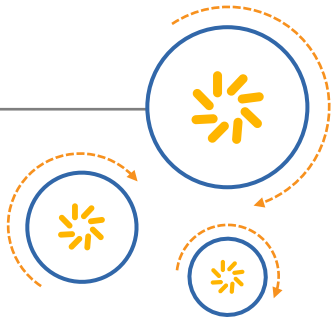
RF360 Europe GmbH

A Qualcomm – TDK Joint Venture



SAW Components

SAW Extractor

BeiDou/GPS/Glonass

Series/type:	B8666
Ordering code:	B39162B8666L210
Date:	September 8, 2016
Version:	2.9

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RF360 Europe GmbH, Anzinger Str. 13, München, Germany

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Table of contents

Data sheet

1 Application

- Premium-performance BeiDou/GPS/Glonass Extractor with single ended 50 Ω ports.
- Ultra-low-loss acoustic structure.
- Advanced fully-integrated multiplexer structure (no external matching needed).
- Using common antenna for BeiDou/GPS/Glonass and Cellular bands.
- Placed between antenna and cellular front-end switches and filters.
- Usable GNSS pass bands: 1559.05 – 1563.144 MHz, 1574.42 – 1576.42 MHz, 1597.55 – 1605.89 MHz.
- Usable CELL pass bands: 699 – 960 MHz, 1710 – 2690 MHz, 3400 – 3600 MHz
- No switches and control lines required.

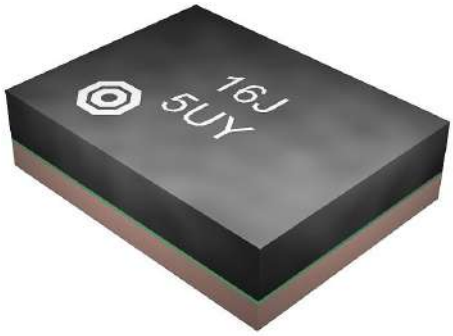

Figure 1: Picture of component with example of marking.

2 Features

- Package size 1.7 mm × 1.3 mm.
- Package height 0.5 mm.
- Approximate weight 0.00225 g.
- RoHS compatible.
- Package for Surface Mount Technology (SMT).
- Ni, gold-plated terminals.
- Electrostatic Sensitive Device (ESD).
- Moisture Sensitivity Level 3 (MSL3).

3 Package

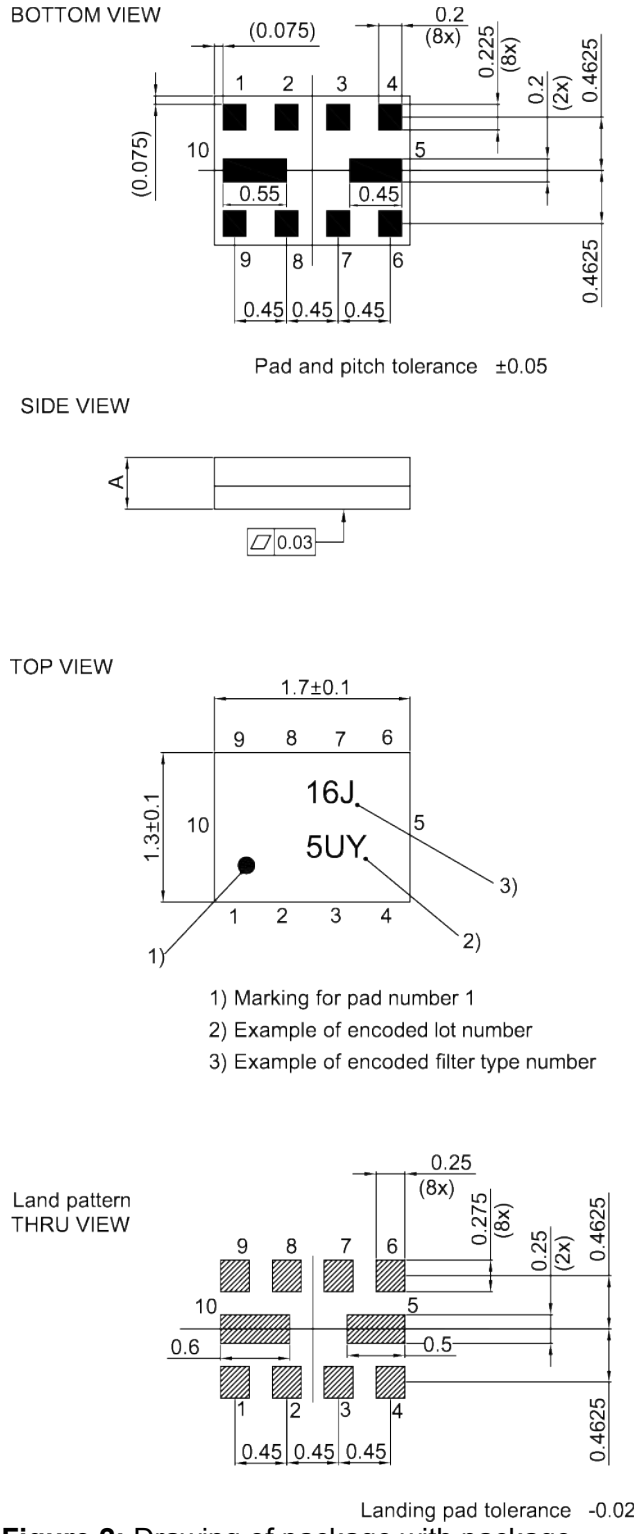

Figure 2: Drawing of package with package height A = 0.5±0.1 mm. See Simplified drawings (p. 21).

