1. Measurement condition :

Ambient temperature T_A:	23 °C		
Input power level:	0 dBm.		
Terminating impedances at f_C:	for input:	1088 Ω ‖ - 7,20 pF.	
	for output:	932 Ω ‖ - 7,92 pF.	
Q-value of matching elements:	> 50		

2. Characteristics :

Remark: The insertion loss a_e is defined as the insertion loss at the nominal frequency f_N . Reference level for the relative attenuation a_{rel} of the **TFH 70D** is the insertion loss. 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 Tc_f is valid both for the centre 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 included in the production tolerance scheme.

Data	**typ. value**		**tolerance / limit**		
Insertion loss (Reference level) a_e	26	dB	max.	27	dB
Nominal frequency f_N				70	MHz
Centre frequency f_C at ambient temperature T_A (f_{CAT})	70,01	MHz	70,0 ± 0,09		MHz
Pass band at ambient temperature T_A: **(PB)**			f_N .... f_N ± 1,5		MHz
Amplitude ripple in O.T.R. (p-p) in : f_N ... f_N ± 1,4 MHz	0,5	dB	max.	0,8	dB
Bandwidth in O.T.R. :					
0,8 dB - band width	3,19	MHz	min.	2,8	MHz
1 dB - band width	3,22	MHz	min.	3,0	MHz
3 dB - band width	3,61	MHz	min.	3,5	MHz
20 dB - band width	4,66	MHz			
40 dB - band width	5,21	MHz	max.	5,6	MHz
45 dB - band width	5,31	MHz			
Relative attenuation a_{rel}					
f_N ..... f_N ± 1,4 MHz	0,5	dB	max.	0,8	dB
f_N ± 1,4 MHz ... f_N ± 1,5 MHz	0,7	dB	max.	1	dB
f_N ± 1,5 MHz ... f_N ± 1,75 MHz	2,5	dB	max.	3	dB
f_N ± 2,8 MHz ... f_N ± 5,0 MHz	44...53	dB	min.	40	dB
f_N ± 5,0 MHz ... f_N ± 20 MHz	53...65	dB	min.	50	dB
f_N - 65 MHz ... f_N - 20 MHz	75...65	dB			
f_N + 35 MHz ... f_N + 63 MHz	42...45	dB			
f_N + 63 MHz ... f_N + 200 MHz	65...70	dB			
Group delay (mean value in PB):	2,76	µs			
Group delay ripple in PB (p-p):	45	ns	max.	100	ns
Deviation from linear phase in PB band (p-p):	2,6° (r.m.s. 0,6°)		max.	6	°
(S11) / (S22) in PB :	3 / 3	dB			
Triple transit attenuation compared to main signal	59	dB			
Crosstalk	52	dB			
Frequency inversion temperature (T_o)	30	° C			
Temperature coefficient of frequency (Tc_f)	-0,045	ppm/K²			
Frequency deviation of f_C over temperature: *)	Δf_C(Hz) = Tc_f(ppm/K) x (T - T_o)² x f_{To} (MHz)				
Operating temperature range (O.T.R.)			0 °C ... + 70 °C		
Storage temperature range			-40 °C ... + 85 °C		

***)** f_{To} is reference frequency f_C at frequency inversion temperature (T_o)

Generated: **Dunzow W.P.**

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

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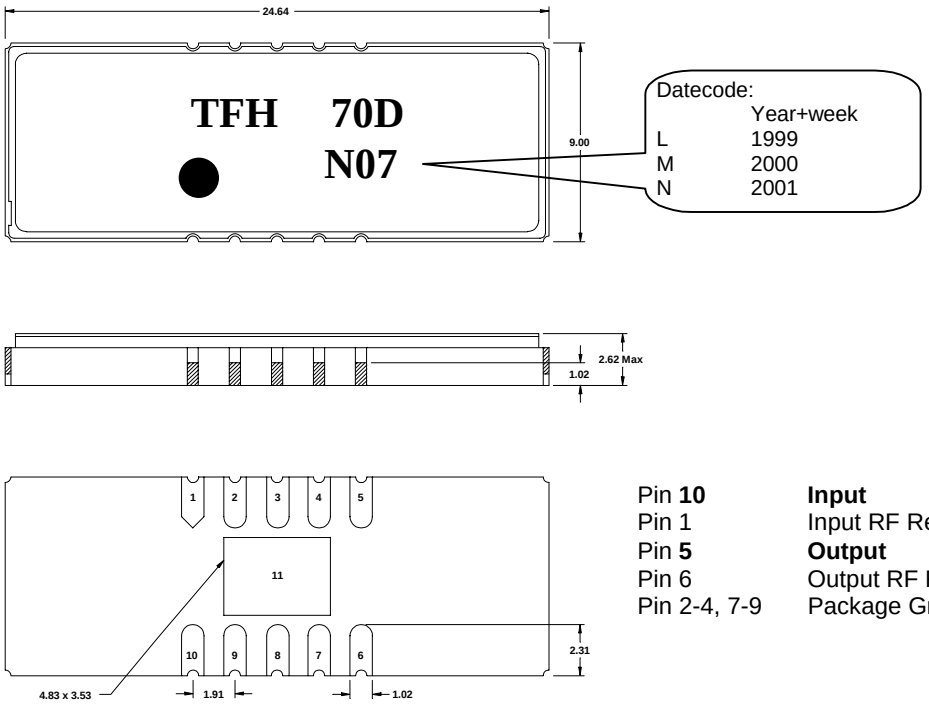
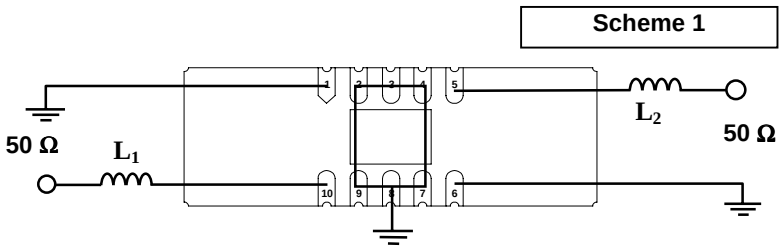
3. Package :



