



RF360  
Europe GmbH

## Data sheet

### SAW RF filter

Base stations  
TETRA

Series/type:	B5047
Ordering code:	B39391B5047Z810

Date:	July 01, 2019
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Version:	2.2
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A Qualcomm – TDK Joint Venture

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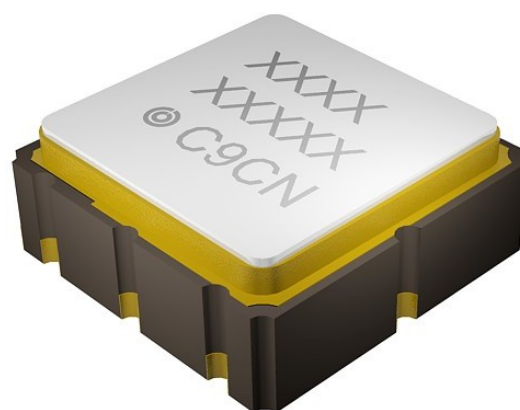
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## 1 Application

- Low-loss filter for TETRA
- Usable pass band 20 MHz
- Unbalanced to balanced operation
- No matching required
- Filter impedance 50  $\Omega$

## 2 Features

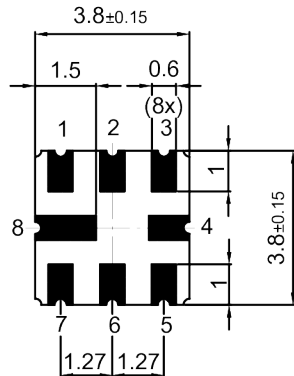
- Package code QCC8B
- Package size  $3.8 \pm 0.15$  mm  $\times$   $3.8 \pm 0.15$  mm
- Package height  $1.5 + 0.1 / - 0.15$  mm
- Approximate weight 0.07 g
- RoHS compatible
- Package for Surface Mount Technology (SMT)
- Ni/Au-plated terminals
- Lead free soldering compatible with J-STD20C
- Electrostatic Sensitive Device (ESD)
- Moisture Sensitivity Level 1 (MSL1)



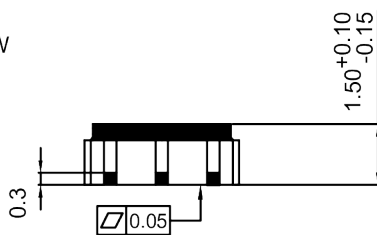
**Figure 1:** Picture of component with example of product marking.

### 3 Package

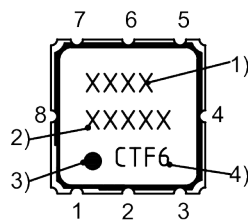
BOTTOM VIEW



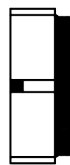
SIDE VIEW



TOP VIEW

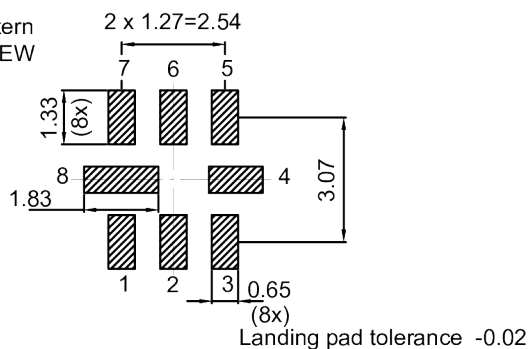


SIDE VIEW



- 1) Device designation
- 2) Last five digits of the lot number
- 3) Marking for pad number 1
- 4) Example of production location and date code

