Measurement condition

Ambient temperature T_A: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 560 Ω || -1.25 pF
Output: 560 Ω || -1.25 pF
External Coil: 47 nH

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS433R 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 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 nominal frequency f_N is fixed at 433.92 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the group delay ripple have to be achieved at the frequencies given below even if the centre 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 centre frequency f_c.

D a t a		**typ. value**		**tolerance / limit**		
Insertion loss (reference level)	a_e	3.8	dB	max.	6.5	dB
Nominal frequency	f_N				433.92	MHz
Centre frequency	f_C	433.95	MHz			
Guaranteed 1.5 dB signal band width	BW	-		min.	160	kHz
Relative attenuation	a_{rel}					
f_N ± 80 kHz		0.8	dB	max.	1.5	dB
f_N ± 460 kHz … f_N ± 660 kHz		32	dB	min.	25	dB
f_N ± 660 kHz … f_N ± 1 MHz		50	dB	min.	40	dB
f_N - 1 MHz … f_N - 13 MHz		58	dB	min.	50	dB
f_N + 1 MHz … f_N + 2 MHz		61	dB	min.	50	dB
f_N + 2 MHz … f_N + 5 MHz		53	dB	min.	47	dB
f_N ± 5 MHz … f_N ± 13 MHz		58	dB	min.	50	dB
Group delay ripple						
f_N ± 70 kHz		0.5	µs	max.	2	µs
Operating temperature range	OTR				-40 °C ... +85 °C	
Storage temperature range					-55 °C ... +125 °C	
Temperature coefficient of frequency	TC_f ***)	-0.036	ppm/K²			
Frequency inversion temperature		20	°C			

*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

**) $\Delta f = TC_f(T - T_0)^2 f_N$

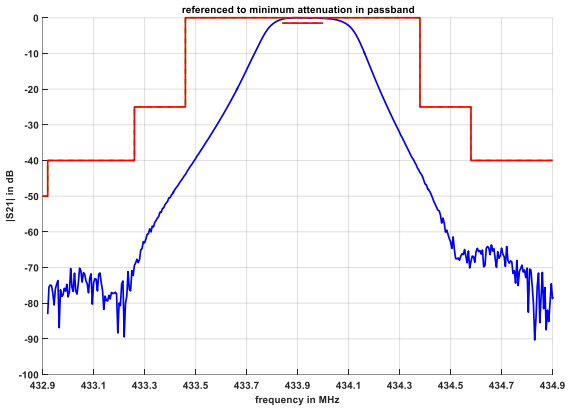
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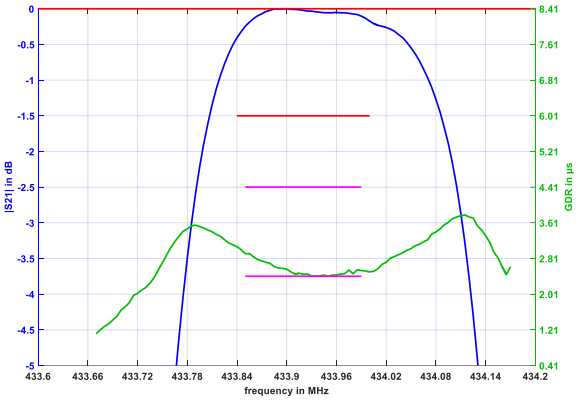
Checked / approved:

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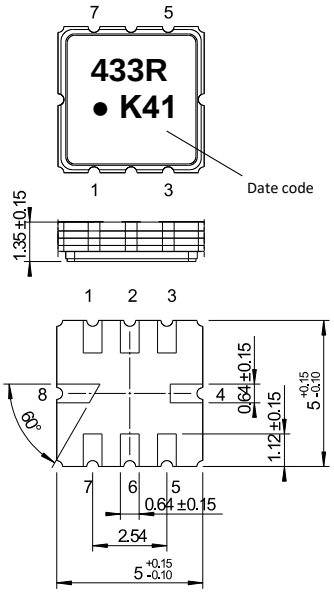
Filter characteristic





Construction and pin connection

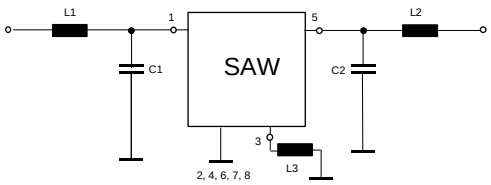
(All dimensions in mm)



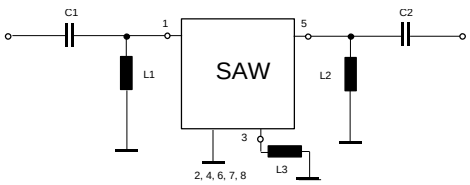
1	Input
2	Input RF Return
3	External Coil
4	Ground
5	Output
6	Output RF Return
7	Ground
8	Ground

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

50 Ω Test circuit 1



50 Ω Test circuit 2



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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;

