

VI TELEFILTER**Filter specification****TFS 70 F - 1/3****1. Measurement condition**

Package, pin connection and 50 Ω matching network
see page 2.

Ambient temperature T_A : 25 °C
 Input power level: 0 dBm (typ.) Max 10 dBm.
 Terminating impedances at f_C : for input: 53 Ω || -40 pF.
 for output: 54 Ω || -40 pF.

2. Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the **TFD 70F** 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 **3 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
Insertion loss (Reference level) a_e	22.5 dB	max 25 dB
Reference frequency f_C at ambient temperature (f_{CTA})	70 MHz	70 ± 0.1 MHz
1 dB - band width	12.24 MHz	
3 dB - band width	12.45 MHz	
40 dB - band width	13.23 MHz	
45 dB - band width	13.30 MHz	
Amplitude ripple (p-p): $f_C \dots f_C \pm 6.1$ MHz	0.5 dB	max 1.0 dB
Relative attenuation	a_{rel}	
f_C	$f_C \pm 6.1$ MHz	- max 1 dB
$f_C \pm 6.1$ MHz	$f_C \pm 6.2$ MHz	- max 3 dB
$f_C \pm 6.65$ MHz	$f_C \pm 6.7$ MHz*)	45 dB min 40 dB
$f_C - 69$ MHz	$f_C - 6.7$ MHz	55 dB min 45 dB
$f_C + 6.7$ MHz	$f_C + 20$ MHz	55 dB min 45 dB
$f_C + 20$ MHz	$f_C + 35$ MHz	45 dB min 40 dB
Group delay	4.1 μs	max 4.5 μs
Group delay ripple (p-p): $f_C \dots f_C \pm 6.0$ MHz	± 50 ns	± max 100 ns
Deviation from linear phase (p-p): $f_C \dots f_C \pm 6.0$ MHz	7.5° (p-p)	
Triple transit attenuation compared to main signal	52 dB	
Input/Output return loss with matching network (S11/S22):	3.6/3.7 dB	
Crosstalk	65 dB	
Substrate material	LiNbO ₃	
Temperature coefficient of frequency (T_{Cf})	-86	-94 ppm/K
Frequency deviation of f_C over temperature	$\Delta f_C(\text{Hz}) = T_{Cf}(\text{ppm/K}) \times (T - T_A) \times f_{CTA}(\text{MHz})$	
Operating temperature range	- 25 °C ... + 80 °C	
Storage temperature range	- 40 °C ... + 85 °C	

*) in this frequency range the limit line is of type SLOPING LINE

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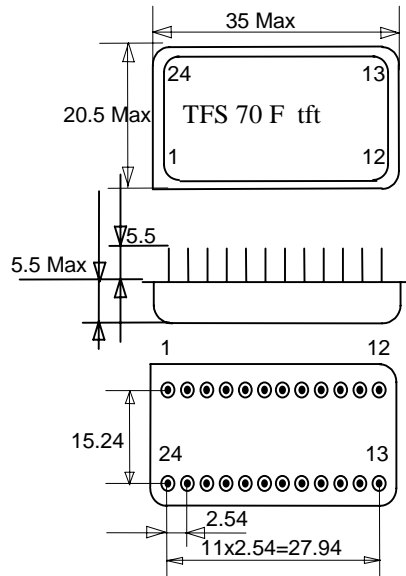
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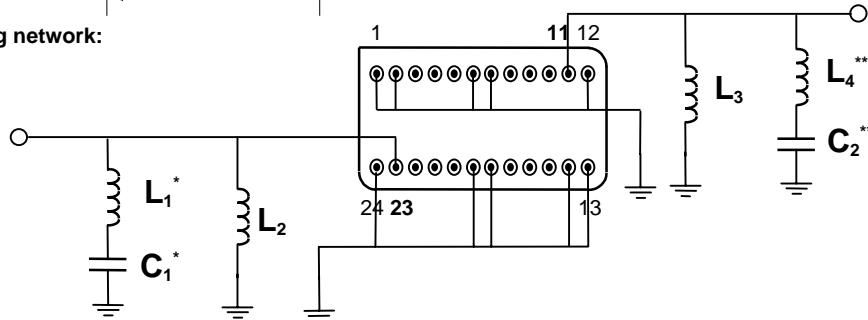
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3. Package



Pin 23	Input
Pin 24	Input RF Return
Pin 11	Output
Pin 12	Output RF Return
Pin 5-8,17-20	Package Ground

4. 50 Ω matching network:



$$L_2 = 217 \pm 5 \text{ nH}$$

$$L_3 = 100 \pm 5 \text{ nH}$$

$$*) L_1 = 465 \pm 10 \text{ nH} \quad C_1 = 70 \text{ pF.}$$

$$1/\sqrt{L_1 C_1} = 2\pi f_1, \quad f_1 = 28.937 \text{ MHz}$$

$$**) L_4 = 200 \pm 10 \text{ nH} \quad C_2 = 10.6 \text{ pF.}$$

$$1/\sqrt{L_4 C_2} = 2\pi f_2, \quad f_2 = 107.375 \text{ MHz}$$

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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

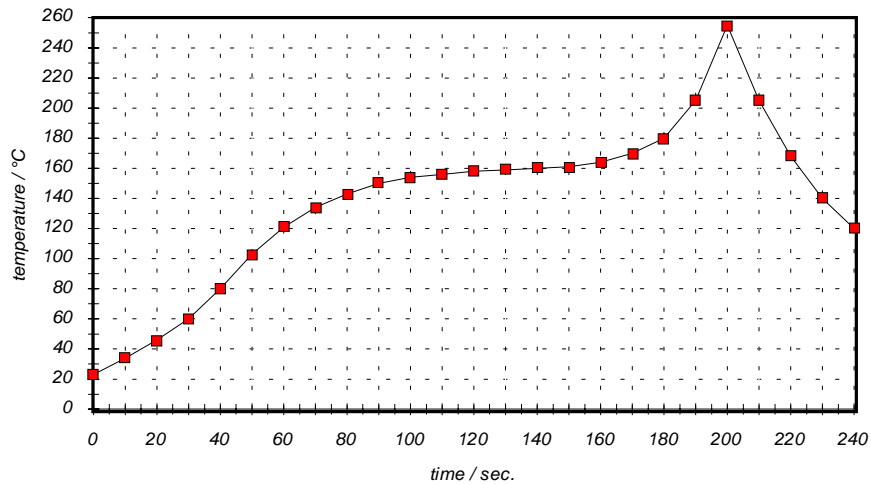


Table for temperature vs. time during the air reflow process

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