

**VI TELEFILTER**

**Filter specification**

**TFS 211**

**1/5**

**Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 360 Ω || -3,7 pF  
     Output: 360 Ω || -3,7 pF

**Characteristics**

**Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 211 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 MHz without any tolerance. The values of relative attenuation  $a_{rel}$  are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

<b>D a t a</b>		<b>typ. value</b>		<b>tolerance / limit</b>	
<b>Insertion loss</b> (reference level)	$a_e$	4,5	dB	max.	6,5
		-			-
<b>Nominal frequency</b>	$f_N$	-			211,0
					MHz
<b>Pass band</b>	PB			$f_N$	± 50
					kHz
<b>3 dB Bandwidth</b>		280	kHz	min.	200
					kHz
<b>Relative attenuation</b>	$a_{rel}$				
$f_N$ ± 200 kHz ... $f_N$ ± 400 kHz		10	dB	min.	5
$f_N$ ± 400 kHz ... $f_N$ ± 600 kHz		30	dB	min.	25
$f_N$ ± 600 kHz ... $f_N$ ± 800 kHz		35	dB	min.	30
$f_N$ ± 800 kHz ... $f_N$ ± 10 MHz		40	dB	min.	35
					dB
<b>Group delay</b>	at $f_N$	3,4	µs	max.	5
					µs
<b>Group delay ripple within PB</b>		-		max.	0,5
					µs
<b>Operating temperature range</b>	OTR	-			- 30 °C ... + 85 °C
<b>Storage temperature range</b>		-			- 40 °C ... + 85 °C
<b>Frequency inversion temperature</b>		+25	°C		
<b>Temperature coefficient of frequency</b>	$TC_f$ **	-0,036	ppm/K <sup>2</sup>		-

\*) 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.

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

**Generated:**

**Checked / Approved:**

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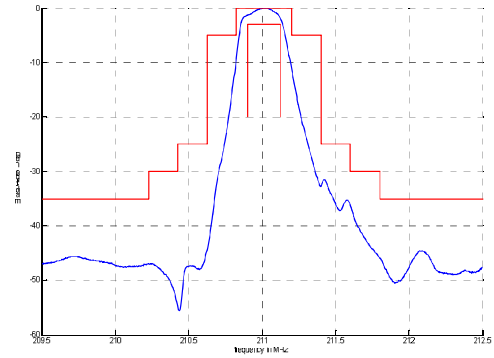
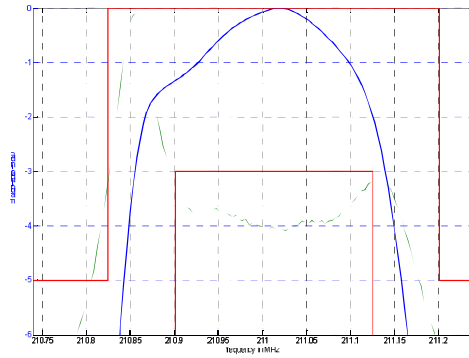
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**Filter specification**

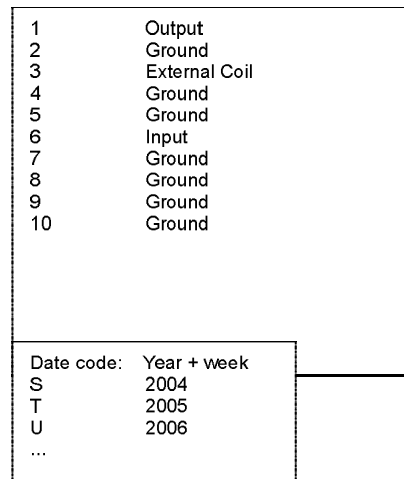
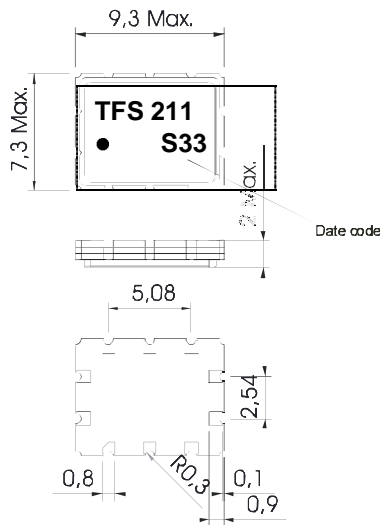
**TFS 211**

