

RF360 Europe GmbH
A Qualcomm – TDK Joint Venture

SAW components

SAW duplexer
LTE band 20

Series/type:	B8622
Ordering code:	B39851B8622P810
Date:	January 31, 2018
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SAW components	B8622
SAW duplexer	806 / 847 MHz

Data sheet

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	10
8 Transmission coefficients	11
9 Reflection coefficients	14
10 Packing material	15
11 Marking	19
12 Soldering profile	20
13 Annotations	21
14 Cautions and warnings	22
Important notes	23

Data sheet

1 Application

- Low-loss SAW duplexer for LTE Band 20 systems
- High isolation
- Usable pass band 30 MHz
- Single-ended duplexer
- Very small size and low height

2 Features

- Package size 1.8 ± 0.1 mm \times 1.4 ± 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)



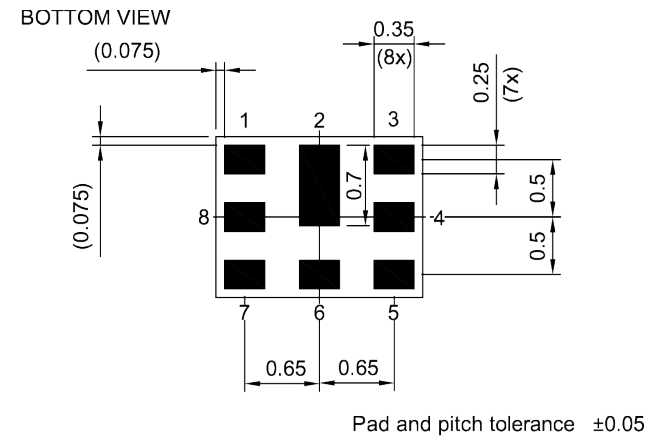
Figure 1: Picture of component with example of product marking.

SAW components **B8622**

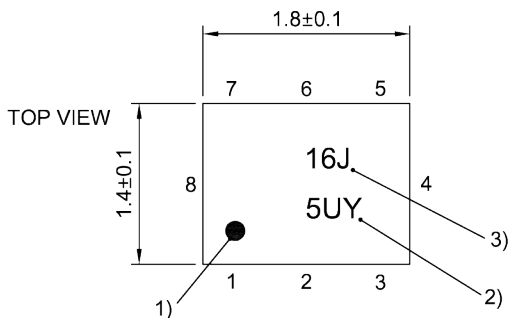
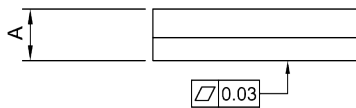
SAW duplexer **806 / 847 MHz**

Data sheet

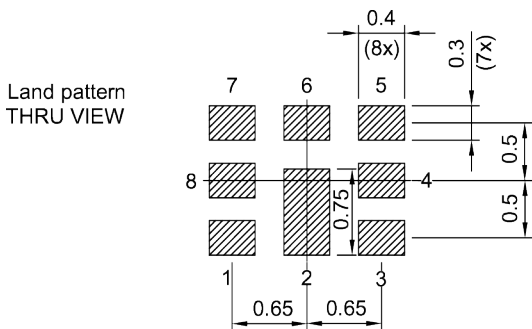
3 Package



SIDE VIEW



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



Landing pad tolerance -0.02

Figure 2: Drawing of package with package height A = 0.475 mm (max.). See Sec. Package information (p. 22).