4 Pin configuration

- 1 ANT
- 4 BeiDou/GPS/Glonass
- 9 CELL
- 2, 3, 5, 6, 7, 8, 10 Ground

5 Matching circuit

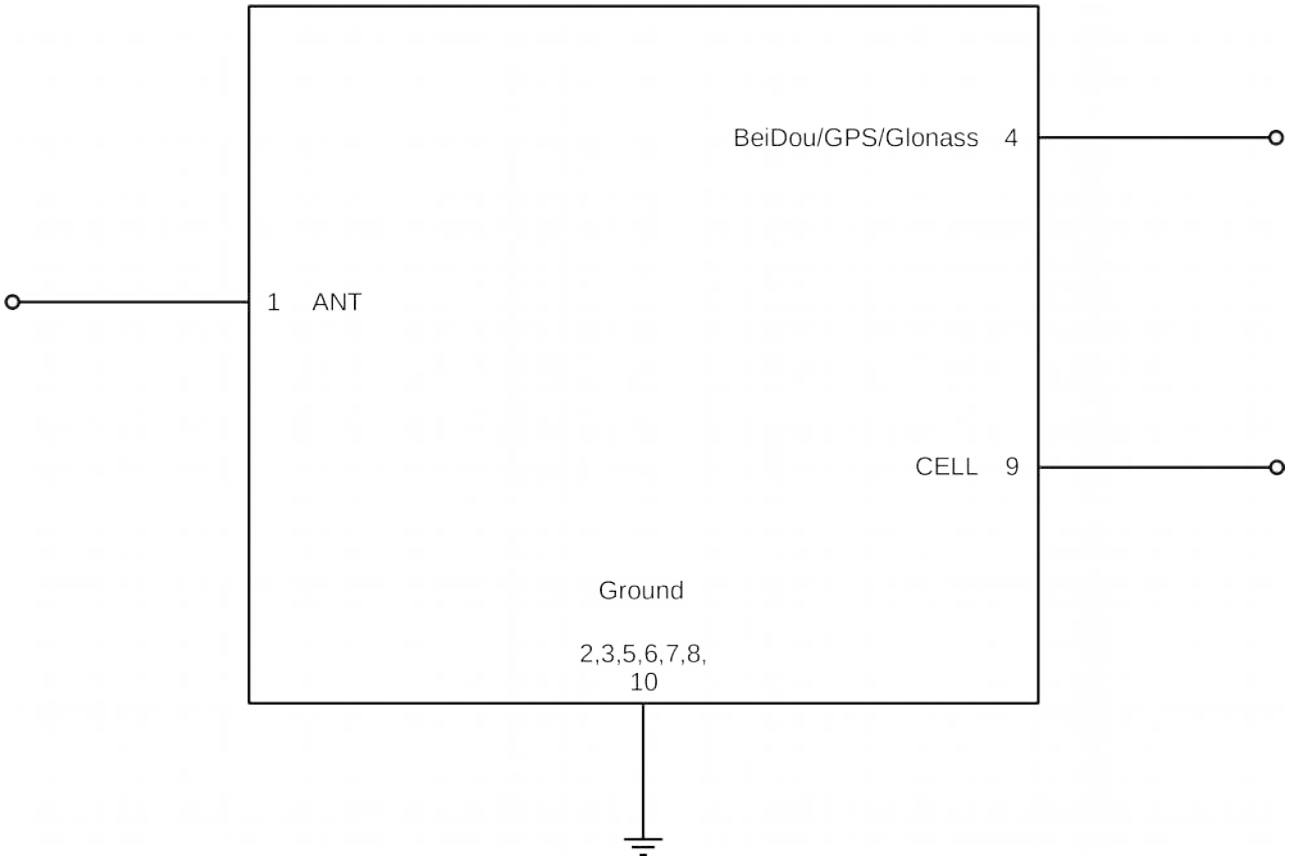

Figure 3: Schematic of matching circuit. No external matching components required.

6 Characteristics ANT – BeiDou/GPS/Glonass

Temperature range for specification T_{SPEC} = −30 °C to +85 °C
ANT terminating impedance Z_{ANT} = 50 Ω
BeiDou/GPS/Glonass terminating impedance Z_{BGG} = 50 Ω
CELL terminating impedance Z_{CELL} = 50 Ω

Characteristics			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Maximum insertion attenuation		α_{max}				
ANT-BeiDou	1559.052 ... 1563.144 MHz		—	1.2	2.6	dB
ANT-GPS	1574.42 ... 1576.42 MHz		—	0.8	1.5	dB
ANT-Glonass	1597.55 ... 1605.89 MHz		—	1.5	3.5	dB
Minimum attenuation		α_{min}				
	100 ... 777 MHz		33	38	—	dB
	777 ... 787 MHz		33	47	—	dB
	787 ... 960 MHz		33	44	—	dB
	1427.9 ... 1462.9 MHz		32	41	—	dB
	1710 ... 1910 MHz		34	40	—	dB
	1910 ... 2025 MHz		33	39	—	dB
	2110 ... 2170 MHz		30	38	—	dB
	2300 ... 2500 MHz		30	38	—	dB
	2500 ... 2690 MHz		29	36	—	dB
	3400 ... 3600 MHz		—	28	—	dB
VSWR (ANT port)		$VSWR_{max}$				
	1559.052 ... 1563.144 MHz		—	1.2	2.0	
	1574.42 ... 1576.42 MHz		—	1.3	2.0	
	1597.55 ... 1605.89 MHz		—	1.4	2.0	
VSWR (BeiDou/GPS/Glonass port)		$VSWR_{max}$				
	1559.052 ... 1563.144 MHz		—	1.3	2.1	
	1574.42 ... 1576.42 MHz		—	1.3	2.0	
	1597.55 ... 1605.89 MHz		—	1.3	2.0	

7 Characteristics ANT – CELL

Temperature range for specification T_{SPEC} = −30 °C to +85 °C
ANT terminating impedance Z_{ANT} = 50 Ω
BeiDou/GPS/Glonass terminating impedance Z_{BGG} = 50 Ω
CELL terminating impedance Z_{CELL} = 50 Ω

Characteristics				min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Maximum insertion attenuation			α_{max}				
	699 ... 824	MHz		—	0.95	1.9	dB
	824 ... 960	MHz		—	0.65	1.5	dB
	1427.9 ... 1510.9	MHz		—	0.7	1.7	dB
	1710 ... 1850	MHz		—	1.2	1.8	dB
	1850 ... 2025	MHz		—	1.1	1.7	dB
	2110 ... 2170	MHz		—	1.2	1.9	dB
	2300 ... 2400	MHz		—	1.0	1.6	dB
	2400 ... 2690	MHz		—	0.8	1.5	dB
	3400 ... 3600	MHz		—	1.1	—	dB
VSWR (ANT port)			$VSWR_{max}$				
	699 ... 824	MHz		—	1.1	2.0	
	824 ... 960	MHz		—	1.1	2.0	
	1427.9 ... 1510.9	MHz		—	1.6	2.1	
	1710 ... 2025	MHz		—	1.3	2.0	
	2110 ... 2170	MHz		—	1.3	2.0	
	2300 ... 2400	MHz		—	1.3	2.0	
	2400 ... 2690	MHz		—	1.2	2.0	
	3400 ... 3600	MHz		—	1.5	—	
VSWR (CELL port)			$VSWR_{max}$				
	699 ... 824	MHz		—	1.2	2.0	
	824 ... 960	MHz		—	1.1	2.0	
	1427.9 ... 1510.9	MHz		—	1.6	2.1	
	1710 ... 2025	MHz		—	1.5	2.1	
	2110 ... 2170	MHz		—	1.4	2.0	
	2300 ... 2400	MHz		—	1.4	2.0	
	2400 ... 2690	MHz		—	1.3	2.0	
	3400 ... 3600	MHz		—	1.5	—	

8 Characteristics BeiDou/GPS/Glonass – CELL

Temperature range for specification T_{SPEC} = −30 °C to +85 °C
ANT terminating impedance Z_{ANT} = 50 Ω
BeiDou/GPS/Glonass terminating impedance Z_{BGG} = 50 Ω
CELL terminating impedance Z_{CELL} = 50 Ω

Characteristics			min. for T_{SPEC}	typ. @+25 °C	max. for T_{SPEC}	
Isolation		α_{min}				
	699... 777	MHz	34	48	—	dB
	777... 787	MHz	34	48	—	dB
	787... 960	MHz	34	45	—	dB
	1427.9... 1462.9	MHz	31	40	—	dB
	1710... 1990	MHz	36	44	—	dB
	2110... 2170	MHz	37	45	—	dB
	2400... 2690	MHz	32	40	—	dB
	3400... 3600	MHz	—	31	—	dB

