Measurement condition
Ambient temperature: 23 °C
Input power level: 0 dBm
Terminating impedances
for input: 470 Ω // -0.4 pF
for output: 470 Ω // -0.4 pF

Construction and pin configuration
see page 2

Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the TFS 311 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_o is the arithmetic mean value of the upper and lower frequencies at the 3 dB filter attenuation level relative to the insertion loss a_e. The nominal frequency f_N is fixed on 311,0 MHz without tolerance. The given values for the relative attenuation a_{rel} and for the group delay ripple have to be reached at the frequencies given below also if the centre frequency f_o is shifted due to the temperature coefficient of frequency TC_f in the operating temperature range and due to a production tolerance for the centre frequency f_o.

D e v e l o p m e n t D a t a		**typ. value**	**tolerance/limit**	
Insertion loss (Reference level)	$a_e = a_{min}$	5	max. 8	dB
Nominal frequency	f_N	-	311,0	MHz
Centre frequency	f_o	311,0 MHz	-	
Pass Band Ripppel f_N ±67,5 kHz		0,5	max. 1,5	dB
Relative attenuation	a_{rel}			
311,0 MHz ± 67,5 kHz			max 1,5	dB
311,0 MHz ± 90 kHz			max 3	dB
311,0 MHz ± 200 kHz	... 311,0 MHz ± 400 kHz	12	min 3	dB
311,0 MHz ± 400 kHz	... 311,0 MHz ± 600 kHz	45	min 28	dB
311,0 MHz ± 600 kHz	... 311,0 MHz ± 1,6 MHz	50	min 38	dB
311,0 MHz ± 1,6 MHz	... 311,0 MHz ± 3 MHz	55	min 43	dB
311,0 MHz ± 3 MHz	... 311,0 MHz ± 25 MHz	52	min 50	dB
311,0 MHz - 120 MHz	... 311,0 MHz - 150 MHz	-	min 40	dB
Group delay ripple	GD			
f_N ± 50 kHz		-	max. 1,2	µs
f_N ± 75 kHz		-	max. +2,3/-2,5	µs
Operating temperature range		- 20 °C ... + 70 °C		
Storage temperature range		- 40 °C ... + 85 °C		
Temperature coefficient of frequency	TC	ca. - 0.036	ppm/K²	
Frequency inversion temperature		+ 20 °C		

Generated:

Checked / approved:

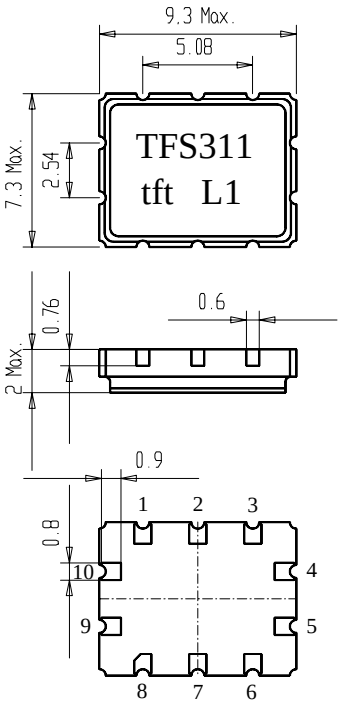
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Construction and pin configuration

(all dimensions in mm)

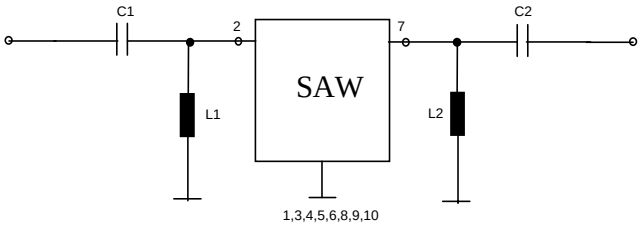


1 Ground	2 Input	3 Ground
6 Ground	7 Output	8 Output

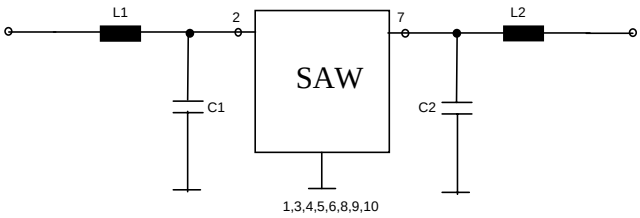
4 Ground	5 Ground
9 Ground	10 Ground

2. 50 Ω -matching network

50 Ohm - test circuit (unbalanced)



50 Ohm - test circuit (unbalanced)



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Stability characteristics

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

1. Shock:	30g, 18 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration:	10 Hz to 150 Hz, 0.35 mm amplitude, 5g; 2 hours for 3 planes; DIN IEC 68 T2 - 6
3. Damp heat:	90 % to 95 % rel. humidity, 40 °C, 10 days; IEC Pub. 68 - 2 - 3
4. Resistance to solder heat (Reflow):	260 °C for 10 sec;

