

VI TELEFILTER**Filter Specification****TFH 70D****1/5****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 T_{Cf} 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 | 70,01 MHz | 70 MHz |
| Centre frequency f_C at ambient temperature T_A (f_{CAT}) | 70,01 MHz | 70,0 \pm 0,09 MHz |
| Pass band at ambient temperature T_A : (PB) | | $f_N \dots f_N \pm 1,5$ MHz |
| Amplitude ripple in O.T.R. (p-p) in : $f_N \dots f_N \pm 1,4$ 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} | | |
| $f_N \dots f_N \pm 1,4$ MHz | 0,5 dB | max. 0,8 dB |
| $f_N \pm 1,4$ MHz ... $f_N \pm 1,5$ MHz | 0,7 dB | max. 1 dB |
| $f_N \pm 1,5$ MHz ... $f_N \pm 1,75$ MHz | 2,5 dB | max. 3 dB |
| $f_N \pm 2,8$ MHz ... $f_N \pm 5,0$ MHz | 44...53 dB | min. 40 dB |
| $f_N \pm 5,0$ MHz ... $f_N \pm 20$ 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 μ s | |
| 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 (T_{Cf}) | -0,045 ppm/K ² | |
| Frequency deviation of f_C over temperature: * | $\Delta f_C(\text{Hz}) = T_{Cf}(\text{ppm/K}) \times (T - T_o)^2 \times f_{T_o}(\text{MHz})$ | |
| Operating temperature range (O.T.R.) | 0 °C ... + 70 °C | |
| Storage temperature range | -40 °C ... + 85 °C | |

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

Generated: _____ **Dunzow W.P.**

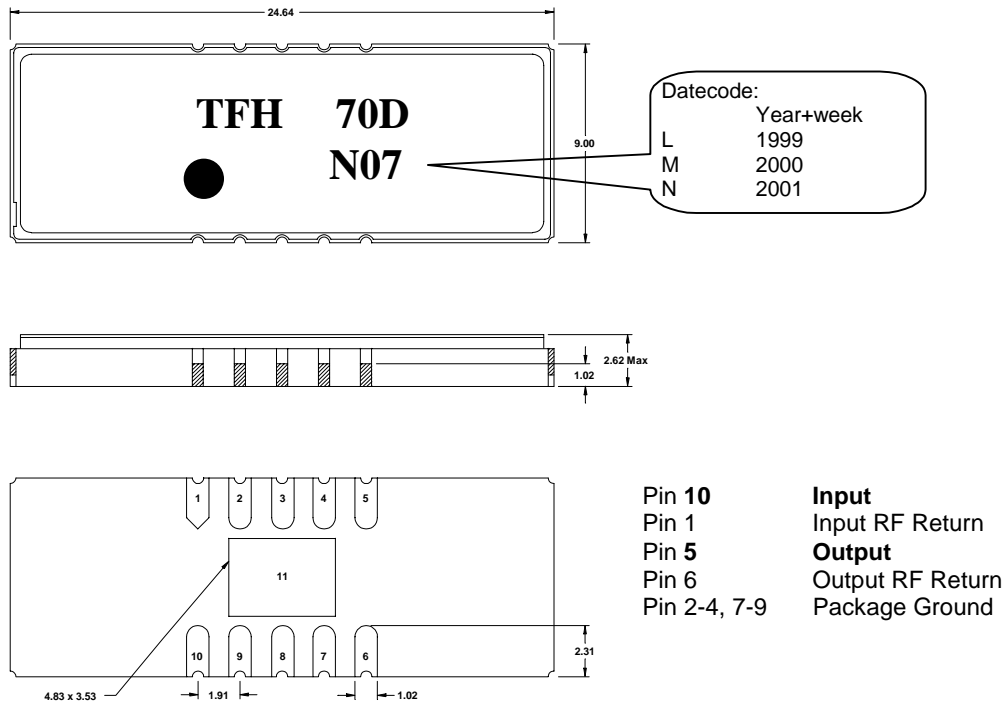
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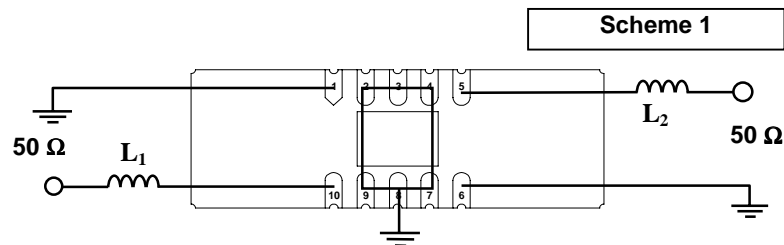
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3. Package :



