



RF360
Europe GmbH

Data sheet

BAW filter
TD-LTE / 5G n41

Part number:	B7543
Ordering code:	B39262B7543L210
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1 Application

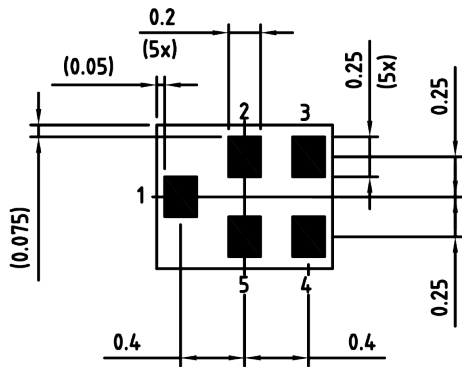
- N41 post PA Tx BAW filter for High Power User Equipment (HPUE) and 5G New Radio (NR) application
- TD-LTE band 41: 2593 MHz (pass band 194 MHz)
- Usable pass band : 194.0 MHz
- High attenuation in B1/66, B3, B25 and B40 to support various EN-DC band combinations
- Very low insertion loss over full bandwidth with WiFi co-existence

2 Features

- Package size $1.1_{\pm 0.05}$ mm \times $0.9_{\pm 0.05}$ mm
- Package height 0.57 mm (max.)
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 3 (MSL3)

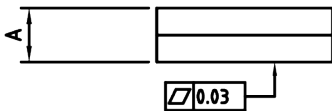
3 Package

BOTTOM VIEW

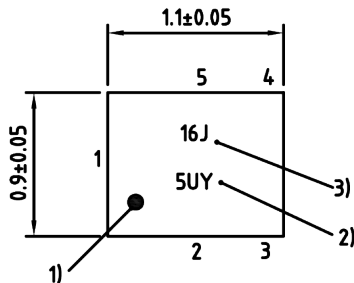


Pad and pitch tolerance ±0.05

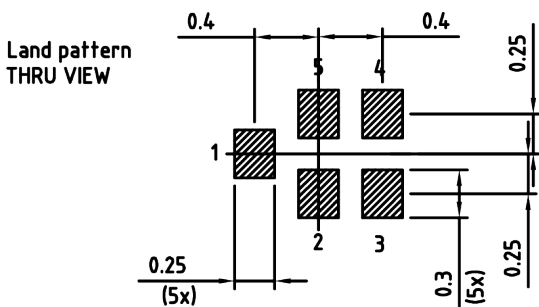
SIDE VIEW



TOP VIEW



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



Landing pad tolerance -0.02

Figure 1: Drawing of package with package height A = 0.57 mm (max.). See Sec. Package information (p. 19).

4 Pin configuration

- 1 Input (Tx)
- 4 Output (Ant)
- 2, 3, 5 Ground

5 Matching circuit

■ $C_{s4b} = 0.9 \text{ pF}$

■ $L_{s1} = 3.0 \text{ nH}$

■ $L_{p4a} = 3.2 \text{ nH}$

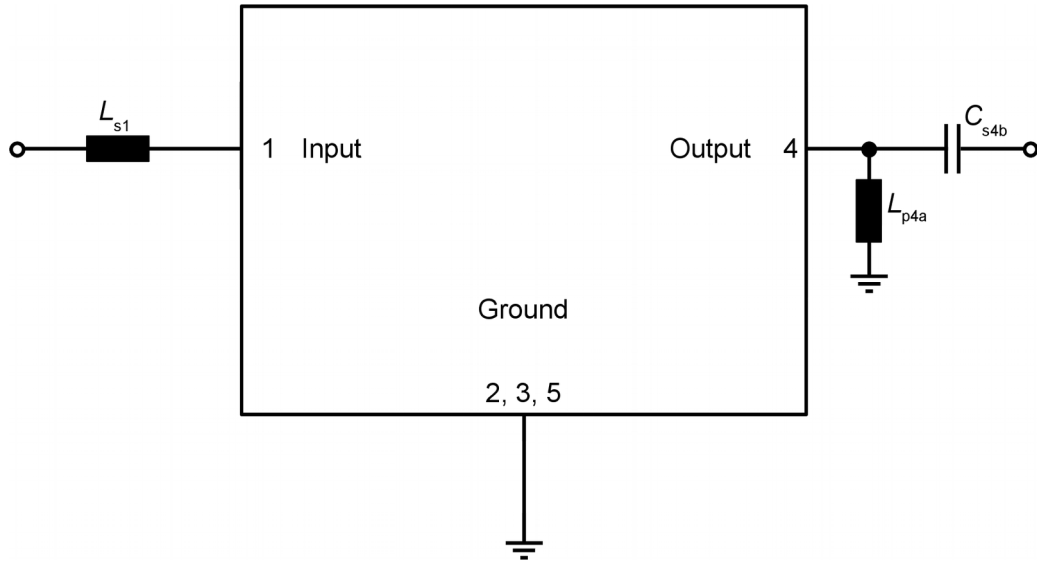


Figure 2: Schematic of matching circuit.

