



RF360
Europe GmbH

SAW components

SAW IF filter
BWA

Series/type:	B5246
Ordering code:	B39141B5246H810
Date:	June 20, 2017
Version:	2.3

RF360 products mentioned within this document are products of RF360 Europe GmbH and other subsidiaries of RF360 Holdings Singapore Pte. Ltd. (collectively, the "RF360 Subsidiaries").

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

© 2019 RF360 Europe GmbH and/or its affiliated companies. All rights reserved.

These materials, including the information contained herein, may be used only for informational purposes by the customer. The RF360 Subsidiaries assume no responsibility for errors or omissions in these materials or the information contained herein. The RF360 Subsidiaries reserve the right to make changes to the product(s) or information contained herein without notice. The materials and information are provided on an AS IS basis, and the RF360 Subsidiaries assume no liability and make no warranty or representation, either expressed or implied, with respect to the materials, or any output or results based on the use, application, or evaluation of such materials, including, without limitation, with respect to the non-infringement of trademarks, patents, copyrights or any other intellectual property rights or other rights of third parties.

No use of this documentation or any information contained herein grants any license, whether express, implied, by estoppel or otherwise, to any intellectual property rights, including, without limitation, to any patents owned by QUALCOMM Incorporated or any of its subsidiaries.

Not to be used, copied, reproduced, or modified in whole or in part, nor its contents revealed in any manner to others without the express written permission of RF360 Europe GmbH.

Qualcomm is a trademark of Qualcomm Incorporated, registered in the United States and other countries. Other product and brand names may be trademarks or registered trademarks of their respective owners.

This technical data may be subject to U.S. and international export, re-export, or transfer ("export") laws. Diversion contrary to U.S. and international law is strictly prohibited.



RF360 Europe GmbH
A Qualcomm – TDK Joint Venture

SAW components

SAW IF filter

BWA

Series/type:	B5246
Ordering code:	B39141B5246H810
Date:	June 20, 2017
Version:	2.3

RF360 products mentioned within this document are offered by RF360 Europe GmbH and other subsidiaries of RF360 Holdings Singapore Pte. Ltd. (collectively, the “RF360 Subsidiaries”).

RF360 Holdings Singapore Pte. Ltd. is a joint venture of Qualcomm Global Trading Pte. Ltd. and EPCOS AG.

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

© 2017 RF360 Europe GmbH and/or its affiliated companies. All rights reserved.

SAW components**B5246****SAW IF filter****140 MHz**

Data sheet

These materials, including the information contained herein, may be used only for informational purposes by the customer. The RF360 Subsidiaries assume no responsibility for errors or omissions in these materials or the information contained herein. The RF360 Subsidiaries reserve the right to make changes to the product(s) or information contained herein without notice. The materials and information are provided on an AS IS basis, and the RF360 Subsidiaries assume no liability and make no warranty or representation, either expressed or implied, with respect to the materials, or any output or results based on the use, application, or evaluation of such materials, including, without limitation, with respect to the non-infringement of trademarks, patents, copyrights or any other intellectual property rights or other rights of third parties.

No use of this documentation or any information contained herein grants any license, whether express, implied, by estoppel or otherwise, to any intellectual property rights, including, without limitation, to any patents owned by QUALCOMM Incorporated or any of its subsidiaries.

Not to be used, copied, reproduced, or modified in whole or in part, nor its contents revealed in any manner to others without the express written permission of RF360 Europe GmbH.

Qualcomm and Qualcomm RF360 are trademarks of Qualcomm Incorporated, registered in the United States and other countries. RF360 is a trademark of Qualcomm Incorporated. Other product and brand names may be trademarks or registered trademarks of their respective owners.

