

**VI TELEFILTER**

**Filter specification**

**TFS 92B**

**Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 2530 Ω || -8,1 pF  
     Output: 2380 Ω || -9,4 pF

**Characteristics**

**Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 92B 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 3 dB filter attenuation level relative to the insertion loss  $a_e$ . The temperature coefficient of frequency  $TC_f$  is valid for both the reference frequency  $f_c$  and the frequency response of the filter in the operating temperature range.

<b>Data</b>		<b>typ. value</b>		<b>tolerance / limit</b>	
<b>Insertion loss</b> (reference level)	$a_e$	11,3	dB	max.	15 dB
<b>Nominal frequency</b>	$f_N$	-			92,0 MHz
<b>Centre frequency</b>	$f_c$	92,01	MHz	-	
<b>Passband</b>	PB			$f_N \pm$	500 kHz
<b>Pass band ripple</b>		0,4	dB	max.	0,8 dB
<b>Amplitude ripple in any 112,5 kHz segment within PB</b>	p-p	0,2	dB	max.	0,5 dB
<b>Relative attenuation</b>	$a_{rel}$				
$f_N$	... $f_N \pm$	500	kHz	0,4	dB max. 0,8 dB
$f_N \pm 1,1$	MHz ... $f_N \pm$	1,5	MHz	47	dB min. 39 dB
$f_N \pm 1,5$	MHz ... $f_N \pm$	3	MHz	48	dB min. 40 dB
0,3	MHz ... $f_N -$	3	MHz	60	dB min. 50 dB
$f_N + 3$	MHz ... $f_N +$	1	GHz	65	dB min. 50 dB
<b>Group delay</b>	at $f_N$	2,3	µs	max.	4 µs
<b>Group delay ripple in any 112,5 kHz segment within PB</b>		60	ns	max.	120 ns
<b>Phase linearity in any 112,5 kHz segment within PB</b>	p-p	1,4	deg	max.	5 deg
<b>Triple transit response suppression</b>		38	dB	min.	35 dB
<b>Input power level</b>		-		max.	23 dBm**)
<b>Operating temperature range</b>	OTR	-			- 40 °C ... + 70°C
<b>Storage temperature range</b>		-			- 40 °C ... + 100°C
<b>Frequency inversion temperature</b>		15	°C		-
<b>Temperature coefficient of frequency</b>	$TC_f$ **	-0,036	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

\*\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T-T_0)^2 \times f_{T0}(\text{MHz})$

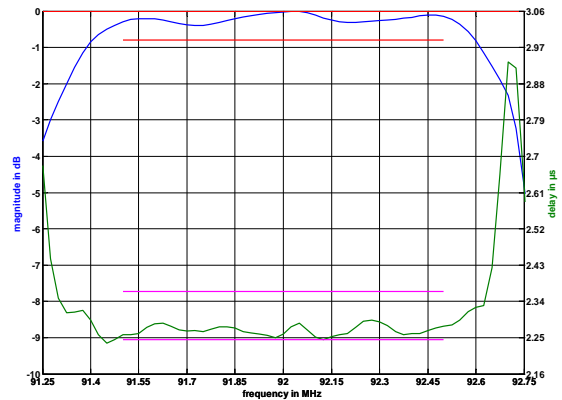
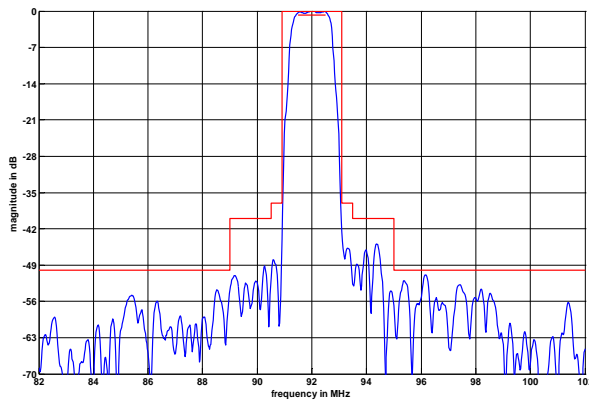
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**Checked / Approved:**

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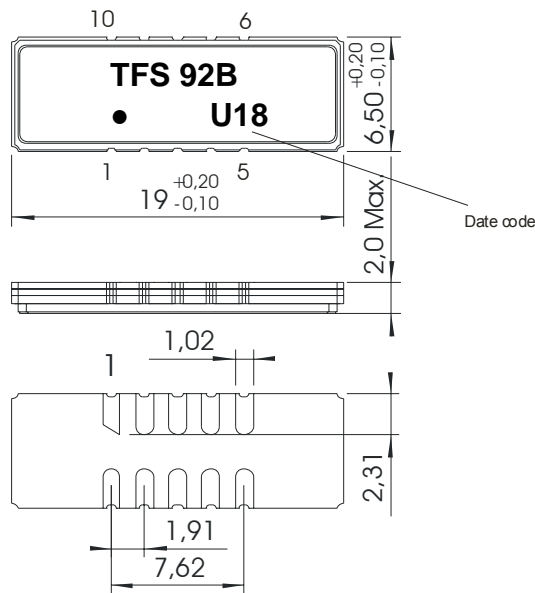
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**Filter characteristic**



**Construction and pin connection**

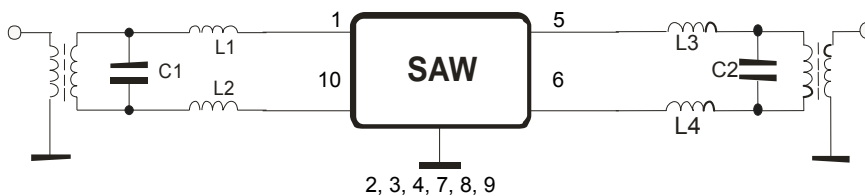
(All dimensions in mm)



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

Date code: Year + week  
 U 2006  
 V 2007  
 W 2008  
 ...

