

**Microchip****Filter specification****TFS 433AB****1/5****Measurement condition**

Ambient temperature $T_A$ :	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	50 $\Omega$	
Output:	50 $\Omega$	

**Characteristics**

Remark:

The maximum attenuation in the pass band is defined as the insertion loss. The nominal frequency  $f_N$  is fixed at 433.5 MHz without any tolerance or limit. The values of absolute attenuation  $a_{abs}$  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.

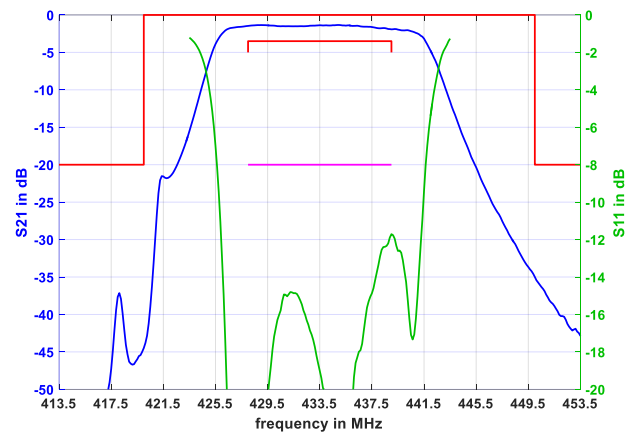
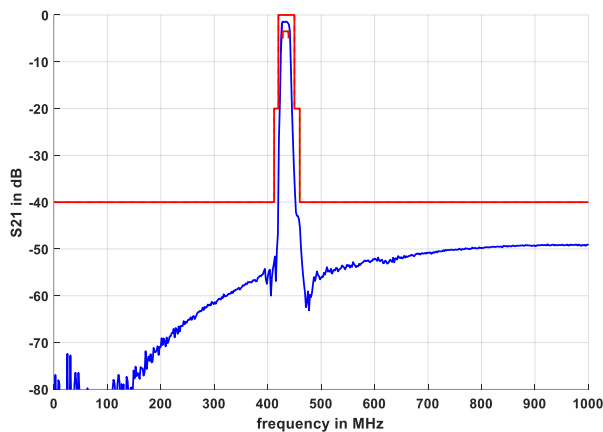
D a t a		typ. value		tolerance / limit		
Insertion loss	$a_e$	2.0	dB	max.	3.5	dB
Nominal frequency	$f_N$	-			433.5	MHz
Passband				$f_N \pm$	5.5	MHz
Pass band variation	PB	0.7	dB	max.	2.0	dB
Absolute attenuation	$a_{abs}$					
0.3 MHz ... 412 MHz		51	dB	min.	40	dB
412 MHz ... 420 MHz		23	dB	min.	20	dB
450 MHz ... 460 MHz		31	dB	min.	20	dB
460 MHz ... 1000 MHz		42	dB	min.	40	dB
Return loss in PB		12	dB	max.	10	dB
Group delay ripple in PB		50	ns	max.	100	ns
Input power level		-		max.	5	dBm
Operating temperature range	OTR	-		- 40 °C ... + 125 °C		
Storage temperature range		-		- 55 °C ... + 125 °C		
Temperature coefficient of frequency	$TC_f$ *	-44	ppm/K	-		

\*)  $\Delta f = TC_f(T - T_A)f_N$ **Generated:****Checked / Approved:**

Microchip Frequency Technology GmbH  
Potsdamer Straße 18  
D 14 513 TELTOW / Germany  
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

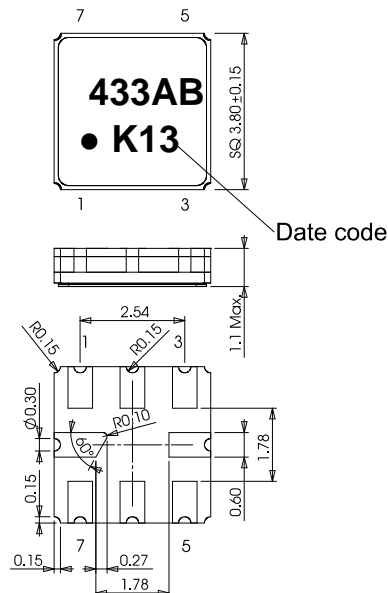
Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

# Filter characteristic



# Construction and pin connection

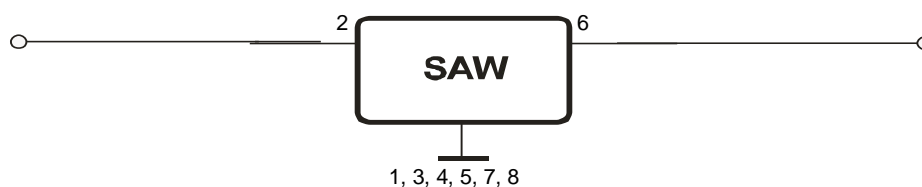
(All dimensions in mm)



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

Date code:	Year + week
K	2018
L	2019
M	2020
...	

