

| | | | |
|------------------|-----------------------------|----------------|------------|
| Microchip | Filter specification | TFS 609 | 1/5 |
|------------------|-----------------------------|----------------|------------|

Measurement condition

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

Characteristics

Remark:

The maximum attenuation in the passband is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 609 MHz without any tolerance or limit. The values of absolute attenuation a_{abs} 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.

| D a t a | typ. value | tolerance / limit |
|---|---------------------|---------------------|
| Insertion loss within PB | a_e 2.5 dB | max. 4.0 dB |
| Nominal frequency | f_N - | 609 MHz |
| Passband | PB - | $f_N \pm 16.0$ MHz |
| Passband variation | 0.9 dB | max. 2.0 dB |
| Absolute attenuation | a_{abs} | |
| $f_N \pm 80$ MHz ... $f_N \pm 149$ MHz | 49 dB | min. 33.5 dB |
| $f_N + 149$ MHz ... $f_N + 300$ MHz | 48 dB | min. 45 dB |
| 1 MHz ... 30 MHz | 52 dB | min. 45 dB |
| 30 MHz ... 200 MHz | 57 dB | min. 50 dB |
| 200 MHz ... $f_N - 149$ MHz | 65 dB | min. 55 dB |
| Group delay ripple within PB | p-p 0.02 μs | max. 0.2 μs |
| IIP3 | * | min. 36 dBm |
| Input power level | - | max. 10 dBm |
| Operating temperature range | OTR - | 23 °C |
| Storage temperature range | - | - 40 °C ... + 85 °C |
| Temperature coefficient of frequency | TC_f ** -76 ppm/K | |

*) $f_{in1} = f_c - 14$ MHz; $f_{in2} = f_c - 14.4$ MHz; $P_{in} = 0$ dBm; $f_{measurement1} = f_c - 13.6$ MHz; $f_{measurement2} = f_c - 14.8$ MHz. 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 .

***) $\Delta f(\text{Hz}) = TC_f (\text{ppm/K}) \times (T - T_0) \times f_{r0} (\text{MHz})$

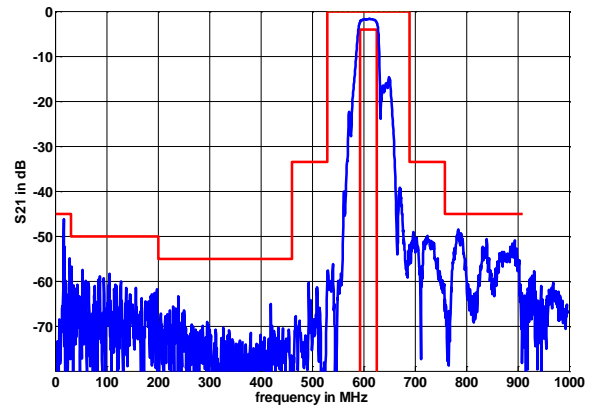
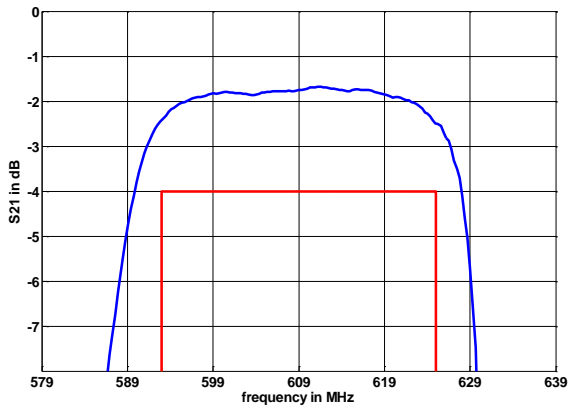
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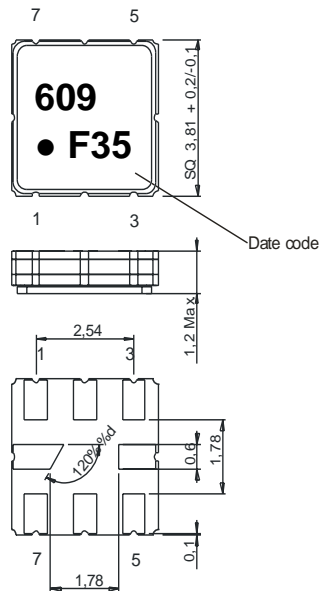
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Filter characteristic



Construction and pin connection

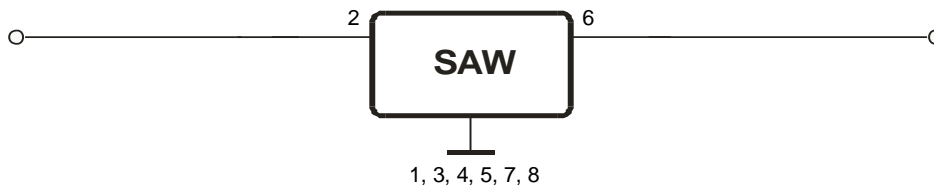
(All dimensions in mm)



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

Date code: Year + week
 F 2015
 G 2016
 H 2017
 ...