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

6 Characteristics

Temperature range for specification	T_{SPEC}	= -30 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 50 Ω + 3.0 nH ¹⁾
Output terminating impedance	Z_{OUT}	= 50 Ω with ext. circuitry. ¹⁾

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	2593	—	MHz
Maximum insertion attenuation			α_{max}				
	2496... 2500	MHz		—	1.6	1.9 ²⁾	dB
	2496... 2500	MHz		—	1.6	2.0	dB
	2500... 2515	MHz		—	1.4	1.9 ²⁾	dB
	2500... 2515	MHz		—	1.4	2.0	dB
	2515... 2545	MHz		—	1.0	1.8 ²⁾	dB
	2515... 2545	MHz		—	1.0	2.0	dB
	2545... 2575	MHz		—	0.8	1.7 ²⁾	dB
	2545... 2575	MHz		—	0.8	2.0	dB
	2575... 2675	MHz		—	0.8	1.7 ²⁾	dB
	2575... 2675	MHz		—	0.8	2.0	dB
	2675... 2690	MHz		—	0.9	2.0 ²⁾	dB
	2675... 2690	MHz		—	0.9	2.0	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	2496... 2690	MHz		—	0.3 ³⁾	0.6 ³⁾	dB
	2515... 2675	MHz		—	0.1 ³⁾	0.4 ³⁾	dB
Maximum VSWR			$VSWR_{max}$				
@ input port	2496... 2690	MHz		—	1.4	2.0	
@ output port	2496... 2690	MHz		—	1.4	2.0	
Minimum attenuation			α_{min}				
	10... 1000	MHz		43	47	—	dB
	703... 748	MHz		51	55	—	dB
	814... 849	MHz		46	52	—	dB
	880... 915	MHz		44	49	—	dB
	1166.22... 1254	MHz		36	40	—	dB
	1559.052... 1605.89	MHz		34	38	—	dB
	1710... 1785	MHz		35	42	—	dB
	1805... 1880	MHz		37	44	—	dB
	1850... 1915	MHz		40	45	—	dB
	1880... 1920	MHz		40	46	—	dB
	1920... 1990	MHz		36	41	—	dB
	1930... 1995	MHz		35	40	—	dB
	2010... 2025	MHz		34	38	—	dB
	2110... 2200	MHz		28	32	—	dB

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
	2300... 2400	MHz	α_{min}	29	34	—	dB
WiFi Ch1	2402... 2422	MHz	$\alpha_{WLAN,min}^{4)}$	39	42	—	dB
WiFi Ch2	2407... 2427	MHz	$\alpha_{WLAN,min}^{4)}$	39	42	—	dB
WiFi Ch3	2412... 2432	MHz	$\alpha_{WLAN,min}^{4)}$	39	43	—	dB
WiFi Ch4	2417... 2437	MHz	$\alpha_{WLAN,min}^{4)}$	39	44	—	dB
WiFi Ch5	2422... 2442	MHz	$\alpha_{WLAN,min}^{4)}$	39	47	—	dB
WiFi Ch6	2427... 2447	MHz	$\alpha_{WLAN,min}^{4)}$	40	48	—	dB
WiFi Ch7	2432... 2452	MHz	$\alpha_{WLAN,min}^{4)}$	40	45	—	dB
WiFi Ch8	2437... 2457	MHz	$\alpha_{WLAN,min}^{4)}$	40	43	—	dB
WiFi Ch9	2442... 2462	MHz	$\alpha_{WLAN,min}^{4)}$	20	43	—	dB
WiFi Ch10	2447... 2467	MHz	$\alpha_{WLAN,min}^{4)}$	14	42	—	dB
WiFi Ch11	2452... 2472	MHz	$\alpha_{WLAN,min}^{4)}$	10	23	—	dB
WiFi Ch12	2457... 2477	MHz	$\alpha_{WLAN,min}^{4)}$	3	12	—	dB
WiFi Ch13	2462... 2482	MHz	$\alpha_{WLAN,min}^{4)}$	2	7	—	dB
	3300... 3700	MHz	α_{min}	26	29	—	dB
	3700... 3980	MHz	α_{min}	27	31	—	dB
	3980... 4200	MHz	α_{min}	29	33	—	dB
	4400... 5000	MHz	α_{min}	32	37	—	dB
	4900... 5950	MHz	α_{min}	39	45	—	dB
	4992... 5380	MHz	α_{min}	39	46	—	dB
	5150... 5850	MHz	α_{min}	40	50	—	dB
	5925... 7125	MHz	α_{min}	35	40	—	dB
	7488... 8070	MHz	α_{min}	29	36	—	dB
Harmonic generation ($P_{IN}=32$ dBm CW signal)							
	$2 f_c$	2496... 2690	MHz	—	-45 ⁵⁾	—	dBm
	$3 f_c$	2496... 2690	MHz	—	-70 ⁵⁾	—	dBm

- 1) See Sec. Matching circuit (p. 6).
- 2) Valid for typical temperature $T = +25$ °C.
- 3) Over any 10 MHz within pass band.
- 4) Average over each WLAN channel with band width of 19 MHz.
- 5) Parameter not tested in mass production.

