

1. Measurement condition :

Ambient temperature T_A :	25 °C
Input power level:	0 dBm.
Terminating impedances at f_C :	for input: 56 Ω -30 pF.
	for output: 56 Ω -30 pF.

2. Characteristics :

Remark:

Reference level for the relative attenuation a_{rel} of the **TFD 70F1** 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	$70 \pm 0,10$ MHz
Pass band (PB) at ambient temperature T_A :		$f_C - 6,1$ MHz ... $f_C + 6,1$ MHz
Amplitude ripple in PB (p-p):	0,5 dB	max. 1,0 dB
Bandwidth at ambient temperature :		
1 dB - band width	12,24 MHz	min. 12,2 MHz
3 dB - band width	12,45 MHz	min. 12,4 MHz
40 dB - band width	13,23 MHz	max. 13,3 MHz
45 dB - band width	13,30 MHz	
50 dB - band width	13,32 MHz	
Relative attenuation	a_{rel}	
$f_C \pm 6,1$ MHz	$f_C \pm 6,1$ MHz	max. 1 dB
$f_C \pm 6,2$ MHz	$f_C \pm 6,2$ MHz	max. 3 dB
$f_C \pm 6,65$ MHz	$f_C \pm 6,8$ MHz*)	min. 40 dB
$f_C \pm 6,8$ MHz	$f_C \pm 7,2$ MHz*)	min. 45 dB
$f_C \pm 7,2$ MHz	$f_C \pm 8$ MHz	min. 48 dB
$f_C \pm 8$ MHz	$f_C \pm 10,2$ MHz	min. 50 dB
$f_C \pm 10,2$ MHz	$f_C \pm 18,2$ MHz*)	min. 40 dB
$f_C \pm 18,2$ MHz	$f_C \pm 35$ MHz	min. 40 dB
Group delay (mean value in PB)	4,1 μ s	max. 4,5 μ s
Group delay ripple (p-p): $f_C \dots f_C \pm 6$ MHz	100 ns	max. 200 ns
Deviation from linear phase (p-p): $f_C \dots f_C \pm 6$ MHz	7,5° (p-p)	
Triple transit attenuation compared to main signal	52 dB	
Input/Output return loss with matching network (S11/S22):	4 / 3,5 dB	
Crosstalk	65 dB	
Substrate material	LiNbO ₃	
Temperature coefficient of frequency (T_{Cf})	-86 ppm/K	-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

Generated:

Dunzow W.P.

Checked/Approved:

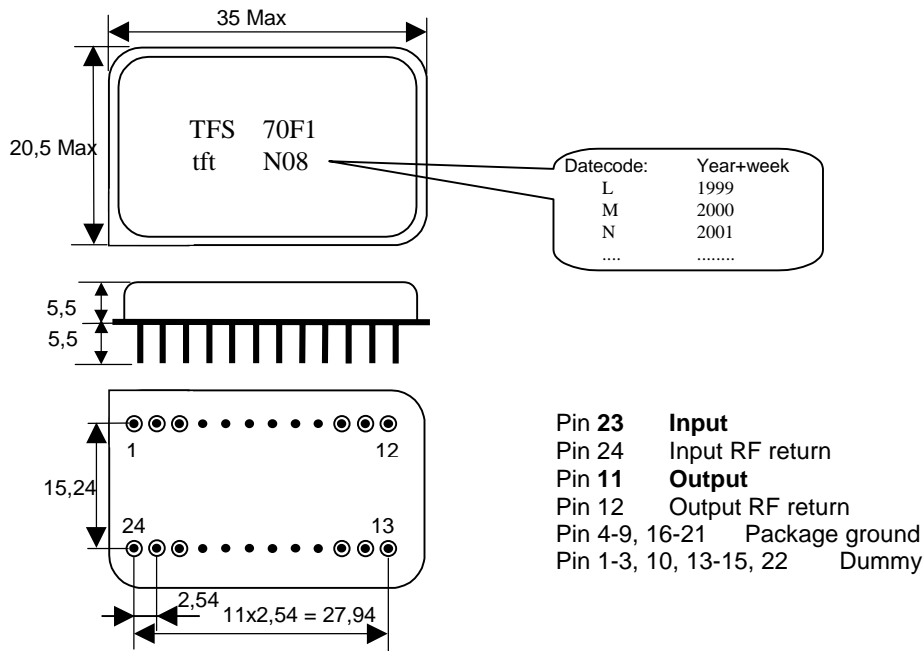
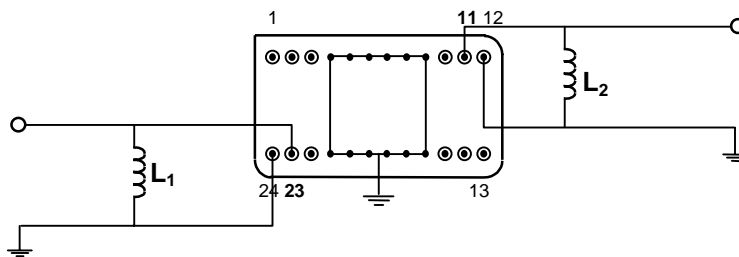
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3. Package :