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;
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0.35 mm or g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 15 min. each / 100 cycles
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;
for temperature conditions, see page 4: "Air reflow temperature conditions"

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

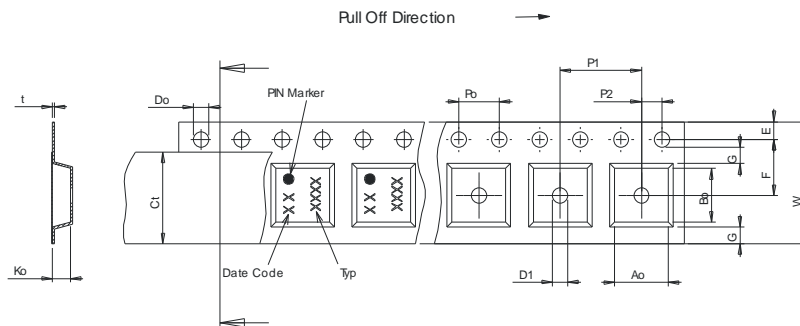
Packing

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;

| | |
|---|-------------|
| max. pieces of filters per 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 |

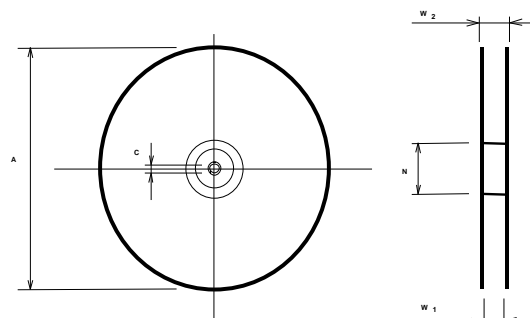
Tape (all dimensions in mm)

- W : 12,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 5,50 ± 0,05
- G(min) : 0,75
- P2 : 2,00 ± 0,05
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 4,30 ± 0,1
- Bo : 4,30 ± 0,1
- Ct : 9,2 ± 0,1



Reel (all dimensions in mm)

- A : 330 or 180
- W1 : 12,4 +2/-0
- W2(max) : 18,4
- N(min) : 50
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

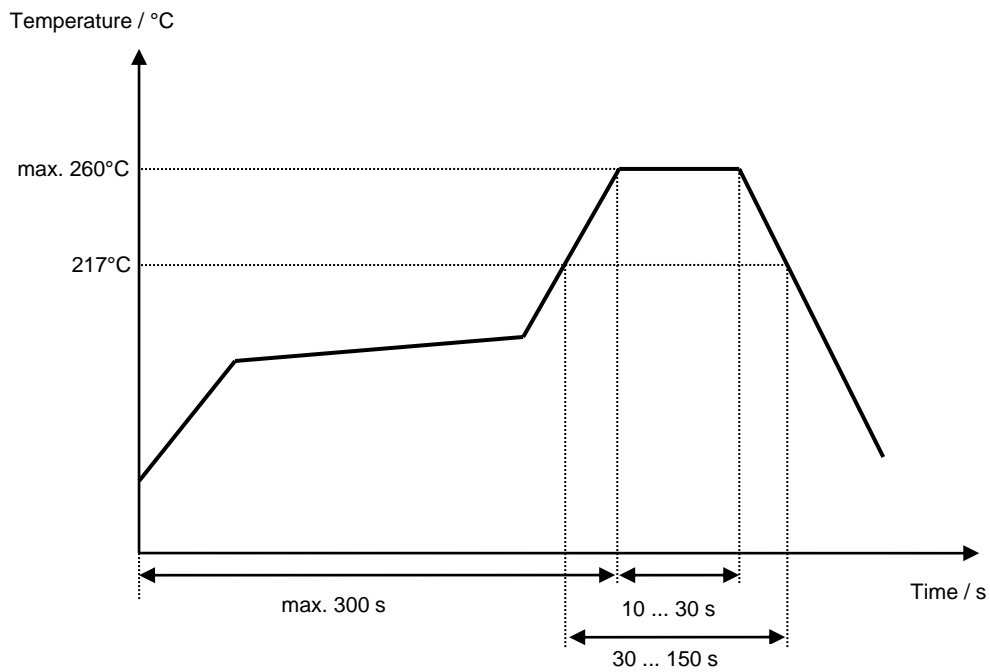
Air reflow temperature conditions

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| 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****TFS 609****5/5**

History

| Version | Reason of Changes | Name | Date |
|----------------|--|-------------|-------------|
| 1.0 | - Generation of development specification | Molke | 06.05.2014 |
| 2.0 | - Absolute attenuation relaxed (1 ... 30 MHz) | Molke | 22.08.2014 |
| 2.1 | - Change from development spec to filter spec - Typical values added - Filter characteristic added | Molke | 25.08.2015 |

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