7 Maximum ratings

Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +85\text{ °C}$	
Shunt L embedded on both ports DC voltage	$ V_{DC} = 5.0\text{ V}$	
ESD voltage		
	$V_{ESD}^{2)} = 450\text{ V (max.)}$	Machine model.
	$V_{ESD}^{3)} = 800\text{ V (max.)}$	Human body model.
	$V_{ESD}^{4)} = 700\text{ V (max.)}$	Charged device model.
Input power	P_{IN}	
@ input port: 2496 ... 2690 MHz	31.5 dBm	10 MHz 5G NR (CP-OFDM) 1RB 50% duty cycle for 5000h @ 50°C.
@ input port: 2496 ... 2690 MHz	32 dBm	10 MHz 5G NR (DFT-s-OFDM), 1RB, 50% duty cycle for 5000 h @ 50 °C.
@ input port: 2496 ... 2690 MHz	32 dBm	5 MHz TD-LTE uplink signal, 1RB, 50% duty cycle for 5000 h @ 50 °C.

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

2) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

3) According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.

4) According to JESD22-C101C (CDM – Field Induced Charged Device Model), 3 negative & 3 positive pulses.

5) Fully hardware matched on PCB.

8 Transmission coefficient

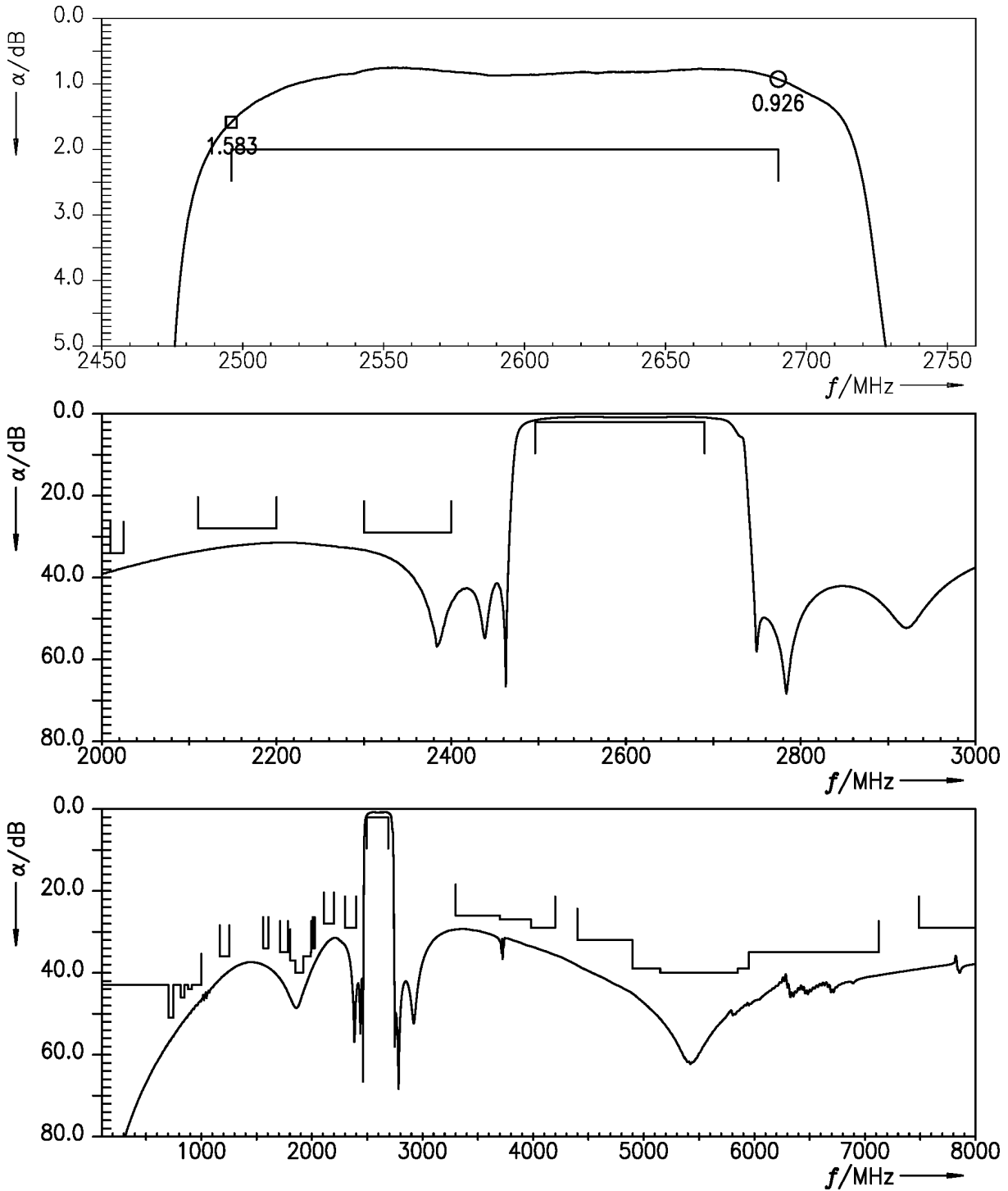


Figure 3: Attenuation.

