

Microchip**Filter specification****TFS 420D****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	181Ω -0.2pF	
Output:	181Ω -0.2pF	

Characteristics**Remark:**

The reference level for the relative attenuation a_{rel} of the TFS 420D 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 center frequency f_c is the arithmetic mean value of the upper and lower frequencies at the 2 dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 420.0 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the pass band ripple have to be achieved at the frequencies given below even if the center frequency f_c is shifted due to the temperature coefficient of frequency TC_f within the operating temperature range and due to a production tolerance for the center frequency f_c .

D a t a						typ. value		tolerance / limit			
Insertion loss (Reference level)						$a_e=a_{min}$	2.7	dB	max.	3.5	dB
Nominal frequency						f_N	-			420.0	MHz
Center frequency						f_c	420.0	MHz		-	
Pass band ripple $f_N \pm 10$ MHz							1.5	dB *)	max.	2.0	dB
Relative attenuation						a_{rel}					
320.0	MHz	...	340.0	MHz		65	dB	min.	50	dB	
365.0	MHz	...	385.0	MHz		50	dB	min.	30	dB	
445.0	MHz	...	477.5	MHz		25	dB	min.	20	dB	
477.5	MHz	...	502.5	MHz		55	dB	min.	40	dB	
547.5	MHz	...	572.5	MHz		70	dB	min.	57	dB	
Intermodulation						IP_3	-		min.	20.0	dB **)
Input power level							-		max.	10.0	dBm
Permissible DC voltage						V_{DC}	-		max.	12.0	V
Operating temperature range						OTR	-			-25 °C ... +75 °C	
Storage temperature range							-			-40 °C ... +85 °C	
Temperature coefficient of frequency						TC_f	-65	ppm/K		-	

*) 1.5 dB over $f_N \pm 10$ MHz at ambient temperature (23 °C).

**) modulation signals: $f_N + 1$ MHz and $f_N + 2$ MHz, each of 10 dBm

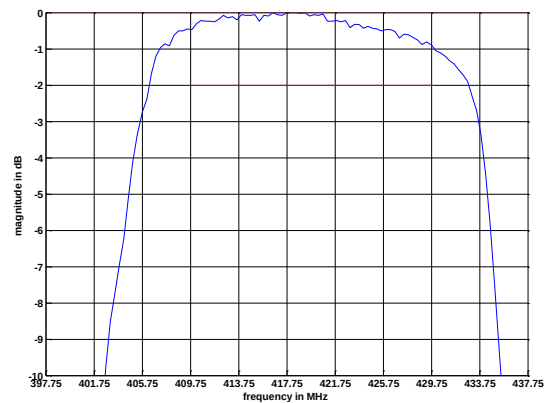
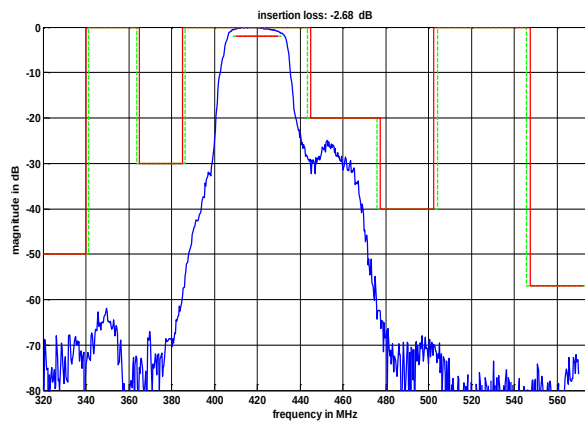
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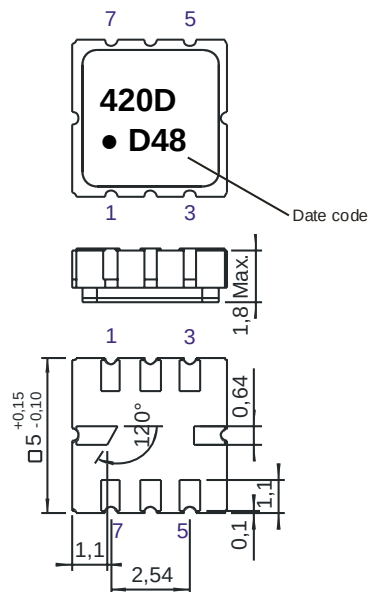
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Filter characteristic



Construction and pin connection

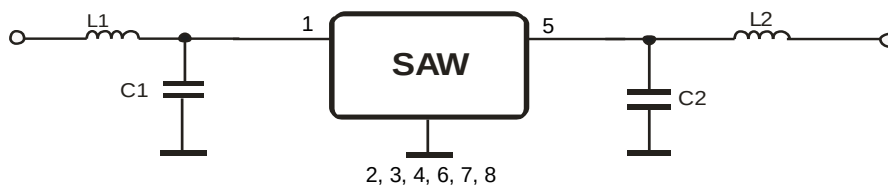
(All dimensions in mm)



1	Input
2	Ground
3	Ground
4	Ground
5	Output
6	Ground
7	Ground
8	Ground

Date code:	Year + week
D	2013
E	2014
F	2015
...	

