

VI TELEFILTER**Preliminary specification****TFS 140 L****1/5****1. Measurement condition :**

Ambient temperature T_A : 45 °C
 Input power level: 0 dBm
 Terminating impedances in f_c : for input: 50 Ω | 0 pF.
 for output: 50 Ω | 0 pF.

2. Characteristics :

Remark: Reference level for the relative attenuation a_{rel} of the **TFS 140 L** 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 and lower frequencies at the 6 dB filter attenuation level relative to the insertion loss a_e . The temperature coefficient of frequency Tc_f is valid both for the reference frequency f_c and the frequency response of the filter in the operating temperature range.

Data		typ. value	tolerance / limit
Insertion loss : (Reference level)	a_e	28,8 dB	max. 31 dB
Centre frequency at ambient temperature :	f_c	140,0 MHz	140,00 \pm 0,25 MHz
Centre frequency at room temperature $T = 23^\circ\text{C}$:		140,230 MHz	140,23 \pm 0,25 MHz
Pass band : (see theoretical ¹⁾ frequency response)	PB		
Pass band tilt in : $f_c \dots f_c \pm 9,992$ MHz		0,02 dB/MHz	
Deviation from theoretical frequency response ¹⁾ (p-p) : $\Delta\alpha$			
$f_c \dots f_c \pm f_y (1-a)$ or $f_c \dots f_c \pm 9,992$ MHz		$\pm 0,15$ dB	\pm max. 0,2 dB
$f_c \pm f_y (1-a) \dots f_c \pm f_y$ or $f_c \pm 9,992$ MHz $\dots f_c \pm 12,1$ MHz		$\pm 0,25$ dB	\pm max. 0,5 dB
Deviation from theoretical phase response ²⁾ (p-p) : $\Delta\phi$			
$f_c \dots f_c \pm f_y$ or $f_c \dots f_c \pm 12,1$ MHz		$\pm 1^\circ$	\pm max. 2 degree
Relative attenuation at ambient temperature :	a_{rel}		
$f_c \pm 15$ MHz $\dots f_c \pm 120$ MHz		55 dB	min. 40 dB
Group delay at f_c	τ_c	1,5 μs	
Reflected attenuation compared to main signal		55 dB	min. 45 dB
Crosstalk attenuation compared to main signal		60 dB	min. 45 dB
Nyquist frequency	f_y	12,10 MHz	
Roll-off factor	a	0,18	
Partitioning factor	p	0,5	
Phase coefficients :	$p_3 = 0,4388$ $p_9 = -0,1531$	$p_5 = 0,6160$ $p_{11} = 0,2762$	$p_7 = -0,2765$ $p_{13} = -0,07817$
Input power level	-		max. 15 dBm
Temperature coefficient of frequency :	Tc_f	- 75 ppm/K	
Frequency deviation of f_c over temperature :		$\Delta f_c(\text{Hz}) = Tc_f(\text{ppm/K}) \times (T - T_A) \times f_c$ (MHz)	
Operating temperature range (OgTR) :			+ 45 °C
Operable temperature range (OTR) :			- 40 °C \dots + 85 °C
Storage temperature range (STR) :			- 40 °C \dots + 85 °C

¹⁾ Theoretical frequency response :

$$H(x) = (S(x))^p; \quad \text{where } x = \frac{f - f_c}{f_y}$$

$$S(x) = \begin{cases} 1 & \text{for } |x| \leq (1-a) \\ \frac{1}{2} + \frac{1}{2} \cos\left(\frac{\pi(|x| - 1 + a)}{2a}\right) & \text{for } (1-a) \leq |x| \leq (1+a), \\ 0 & \text{for } (1+a) \leq |x| \end{cases}$$

²⁾ Theoretical phase response :

$$Ph(y) = [p_3 y^3 + p_5 y^5 + p_7 y^7 + p_9 y^9 + p_{11} y^{11} + p_{13} y^{13}] \left(\frac{180}{\pi}\right) \text{ [deg]}, \quad \text{where } y = \frac{f - f_c}{10} \text{ [MHz]}$$