# 50 Ω Test circuit



Microchip Frequency Technology GmbH  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**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;

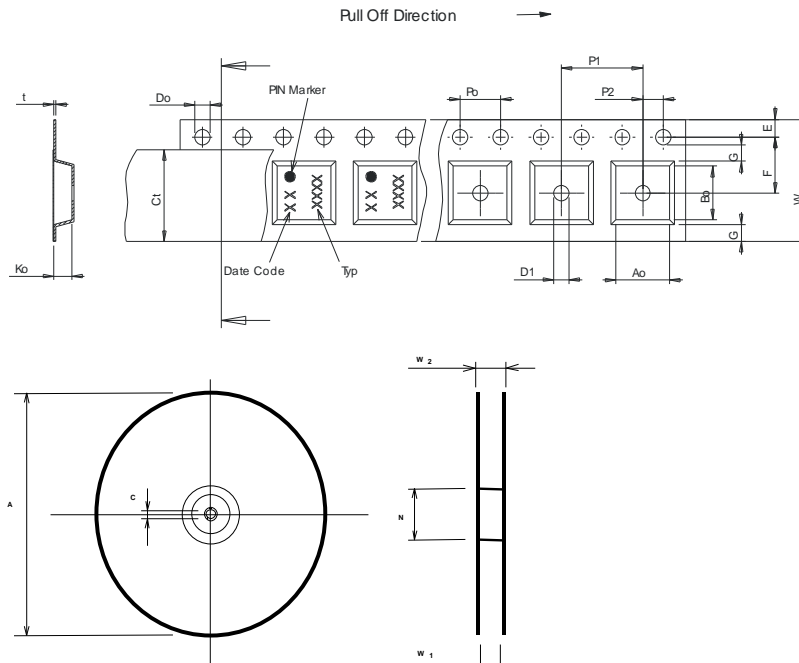
reel of empty components at start: min. 300 mm  
reel of empty components at start including leader: min. 500 mm  
trailer: min. 300 mm

**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	: 9.2 ±0.1
Ko	: 1.80 ±0.1
t	: 0.30 ±0.05

**Reel (all dimensions in mm)**

A	: 330 or 180
W1	: 12.4 +2/-0
W2(max)	: 18.40
N(min)	: 50.00
C	: 13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

**Microchip Frequency Technology GmbH**

**Potsdamer Straße 18**

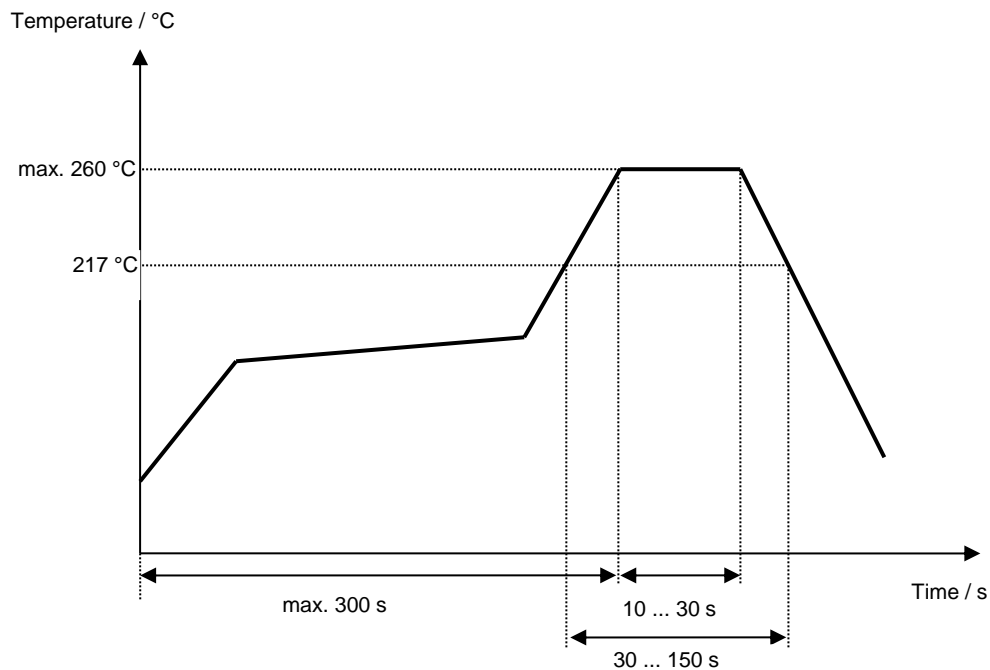
**D 14 513 TELTOW / Germany**

**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Air reflow temperature conditions**

<b>Conditions</b>	<b>Exposure</b>
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 Frequency Technology GmbH****Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

**Microchip****Filter specification****TFS 433AB****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification	S. Channaa	29.06.2009
2.0	- Adding group delay requirement and generation of filter specification	S. Springfeldt	30.09.2009
2.1	- Change of typical values	S. Springfeldt	26.07.2010
2.2	- Change of input power level after power measuring analysis	S. Springfeldt	30.09.2010
3.0	- Re-formatting data table - Updating storage temperature - Change tape and reel direction - Extending operation temperature to -40 °C ... 125 °C	S. Springfeldt	26.03.2018

**Microchip Frequency Technology GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

Microchip Frequency Technology GmbH reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.