



RF360
Europe GmbH

Data sheet

SAW IF filter

Base stations

Low-loss filter for mobile communication

Series/type: B4926
Ordering code: B39131B4926H310

Date: June 13, 2019

Version: 2.1

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A Qualcomm – TDK Joint Venture

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1 Application

- Low-loss IF filter for mobile telephone
- Channel selection in GSM systems
- Hermetically sealed ceramic SMD package
- Balanced and unbalanced operation possible
- No coupling coil required

2 Features

- Package code QCC12C
- Package size $7.0_{\pm 0.15}$ mm \times $5.0_{\pm 0.15}$ mm
- Package height $1.48_{\pm 0.15}$ mm
- Approximate weight 0.2 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)

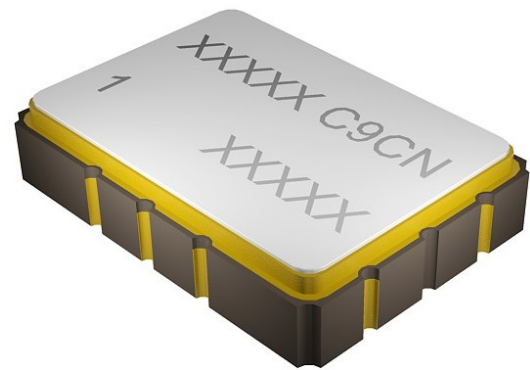
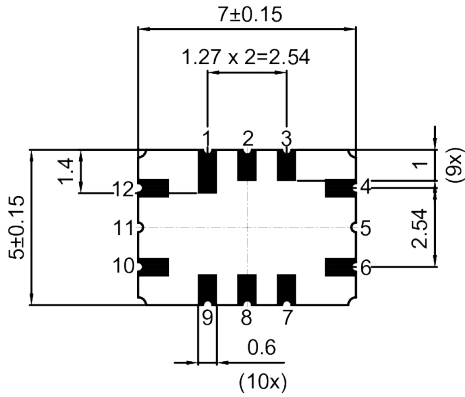


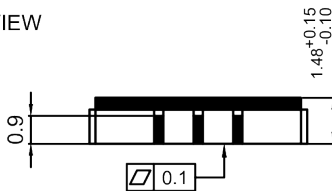
Figure 1: Picture of component with example of product marking.

3 Package

BOTTOM VIEW

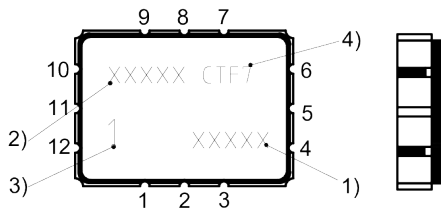


SIDE VIEW



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

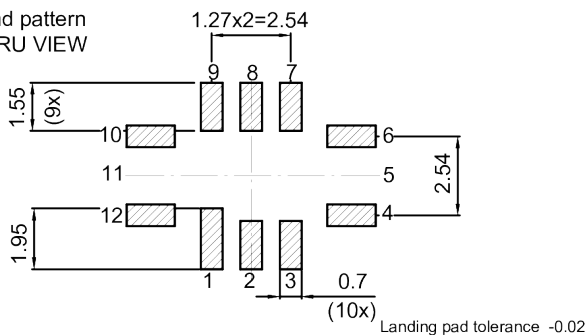


Figure 2: Drawing of package. See Sec. Package information (p. 16).

4 Pin configuration

- 4 Output
- 10 Input
- 1, 2, 3, 7, 8, 9 Ground
- 6 Ground (recommended or output balanced)
- 12 Ground (recommended or input balanced)

5 Matching circuit

- $L_{s10a} = 27 \text{ nH}$
- $L_{s4a} = 43 \text{ nH}$
- $L_{p10,12b} = 82 \text{ nH}$
- $L_{s12a} = 27 \text{ nH}$
- $L_{s6a} = 43 \text{ nH}$
- $L_{p4,6b} = 82 \text{ nH}$

