

**Microchip****Filter specification****TFD 150AM****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	165 $\Omega$	- 5,9 pF
Output:	220 $\Omega$	- 3,7 pF

**Characteristics**

## Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFD 150AM 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 nominal frequency  $f_N$  is fixed at 150,0 MHz without any tolerance. The given values for both the relative attenuation  $a_{rel}$  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)	$a_e$	23	dB	max. 26 dB
<b>Nominal frequency</b>	$f_N$	-		150,0 MHz
<b>Centre frequency at ambient temperature</b>	$f_c$	150,0	MHz	$\pm$ 0,3 MHz
<b>Passband</b>	PB	-		$f_N \pm$ 25 MHz
<b>Pass band ripple <math>f_c \pm 15</math> MHz (p-p)</b>		0,3	dB	max. 1,0 dB
<b>Pass band ripple <math>f_c \pm 25</math> MHz (p-p)</b>		0,5	dB	max. 1,5 dB
<b>Relative attenuation</b>	$a_{rel}$			
$f_c$ ... $f_c \pm 15$ MHz		0,5	dB	max. 1 dB
$f_c \pm 15$ MHz ... $f_c \pm 25$ MHz		0,7	dB	max. 1,5 dB
$f_c \pm 50$ MHz ... $f_c \pm 100$ MHz		40	dB	min. 20 dB
<b>Average group delay within PB ***;****</b>		5000	ns	$\pm$ 10 ns
<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>	$TC_f$ **	-92	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.

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

\*\*\*\*) The average delay is likely to be measured in the time domain. This is the delay of the main peak in the time domain.

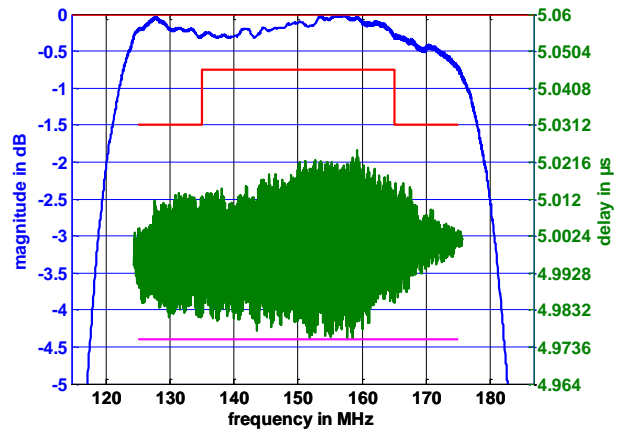
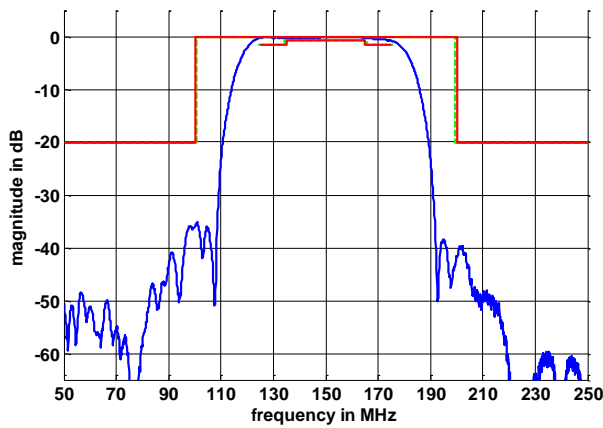
\*\*\*\*\*) The average delay variation due to change in temperature is not included.

