Qualcomm
RF360
Europe GmbH

Data sheet

BAW duplexer

Small cell & femtocell
LTE band 2

Series/type:	B8024
Ordering code:	B39192B8024P810
Date:	July 19, 2018
Version:	2.4

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RF360 Europe GmbH
A Qualcomm – TDK Joint Venture

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Table of contents

1 Application

- Low-loss BAW RF duplexer for LTE small cell & femtocell systems (Band 2)
- Low insertion attenuation
- High power durability
- Usable pass band: 60 MHz
- Rx = Uplink = 1850 – 1910 MHz
- Tx = Downlink = 1930 – 1990 MHz

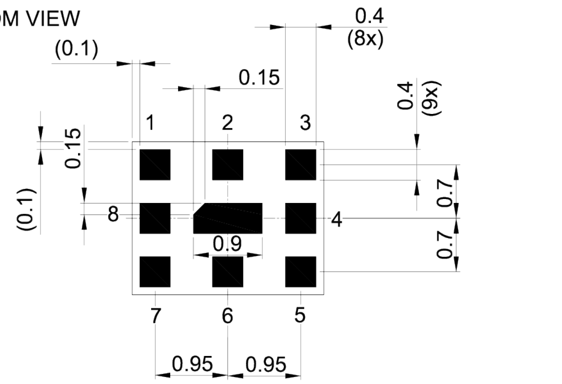
2 Features

- Industrial grade qualified family
- Package size 2.5±0.1 mm × 2.0±0.1 mm
- Package height 0.5 mm (max.)
- Approximate weight 5 mg
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 2a (MSL2a)

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

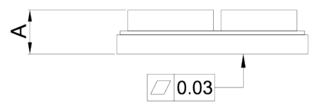
3 Package

BOTTOM VIEW

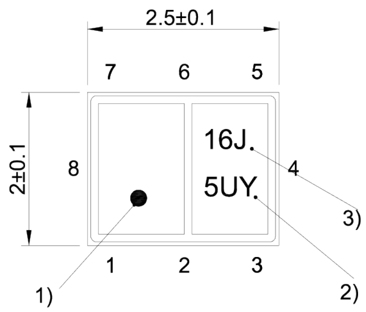


Pad and pitch tolerance ±0.05

SIDE VIEW

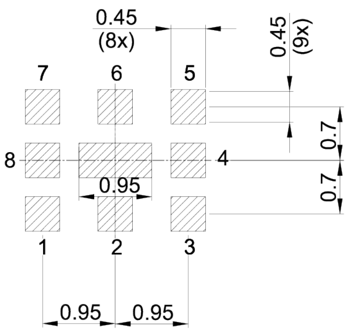


TOP VIEW



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 2: Drawing of package with package height A = 0.5 mm (max.). See Sec. Package information (p. 29).

4 Pin configuration

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

5 Matching circuit

- L_{p1} = 15 nH

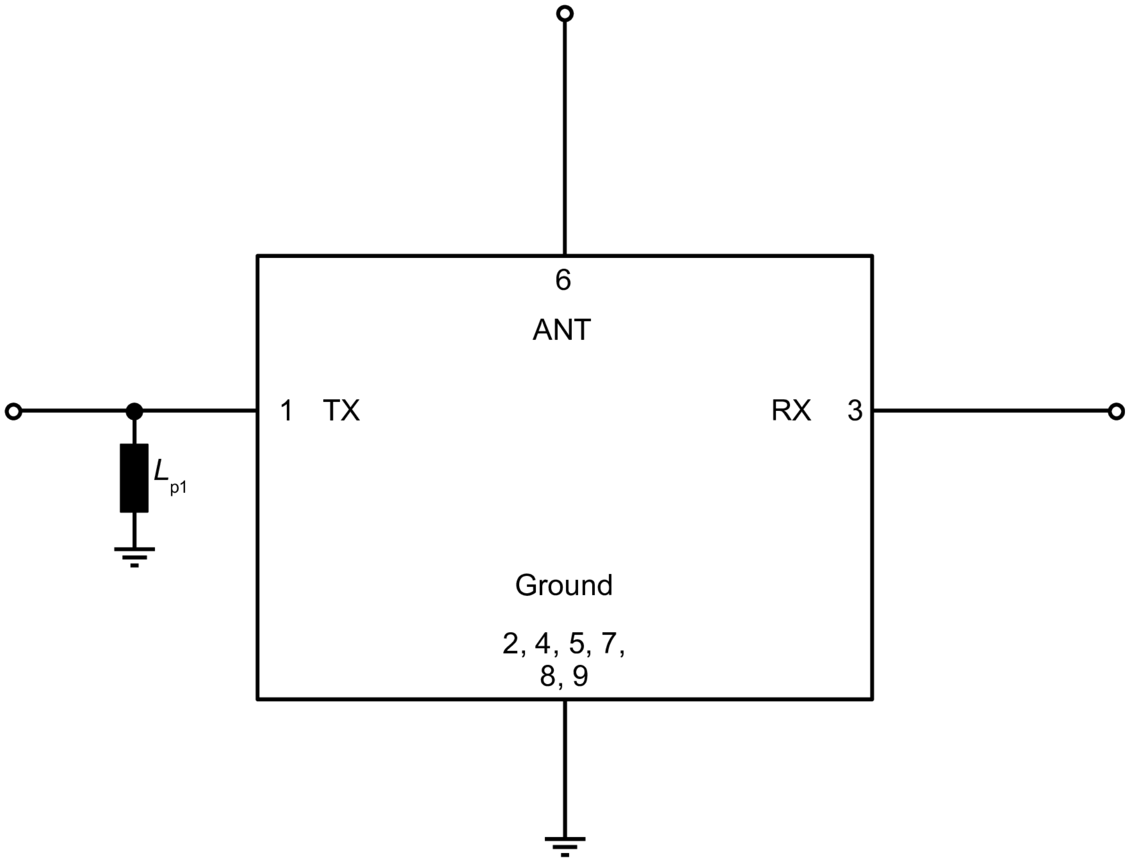


Figure 3: Schematic of matching circuit.

6 Characteristics

6.1 TX – ANT

Temperature range for specification	T_{SPEC}	= −10 °C ... +85 °C
TX terminating impedance	Z_{TX}	= 50 Ω with par. 15 nH[1)]
ANT terminating impedance	Z_{ANT}	= 50 Ω
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				
	1930 ... 1990	MHz		—	1960	—	MHz
Average insertion attenuation			$\alpha_{INT,avg}$ [2)]				
	1930 ... 1935	MHz		—	1.9	2.8	dB
	1935 ... 1990	MHz		—	2.0	2.4	dB
Maximum insertion attenuation			α_{max}				
	1930 ... 1990	MHz		—	2.2	3.3	dB
	1930.24 ... 1989.76	MHz		—	2.2	3.3	dB
	1935 ... 1990	MHz		—	2.2	2.6	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	1930 ... 1990	MHz		—	0.6	2.0	dB
	1935 ... 1990	MHz		—	0.6	1.5	dB
Maximum VSWR			$VSWR_{max}$				
@ TX port	1930 ... 1990	MHz		—	1.6	2.2	
	1935 ... 1950	MHz		—	1.3	2.0	
@ ANT port	1930 ... 1990	MHz		—	1.4	2.3	
	1935 ... 1965	MHz		—	1.3	2.0	
Maximum error vector magnitude			EVM_{max} [3)]				
	1932.4 ... 1987.6	MHz		—	2.4	3.8	%
Minimum attenuation			α_{min}				
	50 ... 699	MHz		30	32	—	dB
	699 ... 798	MHz		25	31	—	dB
	798 ... 824	MHz		25	31	—	dB
	824 ... 894	MHz		25	30	—	dB
	894 ... 1559	MHz		25	28	—	dB
	1559 ... 1606	MHz		25	28	—	dB
	1606 ... 1710	MHz		25	29	—	dB
	1710 ... 1755	MHz		30	34	—	dB
	1755 ... 1770	MHz		30	37	—	dB
	1770 ... 1850	MHz		35	43	—	dB
	1775 ... 1780	MHz		38	44	—	dB
	1850 ... 1910	MHz		45	50	—	dB
	1850.24 ... 1909.76	MHz		45	50	—	dB
	2010 ... 2110	MHz		3	7	—	dB

