

**VI TELEFILTER****Filter specification****TFS 70E****1/5****Measurement condition**

|                          |             |                  |
|--------------------------|-------------|------------------|
| Ambient temperature:     | 23          | °C               |
| Input power level:       | 0           | dBm              |
| Terminating impedance: * |             |                  |
| Input:                   | 50 $\Omega$ | matching network |
| Output:                  | 50 $\Omega$ | matching network |

**Characteristics****Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 70E is the minimum of the pass band attenuation. This value is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 70,2 MHz without any tolerance. The values of relative attenuation  $a_{rel}$  are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

| <b>D a t a</b>                                     |           | <b>typ. value</b> |         | <b>tolerance / limit</b> |                    |     |
|----------------------------------------------------|-----------|-------------------|---------|--------------------------|--------------------|-----|
| <b>Insertion loss</b><br>(reference level)         | $a_e$     | 5,0               | dB      | max.                     | 7,0                | dB  |
| <b>Nominal frequency</b>                           | $f_N$     | -                 |         |                          | 70,2               | MHz |
| <b>Centre frequency</b>                            | $f_c$     | 70,2              | MHz     | 70,2                     | $\pm 0,1$          | MHz |
| <b>Passband</b>                                    | PB        | -                 |         | $f_N$                    | $\pm 350$          | kHz |
| <b>Bandwidth</b><br>3 dB                           |           | 900               | kHz     | min.                     | 700                | kHz |
| <b>Relative attenuation</b><br>$f_c \pm 350,0$ kHz | $a_{rel}$ | 2                 | dB      | max.                     | 3                  | dB  |
| $f_c + 1,15$ MHz ... $f_c + 1,65$ MHz              |           | 26                | dB      | min.                     | 20                 | dB  |
| $f_c - 1,20$ MHz ... $f_c - 1,65$ MHz              |           | 26                | dB      | min.                     | 20                 | dB  |
| $f_c + 1,65$ MHz ... $f_c + 2,00$ MHz              |           | 38                | dB      | min.                     | 35                 | dB  |
| $f_c - 1,65$ MHz ... $f_c - 3,00$ MHz              |           | 38                | dB      | min.                     | 35                 | dB  |
| <b>Group delay</b> at $f_N$                        |           | 1,35              | $\mu s$ |                          | -                  |     |
| <b>Group delay ripple</b> in PB                    | p-p       | 250               | ns      | max.                     | 350                | ns  |
| <b>Input power level</b>                           |           | -                 |         | max.                     | 0                  | dBm |
| <b>Permissible DC voltage</b>                      |           | -                 |         | max.                     | 12                 | V   |
| <b>Operating temperature range</b>                 | OTR       | -                 |         |                          | 0 °C ... + 70 °C   |     |
| <b>Storage temperature range</b>                   |           | -                 |         |                          | -40 °C ... + 85 °C |     |
| <b>Temperature coefficient of frequency</b>        | $TC_f$ ** | -72               | ppm/K   |                          | -                  |     |

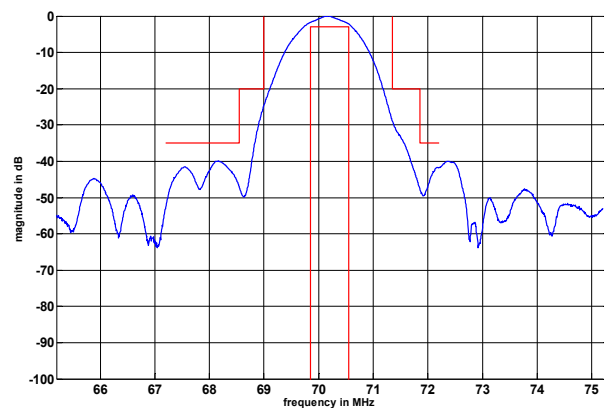
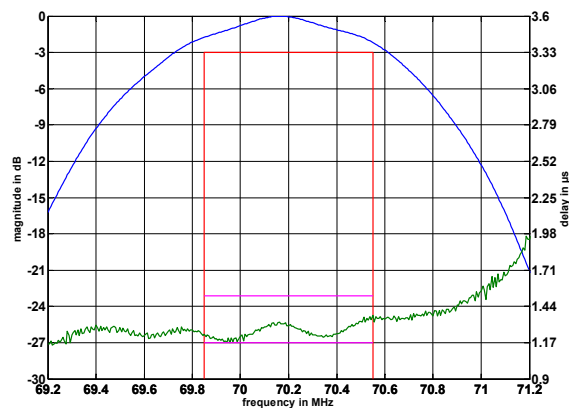
\*) Please refer to the application another more details. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