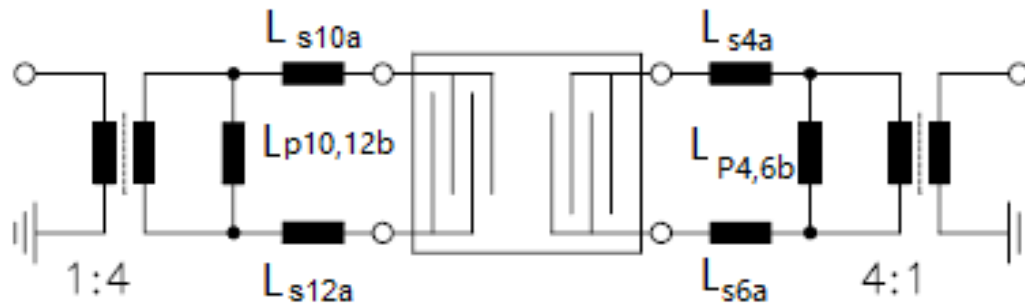


Figure 3: Schematic of matching circuit.

6 Characteristics

Temperature range for specification	T_{SPEC}	= -30 °C ... +80 °C
Input terminating impedance	Z_{IN}	= 50 Ω with ext. circuitry. 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		—	133.2	—	MHz
Minimum insertion attenuation					
	133.1... 133.3 MHz	—	4.5	6.0	dB
Amplitude ripple (p-p)					
	133.1... 133.3 MHz	—	0.4	1.0	dB
Group delay ripple					
	133.1... 133.3 MHz	—	0.3	1.0	μ s
Temperature coefficient of frequency					
		—	0.042	—	ppm/K
Turnover temperature					
		—	25	—	°C
Minimum attenuation (relative to α_{min})					
	103.2... 126.2 MHz	40	48	—	dB
	126.2... 130.2 MHz	35	42	—	dB
	130.2... 132.4 MHz	29	32	—	dB
	132.4... 132.6 MHz	20	29	—	dB
	132.6... 132.8 MHz	15	19	—	dB
	132.8... 132.95 MHz	3	6.5	—	dB
	133.45... 133.6 MHz	3	6.5	—	dB
	133.6... 133.8 MHz	15	17	—	dB
	133.8... 134 MHz	20	27	—	dB
	134... 136.2 MHz	29	31	—	dB
	136.2... 140.2 MHz	35	39	—	dB
	140.2... 163.2 MHz	40	46	—	dB
Impedance for pass band matching					
@ input port: $Z_{in,IN} = R_{IN} \parallel C_{IN}$		$Z_{in,IN}$ ³⁾	—	1000 10.3	— Ω pF
@ output port: $Z_{in,OUT} = R_{OUT} \parallel C_{OUT}$		$Z_{in,OUT}$ ³⁾	—	1300 8.2	— Ω pF

¹⁾ See Sec. Matching circuit (p. 6).

²⁾ Temperature dependence of f_c : $f_c(T) = f_c(T_0)(1 + TC_f(T - T_0)^2)$.

³⁾ Impedance for pass band matching bases on an ideal, perfect matching of the SAW filter to source and to load impedance (here 50 Ω). After removal of the SAW filter the input impedance of the input and output matching network is calculated. The conjugate complex value of these characteristic impedances are the input and output impedances for flat pass band. For more details we refer to RF360 application note #18.

7 Maximum ratings

Operable temperature	$T_{OP} = -40\text{ °C} \dots +105\text{ °C}$	
Storage temperature	$T_{STG}^{1)} = -40\text{ °C} \dots +105\text{ °C}$	
DC voltage	$ V_{DC} = 5.0\text{ V}$	
ESD voltage	$V_{ESD}^{2)} = 50\text{ V}$	Human body model.
Input power @ input port: 133.1 ... 133.3 MHz	$P_{IN} = 10\text{ dBm}$	

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

²⁾ According to JESD22-A114F (HBM – Human Body Model), 1 negative & 1 positive pulse.

