Qualcomm

RF360
Europe GmbH

Data sheet

SAW RF filter

Base stations
TETRA

Series/type:	B5047
Ordering code:	B39391B5047Z810
Date:	July 01, 2019
Version:	2.2

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A Qualcomm – TDK Joint Venture

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Table of contents

1 Application

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

2 Features

- Package code QCC8B
- Package size $3.8_{\pm 0.15}$ mm × $3.8_{\pm 0.15}$ 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)

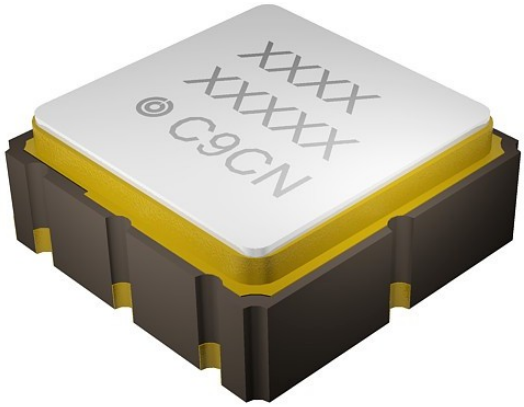
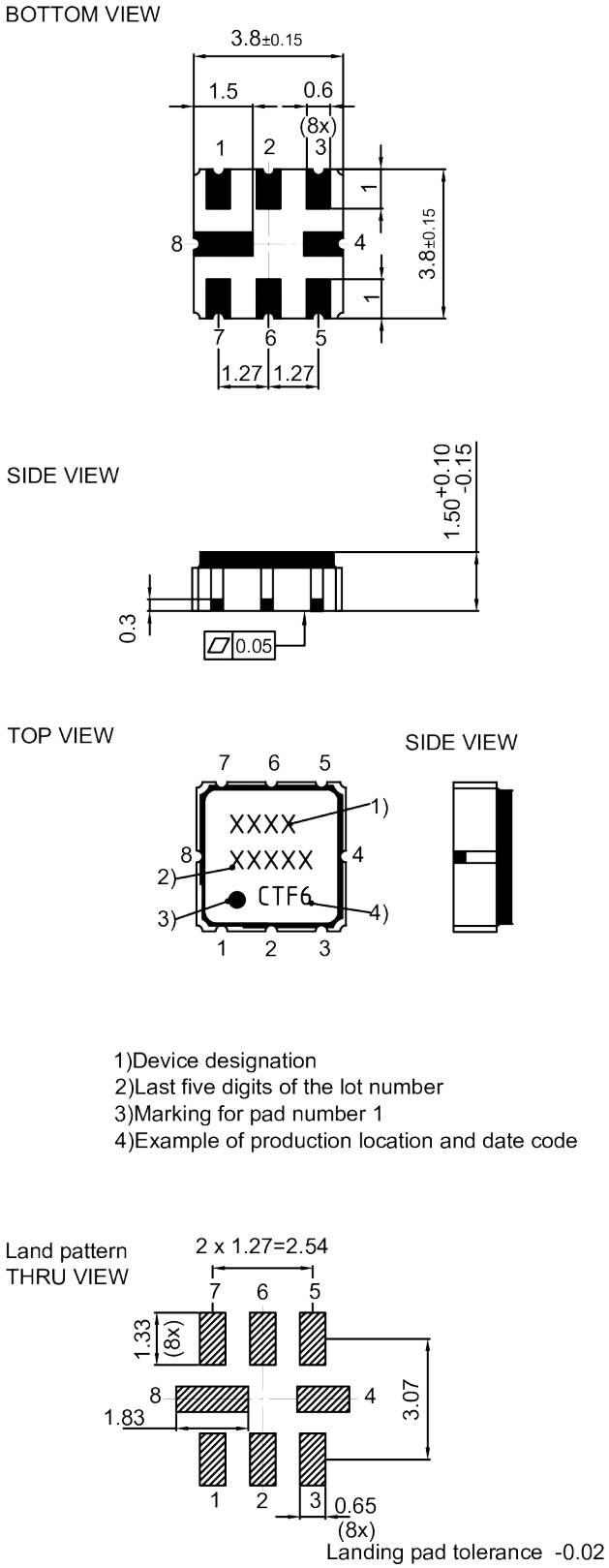


Figure 1: Picture of component with example of product marking.