4 Pin configuration

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

Data sheet

5 Matching circuit

■ $L_{p6} = 11 \text{ nH}$

■ $L_{s3} = 3.9 \text{ nH}$

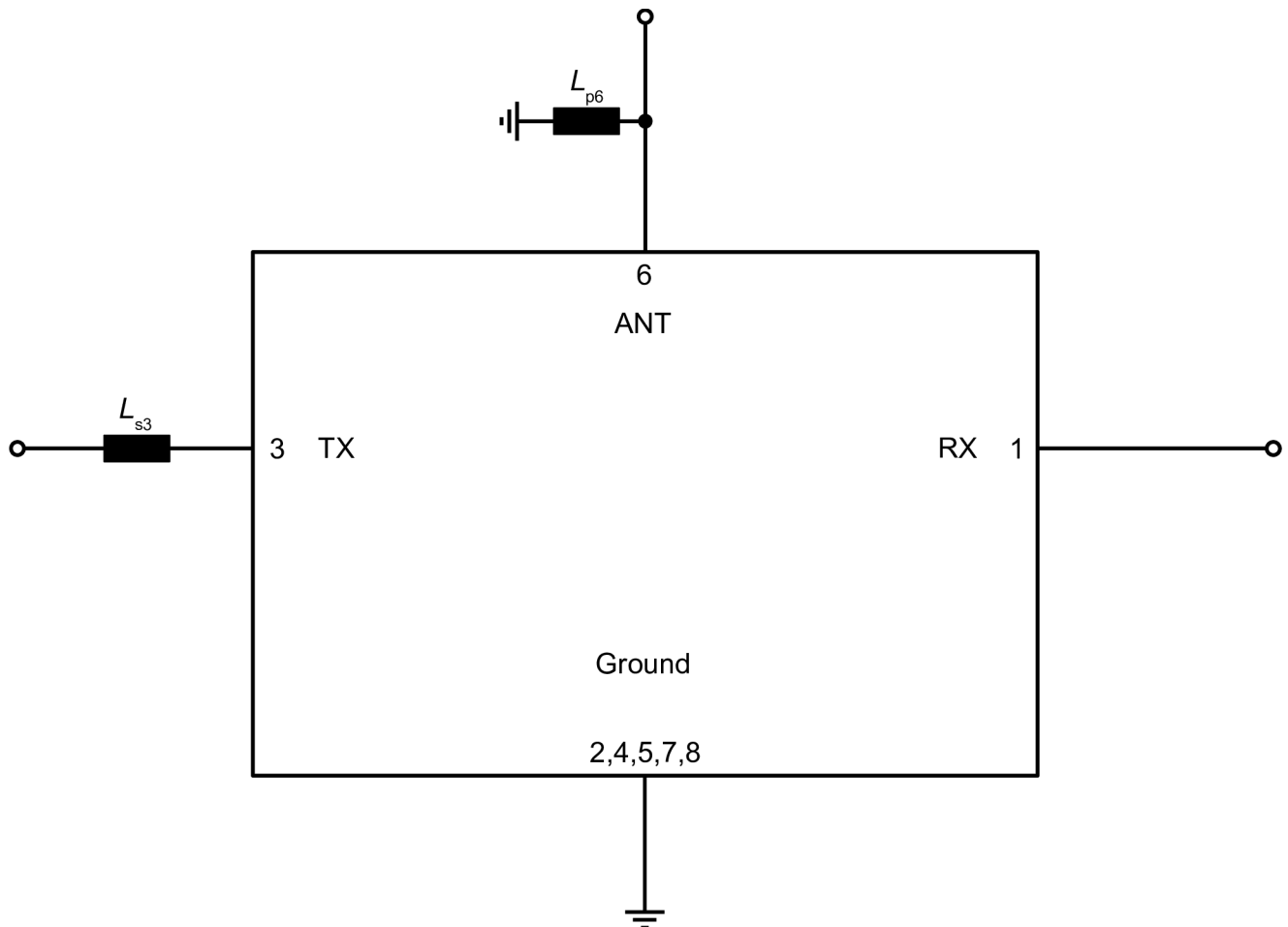


Figure 3: Schematic of matching circuit.

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

SAW components

B8622

SAW duplexer

806 / 847 MHz

Data sheet

6 Characteristics

6.1 TX – ANT

Temperature range for specification	T_{SPEC}	= -20 °C ... +90 °C
TX terminating impedance	Z_{TX}	= 50 Ω with ser. 3.9 nH ¹⁾
ANT terminating impedance	Z_{ANT}	= 50 Ω with par. 11 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	—	847	—	MHz
Maximum insertion attenuation			α_{max}				
	832... 862	MHz		—	1.7	2.0 ²⁾	dB
	832... 862	MHz		—	1.7	2.5	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	832... 862	MHz		—	0.7	1.7	dB
Maximum VSWR			VSWR _{max}				
@ TX port	832... 862	MHz		—	1.5	2.0	
@ ANT port	832... 862	MHz		—	1.6	2.0	
Maximum error vector magnitude			EVM _{max} ³⁾				
	834.4... 859.6	MHz		—	2.1	3.0 ²⁾	%
	834.4... 859.6	MHz		—	2.1	4.0	%
Minimum attenuation			α_{min}				
	10... 771	MHz		35	43	—	dB
	771... 791	MHz		40	48	—	dB
	791... 821	MHz		50	60	—	dB
	821... 827	MHz		1.5	7	—	dB
	873... 903	MHz		5	25	—	dB
	925... 960	MHz		35	45	—	dB
	1565... 1606	MHz		45	52	—	dB
	1664... 2170	MHz		40	55	—	dB
	2400... 2500	MHz		48	56	—	dB
	2500... 2620	MHz		40	56	—	dB
	2620... 2690	MHz		40	55	—	dB
	3328... 3448	MHz		30	44	—	dB
	4000... 6000	MHz		20	30	—	dB

¹⁾ See Sec. Matching circuit (p. 6).

²⁾ Valid for temperature $T = +25$ °C (max.).

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

SAW components

B8622

SAW duplexer

806 / 847 MHz

Data sheet

6.2 ANT – RX

Temperature range for specification	T_{SPEC}	= -20 °C ... +90 °C
TX terminating impedance	Z_{TX}	= 50 Ω with ser. 3.9 nH ¹⁾
ANT terminating impedance	Z_{ANT}	= 50 Ω with par. 11 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	—	806	—	MHz
Maximum insertion attenuation		α_{max}	—	1.7	2.5 ²⁾	dB
	791... 821	MHz	—	1.7	3.0	
Amplitude ripple (p-p)		$\Delta\alpha$	—	0.7	2.2	dB
	791... 821	MHz	—	0.7	2.2	
Maximum VSWR		VSWR _{max}	—	1.6	2.0	
@ ANT port	791... 821	MHz	—	1.6	2.0	
@ RX port	791... 821	MHz	—	1.8	2.2	
Minimum attenuation		α_{min}	40	44	—	dB
	10... 771	MHz	40	44	—	
	771... 782	MHz	10	25	—	
	832... 862	MHz	50	60	—	
	873... 903	MHz	40	54	—	
	1623... 1683	MHz	40	47	—	
	2373... 2570	MHz	40	45	—	
	4900... 6000	MHz	13	17	—	

¹⁾ See Sec. Matching circuit (p. 6).

²⁾ Valid for temperature $T = +25$ °C (max.).

SAW components

B8622

SAW duplexer

806 / 847 MHz

Data sheet

6.3 TX – RX

Temperature range for specification

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

TX terminating impedance

$$Z_{\text{TX}} = 50\ \Omega \text{ with ser. } 3.9\ \text{nH}^{1)}$$

ANT terminating impedance

$$Z_{\text{ANT}} = 50\ \Omega \text{ with par. } 11\ \text{nH}^{1)}$$

RX terminating impedance

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

Characteristics TX – RX

Characteristics TX – RX				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Minimum isolation							
		α_{min}					
	791.34... 820.66	MHz		55	59	—	dB
	832... 862	MHz		57	62	—	dB
	1574... 1577	MHz		40	55	—	dB
	1664... 1724	MHz		20	55	—	dB
	2496... 2586	MHz		20	53	—	dB

¹⁾ See Sec. Matching circuit (p. 6).

SAW components

B8622

SAW duplexer

806 / 847 MHz

Data sheet

7 Maximum ratings

Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +85\text{ °C}$	
DC voltage	$ V_{DC} ^{3)} = 0\text{ V (max.)}^{2)}$	
ESD voltage		
	$V_{ESD}^{4)} = 300\text{ V (max.)}$	Human body model.
	$V_{ESD}^{5)} = 600\text{ V (max.)}$	Charged device model.
Input power	P_{IN}	
@ TX port: 832.25 ... 861.75 MHz	30 dBm	5 MHz LTE uplink signal (25 RB) for 2000 h @ 50 °C.
@ TX port: other frequency ranges	10 dBm	5 MHz LTE uplink signal (25 RB) for 5000 h @ 50 °C.

