

**VI TELEFILTER****Filter specification****TFS 140K****1/5****1. Measurement condition :**

Ambient temperature $T_A$ :	45	°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 140K** 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 nominal frequency  $f_N$  is fixed at **140 MHz**. 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  $T_{cf}$  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
<b>Insertion loss :</b> (Reference level)	$a_e$	28 dB	max. 31 dB
<b>Nominal frequency at 45°C :</b>	$f_N$	140 MHz	140 MHz
<b>Centre frequency at 45°C * ):</b>	$f_{CTA}$	140 MHz	140,000 $\pm$ 0,250 MHz
<b>Pass band :</b>	<b>PB</b>		$f_N - 21$ MHz ... $f_N + 21$ MHz
<b>Amplitude ripple in PB (p-p) :</b>	$\Delta\alpha$	0,2 dB	max. 0,6 dB
<b>Bandwidth at ambient temperature :</b>			
1 dB - band width	$B_{1dB}$	45,50 MHz	min. 45 MHz
1 dB - band width	$B_{1dB}$	45,50 MHz	max. 46 MHz
3 dB - band width	$B_{3dB}$	48,28 MHz	min. 48 MHz
3 dB - band width	$B_{3dB}$	48,28 MHz	max. 49 MHz
40 dB - band width	$B_{40dB}$	59,80 MHz	max. 60 MHz
<b>Relative attenuation at ambient temperature : <math>a_{rel}</math></b>			
$f_N - 21$ MHz ... $f_N + 21$ MHz		-	max. 0,6 dB
$f_N \pm 21$ MHz ... $f_N \pm 22,5$ MHz		-	max. 1 dB
$f_N \pm 23$ MHz ... $f_N \pm 24,5$ MHz		-	min. 1 dB
$f_N \pm 22,5$ MHz ... $f_N \pm 24$ MHz		-	max. 3 dB
$f_N \pm 24,5$ MHz ... $f_N \pm 30$ MHz		-	min. 3 dB
$f_N - 130$ MHz ... $f_N - 30$ MHz		50 dB	min. 40 dB
$f_N + 30$ MHz ... $f_N + 140$ MHz		40...45 dB	min. 36 dB
<b>Group delay (mean value) in <math>f_N \pm 21</math> MHz</b>	$\tau_c$	0,75 $\mu$ s	max. 2 $\mu$ s
<b>Group delay ripple (p-p) in <math>f_N \pm 21</math> MHz</b>	$\Delta\tau_c$	8...12 ns	
<b>Phase ripple (p-p) in <math>f_N \pm 21</math> MHz</b>	$\Delta\phi$	2,1°...2,8°	max. 4 degree
<b>Reflected attenuation compared to main signal</b>		60 dB	min. 50 dB
<b>Crosstalk attenuation compared to main signal</b>		55 dB	
<b>Triple transit attenuation compared to main signal</b>		60 dB	
<b>Input power level</b>		-	max. 15 dBm
<b>Temperature coefficient of frequency :</b>	$T_{cf}$	-72 ppm/K	
<b>Frequency deviation of <math>f_C</math> over temperature: **)</b>		$\Delta f_C(\text{Hz}) = T_{cf} (\text{ppm/K}) \times (T - T_A) \times f_{CTA} (\text{MHz})$	
<b>Operable temperature range :</b>	<b>OTR</b>		- 40 °C ... + 85 °C
<b>Storage temperature range :</b>	<b>STR</b>		- 40 °C ... + 85 °C