Characteristics TX – ANT			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
	2110 ... 2155	MHz	32	36	—	dB
	2155 ... 2190	MHz	34	37	—	dB
	2190 ... 2251	MHz	35	38	—	dB
	2251 ... 2400	MHz	34	40	—	dB
	2400 ... 2500	MHz	40	46	—	dB
	2500 ... 2690	MHz	35	50	—	dB
	2690 ... 3000	MHz	30	54	—	dB
	3000 ... 3300	MHz	20	39	—	dB
	3300 ... 3400	MHz	30	52	—	dB
	3400 ... 3800	MHz	35	52	—	dB
	3800 ... 5150	MHz	35	42	—	dB
	5150 ... 5850	MHz	30	39	—	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) Error Vector Magnitude (EVM) based on definition in 3GPP TS 25.141.

Temperature range for specification	T_{SPEC}	= −40 °C ... +95 °C
TX terminating impedance	Z_{TX}	= 50 Ω with par. 15 nH[1)]
ANT terminating impedance	Z_{ANT}	= 50 Ω
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				
	1930 ... 1990	MHz		—	1960	—	MHz
Average insertion attenuation			$\alpha_{INT,avg}$ [2)]				
	1930 ... 1935	MHz		—	1.9	3.0	dB
	1935 ... 1990	MHz		—	2.0	2.4	dB
Maximum insertion attenuation			α_{max}				
	1930 ... 1990	MHz		—	2.2	3.9	dB
	1930.24 ... 1989.76	MHz		—	2.2	3.9	dB
	1935 ... 1990	MHz		—	2.2	2.6	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	1930 ... 1990	MHz		—	0.6	2.6	dB
	1935 ... 1990	MHz		—	0.6	1.5	dB
Maximum VSWR			$VSWR_{max}$				
@ TX port	1930 ... 1990	MHz		—	1.6	2.2	
	1935 ... 1950	MHz		—	1.3	2.0	
@ ANT port	1930 ... 1990	MHz		—	1.4	2.3	
	1935 ... 1965	MHz		—	1.3	2.0	
Maximum error vector magnitude			EVM_{max} [3)]				
	1932.4 ... 1987.6	MHz		—	2.4	3.8	%
Minimum attenuation			α_{min}				
	50 ... 699	MHz		30	32	—	dB
	699 ... 798	MHz		25	31	—	dB
	798 ... 824	MHz		25	31	—	dB
	824 ... 894	MHz		25	30	—	dB
	894 ... 1559	MHz		25	28	—	dB
	1559 ... 1606	MHz		25	28	—	dB
	1606 ... 1710	MHz		25	29	—	dB
	1710 ... 1755	MHz		30	34	—	dB
	1755 ... 1770	MHz		30	37	—	dB
	1770 ... 1850	MHz		35	43	—	dB
	1775 ... 1780	MHz		38	44	—	dB
	1850 ... 1910	MHz		40	50	—	dB
	1850.24 ... 1909.76	MHz		45	50	—	dB
	2010 ... 2110	MHz		2	7	—	dB
	2110 ... 2155	MHz		32	36	—	dB
	2155 ... 2190	MHz		34	37	—	dB

Characteristics TX – ANT			min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
	2190 ... 2251	MHz	35	38	—	dB
	2251 ... 2400	MHz	34	40	—	dB
	2400 ... 2500	MHz	40	46	—	dB
	2500 ... 2690	MHz	35	50	—	dB
	2690 ... 3000	MHz	30	54	—	dB
	3000 ... 3300	MHz	20	39	—	dB
	3300 ... 3400	MHz	30	52	—	dB
	3400 ... 3800	MHz	35	52	—	dB
	3800 ... 5150	MHz	35	42	—	dB
	5150 ... 5850	MHz	30	39	—	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) Error Vector Magnitude (EVM) based on definition in 3GPP TS 25.141.

6.2 ANT – RX

Temperature range for specification	T_{SPEC}	= −10 °C ... +85 °C
TX terminating impedance	Z_{TX}	= 50 Ω with par. 15 nH[1)]
ANT terminating impedance	Z_{ANT}	= 50 Ω
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				
	1850 ... 1910	MHz		—	1880	—	MHz
Average insertion attenuation			$\alpha_{INT,avg}$ [2)]				
	1850 ... 1910	MHz		—	2.0	2.5	dB
Maximum insertion attenuation			α_{max}				
	1850 ... 1910	MHz		—	2.0	3.0	dB
	1850.24 ... 1909.76	MHz		—	2.0	2.9	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	1850 ... 1910	MHz		—	1.0	2.0	dB
Maximum VSWR			$VSWR_{max}$				
@ ANT port	1850 ... 1910	MHz		—	2.0	2.3	
	1870 ... 1905	MHz		—	1.0	2.0	
@ RX port	1850 ... 1910	MHz		—	1.0	2.3	
	1870 ... 1885	MHz		—	1.0	2.0	
Maximum error vector magnitude			EVM_{max} [3)]				
	1852.6 ... 1907.6	MHz		—	1.0	3.0	%
Minimum attenuation			α_{min}				
	50 ... 1600	MHz		35	38	—	dB
	1600 ... 1750	MHz		20	26	—	dB
	1750 ... 1810	MHz		20	23	—	dB
	1810 ... 1830	MHz		5	16	—	dB
	1930 ... 1990	MHz		45	51	—	dB
	1930.24 ... 1989.76	MHz		45	51	—	dB
	1990 ... 2110	MHz		30	33	—	dB
	2110 ... 2155	MHz		25	30	—	dB
	2190 ... 2251	MHz		23	26	—	dB
	2400 ... 2500	MHz		17	19	—	dB
	2500 ... 2690	MHz		12	16	—	dB
	2690 ... 3400	MHz		10	13	—	dB
	3400 ... 3800	MHz		10	15	—	dB
	3800 ... 5150	MHz		15	17	—	dB
	5150 ... 6000	MHz		15	22	—	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) Error Vector Magnitude (EVM) based on definition in 3GPP TS 25.141.