¹⁾ Not valid for packaging material. Storage temperature for packaging material is -25 °C to +40 °C.

²⁾ DC resistance at RX output might be less than 100Mohm at elevated temperatures. Hence, we recommend usage of blocking capacitors.

³⁾ In case of applied DC voltage blocking capacitors are mandatory.

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.

Data sheet

8 Transmission coefficients

8.1 TX – ANT

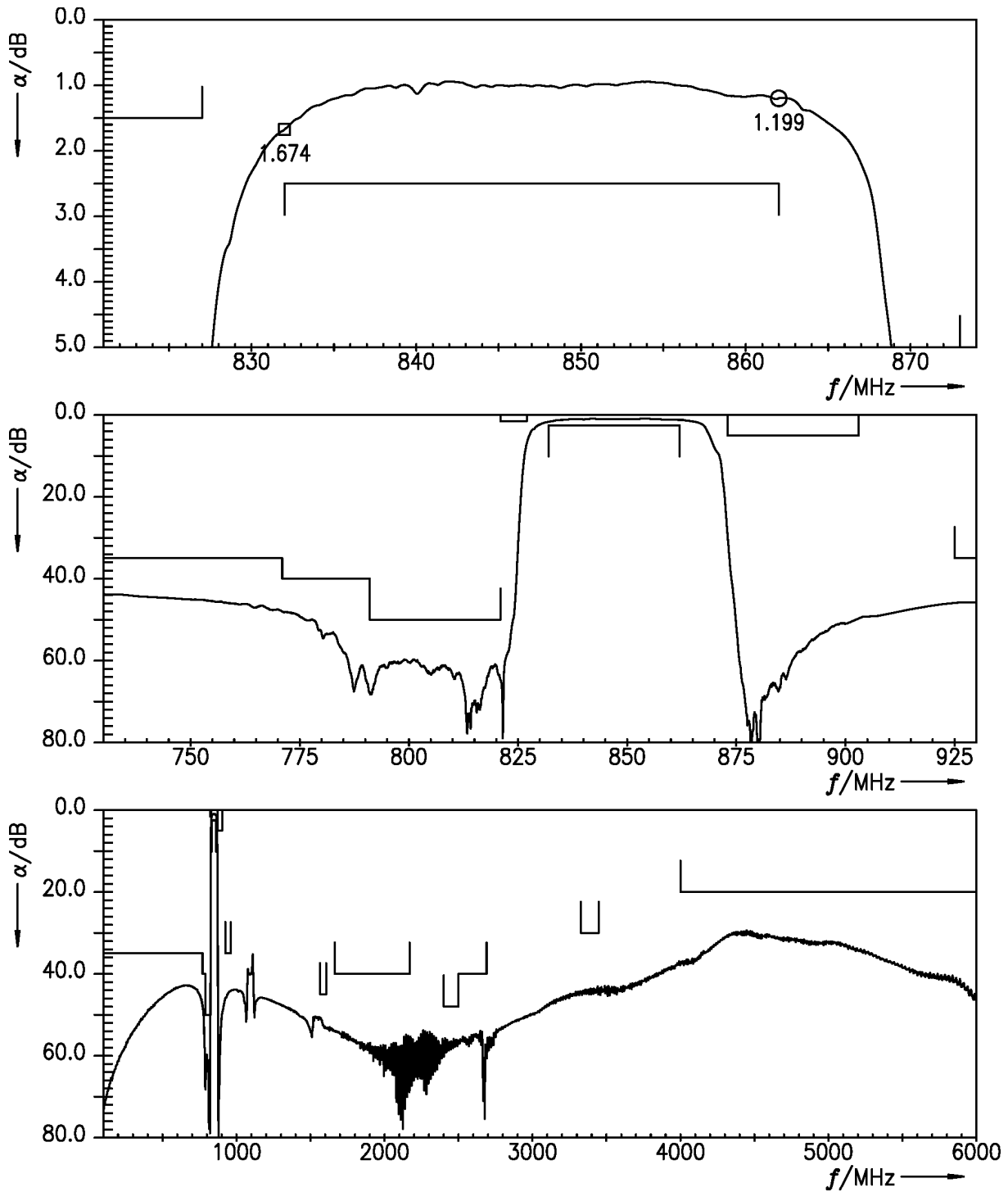


Figure 4: Attenuation TX – ANT.