**50 Ohm 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 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;

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

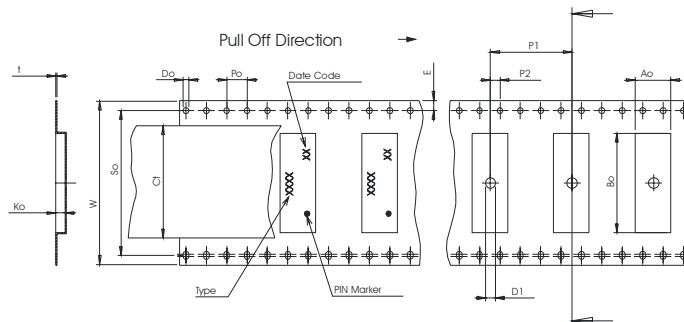
**Packing**

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:	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

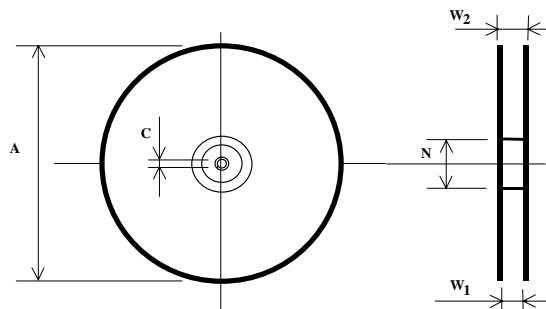
**Tape (all dimensions in mm)**

- W : 32,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 14,20 ± 0,1
- P2 : 2,00 ± 0,1
- P1 : 12,00 ± 0,1
- D1(min) : 2,00
- Ao : 7,10 ± 0,1
- Bo : 19,60 ± 0,1
- So : 28,40 ± 0,1
- Ct : 25,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 32,4 +2/-0
- W2(max) : 38,4
- N(min) : 100
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

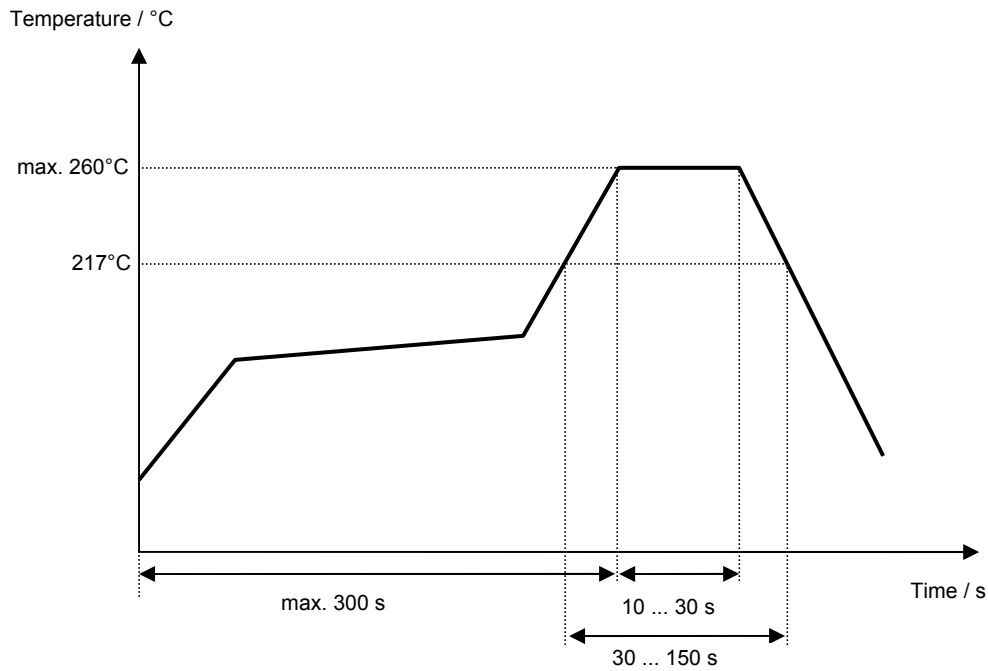
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**Air reflow temperature conditions**

<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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**VI TELEFILTER****Filter specification****TFS 92B****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification	Strehl	18.10.2005
1.1	- Change relative attenuation - Change "stability characteristics" to "stability characteristics, reliability"	Strehl	15.11.2005
1.2	- terminating impedances, typical values and filter characteristic added	Pfeiffer	03.05.2006

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