Temperature range for specification	T_{SPEC}	= −40 °C ... +95 °C
TX terminating impedance	Z_{TX}	= 50 Ω with par. 15 nH[1)]
ANT terminating impedance	Z_{ANT}	= 50 Ω
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				
	1850 ... 1910	MHz		—	1880	—	MHz
Average insertion attenuation			$\alpha_{INT,avg}$ [2)]				
	1850 ... 1910	MHz		—	2.0	2.8	dB
Maximum insertion attenuation			α_{max}				
	1850 ... 1910	MHz		—	2.0	3.3	dB
	1850.24 ... 1909.76	MHz		—	2.0	3.2	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	1850 ... 1910	MHz		—	1.0	2.3	dB
Maximum VSWR			$VSWR_{max}$				
@ ANT port	1850 ... 1910	MHz		—	2.0	2.3	
	1870 ... 1905	MHz		—	1.0	2.0	
@ RX port	1850 ... 1910	MHz		—	1.0	2.3	
	1870 ... 1885	MHz		—	1.0	2.0	
Maximum error vector magnitude			EVM_{max} [3)]				
	1852.6 ... 1907.6	MHz		—	1.0	3.2	%
Minimum attenuation			α_{min}				
	50 ... 1600	MHz		35	38	—	dB
	1600 ... 1750	MHz		20	26	—	dB
	1750 ... 1810	MHz		20	23	—	dB
	1810 ... 1830	MHz		5	16	—	dB
	1930 ... 1990	MHz		40	51	—	dB
	1930.24 ... 1989.76	MHz		40	51	—	dB
	1990 ... 2110	MHz		30	33	—	dB
	2110 ... 2155	MHz		25	30	—	dB
	2190 ... 2251	MHz		23	26	—	dB
	2400 ... 2500	MHz		17	19	—	dB
	2500 ... 2690	MHz		12	16	—	dB
	2690 ... 3400	MHz		10	13	—	dB
	3400 ... 3800	MHz		10	15	—	dB
	3800 ... 5150	MHz		15	17	—	dB
	5150 ... 6000	MHz		15	22	—	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) Error Vector Magnitude (EVM) based on definition in 3GPP TS 25.141.

6.3 TX – RX

Temperature range for specification	T_{SPEC}	= −10 °C ... +85 °C
TX terminating impedance	Z_{TX}	= 50 Ω with par. 15 nH[1)]
ANT terminating impedance	Z_{ANT}	= 50 Ω
RX terminating impedance	Z_{RX}	= 50 Ω

Characteristics TX – RX				**min.** for T_{SPEC}	**typ.** @ +25 °C	**max.** for T_{SPEC}	
Average isolation			$\alpha_{INT,avg}$ [2)]				
	1850 ... 1910	MHz		50	53	—	dB
	1930 ... 1990	MHz		52	58	—	dB
Minimum isolation			α_{min}				
	1850 ... 1910	MHz		48	52	—	dB
	1850.24 ... 1909.76	MHz		48	52	—	dB
	1930 ... 1990	MHz		50	57	—	dB
	1930.24 ... 1989.76	MHz		50	57	—	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.

Temperature range for specification	T_{SPEC}	= −40 °C ... +95 °C
TX terminating impedance	Z_{TX}	= 50 Ω with par. 15 nH[1)]
ANT terminating impedance	Z_{ANT}	= 50 Ω
RX terminating impedance	Z_{RX}	= 50 Ω

Characteristics TX – RX				**min.** for T_{SPEC}	**typ.** @ +25 °C	**max.** for T_{SPEC}	
Average isolation			$\alpha_{INT,avg}$ [2)]				
	1850 ... 1910	MHz		50	53	—	dB
	1930 ... 1990	MHz		51	58	—	dB
Minimum isolation			α_{min}				
	1850 ... 1910	MHz		44	52	—	dB
	1850.24 ... 1909.76	MHz		47	52	—	dB
	1930 ... 1990	MHz		43	57	—	dB
	1930.24 ... 1989.76	MHz		43	57	—	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.

7 Maximum ratings

Operable temperature	T_{OP} = −40 °C ... +95 °C	
Storage temperature	T_{STG} [1)] = −40 °C ... +95 °C	
DC voltage	$\|V_{DC}\|$ [2)] = 0 V (max.)	
ESD voltage		
	V_{ESD} [3)] = 250 V (max.)	Human body model.
	V_{ESD} [4)] = 150 V (max.)	Machine model.
Input power	P_{IN}	
@ TX port: 1930 ... 1990 MHz	30 dBm	5 MHz LTE downlink signal (25 RB) for 100000 h @ 55 °C. P_{IN} 30dBm average, 41dBm peak. Source and load impedance 50Ω.[5)]
@ TX port: other frequency ranges	10 dBm	Source and load impedance 50Ω.
Operating lifetime with output power at antenna 1930 ... 1990 MHz	P_{OUT} [6)] = 24 dBm	Continuous wave for 100000 h @ 55 °C.

1) Not valid for packaging material. Storage temperature for packaging material is −25 °C to +40 °C.
2) In case of applied DC voltage blocking capacitors are mandatory.
3) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
4) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.
5) Expected lifetime according to accelerated power durability measurement, and wear out models.
6) According to accelerated high temperature operating life (HTOL) test.

8 Transmission coefficients

8.1 TX – ANT

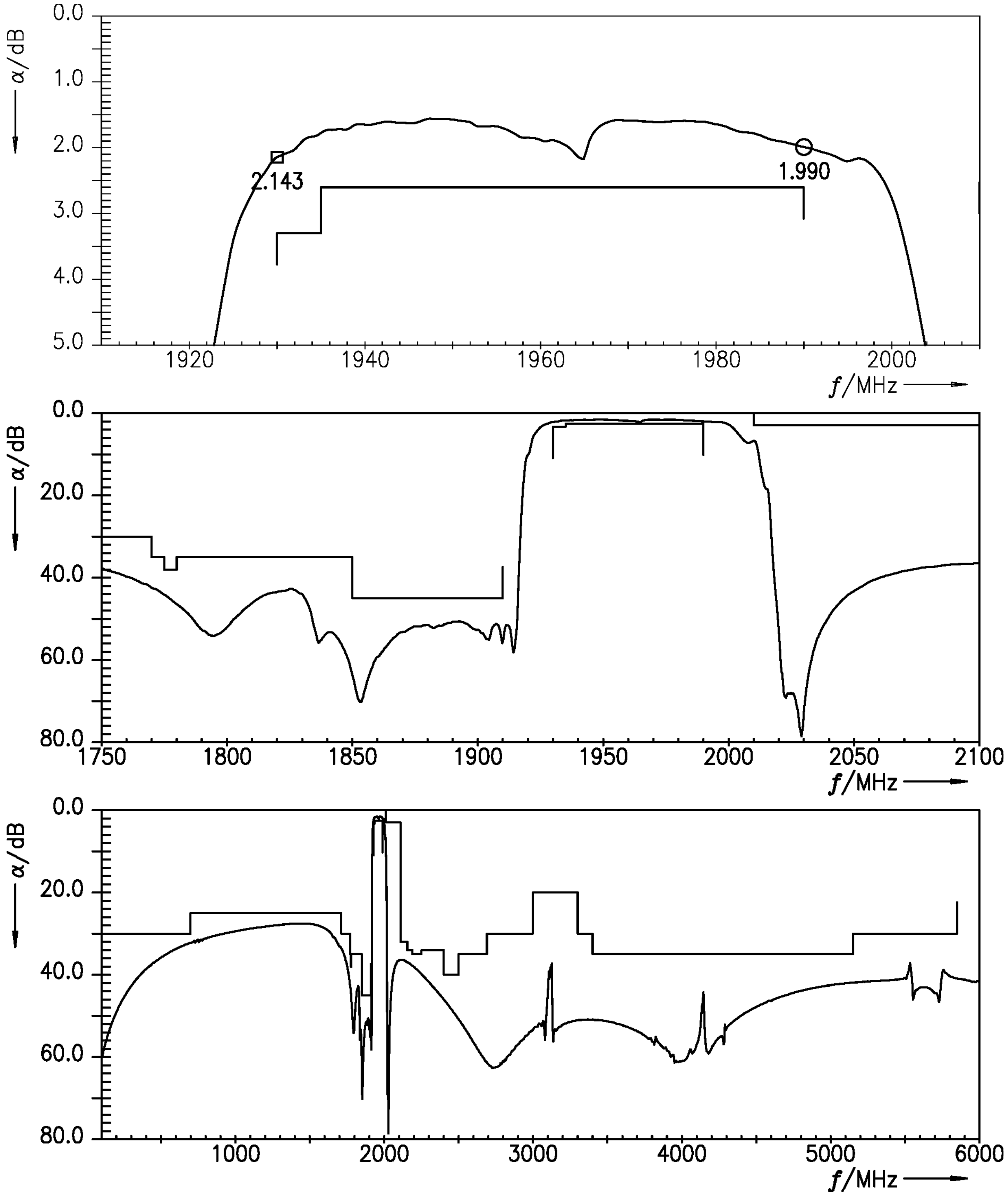


Figure 4: Attenuation TX – ANT.

