

Microchip**Filter specification****TFS1176H****1/5****Measurement condition**

| | | |
|-----------------------------|----|----------|
| Ambient temperature T_A : | 23 | °C |
| Input power level: | 0 | dBm |
| Terminating impedance: | | |
| Input: | 50 | Ω |
| Output: | 50 | Ω |

Characteristics

Remark:

The maximum attenuation in the pass band is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 1176.45 MHz without any tolerance or limit. The values of absolute attenuation a_{abs} are guaranteed over the whole operating temperature range. The frequency shift of the filter within the operating temperature range is included in the production tolerance scheme.

| Data | typ. value | | tolerance / limit | | |
|---|-------------------|-----------|--------------------------|--------------------|-----|
| Insertion loss | a_e | 2.5 dB | max. | 4.0 | dB |
| Nominal frequency | f_N | - | | 1176.45 | MHz |
| Passband | PB | - | $f_N \pm$ | 7.5 | MHz |
| Pass band variation | PBV | 1.0 dB | max. | 2.0 | dB |
| Absolute attenuation | a_{abs} | | | | |
| 1 MHz ... 1100 MHz | | 40 dB | min. | 35 | dB |
| 1100 MHz ... 1146 MHz | | 42 dB | min. | 30 | dB |
| 1206 MHz ... 1260 MHz | | 49 dB | min. | 30 | dB |
| 1260 MHz ... 2000 MHz | | 42 dB | min. | 35 | dB |
| Group delay ripple within PB | | 25 ns | max. | 60 | ns |
| Return loss within PB | | 11 dB | min. | 9 | dB |
| Input power level | *) | - | max. | 20 | dBm |
| Operating temperature range | OTR | - | | -55 °C ... +85 °C | |
| Storage temperature range | | - | | -55 °C ... +125 °C | |
| Temperature coefficient of frequency | $TC_f^{**})$ | -37 ppm/K | | | |

*) max. 20 dBm continuous power over 15 year's lifetime
max. 23 dBm for duty cycle < 1:10000

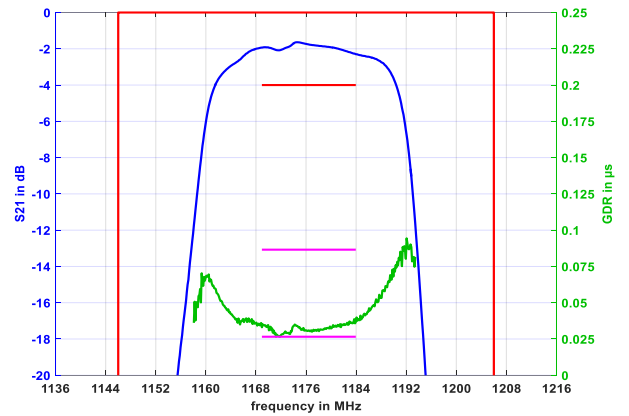
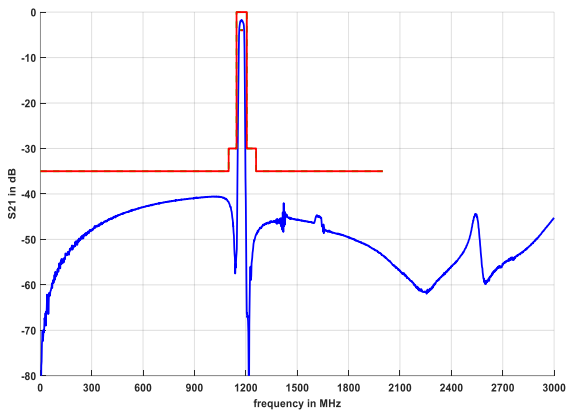
***) $\Delta f = TC_f(T - T_A)f_N$

Generated:**Checked / Approved:**

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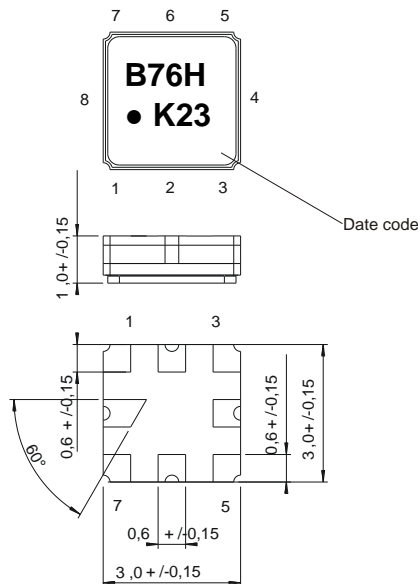
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Filter characteristic



Construction and pin connection

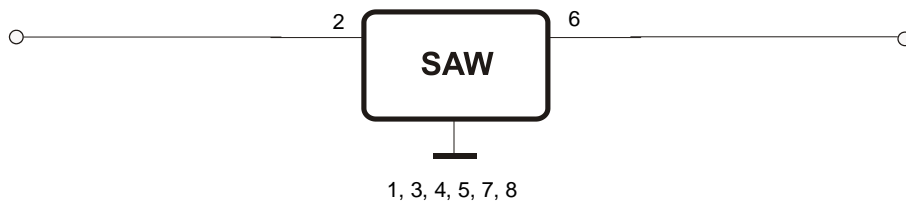
(All dimensions in mm)



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

Date code: Year + week
 K 2018
 L 2019
 M 2020
 ...