SAW components	B8622
SAW duplexer	806 / 847 MHz

Data sheet

8.2 ANT – RX

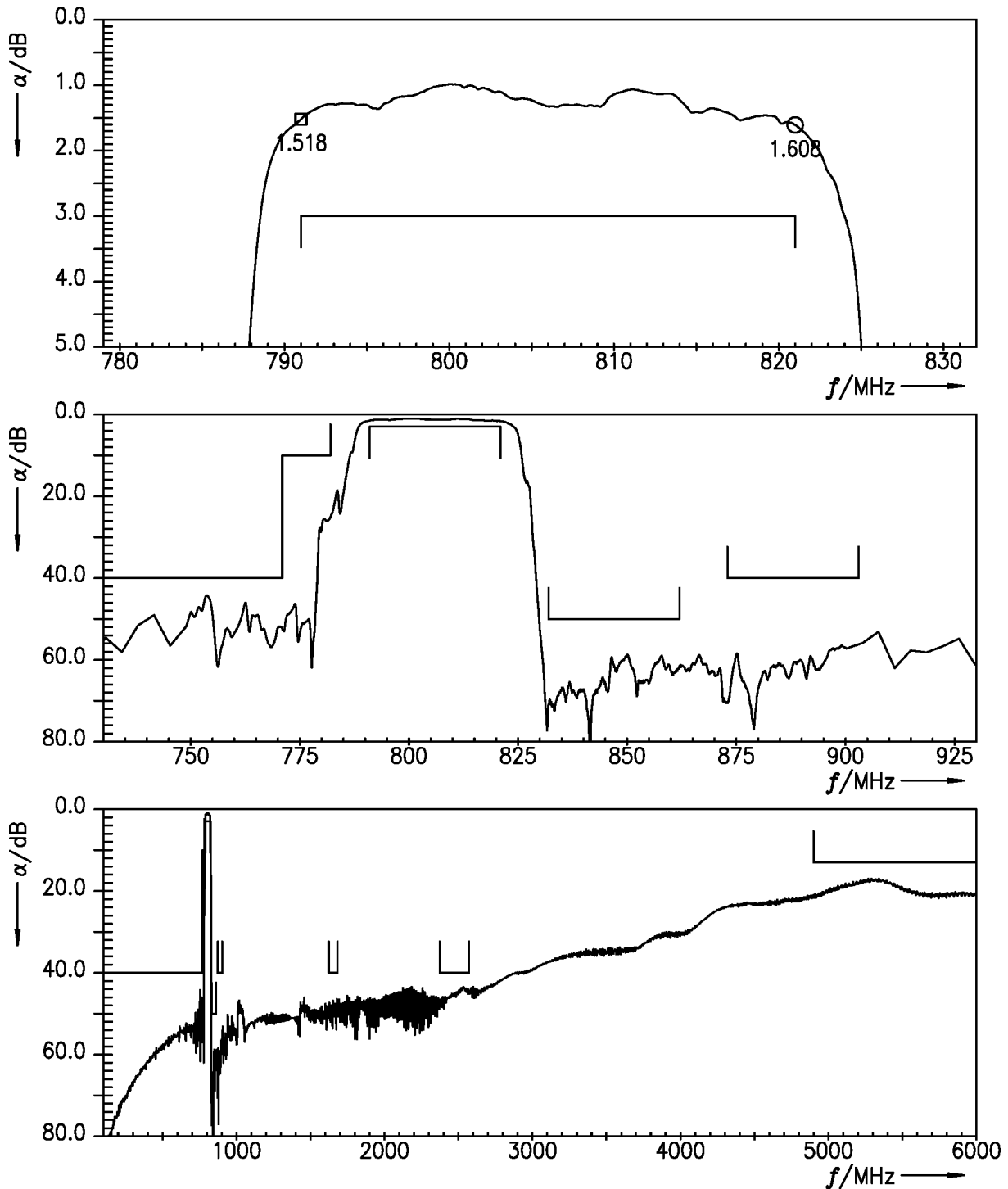


Figure 5: Attenuation ANT – RX.

SAW components	B8622
SAW duplexer	806 / 847 MHz

Data sheet

8.3 TX – RX

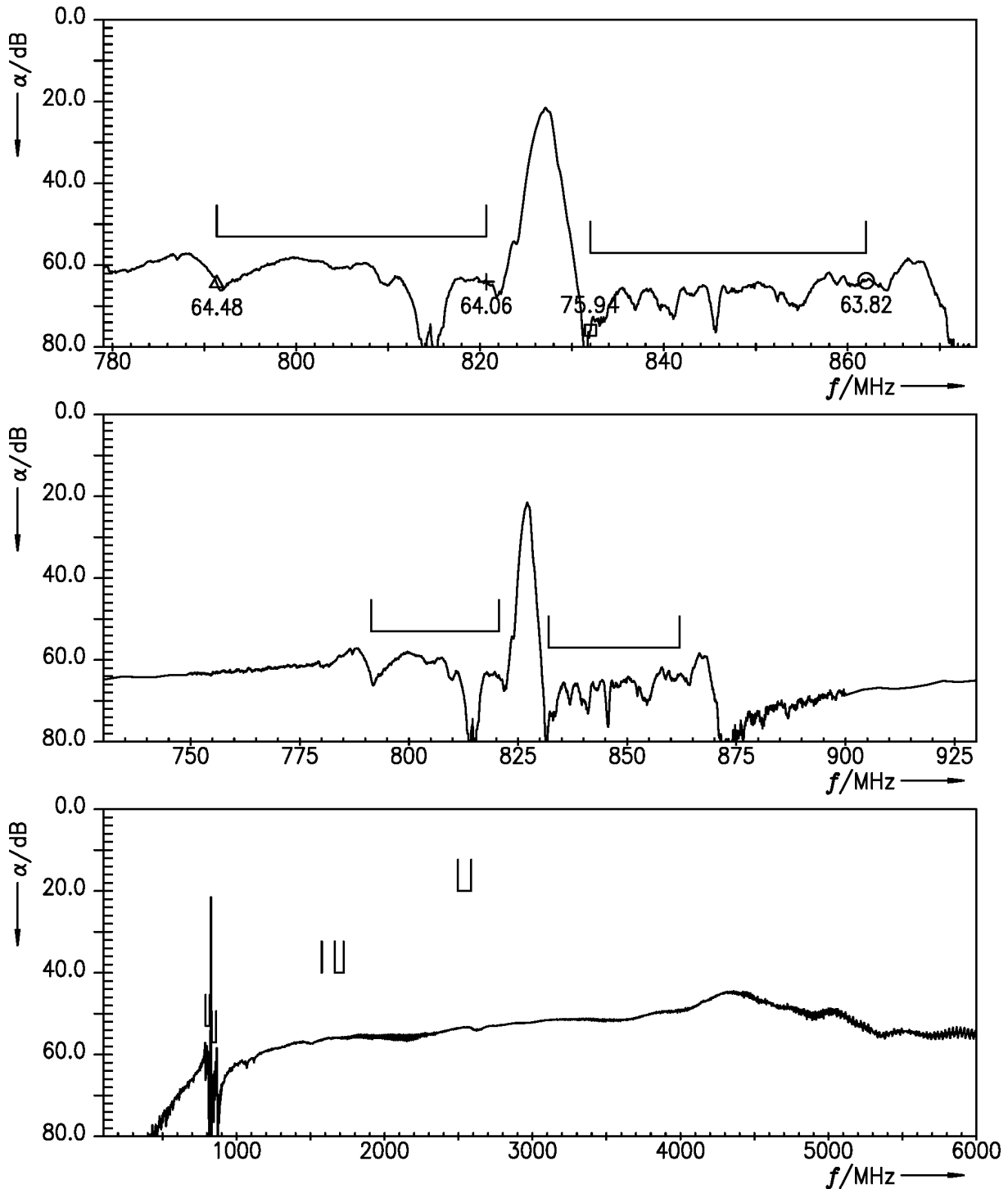


Figure 6: Isolation TX – RX.

