

**VI TELEFILTER****Filter specification****TFS 190E****1/5****Measurement condition**

Ambient Temperature: 23 °C  
 Input Power Level: 0 dBm  
 Terminating Impedance at  $f_C$ :  
     input: 307  $\Omega$  // - 12,4 pF  
     output: 107  $\Omega$  // - 16,9 pF

**Characteristics****Remark:**

The reference level for the relative attenuation  $a_{rel}$  of TFS 190E is the minimum of the pass band attenuation  $a_{min}$ . This minimum is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 190 MHz without any tolerance. The given values for the relative attenuation  $a_{rel}$  and the group delay ripple have to be reached at the frequencies given below, even 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)	$a_e = a_{min}$	21,0 dB	max. 24,0 dB
<b>Nominal Frequency</b>	$f_N$	-	190,0 MHz
<b>Pass Band</b>	PB	-	$f_N \pm 1,92$ MHz
<b>Group Delay Variation within PB</b>		125 ns	max. 300 ns p-p
<b>Relative Attenuation</b>	$a_{rel}$		
$f_N$ ... $f_N \pm 1,92$ MHz		0,8 dB	max. 1 dB
@ $f_N \pm 2,50$ MHz	$f_N \pm 2,50$ MHz	52 dB	min. 30 dB
$f_N \pm 2,50$ MHz ... $f_N \pm 3,75$ MHz	$f_N \pm 3,75$ MHz	50 dB	min. 30 dB
@ $f_N + 3,75$ MHz	$f_N + 3,75$ MHz	54 dB	min. 45 dB
$f_N - 180,00$ MHz ... $f_N - 3,75$ MHz	$f_N - 3,75$ MHz	58 dB	min. 48 dB
$f_N + 3,75$ MHz ... $f_N + 60,00$ MHz	$f_N + 60,00$ MHz	54 dB	min. 43 dB
$f_N + 60,00$ MHz ... $f_N + 310,00$ MHz	$f_N + 310,00$ MHz	60 dB	min. 50 dB
<b>Operating Temperature Range</b>			-30... +85 ° C
<b>Storage Temperature Range</b>			-40... +85 ° C
<b>Temperature Coefficient of frequency <math>TC_f</math> **</b>		- 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.

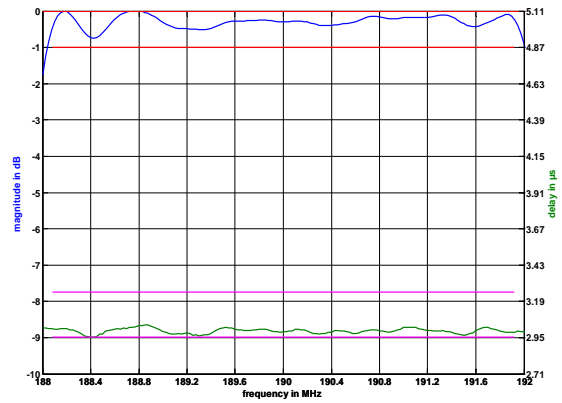
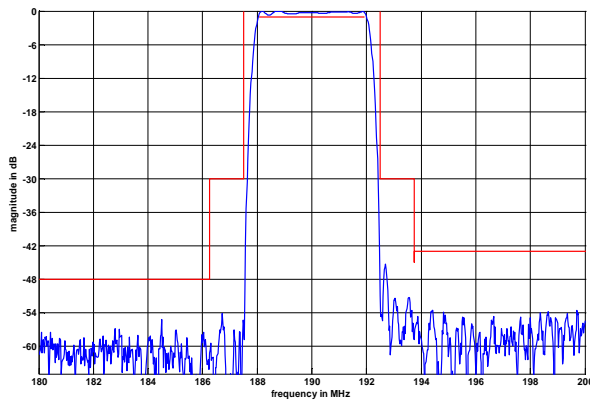
\*\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$

**Generated:****Checked / Approved:**

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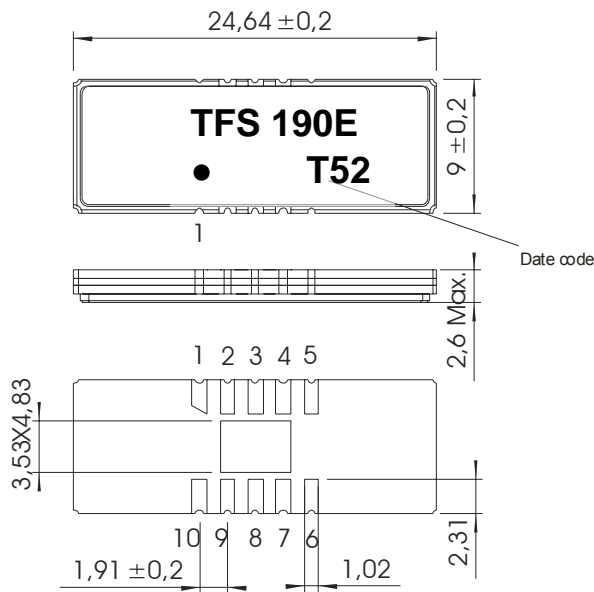
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**Filter characteristic**



**Construction and pin connection**

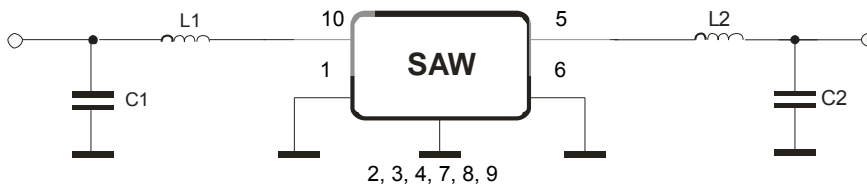
(All dimensions in mm)



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

Date code: Year + week  
 T 2005  
 U 2006  
 V 2007  
 ...

