

VI TELEFILTER**Filter Specification****TFS 167D****1/5****Measurement condition**

Ambient Temperature: 23 °C
 Input Power Level: 0 dBm
 Terminating Impedance at f_c^* :
 input: 450 Ω // -7.5 pF
 output: 470 Ω // -6.6 pF

Characteristics

Remark: Reference level for the relative attenuation a_{rel} of the TFS 167D 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 temperature coefficient of frequency TC_f is valid for both the reference frequency f_c and the frequency response of the filter in the operating temperature range.

| D a t a | | typ. Value | Limit |
|--|-------------------|------------------------------|------------------|
| Insertion Loss (Reference Level) | $a_e = a_{min}$ | 4,8 dB | max. 7,0 dB |
| Nominal Frequency | f_N | - | 167,0 MHz |
| Pass Band | PB | - | $f_N \pm 75$ kHz |
| Average Group Delay within PB | | 2,05 μ s | max. 2,3 μ s |
| Group Delay Variation within PB | | 200 ns | max. 400 ns p-p |
| Relative Attenuation | a_{rel} | | |
| f_N | $f_N \pm 75$ kHz | - | max. 1,5 dB |
| $f_N \pm 0,2$ MHz ... | $f_N \pm 0,4$ MHz | - | min. 2,0 dB |
| $f_N \pm 0,4$ MHz ... | $f_N \pm 0,6$ MHz | 23 dB | min. 20 dB |
| $f_N \pm 0,6$ MHz ... | $f_N \pm 0,8$ MHz | 38 dB | min. 25 dB |
| $f_N - 137,0$ MHz ... | $f_N - 17,0$ MHz | 75 dB | min. 60 dB |
| $f_N - 17,0$ MHz ... | $f_N - 0,8$ MHz | 45 dB | min. 35 dB |
| $f_N + 0,8$ MHz ... | $f_N + 13,0$ MHz | 38 dB | min. 35 dB |
| $f_N + 13,0$ MHz ... | $f_N + 833,0$ MHz | 75 dB | min. 60 dB |
| Return loss in PB | | 12 dB | min. 10 dB |
| Operating Temperature Range ° C | | | -5 +85 |
| Storage Temperature Range | | | -40.... +100 ° C |
| Temperature Coefficient of frequency TC_f | | - 0,036 ppm / K ² | - |
| Out of band intermodulation | | -135 dBm | min. -120 dBm |
| input signals at 167,8 and 168,6 MHz at -20 dBm input signals at 166,2 and 165,4 MHz at -20 dBm | | | |
| Input power | | | max. 15 dBm** |

*) 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.

***) a power of 20 dBm can be applied shortly, for 10 years life time the cycle time should be less than 1:100

generated:

checked / approved:

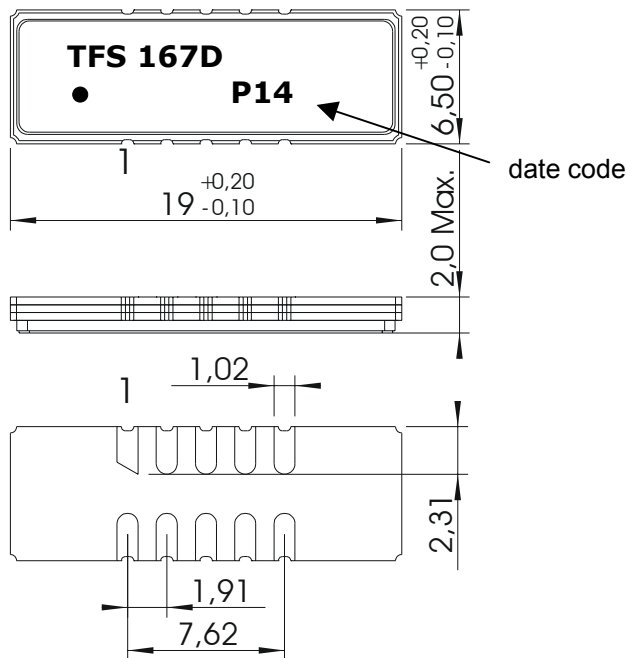
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Construction and pin connection

(All dimensions in mm)



single ended

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

balanced

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

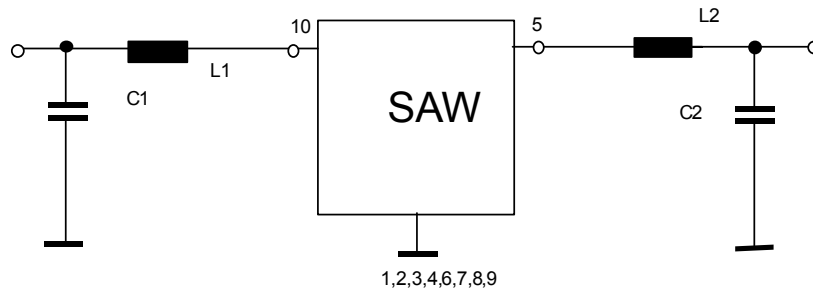
date code:

- M
- N
- P
- ...

