

**VI TELEFILTER**

**Filter specification**

**TFS 170N**

**1/5**

**Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 780 Ω || -7,9 pF  
     Output: 760 Ω || -7.9 pF

**Characteristics**

Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS 170N is the attenuation at nominal frequency  $f_N$ . The maximum attenuation in the pass band is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 170,6 MHz without any tolerance or limit. The values of relative attenuation  $a_{rel}$  are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

D a t a		typ. Value	Limit	
<b>Insertion loss</b>	$a_e$	6,6 dB	max.	8 dB
<b>Nominal frequency</b>	$f_N$	-		170,6 MHz
<b>Passband</b>	PB	-	$f_N \pm$	90 kHz
<b>Amplitude ripple in PB</b>	p-p	0,4 dB	max.	1 dB
<b>Relative attenuation</b>	$a_{rel}$			
$f_N \pm 90$ kHz ... $f_N \pm 200$ kHz		-0,1 dB	min.	-1 dB**
$f_N \pm 0,2$ MHz ... $f_N \pm 0,4$ MHz		2 dB	min.	1 dB
$f_N \pm 0,4$ MHz ... $f_N \pm 0,6$ MHz		23 dB	min.	13 dB
$f_N \pm 0,6$ MHz ... $f_N \pm 0,8$ MHz		35 dB	min.	27 dB
$f_N \pm 0,8$ MHz ... $f_N \pm 1,6$ MHz		45 dB	min.	40 dB
$f_N \pm 1,6$ MHz ... $f_N \pm 3$ MHz		48 dB	min.	43 dB
$f_N \pm 3$ MHz ... $f_N \pm 5,8$ MHz		55 dB	min.	47 dB
$f_N \pm 5,8$ MHz ... $f_N \pm 35$ MHz		60 dB	min.	50 dB
$f_N \pm 35$ MHz ... $f_N \pm 75$ MHz		65 dB	min.	45 dB
$f_N - 75$ MHz ... $f_N - 170$ MHz		70 dB	min.	40 dB
$f_N + 75$ MHz ...	2 GHz	70 dB	min.	40 dB
<b>Time domain response***</b>				
5 μsec		17 dB	min.	10 dB
10 μsec		35 dB	min.	20 dB
30 μsec		80 dB	min.	76 dB
35 μsec		83 dB	min.	79 dB
≥ 40 μsec		84 dB	min.	80 dB
<b>Group delay variation in PB</b>		0,25 μs	max.	1 μs
<b>VSWR in PB</b>		1,5:1	max.	2:1
<b>Input Power Level</b>		-	max.	20 dBm
<b>Temperature coefficient of frequency <math>T_c</math> ****</b>		-0,05 ppm/K <sup>2</sup>		-
<b>Frequency inversion temperature <math>T_0</math></b>		35 °C		-
<b>Operating temperature range</b>		-	- 33 °C .. +	85 °C
<b>Storage temperature range</b>		-	- 40 °C.. +	125 °C
<b>IIP3 *****</b>		36 dBm	min.	30 dBm

\*) The terminating impedances depend on parasites 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.

\*\*\*) reference is max. loss in PB

\*\*\*\*) Attenuation values for delays between 5μs and 35μs shall be interpolated linearly.

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

\*\*\*\*\*)  $f_{in1} = 170,5 \text{ MHz}; f_{in2} = 170,55 \text{ MHz}; P_{in} = 0 \text{ dBm } f_{\text{measurement}} = 170,6 \text{ MHz}$

