

Measurement condition

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedances*): input: 695 Ω || -1.9 pF
 output: 695 Ω || -1.9 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS246R is the minimum of the pass band attenuation a_{min} . The minimum of the pass band attenuation a_{min} is defined as the insertion loss a_e . The centre frequency f_c is the arithmetic mean value of the upper and lower frequencies at the 2 dB filter attenuation level relative to the insertion loss a_e . The temperature coefficient of frequency TC_f is valid for both the reference frequency f_c and the frequency response of the filter within the operating temperature range. The frequency shift of the filter within the operating temperature range is not included in the production tolerance scheme.

Data		typ. value		Variation/ Limitation		
Insertion loss (Reference level)	$a_e = a_{min}$	3.5	dB	max	5.2	dB
Centre frequency	f_c	246.22	MHz		±50	kHz
1 dB bandwidth at ambient temperature	BW	175	kHz	min	160	kHz
				max	190	kHz
3 dB bandwidth at ambient temperature	BW	217	kHz	min	202	kHz
				max	232	kHz
40 dB bandwidth at ambient temperature	BW	604	kHz	min	554	kHz
				max	654	kHz
Relative attenuation	a_{rel}					
f_c ... $f_c \pm 55$ kHz		0.25	dB	max	2	dB
$f_c \pm 220$ kHz ... $f_c \pm 280$ kHz		22	dB	min	10	dB
$f_c \pm 280$ kHz ... $f_c \pm 340$ kHz		35	dB	min	20	dB
$f_c \pm 340$ kHz ... $f_c \pm 3.5$ MHz		42	dB	min	30	dB
$f_c \pm 3.5$ MHz ... $f_c \pm 220$ MHz		53	dB	min	40	dB
Temperature coefficient of the frequency	$TC_f^{**})$	-0.04	ppm/K ²		-	
Frequency inversion temperature	T_0	22.5	°C		± 10	°C
Frequency deviation over temperature		-		max.	-240 ... +6	ppm
Operating temperature range		-			- 40 °C ... + 85 °C	
Storage temperature range		-			- 40 °C ... + 85 °C	
Input power level		-		max	10	dBm

*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

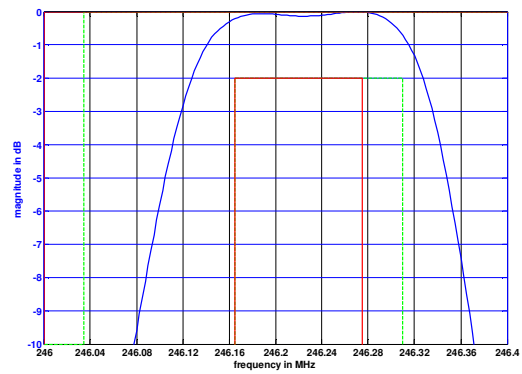
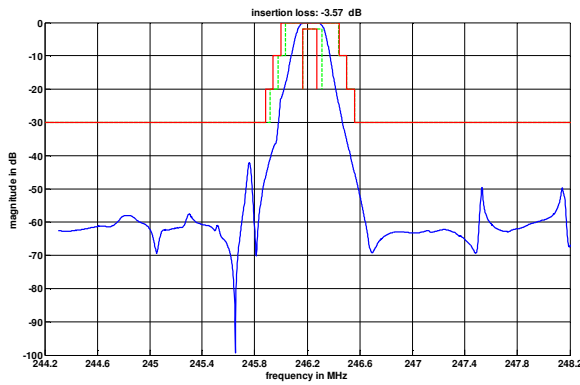
***) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$.

