

<b>Microchip</b>	<b>Filter specification</b>	<b>TFS310A</b>	<b>1/5</b>
------------------	-----------------------------	----------------	------------

**Measurement condition**

Ambient temperature $T_A$ :	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	812 $\Omega$	-4.3 pF
Output:	991 $\Omega$	-3.7 pF

**Characteristics**

Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS310A is the minimum of the pass band attenuation. This value is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 310 MHz without any tolerance. The values of relative attenuation  $a_{rel}$  are guaranteed over the whole operating temperature range. The frequency shift of the filter within the operating temperature range is included in the production tolerance scheme.

D a t a		typ. value	tolerance / limit
<b>Insertion loss</b> (reference level)	$a_e$	- dB	max. 7.6 dB
<b>Nominal frequency</b>	$f_N$	-	310 MHz
<b>Passband</b>	PB	-	$f_N \pm 0.25$ MHz
<b>Pass band ripple</b>		0.3 dB	max. 0.5 dB
<b>Relative attenuation</b>	$a_{rel}$		
$f_N \pm 0.25$ MHz	$f_N \pm 0.25$ MHz	0.3 dB	max. 0.5 dB
$f_N \pm 0.75$ MHz	$f_N \pm 1.5$ MHz	15 dB	min. 10 dB
$f_N - 1.5$ MHz	$f_N - 3.0$ MHz	45 dB	min. 40 dB
$f_N + 1.5$ MHz	$f_N + 3.0$ MHz	40 dB	min. 37 dB
$f_N \pm 3.0$ MHz	$f_N \pm 4.5$ MHz	56 dB	min. 50 dB
$f_N - 21.4$ MHz		72 dB	min. 60 dB
$f_N \pm 50.0$ MHz	$f_N \pm 300.0$ MHz	58 dB	min. 50 dB
<b>Group delay ripple within PB</b>		230 ns	max. 500 ns
<b>IIP3 **</b>		33 dBm	min. 30 dBm
<b>Input power level</b>		-	max. 15 dBm
<b>Operating temperature range</b>	OTR	-	- 40 °C ... + 85°C
<b>Storage temperature range</b>		-	- 55 °C ... +105°C
<b>Frequency inversion temperature</b>	$T_0$	23 °C	
<b>Temperature coefficient of frequency</b>	$TC_f$ ***	-0.043 ppm/K <sup>2</sup>	

\*) The terminating impedances depend on parasites 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.

\*\*)  $f_{in1} = 309.95$  MHz;  $f_{in2} = 309.9$  MHz;  $P_{in} = -10$  dBm  $f_{measurement} = 310$  MHz and  $f_{in1} = 310.05$  MHz;  $f_{in2} = 310.1$  MHz;  $P_{in} = -10$  dBm  $f_{measurement} = 310$  MHz.

\*\*\*)  $\Delta f = TC_f(T - T_0)^2 f_N$

**Generated:**

---

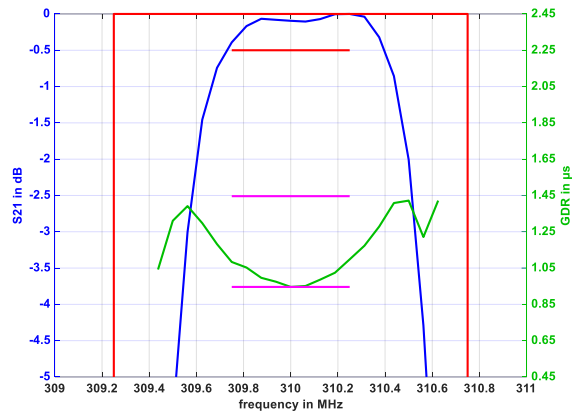
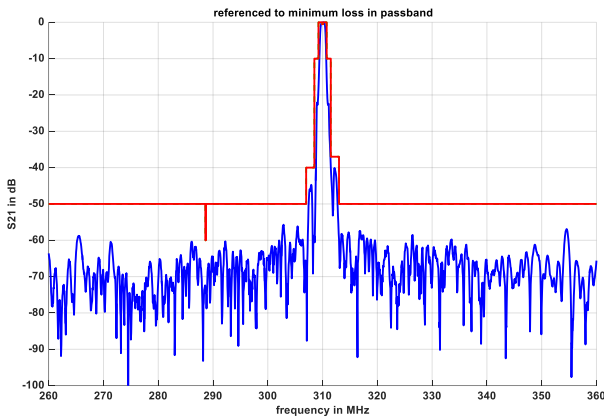
**Checked / Approved:**

---

**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

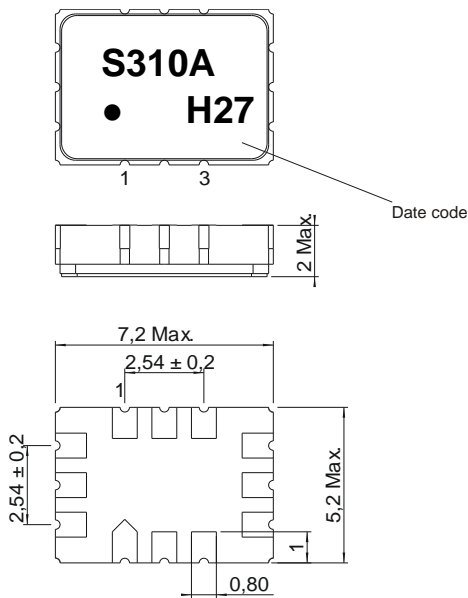
Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Filter characteristic**



