Measurement condition

Ambient temperature T_A:	25 °C ± 2°C	
Input power level:	0 dBm	
Terminating impedances at f_C: *	input:	490 Ω ‖ -12,9 pF
	output:	450 Ω ‖ -11,9 pF.

Characteristics

Remark: Reference level for the relative attenuation a_{rel} of the **TFS 174D** 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 174,2 MHz without tolerance. The given values for the relative attenuation a_{rel} and for the group delay ripple have to be reached 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.

D a t a		**typ. value**	**tolerance / limit**	
Insertion loss (reference level)	a_e	6,3 dB	max. 8,0	dB
Nominal frequency	f_N	-	174,2	MHz
Centre frequency	f_C	174,21 MHz	-	
Passband	PB	-	f_N ± 67	kHz
Amplitude ripple in PB	p-p	0,10 dB	max. 0,25	dB
3 dB bandwidth	BW	750 kHz	min. 660	kHz
Relative attenuation	a_{rel}			
f_N	f_N ± 67 kHz	0,10 dB	max. 0,25	dB
f_N ± 67 kHz	f_N ± 125 kHz	0,10 dB	max. 1,00	dB
f_N ± 125 kHz	f_N ± 200 kHz	0,25 dB	max. 1,20	dB
f_N ± 200 kHz	f_N ± 330 kHz	2,6 dB	max. 3	dB
f_N ± 469 kHz	f_N ± 600 kHz	7 dB	min. 4	dB
f_N ± 600 kHz	f_N ± 860 kHz	18 dB	min. 11	dB
f_N ± 860 kHz	f_N ± 1,2 MHz	30 dB	min. 20	dB
f_N ± 1,2 MHz	f_N ± 6,0 MHz	46 dB	min. 40	dB
f_N - 154,2 MHz	f_N - 6,0 MHz	60 dB	min. 50	dB
f_N + 6,0 MHz	f_N + 225,8 MHz	60 dB	min. 50	dB
Absolute group delay in f_N ± 200 kHz		2,11 µs	max. 2,6	µs
Group delay variation in f_N ± 200 kHz		100 ns	max. 260	ns
Input power level		-	max. 22	dBm ***)
Return loss in PB		18 dB	min. 10	dB
Operating temperature range		-	-5 °C ... + 85°C	
Storage temperature range		-	- 40 °C ... + 85 °C	
Frequency inversion temperature T_0		+ 40 °C	-	
Temperature coefficient of frequency Tc_f **		- 0,04 ppm/K²	-	

*) 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.

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

***) This power level is allowed for short term operation only. The max. input power for continuous operation is max. 15 dBm only.

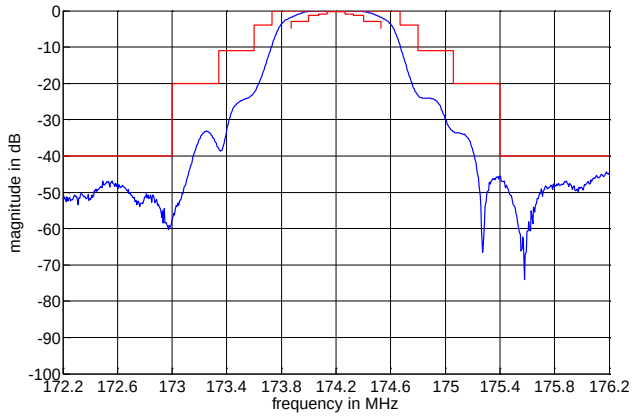
Generated:

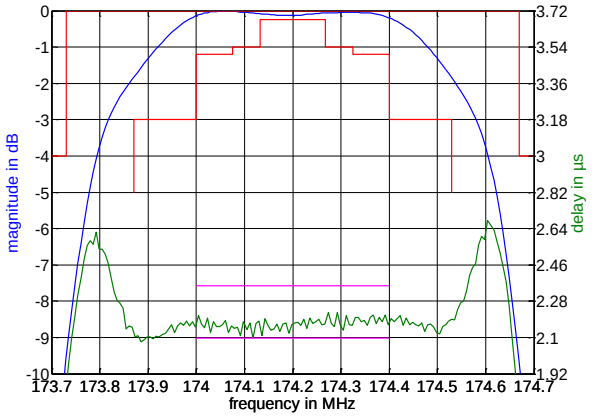
Checked / Approved:

Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

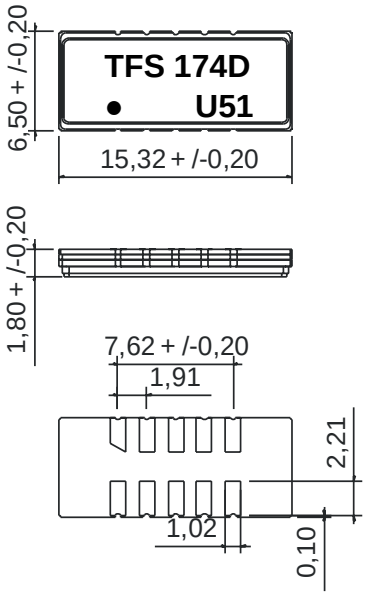
Filter characteristic





Construction and pin connection

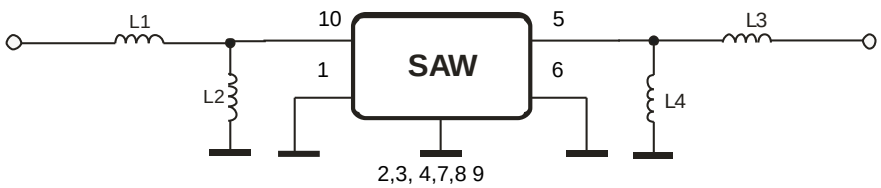
(All dimensions in mm)