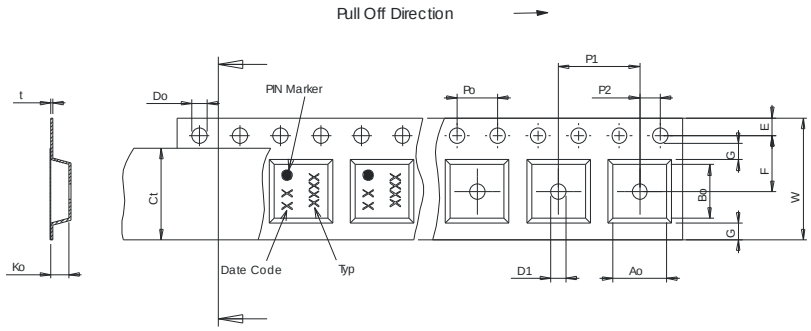
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

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

Packing

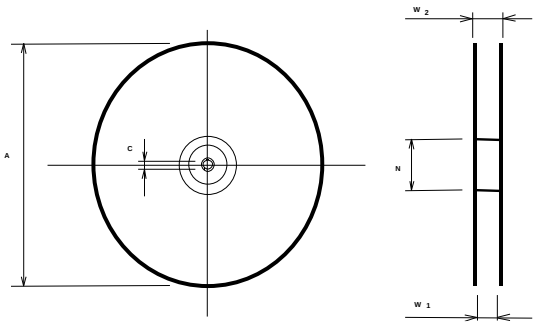
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius; tape type II, embossed carrier tape with top cover tape on the upper side;

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/-0.1
Po	:	4.00	±0.1
Do	:	1.50	±0.10
E	:	1.75	±0.1
F	:	5.50	
G(min)	:	0.75	
P2	:	2.00	±0.1
P1	:	8.00	
D1(min)	:	1.50	
Ao	:	5.30	±0.1
Bo	:	5.30	±0.1
Ct	:	9.2	±0.1
Ko	:	2.10	±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	

The minimum bending radius is 45 mm.

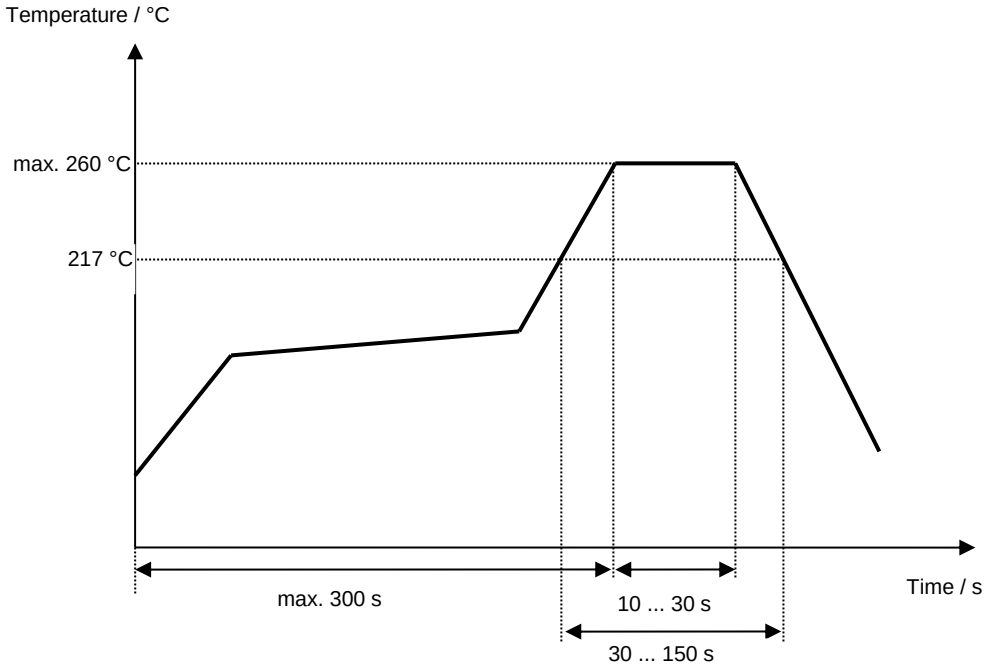
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Air reflow temperature conditions

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



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History

Version	Reason of Changes	Name	Date
1.0	- Generate specification according to customer requirements	Dr. Wall	14.03.2002
1.1	- Change pinning according to discussion with customer.	Dr. Wall	21.03.2002
1.2	- Change development specification to preliminary specification. - Add termination impedances. - Add typical data.	Dr. Wall	22.04.2002
1.3	- Position of coupling coil changed from pin 7 to pin 3	Dr. Wall	23.04.2002
3.0	- Change starting frequency for 25 dB selection from $f_N \pm 400$ kHz to $f_N \pm 460$ kHz. - Change starting frequency for 40 dB selection from $f_N \pm 600$ kHz to $f_N \pm 660$ kHz. - Change typical values. - Change termination impedances.	Dr. Wall	29.04.2002
3.1	- Change preliminary specification to filter specification.	Dr. Wall	24.05.2002
4.0	- Update to new format - Changed package dimensions	Bonnen	10.10.2018

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