50 Ohm Test circuit



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Stability characteristics, reliability

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

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 60068 T2 - 27
2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 60068 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles
DIN IEC 60068 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

This filter is RoHS compliant (2011/65/EU)

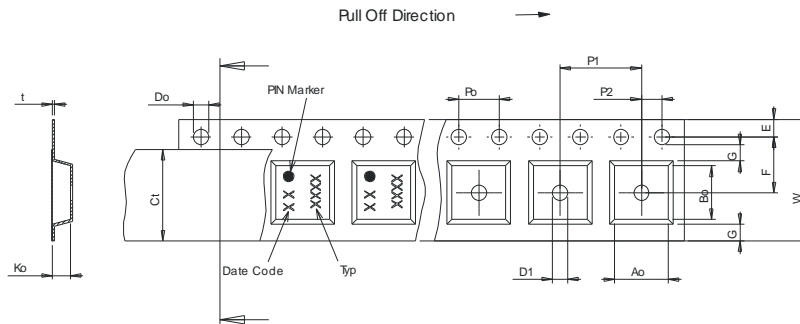
Packing

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;

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

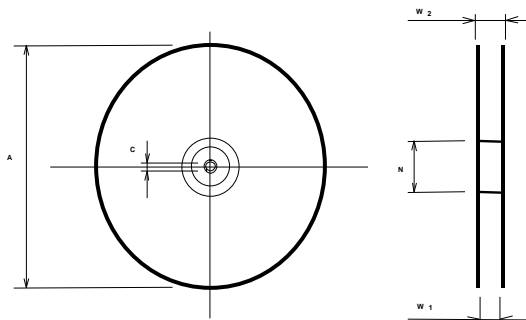
Tape (all dimensions in mm)

- W : 8.00 ±0.3
- Po : 4.00 ±0.1
- Do : 1.50 +0.1/-0
- E : 1.75 ±0.1
- F : 3.50 ±0.05
- G(min) : 0.75
- P2 : 2.00 ±0.05
- P1 : 4.00 ±0.1
- D1(min) : 1.50
- Ao : 3.25 ±0.1
- Bo : 3.25 ±0.1
- Ct : 5.30 ±0.1
- Ko : 1.50 ±0.1
- t : 0.25 ±0.05



Reel (all dimensions in mm)

- A : 330 or 180
- W1 : 8.40 +1.5/-0
- W2(max) : 14.40
- N(min) : 60.00
- C : 13.0 ±0.2



The minimum bending radius is 45 mm.

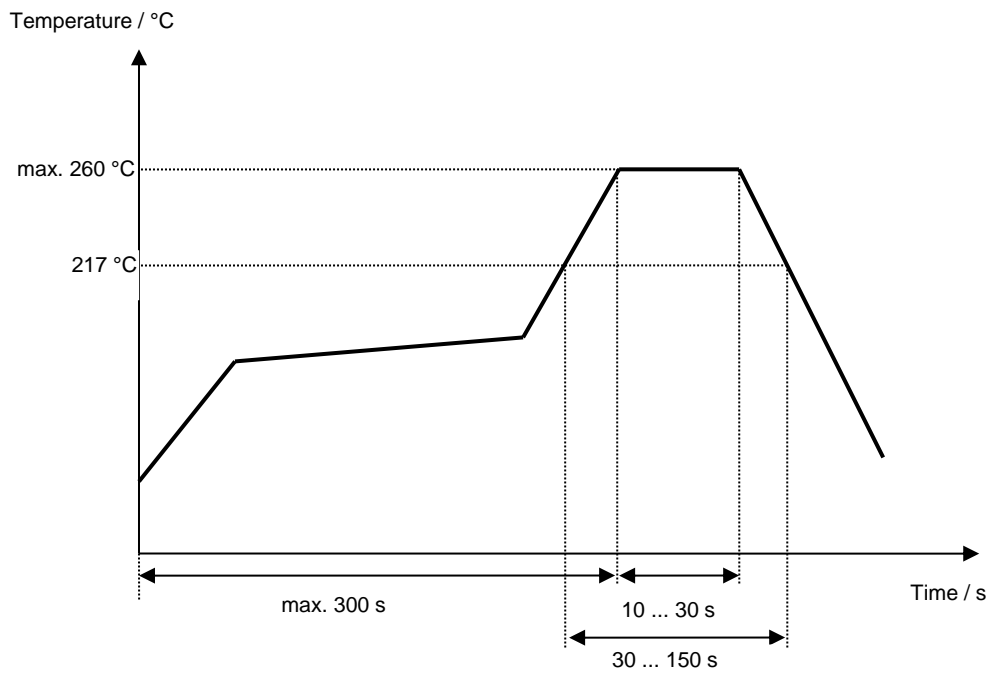
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Air reflow temperature conditions

| 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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Microchip**Filter specification****TFS1176H****5/5****History**

| Version | Reason of Changes | Name | Date |
|----------------|--|-------------|-------------|
| 1.0 | - generation of development specification | P. Jaster | 11.12.2017 |
| 1.1 | - generation of filter specification - add typical values and filter characteristic | C. Noack | 05.06.2018 |
| 1.1 | - change date table | C. Noack | 06.06.2018 |

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