

**VI TELEFILTER****Filter specification****TFS 365B****1/5****Measurement condition**

Ambient temperature  $T_A$ : 23 °C  
 Input power level: 0 dBm  
 Terminating impedances at  $f_C$  \*):  
     input: 590  $\Omega$  // -6,6 pF  
     output: 260  $\Omega$  // -5,5 pF

**Characteristics****Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 365B 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 0,8 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 365 MHz without any tolerance. The given values for both the relative attenuation  $a_{rel}$  and the group delay ripple have to be achieved at the frequencies given below even if the centre frequency  $f_C$  is shifted due to the temperature coefficient of frequency  $TC_f$  in the operating temperature range and due to a production tolerance for the centre frequency  $f_C$ .

| <b>D a t a</b>                                                                |           | <b>typ. value</b> |                    | <b>tolerance / limit</b> |            |
|-------------------------------------------------------------------------------|-----------|-------------------|--------------------|--------------------------|------------|
| <b>Insertion loss</b><br>(reference level)                                    | $a_e$     | 9                 | dB                 | max.                     | 14,5 dB    |
| <b>Nominal frequency</b>                                                      | $f_N$     | -                 |                    | 365                      | MHz        |
| <b>Centre frequency at ambient temperature</b>                                | $f_C$     | 365,025           | MHz                | -                        |            |
| <b>Pass band</b>                                                              | PB        | -                 |                    | $f_N \pm$                | 0,5 MHz    |
| <b>Amplitude ripple within PB</b>                                             |           | 0,3               | dB                 | max.                     | 0,8 dB     |
| <b>In band ripple</b><br>(in any 112,5 kHz increment within the PB)           |           | 0,15              | dB                 | max.                     | 0,5 dB p-p |
| <b>Relative attenuation</b>                                                   | $a_{rel}$ |                   |                    |                          |            |
| $f_N$ ..... $f_N \pm$ 0,5 MHz                                                 |           | 0,3               | dB                 | max.                     | 0,8 dB     |
| $f_N \pm$ 1,2 MHz ..... $f_N \pm$ 1,5 MHz                                     |           | 40                | dB                 | min.                     | 35 dB      |
| $f_N -$ 3,0 MHz ..... $f_N -$ 1,5 MHz                                         |           | 44                | dB                 | min.                     | 40 dB      |
| $f_N +$ 1,5 MHz ..... $f_N +$ 3,2 MHz                                         |           | 43                | dB                 | min.                     | 40 dB      |
| 0,3 MHz ..... $f_N -$ 3 MHz                                                   |           | 55                | dB                 | min.                     | 50 dB      |
| $f_N +$ 3,2 MHz ..... 1,5 GHz                                                 |           | 54                | dB                 | min.                     | 50 dB      |
| <b>Group delay at <math>f_N</math></b>                                        |           | 1,6               | $\mu$ s            | max.                     | 2 $\mu$ s  |
| <b>Group delay ripple</b> in PB<br>(in any 112,5 kHz increment within the PB) |           | 90                | ns                 | max.                     | 120 ns     |
| <b>Phase linearity</b> in PB<br>(in any 112,5 kHz increment within the PB)    |           | 1                 | deg p-p            | max.                     | 5 deg p-p  |
| <b>Input power level</b>                                                      |           | -                 |                    | max.                     | 20 dBm**)  |
| <b>Operating temperature range</b>                                            |           | -                 |                    | - 40 °C ... +            | 70 °C      |
| <b>Storage temperature range</b>                                              |           | -                 |                    | - 40 °C ... +            | 100 °C     |
| <b>Turnover temperature <math>T_o</math></b>                                  |           | 22                | °C                 | -                        |            |
| <b>Temperature coefficient of frequency <math>TC_f^{***}</math></b>           |           | -0,04             | ppm/K <sup>2</sup> | -                        |            |

\*) 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.

\*\*) This power level is only allowed for short term operation (10% of the life time), the max. input power for continuous operation is max. 15dBm only

\*\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_o)^2 \times f_{T0}(\text{MHz})$