Data sheet

9 Reflection coefficients

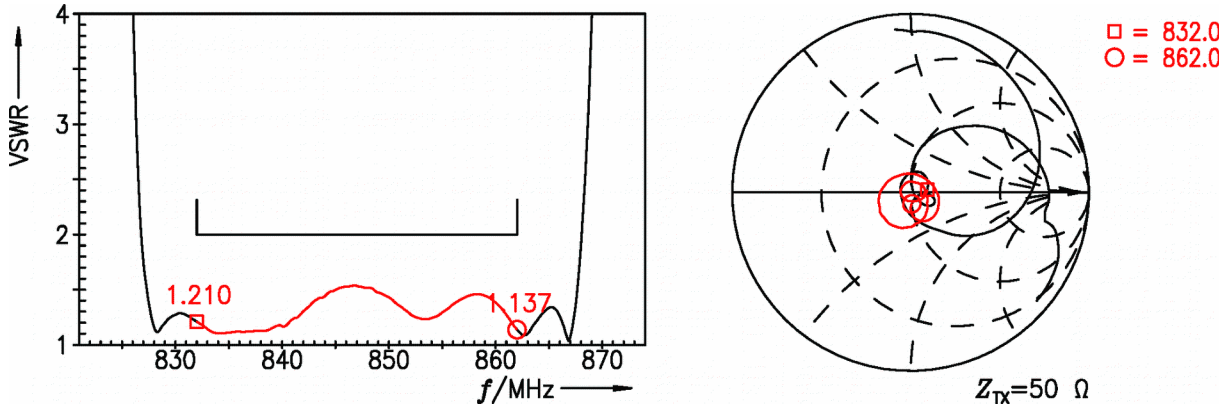


Figure 7: Reflection coefficient at TX port.

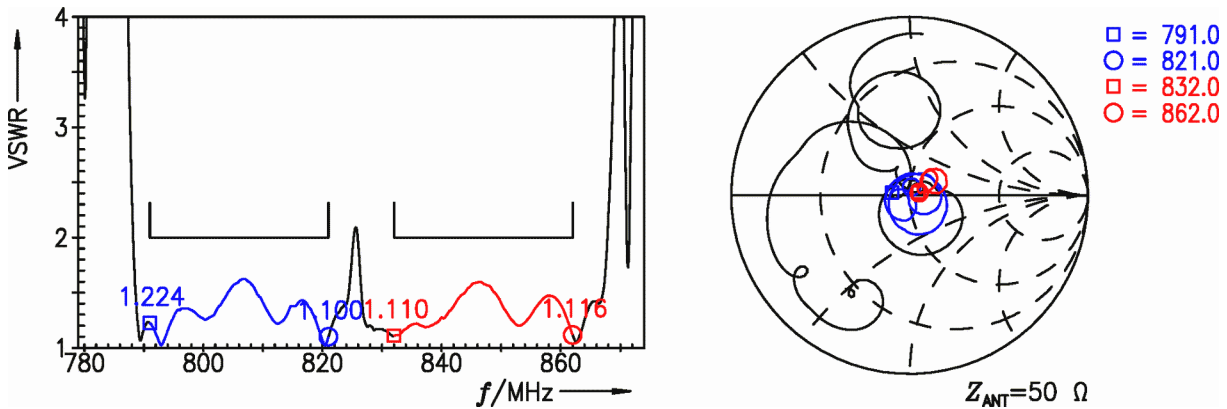


Figure 8: Reflection coefficient at ANT port.

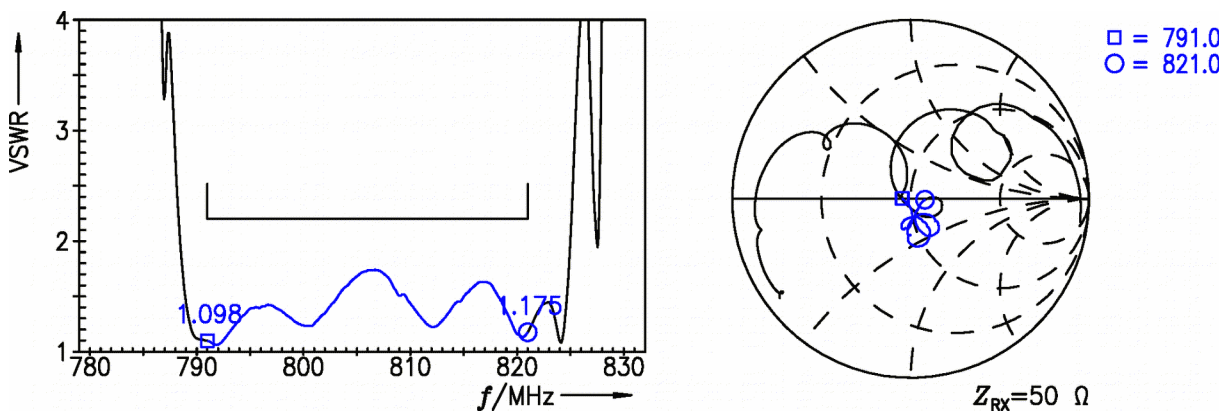


Figure 9: Reflection coefficient at RX port.