9 Reflection coefficients

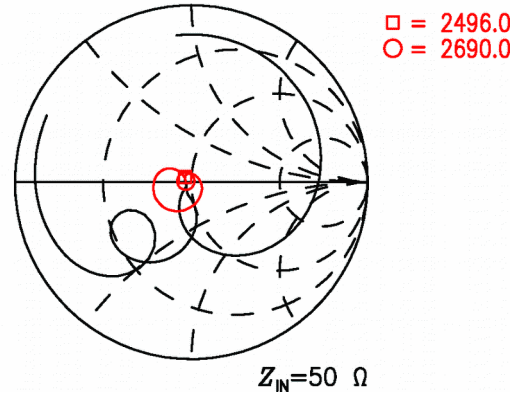
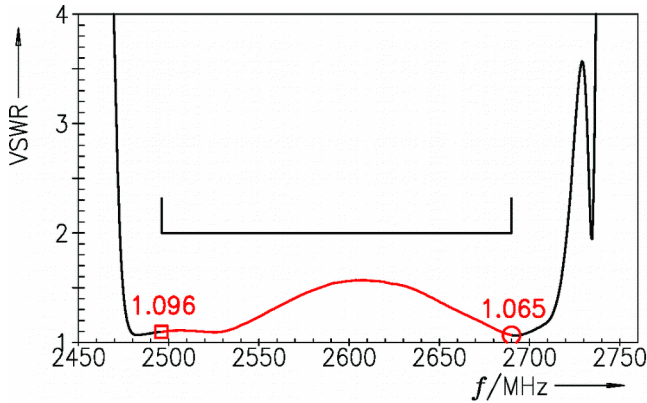


Figure 4: Reflection coefficient at input port.

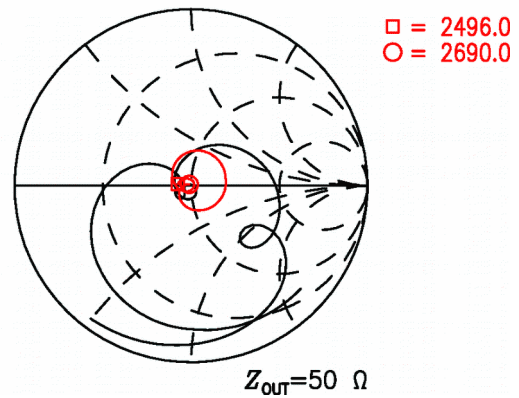
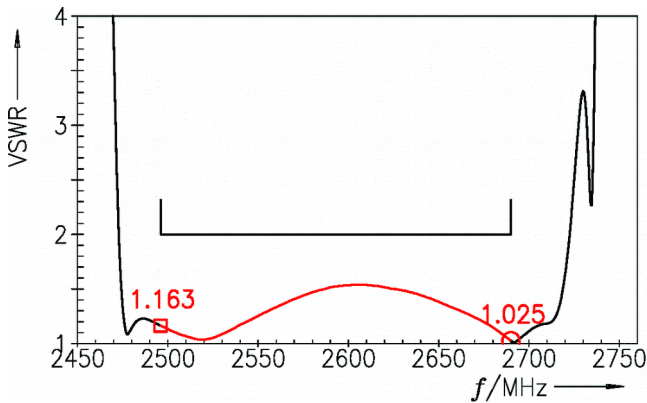


Figure 5: Reflection coefficient at output port.