9 Maximum ratings

Storage temperature	T_{STG} =	−40 °C to +85 °C[1), 2)]	
DC voltage	V_{DC} =	5.0 V (max.)[3)]	
ESD voltage			
	V_{ESD}	50 V (max.)[4)]	Machine model.
	V_{ESD}	350 V (max.)[5)]	Human body model.
	V_{ESD}	600 V (max.)[6)]	Charged device model.
Input power	P_{IN}		
@ CELL port: 699 ... 915 MHz		27 dBm	CW signal. 5000 h @ 55 °C.
@ CELL port: 824 ... 849 MHz		35 dBm	GSM, duty cycle 1:8; effective power in On-state. 5000 h @ 55 °C.
@ CELL port: 880 ... 915 MHz		35 dBm	GSM, duty cycle 1:8; effective power in On-state. 5000 h @ 55 °C.
@ CELL port: 1710 ... 2690 MHz		27 dBm	CW signal. 5000 h @ 55 °C.
@ CELL port: 1710 ... 1785 MHz		33 dBm	GSM, duty cycle 1:8; effective power in On-state. 5000 h @ 55 °C.
@ CELL port: 1850 ... 1910 MHz		33 dBm	GSM, duty cycle 1:8; effective power in On-state. 5000 h @ 55 °C.

1) Extended upper limit: 96h@125°C acc. to IEC 60068-2-2 Bb.
2) Applicable only for components without tape and reel (unpacked).
3) 168h Damp Heat Steady State acc. to IEC60068-2-67 Cy.
4) According to JESD22-A115B (MM – Machine Model), 1 negative & 1 positive pulse.
5) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.
6) According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

10 ANT – BeiDou/GPS/Glonass

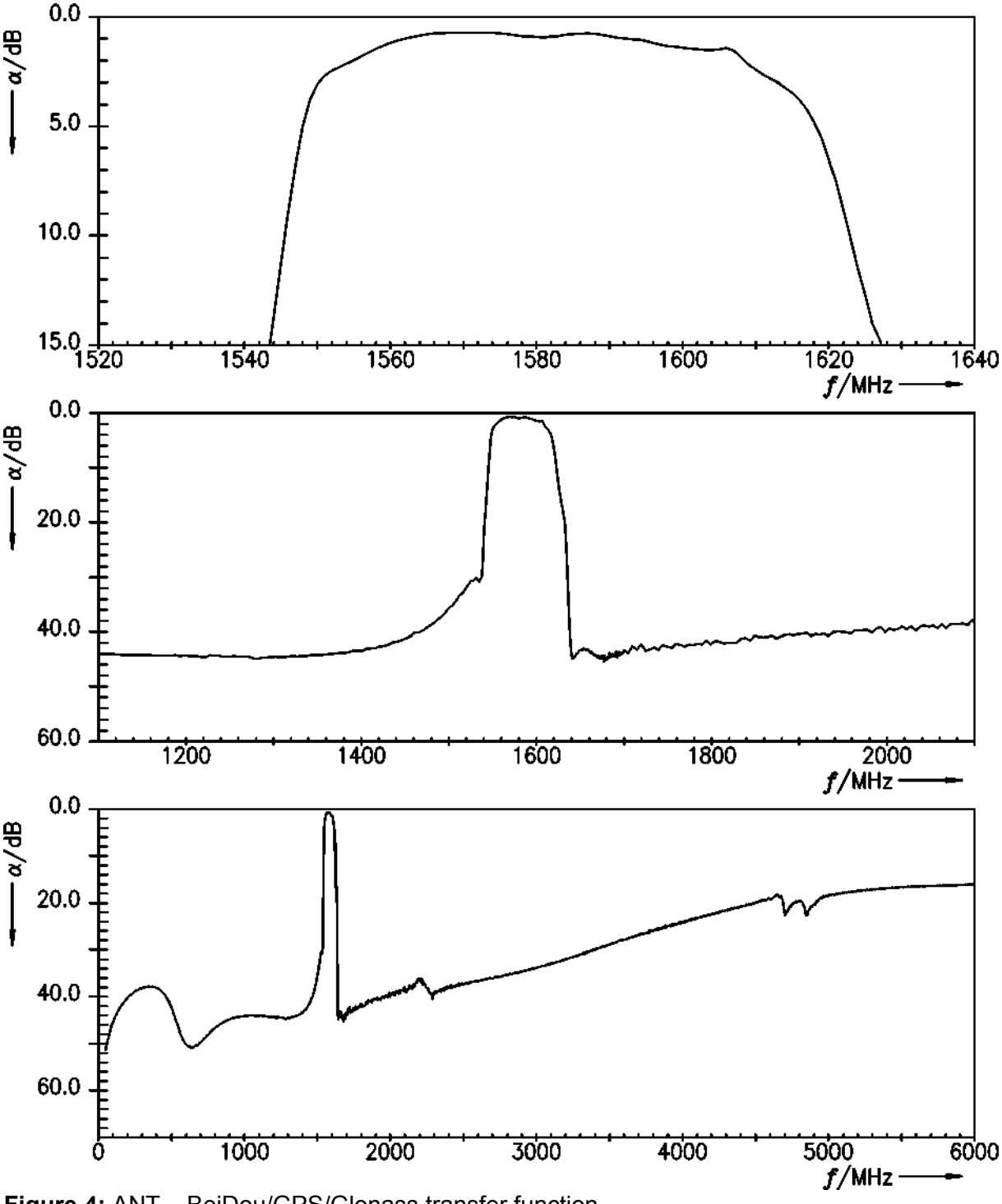

Figure 4: ANT – BeiDou/GPS/Glonass transfer function.

11 Smith charts/VSWR BeiDou/GPS/Glonass

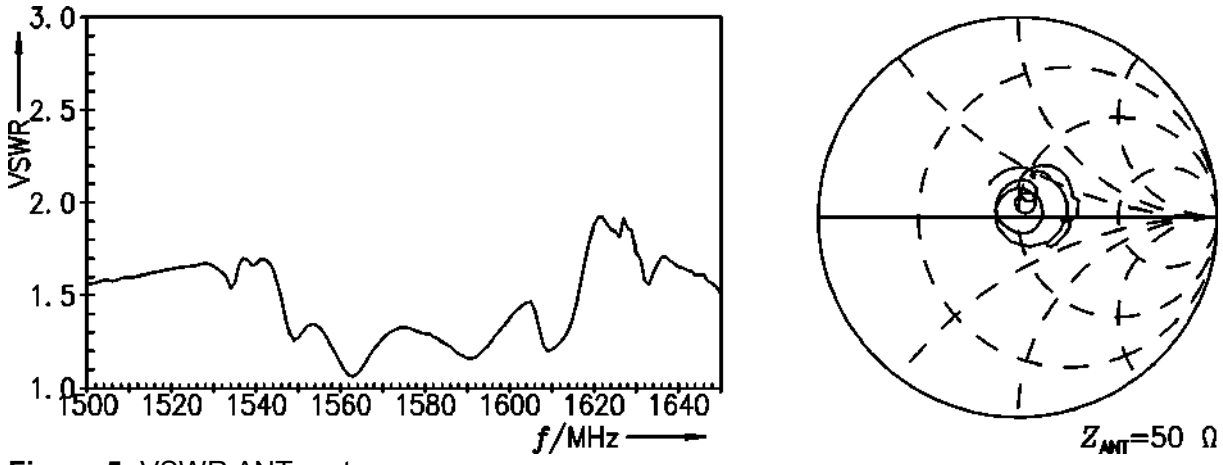

Figure 5: VSWR ANT port.

