

VI TELEFILTER

Filter specification

TFS 170E

1/5

Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	660 Ω -11,6 pF	
Output:	570 Ω -13,6 pF	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 170E 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 centre frequency f_c is the arithmetic mean value of the upper ($f_{3\text{ dB}+}$) and lower ($f_{3\text{ dB}-}$) frequencies at the 3 dB filter attenuation level relative to the insertion loss a_e . The temperature coefficient of frequency TC_f is valid for both the reference frequency f_c and the frequency response of the filter in the operating temperature range. The frequency shift of the filter in the operating temperature range is not included in the production tolerance scheme.

Data		typ. value	tolerance / limit
Insertion loss (reference level)	a_e	11,0 dB	max. 13,0 dB
Centre frequency at ambient temperature	f_c ****)	170 MHz	± 100,0 kHz
Passband	PB	-	f_c ± 2,5 MHz
Pass band ripple p-p		0,8 dB	max. 1,2 dB
Relative attenuation	a_{rel} **)		
$f_{3\text{ dB}+}$ + 75 kHz ... $f_{3\text{ dB}+}$ + 125 kHz		8 dB	min. 6 dB
$f_{3\text{ dB}-}$ - 75 kHz ... $f_{3\text{ dB}-}$ - 125 kHz		8 dB	min. 6 dB
$f_{3\text{ dB}+}$ + 125 kHz ... $f_{3\text{ dB}+}$ + 250 kHz		12 dB	min. 9 dB
$f_{3\text{ dB}-}$ - 125 kHz ... $f_{3\text{ dB}-}$ - 250 kHz		12 dB	min. 9 dB
$f_{3\text{ dB}+}$ + 250 kHz ... $f_{3\text{ dB}+}$ + 500 kHz		29 dB	min. 25 dB
$f_{3\text{ dB}-}$ - 250 kHz ... $f_{3\text{ dB}-}$ - 500 kHz		29 dB	min. 25 dB
$f_{3\text{ dB}+}$ + 500 kHz ... f_c + 10 MHz		31 dB	min. 27 dB
$f_{3\text{ dB}-}$ - 500 kHz ... f_c - 10 MHz		31 dB	min. 27 dB
Group delay	mean value in PB	1,45 µs	max. 2,0 µs
Group delay ripple within PB p-p		280 ns	max. 400 ns
Group delay ripple in an arbitrary 25 kHz segment within PB		30 ns	max. 100 ns
Return loss within PB		13 dB	max. 10 dB
Operating temperature range	OTR	-	+ 10 °C ... + 55 °C
Storage temperature range		-	- 40 °C ... + 85 °C
Temperature coefficient of frequency	TC_f ***	-18 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.

***) we will guarantee that the cascade of 2 filters will fulfil 2 times the single filter rejection specification

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

*****) centre frequency variation per reel limited to 50 kHz, done by a sorting into frequency groups having filters of one reel out of one frequency group only,

each reel will be additionally labeled with the frequency group the filters have been sorted to, possible groups for the centre frequency are:

Group 1: 169,9MHz...169,95 MHz; Group 2: 169,95MHz...170,0 MHz; Group 3: 170,0MHz...170,05 MHz; Group 4: 170,05MHz...170,1 MHz

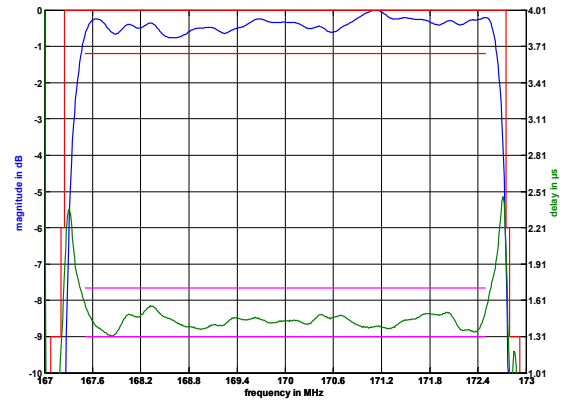
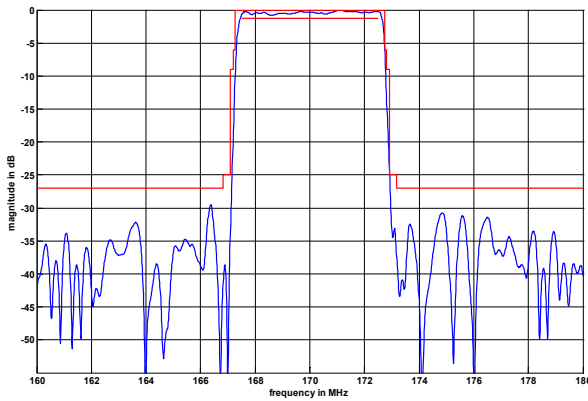
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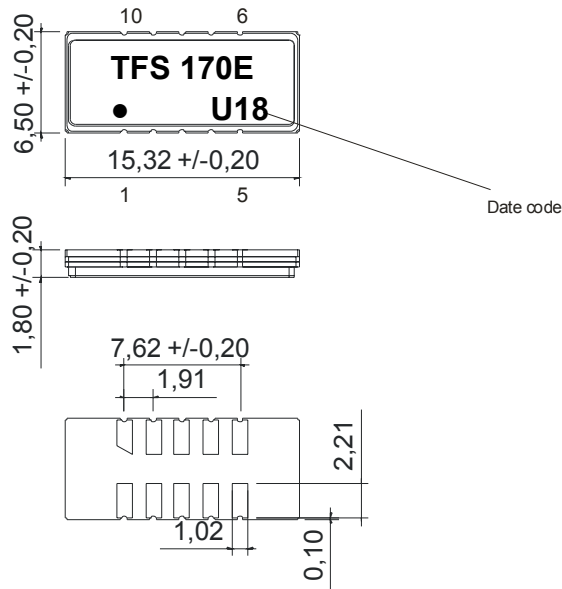
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Filter characteristic