Generated:**Checked / Approved:**

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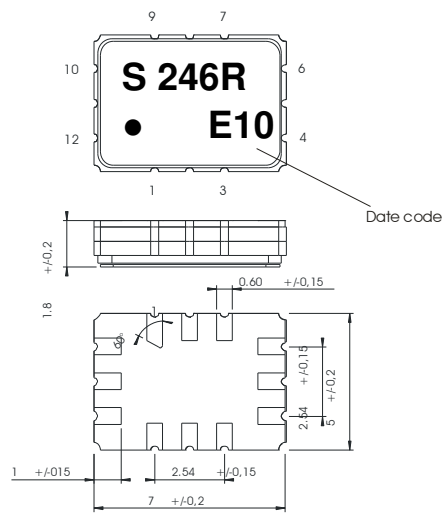
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Filter characteristic



Construction and pin connection

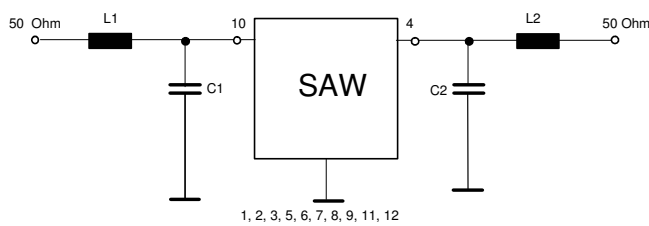
(All dimensions in mm)



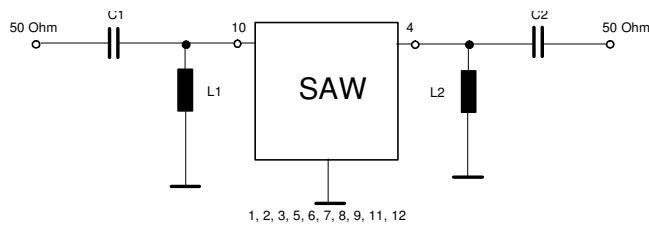
- 1 Ground
- 2 Ground
- 3 Ground
- 4 Output
- 5 Ground
- 6 Ground
- 7 Ground
- 8 Ground
- 9 Ground
- 10 Input
- 11 Ground
- 12 Ground

Date code: Year + week
 E 2014
 F 2015
 G 2016
 ...

50 Ω Test circuit 1



50 Ω Test circuit 2



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Stability characteristics, reliability

After the following tests the filter shall meet the whole specification:

1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0.35 mm or g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 15 min. each / 100 cycles
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;
for temperature conditions, see page 4: "Air reflow temperature conditions"
5. ESD ANSI/ESD S20.20-1999, class 1A for HBM

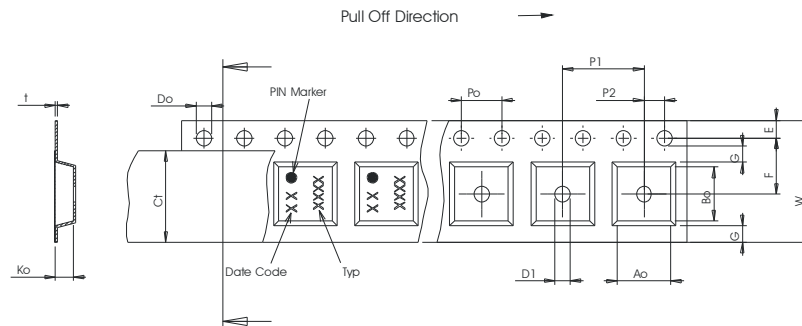
This filter is RoHS compliant (2011/65/EU)

Packing

- Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;
- | | |
|---|-------------|
| max. pieces of filters per reel: | 3000 |
| reel of empty components at start: | min. 300 mm |
| reel of empty components at start including leader: | min. 500 mm |
| trailer: | min. 300 mm |

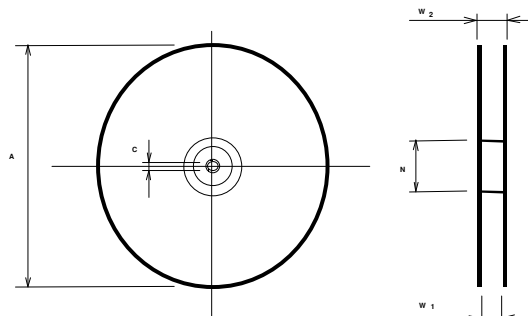
Tape (all dimensions in mm)