8.2 ANT – RX

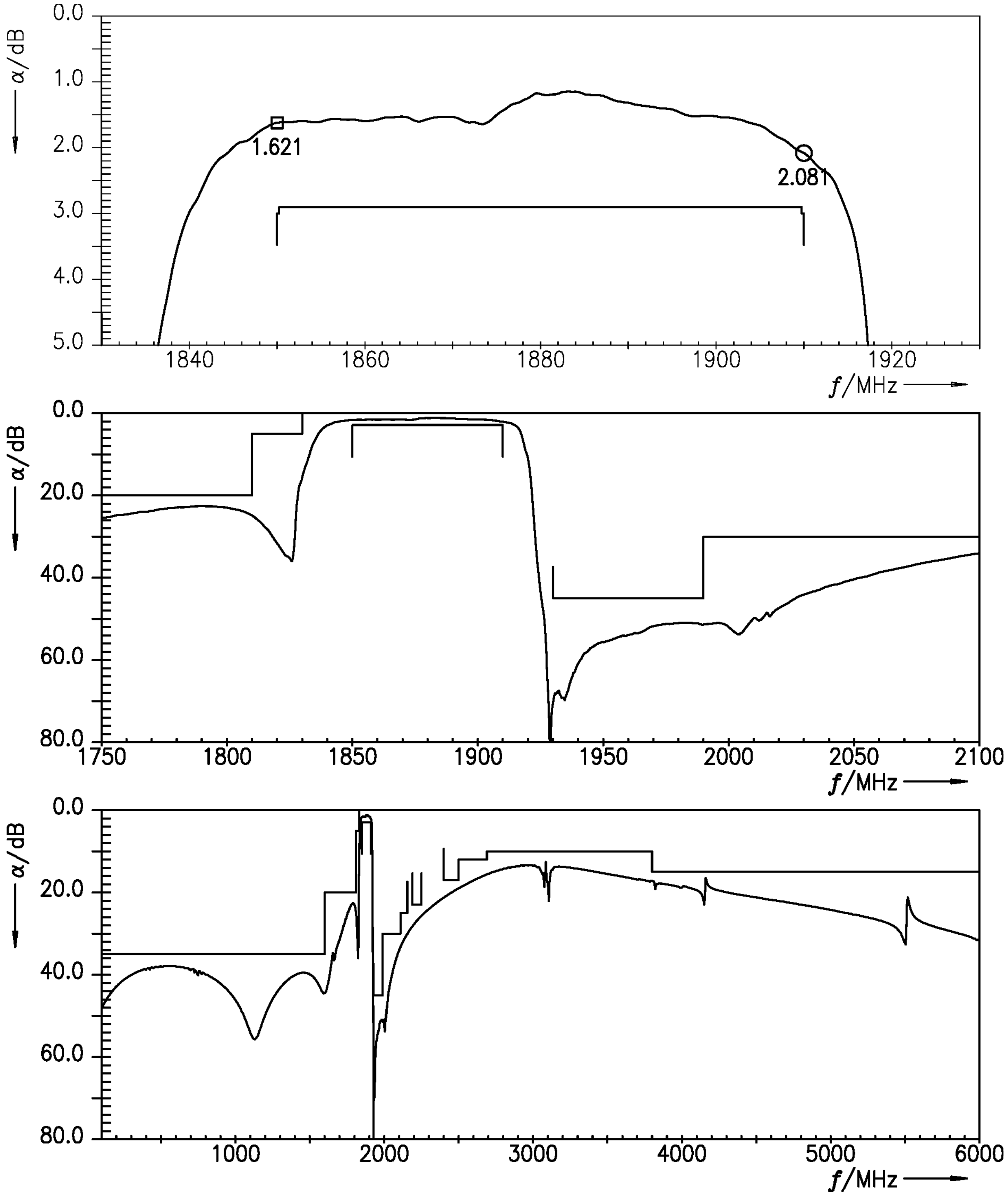


Figure 5: Attenuation ANT – RX.

8.3 TX – RX

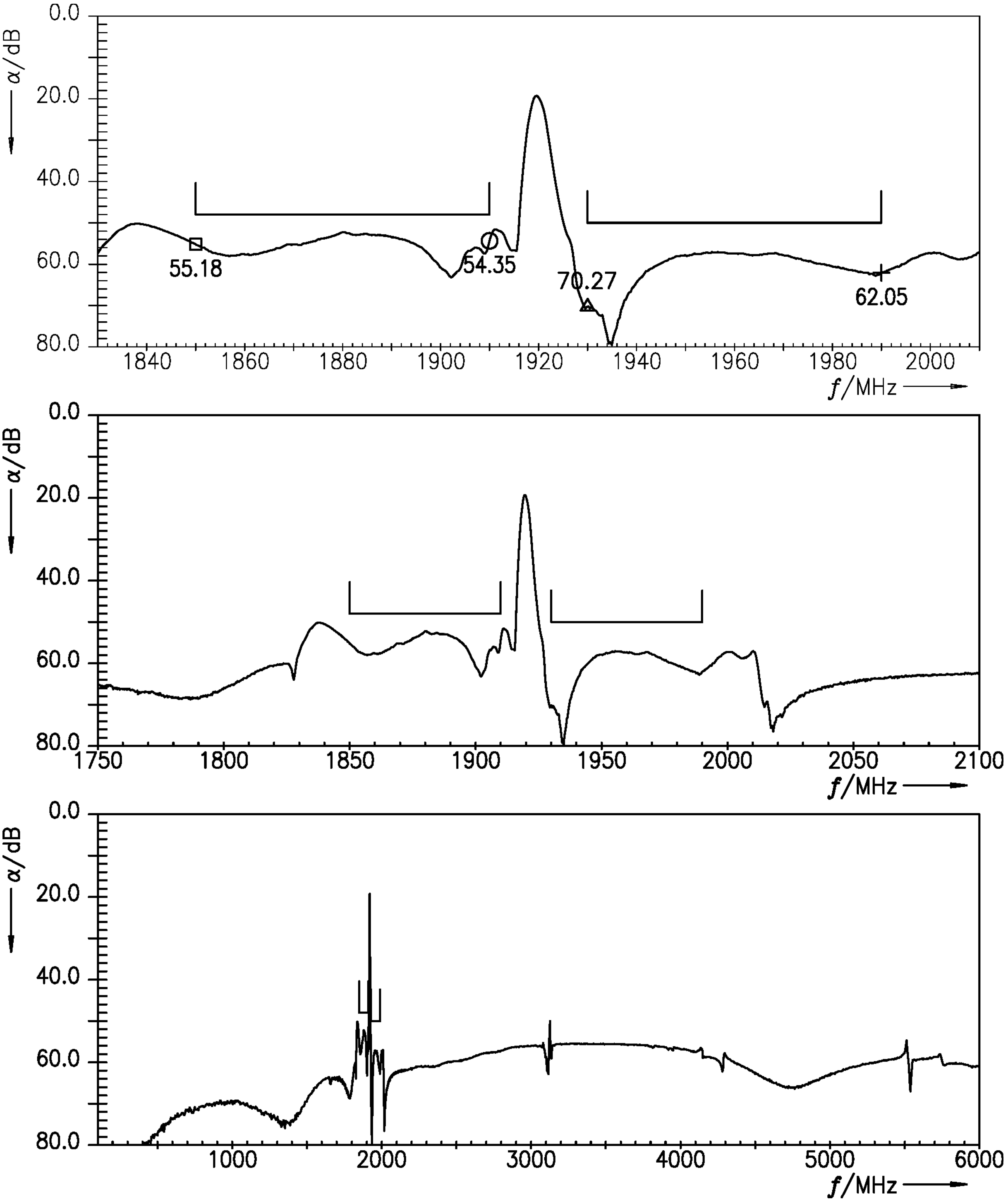


Figure 6: Isolation TX – RX.

