dimensions [mm]

X = 400+5

Y = 418+5

Sealing area 10±3

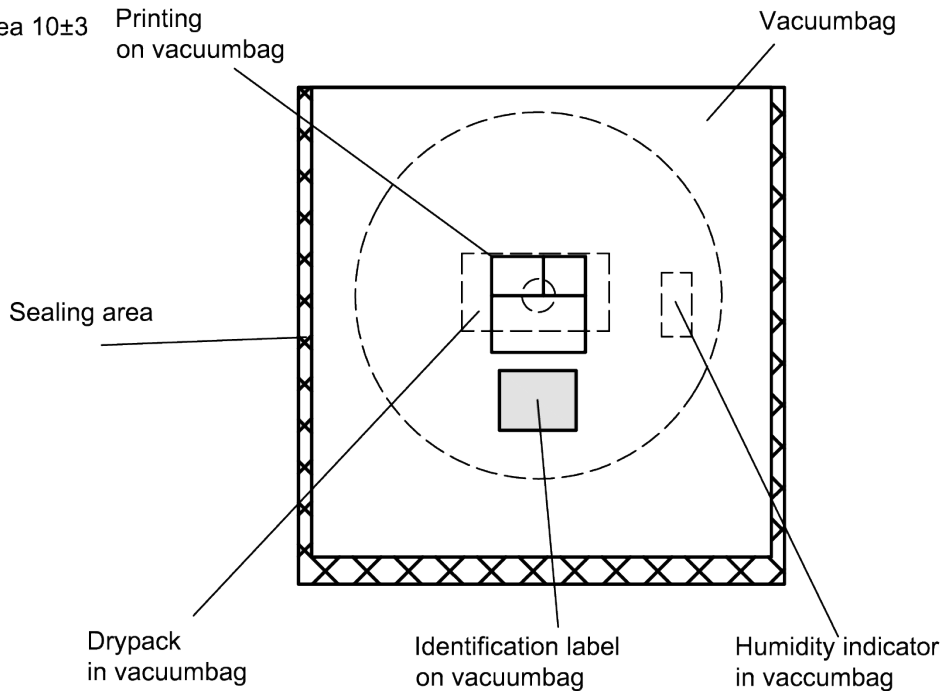


Figure 14: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

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)

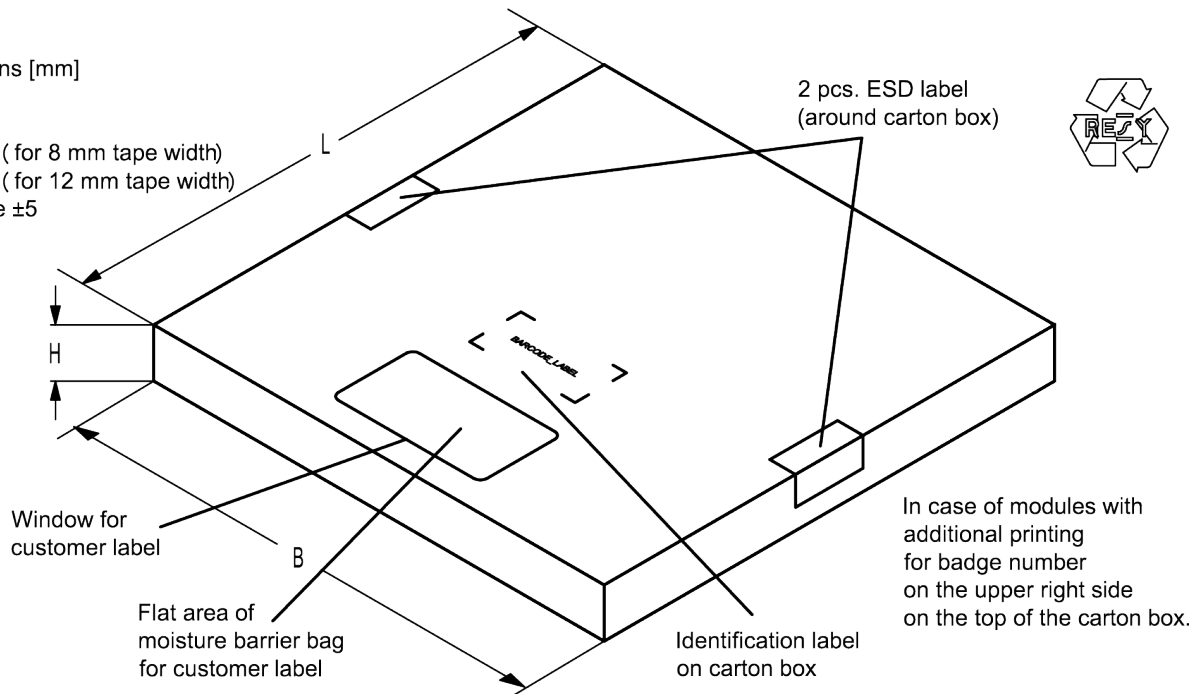


Figure 15: Drawing of folding box for reel with diameter of 330 mm.

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, 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**
 $1 \times 32^2 + 6 \times 32^1 + 18 (=J) \times 32^0 =$ **1234**
 The BASE32 code for product type B1266 is 17J.

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

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).

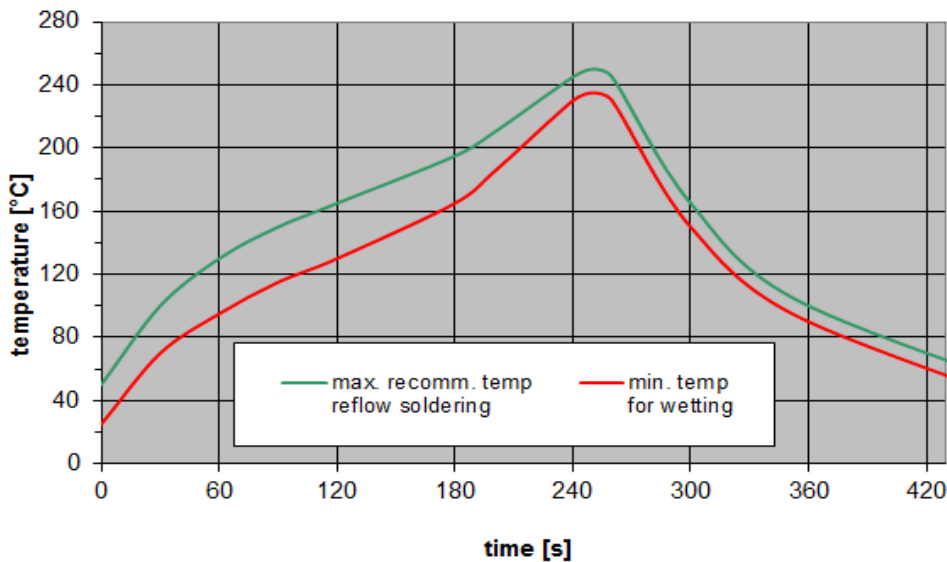


Figure 16: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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 / product IDs and packing units

Ordering code / product ID	RF360 label	Packing unit
B39681B1266P810	B39681-B1266-P810	15000 pcs
	B39681-B1266-P810-S05	5000 pcs
	B39681-B1266-P810-W05	5000 pcs

Table 4: Ordering codes / product IDs and packing units. Shipment will come from either Singapore or Wuxi location.

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 <https://rfe.qualcomm.com/>.

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.

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 (<https://rfe.qualcomm.com>). 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.
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