- W :16.00 + 0.3/-0.1
- Po : 4.00 ± 0.1
- Do : 1.50 + 0.1/-0
- E : 1.75 ± 0.1
- F : 7.50 ± 0.1
- G(min) : 0.75
- P2 : 2.00 ± 0.1
- P1 : 8.00 ± 0.1
- D1(min) : 1.50
- Ao : 5.40 ± 0.1
- Bo : 7.60 ± 0.1
- Ct : :13.3 ± 0.1



Reel (all dimensions in mm)

- A :330 or 180
- W1 :16.4 +2/-0
- W2(max) :22.4
- N(min) :50
- C :13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

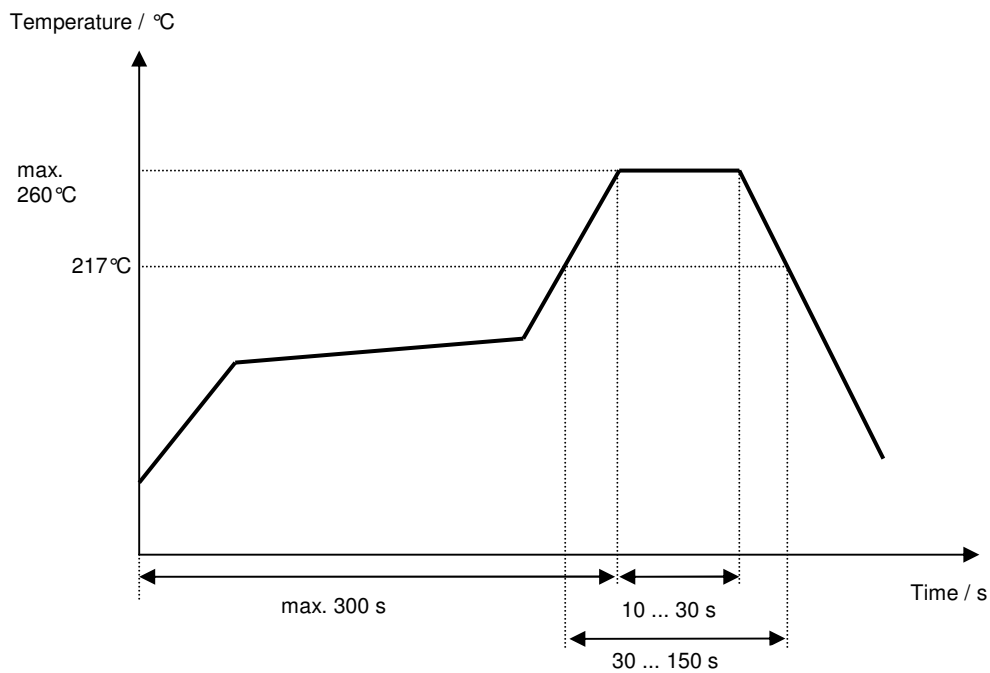
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Air reflow temperature conditions

Conditions	Exposure
Average ramp-up rate (30°C to 217°C)	less than 3°C/second
> 100°C	between 300 and 600 seconds
> 150°C	between 240 and 500 seconds
> 217°C	between 30 and 150 seconds
Peak temperature	max. 260°C
Time within 5°C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50°C)	less than 6°C/second
Time from 30°C to Peak temperature	no greater than 300 seconds

Chip-mount air reflow profile



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History

Version	Reason of Changes	Name	Date
1.0	- Generation of filter specification	Raura	03.03.2014
1.1	- Operating temperature range and pinning updated	Raura	03.03.2014
1.2	- Typo corrections	Raura	03.03.2014
1.3	- Limit lines for 1 dB, 10 dB, 20 dB and 40 dB modified - Limit line for 30 dB added	Dr. Wall	11.03.2014
1.4	- Changed construction and pin connection	Raura	20.03.2014
2.0	- Add typical values, plots, terminating impedances - Change from development to filter specification - Change remark of characteristics - Change typical values of temperature coefficient of frequency - Add frequency deviation over temperature - Remove nominal frequency - Add centre frequency with limits	Bonnen	27.05.2014
2.1	- correct typo in relative attenuation from fn to fc	Bonnen	27.05.2014
3.0	- Add min max limits of different bandwidths - Add a second possible reel diameter	Bonnen	02.07.2014