This technical data may be subject to U.S. and international export, re-export, or transfer ("export") laws. Diversion contrary to U.S. and international law is strictly prohibited.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

Table of contents

1 Application	4
2 Features	4
3 Package	5
4 Pin configuration	5
5 Matching circuit	6
6 Characteristics	7
7 Maximum ratings	8
8 Transmission coefficient	9
9 Return loss	10
10 Group delay	11
11 Impulse response	12
12 Packing material	13
13 Marking	15
14 Soldering profile	16
15 Annotations	17
16 Cautions and warnings	18
Important notes	19

Data sheet

1 Application

- Low-loss IF filter for broadband wireless access
- Usable pass band 15 MHz
- Low Triple Transit
- Balanced operation

2 Features

- Package code QCC12E
- Package size 7.0 ± 0.15 mm \times 5.0 ± 0.15 mm
- Package height $1.33 + 0.15 / - 0.1$ mm
- Approximate weight 0.3 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)

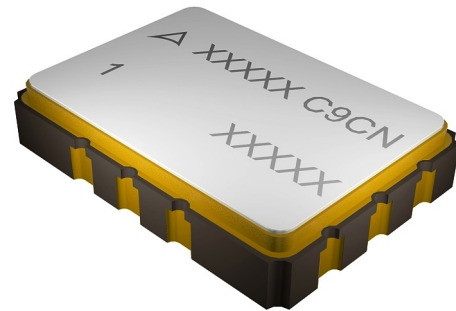


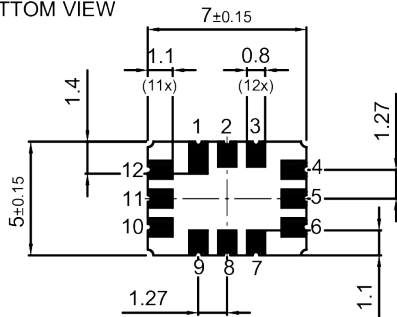
Figure 1: Picture of component with example of product marking.

SAW components **B5246**
SAW IF filter **140 MHz**

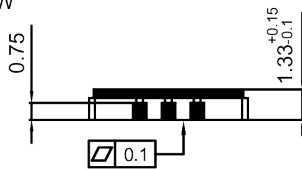
Data sheet

3 Package

BOTTOM VIEW

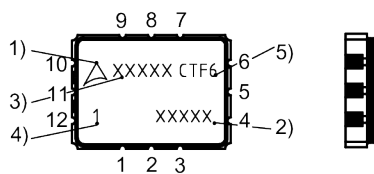


SIDE VIEW



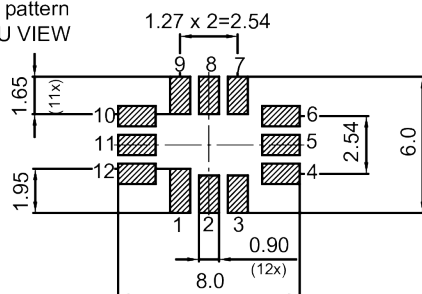
TOP VIEW

SIDE VIEW



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

Land pattern THRU VIEW



Landing pad tolerance -0.02

Figure 2: Drawing of package. See Sec. Package information (p. 18).

4 Pin configuration

- 4 Output balanced
- 6 Output balanced (or output ground)
- 10 Input balanced
- 12 Input balanced (or input ground)
- 1, 2, 3, 5, 7, 8, 9, 11 Ground

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

5 Matching circuit

- $C_{s4b} = 100 \text{ pF}$
- $C_{s6b} = 100 \text{ pF}$
- $C_{s10b} = 68 \text{ pF}$
- $C_{s12b} = 62 \text{ pF}$
- $L_{p4,6c} = 82 \text{ nH}$
- $L_{p10,12c} = 72 \text{ nH}$
- $R_{p4,6a} = 390 \text{ } \Omega$
- $R_{p10,12a} = 390 \text{ } \Omega$