SAW components **B8622**
SAW duplexer **806 / 847 MHz**

Data sheet

10 Packing material

10.1 Tape

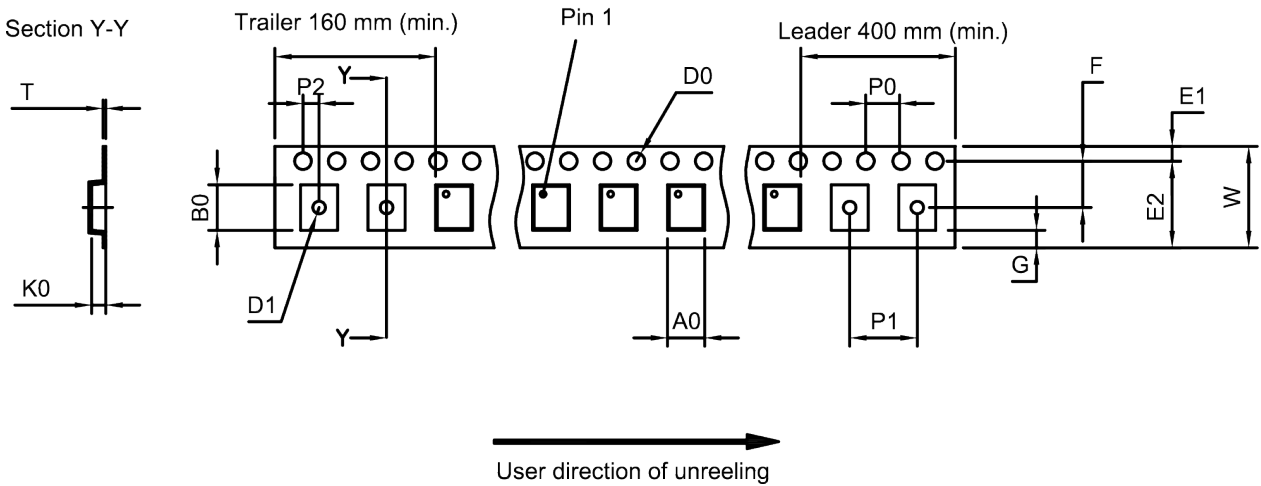


Figure 10: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A ₀	1.62±0.05 mm	E ₂	6.25 mm (min.)	P ₁	4.0±0.1 mm
B ₀	2.04±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±0.05 mm
D ₁	0.8±0.05 mm	K ₀	0.62±0.05 mm	W	8.0±0.1 mm
E ₁	1.75±0.1 mm	P ₀	4.0±0.1 mm		

Table 1: Tape dimensions.