3 Package



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

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

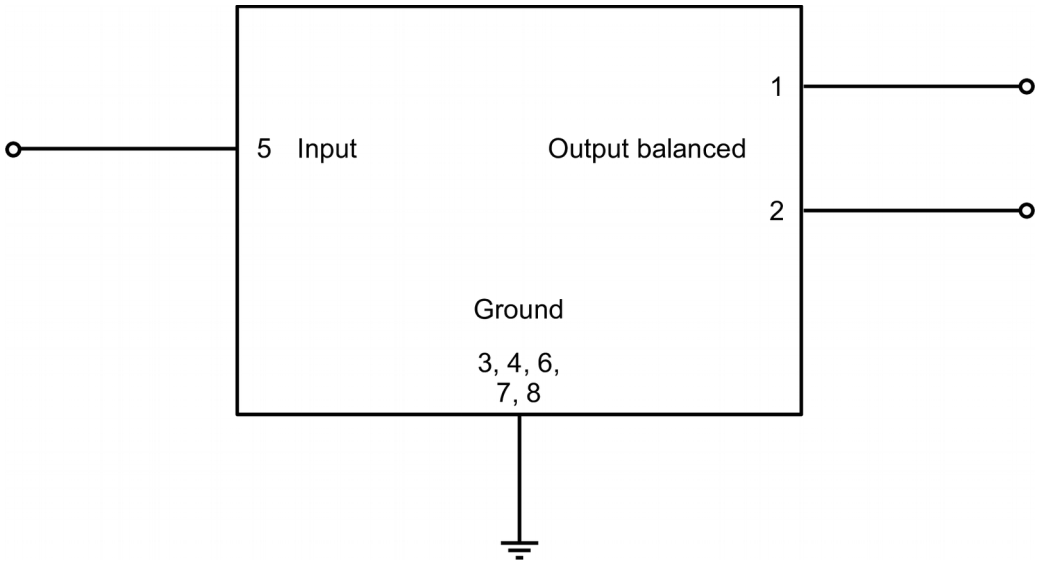


Figure 3: Schematic of matching circuit. No external matching components required.

6 Characteristics

Temperature range for specification T_{SPEC} = −30 °C ... +70 °C
Input terminating impedance Z_{IN} = 50 Ω
Output terminating impedance Z_{OUT} = 50 Ω (balanced)

Characteristics				min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}	
Center frequency			f_C	—	390	—	MHz
Maximum insertion attenuation			α_{max}				
	380... 400	MHz		—	3.1	5.0[1]	dB
Amplitude ripple (p-p)			$\Delta\alpha$				
	380... 400	MHz		—	1.1	3.0[2]	dB
Maximum VSWR			$VSWR_{max}$				
@ input port	380... 400	MHz		—	2.0	2.3	
@ output port	380... 400	MHz		—	2.1	2.3	
Temperature coefficient of frequency			TC_f	—	−70.0	—	ppm/K
Minimum attenuation			α_{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

1) 3.5 dB at 25 °C.
2) 1.5 dB at 25 °C.

7 Maximum ratings

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

1) Not valid for packaging material. Please refer to definition of Shelf life (p. 15).
2) According to JESD22-A115B (MM – Machine Model), 10 negative & 10 positive pulses.

