

VI TELEFILTER**Filter Specification****TFS 112H - 1/5****1. Measurement condition :**

Ambient temperature T_A : 23 °C
 Input power level: 0 dBm.
 Terminating impedances at f_C : for input: 565 Ω | - 6,5 pF.
 for output: 650 Ω | - 5,7 pF.
 Q-value of matching elements: 50...70

2. Characteristics :

Remark:

Reference level for the relative attenuation a_{rel} of the TFS 112H is the minimum of the passband attenuation a_{min} . The minimum of the passband 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 30 dB filter attenuation level relative to the insertion loss a_e .

| D a t a | typ. value | tolerance / limit |
|---|----------------------------|--------------------------|
| Insertion loss (Reference level) a_e | 13,5 dB | max. 14 dB |
| Reference frequency f_C (BW(-30 dB)) | 112,32 MHz | 112,320 \pm 0,035 MHz |
| Bandwidth at ambient temperature: | | |
| 3 dB bandwidth | 1,05 MHz | min. 0,95 MHz |
| 10 dB bandwidth | 1,72 MHz | min. 1,63 MHz |
| 20 dB bandwidth | 2,17 MHz | max. 2,35 MHz |
| 30 dB bandwidth | 2,45 MHz | max. 2,60 MHz |
| 40 dB bandwidth | 2,66 MHz | max. 2,95 MHz |
| Relative attenuation a_{rel} | | |
| f_C $f_C \pm 0,475$ MHz | - | max. 3 dB |
| $f_C \pm 0,475$ MHz ... $f_C \pm 0,815$ MHz | - | max. 10 dB |
| $f_C \pm 1,175$ MHz ... $f_C \pm 1,300$ MHz | - | min. 20 dB |
| $f_C \pm 1,300$ MHz ... $f_C \pm 1,475$ MHz | - | min. 30 dB |
| $f_C \pm 1,475$ MHz ... $f_C \pm 5,0$ MHz | > 45 dB | min. 40 dB |
| $f_C + 5,0$ MHz ... $f_C + 7,5$ MHz | 26 dB | min. 22 dB |
| $f_C + 7,5$ MHz ... $f_C + 17,28$ MHz | > 32 dB | min. 25 dB |
| $f_C + 17,28$ MHz ... $f_C + 20$ MHz | > 40 dB | min. 35 dB |
| $f_C - 20$ MHz ... $f_C - 5$ MHz | 42...45 dB | min. 35 dB |
| Average group delay in f_C ... $f_C \pm 800$ kHz : | 1,35 μ s | |
| Group delay ripple in f_C ... $f_C \pm 800$ kHz : | 150 ns | max. 300 ns |
| Frequency inversion temperature (T_o) | 20 °C | |
| Temperature coefficient ($Tc1_f$) 1st order *) | 0 ppm/K | max. $\pm 7,5$ ppm/K |
| Temperature coefficient ($Tc2_f$) 2nd order **) | - 0,036 ppm/K ² | - |
| Operating temperature range | | - 20 °C ... + 85 °C |
| Storage temperature range | | - 25 °C ... + 90 °C |
| Input power level | - | max. 10 dBm |
| Permissible DC voltage V_{DC} | - | 12 V |
| Permissible AC voltage V_{pp} | - | 10 V |

*) $\Delta f_C(\text{Hz}) = Tc1_f(\text{ppm/K}) \times (T - T_o) \times f_{T_o}(\text{MHz})$

