

Microchip**Filter specification****TFS 174M****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	400 Ω	-7 pF
Output:	280 Ω	-8 pF

Characteristics**Remark:**

The reference level for the relative attenuation a_{rel} of the TFS 174M is the minimum of the pass band attenuation. This value is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 174 MHz without any tolerance. The values of relative attenuation a_{rel} are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

D a t a		typ. value		tolerance / limit		
Insertion loss (reference level)		a_e	10.9	dB	max.	12 dB
Nominal frequency		f_N				174 MHz
Passband		PB	27,9	MHz	$f_N \pm$	12 MHz
Pass band ripple		p-p			max.	1 dB
Relative attenuation		a_{rel}				
f_N	... $f_N \pm$	12 MHz	0,4	dB	max.	1 dB
$f_N - 75$	MHz ... $f_N - 23$	MHz	45	dB	min.	40 dB
$f_N - 23$	MHz ... $f_N - 20$	MHz	45	dB	min.	30 dB
$f_N - 20$	MHz ... $f_N - 17$	MHz	10	dB	min.	5 dB
$f_N + 17$	MHz ... $f_N + 20$	MHz	6	dB	min.	5 dB
$f_N + 20$	MHz ... $f_N + 23$	MHz	37	dB	min.	30 dB
$f_N + 23$	MHz ... $f_N + 36$	MHz	43	dB	min.	36 dB
$f_N + 36$	MHz ... $f_N + 75$	MHz		dB	min.	38 dB
Group delay ripple within PB		p-p	17	ns	max.	100 ns
Phase ripple within PB		p-p	5,5	deg	max.	10 deg
Input power level					max.	10 dBm
Operating temperature range		OTR			- 54 °C ... + 85 °C	
Storage temperature range					- 54 °C ... + 90 °C	
Temperature coefficient of frequency		TC_f **	-88	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.

**) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T0}(\text{MHz})$, f_{T0} : frequency at room temperature

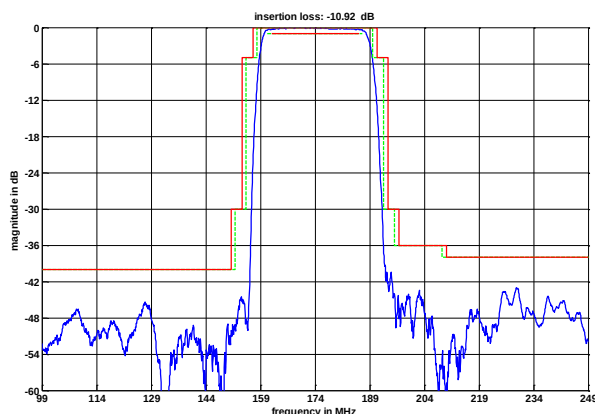
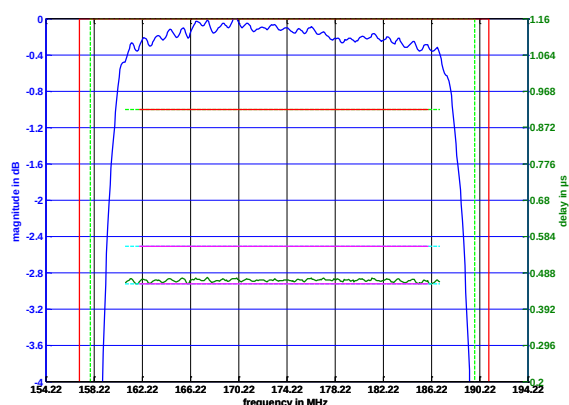
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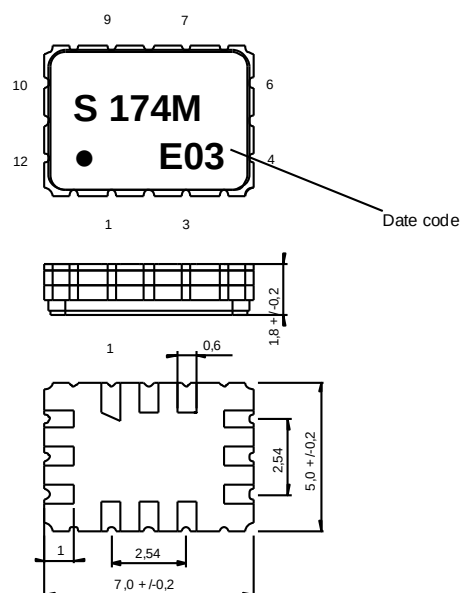
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Filter characteristic



Construction and pin connection

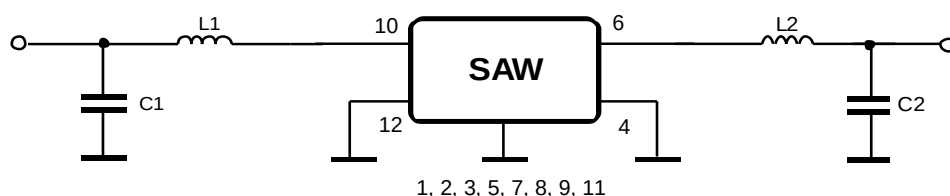
(All dimensions in mm)



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

Date code: Year + week
 E 2014
 F 2015
 G 2016
 ...

