

**VI TELEFILTER****Filter specification****TFS 71H****1 / 5****1. Measurement condition :**

|                                     |             |                            |
|-------------------------------------|-------------|----------------------------|
| Ambient temperature $T_A$ :         | 25          | °C                         |
| Input power level:                  | 0           | dBm                        |
| Terminating impedances in $f_C$ *): | for input:  | 440 $\Omega$   - 29,12 pF. |
|                                     | for output: | 450 $\Omega$   - 33,11 pF. |

**2. Characteristics**

Remark: Reference level for the relative attenuation  $a_{rel}$  of the **TFS 71H** 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 centre frequency  $f_C$  is the arithmetic mean value of the upper and lower frequencies at the **3,75 dB** filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed on **71,100 MHz** without tolerance. The given values for the relative attenuation  $a_{rel}$  and for the group delay ripple have to be reached at the frequencies given below also if the centre frequency  $f_C$  is shifted due to the temperature coefficient of frequency  $TC_f$  in the operating temperature range and due to a production tolerance for the centre frequency  $f_C$ . All specified values are guaranteed in operating temperature range.

| Data   |  | typ. value   | tolerance / limit                   |
|--|--|--|-------------------------------------|
| <b>Insertion loss</b> (Reference level)                              | $a_e$                                      | 16 dB  | max. 17 dB                          |
| <b>Nominal frequency</b>   | $f_N$                                      |  | 71,100 MHz                          |
| <b>Centre frequency</b>  | $f_C$ at ambient temperature ( $f_{CTA}$ ) | 71,110 MHz   |                                     |
| <b>Pass band</b>   | <b>PB</b>                                  |  | $f_N - 525$ kHz ... $f_N + 525$ kHz |
| <b>Amplitude ripple (p-p) in</b>                                     | $f_N$ ... $f_N \pm 500$ kHz                | 0,5 dB   |                                     |
| <b>Bandwidth :</b>   |  |  |                                     |
| 1 dB   |  | 1120 kHz   | min. 1050 kHz                       |
| 1,5 dB   |  | 1150 kHz   |                                     |
| 3,0 dB   |  | 1205 kHz   |                                     |
| 3,75 dB  |  | 1215 MHz   | min. 1180 kHz                       |
| 25 dB  |  | 1445 MHz   | max. 1500 kHz                       |
| 40 dB  |  | 1520 kHz   |                                     |
| 45 dB  |  | 1540 kHz   | max. 1800 kHz                       |
| 50 dB  |  | 1555 kHz   |                                     |
| <b>Relative attenuation</b>  | $a_{rel}$                                  |  |                                     |
|  | $f_N \pm 525$ kHz                          | -  | max. 1 dB                           |
|  | $f_N \pm 590$ kHz                          | -  | max. 3,75 dB                        |
|  | $f_N \pm 750$ kHz                          | 32 dB  | min. 25 dB                          |
|  | $f_N \pm 900$ kHz                          | 55 dB  | min. 45 dB                          |
| <b>Group delay ( mean value in PB ):</b>                             |  | 7,1 $\mu$ s  | 6,0 ... 7,75 $\mu$ s                |
| <b>Group delay ripple in PB (p-p):</b>                               |  | 550 ns   | max. 1 $\mu$ s                      |
| <b>Deviation from linear phase (p-p) in</b>                          | $f_N$ ... $f_N \pm 630$ kHz                | 6°   |                                     |
| <b>Deviation from linear phase ( r.m.s.) in</b>                      | $f_N$ ... $f_N \pm 630$ kHz                | 1,6°   | max. 2 degree                       |
| <b>Input/Output return loss with matching network (S11/S22):</b>     |  | 9...12 dB  | min. 8 dB                           |
| <b>Frequency inversion temperature ( <math>T_o</math> ):</b>         |  | 20...30 °C   |                                     |
| <b>Temperature coefficient of frequency ( <math>TC_f</math> ):</b>   |  | - 0,036 ppm/K <sup>2</sup>   |                                     |
| <b>Frequency deviation of <math>f_C</math> over temperature: **)</b> |  | $\Delta f_C(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_o)^2 \times f_{T_o}(\text{MHz})$ |                                     |
| <b>Operating temperature range ( OTR ):</b>                          |  |  | 0 °C ... + 85 °C                    |
| <b>Storage temperature range :</b>                                   |  |  | - 30 °C ... + 85 °C                 |

\*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

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

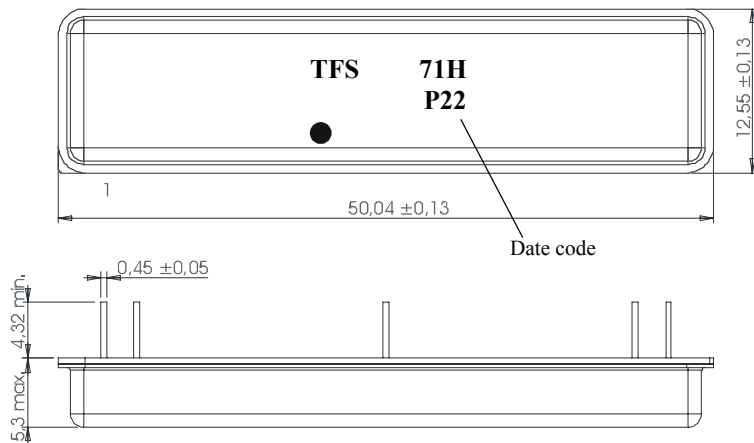
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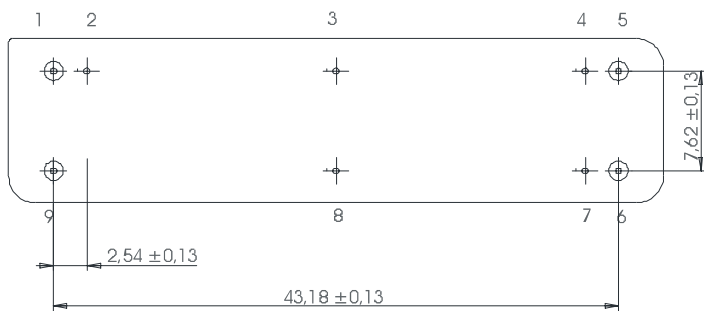
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**3. Package, pin grid 2,54 mm**

