

**VI TELEFILTER****Filter specification****TFS 70H13****1/5****1. Measurement condition :**

Ambient temperature  $T_A$ : 25 °C.  
 Input power level: 0 dBm.  
 Terminating impedances in  $f_C$ : for input: 50  $\Omega$  | 0 pF.  
 for output: 50  $\Omega$  | 0 pF.

**2. Characteristics :**

Remark:

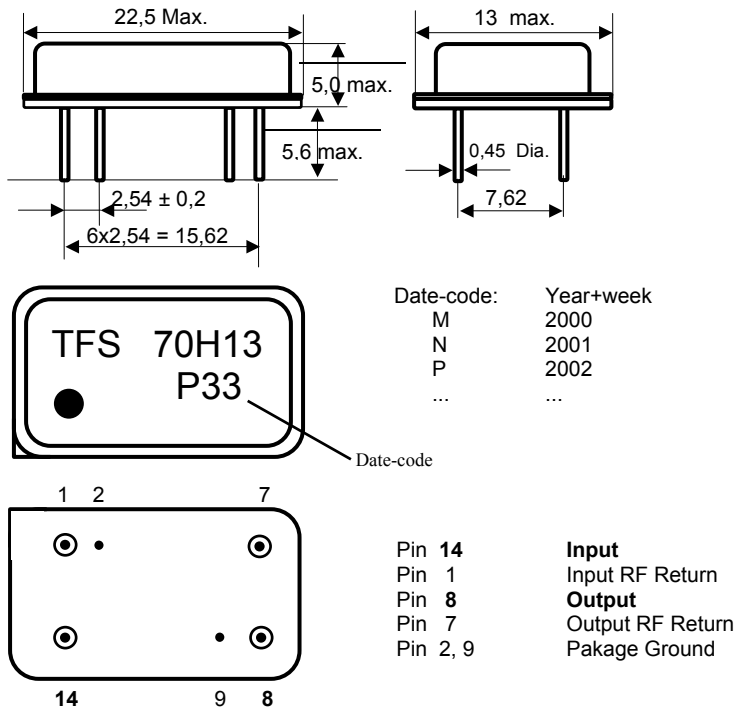
Reference level for the relative attenuation  $a_{rel}$  of the **TFS 70H13** is the minimum of the pass band attenuation  $a_{min}$ . The minimum of the pass band attenuation  $a_{min}$  is defined as the insertion loss  $a_e$ . The reference frequency  $f_C$  is the arithmetic mean value of the upper and lower frequencies at the 20 dB filter attenuation level relative to the insertion loss  $a_e$ . The temperature coefficient of frequency  $T_{Cf}$  is valid both for 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
<b>Insertion loss</b> (Reference level)	$a_e$	22,7 dB	max. 24 dB
<b>Centre frequency</b> at ambient temperature ( $f_{CTA}$ )	$f_C$	70,0 MHz	70,0 $\pm$ 0,1 MHz
<b>Pass band :</b>	<b>PB</b>		$f_C \dots f_C \pm 4,0$ MHz
<b>Amplitude ripple in :</b> $f_C \dots f_C \pm 3,6$ MHz		0,45 dB	max. 0,8 dB
<b>Bandwidth</b> at ambient temperature $T_A$ :	<b>BW</b>		
1 dB		7,83 MHz	min. 7,6 MHz
3 dB		8,39 MHz	min. 8,0 MHz
5 dB		8,70 MHz	
10 dB		9,20 MHz	
20 dB		9,78 MHz	
30 dB		10,16 MHz	
40 dB		10,43 MHz	max. 10,6 MHz
50 dB		10,62 MHz	
<b>Relative attenuation</b>	$a_{rel}$		
$f_C \dots f_C \pm 3,6$ MHz		-	max. 0,8 dB
$f_C \pm 3,6$ MHz ... $f_C \pm 3,8$ MHz		-	max. 1 dB
$f_C \pm 3,8$ MHz ... $f_C \pm 4,0$ MHz		-	max. 3 dB
$f_C \pm 5,3$ MHz ... $f_C \pm 6$ MHz		45 dB	min. 40 dB
$f_C \pm 6$ MHz ... $f_C \pm 15$ MHz		50 dB	min. 45 dB
$f_C \pm 15$ MHz ... $f_C \pm 50$ MHz		55...60 dB	min. 50 dB
<b>Group delay</b> ( mean value in PB ):-		1,83 $\mu$ s	max. 2,5 $\mu$ s
<b>Group delay ripple</b> in PB (p-p):		40 ns	max. 60 ns
<b>Deviation from linear phase</b> in PB :		2,4 deg	max. 4 deg
<b>Triple transit attenuation</b> compared to main signal		54 dB	
<b>Crosstalk</b>		60 dB	
<b>Temperature coefficient of frequency</b> ( $T_{Cf}$ ) :		-87 ppm/K	
<b>Frequency deviation of <math>f_C</math> over temperature :</b>		$\Delta f_C(\text{Hz}) = T_{Cf}(\text{ppm/K}) \times (T - T_o) \times f_{CTA}(\text{MHz})$	
<b>Operating temperature range</b>		- 25 °C ... + 80 °C	
<b>Storage temperature range</b>		- 40 °C ... + 85 °C	