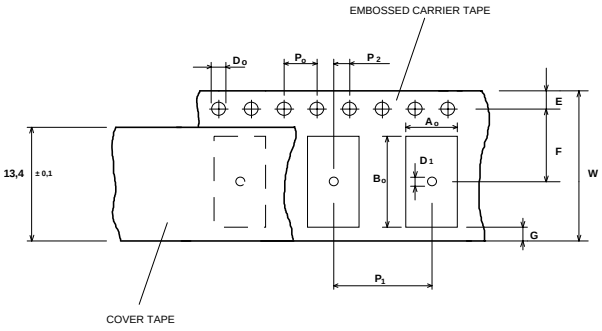
Packing

Tape & Reel: DIN 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: 2000

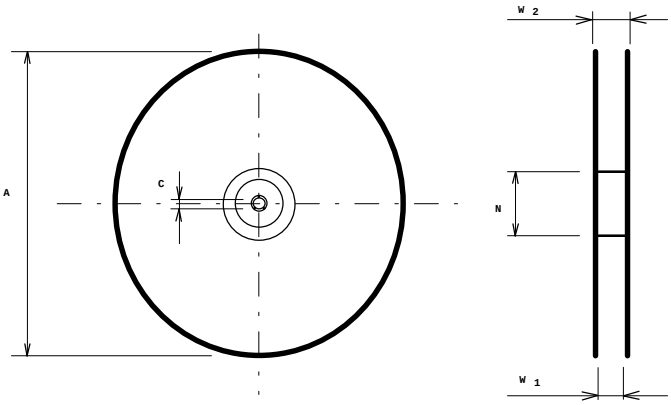
Tape (all dimensions in mm)

W	:	16	± 0,3
Po	:	4	± 0,1
Do	:	1,5	+ 0,5
D1	:	1,5	+ 0,5
E	:	1,75	± 0,1
F	:	7,5	± 0,1
G (min)	:	0,75	
P2	:	2	± 0,1
P1	:	12	± 0,1
D1(min)	:	1,5	
Ao	:	7,6	± 0,1
Bo	:	9,6	± 0,1



Reel (all dimensions in mm):

A	:	330	
W1	:	16,4 +2	
W2 (max)	:	22,4	
N (min)	:	>= 90	
C	:	13	± 0,25



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the right side of the tape.

Air reflow temperature conditions

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1st and 2nd air reflow profile

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

Chip-mount air reflow profile

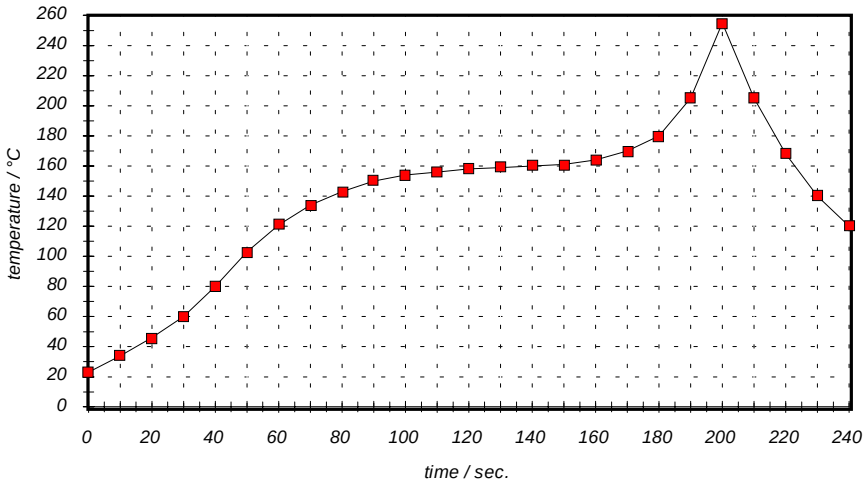


Table for temperature vs. time during the air reflow process

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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