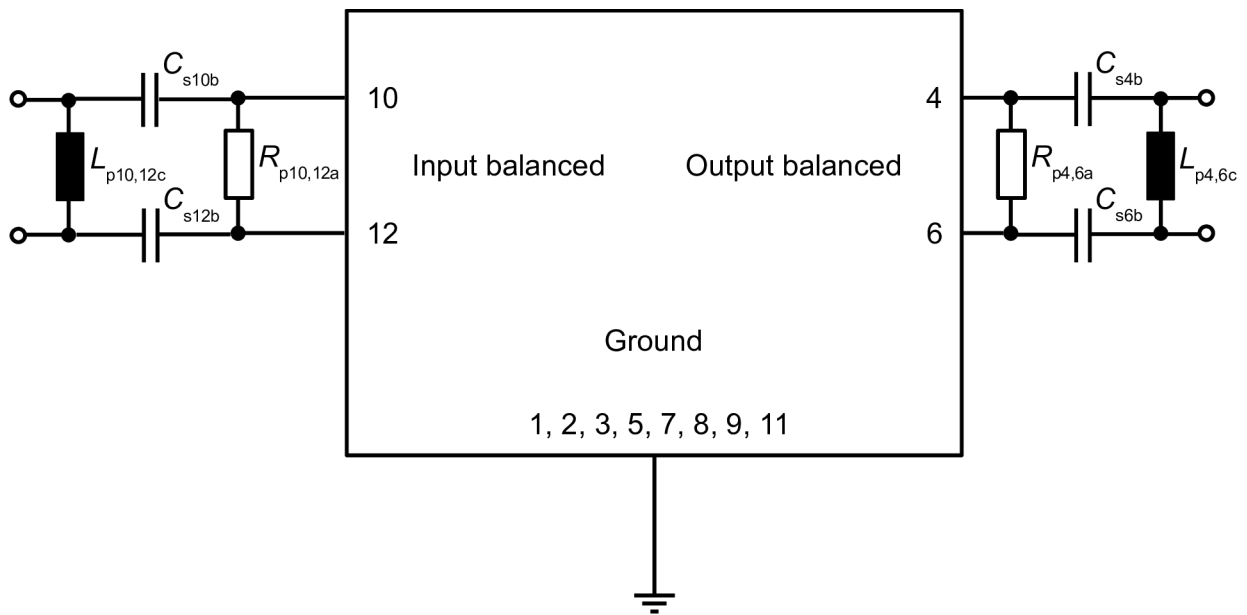


Figure 3: Schematic of matching circuit.

SAW components

B5246

SAW IF filter

140 MHz

Data sheet

6 Characteristics

Temperature range for specification	T_{SPEC}	= -40 °C ... +85 °C
Input terminating impedance	Z_{IN}	= 200 Ω with par. 72 nH, ser. 68 pF, & par. 390 Ω ¹⁾
Output terminating impedance	Z_{OUT}	= 200 Ω with par. 82 nH, ser. 100 pF, & par. 390 Ω ¹⁾

Characteristics		min. for T_{SPEC}	typ. @ +25 °C	max. for T_{SPEC}			
Center frequency	f_C	—	140	—	MHz		
Minimum insertion attenuation (including matching network)	α_{min}	—	11.4	14	dB		
Amplitude ripple (p-p)	$\Delta\alpha$						
		132... 148	MHz	—	0.4	3.0	dB
		132.5... 147.5	MHz	—	0.4	1.0	dB
Average group delay	τ_{avg}						
		132.5... 147.5	MHz	—	700	—	ns
Minimum return loss	α						
@ input port		132.5... 147.5	MHz	10	14	—	dB
@ output port		132.5... 147.5	MHz	10	15	—	dB
Minimum attenuation (relative to α_{min})	$\alpha_{rel,min}$						
		10... 125.5	MHz	40	47	—	dB
		154.5... 160	MHz	32	42	—	dB
		160... 180	MHz	35	50	—	dB
		180... 425	MHz	20	42	—	dB
Group delay ripple	$\Delta\tau_{var}$						
		132.5... 147.5	MHz	—	22	70	ns
Impulse response (relative to max. of main lobe)	α_{rel}						
		2.0... 2.5	μs	40	48	—	dB
Variation of phase	φ_{var}						
		132.5... 147.5	MHz	—	3.0	10	°

¹⁾ See Sec. Matching circuit (p. 6).

SAW components

B5246

SAW IF filter

140 MHz

Data sheet

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} ^{2)} = 0\text{ V}$	
Input power	P_{IN}	
@ input port: 132 ... 148 MHz	20 dBm (max.)	Continuous wave for 1000 h @ 55 °C.
@ input port: 132 ... 148 MHz	17 dBm (max.)	Continuous wave for 100 h @ 85 °C.

