

**Microchip****Filter specification****TFS 915E****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 pass band is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 915 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.

| <b>D a t a</b>                              |                 | <b>typ. value</b> |       | <b>tolerance / limit</b> |         |
|---|-----------------|-------------------|-------|--------------------------|---------|
| <b>Insertion loss</b>                       | $a_e = a_{max}$ | 2,5               | dB    | max.                     | 2,9 dB  |
| <b>Nominal frequency</b>                    | $f_N$           | -                 |       |                          | 915 MHz |
| <b>Passband</b>                             |                 | -                 |       | $f_N \pm$                | 13 MHz  |
| <b>Pass band ripple</b>                     | PB              | 1,0               | dB    | max.                     | 1,5 dB  |
| <b>Absolute attenuation</b>                 | $a_{abs}$       |                   |       |                          |         |
| 0,3 MHz ...                                 | 790 MHz         | 53                | dB    | min.                     | 50 dB   |
| 790 MHz ...                                 | 860 MHz         | 47                | dB    | min.                     | 40 dB   |
| 970 MHz ...                                 | 1040 MHz        | 41                | dB    | min.                     | 30 dB   |
| 1040 MHz ...                                | 1250 MHz        | 48                | dB    | min.                     | 45 dB   |
| 1500 MHz ...                                | 2000 MHz        | 39                | dB    | min.                     | 30 dB   |
| <b>Group delay</b>                          |                 | 55                | ns    | max.                     | 65 ns   |
| <b>Group delay ripple within PB</b>         |                 | 25                | ns    | max.                     | 35 ns   |
| <b>Input power level</b>                    |                 | -                 |       | max.                     | 10 dBm  |
| <b>Operating temperature range</b>          | OTR             | -                 |       | - 40 °C ... + 85 °C      |         |
| <b>Storage temperature range</b>            |                 | -                 |       | - 40 °C ... + 85 °C      |         |
| <b>Temperature coefficient of frequency</b> | $TC_f^*$        | -40               | ppm/K |                          | -       |

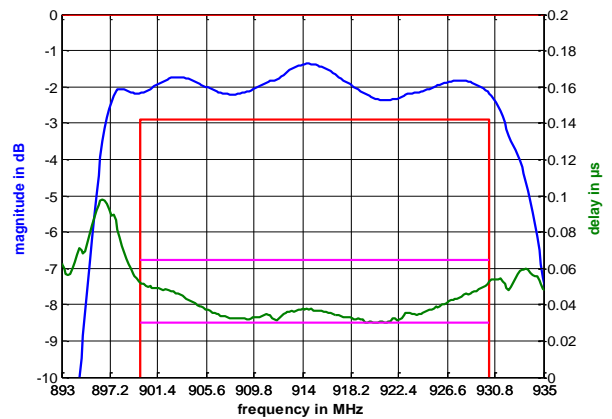
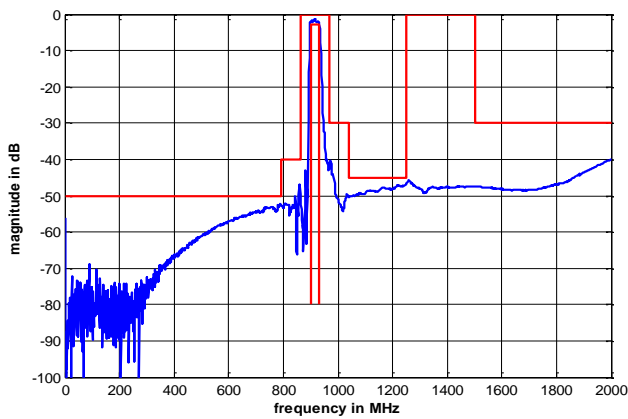
\*)  $\Delta f_c(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{CAT}(\text{MHz})$ .

**Generated:****Checked / Approved:**

**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

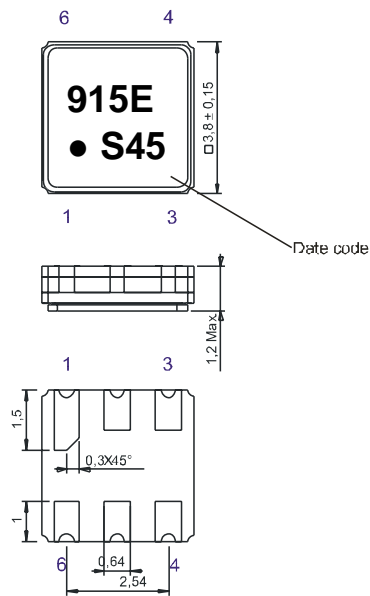
Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Filter characteristic**



**Construction and pin connection**

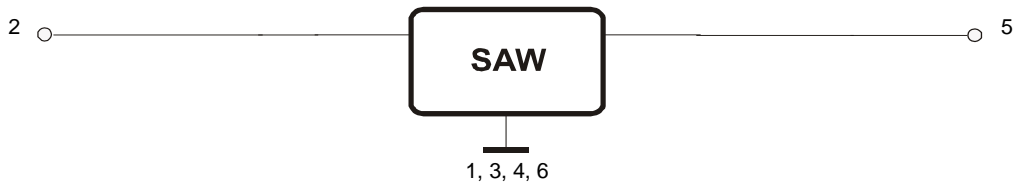
(All dimensions in mm)



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

Date code: Year + week  
 S 2004  
 T 2005  
 U 2006  
 ...