9 Reflection coefficients

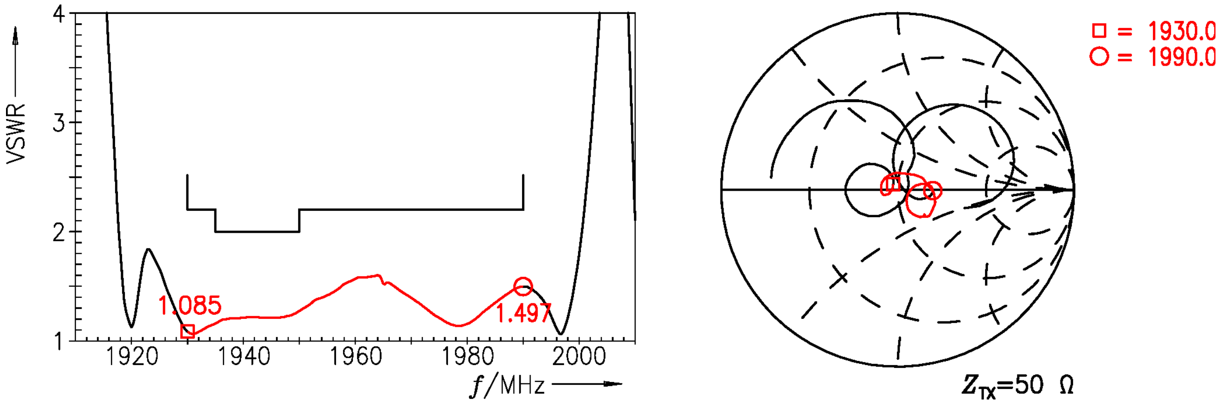


Figure 7: Reflection coefficient at TX port.

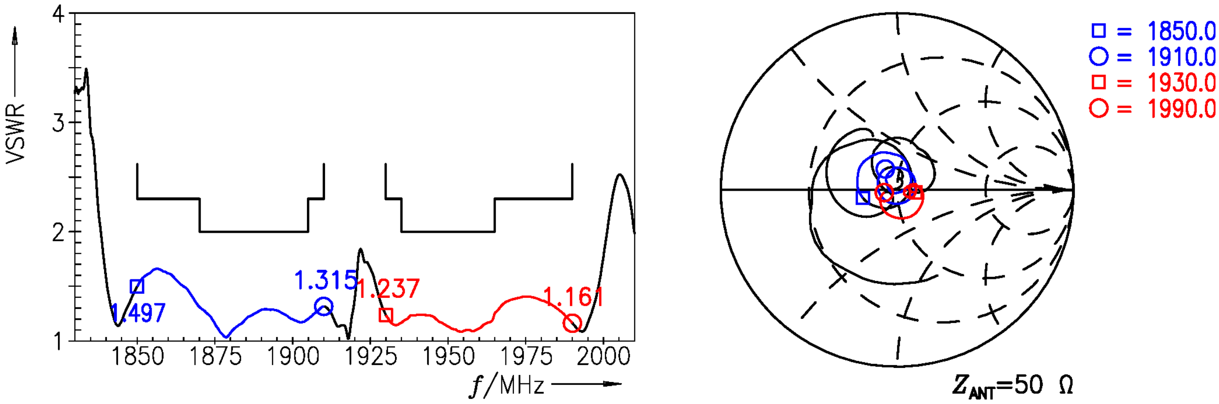


Figure 8: Reflection coefficient at ANT port.

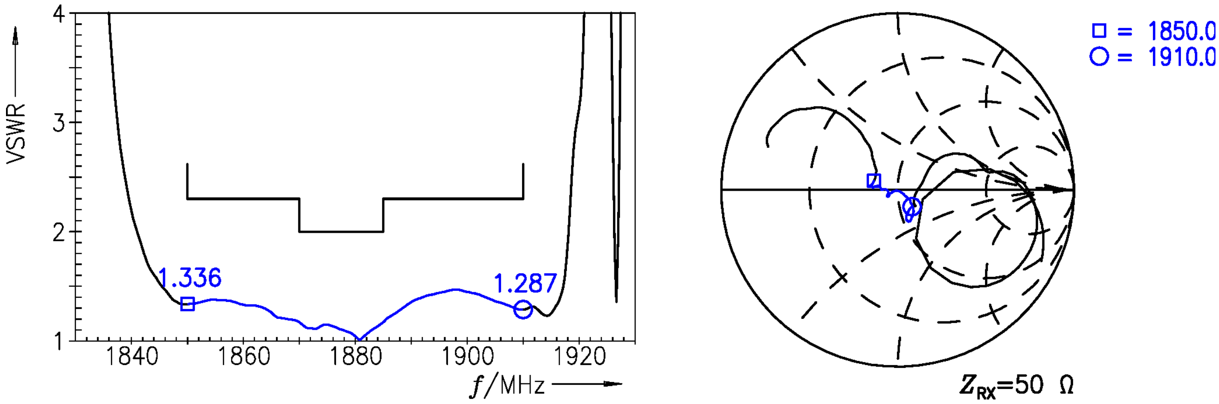


Figure 9: Reflection coefficient at RX port.

10 EVMs

10.1 TX – ANT

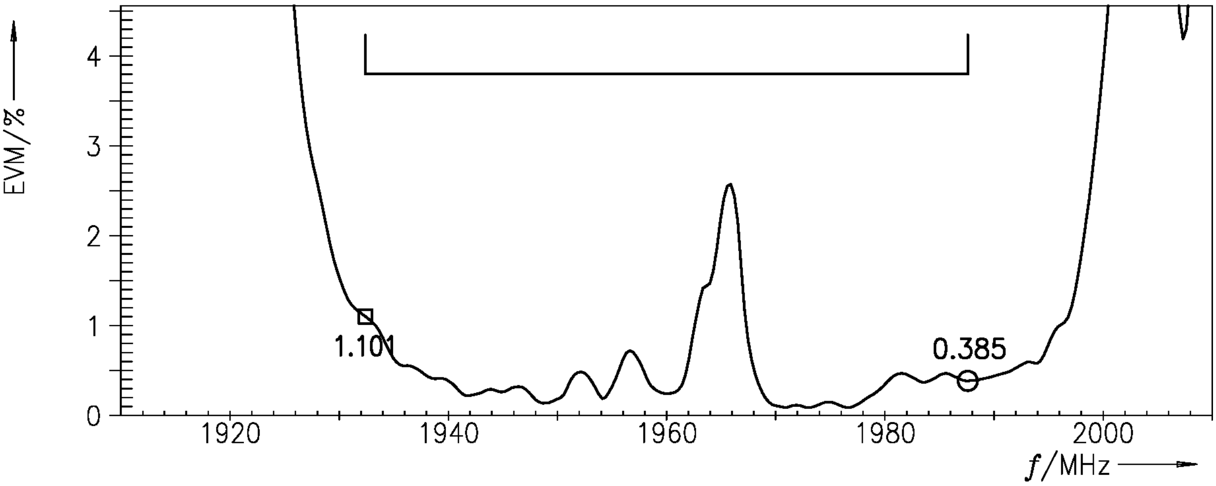


Figure 10: Error vector magnitude TX – ANT.