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

²⁾ In case of applied DC voltage blocking capacitors are mandatory.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

8 Transmission coefficient

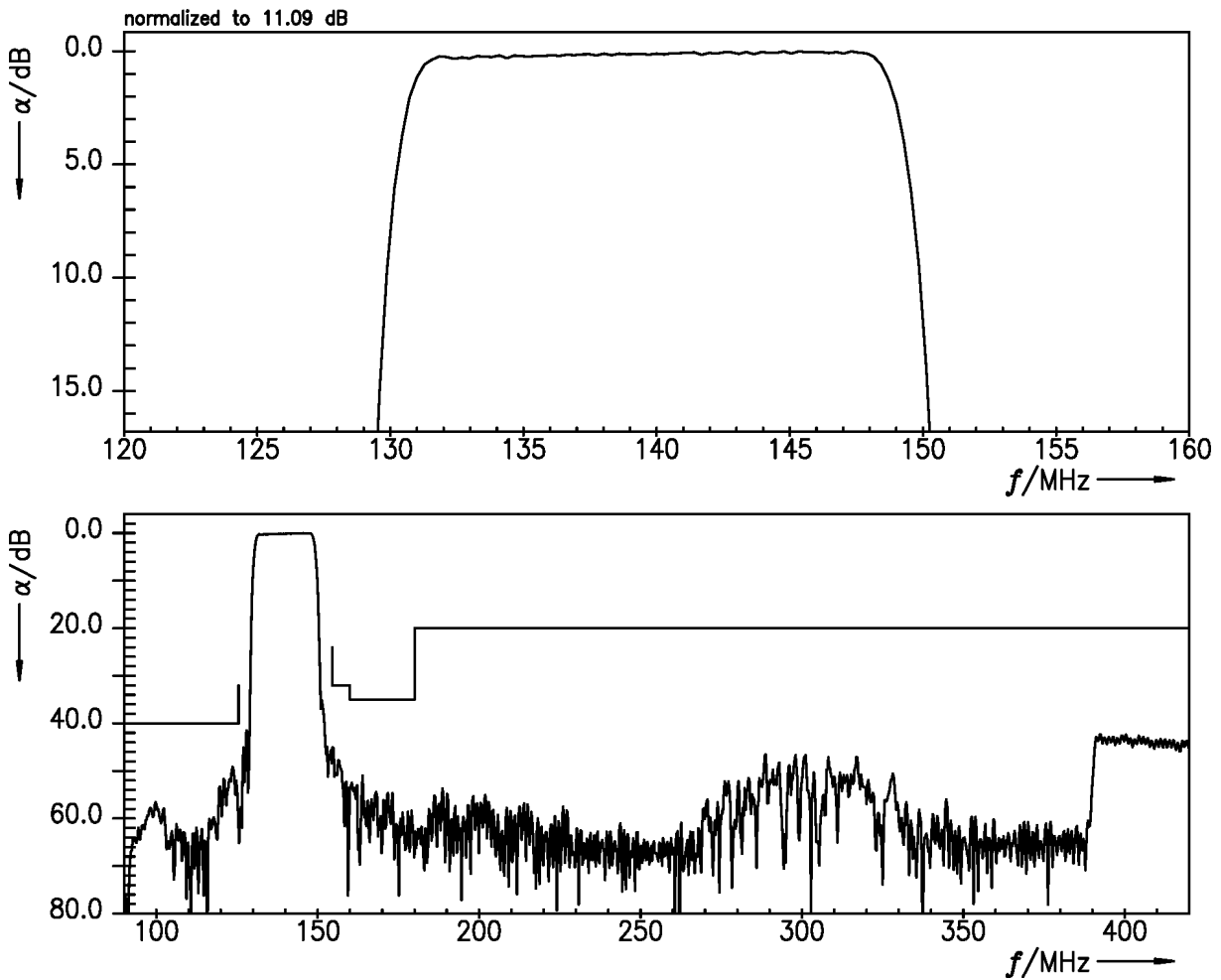


Figure 4: Attenuation.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

