

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

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

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.

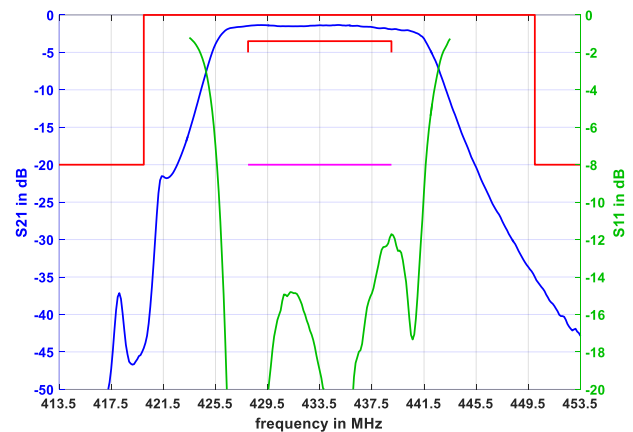
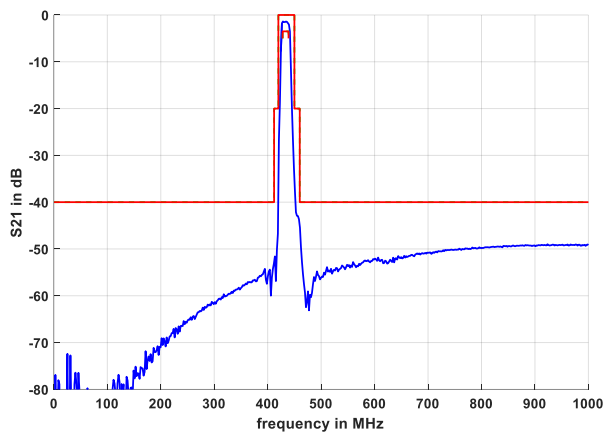
D a t a		typ. value		tolerance / limit		
Insertion loss	a_e	2.0	dB	max.	3.5	dB
Nominal frequency	f_N	-			433.5	MHz
Passband				$f_N \pm$	5.5	MHz
Pass band variation	PB	0.7	dB	max.	2.0	dB
Absolute attenuation	a_{abs}					
0.3 MHz ... 412 MHz		51	dB	min.	40	dB
412 MHz ... 420 MHz		23	dB	min.	20	dB
450 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

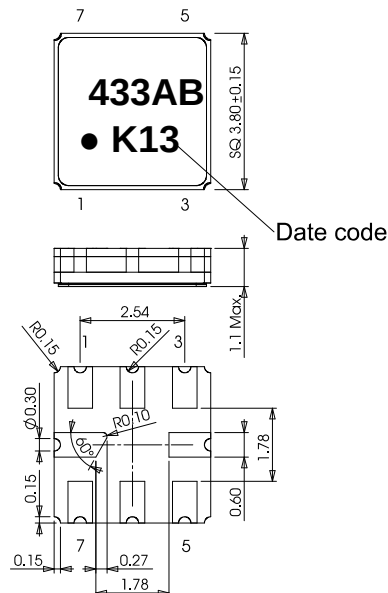
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Filter characteristic



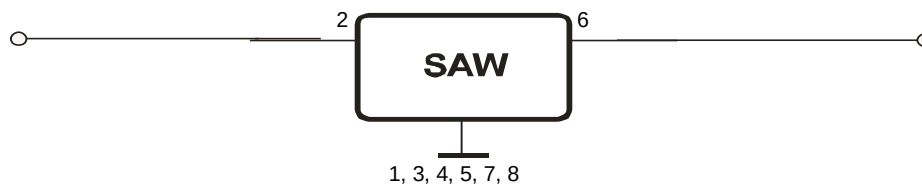
Construction and pin connection

(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

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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;

