

**VI TELEFILTER**

**Filter specification**

**TFS 150C1**

**1/5**

**Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 3800 Ω || -0.7 pF  
     Output: 3800 Ω || -0.7 pF

**Characteristics**

**Remark:**

Reference level for the relative attenuation  $a_{rel}$  of the TFS 150C1 is the minimum in the usable signal bandwidth. The maximum attenuation  $a_{max}$  in the usable signal bandwidth is defined as the insertion loss  $a_e$ . The reference frequency  $f_c$  is the arithmetic mean value of the upper ( $f_{6dB+}$ ) and lower ( $f_{6dB-}$ ) frequencies at the 6 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 150,4 MHz without tolerance. The usable signal bandwidth has to be guaranteed also 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>tolerance / limit</b>
<b>Insertion loss</b> (Reference level)	$a_e$	2,8 dB	max. 5 dB
<b>Nominal frequency</b>	$f_N$	-	150,4 MHz
<b>Centre frequency</b>	$f_c$	150,41 MHz	-
<b>3 dB bandwidth</b>	BW	107 kHz	-
<b>Usable signal band width</b>		-	min. $f_N \pm 10$ kHz
<b>Relative attenuation :</b>	$a_{rel}$		
$f_{6dB-} - 75$ kHz ... $f_{6dB-} - 50$ kHz		-	min. 15 dB
$f_{6dB+} + 50$ kHz ... $f_{6dB+} + 75$ kHz		-	min. 15 dB
$f_{6dB-} - 125$ kHz ... $f_{6dB-} - 75$ kHz		-	min. 20 dB
$f_{6dB+} + 75$ kHz ... $f_{6dB+} + 125$ kHz		-	min. 20 dB
$f_{6dB-} - 250$ kHz ... $f_{6dB-} - 125$ kHz		-	min. 35 dB
$f_{6dB+} + 125$ kHz ... $f_{6dB+} + 250$ kHz		-	min. 35 dB
$f_{6dB-} - 500$ kHz ... $f_{6dB-} - 250$ kHz		-	min. 50 dB
$f_{6dB+} + 250$ kHz ... $f_{6dB+} + 330$ kHz		-	min. 50 dB
$f_{6dB+} + 330$ kHz ... $f_{6dB+} + 397$ kHz		-	min. 40 dB
$f_{6dB+} + 397$ kHz ... $f_{6dB+} + 500$ kHz		-	min. 50 dB
$f_{6dB-} - 500$ kHz ... $f_{6dB-} - 10$ MHz		-	min. 55 dB
$f_{6dB+} + 500$ kHz ... $f_{6dB+} + 10$ MHz		-	min. 55 dB
<b>Operating temperature range</b>		-	- 20 °C ... + 70 °C
<b>Storage temperature range</b>		-	- 30 °C ... + 85 °C
<b>Temperature coefficient of frequency</b> $TC_f$ **)		ca. - 0,036 ppm/K <sup>2</sup>	-
<b>Frequency inversion temperature</b> $T_0$		25 °C	-

\*) 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.

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

**Generated:**

---

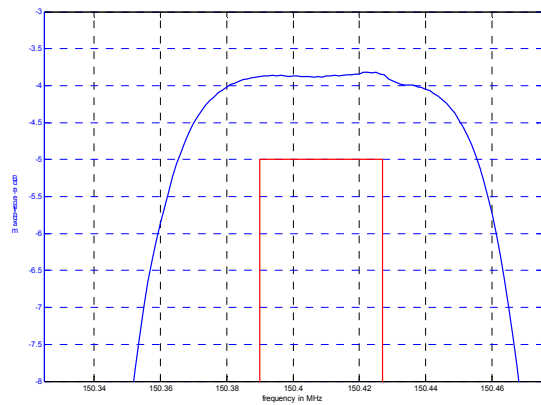
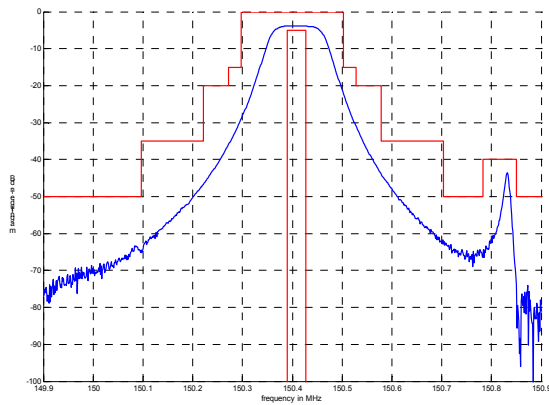
**Checked / approved:**

---

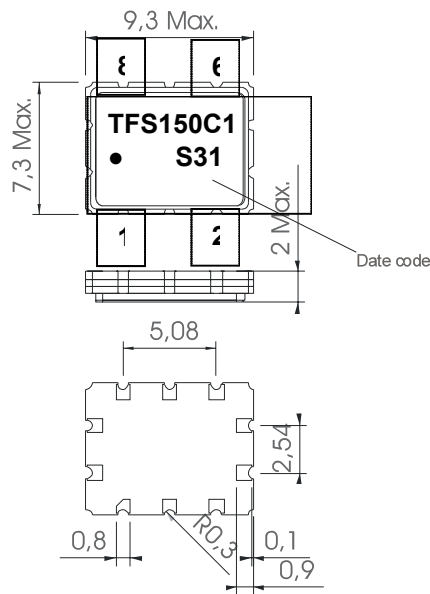
**Tele Filter GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**  
**E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Filter characteristic**