8 Transmission coefficient

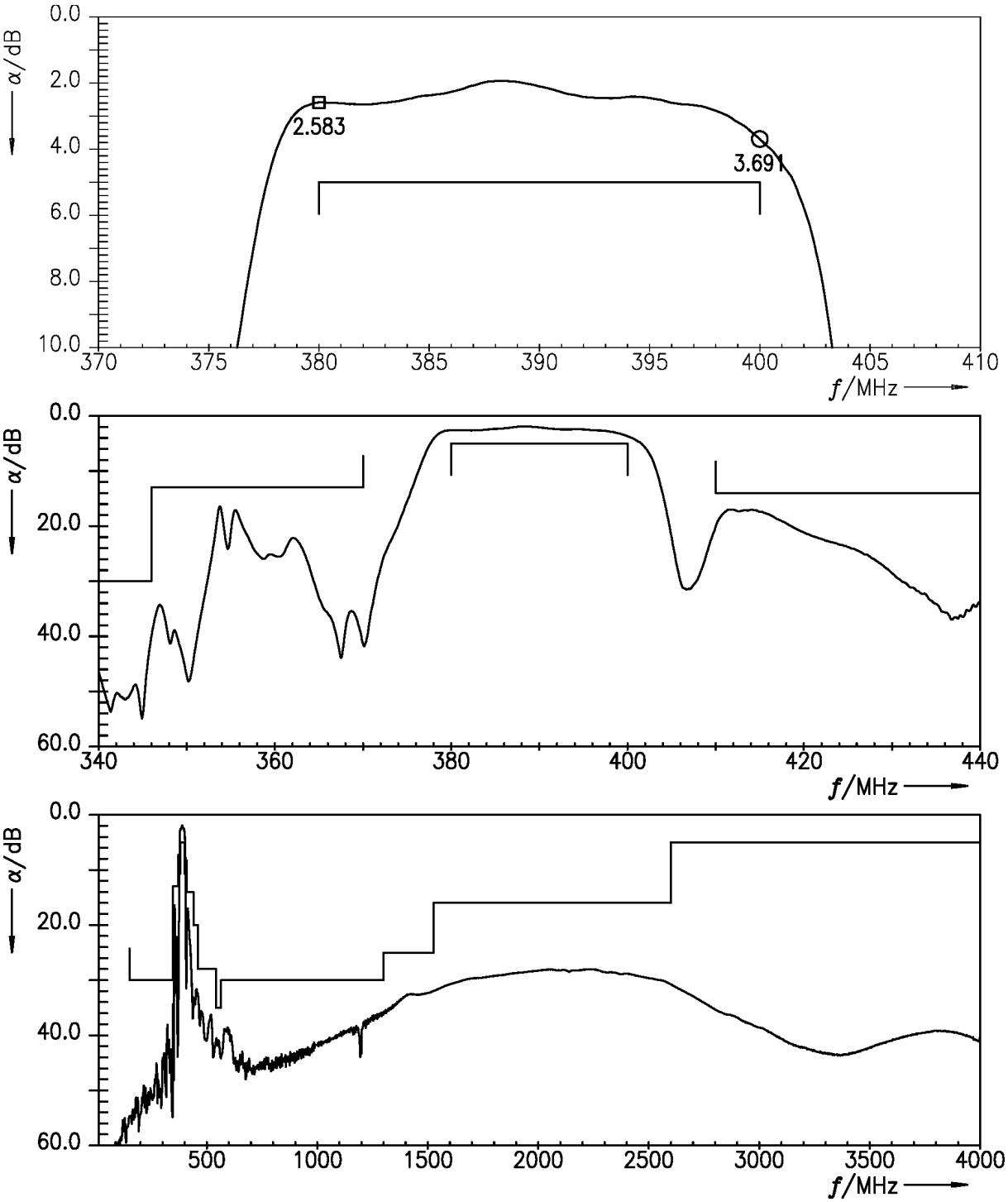


Figure 4: Attenuation.