**generated:**

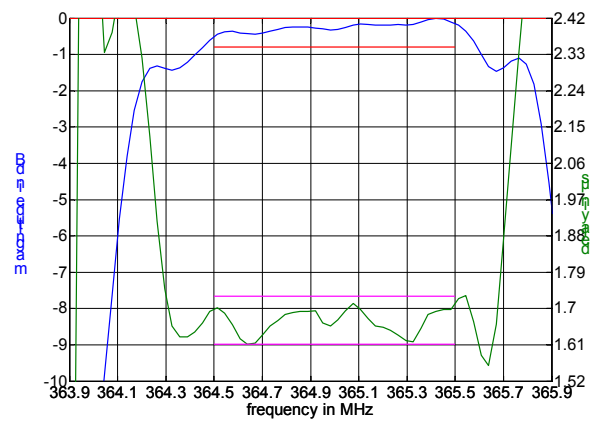
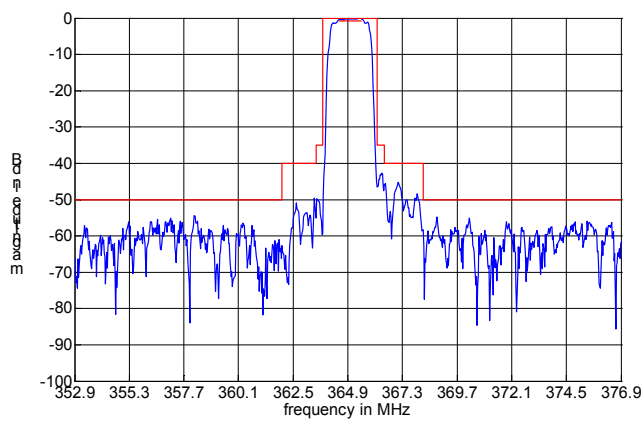
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**checked / approved:**

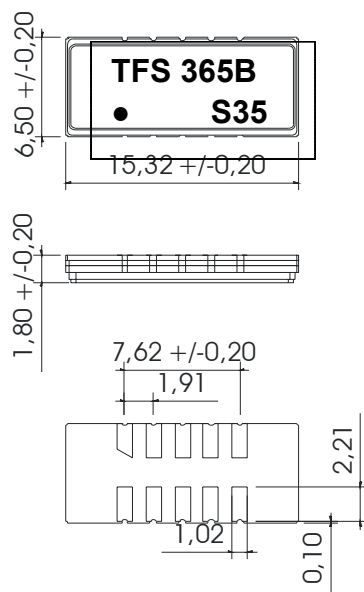
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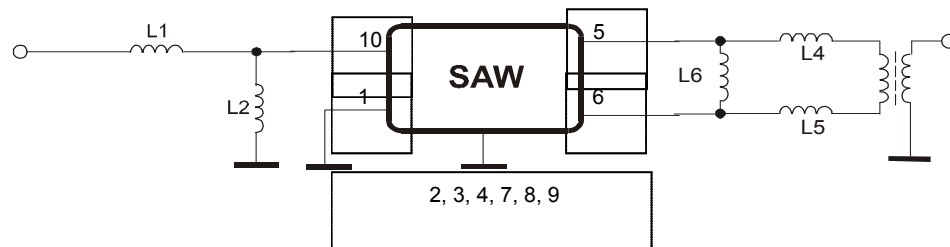
**VI TELEFILTER****Filter specification****TFS 365B****2/5****Filter characteristic****Construction and pin connection**

(All dimensions in mm)



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

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

**50 Ω Test circuit**

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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;

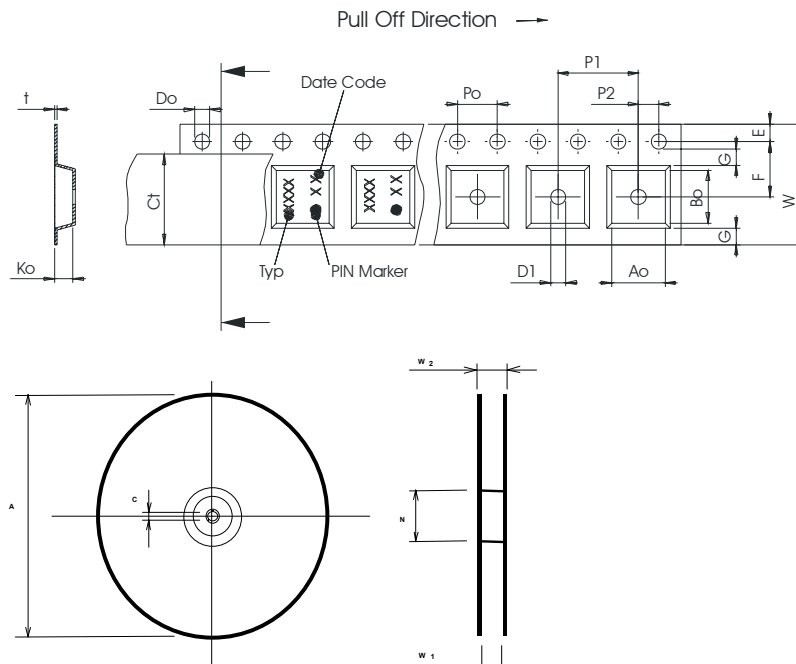
**Packing**

Tape & Reel: IEC 286 – 3, with exeption 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: 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       | : 24,00 ± 0,3  |
| Po      | : 4,00 ± 0,1   |
| Do      | : 1,50 +0,1/-0 |
| E       | : 1,75 ± 0,1   |
| F       | : 11,50 ± 0,1  |
| G(min)  | : 0,60         |
| P2      | : 2,00 ± 0,1   |
| P1      | : 12,00 ± 0,1  |
| D1(min) | : 1,50         |
| Ao      | : 7,10 ± 0,1   |
| Bo      | : 15,90 ± 0,1  |
| Ct      | : 21,5 ± 0,1   |