**Construction and pin connection**  
(All dimensions in mm)

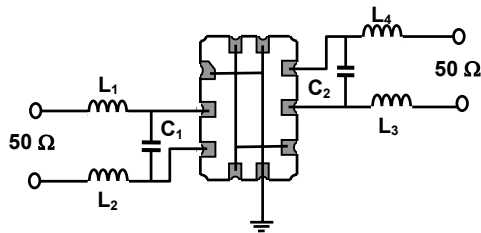


1	Input
2	Input
3	Ground
4	Ground
5	Ground
6	Output
7	Output
8	Ground
9	Ground
10	Ground

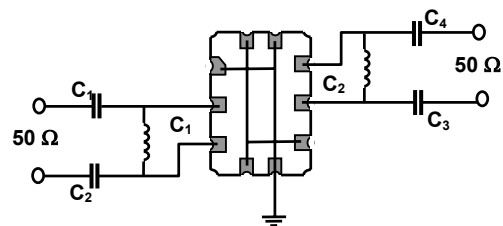
  

Date code: Year + week	
S	2004
T	2005
U	2006
...	

**50 Ω Test circuit 1 :**



**50 Ω Test circuit 2:**



**Tele Filter GmbH**  
 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)

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**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 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;

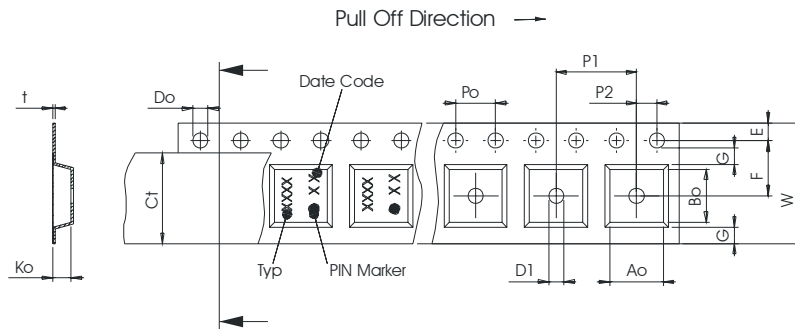
**Packing**

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 peer reel: 3000  
reel of empty components at start: min. 300 mm  
reel of empty components at start including leader: min. 500 mm  
trailer: min. 300 mm

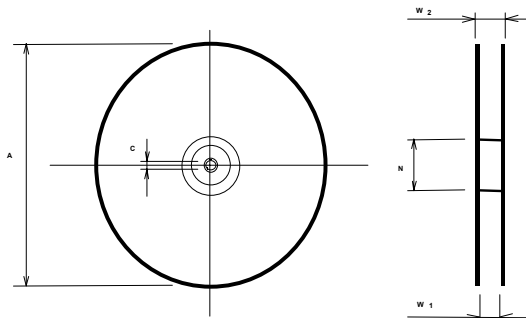
**Tape (all dimensions in mm)**

- W : 16,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,10
- F : 7,50 ± 0,10
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 12,00 ± 0,1
- D1(min) : 1,50 +0,1/-0
- Ao : 7,60 ± 0,10
- Bo : 9,60 ± 0,10
- Ct : 13,5



**Reel (all dimensions in mm)**

- A : 330
- W1 : 16,4
- W2(max) : 22,4
- N(min) : 50
- C : 13,0



The minimum bending radius is 45 mm.

**Tele Filter GmbH**  
**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)**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**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**

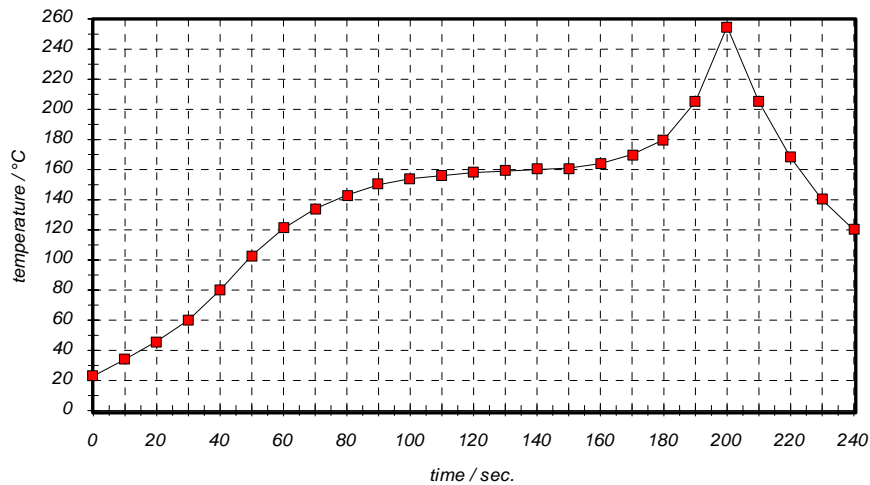


Table for temperature vs. time during the air reflow process

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

Tele Filter GmbH  
 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)

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**VI TELEFILTER****Filter specification****TFS 150C1****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.1	Generation of specification according to customer requirements.	Dunzow W.	11.10.2001.
1.2	Change defenition of insertion loss. Change remark according to temperature dependence and production tolerance. Remove attenuation requirement at $f_N \pm 910$ kHz. Add selection at $f_{6dB}$ -500 kHz. Define frequency range were ultimate rejection of 55 dB is measured.	Dr. Wall	14.11.2001
1.3	Add formula for calculation of temperature dependence of frequency. Change frequency inversion temperature to 25 °C.	Dr. Wall	24.04.2002
1.4	Correct termination impedances. Correct tape and reel. Add filter characteristic.	Dr. Wall	27.07.2004

---

**Tele Filter GmbH**  
**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)**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.