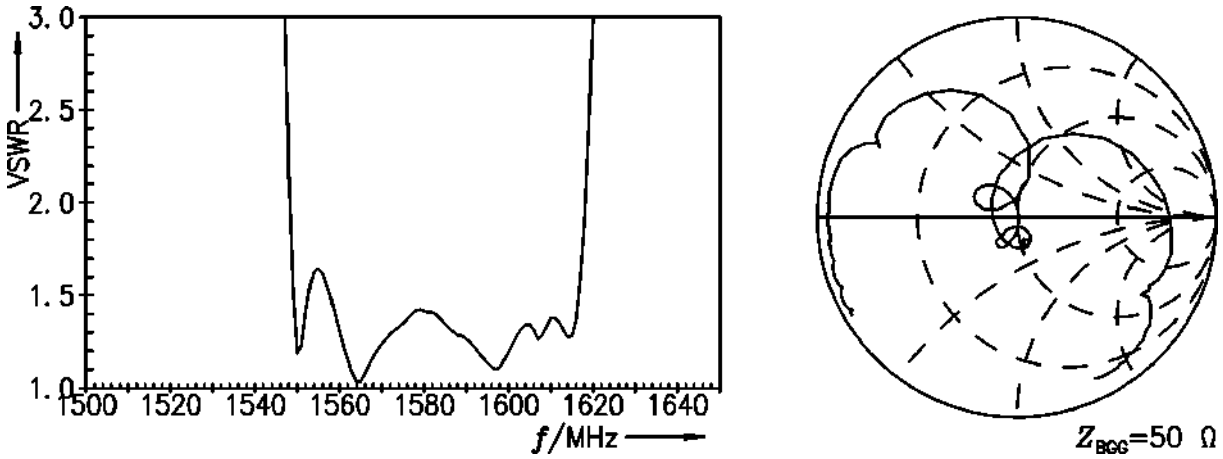

Figure 6: VSWR BeiDou/GPS/Glonass port.

12 ANT – CELL

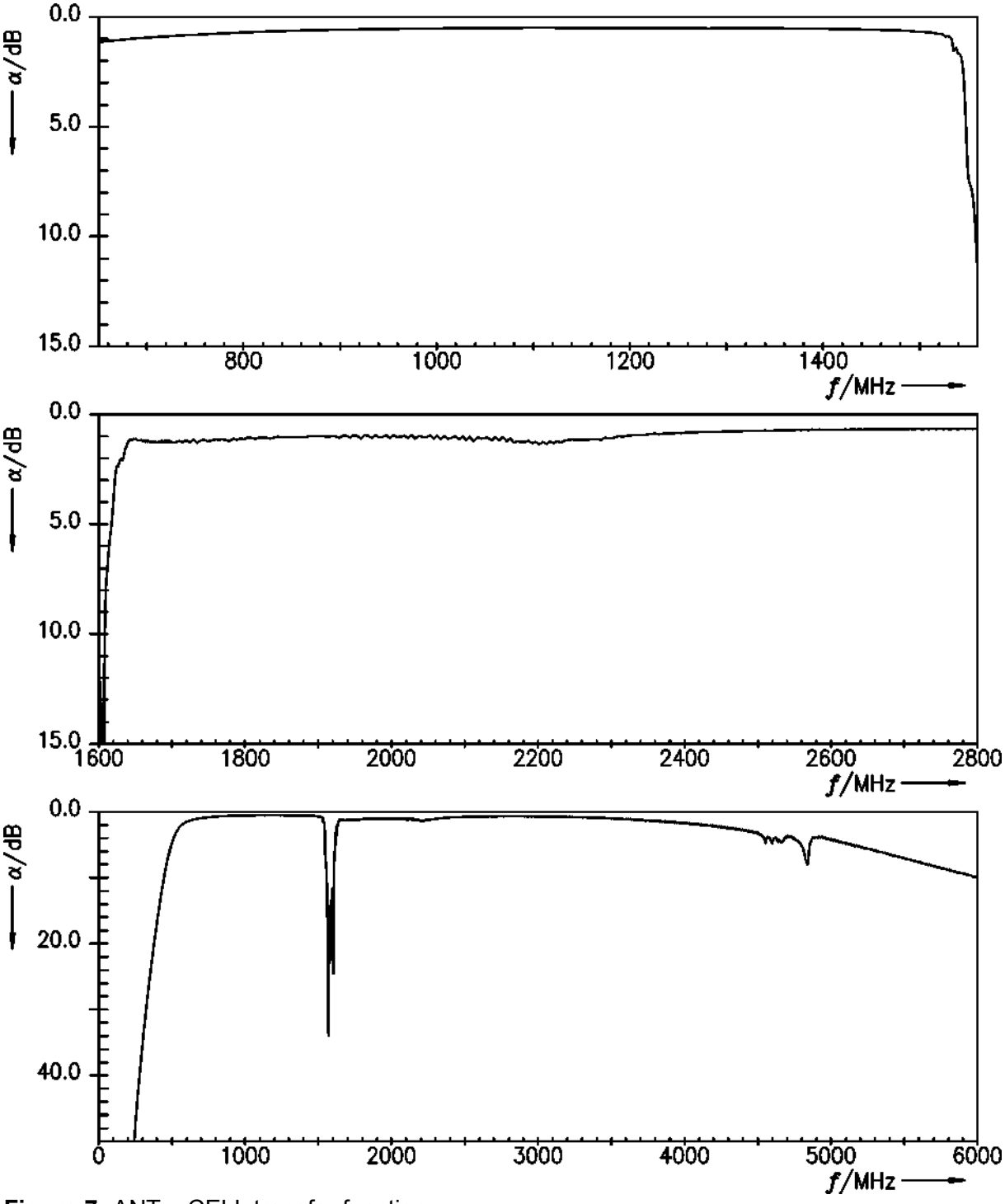

Figure 7: ANT – CELL transfer function.

