

Microchip**Filter specification****TFS 153C****1/5****Measurement condition**

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	63 Ω	-34 pF
Output:	55 Ω	-44 pF

Characteristics

Remark:

The nominal frequency f_N is fixed at 153.6. The insertion loss a_e is defined as loss value determined at f_N . Reference level for the relative attenuation a_{rel} of the TFS153C is 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 . All specified data are met within the operating temperature range.

D a t a	typ. value				tolerance / limit		
Insertion loss (reference level)	a_e	11.5	dB		max.	12.5	dB
Nominal frequency	f_N					153.6	MHz
Passband PB		-			$f_N \pm$	10	MHz
Ripple within PB	p-p	0.2	dB		max.	1	dB
Relative attenuation	a_{rel}						
$f_N - 152.6$ MHz ... $f_N - 15$ MHz		45	dB		min.	35	dB
$f_N + 15$ MHz ... $f_N + 138.6$ MHz		40	dB		min.	35	dB
$f_N + 138.6$ MHz ... $f_N + 168.6$ MHz		70	dB		min.	20	dB
$f_N + 168.6$ MHz ... $f_N + 346.4$ MHz		70	dB		min.	35	dB
Group delay ripple	p-p						
$f_N - 10$ MHz ... $f_N + 10$ MHz		45	ns		max.	60	ns
Phase linearity	p-p						
$f_N - 10$ MHz ... $f_N + 10$ MHz		4	deg		max.	5	deg
Triple transit response suppression		70	dB		min.	35	dB
Input power level		-			max.	17	dBm
Third order intercept	IIP3**	42	dBm		min.	35	dBm
Input /Output return loss					.		
$f_N - 4$ MHz ... $f_N + 4$ MHz		12	dB		min.	10	dB
$f_N - 10$ MHz ... $f_N + 10$ MHz		9	dB		min.	8	dB
Operating temperature range	OTR	-			-25 °C.....	+85 °C	
Storage temperature range		-			-55 °C.....	+125 °C	
Temperature coefficient of frequency	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.

**) Measured with tones spaced at 5 MHz and 10 MHz above and below f_c

***) $\Delta f = TC_f(T - T_A)f_N$

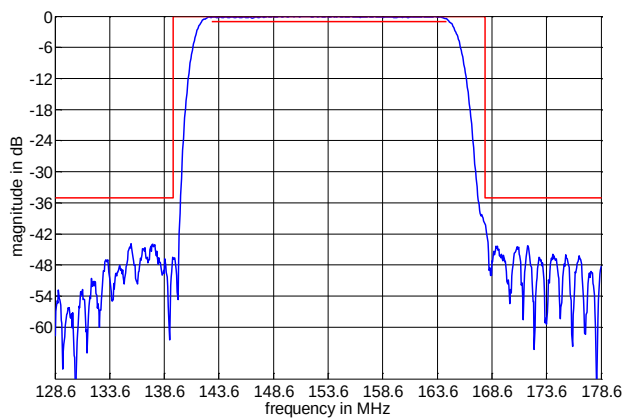
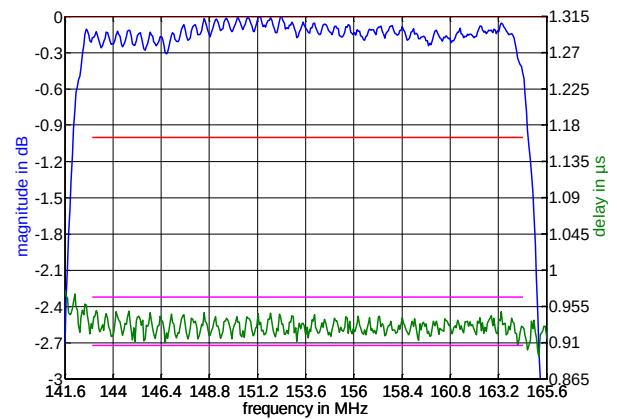
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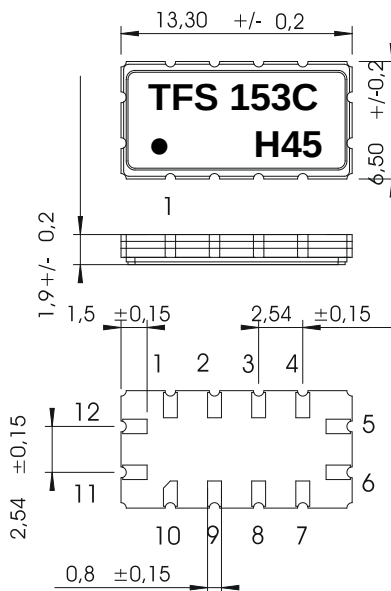
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Filter characteristic



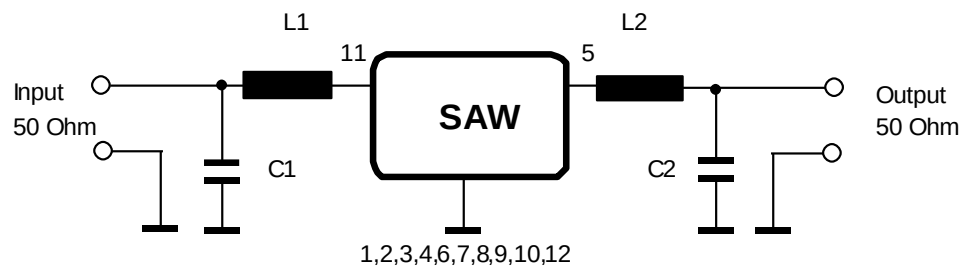
Construction and pin connection

(All dimensions in mm)



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

Date code: Year + week
H 2016
J 2017
K 2018
...