8 Transmission coefficient

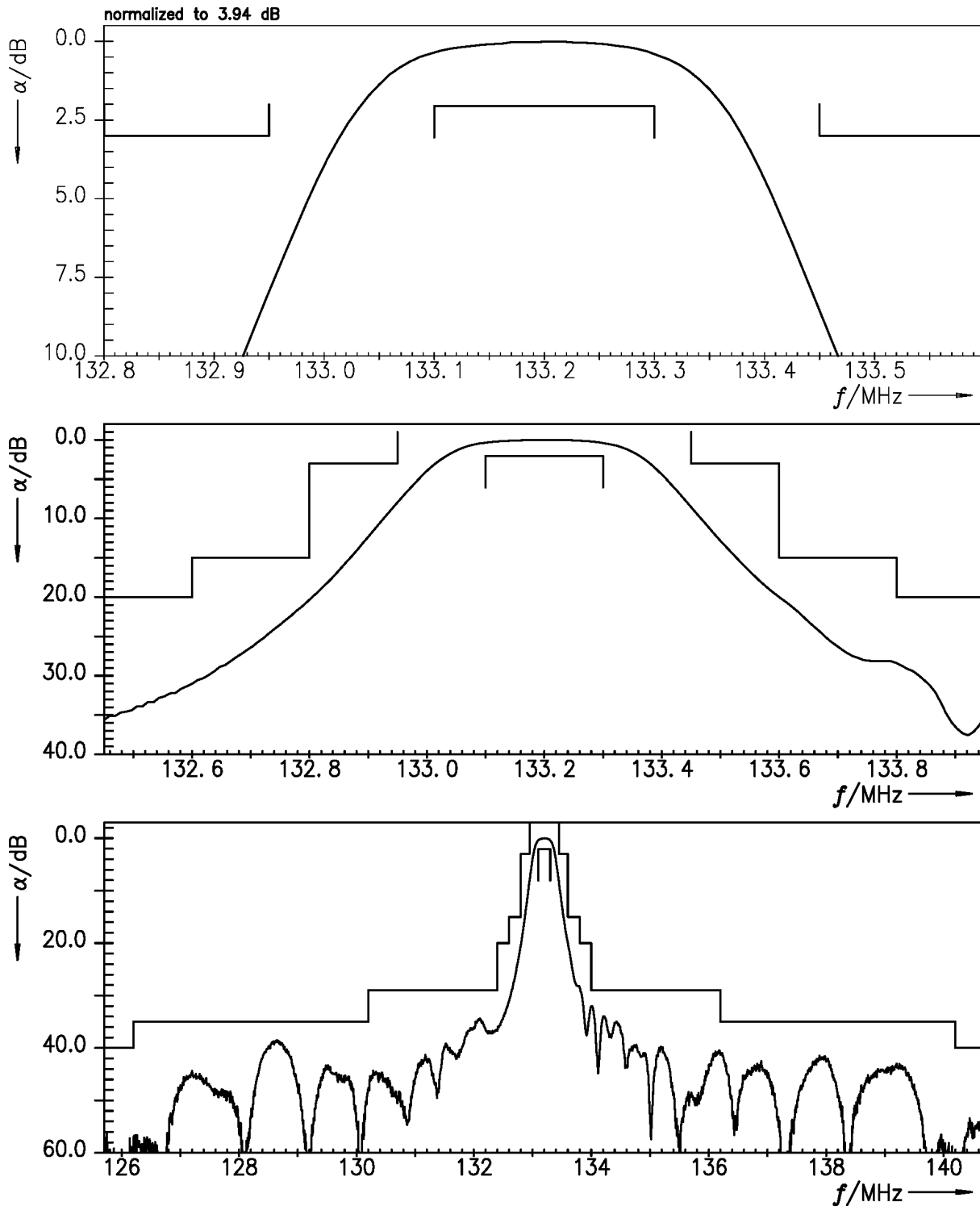


Figure 4: Attenuation.

