# VI TELEFILTER — Filter specification — TFS 240L — 1/5

## Measurement condition

Ambient temperature: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 360 Ω || -9,6 pF
Output: 360 Ω || -10,0 pF

## Characteristics

Remark:
The reference level for the relative attenuation $a_{rel}$ of TFS 240L is the minimum of the pass band attenuation $a_{min}$. This value 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 25 dB filter attenuation level relative to the insertion loss $a_e$. The given values for the relative attenuation $a_{rel}$ and the group delay ripple have to be reached 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 $f_c$.

| D a t a | | typ. value | | tolerance / limit | | |
|---|---|---|---|---|---|---|
| **Insertion loss** (reference level) | $a_e$ | 5,2 | dB | max. | 9,0 | dB |
| **Centre frequency** (reference frequency at ambient temperature) | $f_c$ | 240 | MHz | ± | 25 | kHz |
| **Passband** | PB | - | | $f_c$ ± | 100 | kHz |
| **Pass band ripple** p-p | | 0,2 | dB | max. | 0,5 | dB |
| **Relative attenuation** | $a_{rel}$ | | | | | |
| $f_c$ … $f_c$ ± 0,100 MHz | | 0,2 | dB | max. | 0,5 | dB |
| $f_c$ ± 0,100 MHz … $f_c$ ± 0,150 MHz | | 0,5 | dB | max. | 1 | dB |
| $f_c$ ± 0,375 MHz … $f_c$ ± 0,575 MHz | | 35 | dB | min. | 25 | dB |
| $f_c$ ± 0,575 MHz … $f_c$ ± 0,975 MHz | | 40 | dB | min. | 30 | dB |
| $f_c$ ± 0,975 MHz … $f_c$ ± 5,000 MHz | | 40 | dB | min. | 35 | dB |
| 10,000 MHz … $f_c$ - 5,000 MHz | | 48 | dB | min. | 38 | dB |
| $f_c$ ± 5,000 MHz … $f_c$ + 360,000 MHz | | 48 | dB | min. | 38 | dB |
| **Average group delay within PB** | | 1,8 | µs | max. | 2,4 | µs |
| **Group delay ripple within PB** | | 250 | ns | max. | 400 | ns |
| **Triple transit response suppression** | | 18 | dB | min. | 15 | dB |
| **Return loss within $f_c$ ± 150 kHz** | | 12 | dB | min. | 7 | dB |
| **Input power level** | | - | | max. | 20 | dBm*** |
| **Operating temperature range** | OTR | - | | - 30 °C ... + 80 °C | | |
| **Storage temperature range** | | - | | - 40 °C ... + 85 °C | | |
| **Frequency inversion temperature** | | 28 | °C | | - | |
| **Temperature coefficient of frequency** | $TC_f$ ** | -0,04 | ppm/K² | | - | |

*) 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.
**) $\Delta f_C(Hz) = Tc_f(ppm/K^2) \times (T - T_o)^2 \times f_{CAT}$ (MHz).
***) This power level is allowed for short term operation (10% of life time) only, the max. input power for continuous operation is 15 dBm