Land pattern  
 THRU VIEW

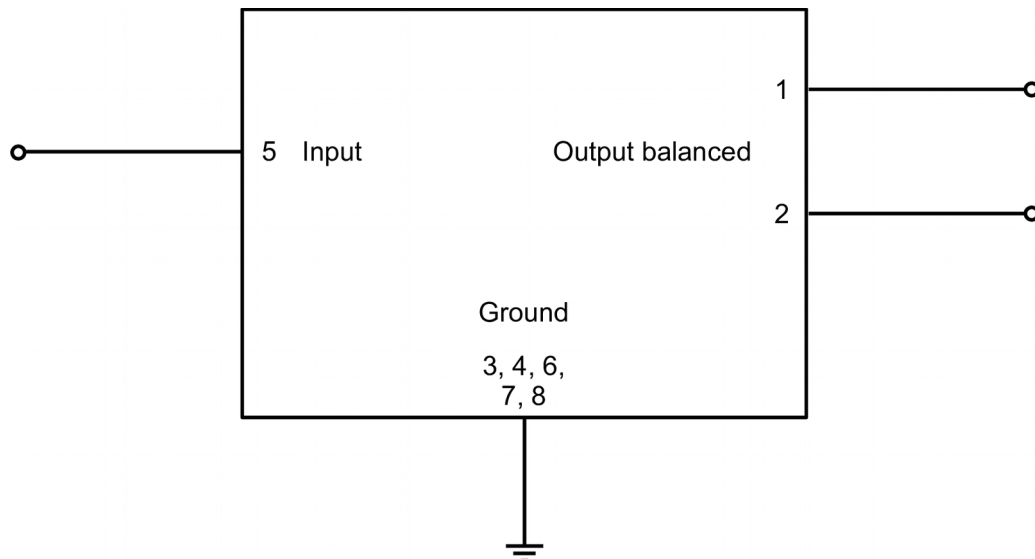


**Figure 2: Drawing of package.** See Sec. Package information (p. 16).

### 4 Pin configuration

- 1, 2 Output balanced
- 5 Input
- 3, 4, 6, 7, 8 Ground

## 5 Matching circuit



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



## 6 Characteristics

Temperature range for specification	$T_{\text{SPEC}}$	= -30 °C ... +70 °C
Input terminating impedance	$Z_{\text{IN}}$	= 50 $\Omega$
Output terminating impedance	$Z_{\text{OUT}}$	= 50 $\Omega$ (balanced)

Characteristics			min. for $T_{\text{SPEC}}$	typ. @ +25 °C	max. for $T_{\text{SPEC}}$	
<b>Center frequency</b>		$f_c$	—	390	—	MHz
<b>Maximum insertion attenuation</b>		$\alpha_{\text{max}}$				
	380... 400	MHz	—	3.1	5.0 <sup>1)</sup>	dB
<b>Amplitude ripple (p-p)</b>		$\Delta\alpha$				
	380... 400	MHz	—	1.1	3.0 <sup>2)</sup>	dB
<b>Maximum VSWR</b>		VSWR <sub>max</sub>				
@ input port	380... 400	MHz	—	2.0	2.3	
@ output port	380... 400	MHz	—	2.1	2.3	
<b>Temperature coefficient of frequency</b>		TC <sub>f</sub>	—	-70.0	—	ppm/K
<b>Minimum attenuation</b>		$\alpha_{\text{min}}$				
	0... 150	MHz	35	54	—	dB
	150... 346	MHz	30	34	—	dB
	346... 370	MHz	13	17	—	dB
	410... 440	MHz	14	17	—	dB
	440... 460	MHz	20	31	—	dB
	460... 542	MHz	28	32	—	dB
	542... 563	MHz	35	40	—	dB
	563... 1300	MHz	30	34	—	dB
	1300... 1526	MHz	25	30	—	dB
	1526... 2600	MHz	16	20	—	dB
	2600... 4000	MHz	5	28	—	dB

<sup>1)</sup> 3.5 dB at 25 °C.

<sup>2)</sup> 1.5 dB at 25 °C.