10 Packing material

10.1 Tape

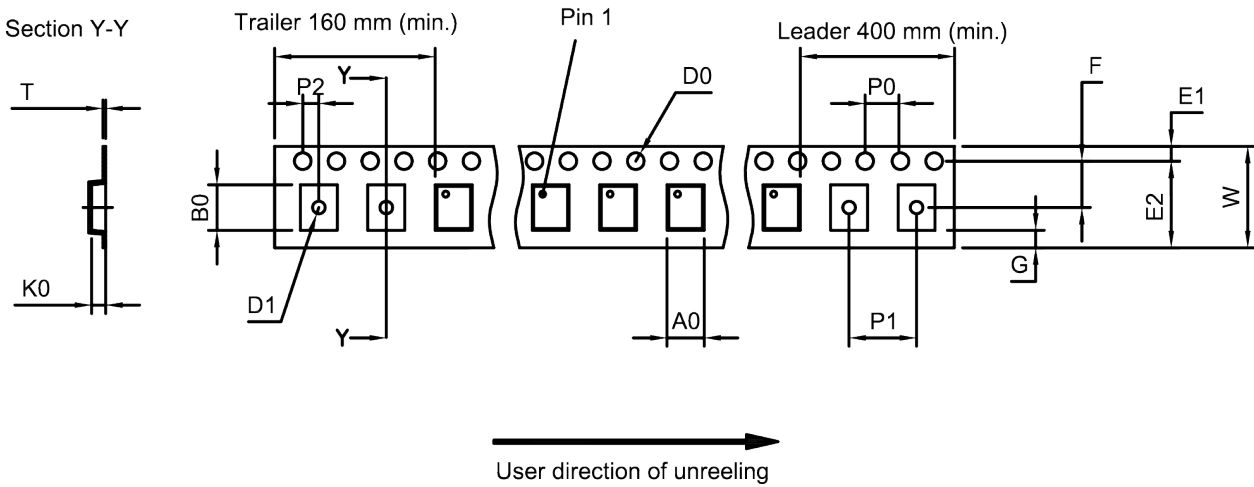


Figure 6: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A ₀	1.05±0.05 mm	E ₂	6.25 mm (min.)	P ₁	2.0±0.05 mm
B ₀	1.25±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	0.2±0.02 mm
D ₁	0.4±0.05 mm	K ₀	0.63±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

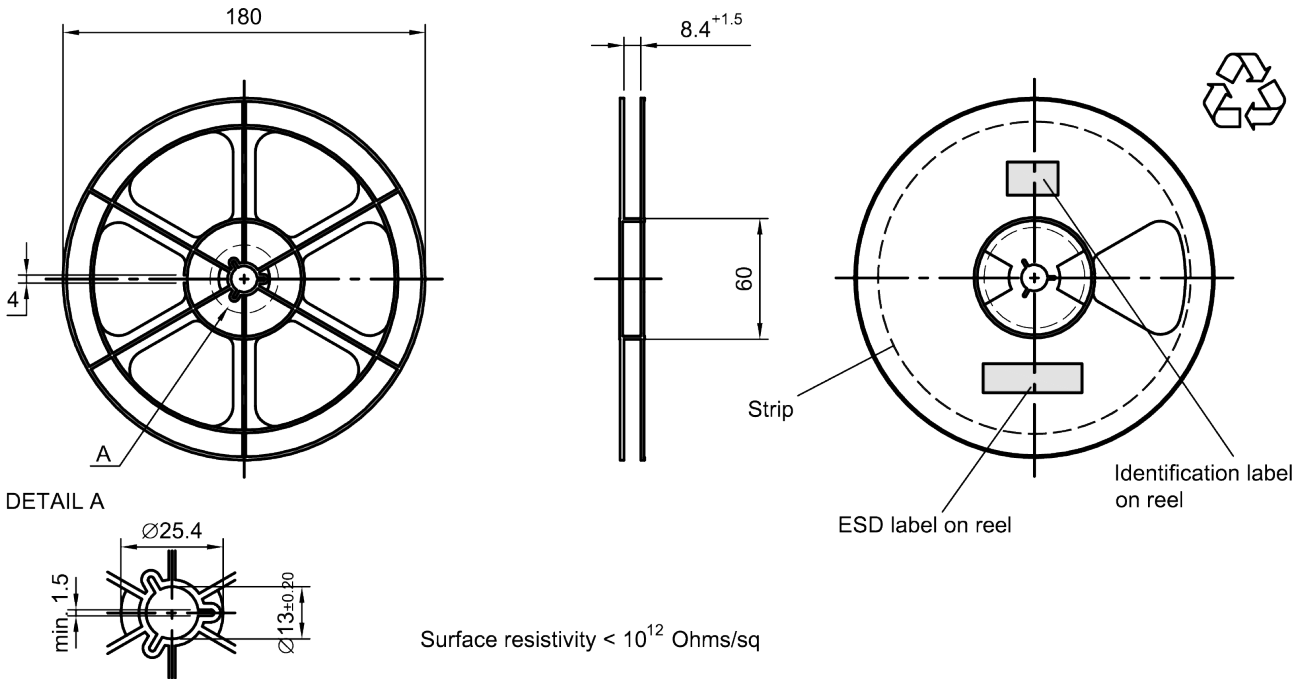


Figure 7: Drawing of reel (first-angle projection) with diameter of 180 mm.

Dimensions [mm]