9 Return loss

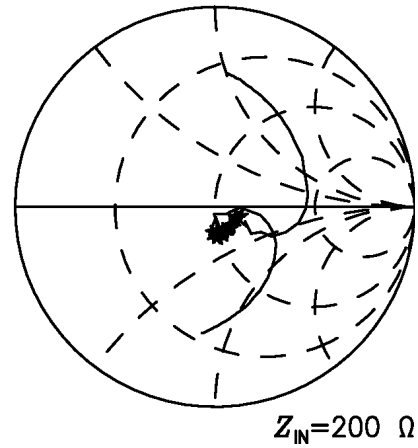
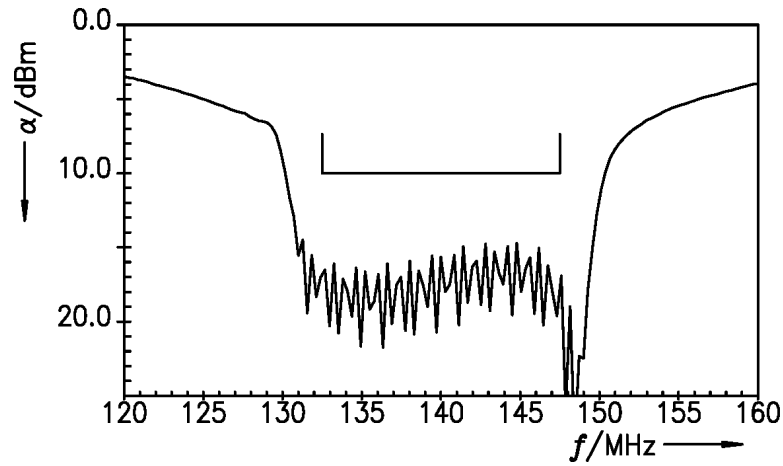


Figure 5: Return loss at IN port.

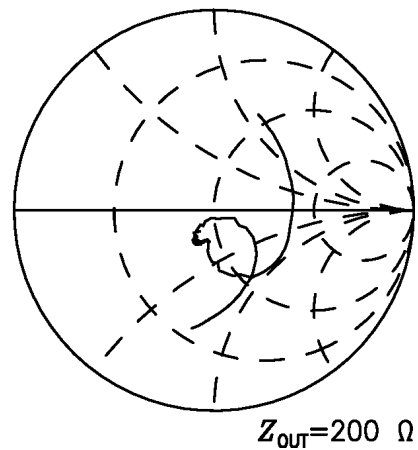
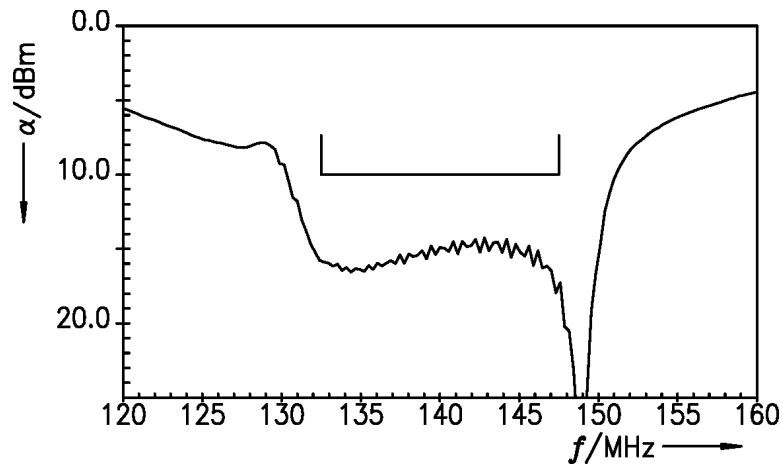


Figure 6: Return loss at OUT port.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

