1. Measurement condition :

Ambient temperature T_A: 23 °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 **TFD 70U** is the minimum of the pass band attenuation $\mathbf{a_{min}}$. The minimum of the pass band attenuation a_{min} is defined as the insertion loss $\mathbf{a_e}$. The reference frequency f_C is the arithmetic mean value of the upper and lower frequencies at the **20 dB** filter attenuation level relative to the insertion loss $\mathbf{a_e}$. The temperature coefficient of frequency $\mathbf{Tc_f}$ is valid both for the reference frequency $\mathbf{f_C}$ 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) $\mathbf{a_e}$	20,5	dB	max.	22	dB
Centre frequency $\mathbf{f_C}$ at ambient temperature $\mathbf{(f_{CTA})}$	70	MHz	70 ± 0,15		MHz
Pass band (PB) :			f_C ... f_C ± 5,6		MHz
Amplitude ripple in PB (p-p):	0,3	dB	max.	1	dB
Bandwidth : at ambient temperature T_A					
1 dB - band width	11,96	MHz	min.	11,2	MHz
3 dB - band width	13,67	MHz	min.	13,0	MHz
20 dB - band width	18,00	MHz			
40 dB - band width	20,15	MHz	max.	22	MHz
Relative attenuation $\mathbf{a_{rel}}$					
f_C ..... f_C ± 5,6 MHz		-	max.	1	dB
f_C ± 5,6 MHz ... f_C ± 6,5 MHz		-	max.	3	dB
f_C ± 11 MHz ... f_C ± 30 MHz	47...55	dB	min.	40	dB
f_C - 70 MHz ... f_C - 30 MHz	47...55	dB	min.	40	dB
f_C + 30 MHz ... f_C + 70 MHz	37...39	dB	min.	35	dB
Group delay (mean value in PB):	0,720	µs	max.	1	µs
Group delay ripple in : f_C ... f_C ± 7,5 MHz	20	ns	max.	30	ns
Deviation from linear phase in : f_C ... f_C ± 7,5 MHz	2,5° (r.m.s. 0,6 °)				
Triple transit attenuation compared to main signal	50...52	dB			
Crosstalk	60...70	dB			
Temperature coefficient of frequency (Tc_f) :	- 72	ppm/K			
Frequency deviation of f_C over temperature :	$\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_A) \times f_{CTA}$ (MHz)				
Operating temperature range			- 25 °C ... + 80 °C		
Storage temperature range			- 40 °C ... + 85 °C		

Generated: **Wadim Dunzow**

Checked/Approved: **Dr. Bert Wall**

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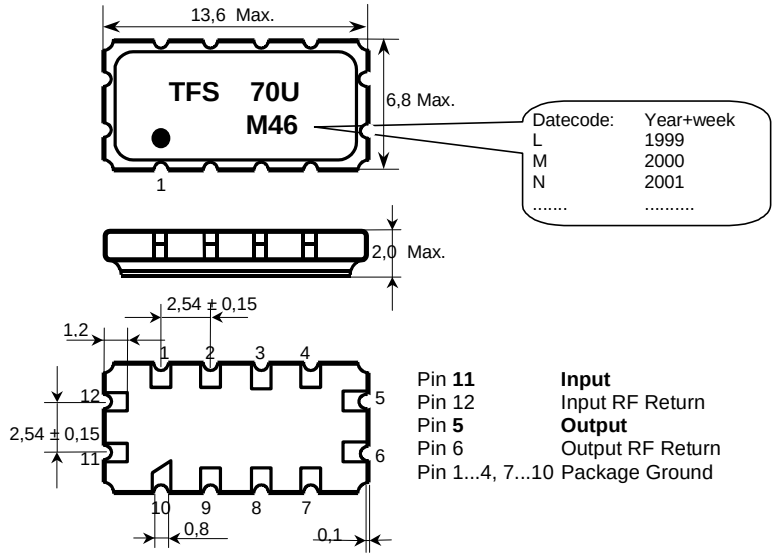
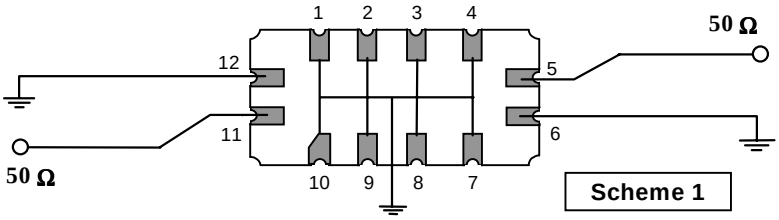
3. Package (All dimensions in mm)



Pin **11** **Input**
Pin 12 Input RF Return
Pin **5** **Output**
Pin 6 Output RF Return
Pin 1...4, 7...10 Package Ground

4. 50 Ω matching network :



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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: (cycle)	25 °C to 55°C / 95% r.H. / 10 cycles 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;