**50 Ω Test circuit**



**Microchip Frequency Technology GmbH**  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**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 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;

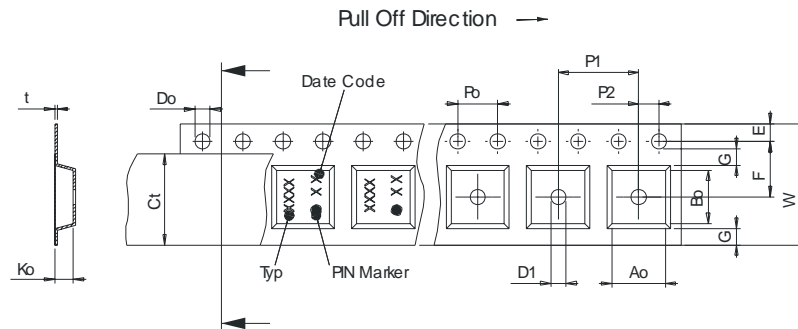
**Packing**

Tape & Reel: IEC 286 – 3, with 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 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

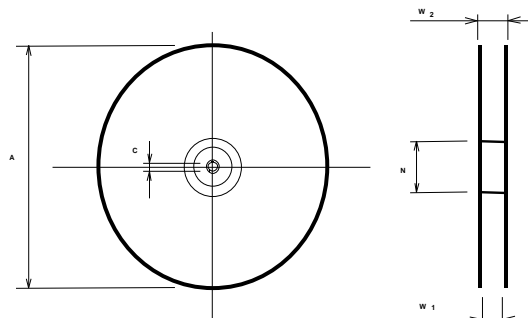
**Tape (all dimensions in mm)**

- W : 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 : 9,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- 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.

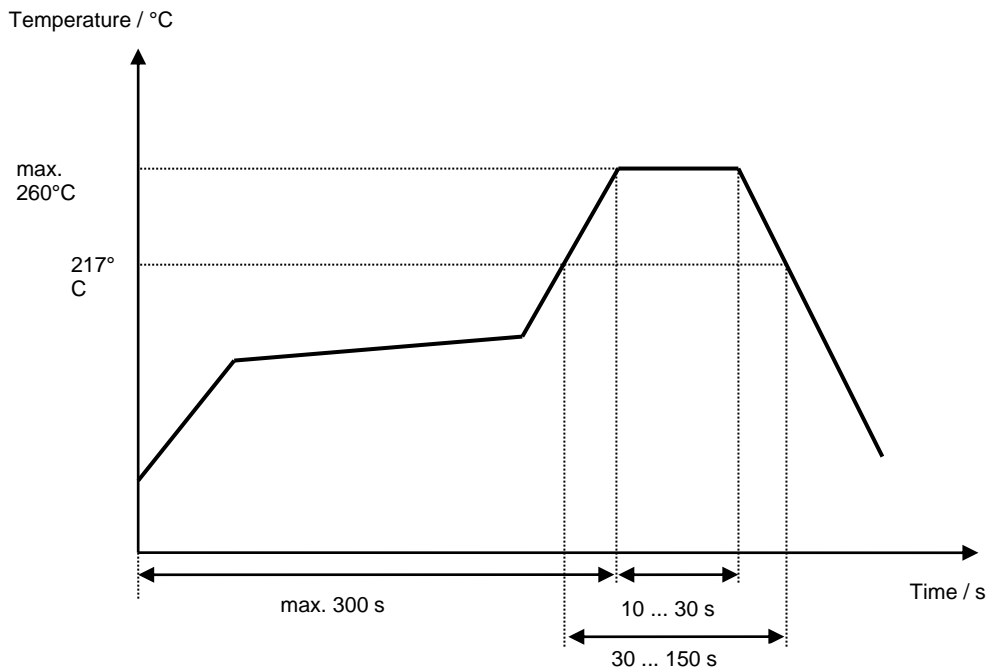
**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Air reflow temperature conditions**

| <b>Conditions</b>                          | <b>Exposure</b>             |
|--|-----------------------------|
| 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**



**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

---

**Microchip****Filter specification****TFS 915E****5/5**

---

**History**

| <b>Version</b> | <b>Reason of Changes</b>                              | <b>Name</b> | <b>Date</b> |
|----------------|---|-------------|-------------|
| 1.0            | - Generation of filter specification                  | Noack       | 04.11.2004  |
| 1.1            | - Change operating temperature range (-30°C to -40°C) | Noack       | 15.11.2004  |

---

**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

---

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.