4. 50 Ω matching network:

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. Damp heat: 25 °C to 55°C / 95% r.H. / 10 cycles
(cycle) DIN IEC 68 - 2 – 30 Db
4. Resistance to solder heat (reflow): max. 2 times reflow process;
for temperature conditions 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

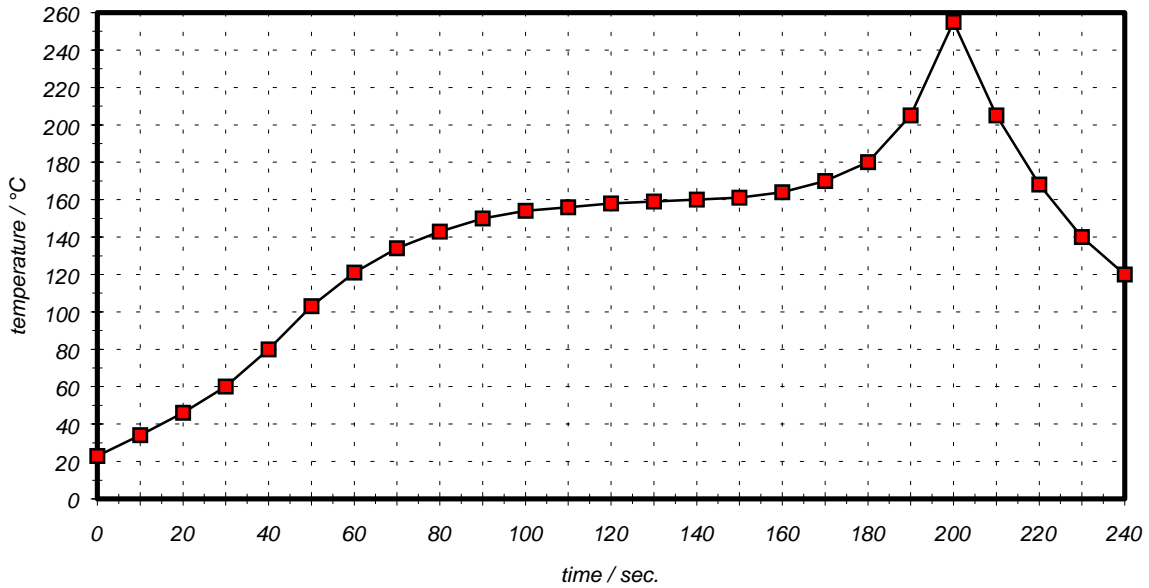


Table for temperature vs. time during the air reflow process

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
2.4	Generate filter specification in actually format. - change package; - add " 5. Sability characteristics ";	Dunzow W.	09.04.2001