

Microchip**Filter specification****TFS 130D****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	366,19 Ω	-16,94 pF
Output:	352,03 Ω	-18,06 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS130D 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 130.4 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		6,1		max.		7,0	dB											
Nominal frequency							f _N		-				130,4	MHz											
Passband							PB		MHz		f _N		±	0,4	MHz										
Amplitude ripple within f _N ... f _N ± 0,4 MHz							p-p		0,34		dB		max.		1,0	dB									
Amplitude ripple within f _N ... f _N ± 0,2 MHz							p-p		0,26		dB		max.		0,6	dB									
Amplitude ripple within f _N ... f _N ± 0,4 MHz over any 200kHz segment							p-p		0,28		dB		max.		0,8	dB									
Relative attenuation							a _{rel}																		
f _N							...		f _N ±		0,4		MHz		0,34		dB	max.		1	dB				
f _N ±							1,4		MHz		...		f _N ±		1,8		MHz		32,0		dB	min.		20	dB
f _N -							1,8		MHz		...		f _N -		6,5		MHz		34,1		dB	min.		28	dB
f _N +							1,8		MHz		...		f _N +		6,5		MHz		28,8		dB	min.		26	dB
f _N ±							6,5		MHz		...		f _N ±		41		MHz		33,1		dB	min.		30	dB
Average Group Delay f _N ... f _N ± 0,4 MHz									0,6		μs		max.		1,0		μs								
Group delay ripple within f _N ... f _N ± 0,4 MHz							p-p		126				max.		400		ns								
Group delay ripple within f _N ... f _N ± 0,2 MHz							p-p		65				max.		200		ns								
Group delay ripple within f _N ... f _N ± 0,4 MHz over any 200kHz segment							p-p		109				max.		300		ns								
Input & Output return loss within PB									14,9				min.		10		dB								
Input power level, (in band, f _N ... f _N ± 0,4 MHz)									-				max.		5		dBm								
Input power level, (out of band, f _N ± 2,5... f _N ± 41 MHz)									-				max.		15		dBm								
Operating temperature range							OTR						- 40 °C ... + 75 °C												
Storage temperature range													- 40 °C ... + 85 °C												
Temperature coefficient of frequency							TC _f **		-18		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.

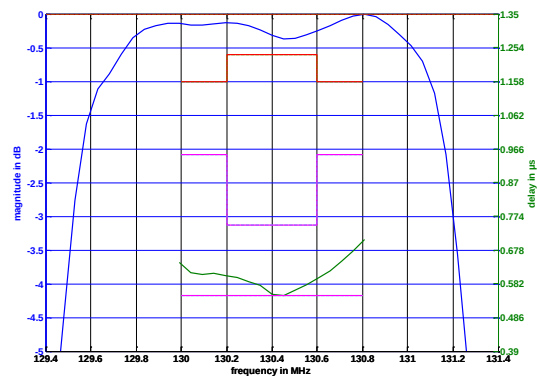
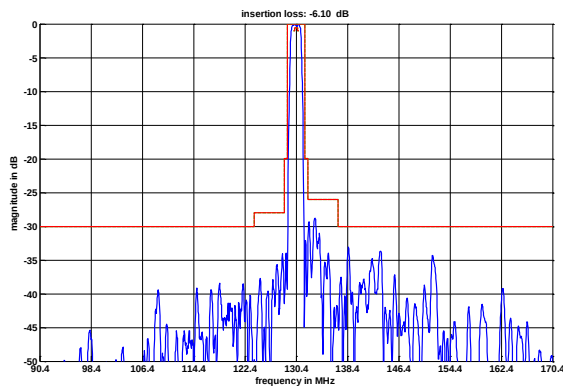
**) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{cat}(\text{MHz})$.

Generated:**Checked / Approved:**

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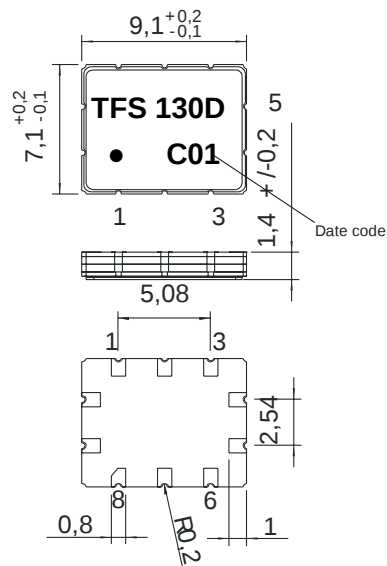
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Filter characteristic



Construction and pin connection

(All dimensions in mm)

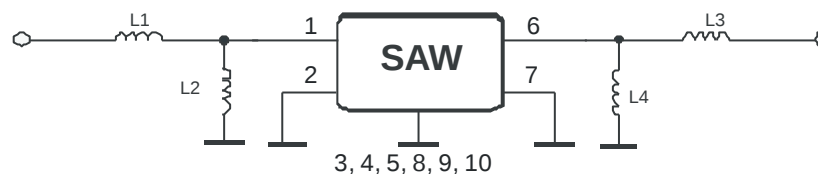


1	Input
2	Input RF Return *
3	Ground
4	Ground
5	Ground
6	Output
7	Output RF Return *
8	Ground
9	Ground
10	Ground

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

* Note that pin 2 and pin 7 are NOT to be bonded to package ground internally.