9 Reflection coefficients

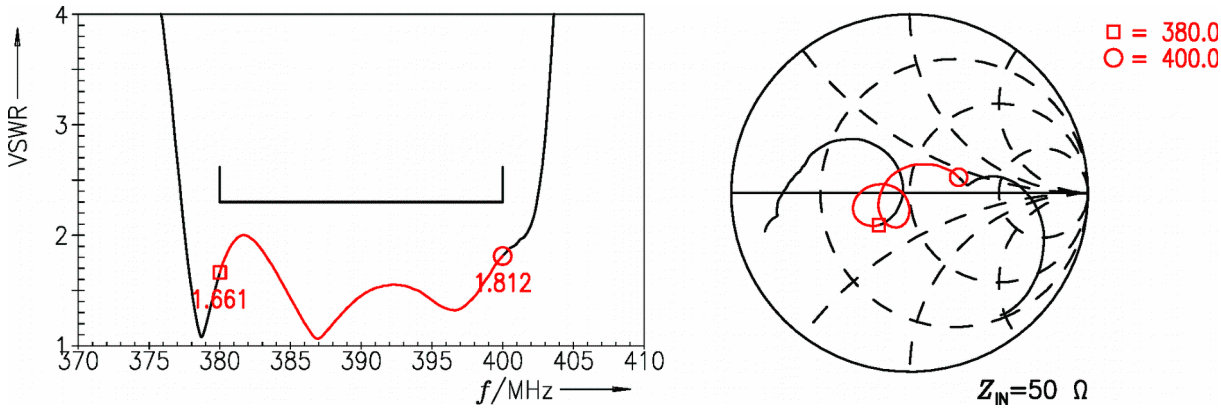


Figure 5: Reflection coefficient at input port.

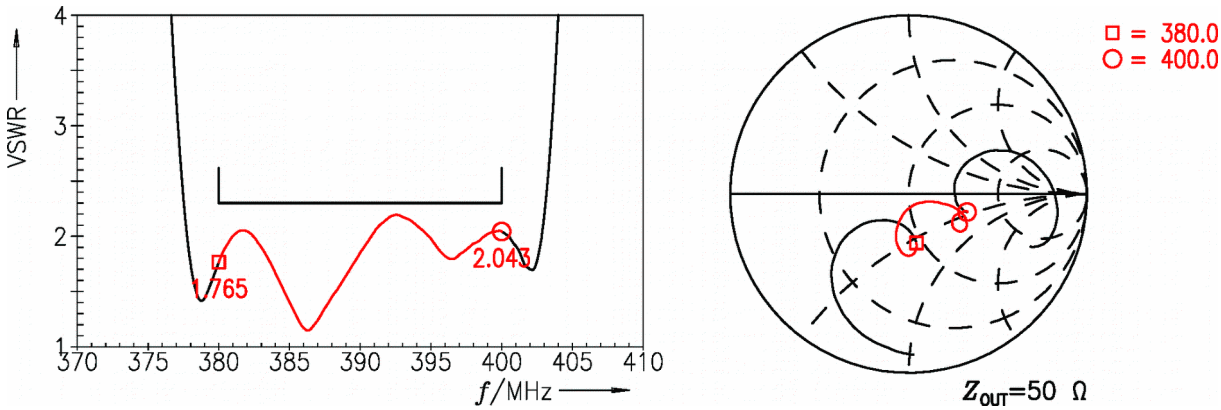


Figure 6: Reflection coefficient at output port.