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

Date code:	Year + week
T	2005
U	2006
V	2007
...	

50 Ω Test circuit



Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

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)

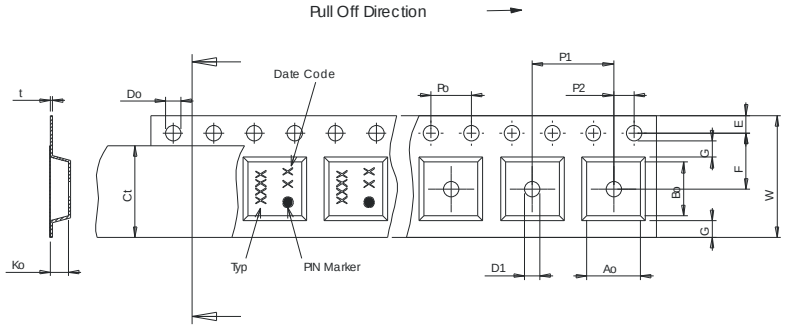
Packing

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

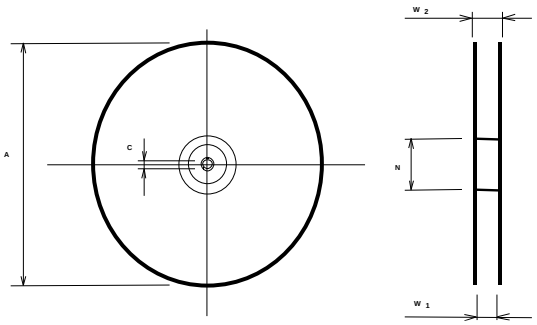
Tape (all dimensions in mm)

W	:	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.

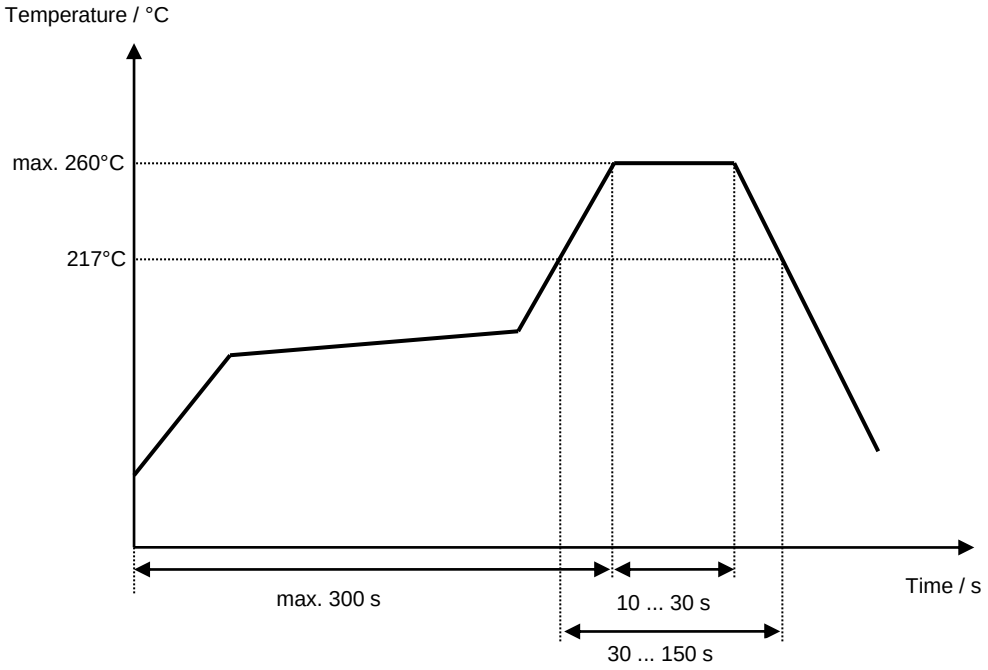
Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

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



Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

History

Version	Reason of Changes	Name	Date
1.0	- generate development specification	Roizengaft	17.12.2003
1.1	frequency range of group delay limits extended	Pfeiffer	15.01.2004
1.2	terminating impedance (preliminary value), typical values and matching configuration added	Pfeiffer	22.01.2004
1.3	terminating impedance fixed, typical values corrected	Pfeiffer	06.04.2004
1.4	power level increased stability characteristics, tape and reel and reflow profile updated	Steiner	21.12.2006

Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.