**Reel (all dimensions in mm)**

|         |                  |
|---------|------------------|
| A       | : 330            |
| W1      | : 24,4 +2/-0     |
| W2(max) | : 30,4           |
| N(min)  | : 60             |
| C       | : 13,0 +0,5/-0,2 |

The minimum bending radius is 45 mm.

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**VI TELEFILTER****Filter specification****TFS 365B****4/5****Air reflow temperature conditions**

1st and 2nd air reflow profile

|                     |                     |                      |                  |
|---------------------|---------------------|----------------------|------------------|
| <b>Name:</b>        | pre-heating periods | main-heating periods | peak temperature |
| <b>Temperature:</b> | 150 °C - 170 °C     | over 200 °C          | 255 °C ± 5 °C    |
| <b>Time:</b>        | 60 sec. - 90 sec.   | 20 sec. - 25 sec.    |                  |

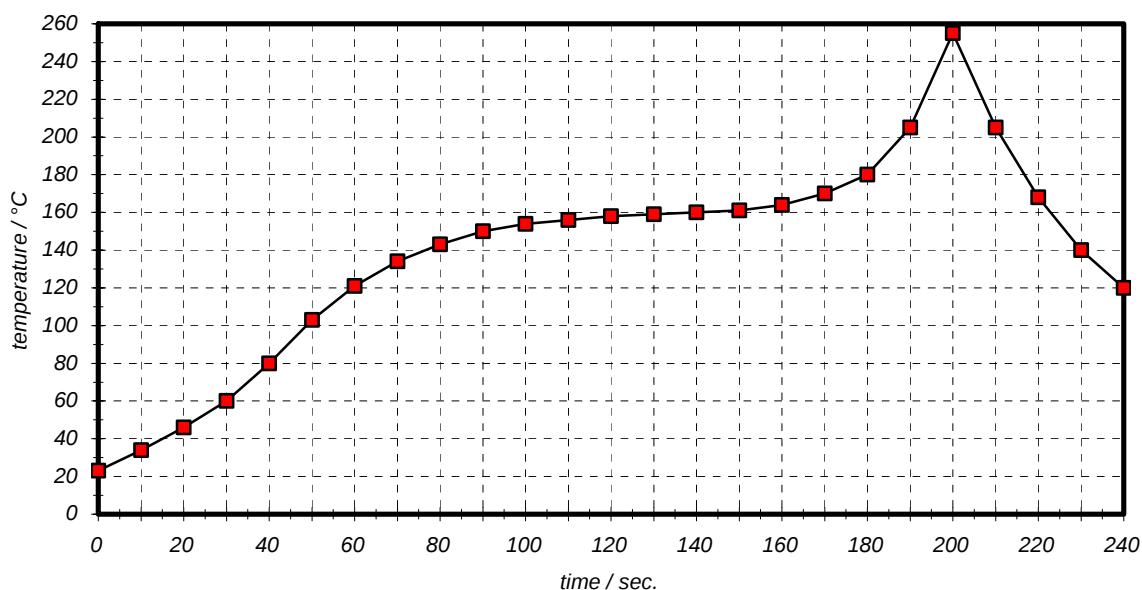
**Air reflow profile**

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

| time / sec. | temperature / °C | time / sec. | temperature / °C |
|-------------|------------------|-------------|------------------|
| 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 365B****5/5****History**

| <b>Version</b> | <b>Reason of Changes</b>                                                                            | <b>Name</b> | <b>Date</b> |
|----------------|-----------------------------------------------------------------------------------------------------|-------------|-------------|
| 1.0            | Generate development specification                                                                  | Roizengaft  | 22.12.2003  |
| 1.1            | Change of relative attenuation from 39 dB to 35 dB                                                  | Dr. Wall    | 12.01.2004  |
| 1.2            | Change of relative attenuation in between $f_c + 3\text{MHz}$ .... $f_c + 3,2\text{ MHz}$           | Pfeiffer    | 16.02.2004  |
| 1.3            | terminating impedance (preliminary values) and typical vales added<br>triple transit limits removed | Pfeiffer    | 20.02.2004  |
| 1.4            | turn over temperature, temperature coefficient and filter characteristic added                      | Pfeiffer    | 24.08.2004  |