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 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 15 min. each / 100 cycles
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;
for temperature conditions, see page 4: "Air reflow temperature conditions"
5. ESD ANSI/ESD S20.20-1999, class 1A for HBM

This filter is RoHS compliant (2011/65/EU)

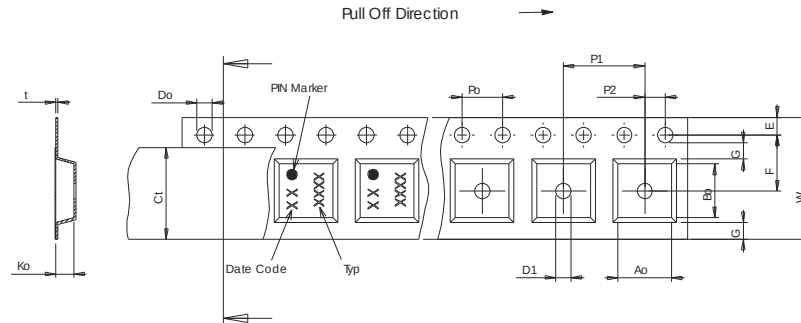
Packing

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;

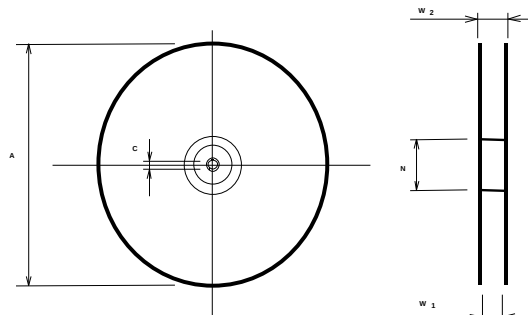
max. pieces of filters per reel: 3000
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

Tape (all dimensions in mm)

W	: 16,00 +0,3/-0,1
Po	: 4,00 ± 0,1
Do	: 1,50 +0,1/-0
E	: 1,75 ± 0,1
F	: 7,50 ± 0,1
G(min)	: 0,75
P2	: 2,00 ± 0,1
P1	: 8,00 ± 0,1
D1(min)	: 1,50
Ao	: 5,40 ± 0,1
Bo	: 7,60 ± 0,1
Ct	: 13,3 ± 0,1

**Reel (all dimensions in mm)**

A	: 330
W1	: 16,4 +2/-0
W2(max)	: 22,4
N(min)	: 50
C	: 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

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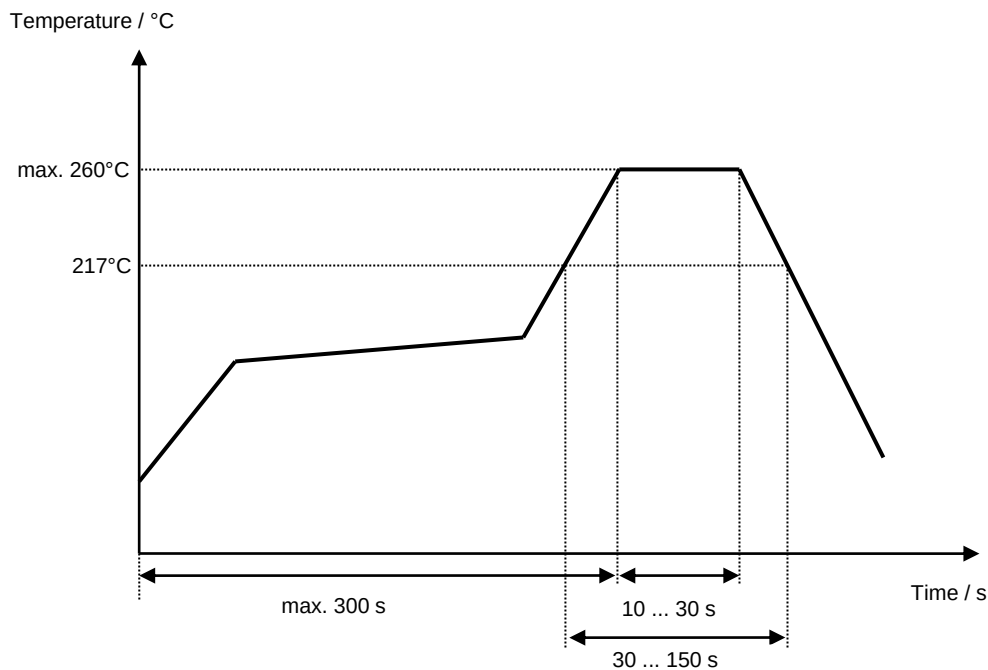
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Air reflow temperature conditions

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**Filter specification****TFS 174M****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Chilla	11.01.2012
1.1	- Created filter specification - Added terminating impedance - Added typical values - Added filter characteristic - Added test circuit	Chilla	17.01.2014

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