Construction and pin connection

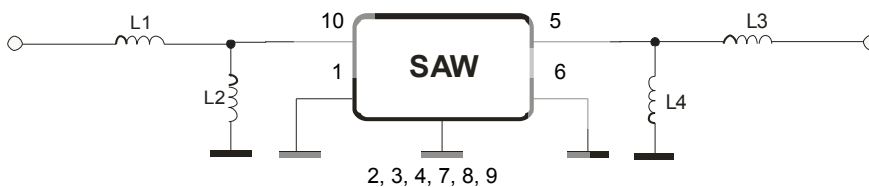
(All dimensions in mm)



- 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
 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: trice 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)

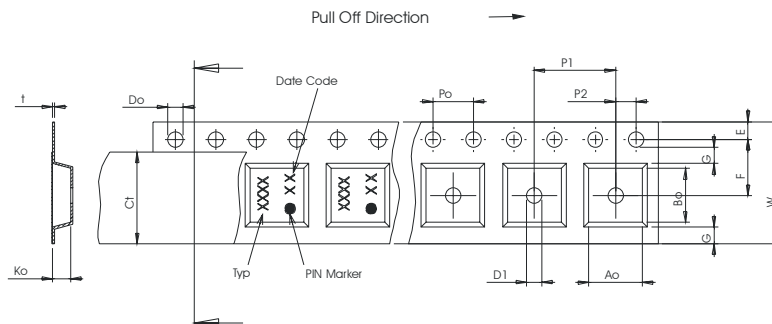
Packing

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:	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

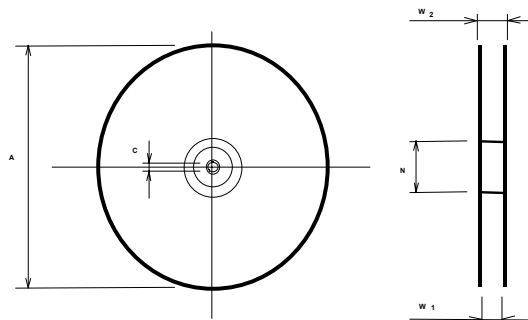
Tape (all dimensions in mm)

- W : 24,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 11,50 ± 0,1
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 12,00 ± 0,1
- D1(min) : 1,50
- Ao : 7,10 ± 0,1
- Bo : 15,90 ± 0,1
- Ct : 21,5 ± 0,1



Reel (all dimensions in mm)

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



The minimum bending radius is 45 mm.

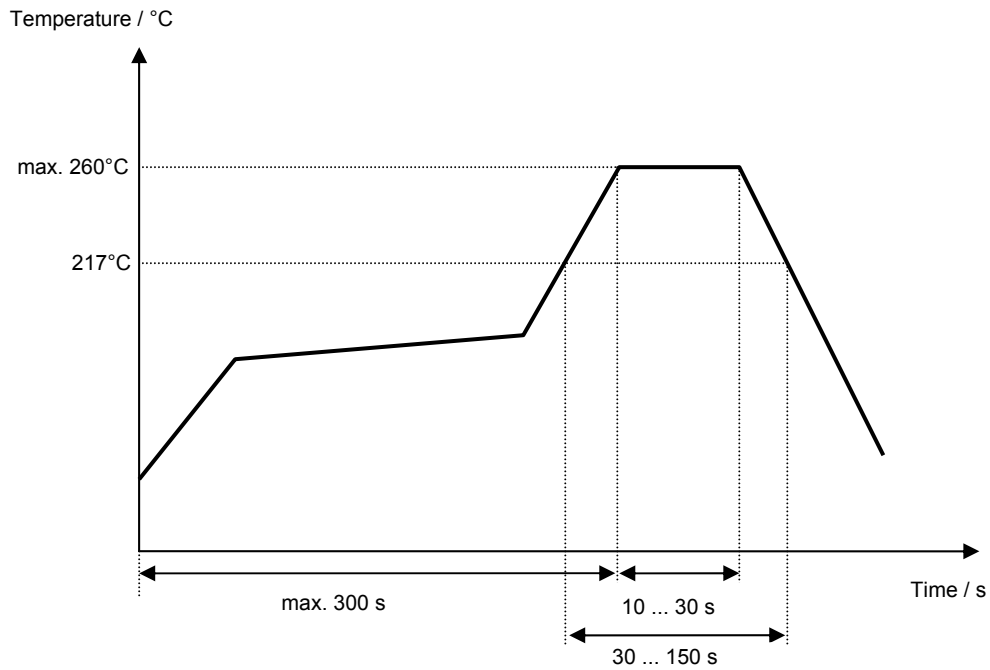
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Air reflow temperature conditions

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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VI TELEFILTER**Filter specification****TFS 170E****5/5****History**

Version	Reason of Changes	Name	Date
1.0	Generation of development specification	Channaa	24.10.2005
1.1	centre frequency variation per reel limited to a window of 50 kHz Typo's in relative attenuation table corrected	Steiner	26.10.2005
1.2	add sentence *****) to characteristics	Channaa	18.11.2005
1.3	- terminating impedance, typical values and matching configuration added - filter characteristics added - limits for pass band ripple and group delay ripple changed	Pfeiffer	27.03.2006
1.4	- change of pin outs - change of terminating impedance	Pfeiffer	05.05.2006

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