**Filter characteristic**

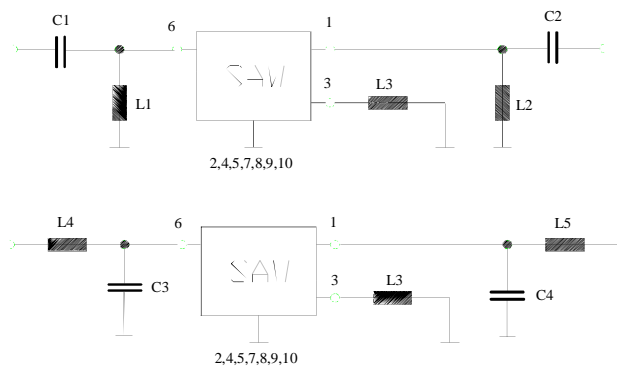


**Construction and pin connection**

(All dimensions in mm)



**50 Ohm Test circuit**



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**Stability characteristics**

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

1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: twice max.;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

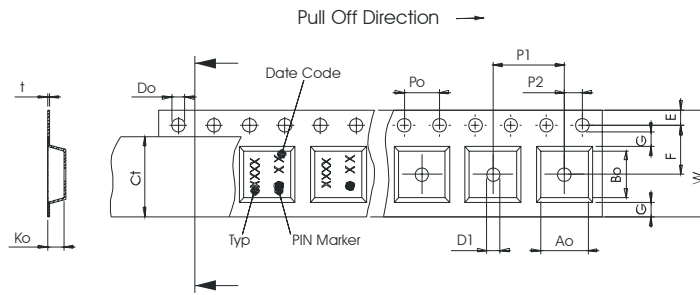
**Packing**

Tape & Reel: IEC 286 – 3, with exeption 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 peer 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

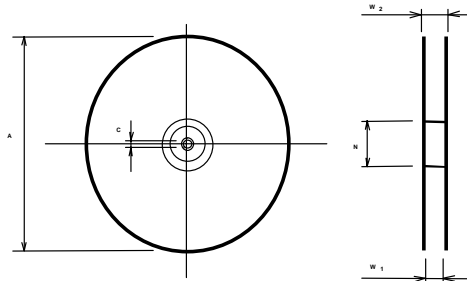
**Tape (all dimensions in mm)**

- W : 16,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,10
- F : 7,50 ± 0,10
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 12,00 ± 0,1
- D1(min) : 1,50 +0,1/-0
- Ao : 7,60 ± 0,10
- Bo : 9,60 ± 0,10
- Ct : 13,5



**Reel (all dimensions in mm)**

- A : 330
- W1 : 16,4
- W2(max) : 22,4
- N(min) : 50
- C : 13,0



The minimum bending radius is 45 mm.

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**Air reflow temperature conditions**

1st and 2nd air reflow profile

<b>Name:</b>	pre-heating periods	main-heating periods	peak temperature
<b>Temperature:</b>	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
<b>Time:</b>	60 sec. - 90 sec.	20 sec. - 25 sec.	

**Chip-mount air reflow profile**

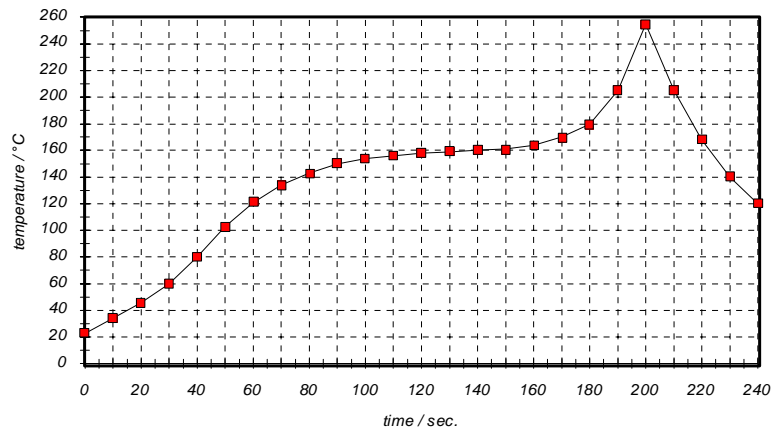


Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

time / sec.	temperature / °C	time / sec.	temperature / °C
0	23	140	160
10	34	150	161
20	46	160	164
30	60	170	170
40	80	180	180
50	103	190	205
60	121	195	230
70	134	200	255
80	143	205	230
90	150	210	205
100	154	215	180
110	156	220	165
120	158	230	140
130	159	240	120

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**VI TELEFILTER****Filter specification****TFS 211****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.2.	Change Centre frequency to Nominal frequency Change remark Correct tapeand reel Add history	Strehl	13.08.04

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