**Generated:**

**Checked / Approved:**

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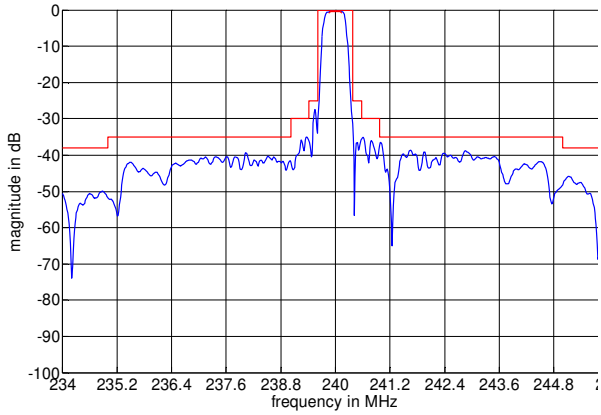
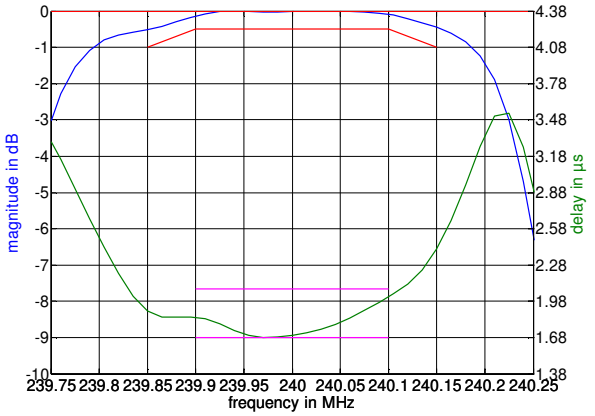
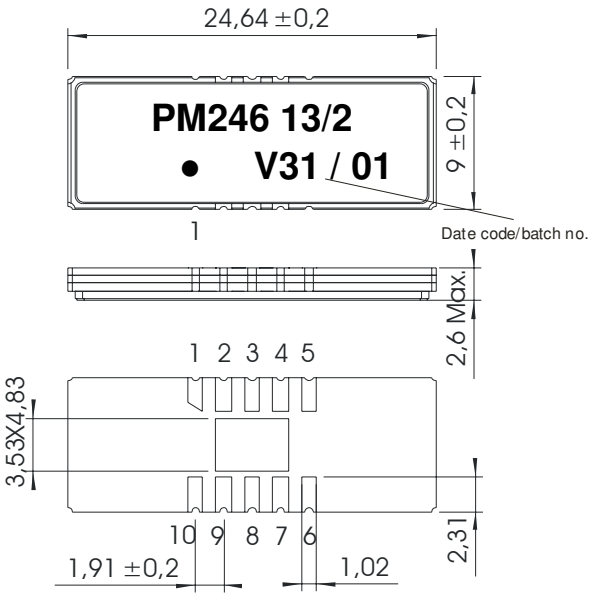
## Filter characteristic




## Construction and pin connection

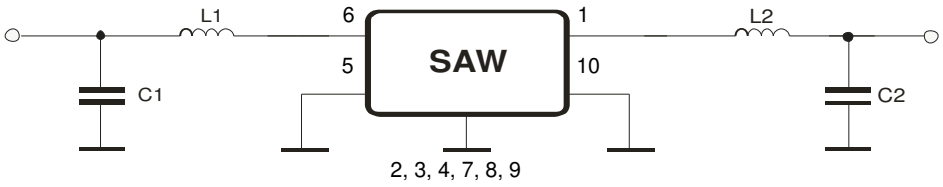
(All dimensions in mm)




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

| Date code: | Year + week |
|---|---|
| V | 2007 |
| W | 2008 |
| X | 2009 |
| ... | |

## 50 Ω Test circuit

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### Stability characteristics, reliability

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

| | |
|---|---|
| 1. Shock: | 500g, 1 ms, half sine wave, 3 shocks each plane;<br>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;<br>DIN IEC 68 T2 - 6 |
| 3. Change of temperature: | -55 °C to 125°C / 30 min. each / 10 cycles<br>DIN IEC 68 part 2 – 14 Test N |
| 4. Resistance to solder heat (reflow): | reflow possible: three times max.;<br>for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4; |

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

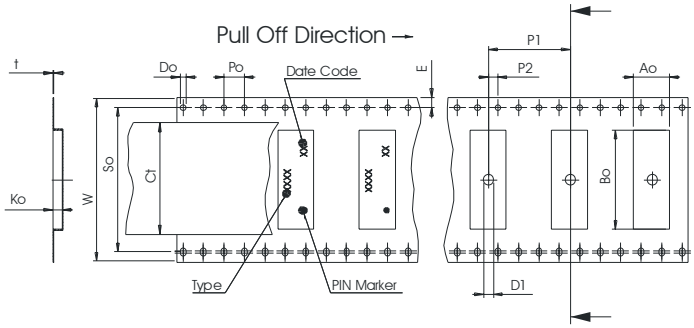
### Packing

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: | 1000 |
| reel of empty components at start: | min. 300 mm |
| reel of empty components at start including leader: | min. 500 mm |
| trailer: | min. 300 mm |

