

Microchip**Filter specification****TFS70L14****1/5****Measurement condition**

Ambient temperature T_A : 25 °C
 Input power level: 0 dBm
 Terminating impedances in f_C *): for input: 100 Ω | - 15.914 pF.
 for output: 131 Ω | - 15.275 pF.

Characteristics**Remark:**

Reference level for the relative attenuation a_{rel} of the TFS 70L14 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 frequency shift of the filter in the operating temperature range is not included in the production tolerance scheme.

D a t a		typ. value		tolerance / limit		
Insertion loss (reference level)	a_e	11	dB	max.	12.5	dB
Centre frequency at T_A	f_C	70	MHz		70.0±0.1	MHz
Passband	PB			f_C	± 6.5	MHz
Amplitude ripple in PB	p-p	0.4	dB	max.	1	dB
Passband 2	PB2			f_C	± 6.0	MHz
Amplitude ripple in PB2	p-p	0.5	dB	max.	0.5	dB
Bandwidth at T_A						
1	dB	13.35	MHz	min.	13	MHz
3	dB	14.5	MHz	min.	14	MHz
Relative attenuation		a_{rel}				
f_C	...	$f_C \pm 6$	MHz	0.4	dB	max. 0.5 dB
$f_C \pm 6$	MHz	$f_C \pm 6.5$	MHz	0.5	dB	max. 1 dB
$f_C \pm 6.5$	MHz	$f_C \pm 7$	MHz	2.1	dB	max. 3 dB
$f_C - 20$	MHz	$f_C - 9.65$	MHz	43	dB	min. 40 dB
$f_C + 10.35$	MHz	$f_C + 20$	MHz	43	dB	min. 40 dB
Average group delay in PB		1.1	µs	max.	1.5	µs
Group delay ripple in $f_C \pm 6.3$ MHz		p-p	65	ns	max.	90 ns
Phase linearity in $f_C \pm 6.3$ MHz		p-p	6.5	deg	max.	11 deg
Operating temperature range		OTR	-	-20 °C ... + 70 °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.

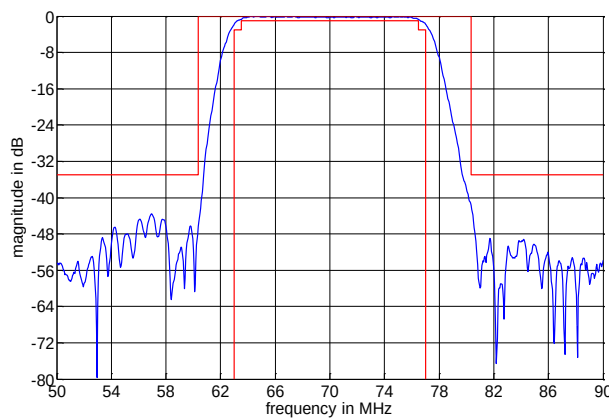
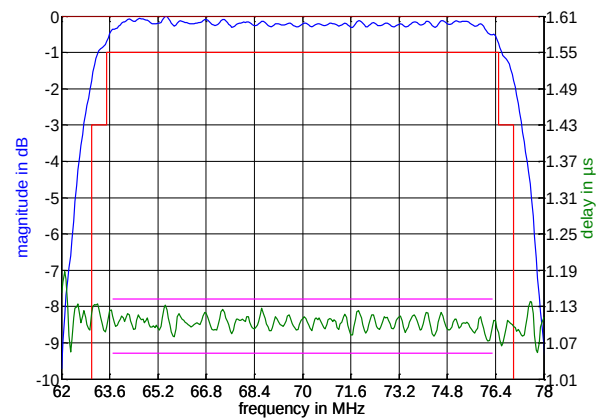
**) $\Delta f = TC_f(T - T_A)f_N$

Generated:**Checked / Approved:**

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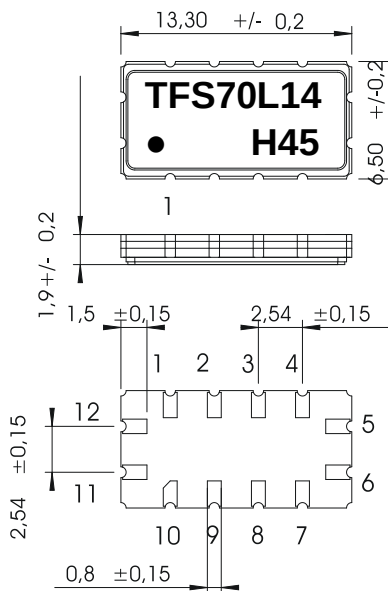
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Filter characteristic



