

**VI TELEFILTER****Filter specification****TFS 420A - 1/4****1. Measurement condition**

Ambient temperature  $T_A$ : 23 °C  
 Input power level: 0 dBm  
 Typical terminating impedances in  $f_N$ : for input: 210  $\Omega$  | -5,38 pF.  
 for output: 174  $\Omega$  | -3,99 pF.

**2. Characteristics**

Remark:

Reference level for the relative attenuation  $a_{rel}$  of the **TFS 420A** 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 nominal frequency  $f_N$  is fixed at **420,0 MHz** without tolerance or limit. 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.

Data	typ. value		tolerance / limit	
<b>Insertion loss</b> (Reference level) $a_e$	21,5	dB	max 24	dB
<b>Nominal frequency</b> $f_N$	-		420,0	MHz
<b>Centre frequency</b> $f_C$ at ambient temperature ( $f_{CAT}$ )	420,03	MHz	-	
<b>Pass band (-1dB)</b>	$f_N - 4,1 \text{ MHz} \dots f_N + 4,1 \text{ MHz}$			
<b>Amplitude ripple (p-p):</b> $f_N \dots f_N \pm 4,1 \text{ MHz}$	0,4	dB	max 1,0	dB
<b>Bandwidth at ambient temperature:</b>				
1 dB - band width	9,14	MHz		
3 dB - band width	10,50	MHz		
20 dB - band width	14,23	MHz		
40 dB - band width	15,91	MHz		
<b>Relative attenuation <math>a_{rel}</math></b>				
$f_N$	$f_N \pm 4,1$	MHz	-	max. 1 dB
$f_N \pm 4,1$	$f_N \pm 5,0$	MHz	-	max. 3 dB
$f_N \pm 5,5$	$f_N \pm 10$	MHz	-	min. 3 dB
$f_N \pm 10$	$f_N \pm 100$	MHz	45...60	dB
$f_N - 430$	$f_N - 100$	MHz	70...80	dB
$f_N + 100$	$f_N + 300$	MHz	60...70	dB
<b>Average group delay in pass band:</b>	0,630	$\mu$ s		
<b>Group delay ripple in pass band (p-p):</b>	40	ns	max 60	ns
<b>Triple transit attenuation compared to main signal:</b>	45...49	dB		
<b>Crosstalk</b>	50...54	dB		
<b>Frequency inversion temperature (<math>T_o</math>)</b>	30	°C		
<b>Temperature coefficient of frequency (<math>Tc_f</math>)</b>	- 0,050	ppm/K <sup>2</sup>		
<b>Frequency deviation of <math>f_C</math> over temperature T : *)</b>	$\Delta f_C(\text{Hz}) = Tc_f(\text{ppm/K}) \times (T - T_o)^2 \times f_{T_o}(\text{MHz})$			
<b>Operating temperature range</b>	-20 °C ... + 75 °C			
<b>Storage temperature range</b>	- 40 °C ... + 85 °C			
<b>Input power level</b>	-		max. + 10	dBm

\*)  $f_{T_o}$  is reference frequency  $f_C$  at frequency inversion temperature ( $T_o$ )