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



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;

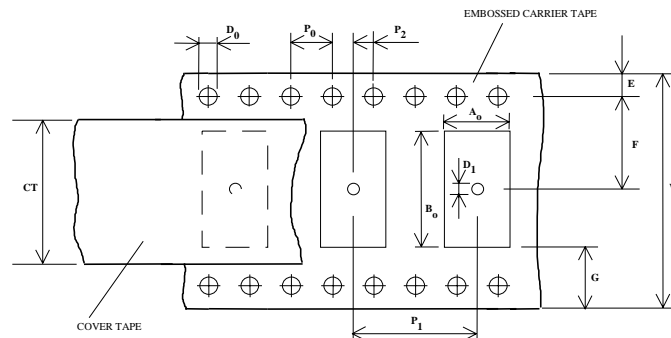
6. Packing :

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 |

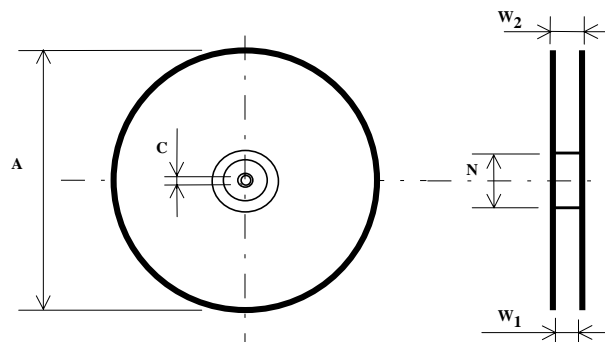
Tape (all dimensions in mm)

| | |
|---------|----------------|
| 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 |



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

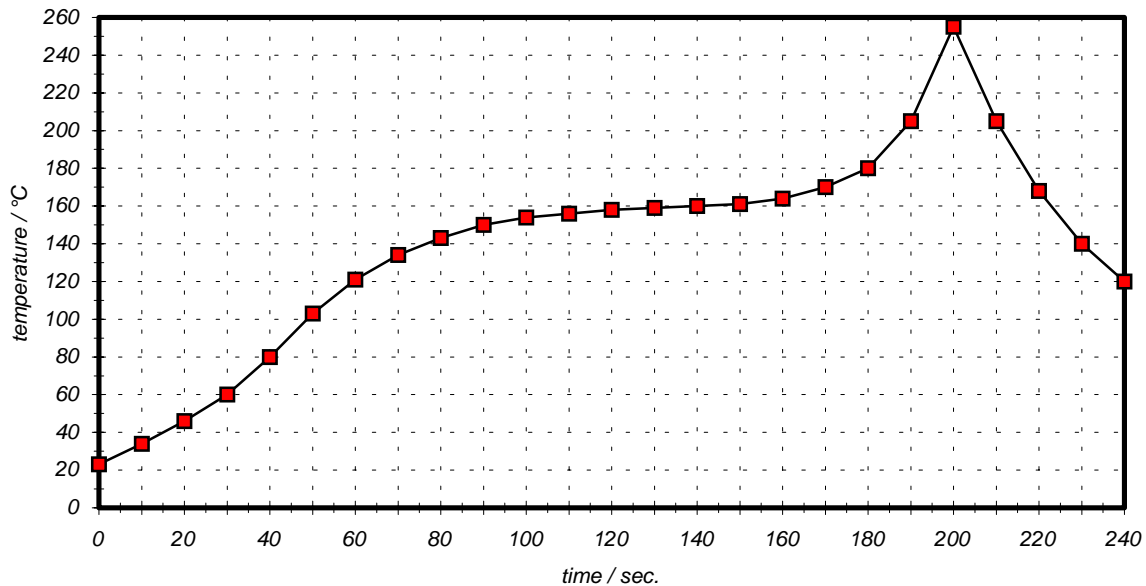


Table for temperature vs. time during the air reflow process

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 |

8. History :

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