***) $\Delta f_C(\text{Hz}) = Tc2_f(\text{ppm/K}^2) \times (T - T_o)^2 \times f_{T_o}(\text{MHz})$

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

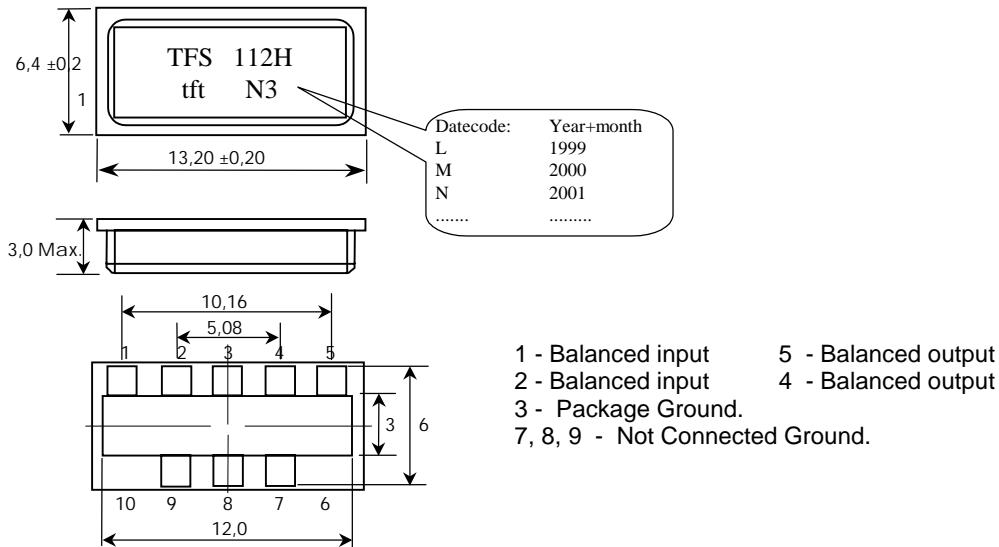
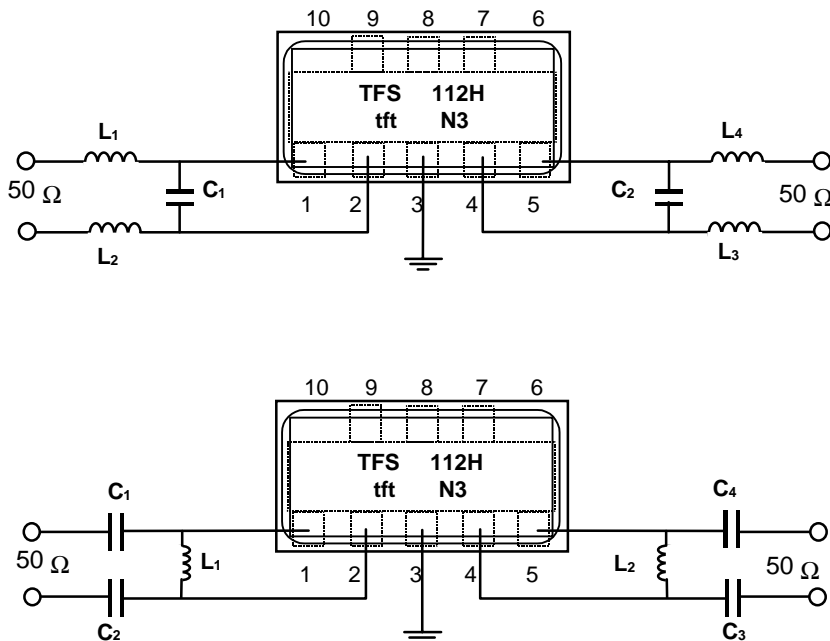
Generated: _____ **Dunzow W.**

Checked/Approved: _____

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VI TELEFILTER**Filter Specification****TFS 112H - 2/5****3. Package and pin connection :** (All dimensions in mm)**4. 50 Ω - matching network (Principal scheme) :**

About matching element values and unbalanced Scheme see Application Note.

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VI TELEFILTER**Filter Specification****TFS 112H - 3/5****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. Resistance to solder heat (reflow): max. 2 times reflow process;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

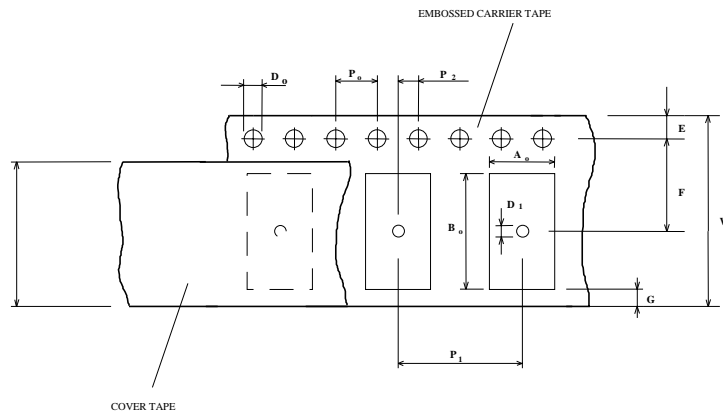
6. Packing :

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;