10.2 ANT – RX

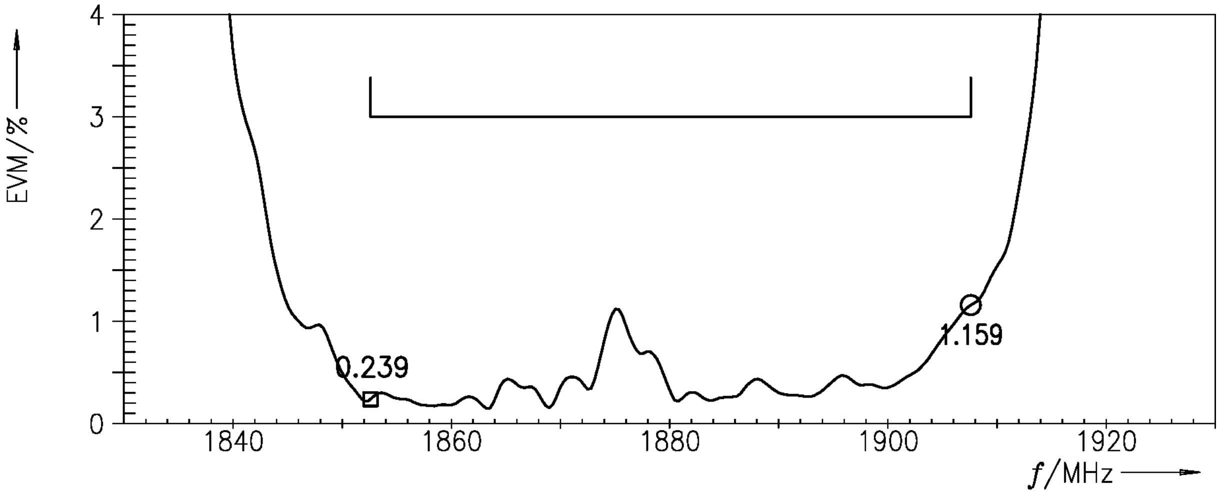


Figure 11: Error vector magnitude ANT – RX.

11 Packing material

11.1 Tape

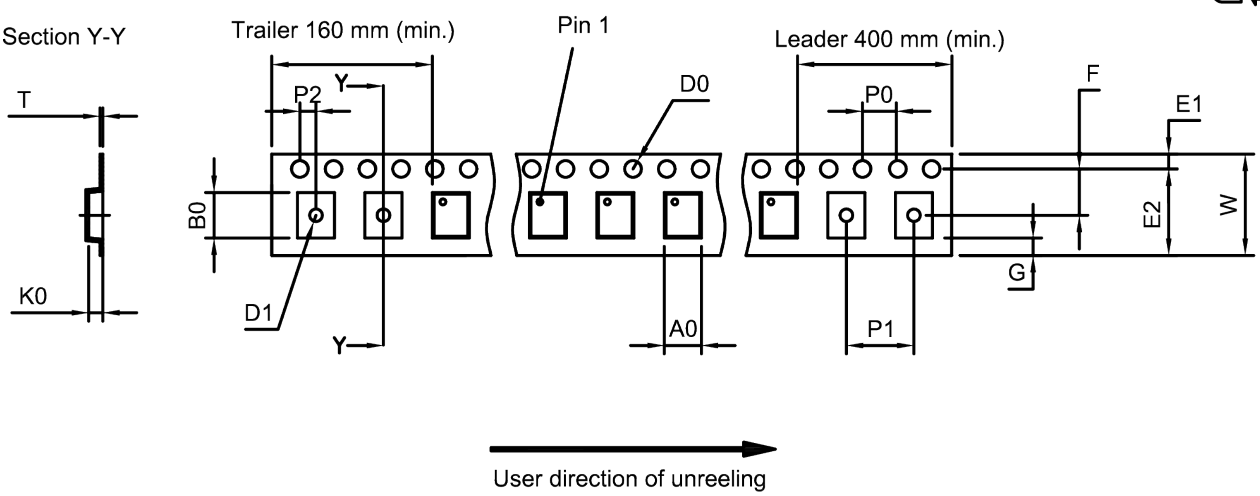


Figure 12: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

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

11.2 Reel with diameter of 180 mm

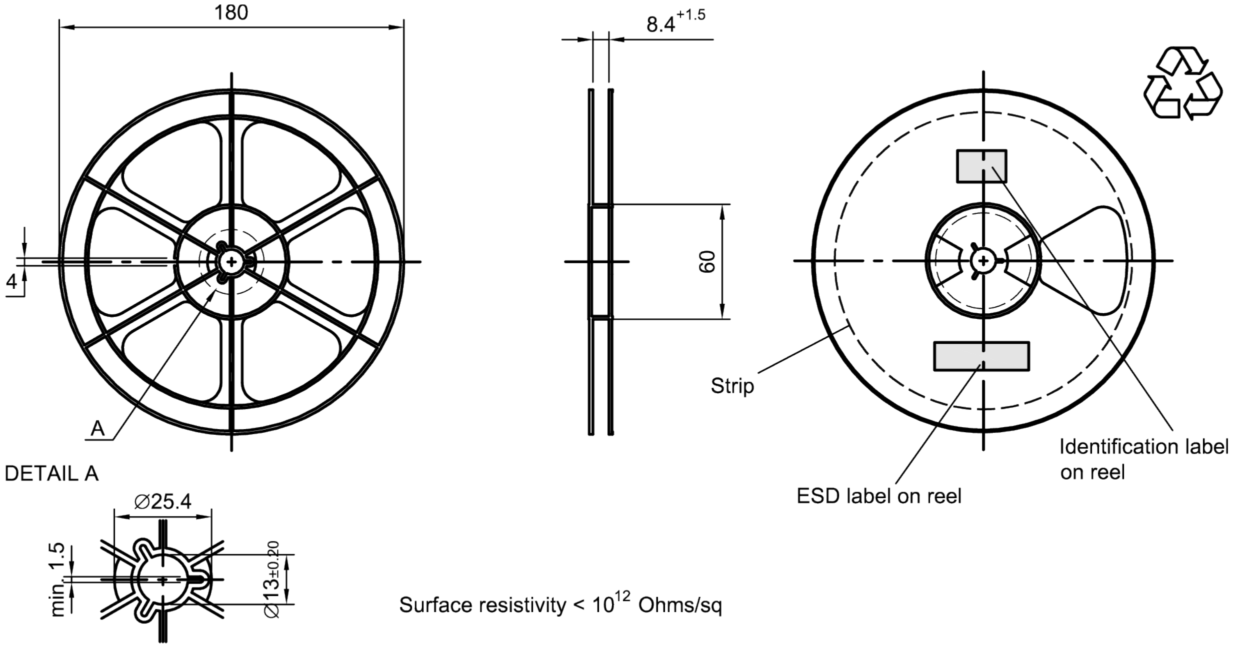


Figure 13: Drawing of reel (first-angle projection) with diameter of 180 mm.