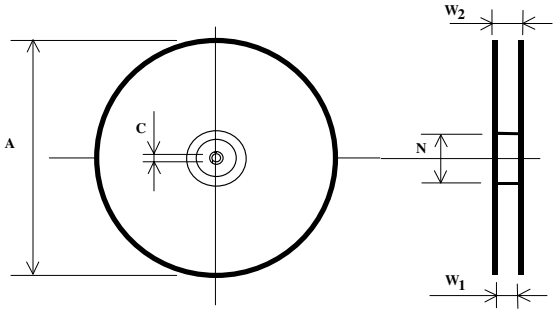
**Tape (all dimensions in mm)**

| | | |
|---|---|---|
| W | : 44,00 | ± 0,3 |
| Po | : 4,00 | ± 0,1 |
| Do | : 1,50 | +0,1/-0 |
| E | : 1,75 | ± 0,1 |
| F | : 20,20 | ± 0,15 |
| P2 | : 2,00 | ± 0,15 |
| P1 | : 16,00 | ± 0,1 |
| D1(min) | : 2,00 | |
| Ao | : 9,30 | ± 0,1 |
| Bo | : 24,90 | ± 0,1 |
| So | : 40,40 | ± 0,1 |
| Ct | : 38,0 | ± 0,1 |




**Reel (all dimensions in mm)**

| | | |
|---|---|---|
| A | :330 | |
| W1 | : 44,4 | +2/-0 |
| W2(max) | : 50,4 | |
| N(min) | :100 | |
| C | : 13,0 | +0,5/-0,2 |




The minimum bending radius is 45 mm.

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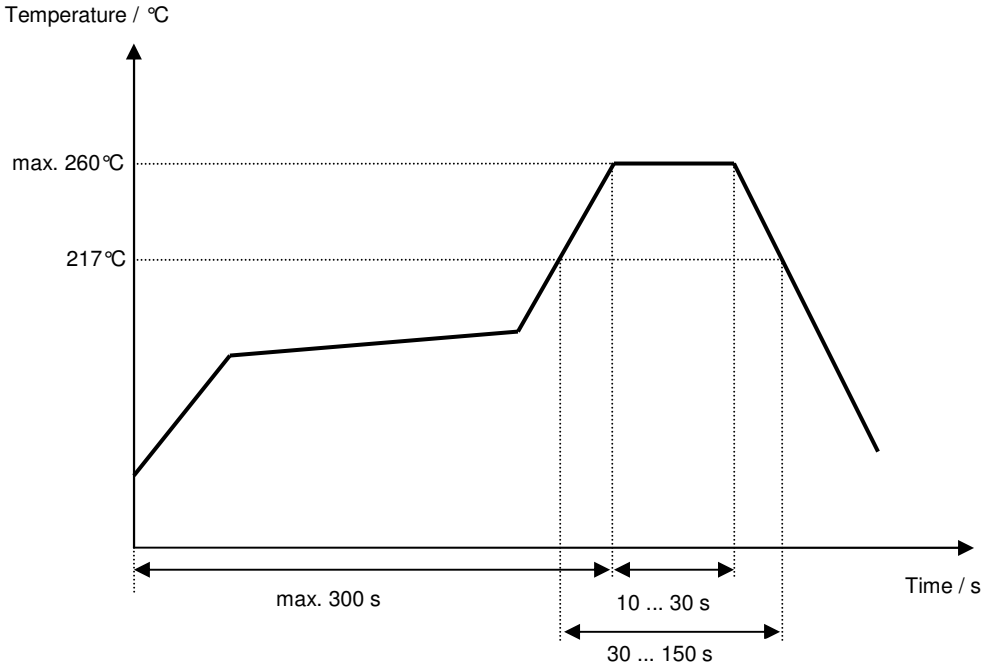
**Air reflow temperature conditions**

| 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**

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## History

| Version | Reason of Changes | Name | Date |
|---|---|---|---|
| 1.0 | - Generation of specification | Pfeiffer | 02.04.2004 |
| 1.1 | - Filter characteristic added<br>- Labelling changed (no. of batch included) | Pfeiffer | 15.07.2004 |
| 1.2 | - Change stability characteristics | Strehl | 01.08.2007 |

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