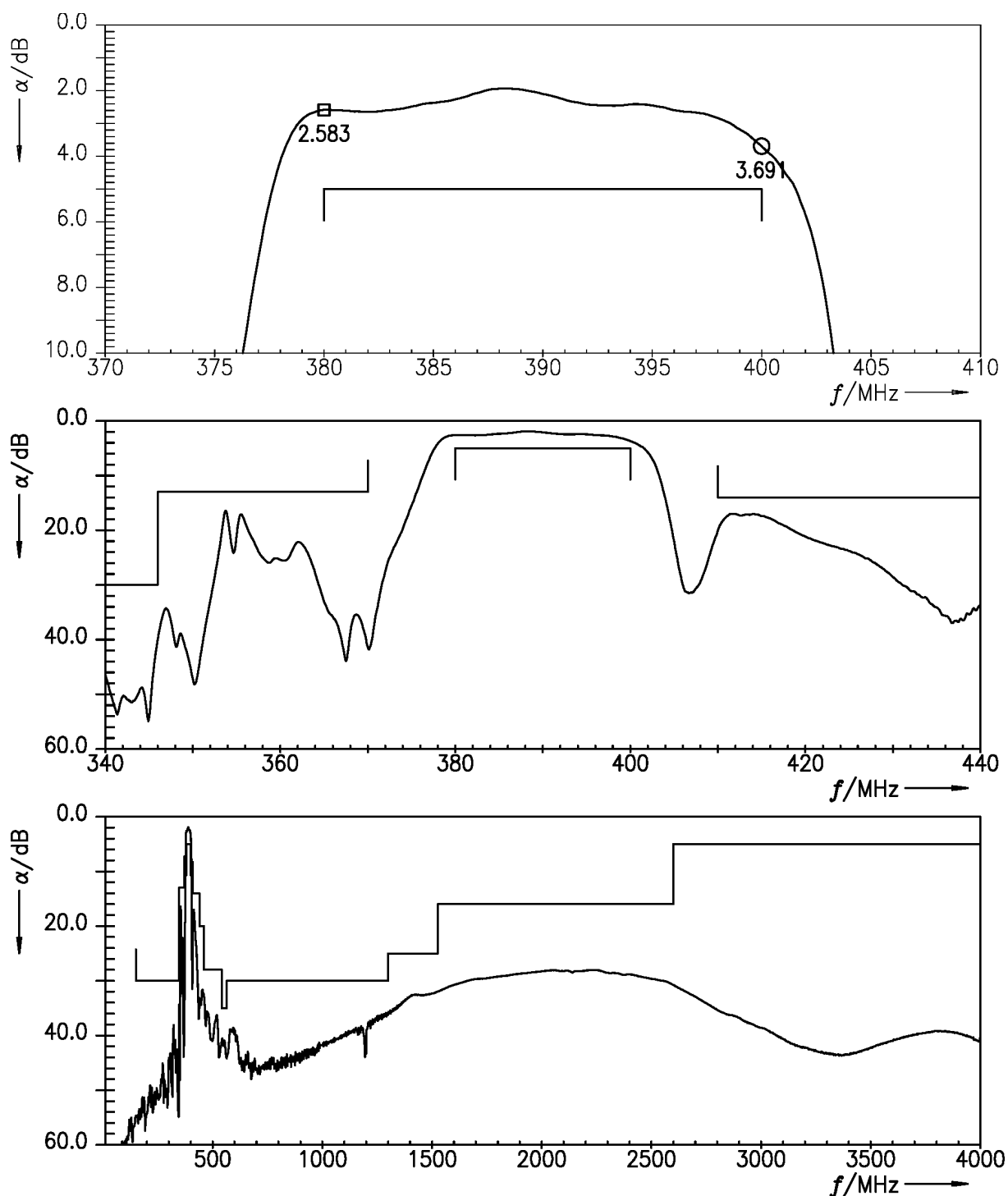
## 7 Maximum ratings

Operable temperature	$T_{OP} = -40\text{ °C} \dots +125\text{ °C}$	
Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +125\text{ °C}$	
DC voltage	$ V_{DC}  = 5.0\text{ V}$	
ESD voltage	$V_{ESD}^{2)} = 100\text{ V}$	Machine model. 10 pulses.
Input power @ input port: 380 ... 400 MHz	$P_{IN} = 15\text{ dBm}$	Continuous wave

<sup>1)</sup> Not valid for packaging material. Please refer to definition of Shelf life (p. 15).

