

**VI TELEFILTER**

**Filter specification**

**TFS 365B**

**Measurement condition**

Ambient temperature  $T_A$ : 23 °C  
 Input power level: 0 dBm  
 Terminating impedances at  $f_C$  \*):  
     input: 590 Ω// -6,6 pF  
     output: 260 Ω// -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> (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> (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 µs	max. 2 µs
<b>Group delay ripple</b> in PB (in any 112,5 kHz increment within the PB)		90 ns	max. 120 ns
<b>Phase linearity in PB</b> (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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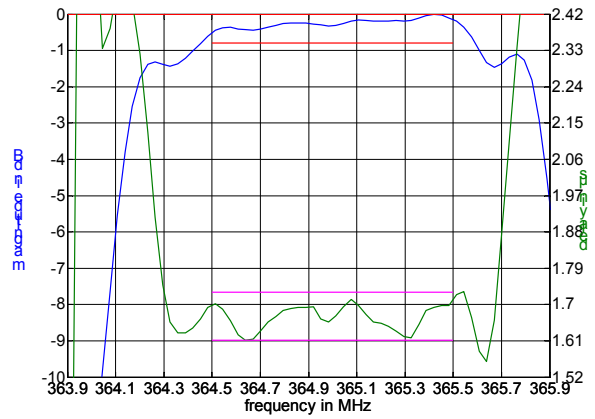
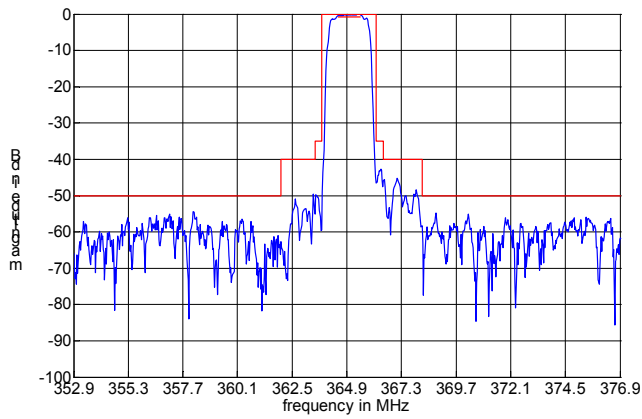
**checked / approved:**

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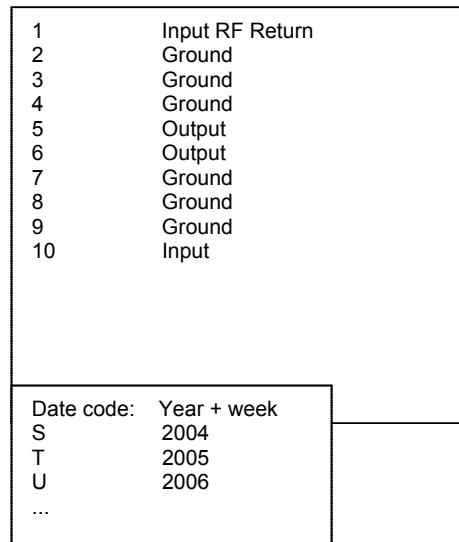
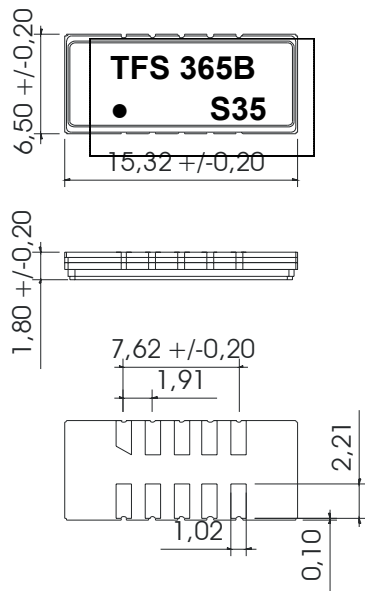
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**Filter characteristic**

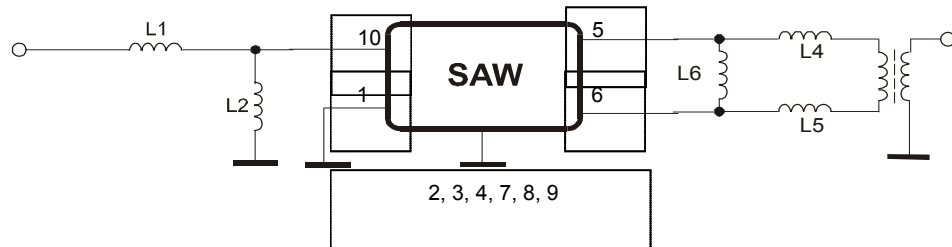


**Construction and pin connection**

(All dimensions in mm)