50 Ω Test circuit

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Stability characteristics, reliability

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

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 60068 T2 - 27
2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 60068 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles
DIN IEC 60068 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;
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

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;

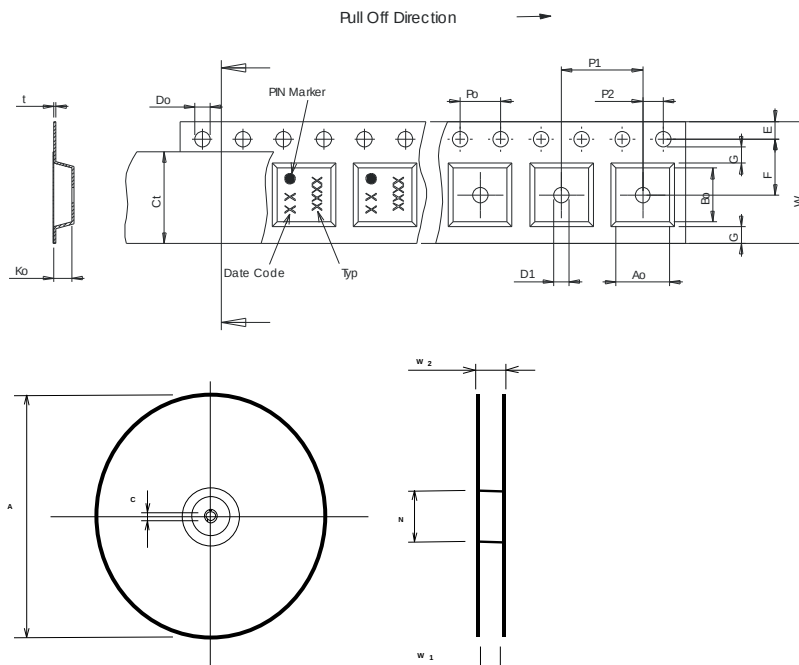
max. pieces of filters per reel:	1700
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

W	: 24.00 +0.30/-0.10
Po	: 4.00 ±0.1
Do	: 1.50 +0.1/0
E	: 1.75 ±0.10
F	: 11.50 ±0.10
G(min)	: 0.60
P2	: 2.00 ±0.1
P1	: 12.00 ±0.1
D1(min)	: 1.50
Ao	: 7.00 ±0.10
Bo	: 13.80 ±0.10
Ct	: 21.00 ±0.1
Ko	: 2.10 ±0.10
t	: 0.30 ±0.05

Reel (all dimensions in mm)

A	: 330 or 180
W1	: 24.4 +2/-0
W2(max)	: 30.40
N(min)	: 60.00
C	: 13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

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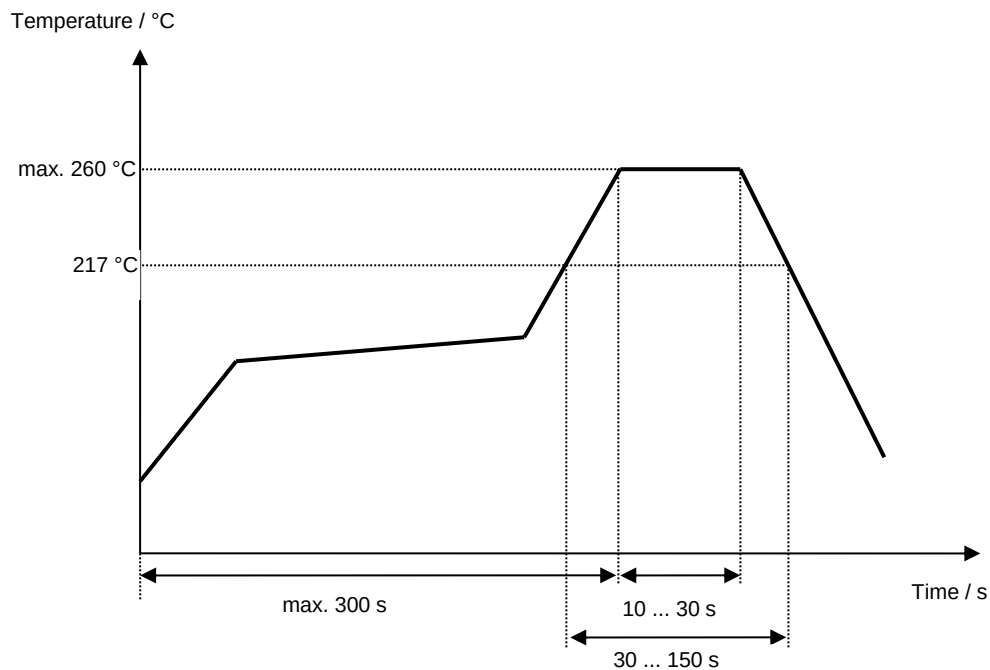
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Air reflow temperature conditions

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

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Microchip**Filter specification****TFS 153C****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- generation of specification according to customer requirements	Roizengaft	02.02.2004
1.1	- generated filter specification - added termination impedances - added typical values - changed insertion loss - changed group delay ripple - changed phase linearity - changed input/output return loss - changed IP3 description - changed storage temperature range - deleted description for power level - added filter characteristic - changed construction and pin connection - added test circuit - changed packing	Chilla	15.06.2004
1.2	- added temperature coefficient of frequency	Chilla	23.09.2005
1.3	- added IIP3	Chilla	27.02.2009
1.4	- changed temperature coefficient	Chilla	06.04.2009
2.0	- Change tape & reel dimensions - Update header and footer sections - Update data section - Update storage temperature range - Update stability characteristics, reliability	Bonnen	04.11.2016

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