13 Smith charts/VSWR CELL

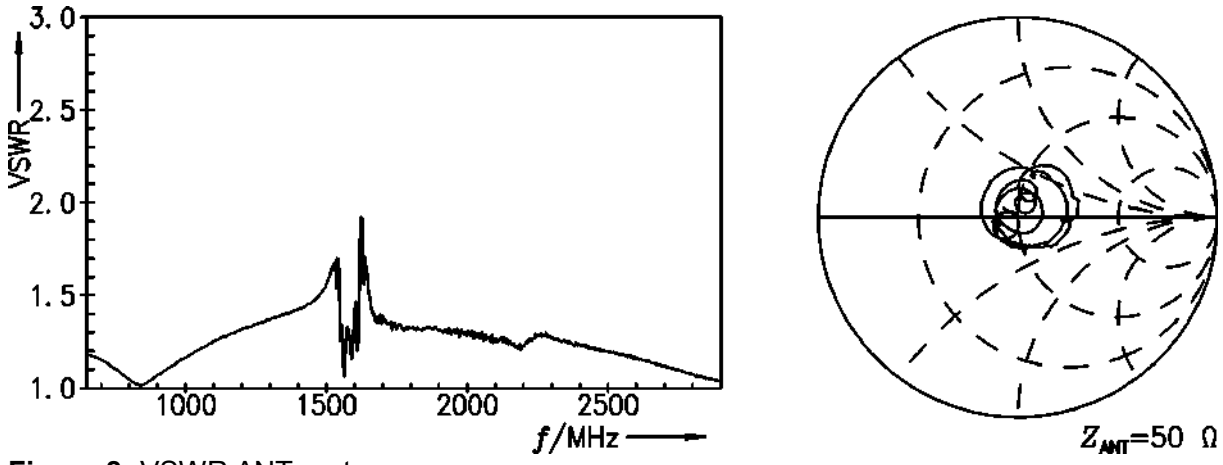

Figure 8: VSWR ANT port.

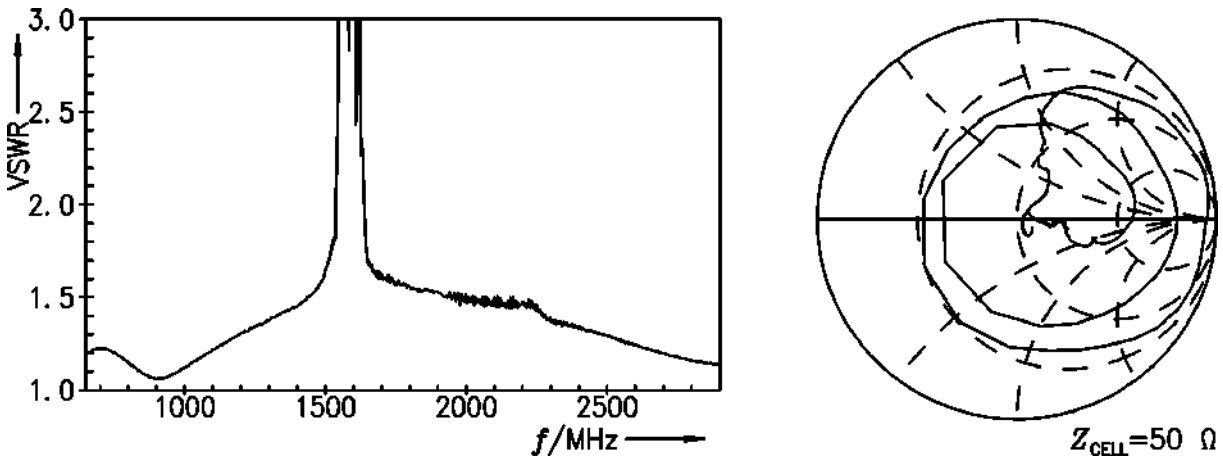

Figure 9: VSWR CELL port.

14 Isolations

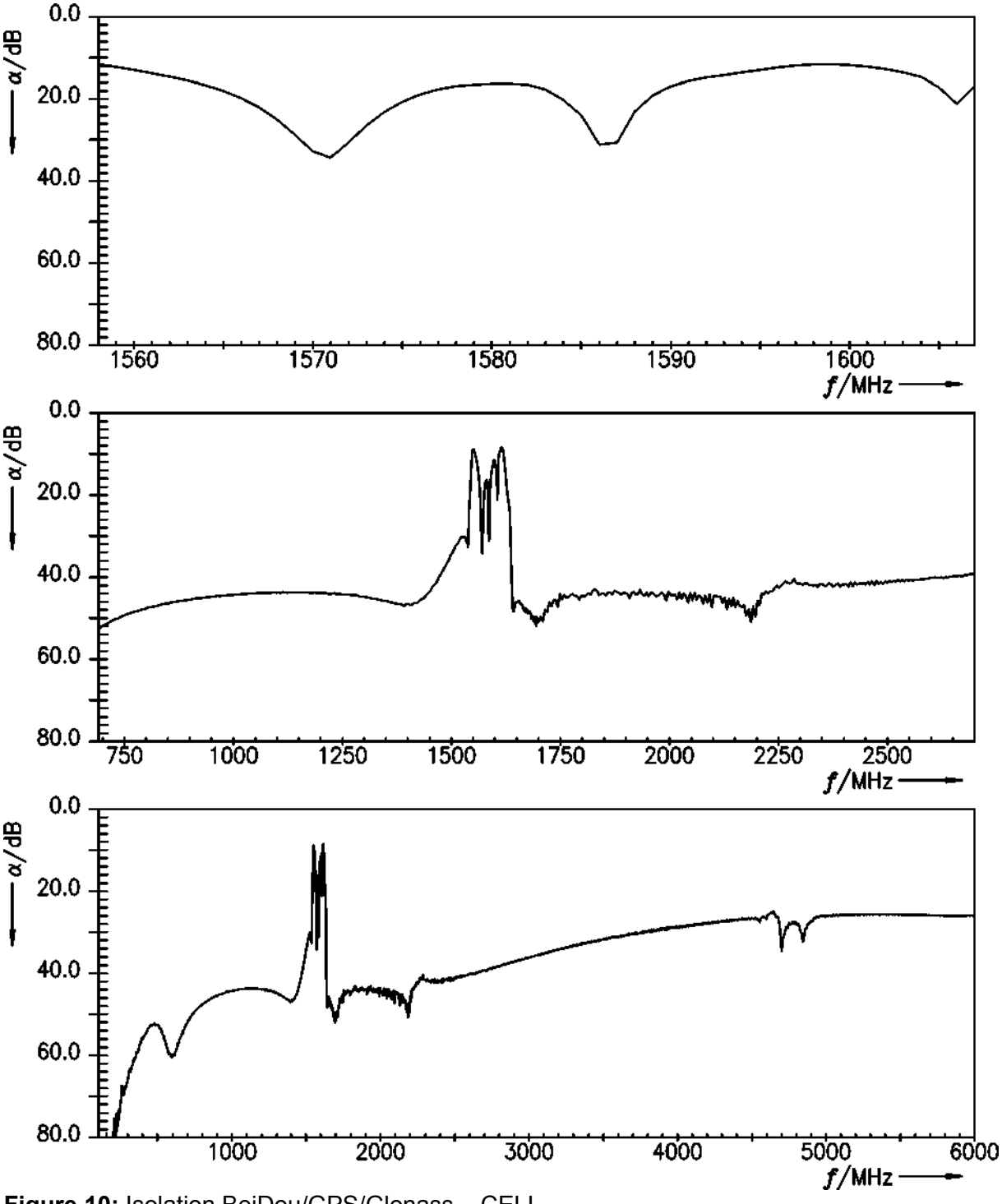

Figure 10: Isolation BeiDou/GPS/Glonass – CELL.