9 Group delay

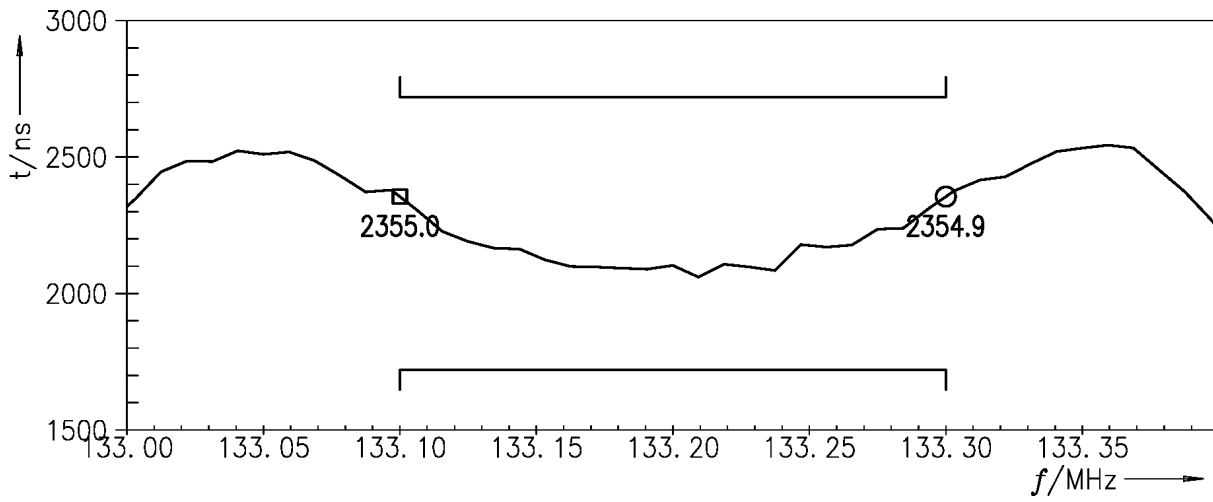


Figure 5: Group delay ripple.

10 Packing material

10.1 Tape

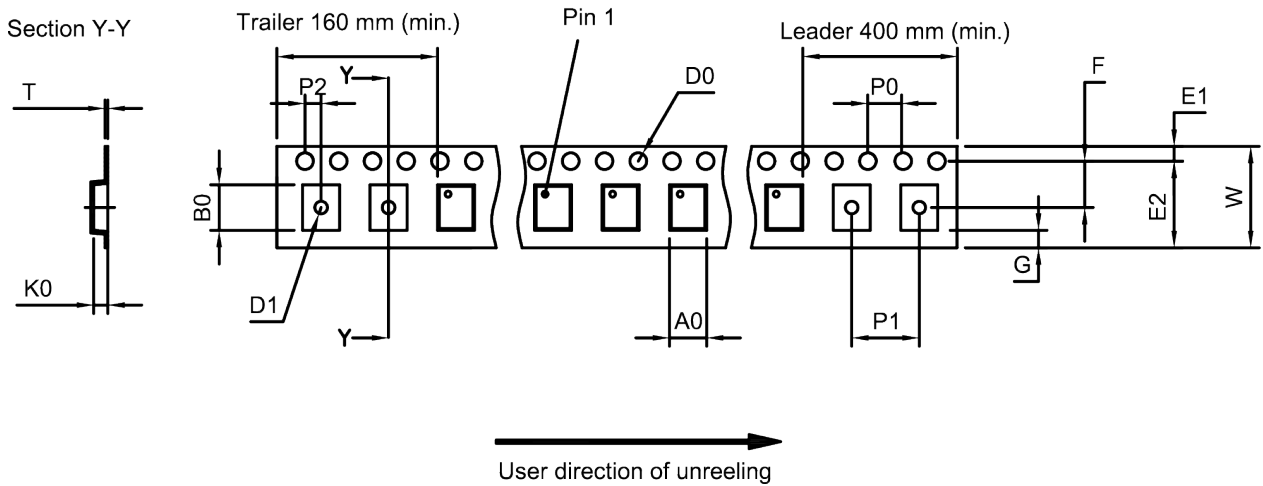


Figure 6: Drawing of tape (first-angle projection) for illustration only and not to scale. The valid tape dimensions are listed in Table 1.

