

**VI TELEFILTER****Filter specification****TFS 172B****1/5****Measurement condition**

|                            |                  |     |
|----------------------------|------------------|-----|
| Ambient temperature:       | 23               | °C  |
| Input power level:         | 0                | dBm |
| Terminating impedances *): | 180 Ω    -3,4 pF |     |
| input:                     | 180 Ω    -3,4 pF |     |
| output:                    | 180 Ω    -3,4 pF |     |
| Source:                    | 200              | Ω   |
| Load:                      | 200              | Ω   |

**Characteristics****Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 172B 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 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 172,8 MHz without any tolerance. The given values for both the relative attenuation  $a_{rel}$  and the group delay ripple have to be achieved at the frequencies given below even 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  $f_c$ .

| <b>D a t a</b>                              |                 | <b>typ. value</b> | <b>tolerance / limit</b>   |
|---|-----------------|-------------------|----------------------------|
| <b>Insertion loss</b><br>(reference level)  | $a_e = a_{min}$ | 3,1 dB            | max. 4,0 dB<br>min. 2,0 dB |
| <b>Nominal frequency</b>                    | $f_N$           |                   | 172,8 MHz                  |
| <b>Centre frequency</b>                     | $f_c$           | 172,8 MHz         |                            |
| <b>Pass band</b>                            |                 |                   | $f_N \pm 4,42$ MHz         |
| <b>Pass band ripple</b>                     |                 | 0,5 dB            | max. 0,8 dB                |
| <b>Relative attenuation</b>                 | $a_{rel}$       |                   |                            |
| $f_N - 172,5$ MHz ... $f_N - 29,8$ MHz      |                 | 54 dB             | min. 40 dB                 |
| $f_N + 30,2$ MHz ... $f_N + 827,2$ MHz      |                 | 53 dB             | min. 40 dB                 |
| <b>Group delay ripple within PB</b>         |                 | 70 ns             | max. 100 ns                |
| <b>VSWR within PB</b>                       |                 | 1,5 : 1           | max. 2,5 : 1               |
| <b>Input power level</b>                    |                 | -                 | max. 10 dBm                |
| <b>Operating temperature range</b>          | OTR             | -                 | - 10 °C ... + 85 °C        |
| <b>Storage temperature range</b>            |                 | -                 | - 30 °C ... + 90 °C        |
| <b>Temperature coefficient of frequency</b> | $TC_f$ **       | -78 ppm/K         | -                          |

\*) 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.

\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T0}(\text{MHz})$ .

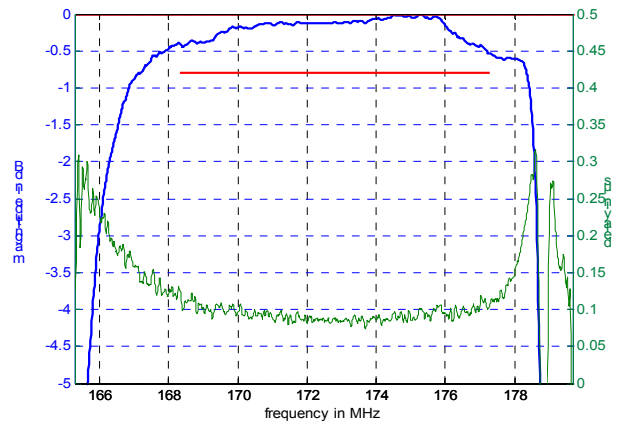
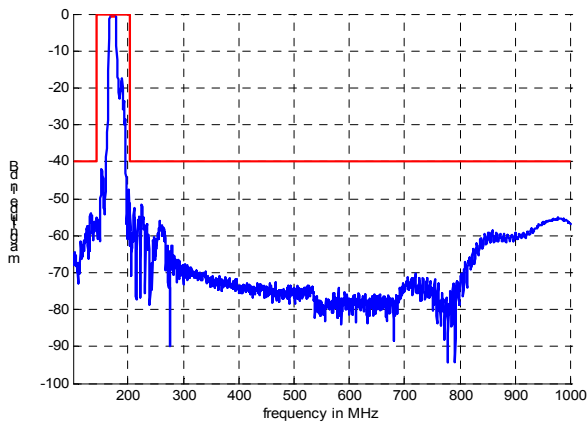
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**checked / approved:** \_\_\_\_\_

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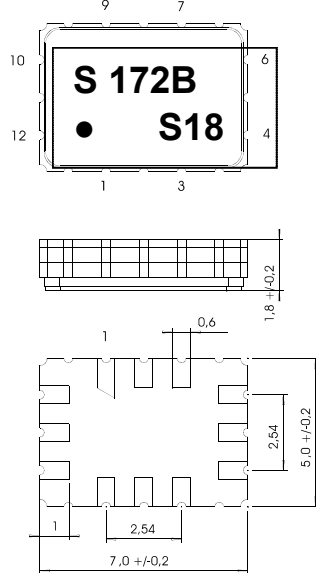
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**Filter characteristic**



**Construction and pin connection**

(All dimensions in mm)