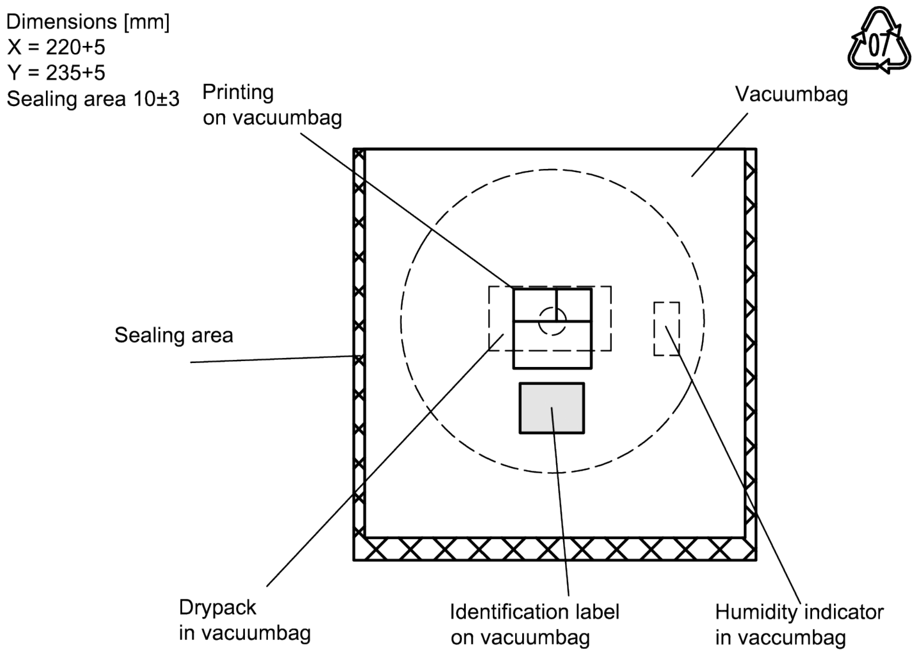


Figure 14: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

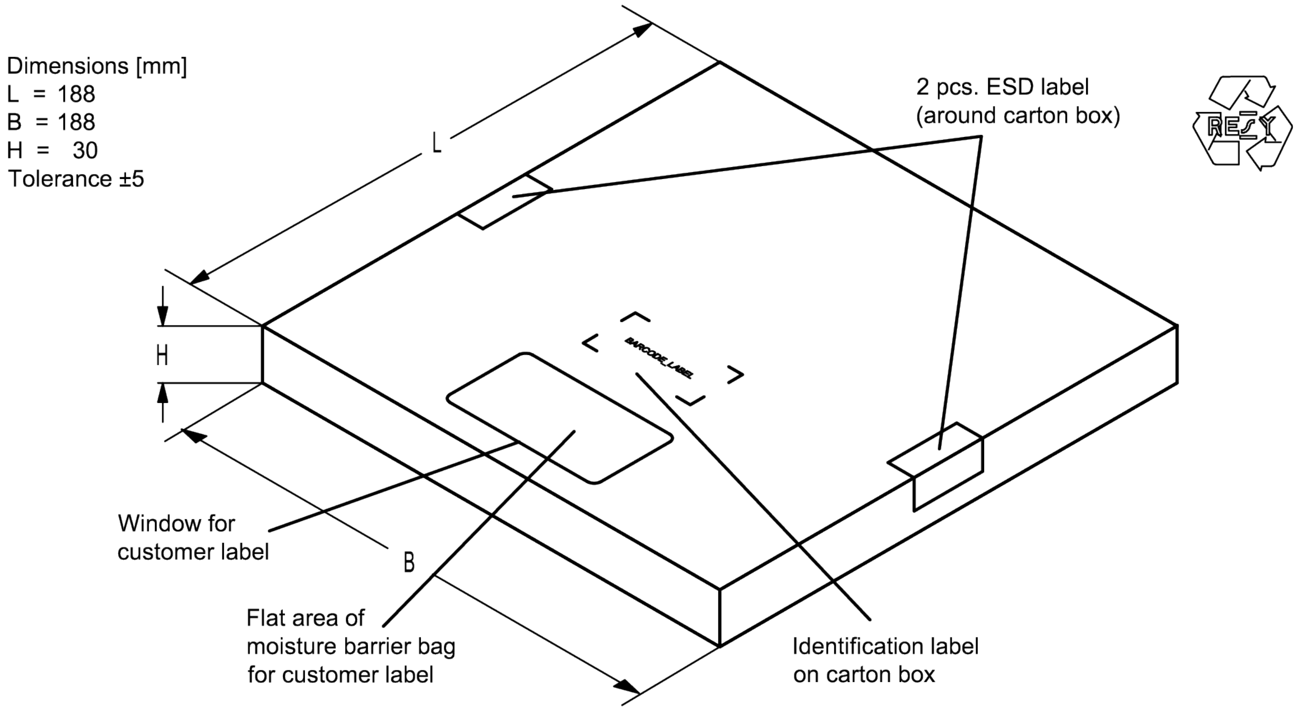


Figure 15: Drawing of folding box for reel with diameter of 180 mm.

11.3 Reel with diameter of 330 mm

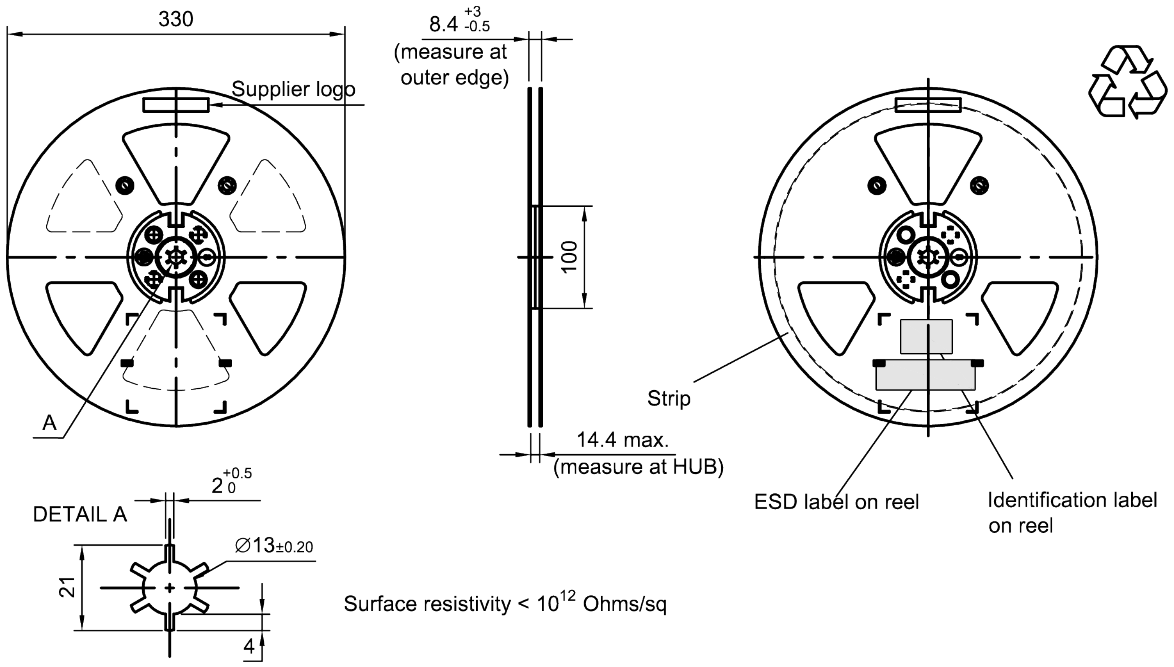


Figure 16: Drawing of reel (first-angle projection) with diameter of 330 mm.