**Construction and pin connection**

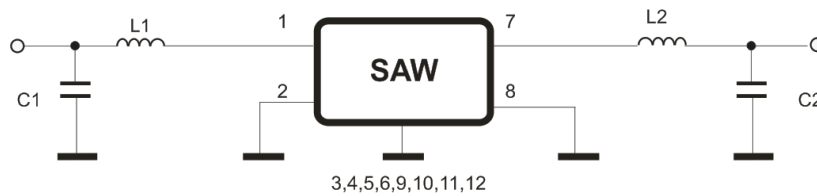
(All dimensions in mm)



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

Date code: Year + week  
 H 2016  
 J 2017  
 K 2018  
 ...

**50 Ω Test circuit**



**Microchip Frequency Technology GmbH**  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Stability characteristics, reliability**

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

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 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 refer to the attached "Air reflow temperature conditions" on page 4;
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

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

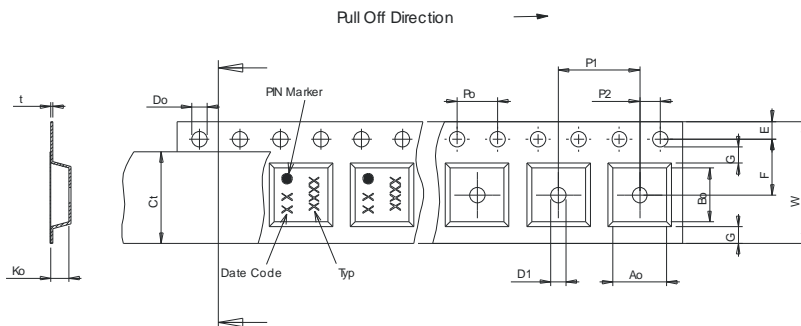
**Packing**

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

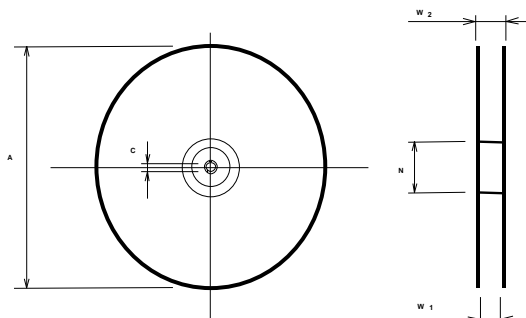
**Tape (all dimensions in mm)**

- 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.

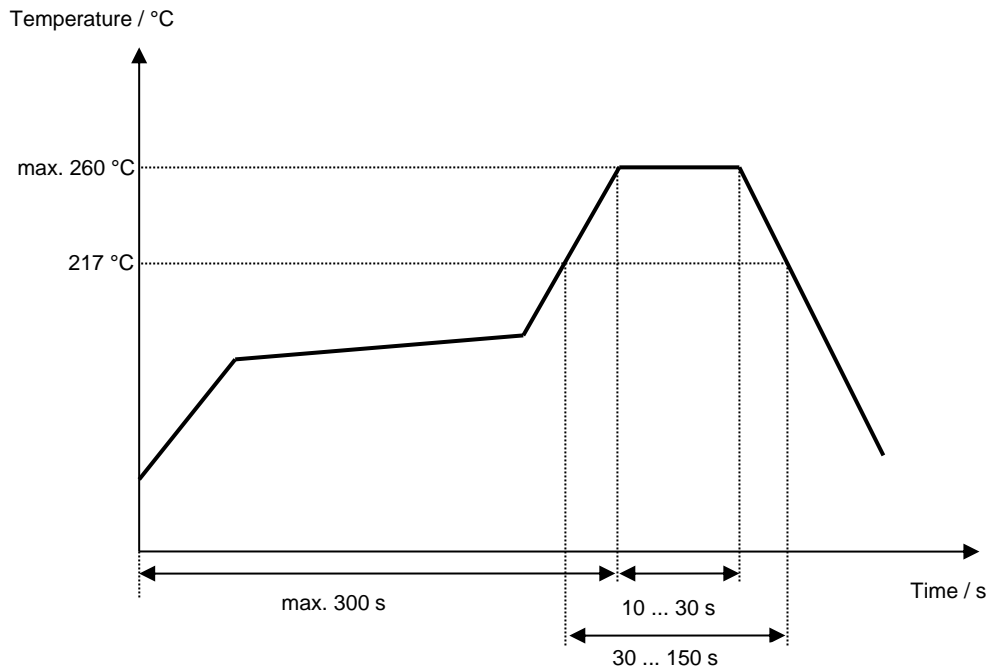
**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Air reflow temperature conditions**

<b>Conditions</b>	<b>Exposure</b>
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**



**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

---

**Microchip****Filter specification****TFS310A****5/5**

---

**History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification.	TCUK	30.06.2016
1.1	- Add typ values and move from development to filter specification.	TCUK	29.09.2016

---

**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

---

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.