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 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 / 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 refer to the attached "Air reflow temperature conditions" on page 4;

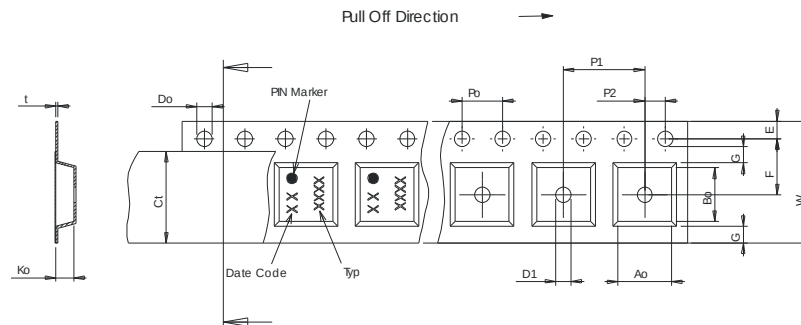
This filter is RoHS compliant (2011/65/EU)

Packing

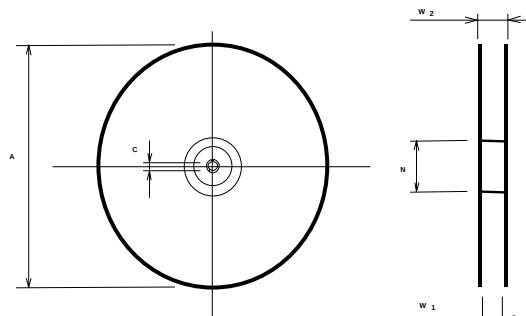
- Tape & Reel:
- IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;
- max. pieces of filters per reel: 3000
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

Tape (all dimensions in mm)

W	: 12,00
Po	: 4,00
Do	: 1,50
E	: 1,75
F	: 5,50
G(min)	: 0,75
P2	: 2,00
P1	: 8,00
D1(min)	: 1,50
Ao	: 5,30
Bo	: 5,30
Ct	: 9,2 ± 0,1

**Reel (all dimensions in mm)**

A	: 330
W1	: 12,4 +2/-0
W2(max)	: 18,4
N(min)	: 50
C	: 13,0



The minimum bending radius is 45 mm.

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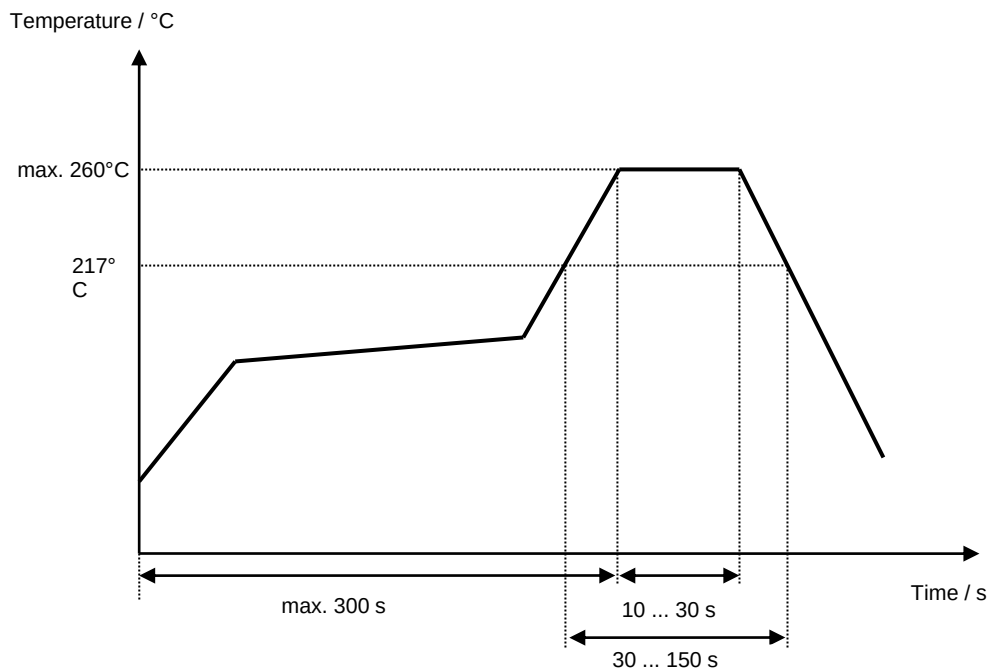
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Air reflow temperature conditions

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**History**

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Microchip		Filter specification	TFS 420D	5/5
Version	Reason of Changes	Name	Date	
1.0	- generate according customer requirement specification	Dr. Sabah	28.06.2001	
1.1	- add of relative attenuation f_N - 35 MHz ... f_N - 55 MHz min. 30,0 dB - add of IP3 (min. 20 dBm) - add of DC voltage 12 V - add of typ. Value in pass band 1,50 dB	Dr. Sabah	06.07.2001	
1.2	- add of typ. value of 60 dB (f_N +127,5 MHz ... f_N +152,5 MHz)	Dr. Sabah	11.07.2001	
1.3	- add of 50 Ω matching circuit	Dr. Sabah	13.07.2001	
1.4	- correct of 50 Ω matching circuit - change from development specification to filter specification - add of typical data and terminating impedance	Dr. Sabah	07.01.2002	
2.0	- changed maximum insertion loss from 3.0 dB to 3.5 dB	Schönbein	25.11.2013	