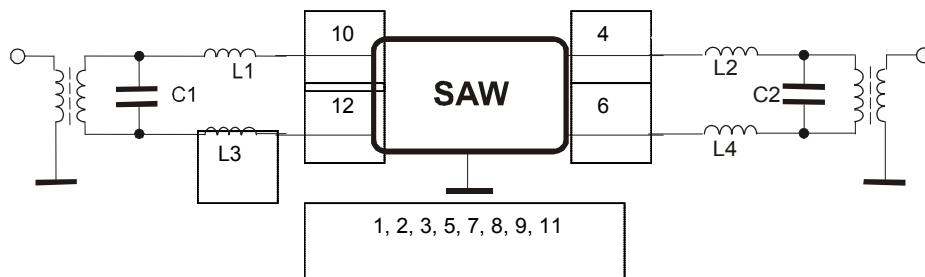


|    |        |
|----|--------|
| 1  | Ground |
| 2  | Ground |
| 3  | Ground |
| 4  | Output |
| 5  | Ground |
| 6  | Output |
| 7  | Ground |
| 8  | Ground |
| 9  | Ground |
| 10 | Input  |
| 11 | Ground |
| 12 | Input  |

|            |             |
|------------|-------------|
| Date code: | Year + week |
| S          | 2004        |
| T          | 2005        |
| U          | 2006        |
| ...        |             |

**50 Ω Test circuit**



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**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 5 g 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): reflow possible: twice max.;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

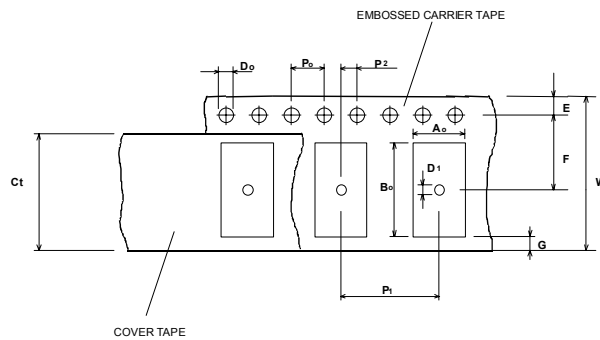
**Packing**

Tape & Reel: 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 peer reel:                   | 3000        |
| reel of empty components at start:                  | min. 300 mm |
| reel of empty components at start including leader: | min. 500 mm |
| trailer:  | min. 300 mm |

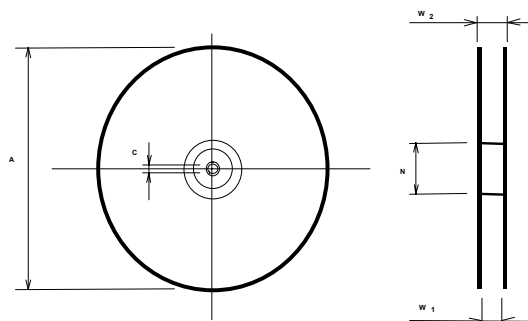
**Tape (all dimensions in mm)**

- W : 16,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 7,50 ± 0,1
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 5,50 ± 0,1
- Bo : 7,50 ± 0,1
- Ct : 13,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 16,4 +2/-0
- W2(max) : 22,4
- N(min) : 50
- C : 13,0 +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. Marking of the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on the right.

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**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.    |                  |

**Chip-mount air reflow profile**

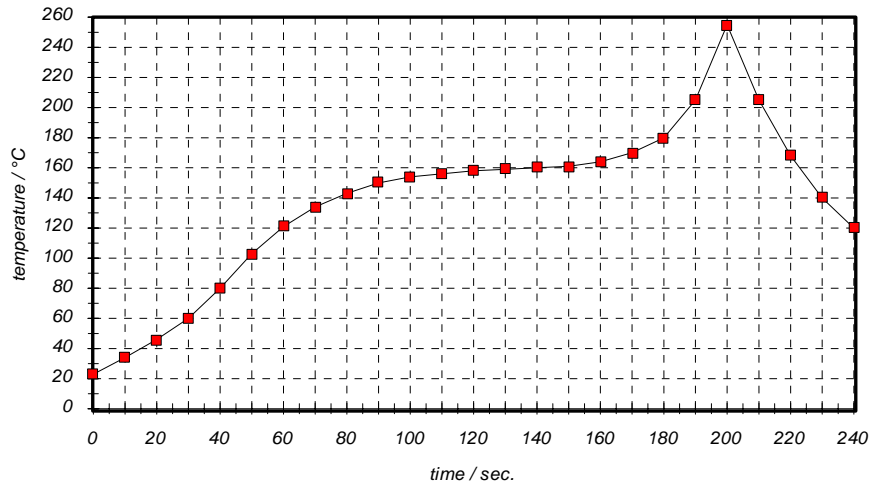


Table for temperature vs. time during the air reflow process

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 172B****5/5****History**

| <b>Version</b> | <b>Reason of Changes</b>  | <b>Name</b> | <b>Date</b> |
|----------------|---|-------------|-------------|
| 1.0            | - Generation of specification according to customer specification.  | Dr. Sabah   | 12.08.2003  |
| 1.1            | - Change of passband, change of pass band ripple<br>definition of group delay ripple, add source and load impedance,<br>definition of package (construction, pin configuration, tape and reel)                                  | Roizengaft  | 13.01.2004  |
| 1.2            | - Generation of filter specification<br>- Change remark of filter characteristic<br>- Add typical value<br>- Change package (construction, pin connection)<br>- Add input and output impedance<br>- Add temperature coefficient | Noack       | 16.04.2004  |
| 1.3            | - Change package (construction, pin configuration)  | Noack       | 30.04.2004  |

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