A ₀	5.3±0.1 mm	E ₂	14.25 mm (min.)	P ₁	8.0±0.1 mm
B ₀	7.3±0.1 mm	F	7.5±0.1 mm	P ₂	2.0±0.1 mm
D ₀	1.5+0.1/-0 mm	G	0.75 mm (min.)	T	0.3±0.05 mm
D ₁	1.5 mm (min.)	K ₀	1.9±0.1 mm	W	16.0+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 330 mm

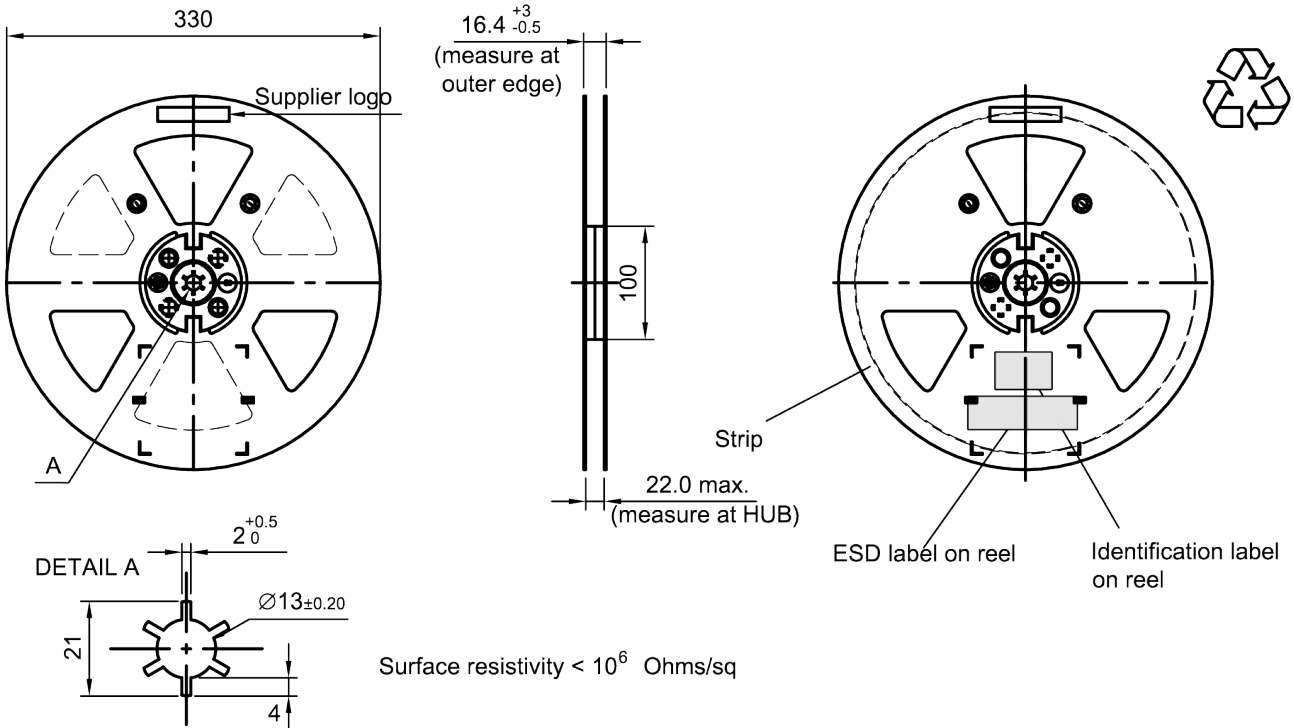
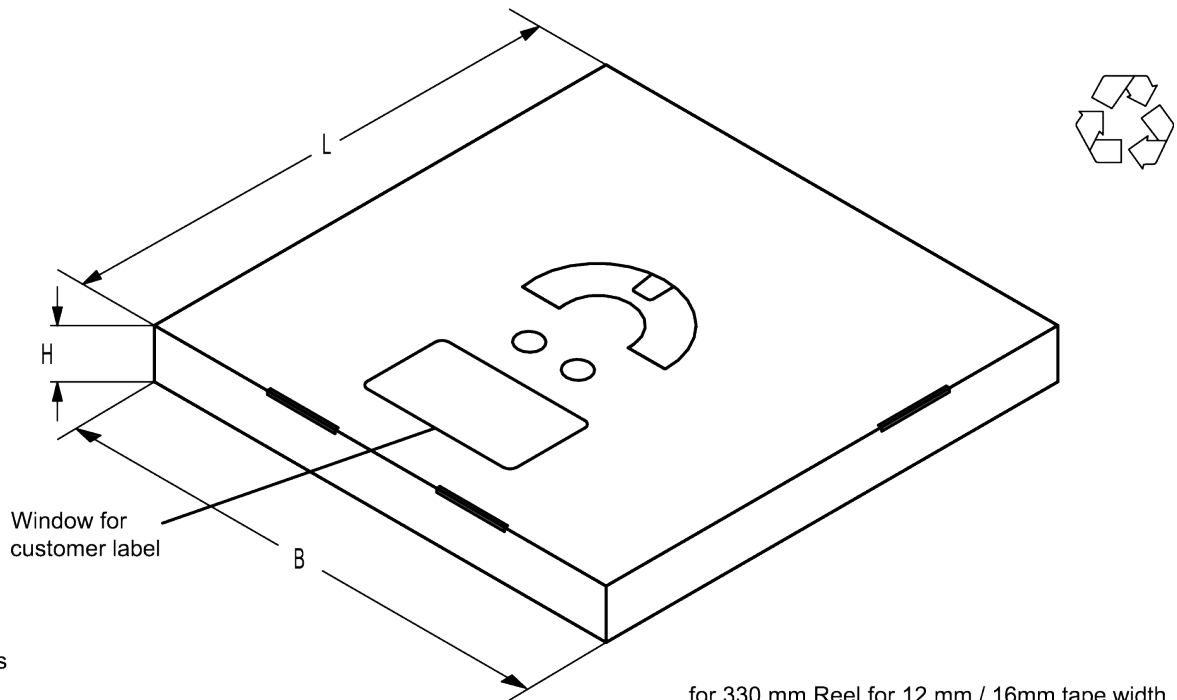