**Generated:** \_\_\_\_\_ **Wadim P. Dunzow**

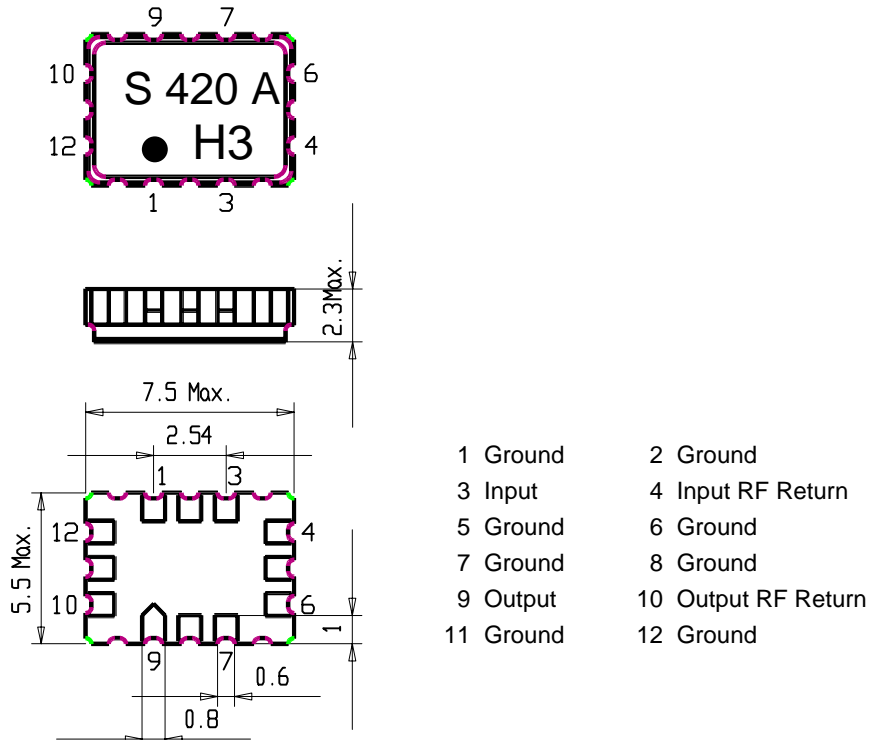
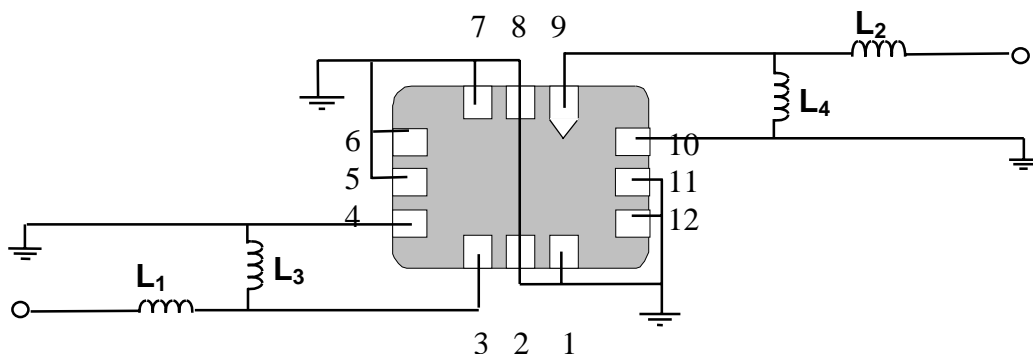
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## 3. Package

4. 50  $\Omega$  matching network:

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**Stability characteristics**

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

1. Shock: 30g, 18 ms, half sine wave, 3 shocks each plane;  
IEC 68 - 2 - 27
2. Vibration: 10 Hz to 150 Hz, 0.35 mm amplitude, 5g; 2 hours for 3 planes;  
IEC 68 - 2 - 6
3. Damp heat: 90 % to 95 % rel. humidity, 40 °C, 10 days;  
IEC 68 - 2 - 3
4. Resistance to solder heat (Reflow): 260 °C for 10 sec;

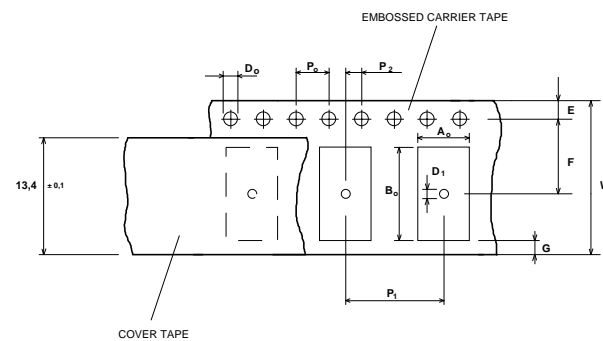
**Packing**

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;