10 Group delay

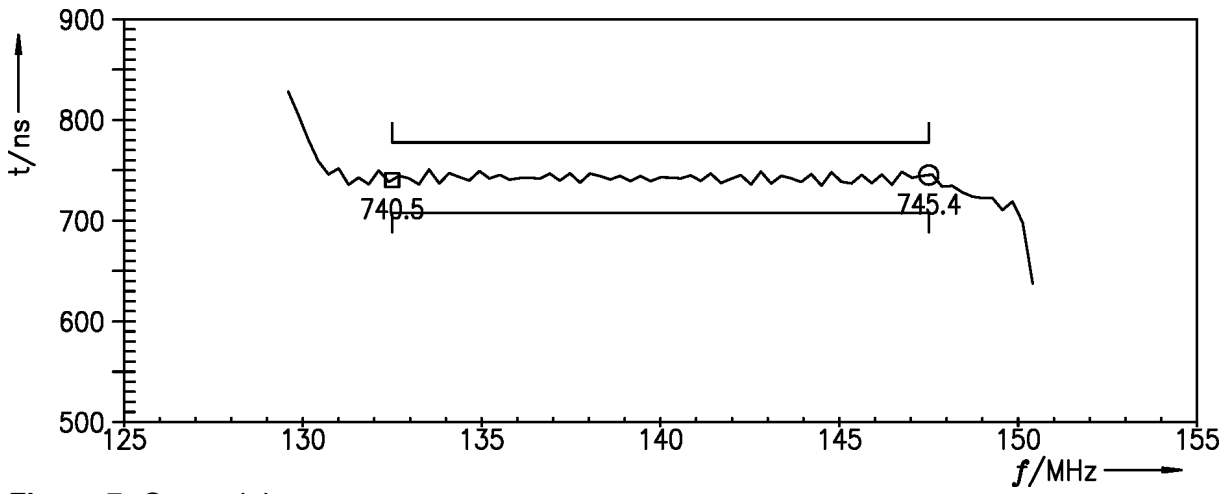


Figure 7: Group delay.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

11 Impulse response

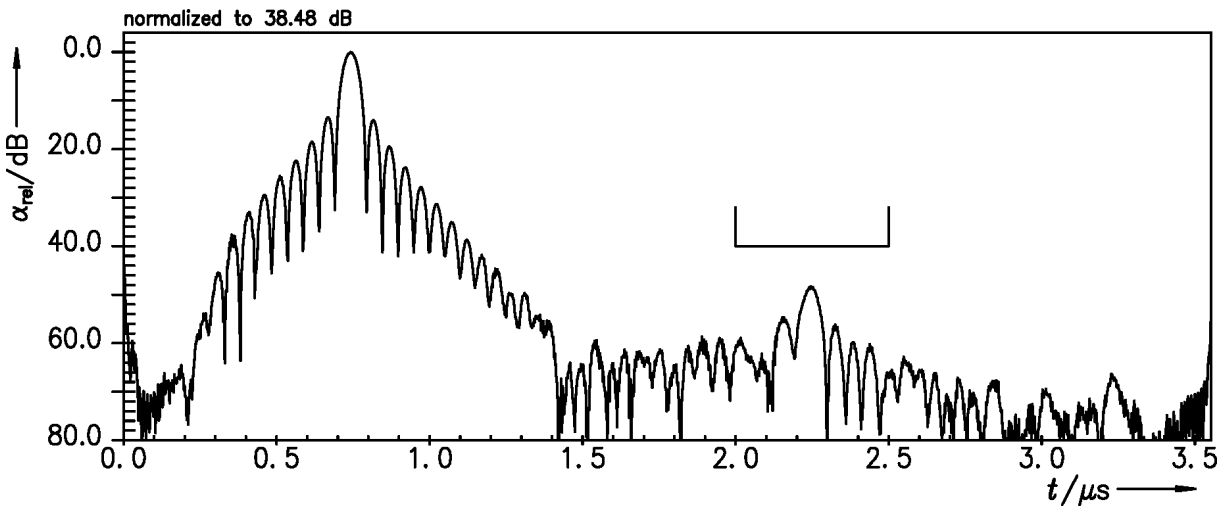


Figure 8: Impulse response (relative to max. of main lobe).