Pin **10**	**Input**
Pin 1	Input RF Return
Pin **5**	**Output**
Pin 6	Output RF Return
Pin 2-4, 7-9	Package Ground

4. 50 Ω matching network : (see Application Note of TFH 70D)



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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;

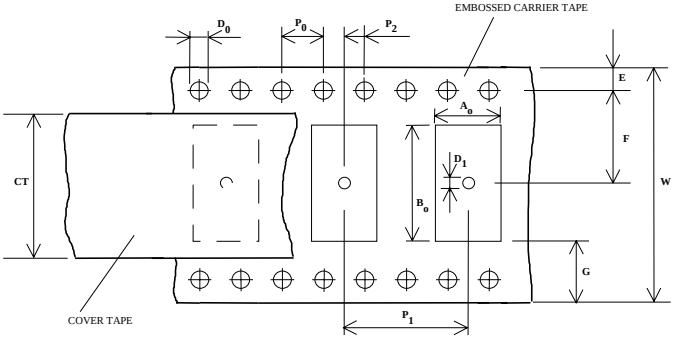
6. Packing :

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:	1000
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

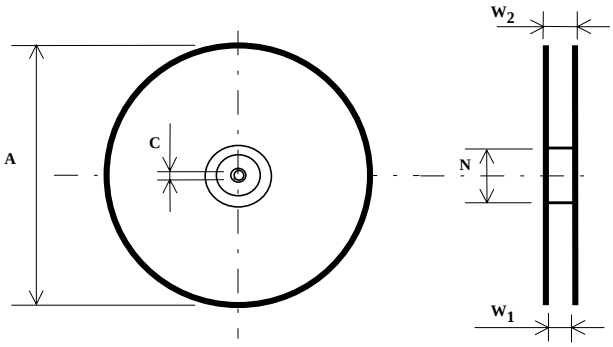
Tape (all dimensions in mm)

W	:	44	± 0,3
Po	:	4	± 0,1
Do	:	1,5	+ 0,1
E	:	1,75	± 0,1
F	:	20,25	± 0,05
G (min)	:	0,75	
P2	:	2	± 0,05
P1	:	16	± 0,1
D1(min)	:	2,0	
Ao	:	9,3	± 0,1
Bo	:	24,9	± 0,1
CT	:	38	± 0,2



Reel (all dimensions in mm):

A	:	330
W1	:	46
W2 (max)	:	50
N (min)	:	100
C	:	13 ± 0,2



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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

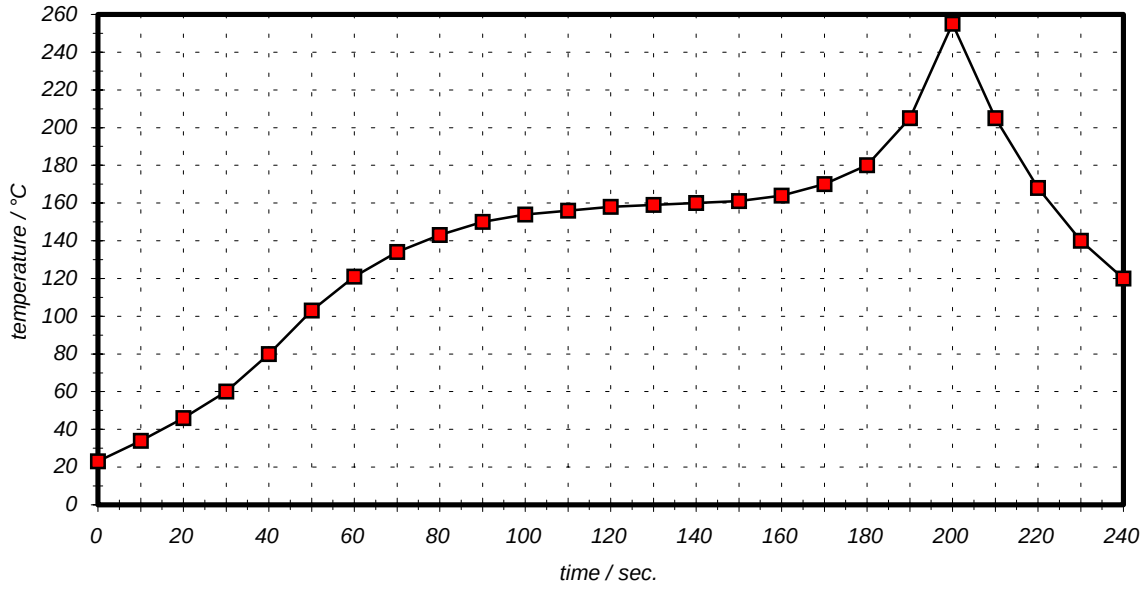

Table for temperature vs. time during the air reflow process

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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8. History :

Version	Reason of changes	Name	Date
1.0	Generate extended filter specification.	Dunzow W.	09.03.2001

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