15 Packing material

15.1 Tape

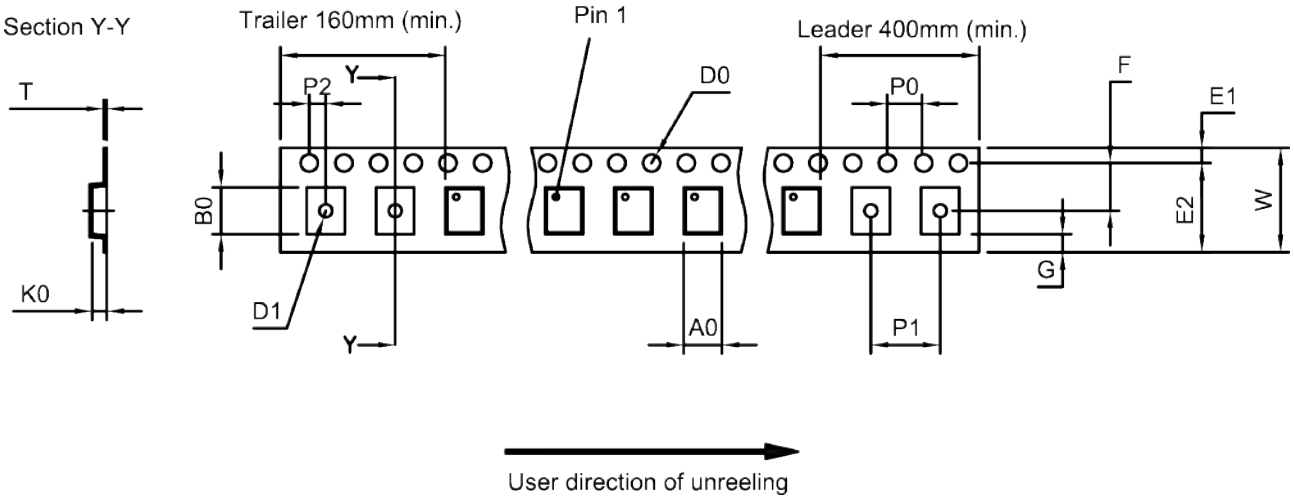

Figure 11: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

A_0	$1.52_{\pm 0.05}$ mm
B_0	$1.94_{\pm 0.05}$ mm
D_0	$1.55_{\pm 0.05}$ mm
D_1	$0.50_{\pm 0.05}$ mm
E_1	$1.75_{\pm 0.1}$ mm

E_2	6.25 mm (min.)
F	$3.5_{\pm 0.05}$ mm
G	0.75 mm (min.)
K_0	$0.62_{\pm 0.05}$ mm
P_0	$4.0_{\pm 0.1}$ mm

P_1	$4.0_{\pm 0.1}$ mm
P_2	$2.0_{\pm 0.1}$ mm
T	$0.25_{\pm 0.03}$ mm
W	$8.0_{+0.3/-0}$ mm

Table 1: Tape dimensions.

15.2 Reel with diameter of 180 mm

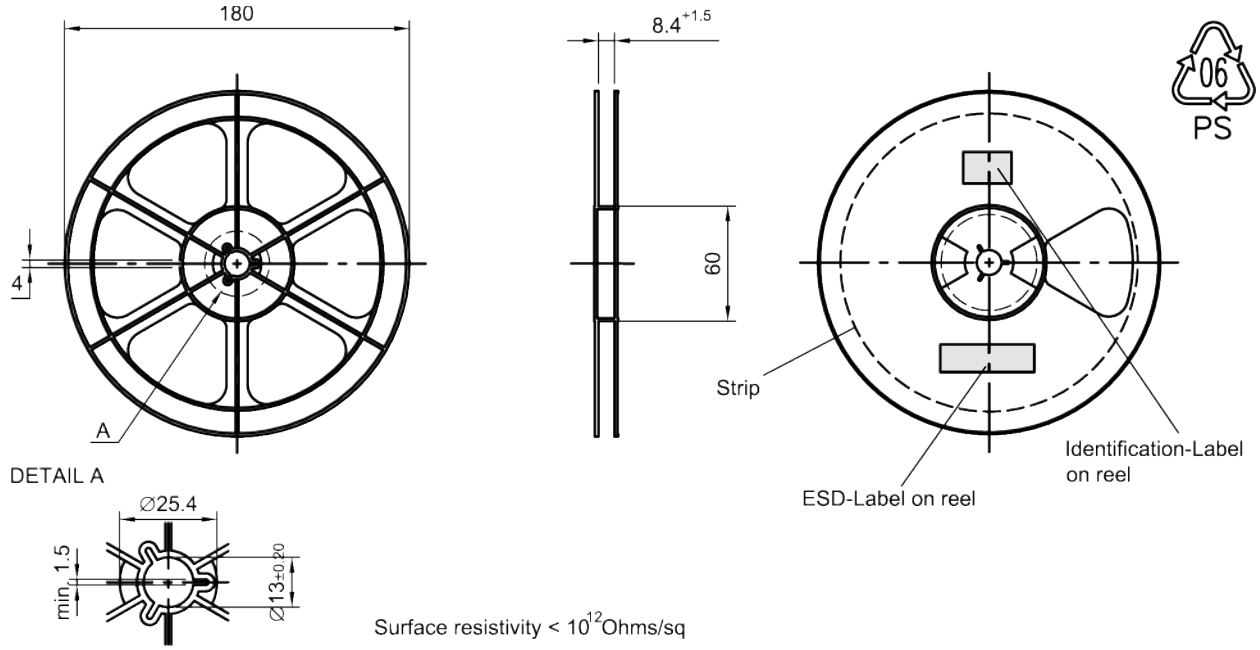

Figure 12: Drawing of reel (first-angle projection) with diameter of 180 mm.