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

12 Packing material

12.1 Tape

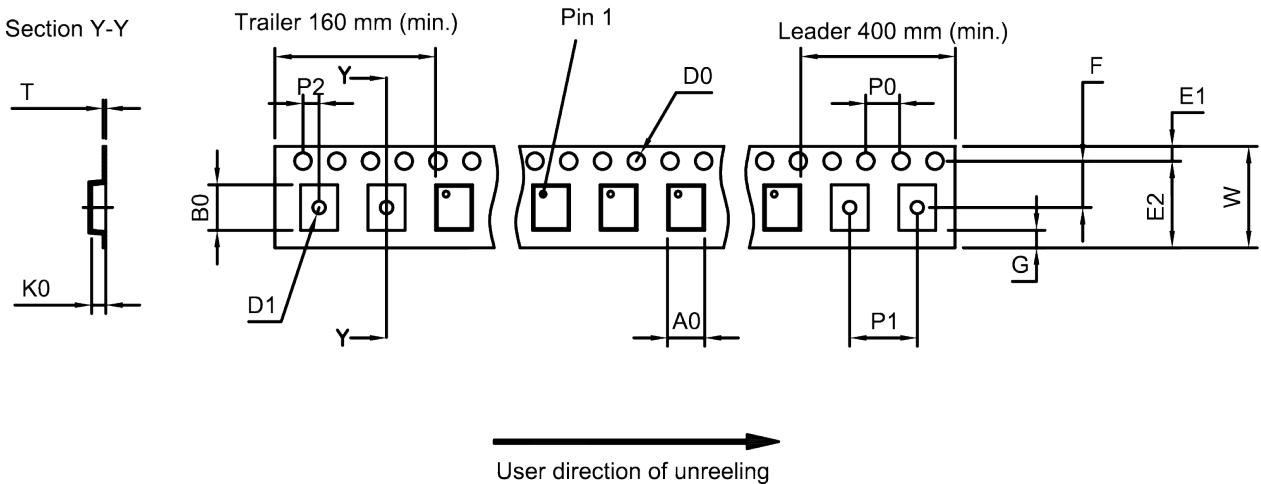


Figure 9: Drawing of tape (first-angle projection) with tape dimensions according to Table 1.

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.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

12.2 Reel with diameter of 330 mm

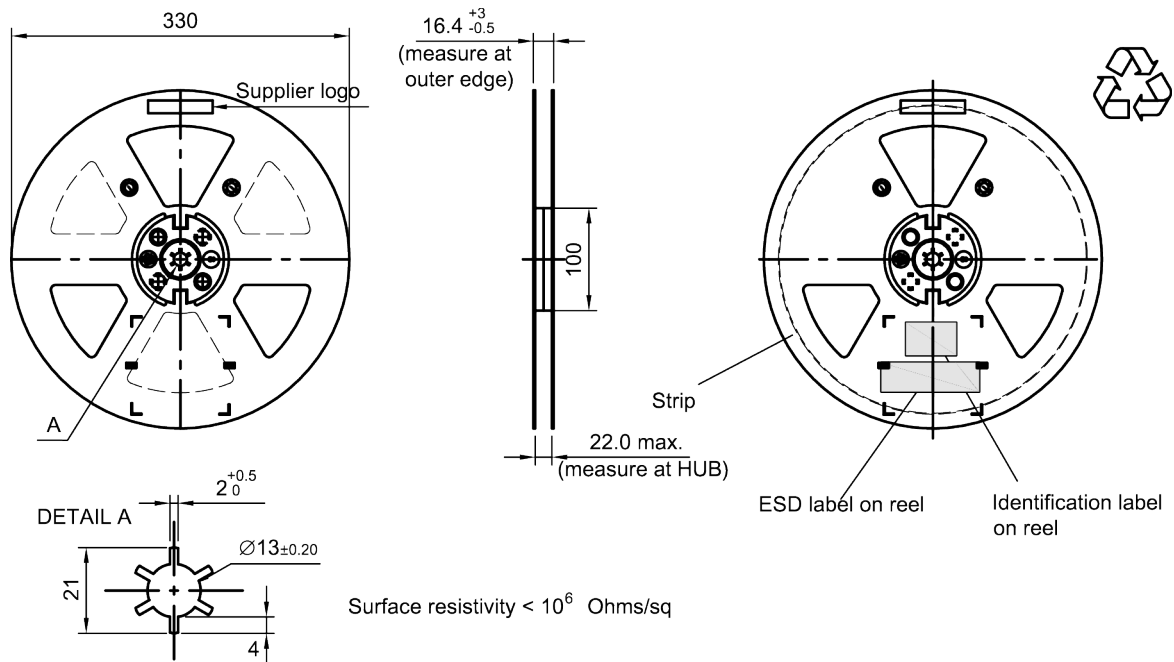
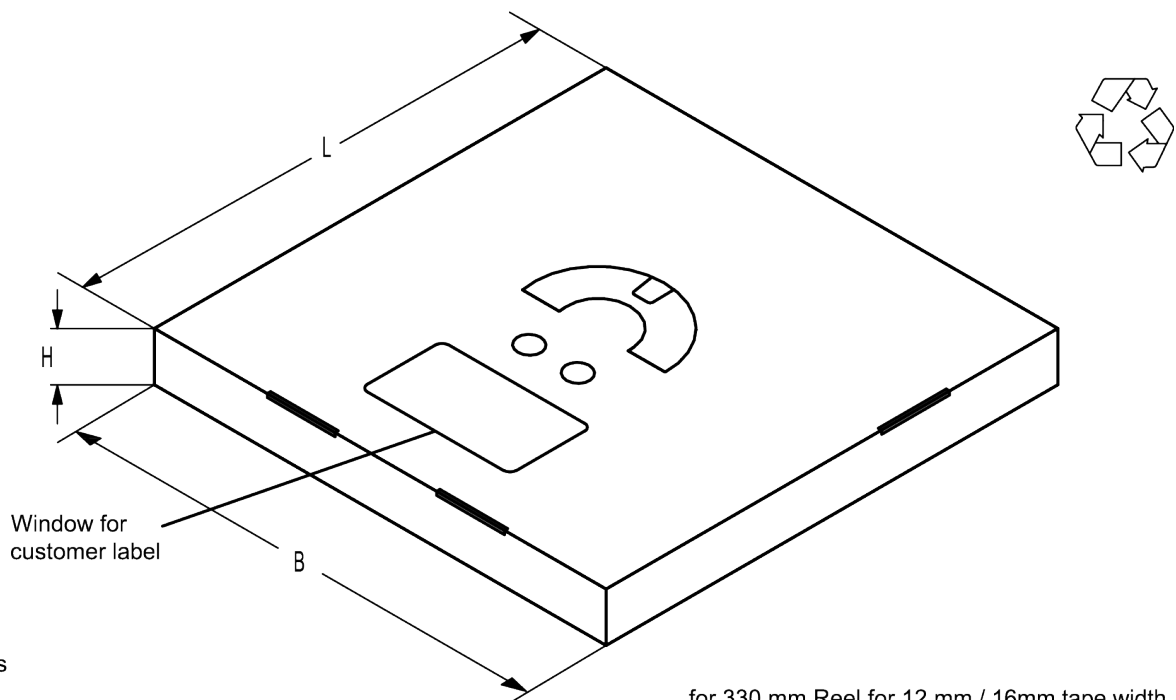