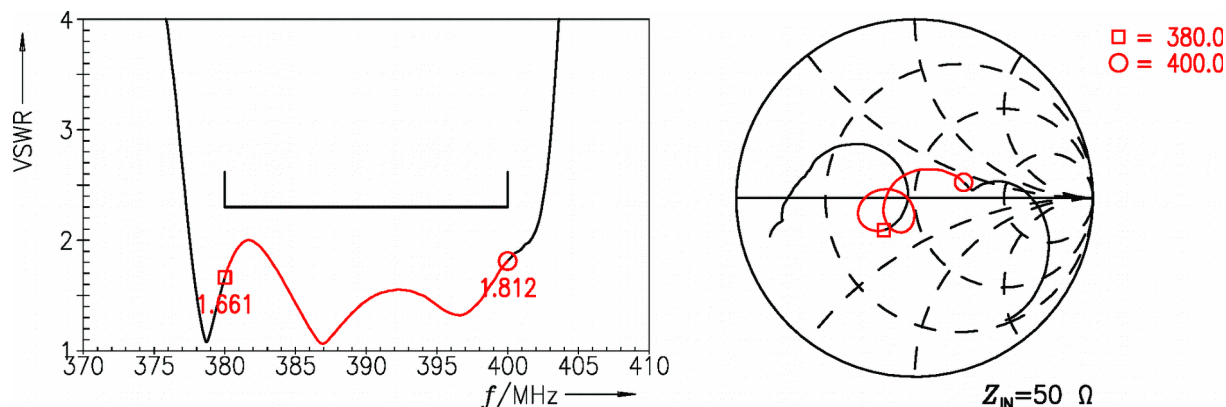
<sup>2)</sup> According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