generated: \_\_\_\_\_

checked / approved: \_\_\_\_\_

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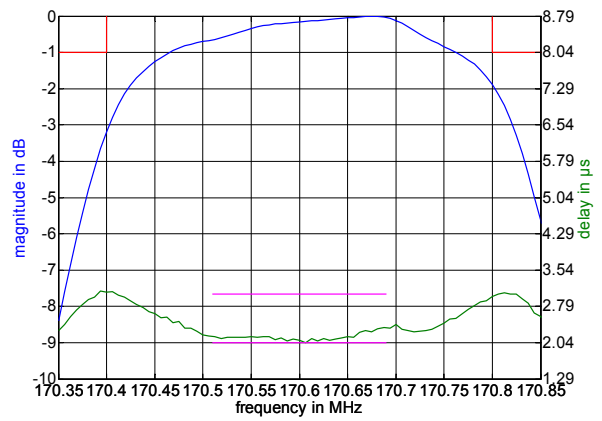
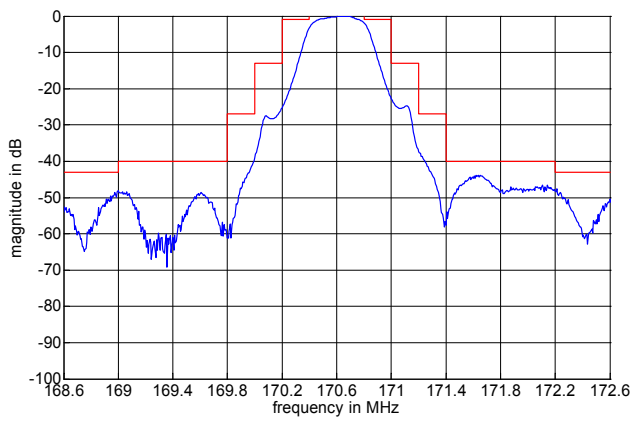
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**VI TELEFILTER**

**Filter specification**

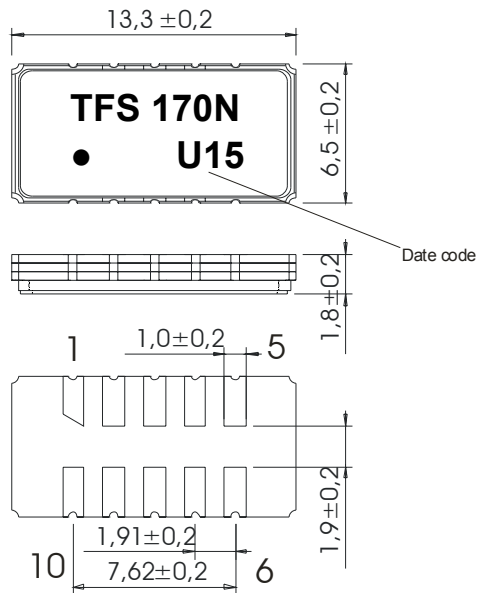
**TFS 170N**

**Filter characteristic**



**Construction and pin connection**

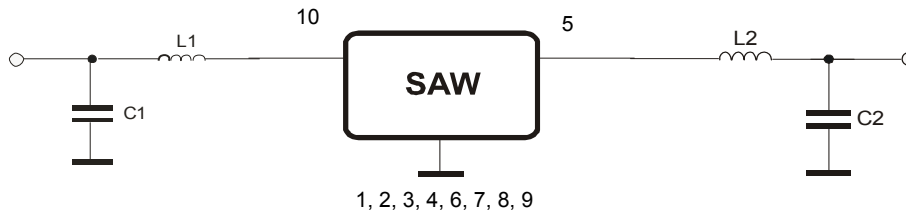
(All dimensions in mm)



- 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  
 U 2006  
 V 2007  
 W 2008  
 ...

**50 Ω Test circuit**



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**Stability characteristics, reliability**

