

**VI TELEFILTER****Filter specification****TFS 110W****1/5****Measurement condition**

|                          |              |          |
|--------------------------|--------------|----------|
| Ambient temperature:     | 25           | °C       |
| Input power level:       | 0            | dBm      |
| Terminating impedance: * |              |          |
| Input:                   | 297 $\Omega$ | -23,3 pF |
| Output:                  | 315 $\Omega$ | -24,6 pF |

**Characteristics****Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 110W 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 110,592 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)  | $a_e$                     | 3,5               | dB    | max.                     | 4,5       | dB  |
| <b>Nominal frequency</b>                    | $f_N$                     | -                 |       |                          | 110,592   | MHz |
| <b>Centre frequency</b>                     | $f_C$                     | 110,592           | MHz   |                          | -         |     |
| <b>Passband</b>                             | PB                        |                   |       | $f_N$                    | $\pm 280$ | kHz |
| <b>Pass band ripple</b>                     |                           | -                 |       | max.                     | 3         | dB  |
| <b>Relative attenuation</b>                 | $a_{rel}$                 |                   |       |                          |           |     |
| $f_N$                                       | $\dots f_N \pm 0,280$ MHz | 1                 | dB    | max.                     | 3         | dB  |
| $f_N \pm 1,150$ MHz                         | $\dots f_N \pm 1,728$ MHz | 18                | dB    | min.                     | 10        | dB  |
| $f_N \pm 1,728$ MHz                         | $\dots f_N \pm 3,456$ MHz | 35                | dB    | min.                     | 30        | dB  |
| $f_N + 3,456$ MHz                           | $\dots f_N + 5,184$ MHz   | 45                | dB    | min.                     | 40        | dB  |
| $f_N - 3,456$ MHz                           | $\dots f_N - 5,184$ MHz   | 49                | dB    | min.                     | 45        | dB  |
| $f_N - 5,184$ MHz                           |                           | 53                | dB    | min.                     | 50        | dB  |
| $f_N - 5,184$ MHz                           | $\dots f_N - 15,000$ MHz  | 50                | dB    | min.                     | 40        | dB  |
| <b>Group delay ripple within PB</b>         | p-p                       | 100               | ns    | max.                     | 700       | ns  |
| <b>Input power level</b>                    |                           |                   |       | max.                     | 0         | dBm |
| <b>Permissible DC voltage</b>               |                           |                   |       | max.                     | 3         | V   |
| <b>Operating temperature range</b>          | OTR                       | -                 |       | - 20 °C ... + 70 °C      |           |     |
| <b>Storage temperature range</b>            |                           | -                 |       | - 40 °C ... + 85 °C      |           |     |
| <b>Temperature coefficient of frequency</b> | $TC_f$ **                 | -19               | ppm/K |                          |           |     |

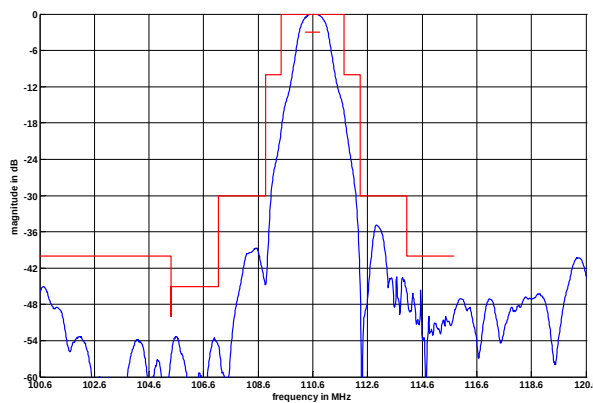
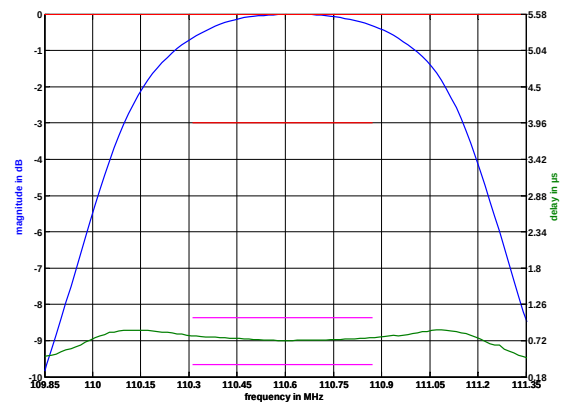
\*) The terminating impedances depend on parasites and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

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

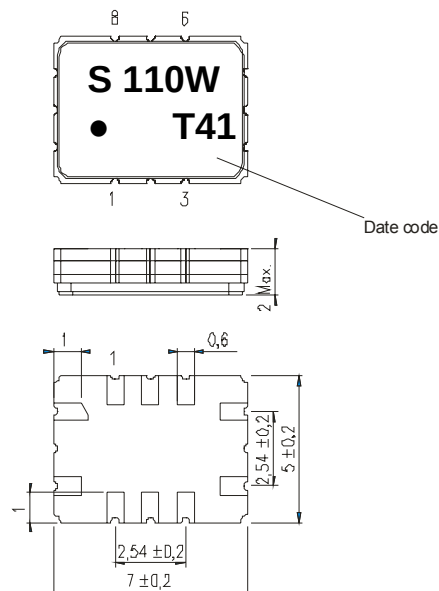
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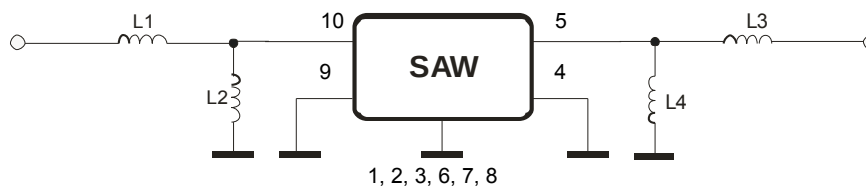
**VI TELEFILTER****Filter specification****TFS 110W****2/5****Filter characteristic****Construction and pin connection**

