

**Measurement condition**

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

**Characteristics**

## Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS836G is the maximum attenuation in the pass band. The maximum attenuation in the pass band is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 836.5 MHz without any tolerance or limit. The values of relative attenuation  $a_{rel}$  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>                       | $a_e$     | 1.8 dB            | max. 3.0 dB              |
| <b>Nominal frequency</b>                    | $f_N$     |                   | 836.5 MHz                |
| <b>Passband</b>                             | PB        |                   | $f_N \pm 12.5$ MHz       |
| <b>Pass band variation</b>                  |           | 1.1 dB            | max. 1.5 dB              |
| <b>Relative attenuation</b>                 | $a_{rel}$ |                   |                          |
| 764 MHz ... 784 MHz                         |           | 28 dB             | min. 25 dB               |
| 784 MHz ... 804 MHz                         |           | 38 dB             | min. 10 dB               |
| 869 MHz ... 889 MHz                         |           | 63 dB             | min. 10 dB               |
| 889 MHz ... 909 MHz                         |           | 29 dB             | min. 25 dB               |
| <b>Return loss within PB</b>                |           | 10 dB             | min. 8 dB                |
| <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> | $TC_f^*$  | 46 ppm/K          | -                        |

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

**Generated:**

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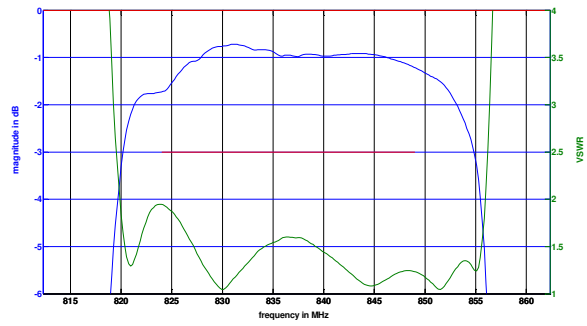
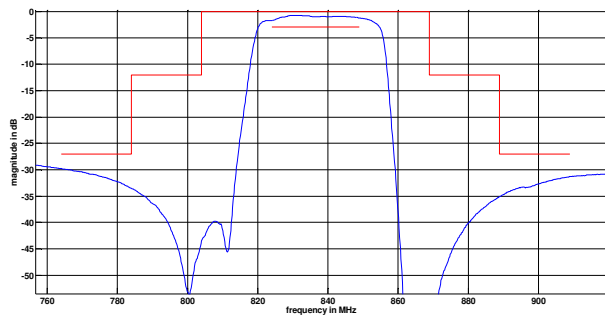
**Checked / Approved:**

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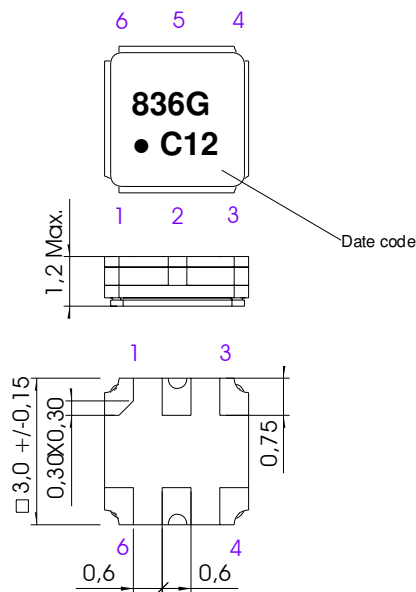
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**Filter characteristic**



**Construction and pin connection**

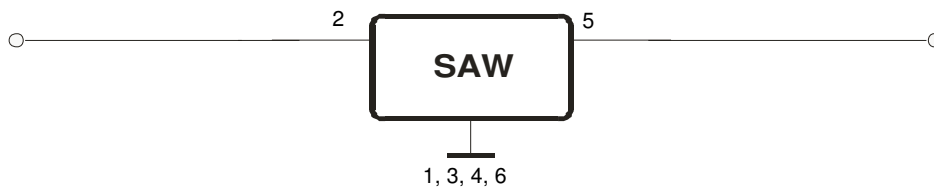
(All dimensions in mm)



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

- Date code: Year + week
- B 2011
  - C 2012
  - D 2013
  - ...