X = 220+5

Y = 235+5

Sealing area 10±3

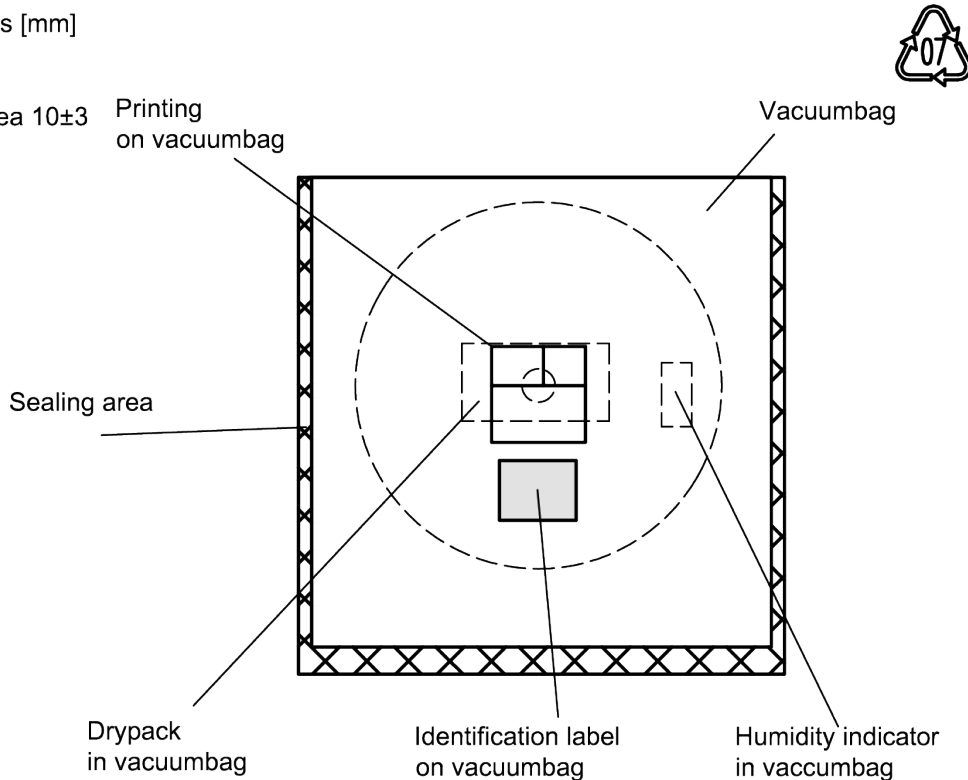


Figure 8: Drawing of moisture barrier bag (MBB) for reel with diameter of 180 mm.

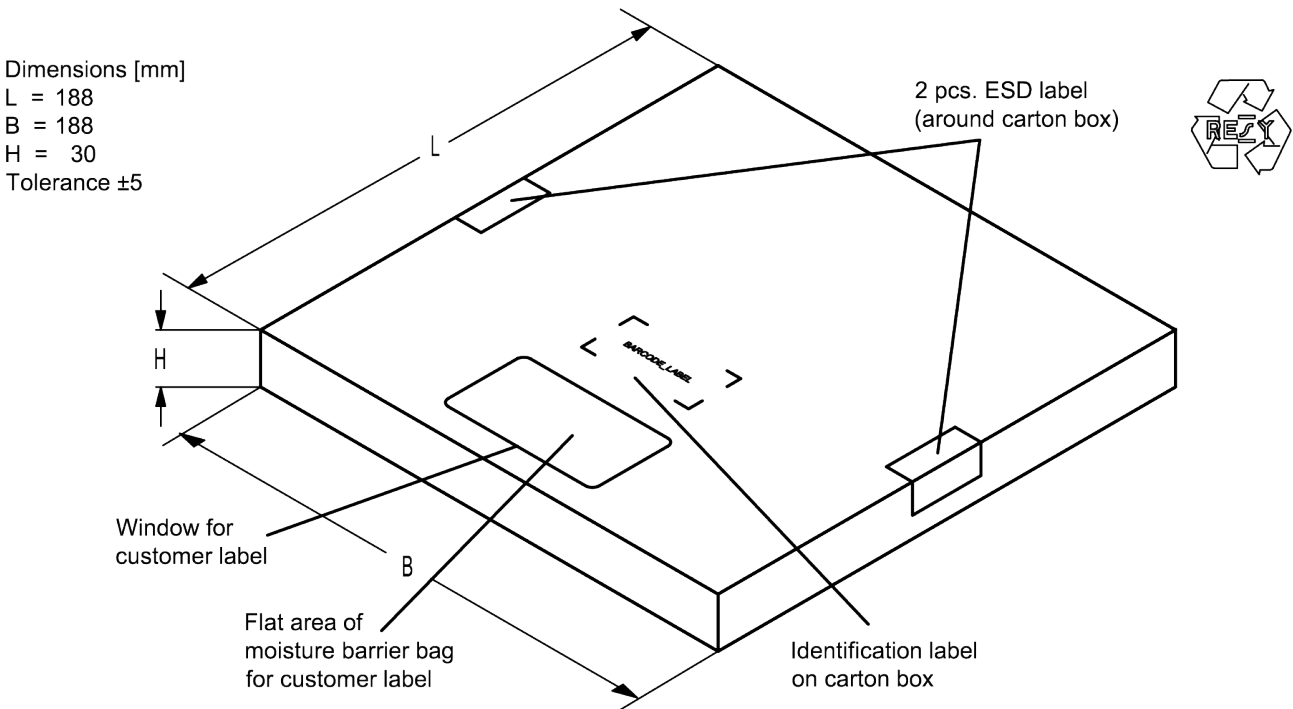


Figure 9: Drawing of folding box for reel with diameter of 180 mm.