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

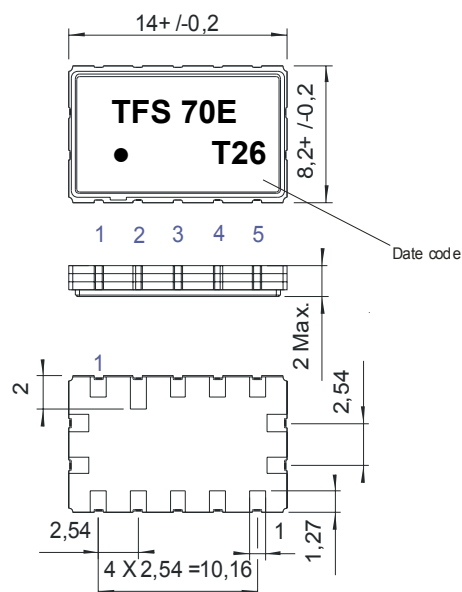
**Generated:****Checked / Approved:**

Tele Filter GmbH  
Potsdamer Straße 18  
D 14 513 TELTOW / Germany  
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30  
E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

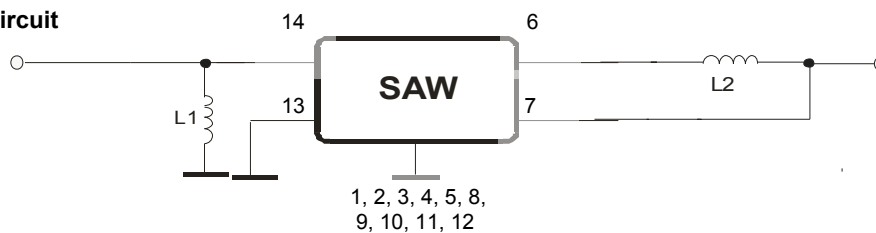
**VI TELEFILTER****Filter specification****TFS 70E****2/5****Filter characteristic****Construction and pin connection**

(All dimensions in mm)



|    |                  |
|----|------------------|
| 1  | Ground           |
| 2  | Ground           |
| 3  | Ground           |
| 4  | Ground           |
| 5  | Output RF Return |
| 6  | Output           |
| 7  | Output           |
| 8  | Output RF Return |
| 9  | Ground           |
| 10 | Ground           |
| 11 | Ground           |
| 12 | Ground           |
| 13 | Input RF Return  |
| 14 | Input            |

Date code: Year + week  
 T 2005  
 U 2006  
 V 2007  
 ...

**50  $\Omega$  Test circuit**

Tele Filter GmbH  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30  
 E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**VI TELEFILTER****Filter specification****TFS 70E****3/5****Stability characteristics**

After the following tests the filter shall meet the whole specification:

1. Shock: 500g, 1 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;

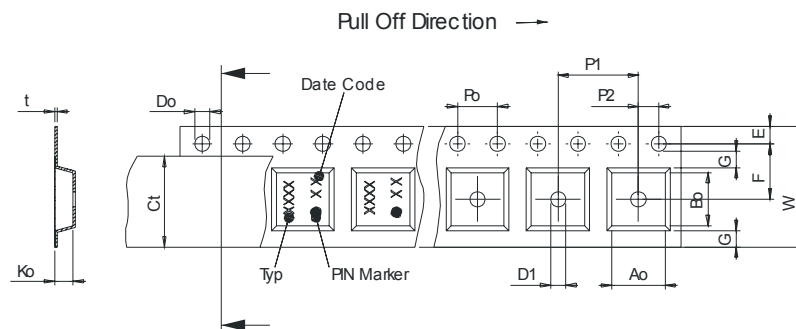
**Packing**

Tape & Reel: IEC 286 – 3, with exeption of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;