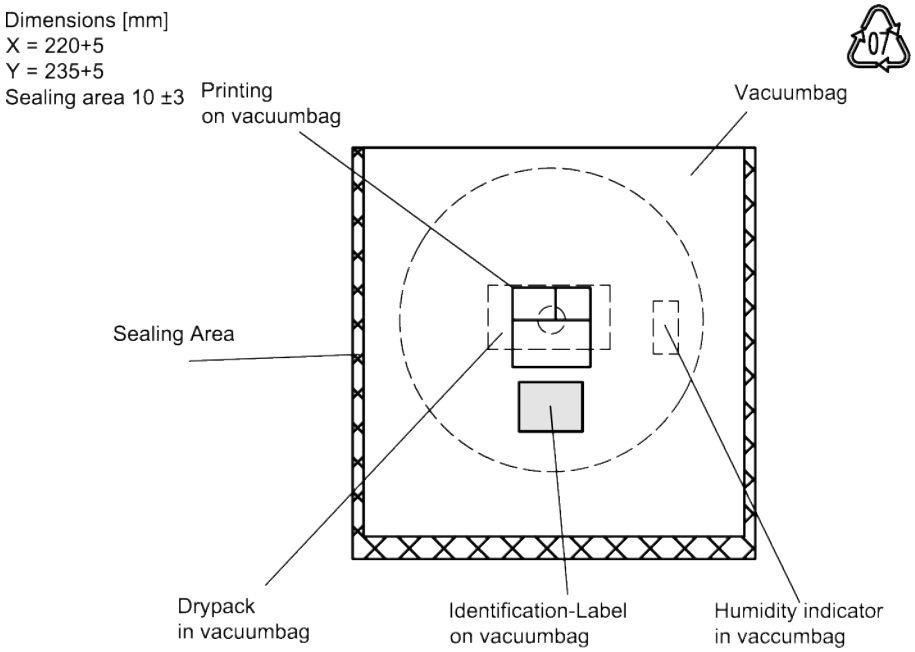

Figure 13: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

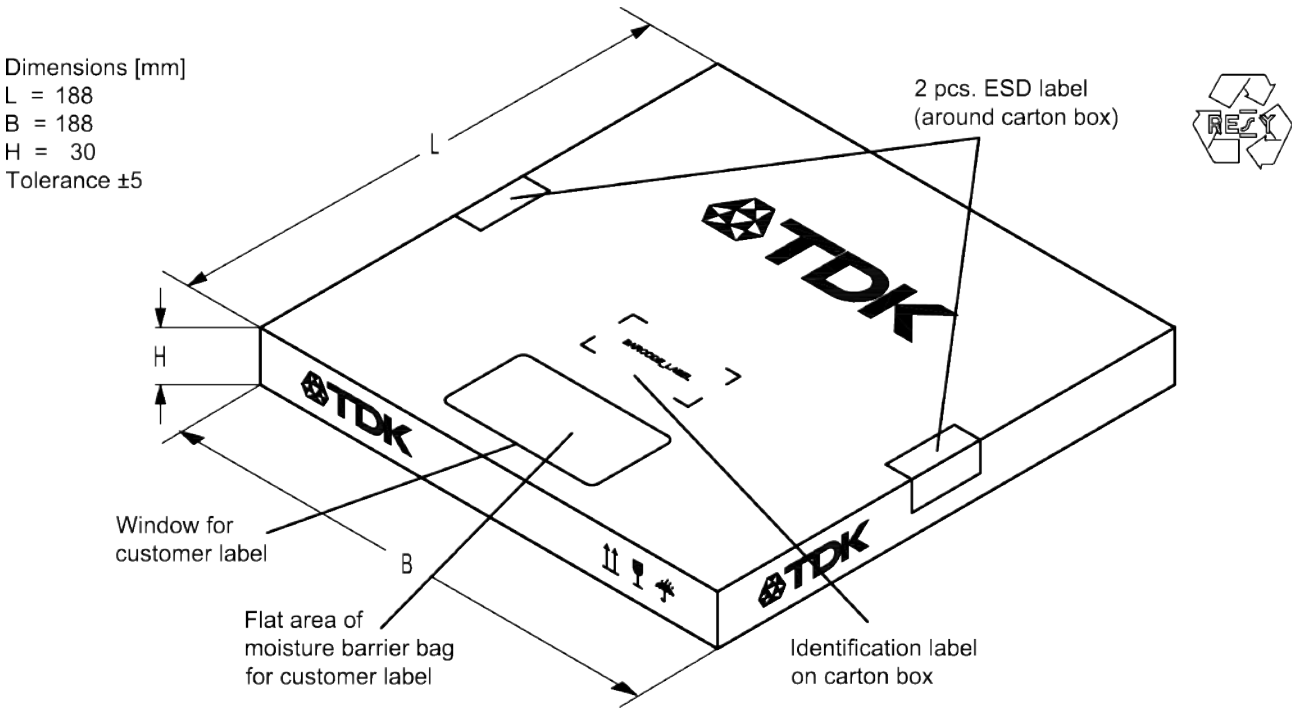

Figure 14: Drawing of folding box for reel with diameter of 180 mm.

15.3 Reel with diameter of 330 mm

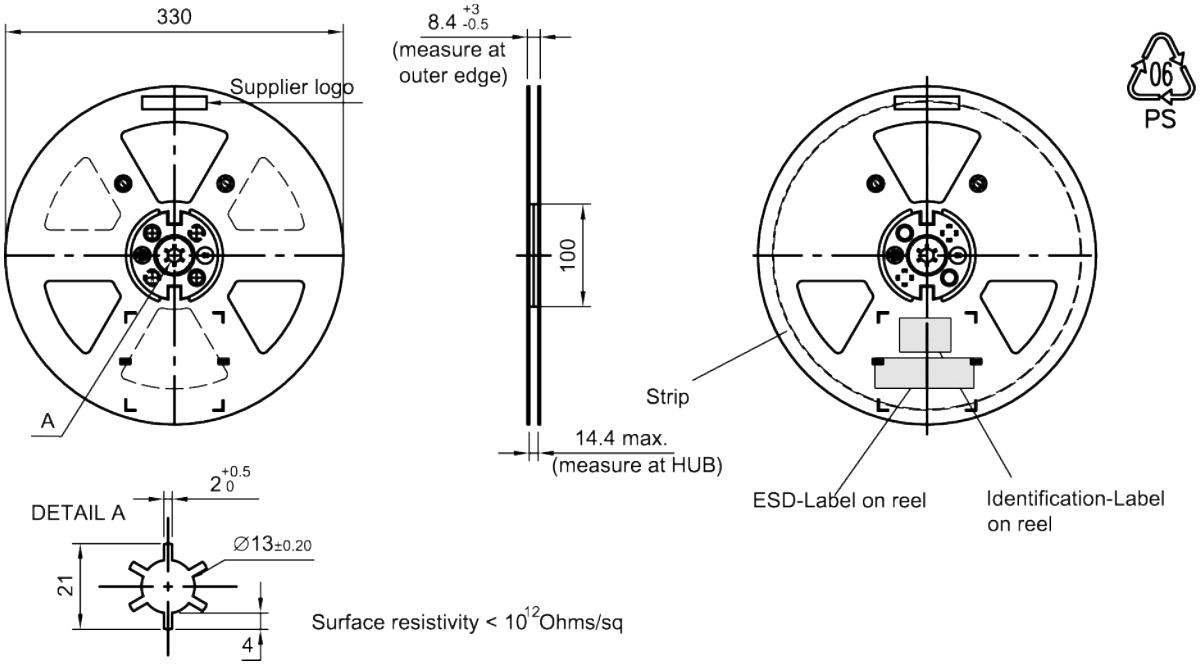

Figure 15: Drawing of reel (first-angle projection) with diameter of 330 mm.