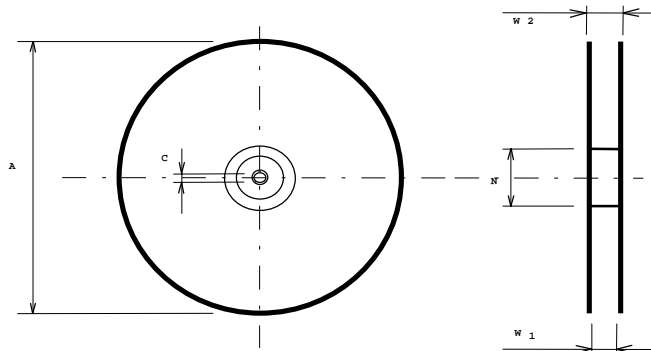
max. pieces of filters per reel: 1700
reel of empty components at start: min 300 mm
reel of empty components at start including leader: min 500 mm
Trailer: min 300 mm

Tape (all dimensions in mm)

| | |
|---------|--------------|
| W | : 24 ± 0,3 |
| Po | : 4 ± 0,1 |
| Do | : 1,5 ± 0,1 |
| E | : 1,75 ± 0,1 |
| F | : 7,5 ± 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 | : 32,4 +2 |
| W2 (max) | : 38,4 |
| N (min) | : 100 |
| 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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VI TELEFILTER**Filter Specification****TFS 112H - 4/5****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. | |

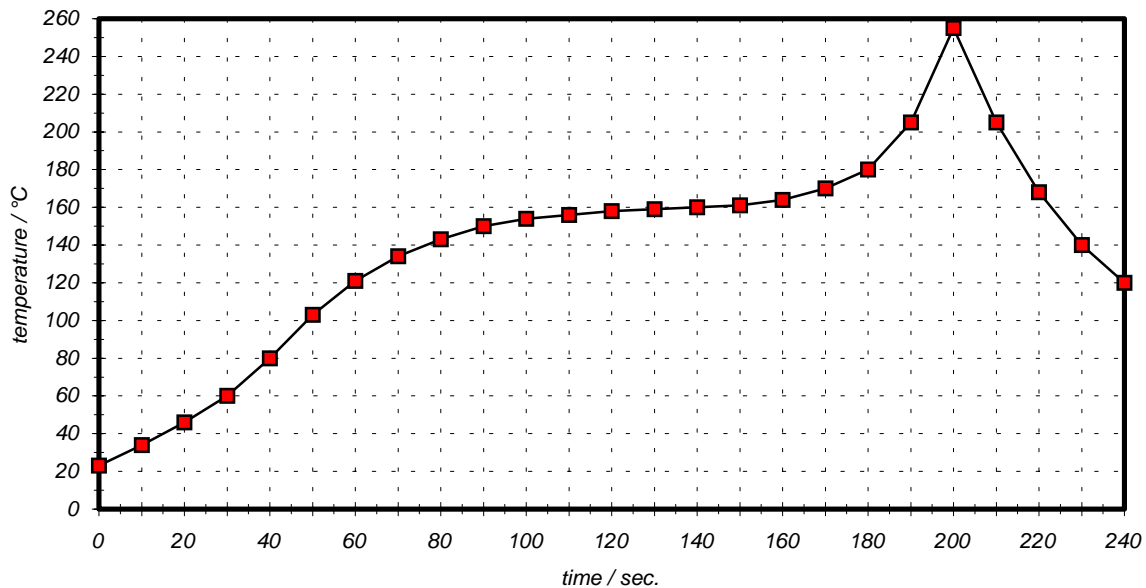
Air reflow profile

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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VI TELEFILTER**Filter Specification****TFS 112H - 5/5**

History

| Version | Reason of Changes | Name | Date |
|----------------|--|-------------|-------------|
| 1.0 | Generate filter specification according to customer requirements. | Dunzow W. | 16.10.2000 |
| 1.1 | Delete unbalanced matching networks. | Dunzow W | 19.10.2000 |
| 1.2 | Edit termination impedances . Change limit lines in selection : in $f_C + 5,0$ MHz... $f_C + 7,50$ MHz from min. 27 dB to min. 22 dB, in $f_C + 7,5$ MHz... $f_C + 17,28$ MHz from min. 30 dB to min. 25 dB, in $f_C + 17,28$ MHz from min. 40 dB to min. 35 dB. | Dunzow W | 17.11.2000 |
| 1.3 | Format correction. | Dunzow W. | 14.02.2001 |

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