Figure 10: Drawing of reel (first-angle projection) with diameter of 330 mm.



Dimensions

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

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

Figure 11: Drawing of folding box for reel with diameter of 330 mm.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

13 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.

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

Data sheet

14 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
$T \geq 255$ °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).

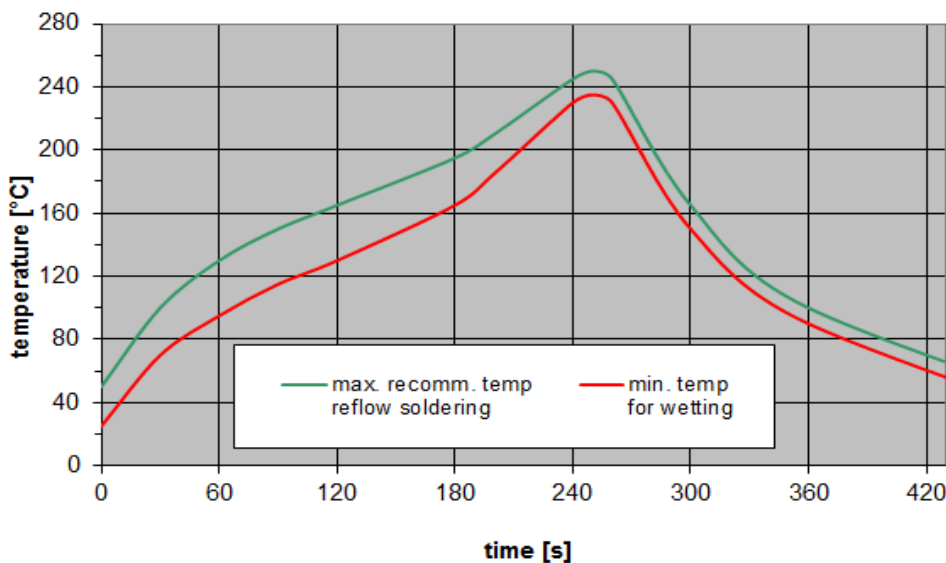


Figure 12: Recommended reflow profile for convection and infrared soldering – lead-free solder.

SAW components	B5246
SAW IF filter	140 MHz

Data sheet

15 Annotations

15.1 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>.

15.2 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.

15.3 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.

Data sheet

16 Cautions and warnings

16.1 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.

16.2 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.

16.3 Moldability

Before using in overmolding environment, please contact your local RF360 sales office.

16.4 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.

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 (www.rf360jv.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.