10 Packing material

10.1 Tape

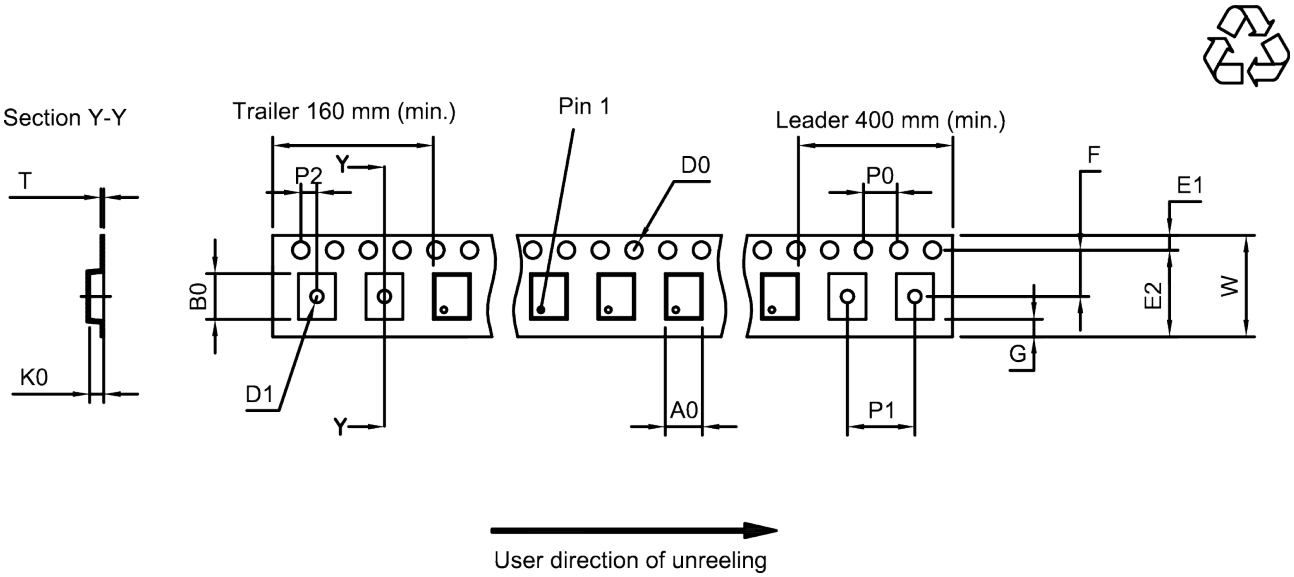


Figure 7: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A_0	$4.1_{\pm 0.1}$ mm
B_0	$4.1_{\pm 0.1}$ mm
D_0	$1.5^{+0.1/-0}$ mm
D_1	1.5 mm (min.)
E_1	$1.75_{\pm 0.1}$ mm

E_2	10.25 mm (min.)
F	$5.5_{\pm 0.05}$ mm
G	0.75 mm (min.)
K_0	$1.8_{\pm 0.1}$ mm
P_0	$4.0_{\pm 0.1}$ mm

P_1	$8.0_{\pm 0.1}$ mm
P_2	$2.0_{\pm 0.1}$ mm
T	$0.3_{\pm 0.05}$ mm
W	$12.0^{+0.3/-0.1}$ mm

Table 1: Tape dimensions.