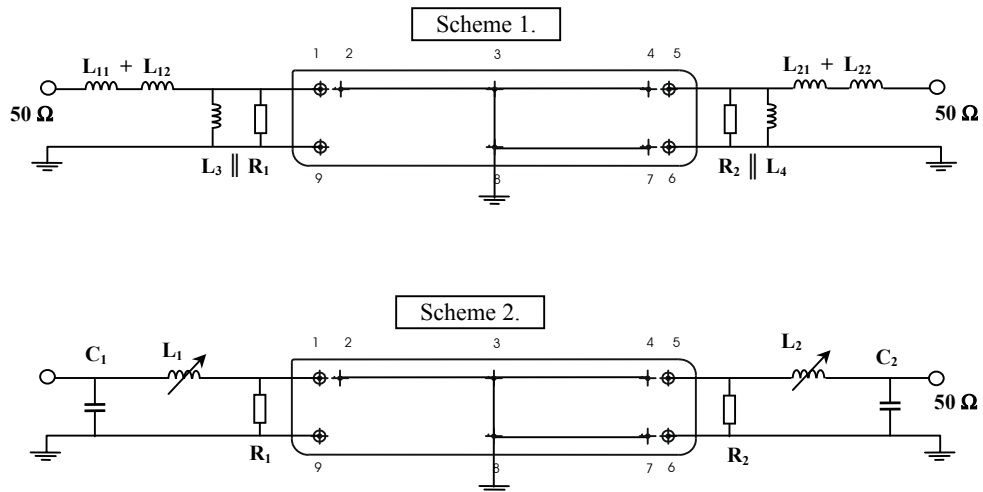


Datecode: Year+week  
 M 2000  
 N 2001  
 P 2002  
 ... ..



Pin 1 - Input.  
 Pin 9 - Input RF Return.  
 Pin 5 - Output.  
 Pin 6 - Output RF Return.  
 Pin 2 - 4, 7, 8 PackageGround.

**4. 50 Ω matching network ( see Application Note ):**



For final test we use scheme 1.

**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. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N
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

|                     |                     |                      |                  |
|---------------------|---------------------|----------------------|------------------|
| <b>Name:</b>        | pre-heating periods | main-heating periods | peak temperature |
| <b>Temperature:</b> | 150 °C - 170 °C     | over 200 °C          | 255 °C ± 5 °C    |
| <b>Time:</b>        | 60 sec. - 90 sec.   | 20 sec. - 25 sec.    |                  |

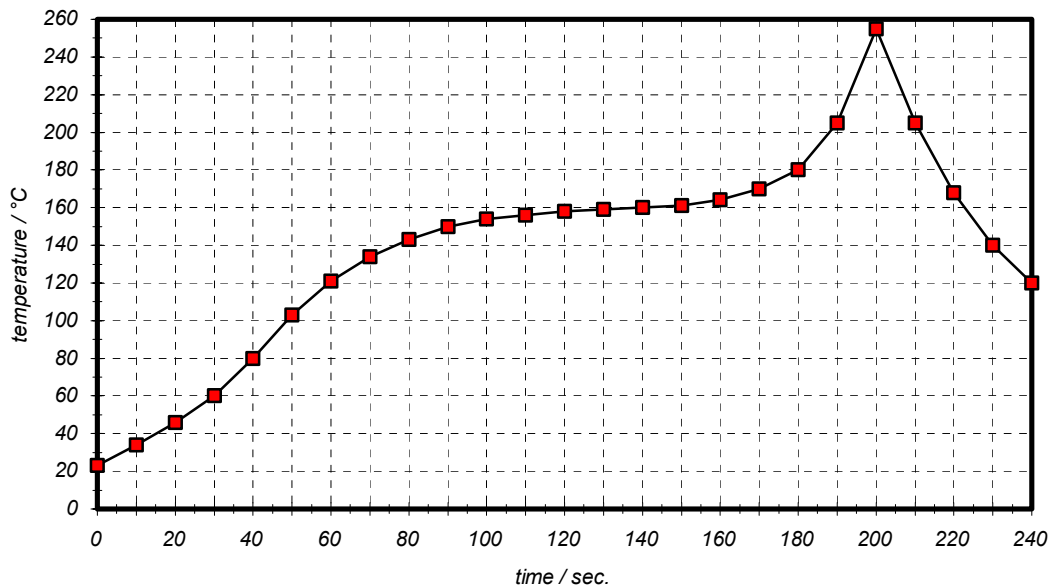
**Air reflow profile**

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              |

**VI TELEFILTER****Filter specification****TFS 71H****5 / 5****7. History :**

| <b>Version</b> | <b>Reason of Changes</b>   | <b>Name</b> | <b>Date</b> |
|----------------|--|-------------|-------------|
| 1.0            | Generate development specification according to customer requirements. | Pfeiffer W. | 18.07.2001  |
| 1.1            | Generate filter specification.   | Dunzow W.   | 11.01.2002  |