

**VI TELEFILTER****Filter specification****TFS 110P****1/4****Measurement condition**

Ambient temperature: 23°C

Input power level: 0 dBm

Terminating impedances

for input: 2,9 kΩ || -6.2 pF

for output: 2,8 kΩ || -5.5 pF

**Characteristics**

Remark:

Reference level for the relative attenuation  $a_{rel}$  of the TFS 110 P 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 reference frequency  $f_c$  is the arithmetic mean value of the upper and lower frequencies at the 30 dB filter attenuation level relative to the insertion loss  $a_e$ .

<b>Data</b>		<b>typ. value</b>	<b>tolerance / limit</b>
<b>Insertion loss</b> (reference level)	$a_e = a_{min}$	8 dB	10 dB
<b>Reference frequency</b>	$f_c$ (30 dB-BW)	110,592 MHz	± 60 kHz
<b>Pass band shape</b> (3 dB-BW)			Gaussian -
3 dB bandwidth	BW	965 kHz	-
10 dB bandwidth		1695 kHz	-
20 dB bandwidth		2255 kHz	-
30 dB bandwidth		2600 kHz	-
40 dB bandwidth		2840 kHz	-
<b>Relative attenuation</b>	$a_{rel}$		
$f_c + 475$ kHz		-	≤ 3 dB
$f_c - 425$ kHz		-	≤ 3 dB
$f_c ± 800$ kHz		-	≤ 10 dB
$f_c + 1200$ kHz		-	≥ 20 dB
$f_c - 1210$ kHz		-	≥ 20 dB
$f_c + 1375$ kHz		-	≥ 30 dB
$f_c - 1395$ kHz		-	≥ 30 dB
$f_c + 1500$ kHz ... $f_c + 5$ MHz		> 40 dB	≥ 35 dB
$f_c + 5$ MHz ... $f_c + 10$ MHz		> 40 dB	≥ 30 dB
$f_c - 1535$ kHz ... $f_c - 10$ MHz		> 45 dB	≥ 40 dB
<b>Group delay</b>	GD		
Ripple $f_c ± 576$ kHz		250 ns	max 400 ns
<b>Temperature coefficient</b>	TC 2nd order *)	- 0,032 ppm/K <sup>2</sup>	-
<b>Frequency inversion temperature</b> $T_o$		t.b.d.	
<b>Operating temperature range</b>		- 10 °C ... + 60 °C	
<b>Storage temperature range</b>		- 40 °C ... + 85 °C	
<b>Input power level</b>		-	max. + 10 dBm

\*) -  $\Delta f$  (Hz) = TC (ppm/K<sup>2</sup>) x (T - T<sub>o</sub>)<sup>2</sup> x F<sub>T<sub>o</sub></sub> (MHz)**Generated:****Checked / approved:**

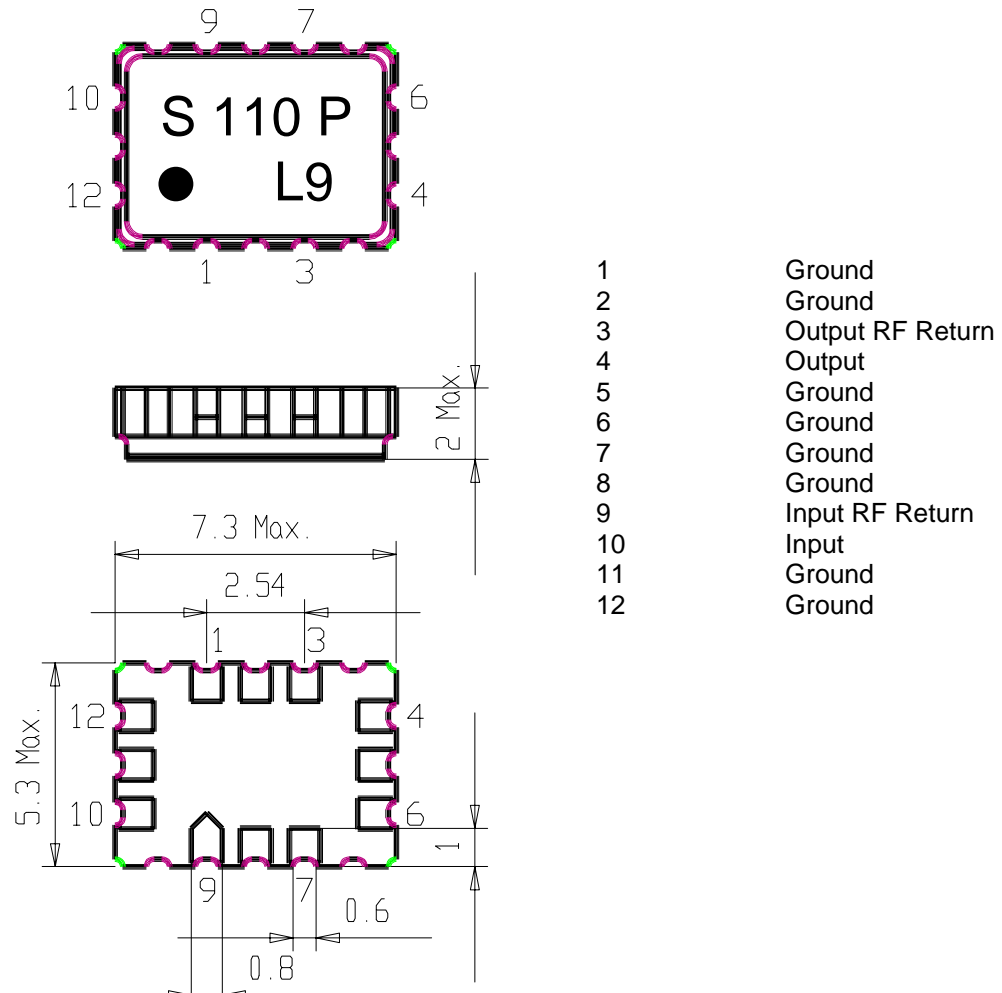
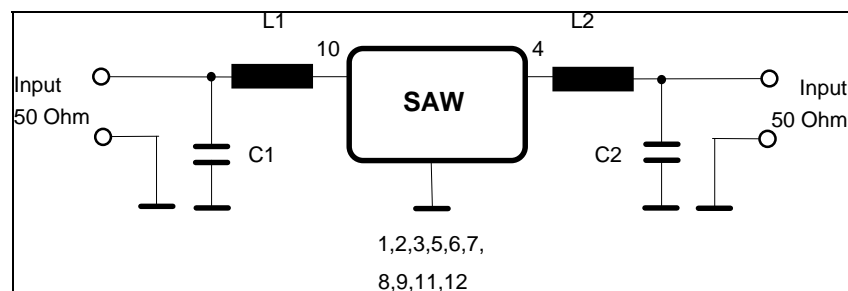
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**Construction and pin connection**