10.3 Reel with diameter of 330 mm

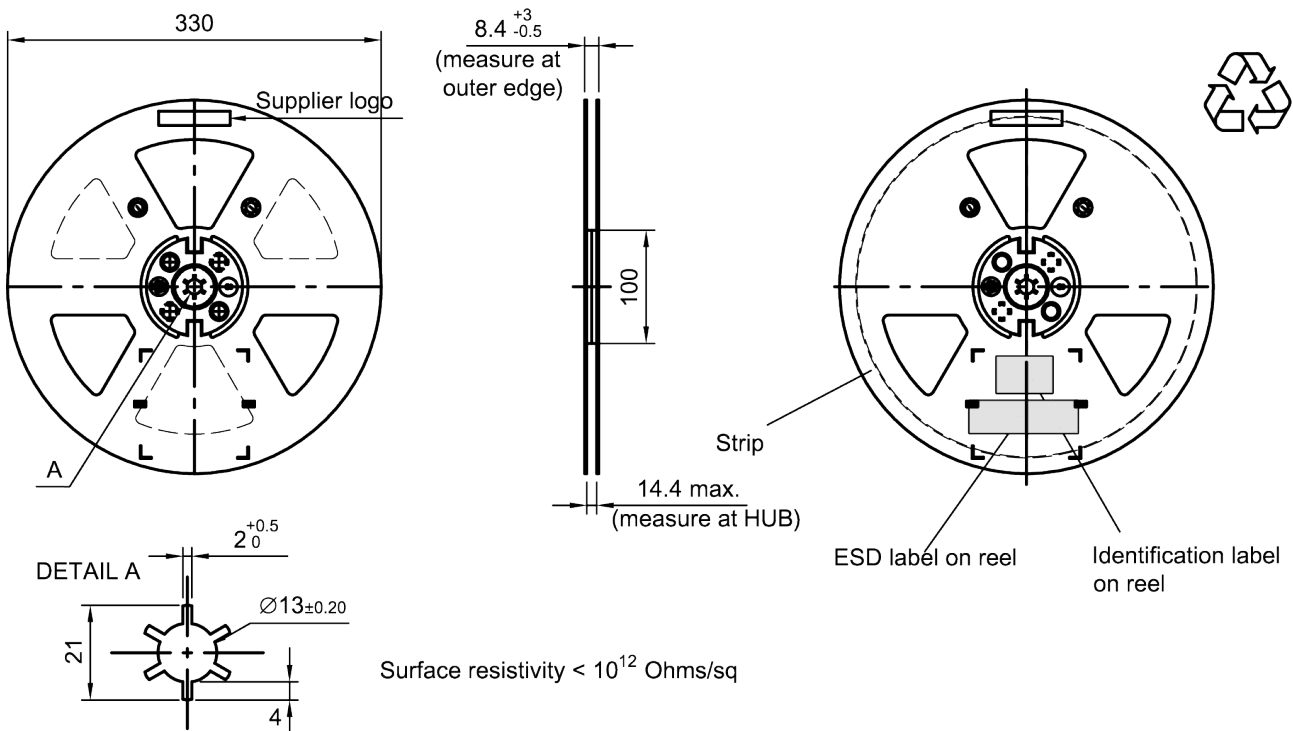


Figure 10: Drawing of reel (first-angle projection) with diameter of 330 mm.

Dimensions [mm]

X = 400+5

Y = 418+5

Sealing area 10±3

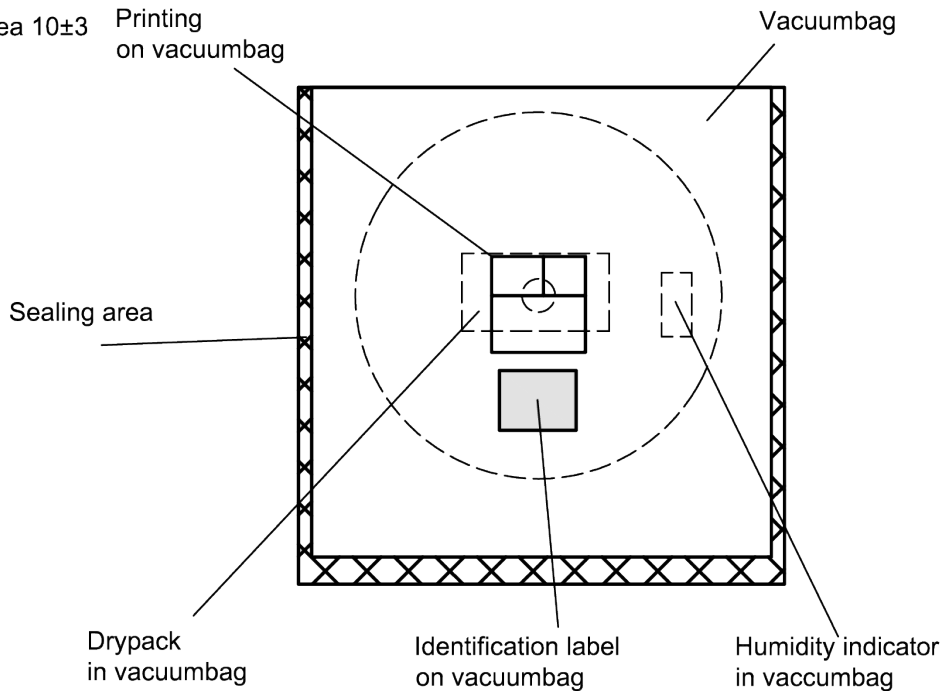


Figure 11: Drawing of moisture barrier bag (MBB) for reel with diameter of 330 mm.