10.2 Reel with diameter of 330 mm

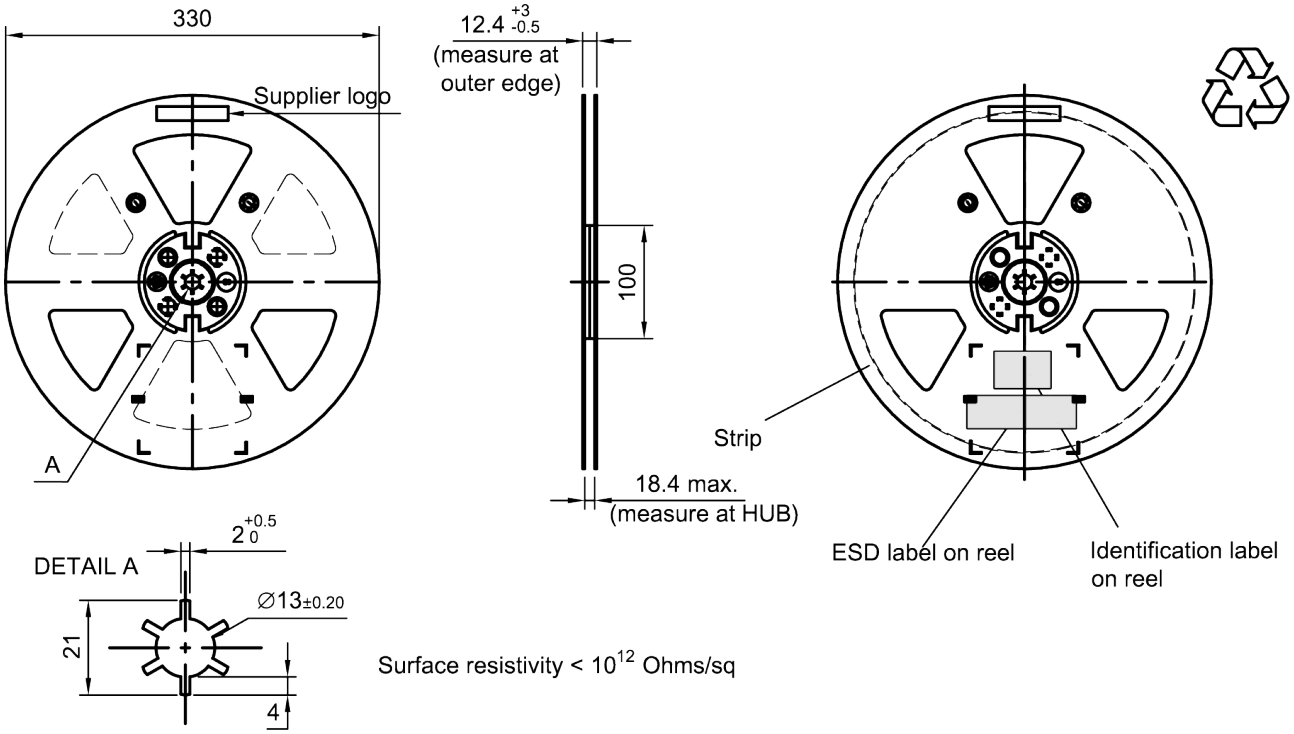


Figure 8: Drawing of reel (first-angle projection) with diameter of 330 mm.