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

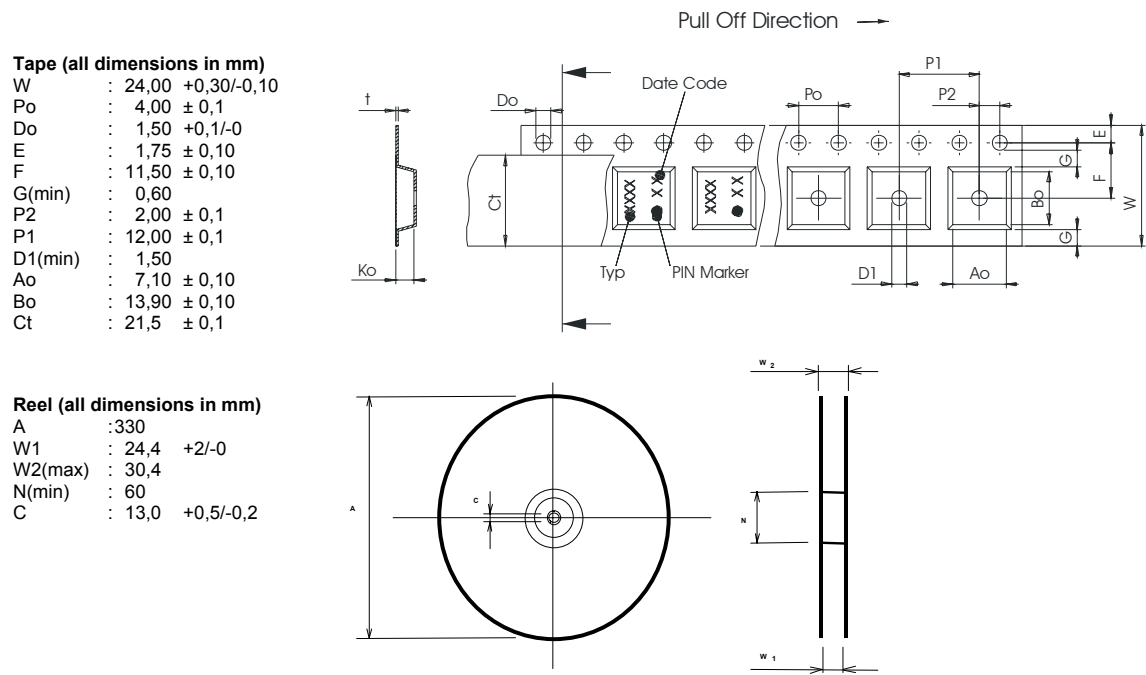
1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times 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 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



The minimum bending radius is 45 mm.

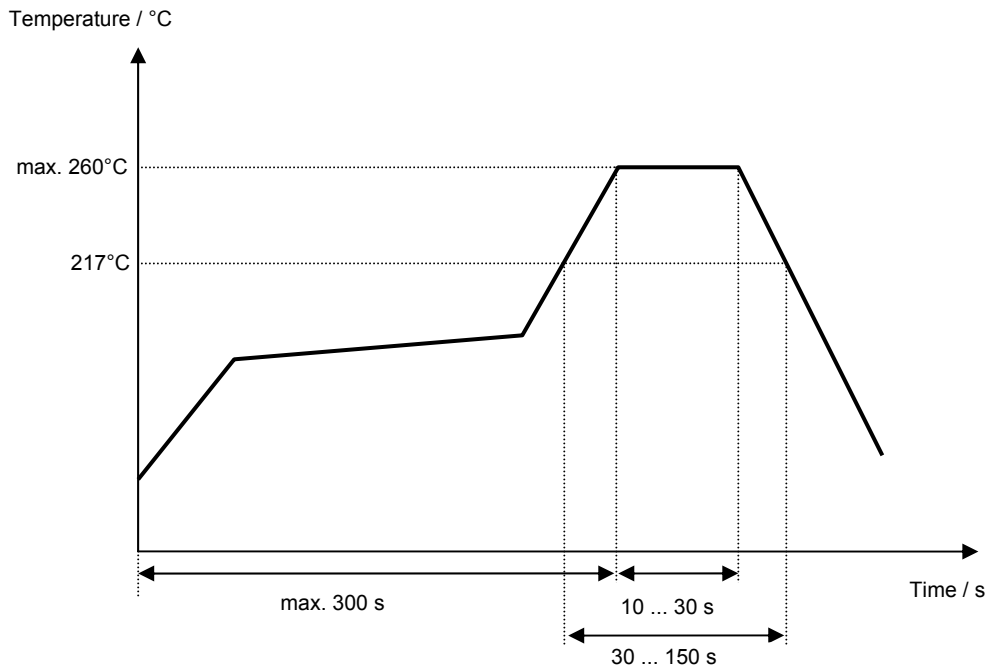
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**Air reflow temperature conditions**

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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**History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	generation of "Development specification" according to customer requirements	Pfeiffer	13.07.2004
1.1	package tolerances modified	Steiner	16.08.2004
1.2	terminating impedance added (preliminary value) typical value and filter characteristic added definition for insertion loss changed limits for relative attenuation corrected	Pfeiffer	17.09.2004
1.3	terminating impedance fixed air reflow temperature conditions modified	Pfeiffer	18.10.2004
1.4	limit for maximum input power level fixed to 20 dBm air reflow temperature conditions modified	Pfeiffer	04.11.2004
1.5	operating temperature range extended	Pfeiffer	31.03.2006
1.6	typical values and more details added for IP3 VSWR typo corrected	Pfeiffer	11.04.2006