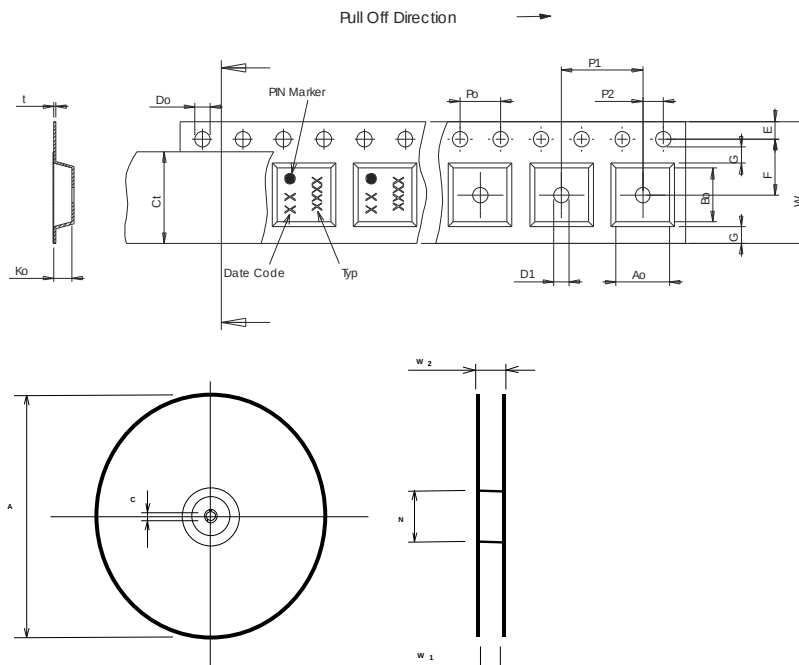
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

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

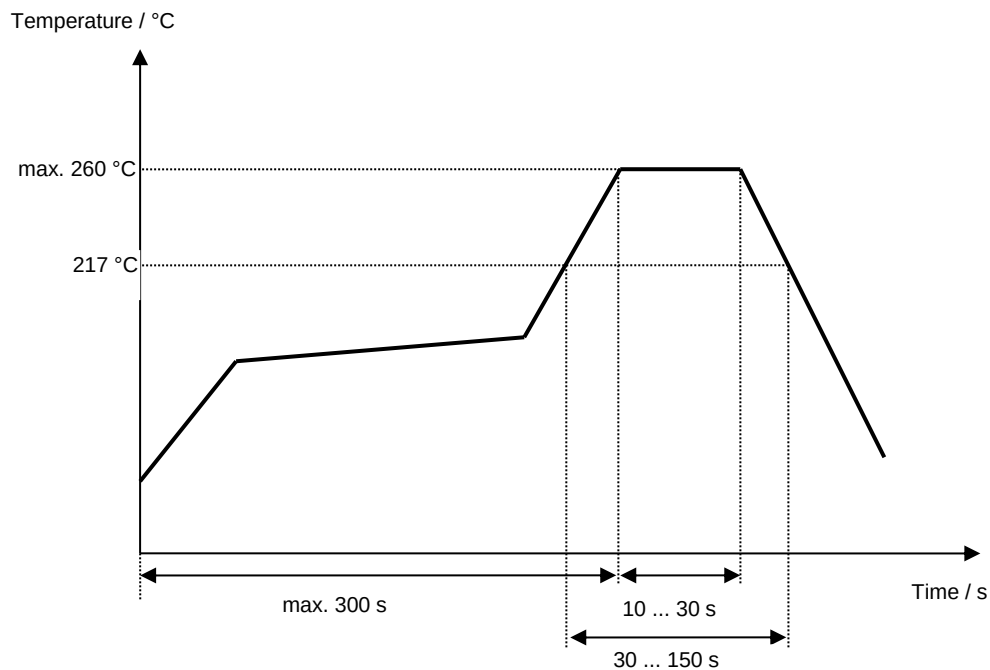
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Air reflow temperature conditions

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 433AB****5/5****History**

Version	Reason of Changes	Name	Date
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

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