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)

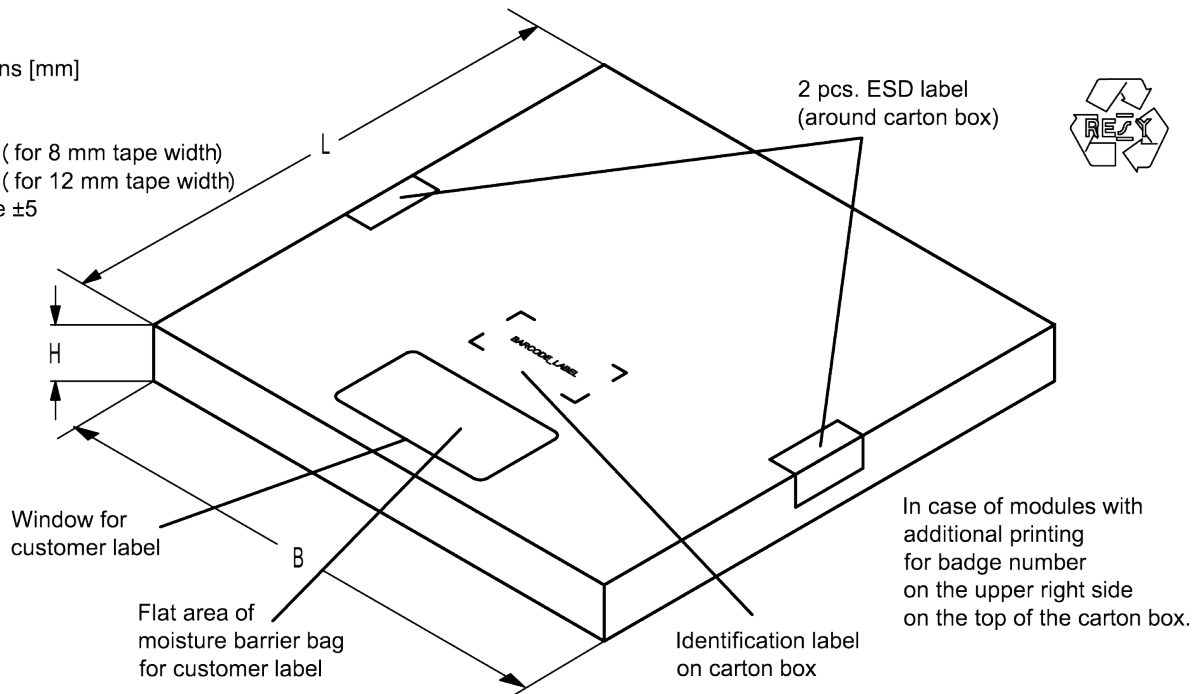


Figure 12: Drawing of folding box for reel with diameter of 330 mm.

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 B7543 is 7BQ.

■ 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).

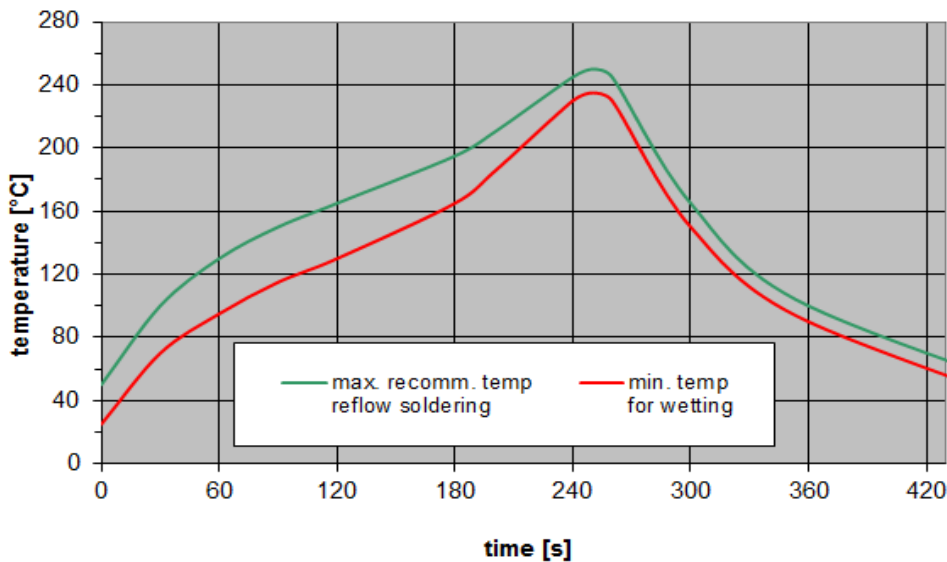


Figure 13: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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
B39262B7543L210	B39262-B7543-L210	10000 pcs
B39262B7543L210S 5	B39262-B7543-L210S 5	5000 pcs

Table 4: Ordering codes / product IDs and packing units.

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://rffe.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.
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