(All dimensions in mm)



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

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

**50 Ohm Test circuit**

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**VI TELEFILTER****Filter specification****TFS 110W****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;

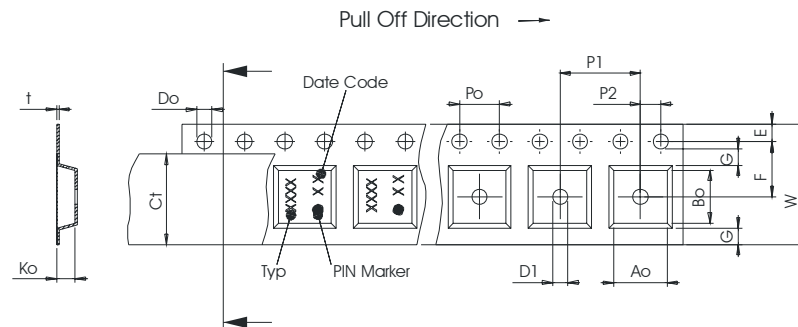
**Packing**

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;

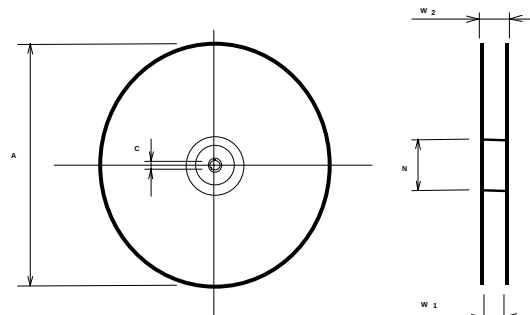
|                                                     |             |
|-----------------------------------------------------|-------------|
| max. pieces of filters peer reel:                   | 3000        |
| reel of empty components at start:                  | min. 300 mm |
| reel of empty components 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 |



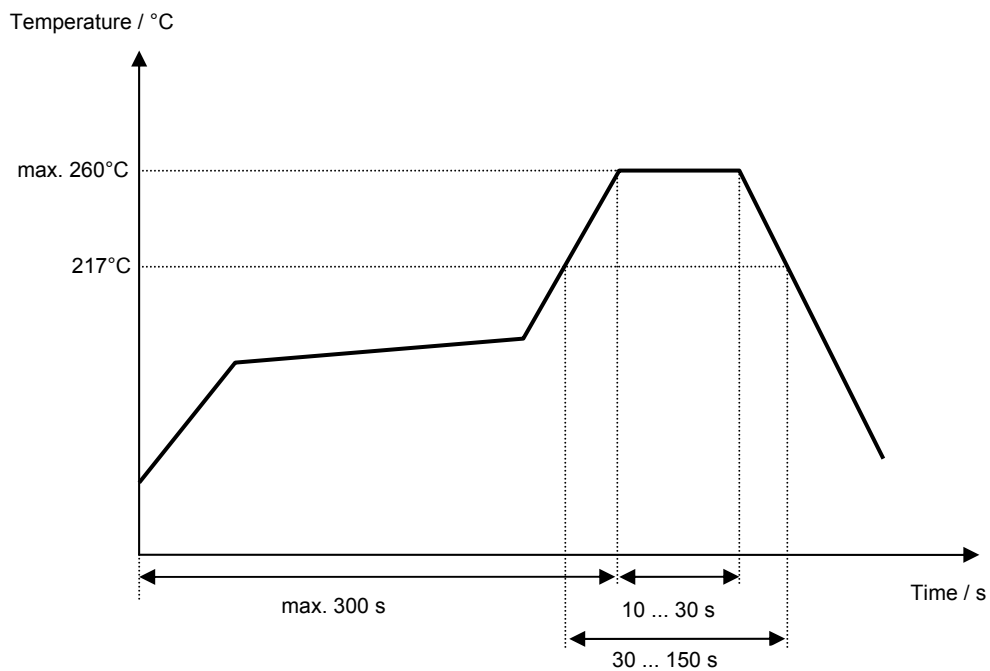
The minimum bending radius is 45 mm.

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**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 110W****5/5****History**

| <b>Version</b> | <b>Reason of Changes</b>                                                                                                        | <b>Name</b> | <b>Date</b> |
|----------------|---------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|
| 1.0            | - generation of development specification                                                                                       | Strehl      | 10.06.2005  |
| 1.1            | - change pass band and relative attenuation                                                                                     | Strehl      | 13.07.2005  |
| 1.2            | - terminating impedance (preliminary value), typical values and filter characteristic added<br>- matching configuration changed | Pfeiffer    | 02.09.2005  |
| 1.3            | - terminating impedance fixed<br>- typical values and filter characteristic changed                                             | Pfeiffer    | 07.10.2005  |

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