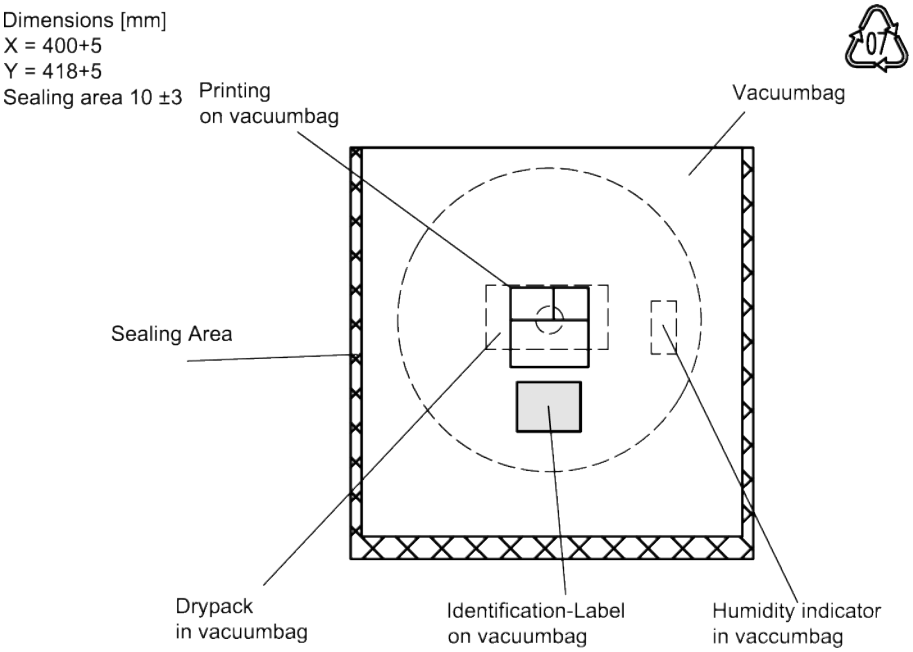

Figure 16: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

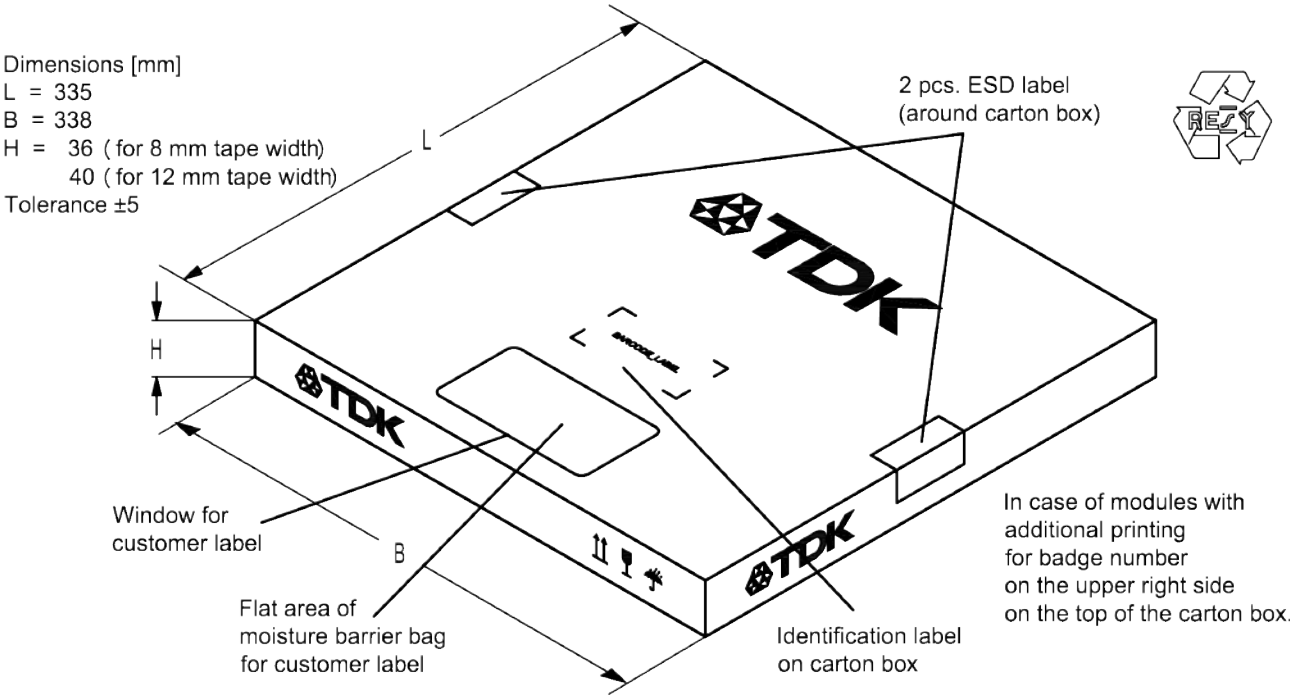

Figure 17: Drawing of folding box for reel with diameter of 330 mm.

16 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 B8666 is 8ET.

- 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			
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.

17 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).

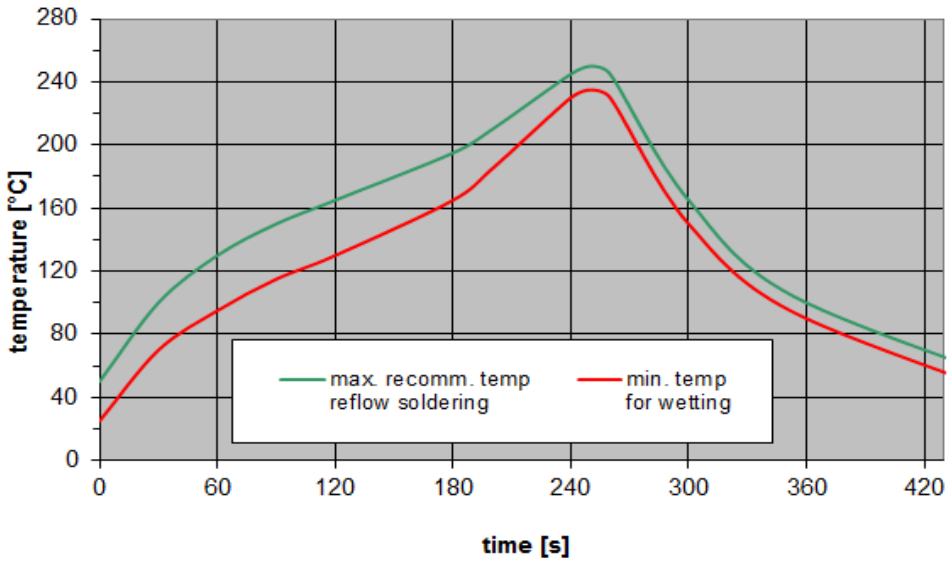

Figure 18: Recommended reflow profile for convection and infrared soldering – lead-free solder.

18 Annotations

18.1 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.

18.2 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.

18.3 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.

18.4 Ordering code and packing units

Ordering code	Packing units
B39162B8666L210	15000 pcs

Table 4: Ordering codes and packing units.

19 Cautions and warnings

19.1 Moldability

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

19.2 Simplified drawings

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).

Projection method

Unless otherwise specified first-angle projection is applied.

Contact and Important notes

For further information please contact your local EPCOS sales office or visit our web page at www.epcos.com.

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For questions on technology, prices and delivery please contact the sales offices of EPCOS AG or the international representatives.

Due to technical requirements components may contain dangerous substances. For information on the type in question please also contact one of our sales offices.

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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.**
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