**50 Ohm Test circuit**



**Stability characteristics, reliability**

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

1. Shock: 500g, 1 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;

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

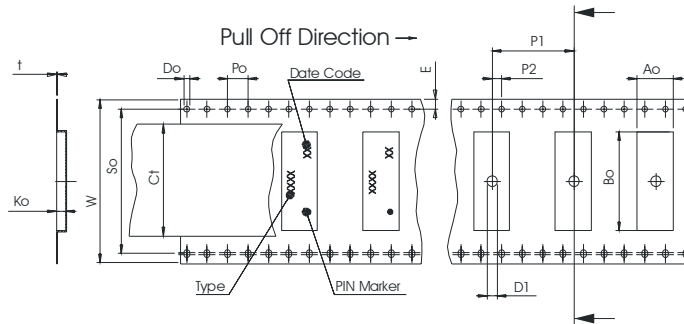
**Packing**

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:	1000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

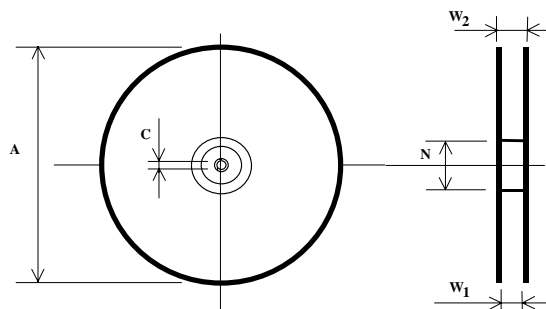
**Tape (all dimensions in mm)**

- W : 44,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 20,20 ± 0,15
- P2 : 2,00 ± 0,15
- P1 : 16,00 ± 0,1
- D1(min) : 2,00
- Ao : 9,30 ± 0,1
- Bo : 24,90 ± 0,1
- So : 40,40 ± 0,1
- Ct : 38,0 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 44,4 +2/-0
- W2(max) : 50,4
- N(min) : 100
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

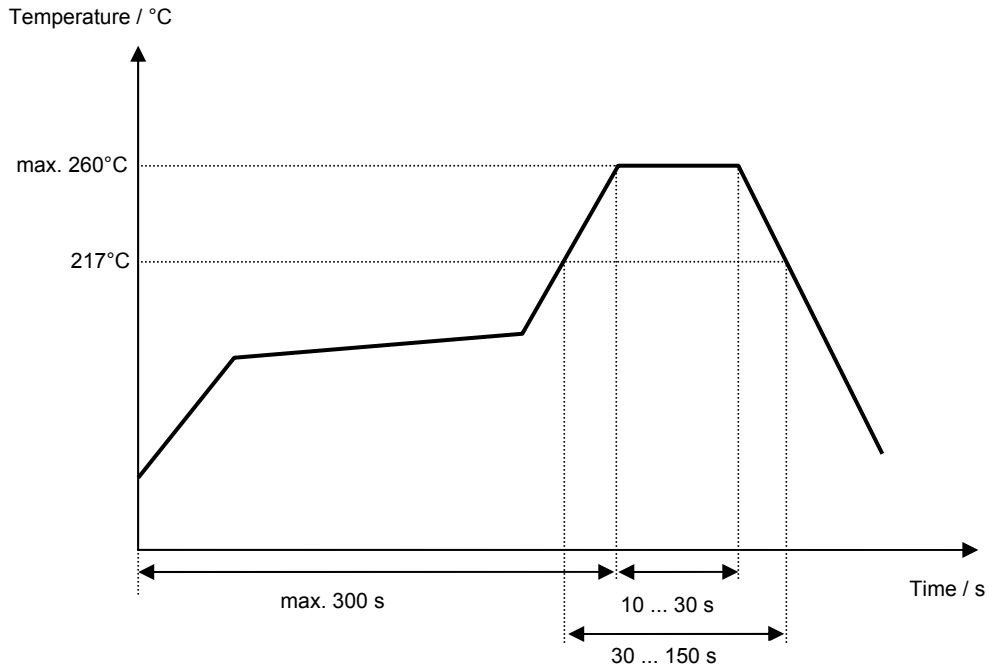
**Air reflow temperature conditions**

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Conditions	Exposure
Average ramp-up rate (30°C to 217°C)	less than 3°C/second
> 100°C	between 300 and 600 seconds
> 150°C	between 240 and 500 seconds
> 217°C	between 30 and 150 seconds
Peak temperature	max. 260°C
Time within 5°C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50°C)	less than 6°C/second
Time from 30°C to Peak temperature	no greater than 300 seconds

**Chip-mount air reflow profile**



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**VI TELEFILTER****Filter specification****TFS 190E****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	Pfeiffer	30.10.2001
1.1	typical values added terminating impedance added (preliminary value)	Pfeiffer	05.02.2002
1.2	- typical values corrected and added - filter characteristic added - air reflow temperature conditions and stability characteristics modified	Pfeiffer	23.12.2005

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