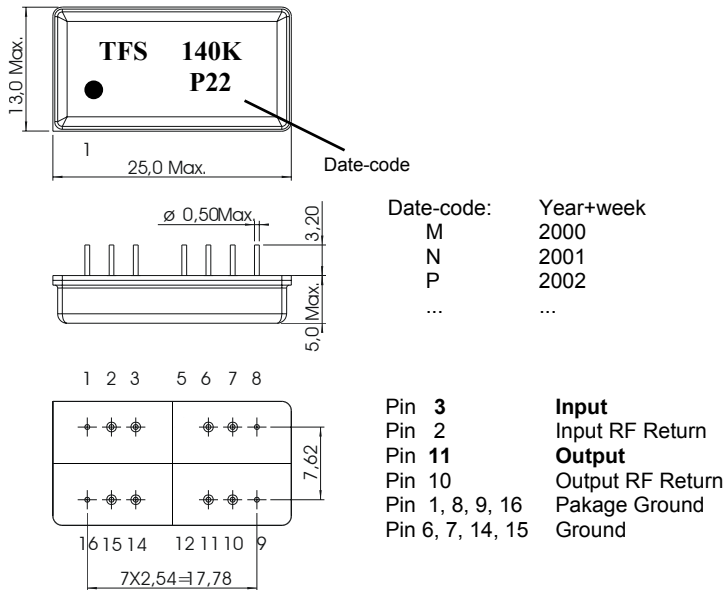
\*)  $f_C(23^\circ\text{C}) = 140,220 \pm 0,250$  MHz.\*\*)  $f_{CTA}$  is reference frequency  $f_C$  at ambient temperature ( $T_A = 45^\circ\text{C}$ ).**Generated:****W. Dunzow****Checked/Approved:****Dr. Bert Wall**

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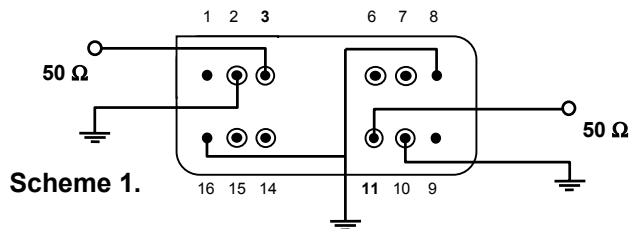
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**3. Construction and pin connection :** (All dimensions in mm)  
pin grid 2,54 mm



**4. 50  $\Omega$  matching network ( please refer to the application note for further matching 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, 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**

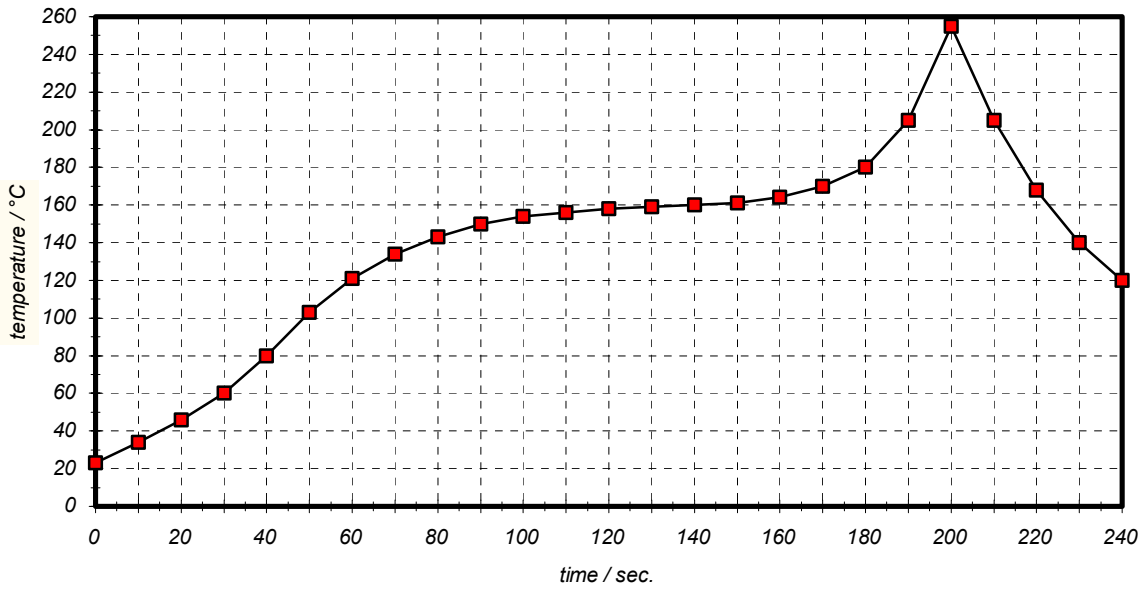


Table for temperature vs. time during the air reflow process

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

**7. History :**

Version	Reason of changes	Name	Date
1.0	Generate development specification.	Dunzow W.	20.02.2002
1.1	Generate filter specification.	Dunzow W.	20.02.2002