## 8 Transmission coefficient

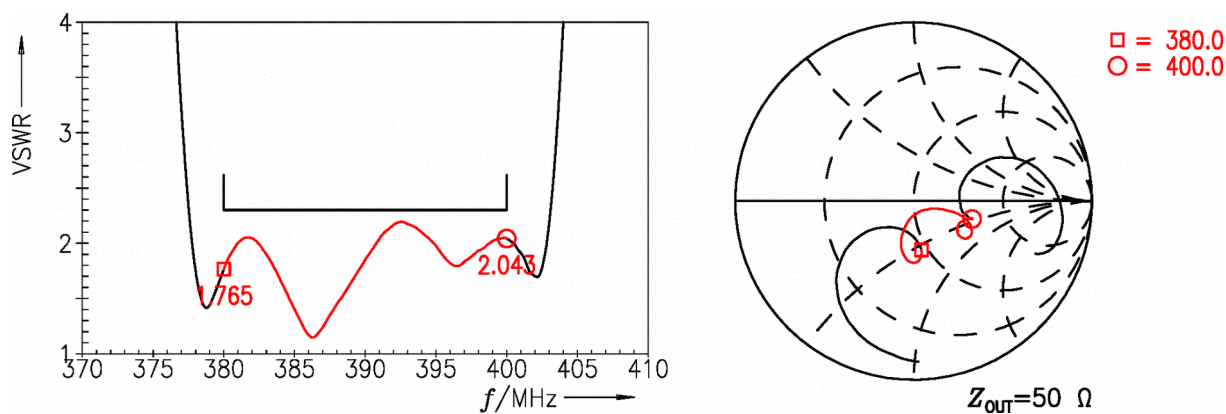


**Figure 4:** Attenuation.

## 9 Reflection coefficients



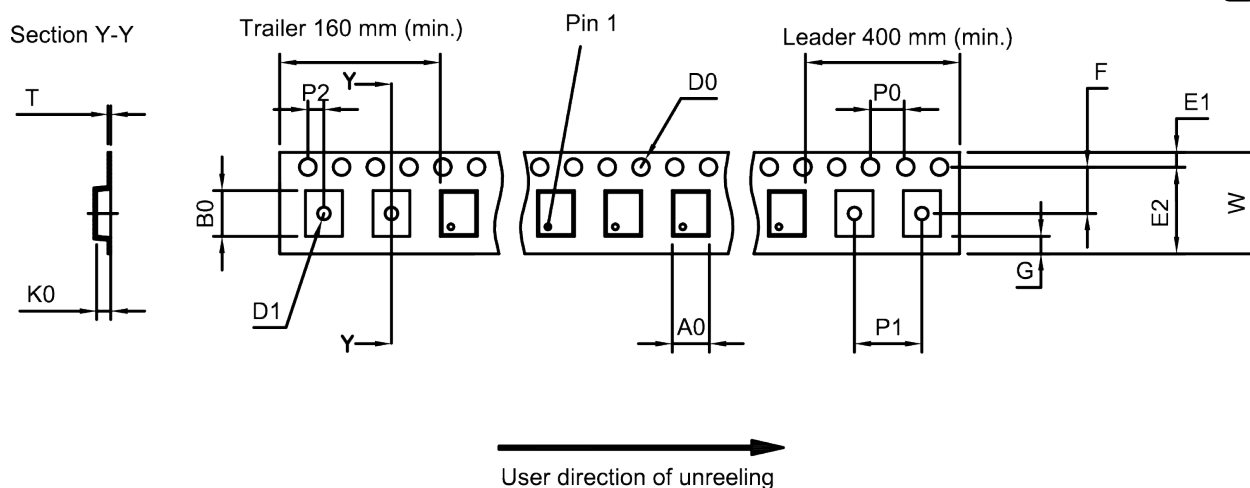
**Figure 5:** Reflection coefficient at input port.



**Figure 6:** Reflection coefficient at output port.

## 10 Packing material

### 10.1 Tape



**Figure 7:** Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

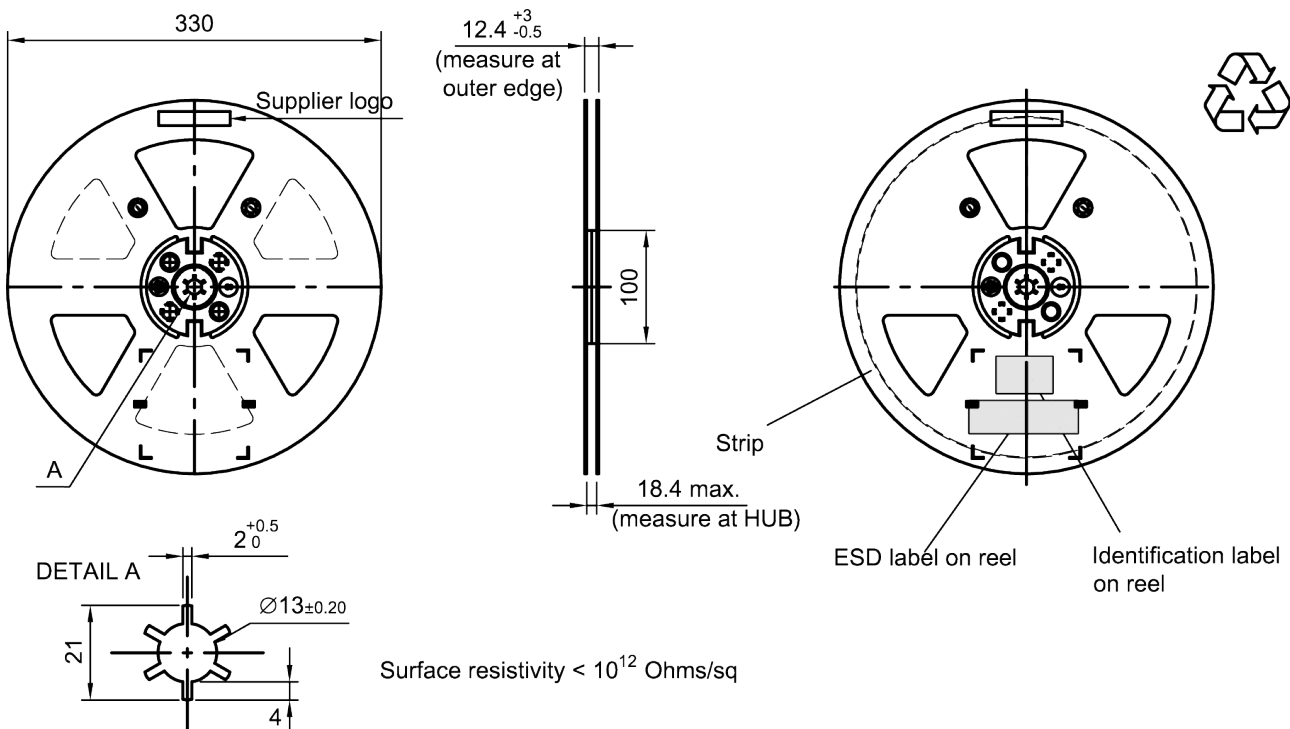
A <sub>0</sub>	4.1±0.1 mm
B <sub>0</sub>	4.1±0.1 mm
D <sub>0</sub>	1.5+0.1/-0 mm
D <sub>1</sub>	1.5 mm (min.)
E <sub>1</sub>	1.75±0.1 mm