SAW components	B8622
SAW duplexer	806 / 847 MHz

Data sheet

10.2 Reel with diameter of 180 mm

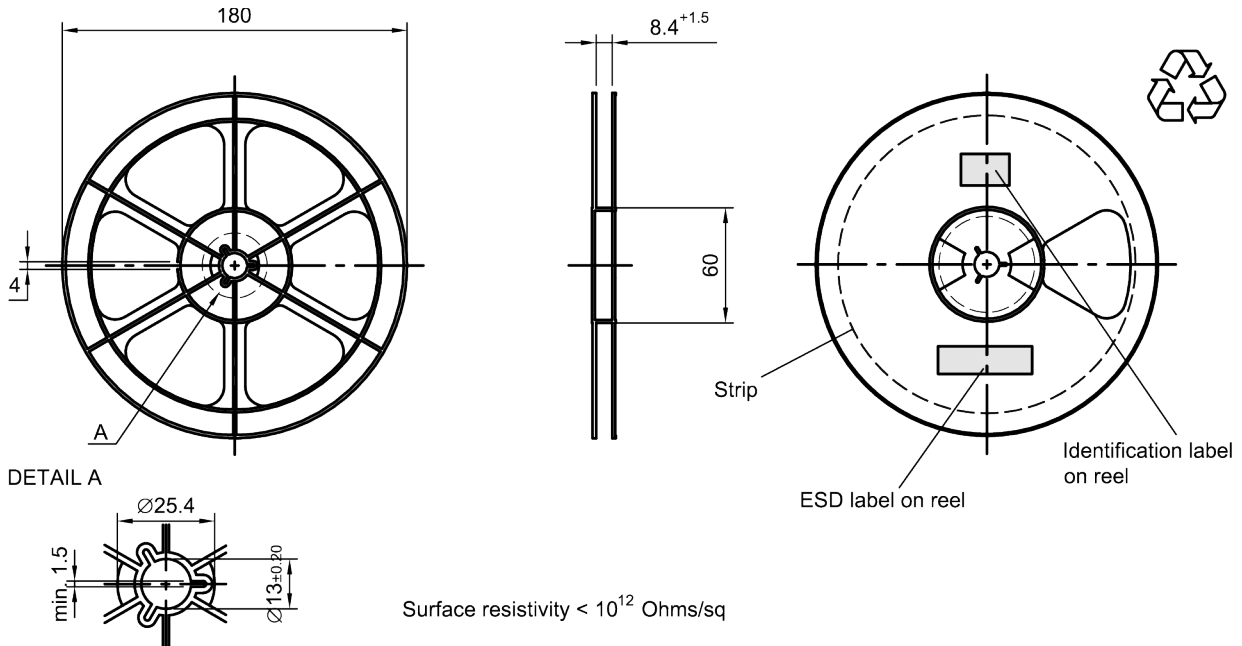


Figure 11: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

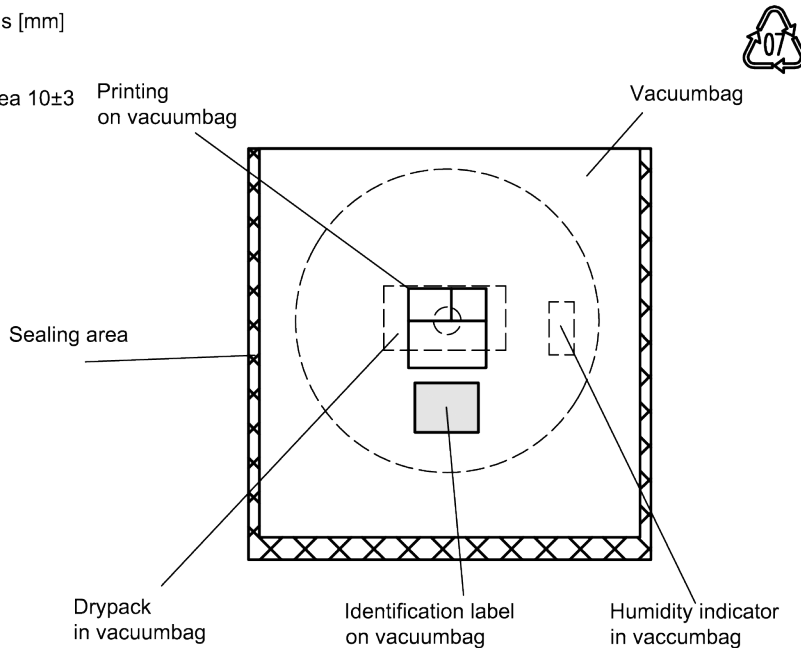


Figure 12: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

SAW components **B8622**
SAW duplexer **806 / 847 MHz**

Data sheet

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

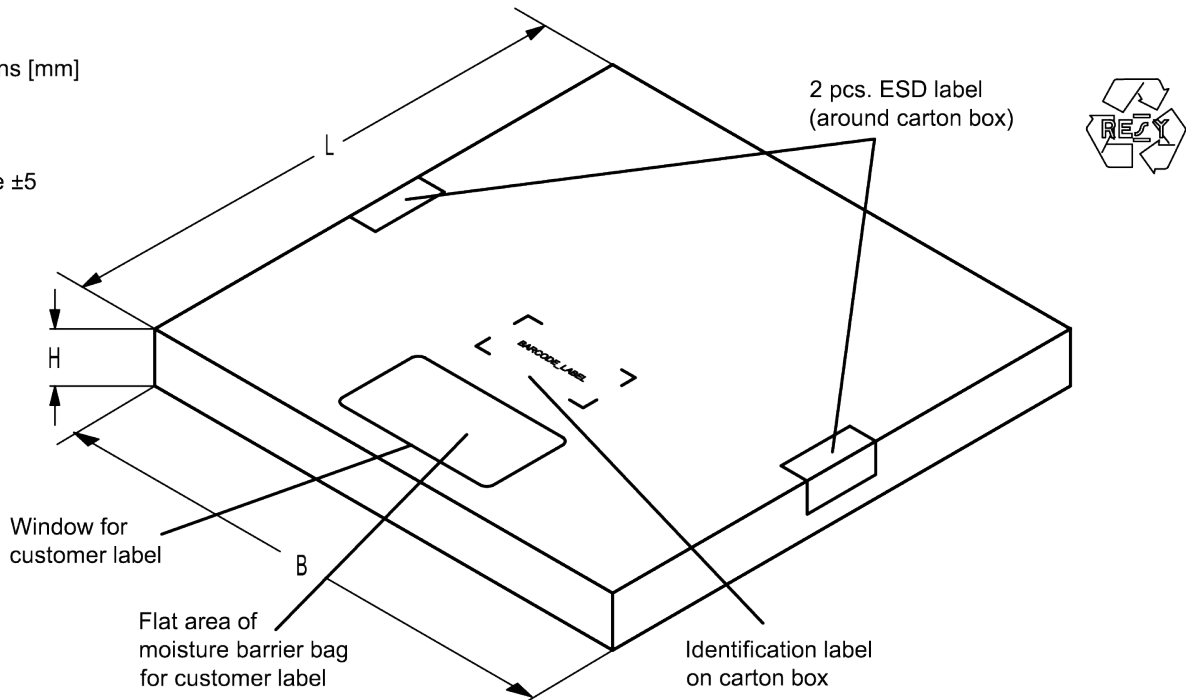


Figure 13: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

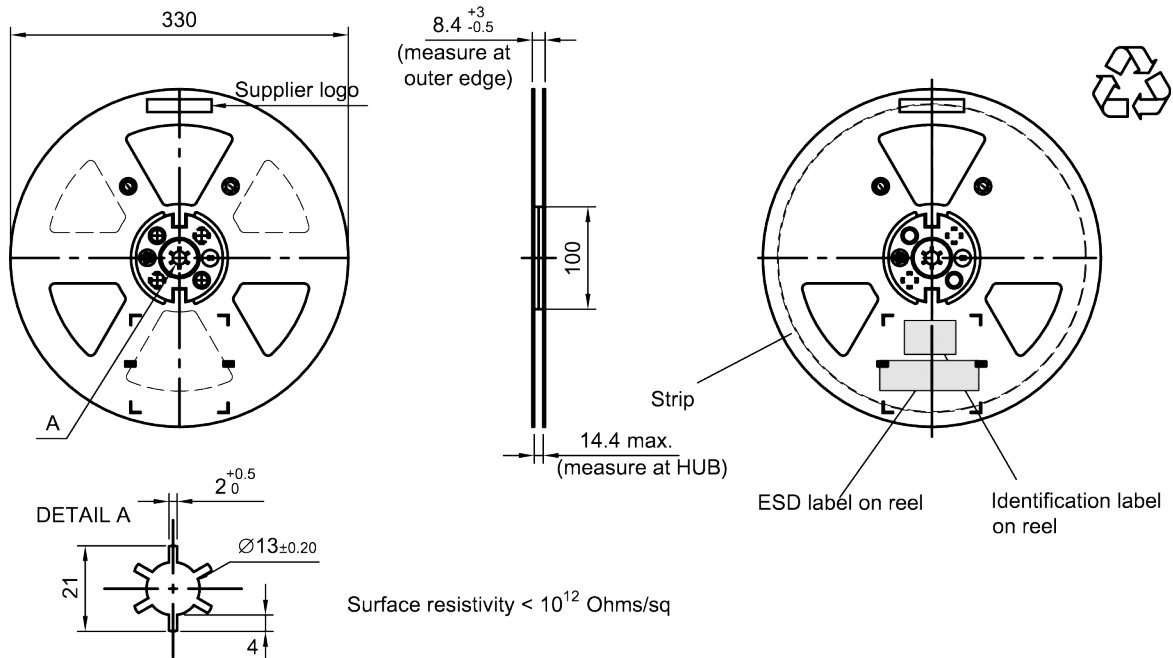


Figure 14: Drawing of reel (first-angle projection) with diameter of 330 mm.

