

**VI TELEFILTER**

**Filter specification**

**TFS 250**

**Measurement Condition**

Ambient Temperature: 23 °C  
 Input Power Level: 0 dBm  
 Source impedance: 50 Ω  
 Load impedance: 50 Ω  
 Terminating impedances: \*  
     input: 1,05 kΩ || -7.9 pF  
     output: 1,02 kΩ || -8.2 pF

**Characteristics**

**Remark:**

Reference level for the relative attenuation  $a_{rel}$  is the minimum pass band attenuation  $a_{min}$ . It is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed to 250,0 MHz. The centre frequency  $f_C$  is the arithmetic mean value of the upper and lower frequencies at the 1,0 dB filter attenuation level relative to the insertion loss  $a_e$ . The given values for the insertion loss, the relative attenuation  $a_{rel}$  and the group delay ripple have to be reached at the frequencies given below also if the centre frequency  $f_C$  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  $f_C$ .

<b>D a t a</b>		<b>typ. Value</b>		<b>Limit</b>	
<b>Insertion loss</b> (Reference level)	$a_e = a_{min}$	13,0	dB	max. ± 1	dB
<b>Nominal frequency</b>	$f_N$	-		250,0	MHz
<b>Passband</b>	PB	-		$f_N ± 2$	MHz
<b>Amplitude ripple in PB</b>		0,4	dB	max.	1,0 dB
<b>Relative attenuation</b>	$a_{rel}$				
$f_N ± 3,0$ MHz ... $f_N ± 3,5$ MHz		25	dB	min. 11	dB
$f_N ± 3,5$ MHz ... $f_N ± 4,0$ MHz		40	dB	min. 21	dB
$f_N ± 4,0$ MHz ... $f_N ± 6,0$ MHz		40	dB	min. 24	dB
$f_N - 249,0$ MHz ... $f_N - 6,0$ MHz		52	dB	min. 40	dB
$f_N + 6,0$ MHz ... $f_N + 12,5$ MHz		52	dB	min. 40	dB
$f_N + 12,5$ MHz ... $f_N + 14,3$ MHz		65	dB	min. 54	dB
$f_N + 14,3$ MHz ... $f_N + 24,6$ MHz		65	dB	min. 40	dB
$f_N + 24,6$ MHz ... $f_N + 29,0$ MHz		70	dB	min. 54	dB
$f_N + 29$ MHz ... 2,5 GHz		40	dB	min. 30	dB
<b>Group delay ripple in PB</b>	$\varphi$	60	ns	max. 150	ns
<b>Phase ripple in PB</b>		3,5	°p-p	max. 5	° p-p
<b>VSWR in PB</b>		1,65:1		max. 2:1	
<b>Input power level</b>					
Continous power		-		max. 10	dBm
Peaks for cycle times<1%		-		max. 20	dBm
<b>Operating temperature range</b>		-		- 10 °C ... + 85 °C	
<b>Temperature coefficient of frequency</b> $TC^{**}$		-0,036	ppm/K <sup>2</sup>	-	
<b>Frequency inversion temperature</b> $T_0$		25	°C	-	

\*) 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.

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

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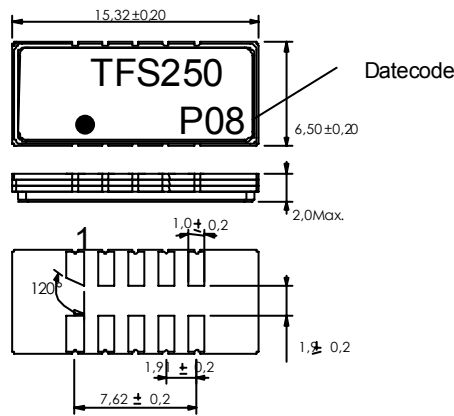
**Checked / approved:** \_\_\_\_\_

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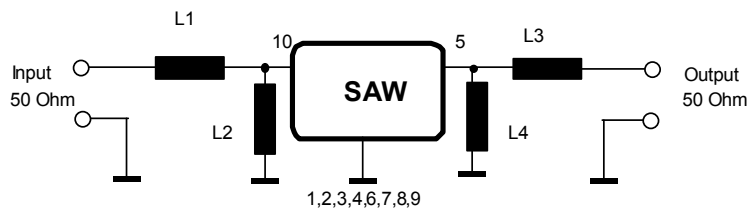
**Construction and pin connection**



- 1 Input RF return
- 2 Ground
- 3 Ground
- 4 Ground
- 5 Output
- 6 Output RF return
- 7 Ground
- 8 Ground
- 9 Ground
- 10 Input

Datecode: Year+week  
 M 2000  
 N 2001  
 P 2002  
 ...