E <sub>2</sub>	10.25 mm (min.)
F	5.5±0.05 mm
G	0.75 mm (min.)
K <sub>0</sub>	1.8±0.1 mm
P <sub>0</sub>	4.0±0.1 mm

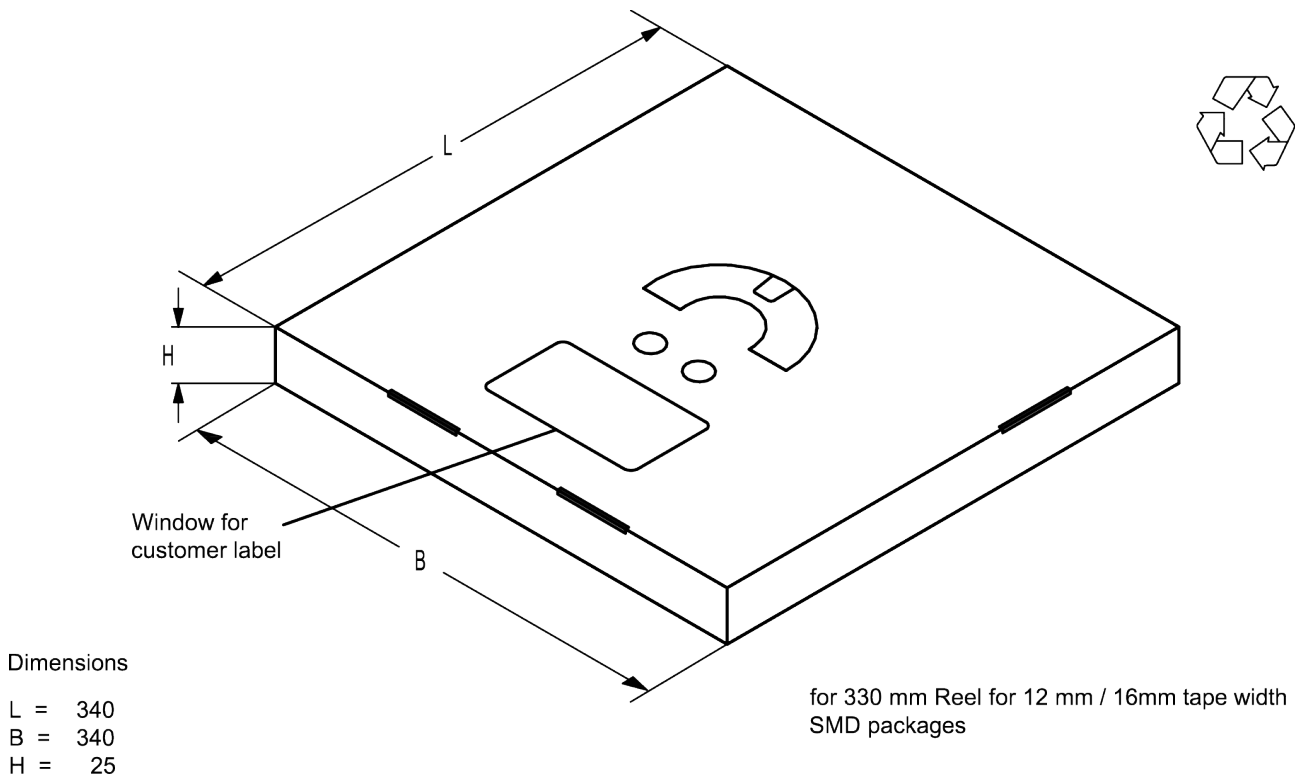
P <sub>1</sub>	8.0±0.1 mm
P <sub>2</sub>	2.0±0.1 mm
T	0.3±0.05 mm
W	12.0+0.3/-0.1 mm