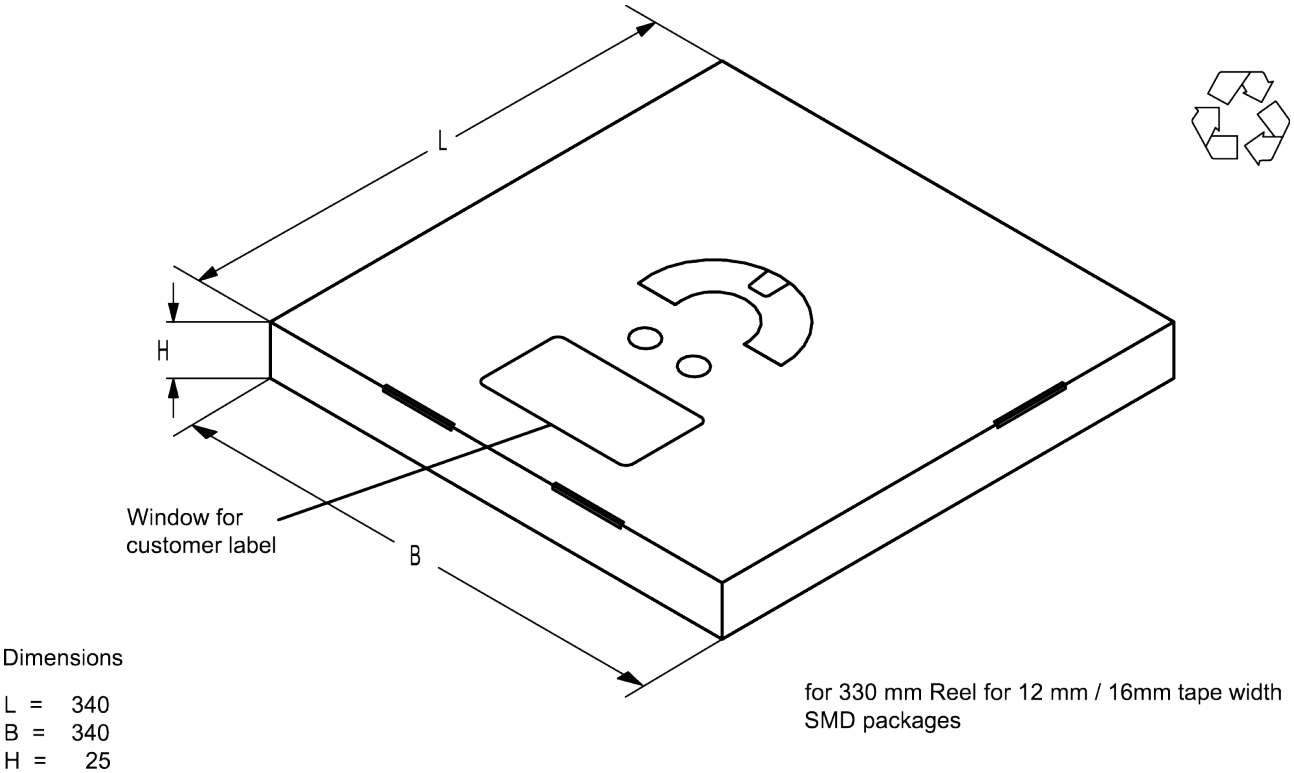


Figure 9: Drawing of folding box for reel with diameter of 330 mm.

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: B3xxxxB**1234**xxxx

- 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.

1st digit (day)					
Day	Code	Day	Code	Day	Code
1	1	11	A	21	M
2	2	12	B	22	N
3	3	13	C	23	P
4	4	14	D	24	R
5	5	15	E	25	S
6	6	16	F	26	T
7	7	17	H	27	U
8	8	18	J	28	V
9	9	19	K	29	W
10	0	20	L	30	X
				31	Z

2nd digit (year)			
Year	Code	Year	Code
2010	A	2022	P
2011	B	2023	R
2012	C	2024	S
2013	D	2025	T
2014	E	2026	U
2015	F	2027	V
2016	H	2028	W
2017	J	2029	X
2018	K	2030	Z
2019	L	2031	A
2020	M	2032	B
2021	N	and so on	

3rd digit (month)			
Month	Code	Month	Code
Jan	1	Jul	7
Feb	2	Aug	8
Mar	3	Sep	9
Apr	4	Oct	0
May	5	Nov	N
Jun	6	Dec	D

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 → 26th
Year: F → 2015
Month: 6 → June

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 ≥ 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).

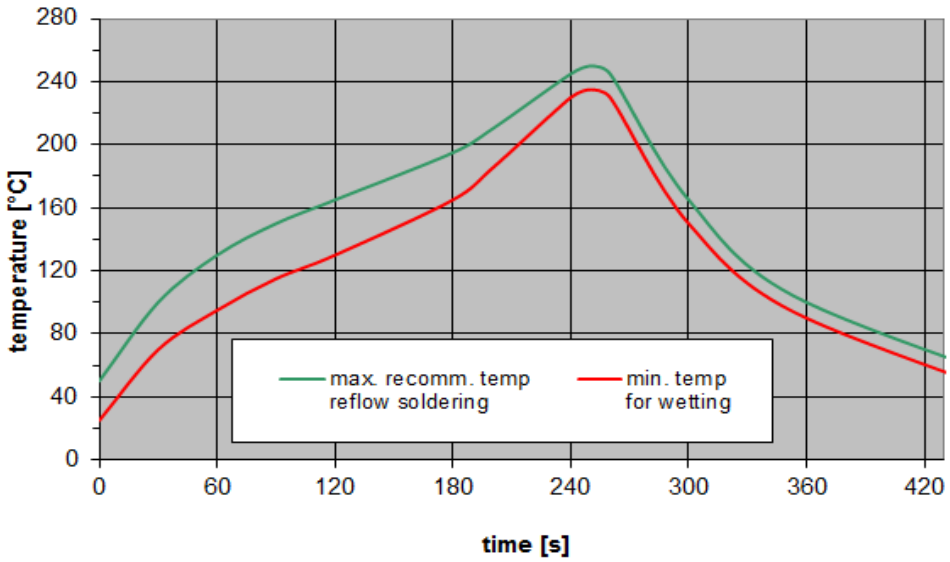


Figure 10: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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 °C to +40 °C, and
- storage humidity with ≤ 75 % r.h. mean annual humidity, ≤ 95 % r.h. for max. 30 days / year, and no dew condensation.

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.

15 Important notes

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