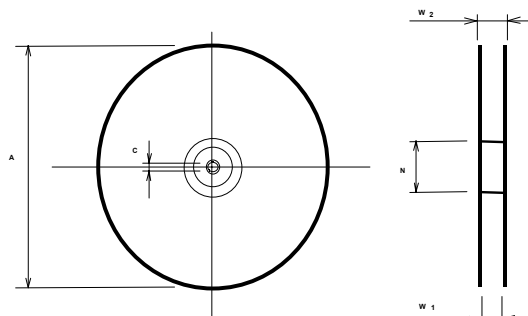
|                                                     |             |
|-----------------------------------------------------|-------------|
| max. pieces of filters peer reel:                   | 1500        |
| reel of empty components at start:                  | min. 300 mm |
| reel of empty components at start including leader: | min. 500 mm |
| trailer:                                            | min. 300 mm |

**Tape (all dimensions in mm)**

W : 24,00  
Po : 4,00  
Do : 1,50  
E : 1,75  
F : 11,50  
G(min) : 0,60  
P2 : 2,00  
P1 : 12,00  
D1(min) : 1,50  
Ao : 8,80  
Bo : 14,60  
Ct : 21,5

**Reel (all dimensions in mm)**

A : 330  
W1 : 24,4  
W2(max) : 30,4  
N(min) : 60  
C : 13,0



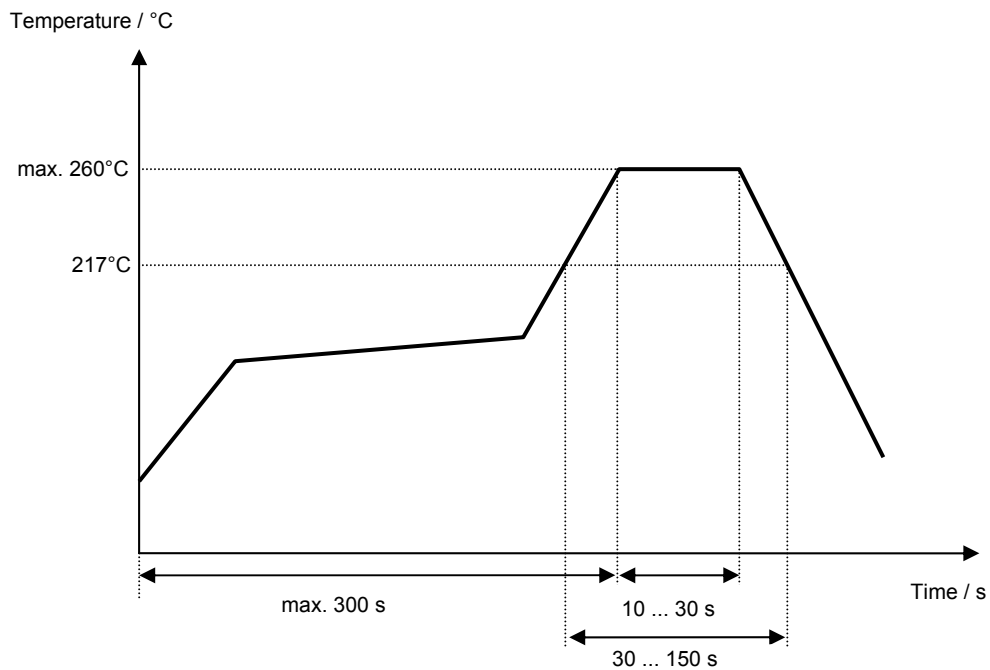
The minimum bending radius is 45 mm.

**Tele Filter GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**  
**E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Air reflow temperature conditions**

| Conditions                                 | Exposure                    |
|--------------------------------------------|-----------------------------|
| Average ramp-up rate (30°C to 217°C)       | less than 3°C/second        |
| > 100°C                                    | between 300 and 600 seconds |
| > 150°C                                    | between 240 and 500 seconds |
| > 217°C                                    | between 30 and 150 seconds  |
| Peak temperature                           | max. 260°C                  |
| Time within 5°C of actual peak temperature | between 10 and 30 seconds   |
| Cool-down rate (Peak to 50°C)              | less than 6°C/second        |
| Time from 30°C to Peak temperature         | no greater than 300 seconds |

**Chip-mount air reflow profile**

**VI TELEFILTER****Filter specification****TFS 70E****5/5****History**

| <b>Version</b> | <b>Reason of Changes</b>                          | <b>Name</b> | <b>Date</b> |
|----------------|---------------------------------------------------|-------------|-------------|
| 2.1            | - change date code<br>- add terminating impedance | Strehl      | 29.06.2005  |