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 plane, 3 planes;
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)

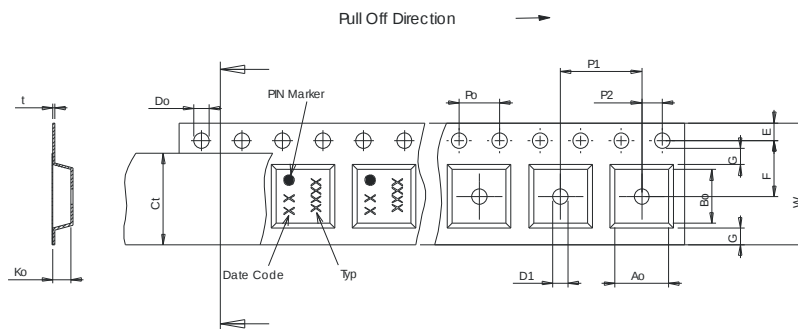
Packing

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;

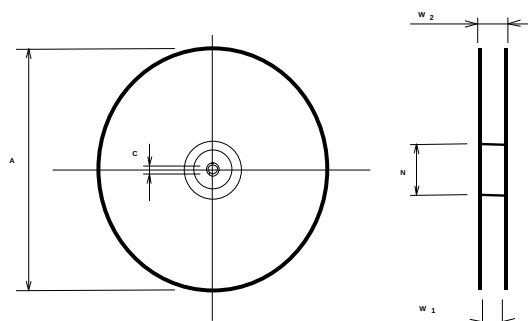
max. pieces of filters per reel:	2000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

W	: 16,00 ± 0,3
Po	: 4,00 ± 0,1
Do	: 1,50 +0,1/-0
E	: 1,75 ± 0,10
F	: 7,50 ± 0,10
G(min)	: 0,60
P2	: 2,00 ± 0,1
P1	: 12,00 ± 0,1
D1(min)	: 1,50 +0,1/-0
Ao	: 7,60 ± 0,10
Bo	: 9,60 ± 0,10
Ct	: 13,5

**Reel (all dimensions in mm)**

A	: 330
W1	: 16,4
W2(max)	: 22,4
N(min)	: 50
C	: 13,0



The minimum bending radius is 45 mm.

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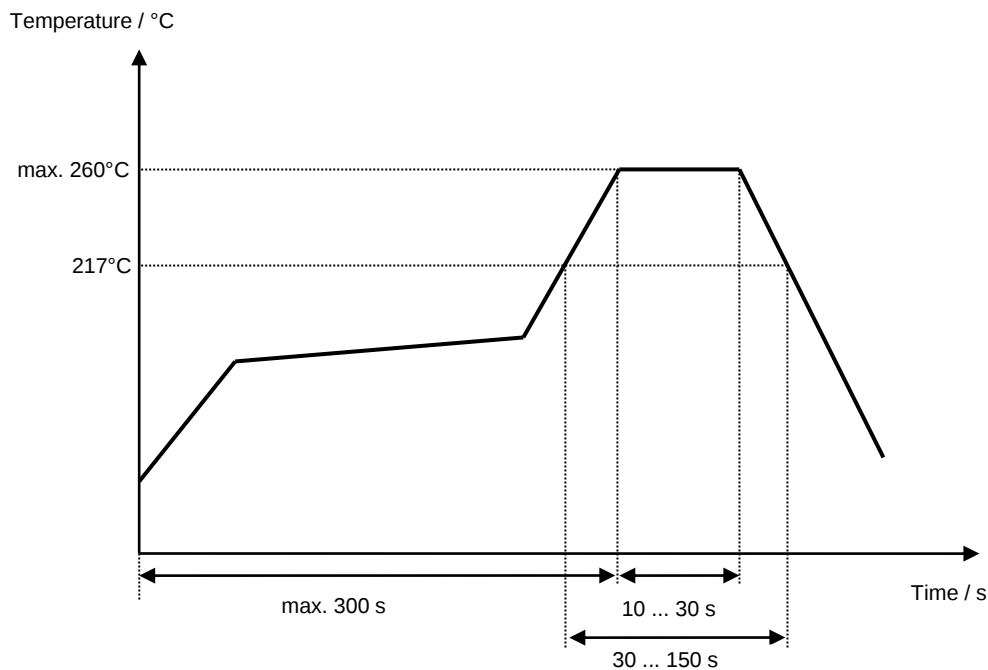
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Air reflow temperature conditions

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 130D****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- development specification	TCUK	08.04.2011
1.1	- tape&reel direction updated	TCUK	15.04.2011
2.0	- relax fN+1,8MHz...fN+6,5MHz min. 28 to 26dB, add typ values, term imp & dev to filter spec	TCUK	12.08.2011
2.1	- tape&reel dimensions updated	TCUK	18.08.2011

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