SAW components **B8622**
SAW duplexer **806 / 847 MHz**

Data sheet

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

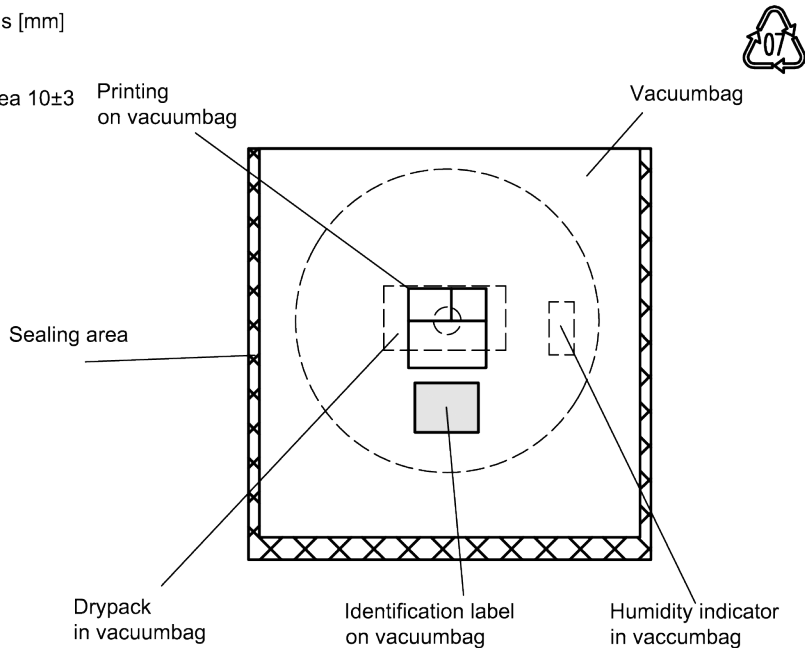


Figure 15: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

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

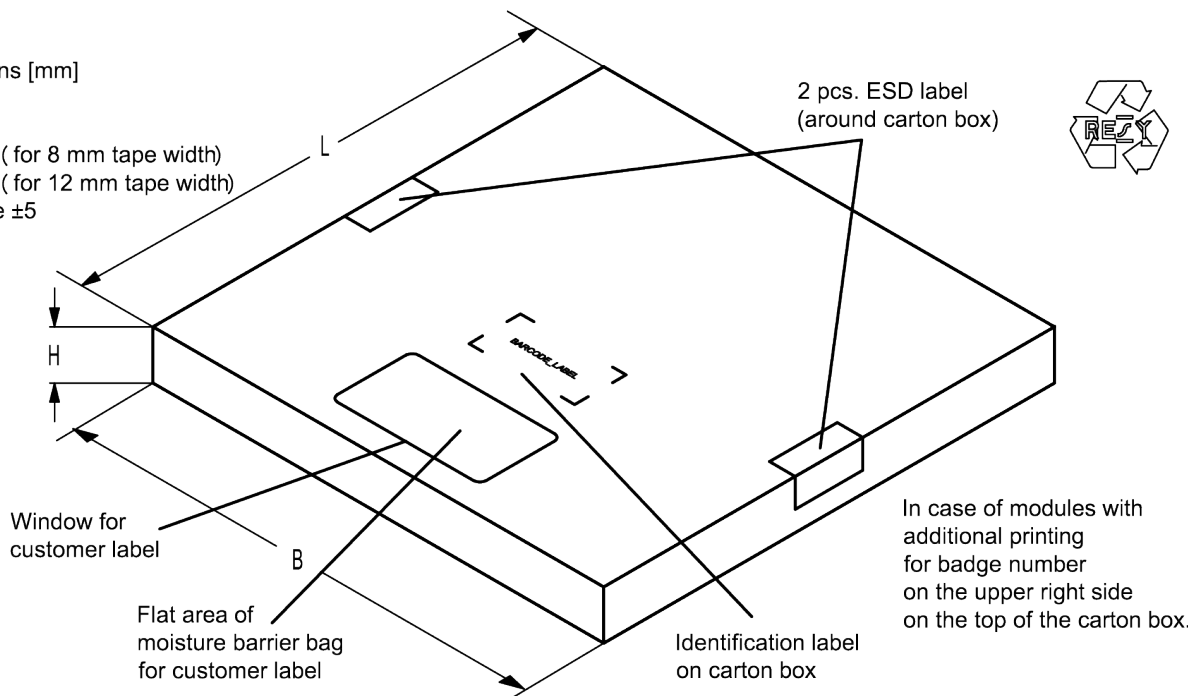


Figure 16: Drawing of folding box for reel with diameter of 330 mm.

SAW components

B8622

SAW duplexer

806 / 847 MHz

Data sheet

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 B8622 is 8DE.

■ 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.

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
$T > 220$ °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).

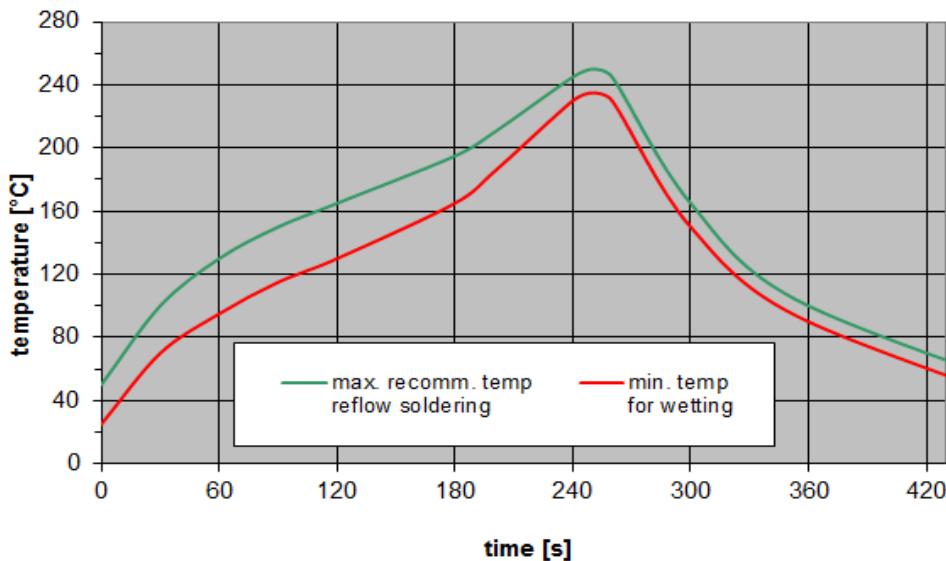


Figure 17: Recommended reflow profile for convection and infrared soldering – lead-free solder.

Data sheet

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 RF360 sales office.

13.4 Ordering codes and packing units

Ordering code	Packing unit
B39851B8622P810	15000 pcs

Table 4: Ordering codes and packing units.

Data sheet

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.

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.
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