**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 5 g respectively, 1 octave per min, 10 cycles per plan, 3 planes;  
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: three times max.;  
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)

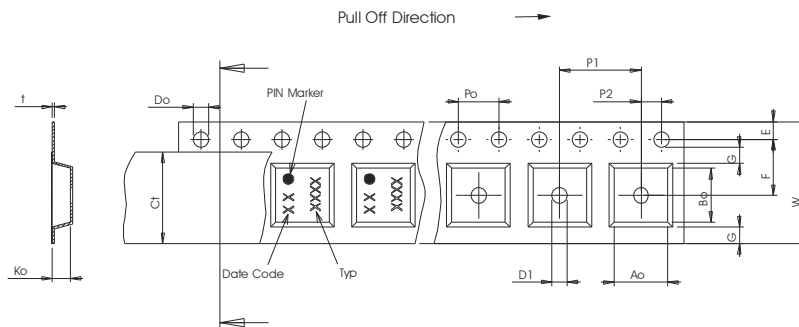
**Packing**

Tape & Reel: IEC 286 – 3, with 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 |

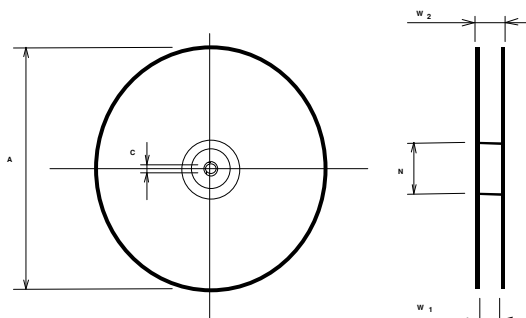
**Tape (all dimensions in mm)**

- W : 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 : 5,3 ± 0,1



**Reel (all dimensions in mm)**

- A : 180
- W1 : 8,4 +1,5/-0
- W2(max) : 14,4
- N(min) : 60
- C : 13,0 ± 0,2



The minimum bending radius is 45 mm.

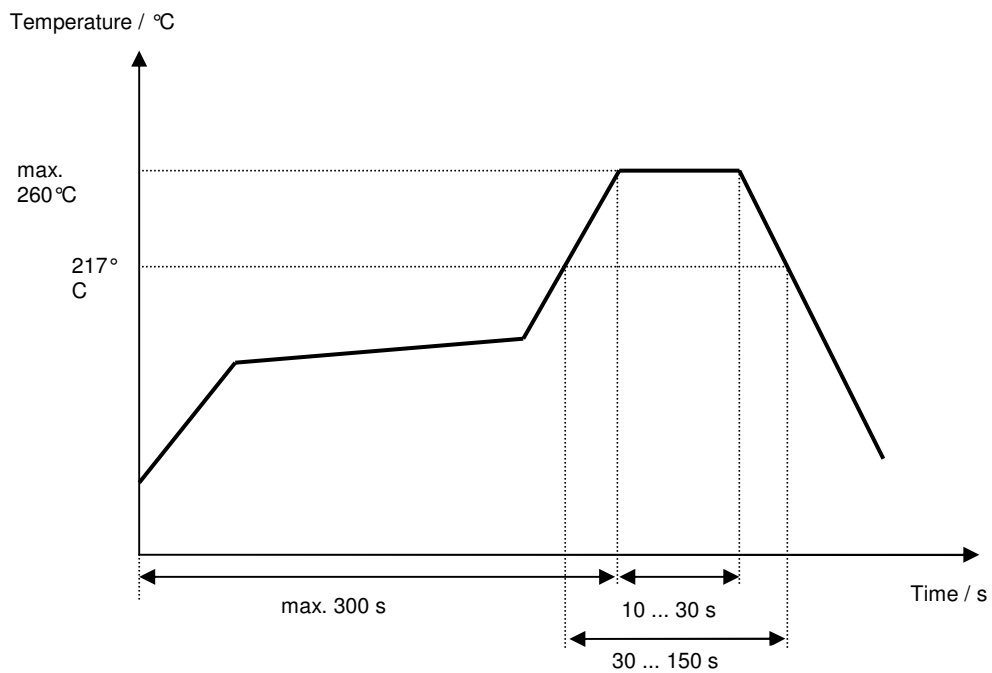
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**Air reflow temperature conditions**

| <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**



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**History**

| <b>Version</b> | <b>Reason of Changes</b>  | <b>Name</b>    | <b>Date</b> |
|----------------|---|----------------|-------------|
| 1.0            | - Generation of development specification   | S.Springfeldt  | 04.01.2012  |
| 1.1            | - typo correction in absolute attenuation   | S. Springfeldt | 04.01.2012  |
| 2.0            | - Change reference level towards relative attenuation<br>- fixing power input level | S.Springfeldt  | 16.01.2012  |
| 2.1            | - Generation of filter specification  | S.Springfeldt  | 26.03.2012  |

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