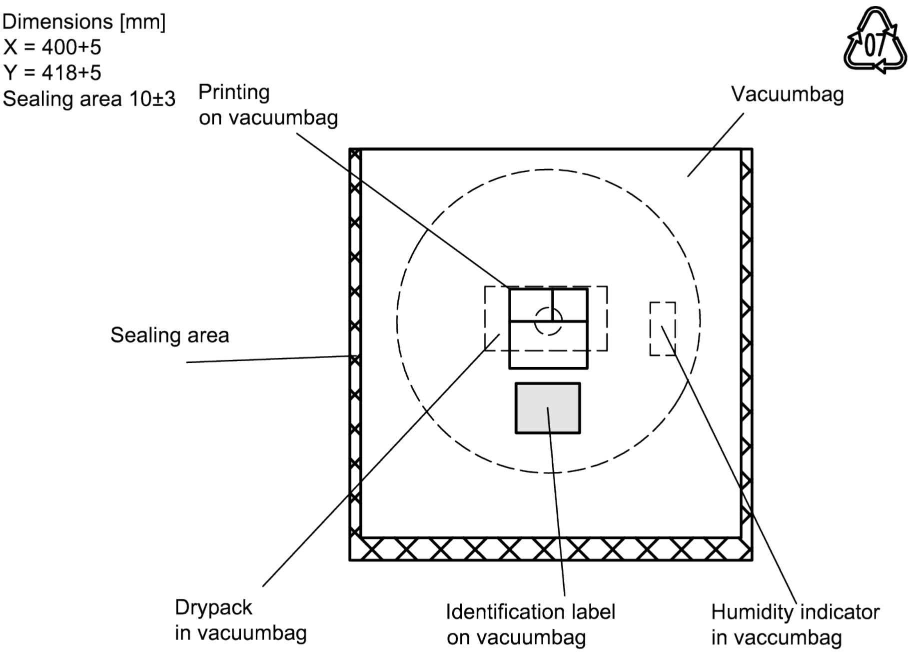


Figure 17: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

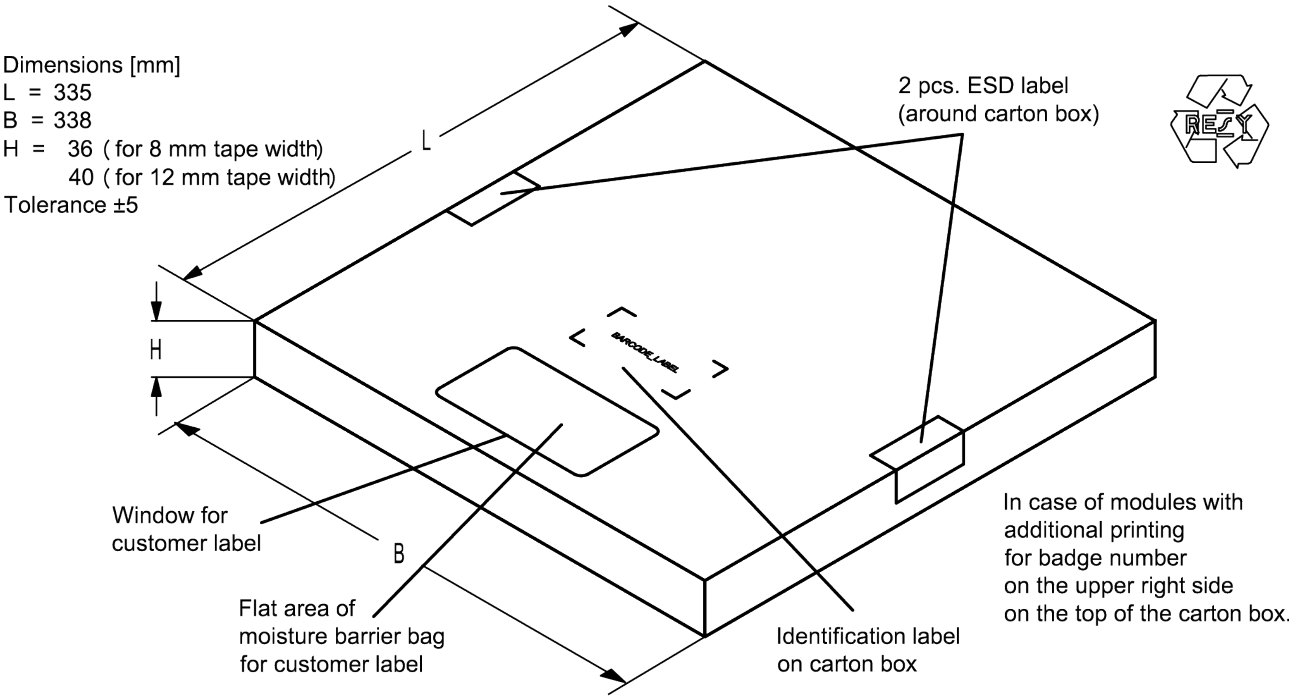


Figure 18: Drawing of folding box for reel with diameter of 330 mm.

12 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**

$\mathbf{1} \times 32^2 + \mathbf{6} \times 32^1 + \mathbf{18\ (=J)} \times 32^0$ = **1234**

The BASE32 code for product type B8024 is 7TR.

- 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**

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

13 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).

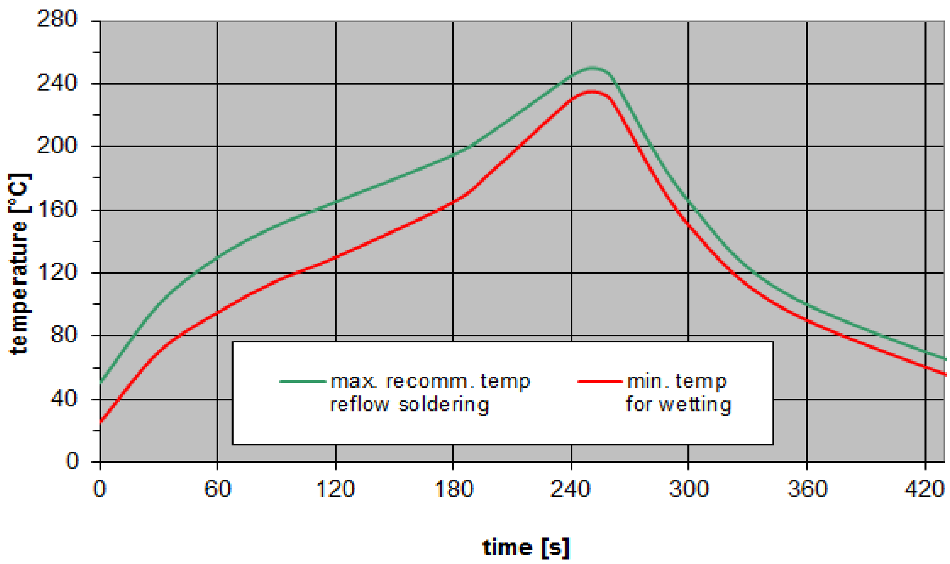


Figure 19: Recommended reflow profile for convection and infrared soldering – lead-free solder.

14 Annotations

14.1 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.

14.2 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.

14.3 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.

14.4 Ordering codes and packing units

Ordering code	Packing unit
B39192B8024P810	5000 pcs

Table 4: Ordering codes and packing units.

15 Cautions and warnings

15.1 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.

15.2 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.

15.3 Moldability

Before using in overmolding environment, please contact your local RF360 sales office.

15.4 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).

Dimensions do not include burrs.

Projection method

Unless otherwise specified first-angle projection is applied.

16 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.