(All dimensions in mm)

**50 Ω 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 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Damp heat: 25 °C to 55°C / 95% r.H. / 10 cycles  
(cycle) DIN IEC 68 - 2 – 30 Db
4. Resistance to solder heat (reflow): max. 2 times reflow process;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

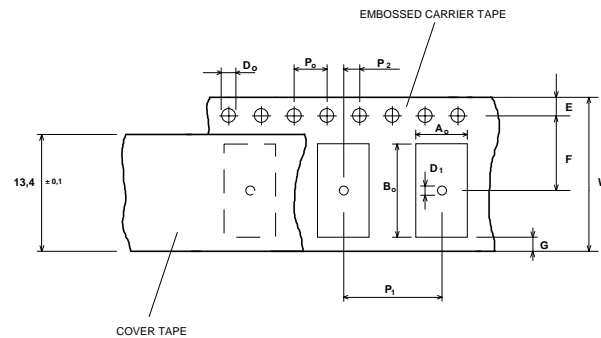
**Packing**

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;

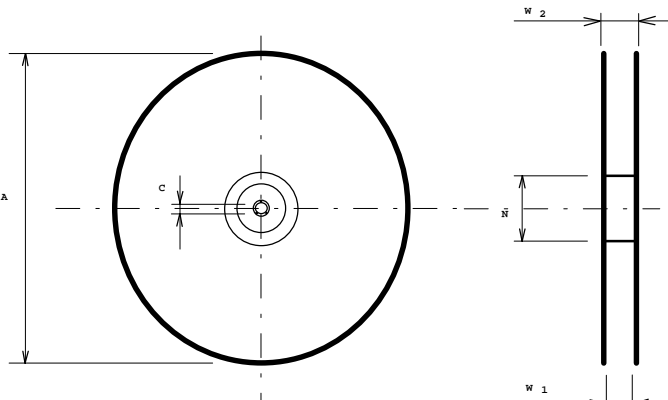
max. pieces of filters per reel: 3000  
Reel of empty components at start: min 300 mm  
Reel of empty components at start including leader: min 500 mm  
Trailer: min 300 mm

**Tape (all dimensions in mm)**

W	: 16 ± 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 ± 0,05
P1	: 8 ± 0,1
D1(min)	: 1,5
Ao	: 5,4 ± 0,1
Bo	: 7,4 ± 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.

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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.	

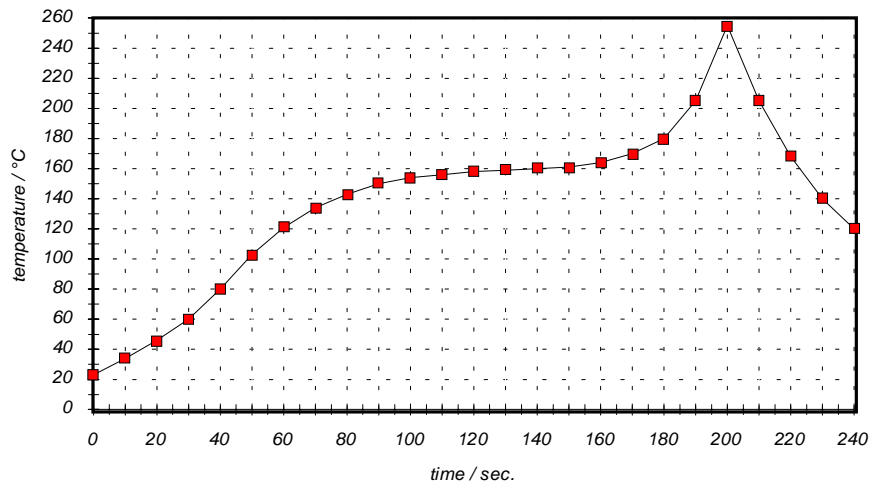
**Chip-mount air reflow profile**

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