

**VI TELEFILTER**

**Filter specification**

**TFS 140X**

**1/5**

**Measurement condition**

Ambient temperature: 25 °C  
 Input power level: 0 ± 2 dBm  
 Source and load impedance: 50 Ω  
 Terminating impedances \*  
     Input: 99 Ω || - 28.3 pF  
     Output: 103 Ω || - 27.2 pF

**Characteristics**

**Remark:**

The reference level for the relative attenuation  $a_{rel}$  of TFS140X is the minimum of the pass band attenuation  $a_{min}$ . This value is defined as the insertion loss  $a_e$ . The centre frequency  $f_c$  is the arithmetic mean value of the upper and lower frequencies at the 20 dB filter attenuation level relative to the insertion loss  $a_e$ . The frequency shift of the filter in the operating temperature range is not included in the production tolerance scheme

<b>D a t a</b>		<b>typ. value</b>		<b>limit</b>	
<b>Insertion loss</b>	$a_e = a_{min}$	9	dB	max.	12 dB
<b>Nominal frequency</b>	$f_N$	140	MHz		140,0 MHz
<b>Centre frequency <math>f_C</math></b> (at ambient temperature)					139,60 ... 140,40 MHz
<b>Pass band</b>	PB			$f_N$	± 7,1 MHz
<b>Amplitude ripple</b> (peak to adjacent valley) within $f_N \pm 7,2$ MHz		0.2		max.	1 dB
<b>Bandwidth</b>					
1 dB		17,6	MHz	min.	17 MHz
3 dB		18,5	MHz	min.	17,75 MHz
35 dB		21,8	MHz	max.	24 MHz
40 dB		24,8	MHz	max.	48 MHz
<b>Relative attenuation</b>	$a_{rel}$				
$f_N \dots$	$f_N \pm 8,5$ MHz	0,5	dB	max.	1 dB
$f_N \pm 8,5$ MHz ...	$f_N \pm 8,875$ MHz	1,5	dB	max.	3 dB
$f_N \pm 12$ MHz ...	$f_N \pm 24$ MHz	40	dB	min.	35 dB
$f_N \pm 24$ MHz ...	$f_N \pm 40$ MHz	50	dB	min.	40 dB
<b>Phase variation</b> within PB		6	deg	max.	10 deg p-p
<b>Group delay ripple</b> within PB		44	ns	max.	60 ns
<b>Absolute group delay</b> within PB		777	ns	max.	825 ns
<b>Input power level</b>				max.	+ 10 dBm
<b>Operable temperature range</b>					- 40 °C ... + 85 °C
<b>Storage temperature range</b>					- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>	TCf	-87	ppm/K		

\*) 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.

**Generated:** \_\_\_\_\_

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

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**VI TELEFILTER**

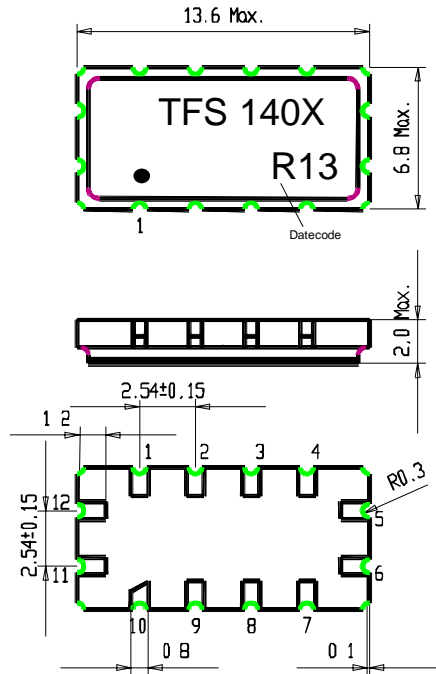
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**Construction and pin connection**

(All dimensions in mm)



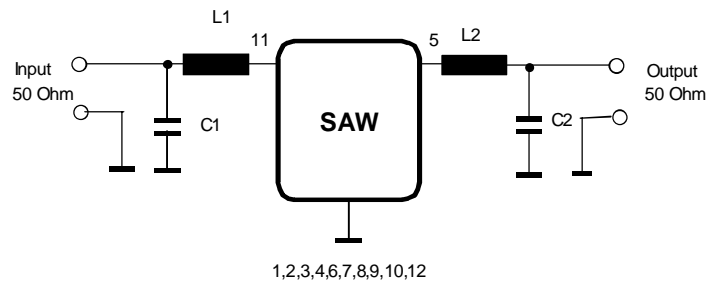
- 1 Ground
- 2 Ground
- 3 Ground
- 4 Ground
- 5 Output
- 6 Output RF Return
- 7 Ground
- 8 Ground
- 9 Ground
- 10 Ground
- 11 Input
- 12 Input RF Return