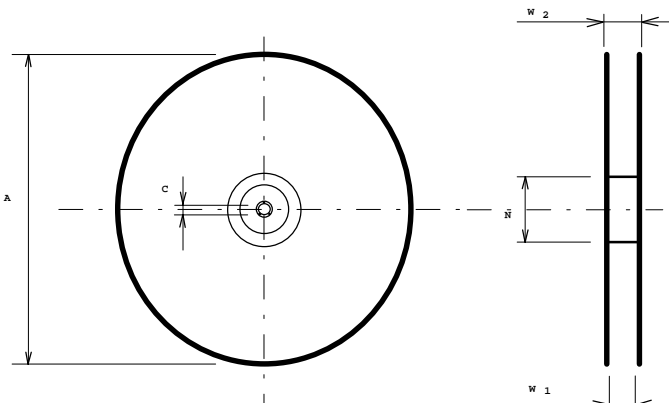
max. pieces of filters per reel: 3000

**Tape (all dimensions in mm)**

W	: 16 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 + 0,5
D1	: 1,5 + 0,5
E	: 1,75 ± 0,1
F	: 7,5 ± 0,1
G (min)	: 0,75
P2	: 2 ± 0,05
P1	: 8 ± 0,1
D1(min)	: 1,5
Ao	: 5,4 ± 0,1
Bo	: 7,4 ± 0,1

**Reel (all dimensions in mm):**

A	:	330
W1	:	16,4 +2
W2 (max)	:	22,4
N (min)	:	>= 90
C	:	13 ± 0,25



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the right side of the tape.

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**Air reflow temperature conditions:**

## 1st and 2nd air reflow profile

Name:	pre-heating periods	main-heating periods	peak temperature
Temperature:	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

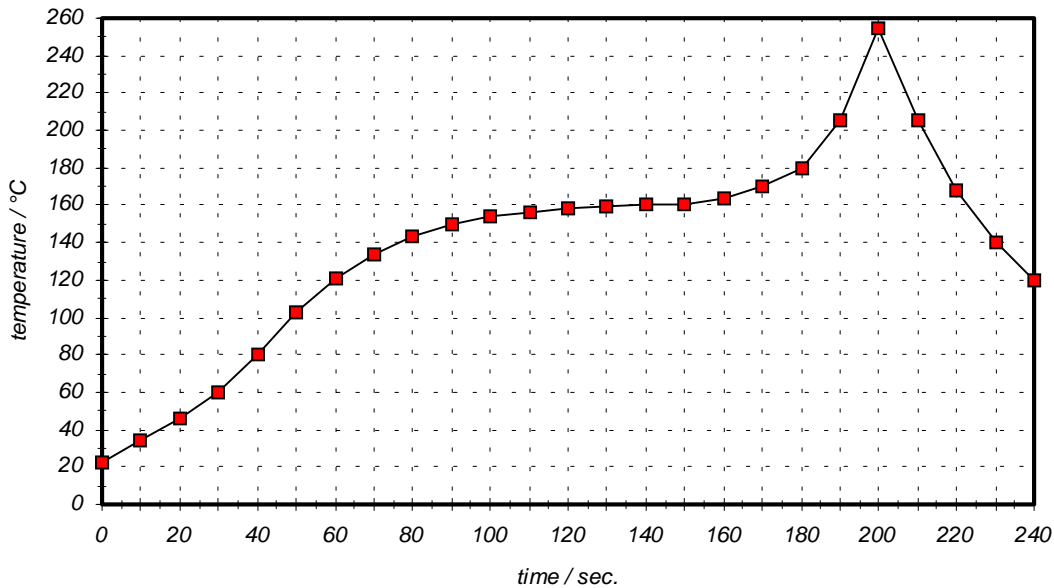
**Chip-mount air reflow profile**

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

time / sec.	temperature / °C	time / sec.	temperature / °C
0	23	140	160
10	34	150	161
20	46	160	164
30	60	170	170
40	80	180	180
50	103	190	205
60	121	195	230
70	134	200	255
80	143	205	230
90	150	210	205
100	154	215	180
110	156	220	165
120	158	230	140
130	159	240	120

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