**Table 1:** Tape dimensions.

## 10.2 Reel with diameter of 330 mm



**Figure 8:** Drawing of reel (first-angle projection) with diameter of 330 mm.



**Figure 9:** Drawing of folding box for reel with diameter of 330 mm.

## 11 Marking

Products are marked with device designation, lot number, as well as production location and date code.

- Device designation: The 4-character device designation of the ordering code is used for the marking.

Example for 4-character device designation: B3xxxxB1234xxxx

- Lot number: The last 5 digits of the lot number are used for the marking.

Example: 12345

- Production location and date code: The production location is Wuxi (encoded in the first character 'C'). The production date code is encoded in the last three characters according to Table 2.

1 <sup>st</sup> digit (day)						2 <sup>nd</sup> digit (year)				3 <sup>rd</sup> digit (month)			
Day	Code	Day	Code	Day	Code	Year	Code	Year	Code	Month	Code	Month	Code
1	1	11	A	21	M	2010	A	2022	P	Jan	1	Jul	7
2	2	12	B	22	N	2011	B	2023	R	Feb	2	Aug	8
3	3	13	C	23	P	2012	C	2024	S	Mar	3	Sep	9
4	4	14	D	24	R	2013	D	2025	T	Apr	4	Oct	0
5	5	15	E	25	S	2014	E	2026	U	May	5	Nov	N
6	6	16	F	26	T	2015	F	2027	V	Jun	6	Dec	D
7	7	17	H	27	U	2016	H	2028	W				
8	8	18	J	28	V	2017	J	2029	X				
9	9	19	K	29	W	2018	K	2030	Z				
10	0	20	L	30	X	2019	L	2031	A				
				31	Z	2020	M	2032	B				
						2021	N	and so on					

**Table 2:** Production date code.

Example of how to decode production location and date code:

Code: **C T F 6**

Location: C → Wuxi

Day: T → 26<sup>th</sup>

Year: F → 2015

Month: 6 → June

## 12 Soldering profile

The recommended soldering process is in accordance with IEC 60068-2-58 – 3<sup>rd</sup> 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 $T_{\text{peak}}$	250 °C +0/-5 °C
wetting temperature $T_{\text{min}}$	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 10:** 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 Shelf life

The shelf life of components is determined by solderability of the package terminals. It is specified as 2 years from manufacturing date assuming the following conditions:

- storage in original packaging and non-aggressive atmosphere,
- storage temperature ranging from  $-25\text{ }^{\circ}\text{C}$  to  $+40\text{ }^{\circ}\text{C}$ , and
- storage humidity with  $\leq 75\text{ \% r.h.}$  mean annual humidity,  $\leq 95\text{ \% r.h.}$  for max. 30 days / year, and no dew condensation.

## **14 Cautions and warnings**

### **14.1 Display of ordering codes for RF360 products**

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### **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.
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