

**VI TELEFILTER**

**Filter specification**

**TFS 433S**

**1/5**

**Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	50	Ω
Output:	50	Ω

**Characteristics**

**Remark:**

The reference level for the relative attenuation  $a_{rel}$  of TFS 433S is the minimum of the pass band attenuation  $a_{min}$ . This value is defined as 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  $a_e$ . The given values for the relative attenuation  $a_{rel}$  and the group delay ripple have to be reached at the frequencies given below, even if the centre frequency  $f_C$  is shifted due to the temperature coefficient of frequency  $TC_f$  in the operating temperature range and due to a production tolerance for the centre frequency  $f_C$ .

<b>D a t a</b>		<b>typ. value</b>	<b>tolerance / limit</b>
<b>Insertion Loss</b> (reference level)	$a_e$	3,1 dB	3,8 dB
<b>Nominal Frequency</b>	$f_N$	-	433,92 MHz
<b>Centre Frequency</b>	$f_C$	433,92 MHz	-
<b>Passband</b>	PB		
1 dB		5 MHz	min. 1,71 MHz
<b>Relative Attenuation</b>	$a_{rel}$		
$f_N - 0,92$ MHz ... $f_N + 0,79$ MHz		0,45 dB	max. 1 dB
$f_N - 8,42$ MHz ... $f_N - 18,92$ MHz		50 dB	min. 37 dB
$f_N - 18,92$ MHz ... $f_N - 25,92$ MHz		60 dB	min. 52 dB
$f_N - 25,92$ MHz ... $f_N - 40,92$ MHz		65 dB	min. 42 dB
$f_N - 40,92$ MHz ... $f_N - 83,92$ MHz		70 dB	min. 52 dB
$f_N - 83,92$ MHz ... $f_N - 423,92$ MHz		68 dB	min. 37 dB
$f_N + 9,58$ MHz ... $f_N + 20,08$ MHz		25 dB	min. 12 dB
$f_N + 20,08$ MHz ... $f_N + 41,08$ MHz		50 dB	min. 34 dB
$f_N + 41,08$ MHz ... $f_N + 141,08$ MHz		65 dB	min. 50 dB
$f_N + 141,08$ MHz ... $f_N + 566,08$ MHz		45 dB	min. 40 dB
<b>Operating Temperature Range</b>	OTR	-	- 40 °C ... + 85 °C
<b>Storage Temperature Range</b>		-	- 45 °C ... + 90 °C
<b>Temperature Coefficient of Frequency</b>	$TC_f$ *	-35 ppm/K	-
<b>Input Power Level</b>		-	max. 10 dBm

\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T0}(\text{MHz})$ .

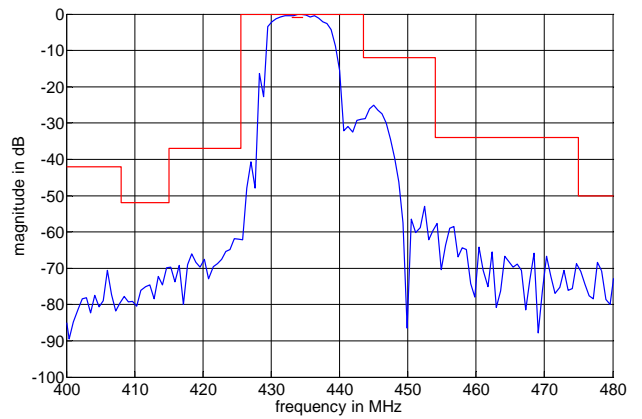
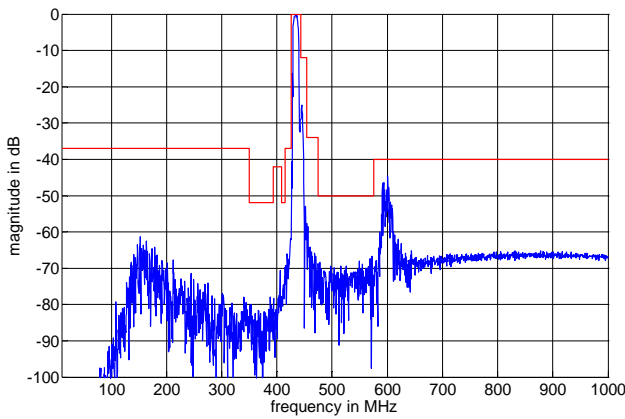
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**Checked / Approved:**

Tele Filter GmbH  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30  
 E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)

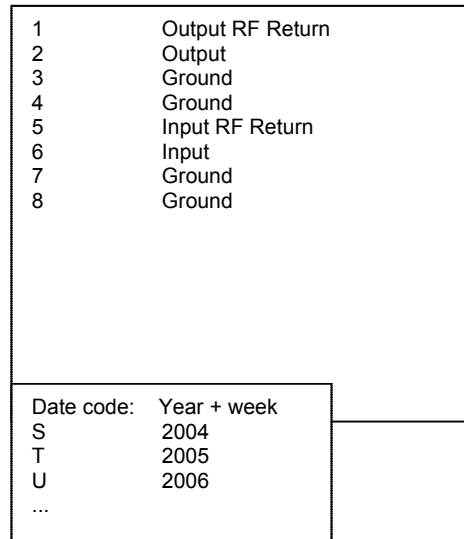
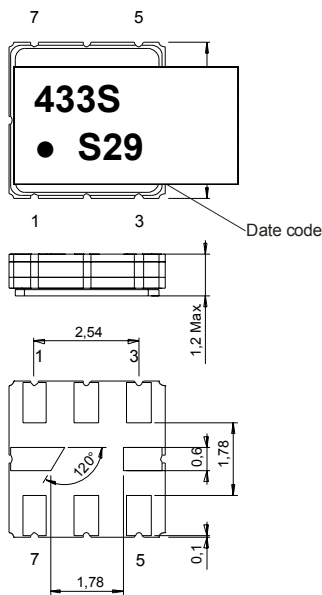
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**Filter characteristic**