Generated: W. Duzow

Checked/Approved: Dr. Bert Wall

VI TELEFILTER

Potsdamer Straße 18

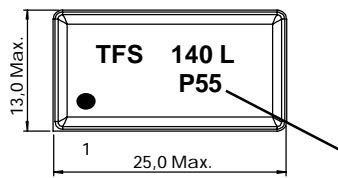
D 14 513 TELTOW / Germany

Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

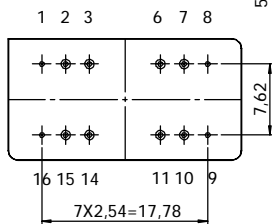
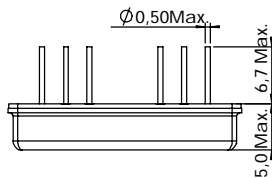
E-Mail: tft@telefilter.com

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.

3. Construction and pin connection : (All dimensions in mm)
pin grid 2,54 mm

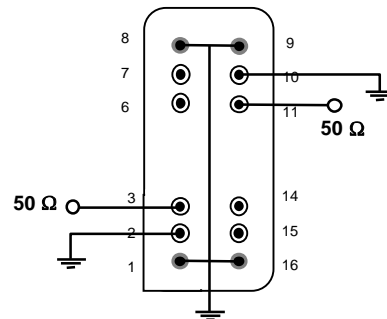


Date-code:	Year+week
M	2000
N	2001
P	2002
...	...



Pin 3	input
Pin 2	input RF Return
Pin 11	output
Pin 10	output RF Return
Pin 1, 8, 9, 16	package ground
Pin 6, 7, 14, 15	not connected

4. 50 Ω - Matching network :



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

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.

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 refer to the attached "Air reflow temperature conditions" on page 4;

6. Soldering temperature conditions :

1st and 2nd soldering temperature 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.	

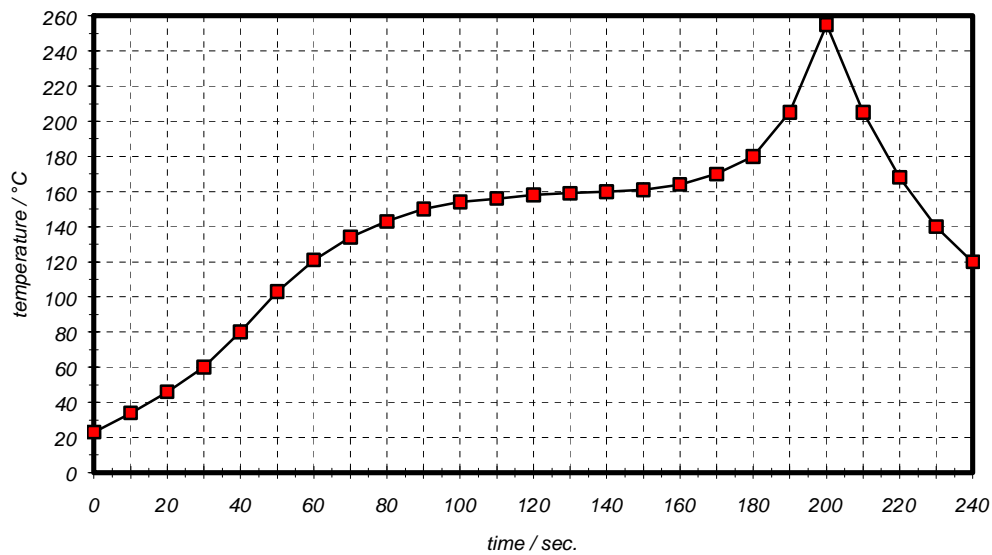
Soldering temperature profile

Table for temperature vs. time during the soldering 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

7. History :

Version	Reason of Changes	Name	Date
1.0	Generate development specification according to customer requirements.	W. Dunzow	05.11.2001
1.1	Generate preliminary specification after 1 st iteration. Add typical values for filter after 1 st iteration.	W. Dunzow	17.05.2002
1.2	Package drawing correction. Delete tolerance value for tilt in pass band.	W. Dunzow	28.06.2002