**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;

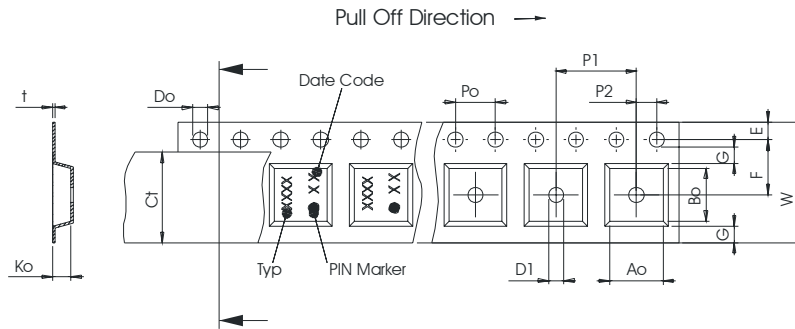
**Packing**

Tape & Reel: IEC 286 – 3, with 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: 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

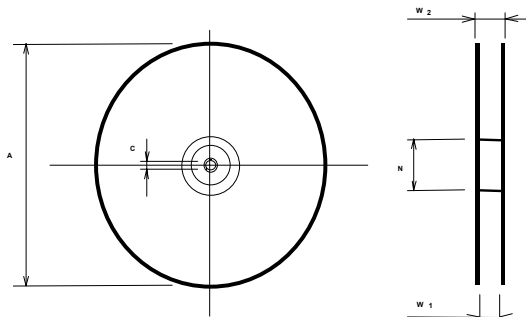
**Tape (all dimensions in mm)**

- 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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**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**

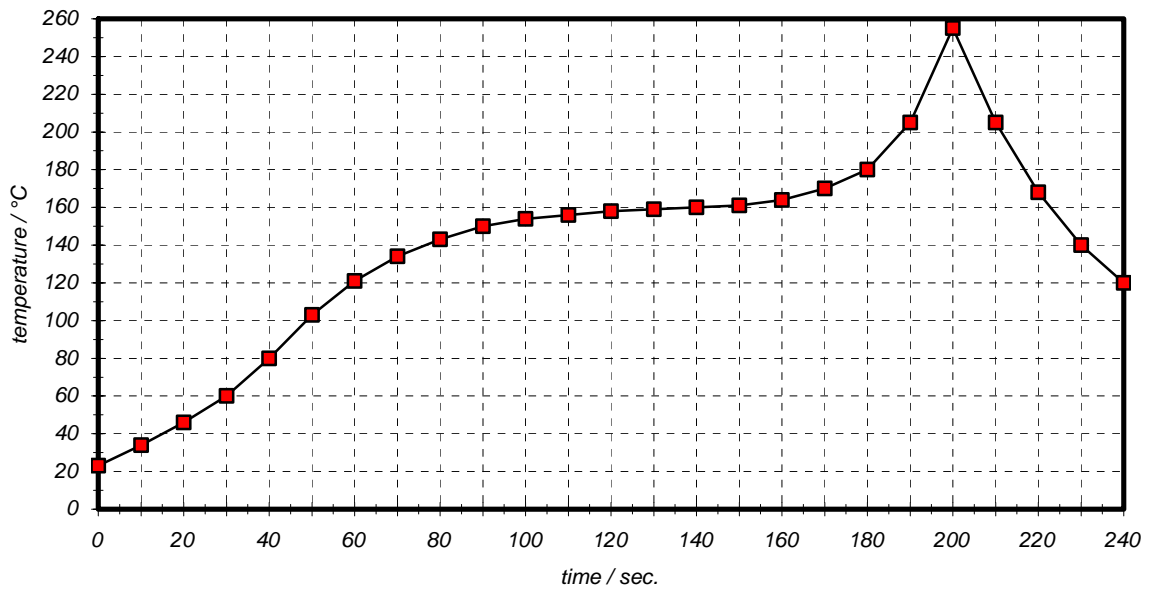


Table for temperature vs. time during the air reflow process

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

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**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 triple transit limits removed	Pfeiffer	20.02.2004
1.4	turn over temperature, temperature coefficient and filter characteristic added	Pfeiffer	24.08.2004