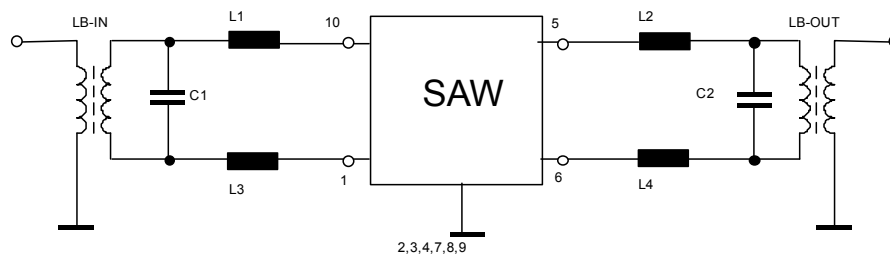
year + week

- 2000
- 2001
- 2002

50 Ω matching circuit, single ended



200 Ω matching circuit, differential



optional possible: matching circuit, input 50 Ω single ended / output 200 Ω differential

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

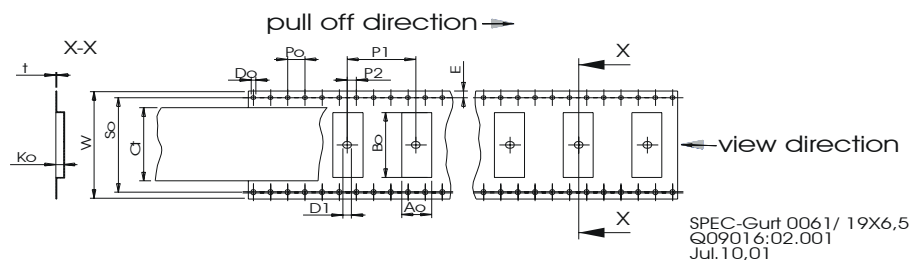
Packing

Tape & Reel: DIN 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;

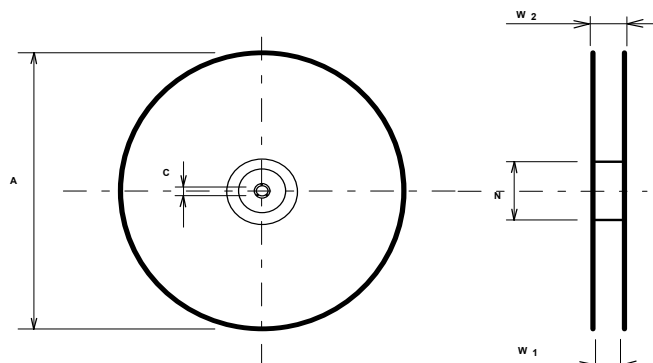
max. pieces of filters per reel: 2000
Reel of empty components at start: min 300 mm
Reel of empty components at start including leader: min 500 mm
Trailer: min 300 mm

Tape (all dimensions in mm)

| | |
|---------|---------------|
| W | : 32 ± 0,3 |
| Po | : 4 ± 0,1 |
| Do | : 1,5 + 0,5 |
| E | : 1,75 ± 0,1 |
| So | : 28,4 ± 0,1 |
| P2 | : 2 ± 0,1 |
| P1 | : 12 ± 0,1 |
| D1(min) | : 2 |
| Ao | : 7,1 ± 0,1 |
| Bo | : 19,6 ± 0,1 |
| Ko | : 2,0 ± 0,1 |
| t | : 0,35 ± 0,05 |
| Ct | : 25,5 ± 0,1 |

**Reel (all dimensions in mm):**

| | |
|----------|----------------|
| A | : 330 |
| W1 | : 32,4 +2 |
| W2 (max) | : 38,4 |
| N (min) | : 100 |
| C | : 13 +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. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape in the above shown direction.

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Air reflow temperature conditions1st 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. | |

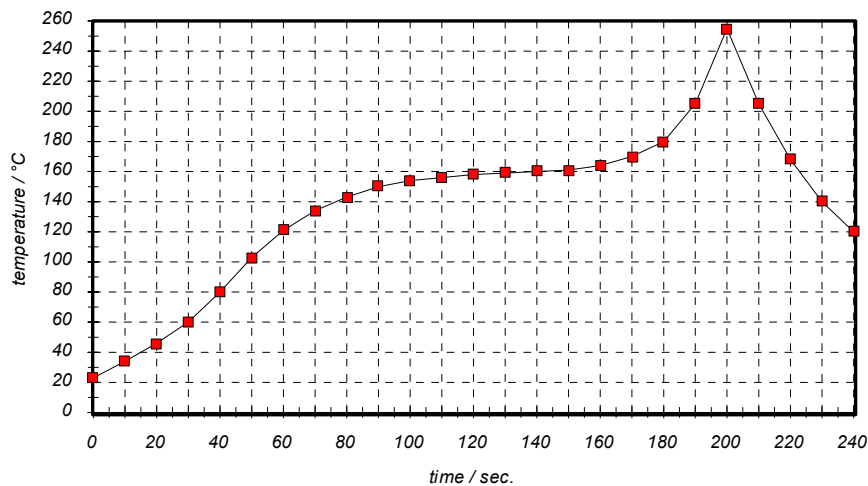
Chip-mount air reflow profile

Table for temperature vs. Time during the air reflow process

Tolerance of temperatures: ± 5 °C

| <u>time / sec.</u> | <u>Temperature / °C</u> | <u>time / sec.</u> | <u>Temperature / °C</u> |
|--------------------|-------------------------|--------------------|-------------------------|
| 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 167D****5/5****History**

| Version | Reason of Changes | Name | Date |
|----------------|--|-------------|-------------|
| 1.0 | - generation of specification according to customer requirements | Pfeiffer | 14.11.2001 |
| 1.1 | - terminating impedances added - typical values added | Pfeiffer | 27.03.2002 |

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