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

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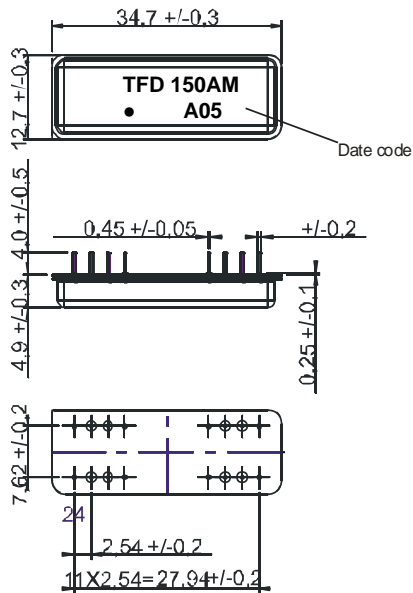
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**Filter characteristic**



**Construction and pin connection**

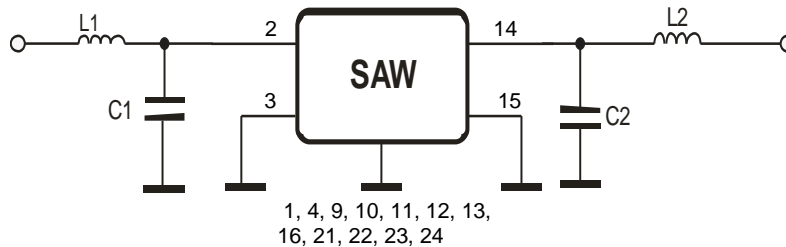
(All dimensions in mm)



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

Date code: Year + week  
 A 2010  
 B 2011  
 C 2012  
 ...

**50 Ohm Test circuit**



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**Stability characteristics, reliability**

After the following tests the filter shall meet the whole specification:

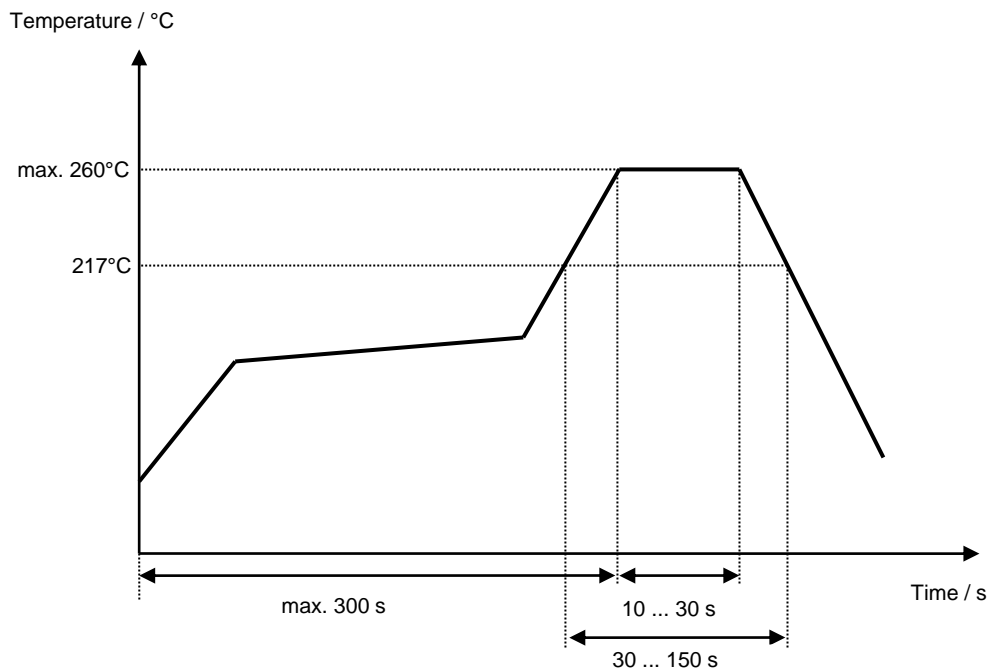
1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: 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)

**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**



**History**

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**Microchip****Filter specification****TFD 150AM****5/5**

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<b>Version</b>	<b>Reason of changes</b>	<b>Name</b>	<b>Date</b>
1.0	- development specification	Pfeiffer	30.11.2009
1.1	- improved insertion loss	A Jaffer	04.12.2009
1.2	- pass band ripple changed, matching configuration added - typical values added (preliminary values)	Pfeiffer	29.01.2010
1.3	- tolerance of center frequency changed	Molke	11.06.2010
1.4	- add filter characteristic, terminating impedances, move to filter specification	A Jaffer	11.08.2010

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