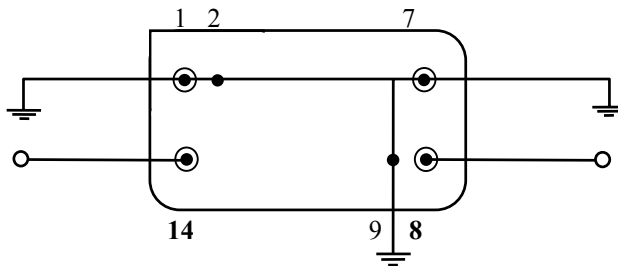
**Generated:** W. Duzow**Checked / approved:** Dr. Bert Wall**VI TELEFILTER****Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30****E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)**

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**3. Construction and pin connection :** (All dimensions in mm)



**4. 50 Ω matching network ( please refer to the application note for further details ) :**



**5. 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;

## 6. 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.	

**Air reflow profile**

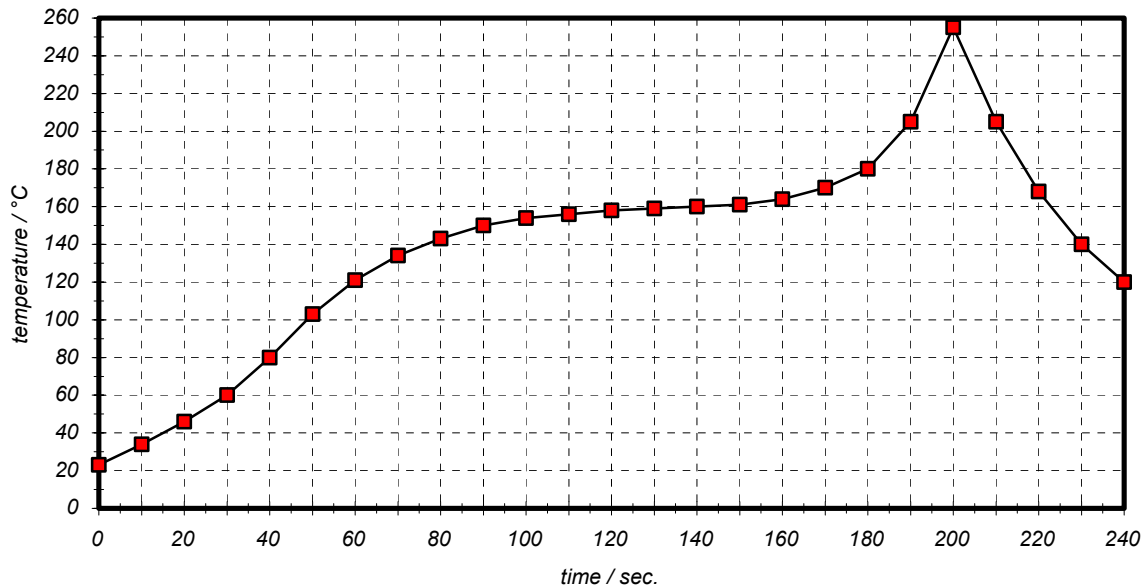


Table for temperature vs. time during the air reflow process

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 70H13****5/5**

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**History**

<b>Version</b>	<b>Reason of changes</b>	<b>Name</b>	<b>Date</b>
1.0	generate preliminary specification .	Dunzow W.	22.11.2001
1.1	generate filter specification.	Dunzow W.	24.06.2002

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