**50 Ω test circuit**



**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, 1,5 mm or 20g 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): max. 2 times reflow process;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

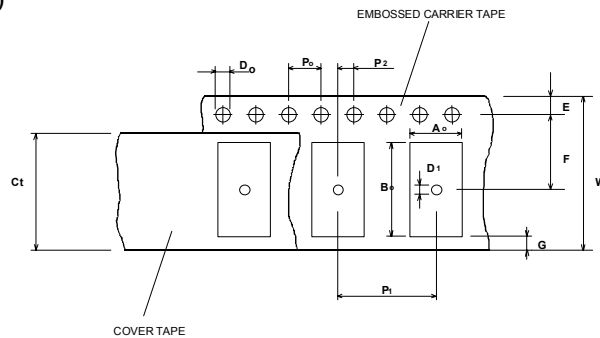
**Packing**

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  
 Reel of empty components at start: min 300 mm  
 Reel of empty components at start including leader: min 500 mm  
 Trailer: min 300 mm

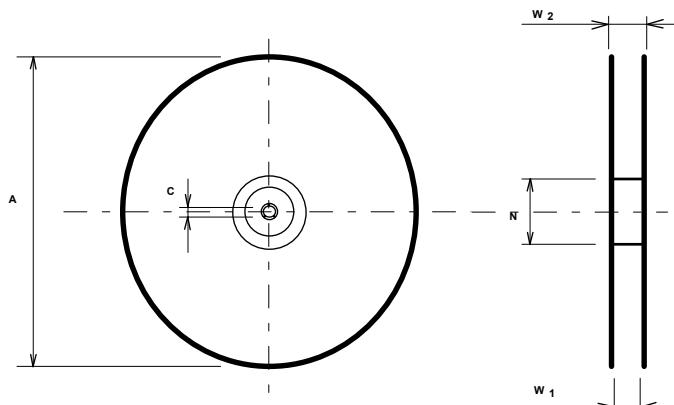
**Tape (all dimensions in mm)**

- W : 24 ± 0,3
- Po : 4 ± 0,1
- Do : 1,5 + 0,1
- E : 1,75 ± 0,1
- F : 11,5 ± 0,1
- G (min): 0,60
- P2 : 2 ± 0,1
- P1 : 12 ± 0,1
- D1(min): 1,5
- Ao : 7,1 ± 0,1
- Bo : 15,9 ± 0,1
- Ct : 21,5 ± 0,1



**Reel (all dimensions in mm):**

- A : 330
- W1 : 24,40 +2,0
- W2 (max): 30,4
- N (min) : 60
- C : 13 0,5/-0,2



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**

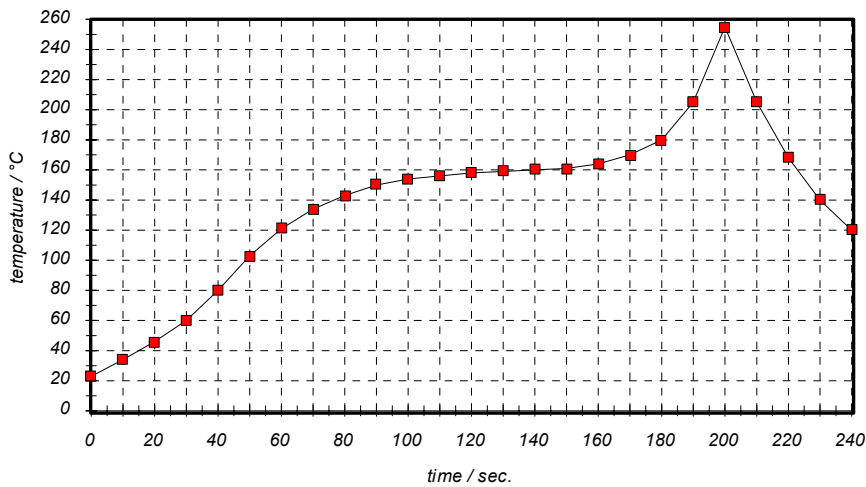


Table for temperature vs. time during the air reflow process

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

**VI TELEFILTER****Filter specification****TFS 250****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	Generation of "Development Specification" according to customers requirements	Steiner	01.06.2001
1.1	Add "Temperature coefficient" to "Characteristics" Add "Frequency inversion temperature" to "Characteristics" Use lower conditions for "Relative attenuation" Add "Phase ripple" to "Characteristics" Use lower conditions for "Group delay ripple" Add footnotes Correct "Tape" information	Herrler	09.08.2001
<b>Filter specification</b>			
2.0	- terminating impedances and typical values added - package changed to 15x6mm 10 pad	Steiner	5.11.01
3.0	- terminating impedance adjusted	Steiner	

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