Figure 7: Drawing of reel (first-angle projection) with diameter of 330 mm.



Dimensions

- L = 340
- B = 340
- H = 25

for 330 mm Reel for 12 mm / 16mm tape width SMD packages

Figure 8: 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 st digit (day)						2 nd digit (year)				3 rd 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 → 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).

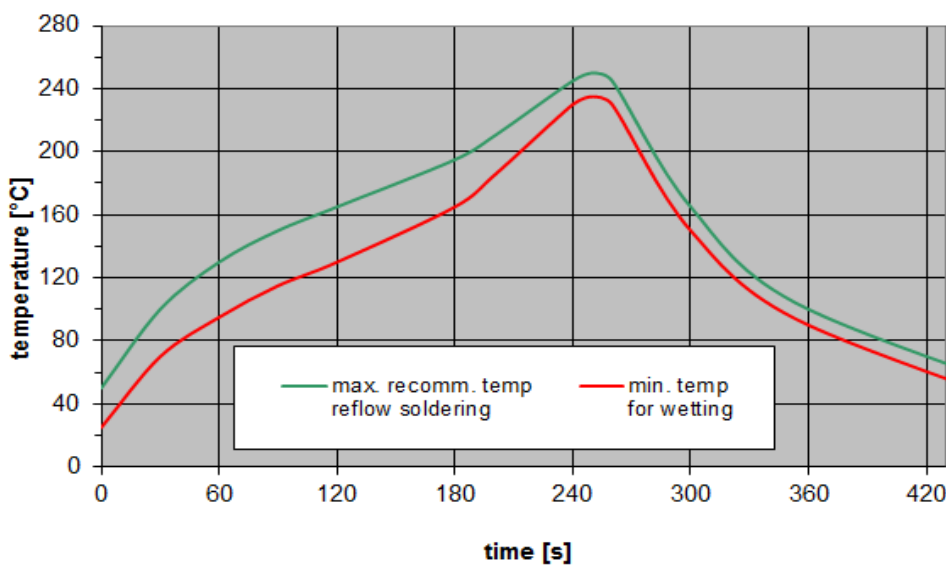


Figure 9: Recommended reflow profile for convection and infrared soldering – lead-free solder.

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 $+40\text{ °C}$, and
- storage humidity with $\leq 75\%$ r.h. mean annual humidity, $\leq 95\%$ r.h. for max. 30 days / year, and no dew condensation.

14 Cautions and warnings

14.1 Display of ordering codes for RF360 products

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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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