Date code: Year+week

- N 2001
- P 2002
- R 2003

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**50 Ω test circuit**



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**Filter specification**

**TFS 140X**

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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. 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, please refer to the attached "Air reflow temperature conditions" on page 4;

**Packing**

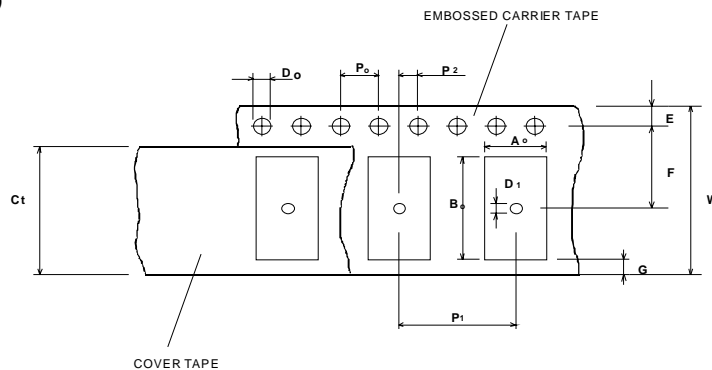
Tape & Reel: DIN IEC 286 – 3, with exception of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:	1700
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300

mm

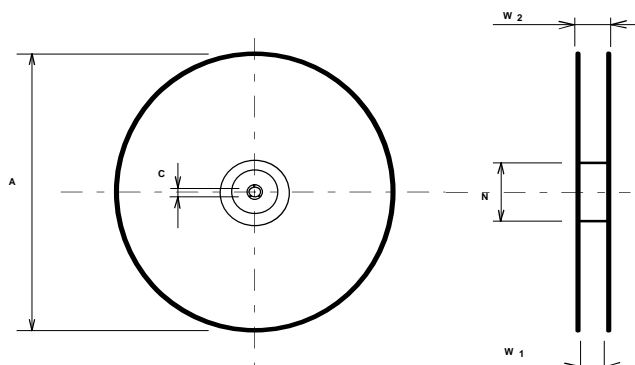
**Tape (all dimensions in mm)**

- 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 ± 0,2
- Bo : 13,9 ± 0,2
- 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. Markings on the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on its right.

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**Air reflow temperature conditions**

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**

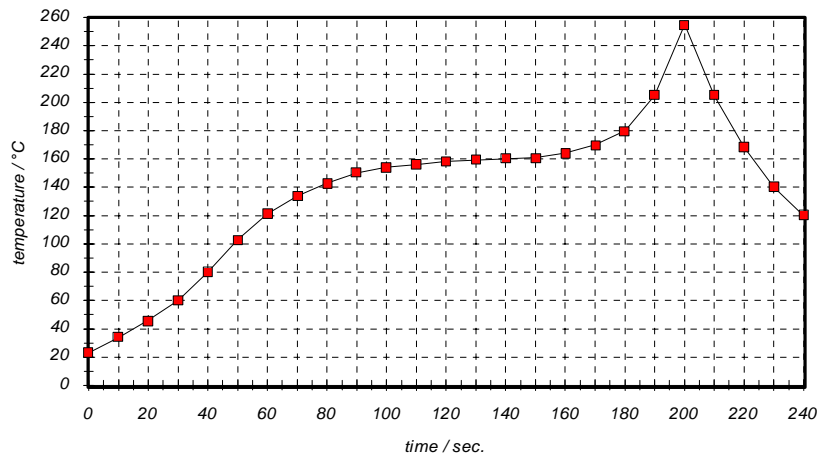


Table for temperature vs. time during the air reflow process

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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**VI TELEFILTER****Filter specification****TFS 140X****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	generation of specification according to customer requirements	E. Chilla	28.04.2003
1.1	group delay ripple changed absolute group delay added	E. Chilla	21.04.2003
1.2	changed to filter specification terminating impedances added typical values added pass band added bandwidth for 1 dB, 3 dB, 35 dB changed relative attenuation changed	E. Chilla	24.11.2003

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