Construction and pin connection

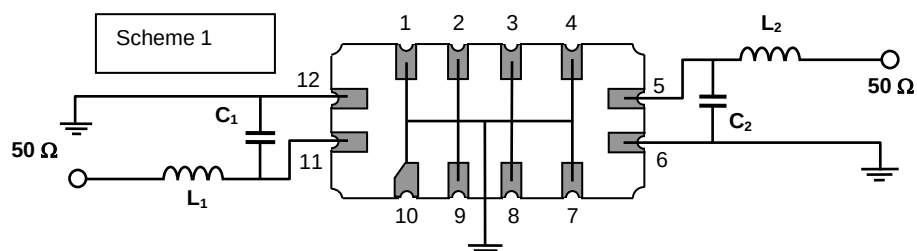
(All dimensions in mm)



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

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;

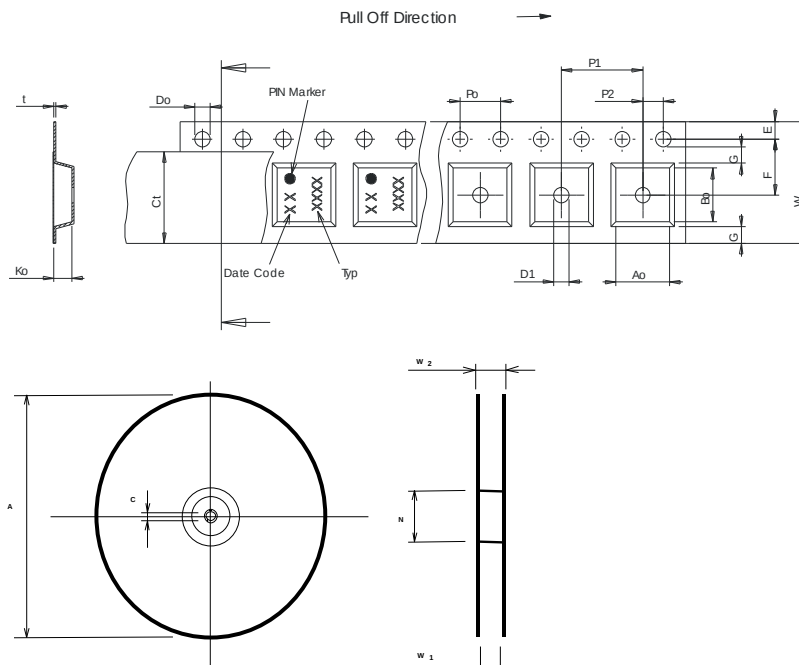
max. pieces of filters per reel:	1700
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

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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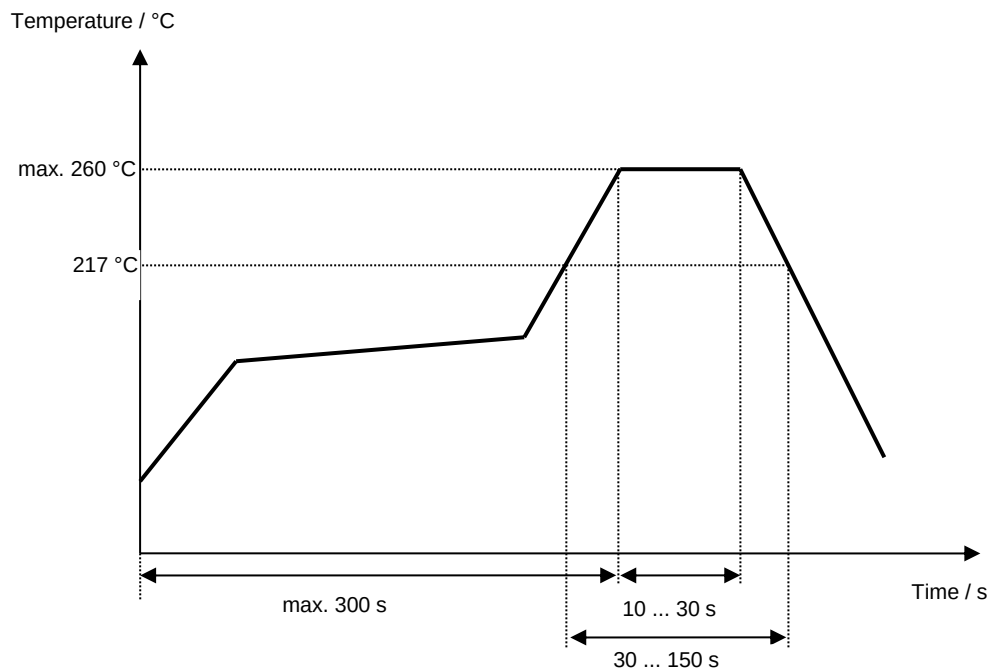
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Air reflow temperature conditions

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**Filter specification****TFS70L14****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generate Preliminary specification	Dunzow	28.08.2001
1.1	- Generate Filter specification	Dunzow	11.09.2001
2.0	- Passband 2 added - Amplitude ripple in passband 2 added	Chilla	05.10.2010
3.0	- Change tape & reel dimensions - Update header and footer sections - Update data section - Update storage temperature range - Update stability characteristics, reliability	Bonnen	03.11.2016

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