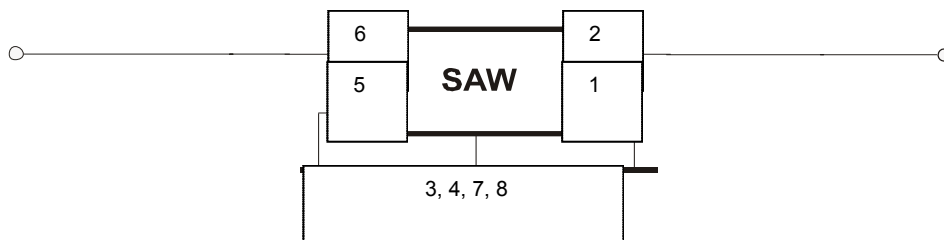


**Construction and pin connection**

(All dimensions in mm)



**50 Ohm Test circuit**



**Tele Filter GmbH**  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30  
 E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)

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**Stability characteristics**

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

1. Shock: 500g, 18 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 plan, 3 plans;  
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: twice max.;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

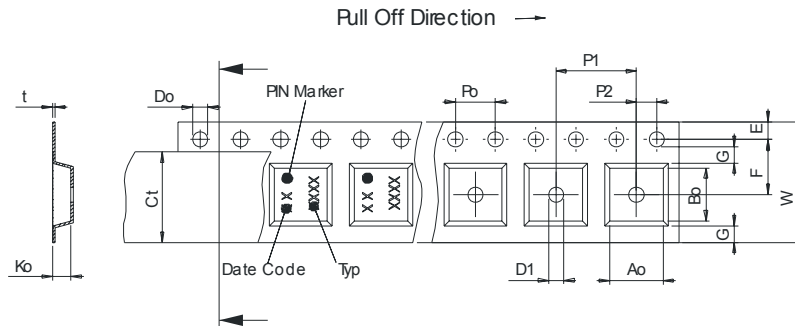
**Packing**

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 peer 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

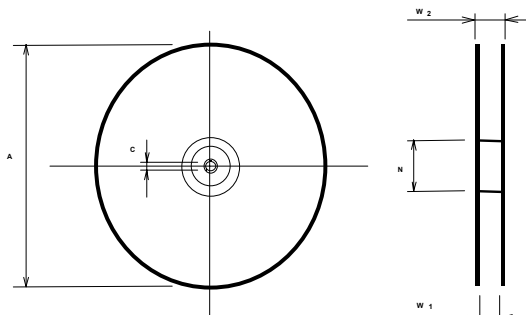
**Tape (all dimensions in mm)**

- W : 12,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 5,50 ± 0,05
- G(min) : 0,75
- P2 : 2,00 ± 0,05
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 4,30 ± 0,1
- Bo : 4,30 ± 0,1
- Ct : 9,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 12,4 +2/-0
- W2(max) : 18,4
- N(min) : 50
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

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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**

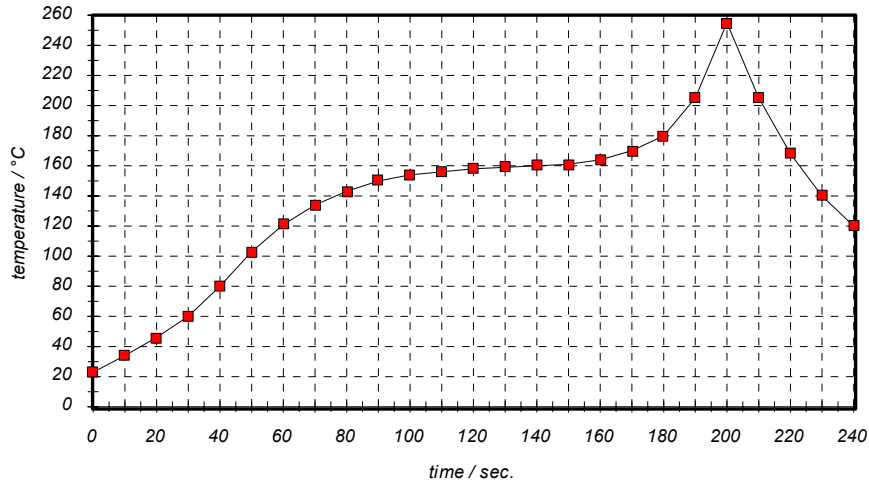


Table for temperature vs. time during the air reflow process

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

**VI TELEFILTER****Filter specification****TFS 433S****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification according to customer specification.	Dr. Sabah	17.06.2003
1.1	- Filter specification, add oft typical values	Dr. Sabah	19.08.2003
1.2	- Change relative attenuation - $f_{N+}$ 156,08 MHz ... $f_N$ +566,08 MHz typ. 50dB min. 45dB change to $f_{N+}$ 141,08 MHz ... $f_N$ +566,08 MHz typ. 45dB min. 35dB	M. Springfeldt	12.02.2004
1.3	- Remove mistake in relative attanuation	M. Springfeldt	13.02.2003
1.4	- Change relative attenuation - $f_{N+}$ 156,08 MHz ... $f_N$ +566,08 MHz typ. 50dB min. 45dB change to $f_{N+}$ 141,08 MHz ... $f_N$ +566,08 MHz typ. 45dB min. 40dB	M. Springfeldt	26.02.2004
1.5	- Change Temperature Coefficient of Frequency - Change Packing	M. Springfeldt	14.07.2004

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