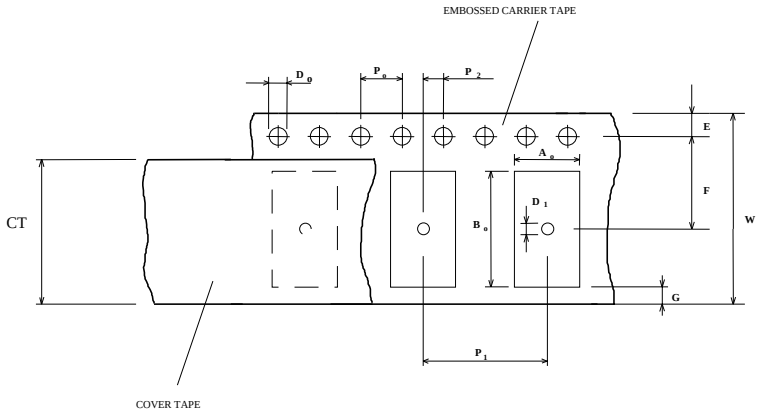
6. Packing :

Tape & Reel: DIN 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 per reel:	1700
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
Trailer	min 300 mm

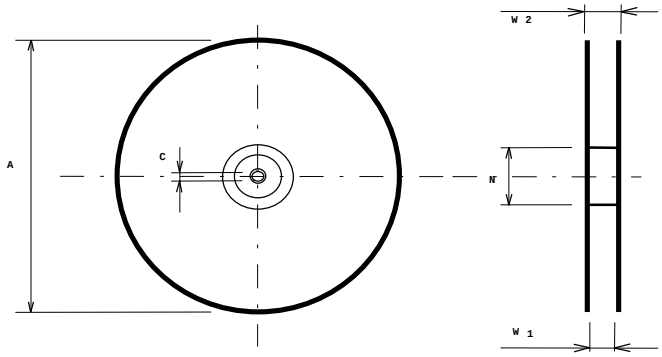
Tape (all dimensions in mm)

W	:	24 ± 0,3
Po	:	4 ± 0,1
Do	:	1,5 + 0,1
E	:	1,75 ± 0,1
F	:	11,5 ± 0,1
G (min)	:	0,6
P2	:	2 ± 0,1
P1	:	12 ± 0,1
D1(min)	:	1,5
Ao	:	7,1 ± 0,2
Bo	:	13,9 ± 0,2
CT	:	21,5 ± 0,1



Reel (all dimensions in mm):

A	:	330
W1	:	24,4 +2
W2 (max)	:	30,4
N (min)	:	60
C	:	13 +0,5/-0,2



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the right side of the tape.

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7. 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

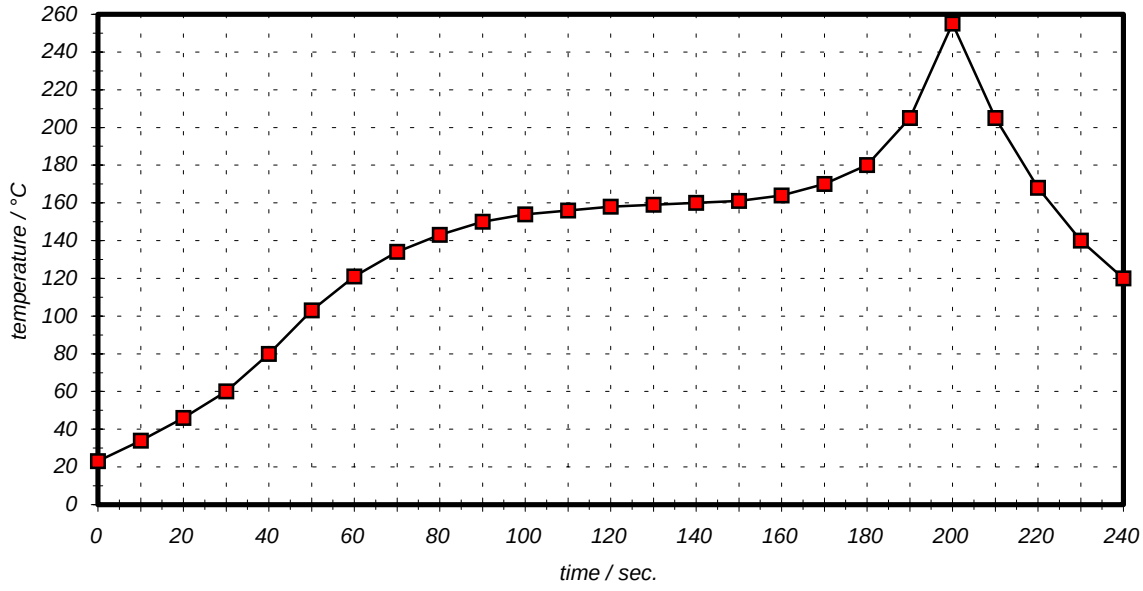

Table for temperature vs. time during the air reflow process

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

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History :

Version	Reason of Changes	Name	Date
2.0	Generate filter specification for new package.	Dunzow W.	14.02.2001

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