

**VI TELEFILTER****Filter specification****TFS 163A****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	33 Ω    19,6 pF	
Output:	33 Ω    19,8 pF	

**Characteristics**

## Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS163A 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 reference 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 both for the reference frequency  $f_c$  and the frequency response of the filter in the operating temperature range. The bandwidth 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> (reference level)	$a_e$	24,2	dB	max. 25	dB
<b>Nominal frequency</b>	$f_N$	-		163,65	MHz
<b>Centre frequency</b>	$f_c$	163,65	MHz	163,65	± 0,1 MHz
<b>Passband</b>	PB	-		$f_N$ ±	8,8 MHz
<b>Pass band ripple (p-p)</b>		0,7	dB	max.	1,0 dB
<b>Bandwidth</b>	BW				
3 dB		18,02	MHz	min.	17,92 MHz
15 dB		18,73	MHz	max.	18,78 MHz
45 dB		19,20	MHz	max.	20,0 MHz
<b>Relative attenuation</b>	$a_{rel}$				
$f_c$	... $f_c$ ±	8,96	MHz	2,4	dB
$f_c$ ±	9,39 MHz ... $f_c$ ±	9,60	MHz	19	dB
$f_c$ ±	9,60 MHz ... $f_c$ ±	10,00	MHz	47	dB
$f_c$ ±	10,00 MHz ... $f_c$ ±	10,90	MHz	47	dB
$f_c$ +	10,90 MHz ... $f_c$ +	400	MHz	54	dB
$f_c$ -	140 MHz ... $f_c$ -	10,90	MHz	54	dB
<b>Absolute group delay within PB</b>		2,6	µs	max.	4 µs
<b>Group delay ripple within PB (p-p)</b>		85	ns	max.	150 ns
<b>Operating temperature range</b>	OTR	-		- 25 °C ... + 80 °C	
<b>Storage temperature range</b>		-		- 40 °C ... + 85 °C	
<b>Temperature coefficient of frequency</b>	$TC_f$ **	-87	ppm/K	-	

\*) 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.

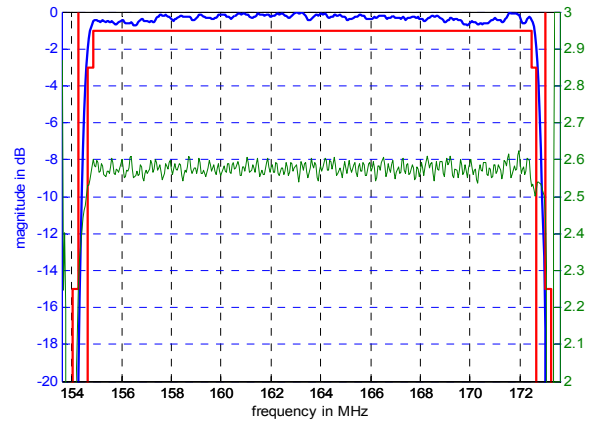
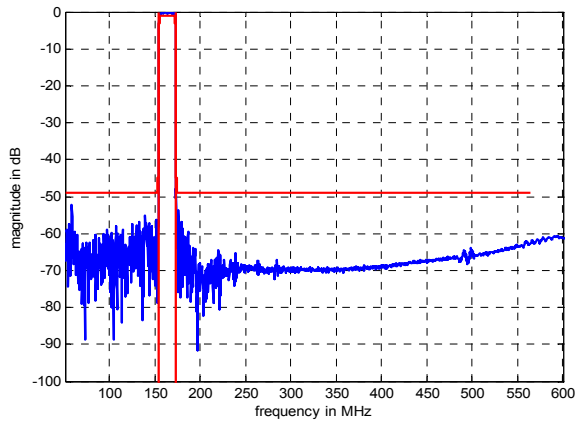
\*\*\*)  $\Delta f_c(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_A) \times f_{CAT}(\text{MHz})$

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

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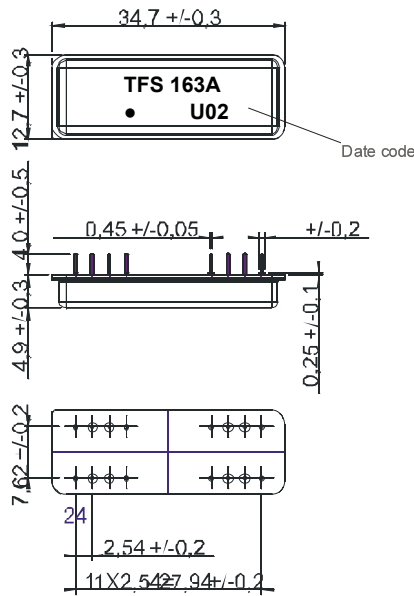
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**Filter characteristic**



**Construction and pin connection**

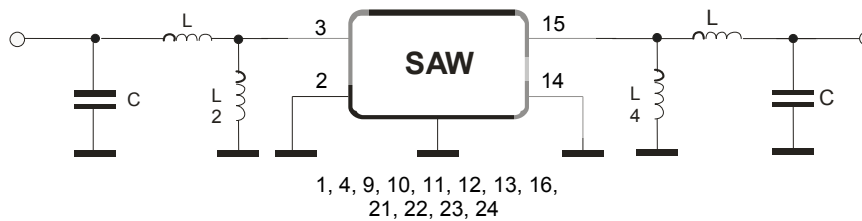
(All dimensions in mm)



- 1 Ground
- 2 Input RF Return
- 3 Input
- 4 Ground
- 9,10,11,12 Ground
- 13 Ground
- 14 Output RF Return
- 15 Output
- 16 Ground
- 21,22,23,24 Ground

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

**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 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)

**Air reflow temperature conditions**

Conditions	Exposure
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 163A****5/5****History**

<b>Version</b>	<b>Reason of changes</b>	<b>Name</b>	<b>Date</b>
1.0	- specification generated	Pfeiffer	02.12.2005
1.1	- change 3 dB bandwidth	Noack	20.12.2005
1.2	- generation of filter specification - added typical value - added filter characteristic	Noack	11.01.2006

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