

Microchip**Filter specification****TFS1601A****1/5****Measurement condition**

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	200	Ω
Output:	200	Ω

Characteristics

Remark:

The maximum attenuation in the pass band is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 1601.5 MHz without any tolerance or limit. The values of absolute attenuation a_{abs} are guaranteed over the whole operating temperature range. The frequency shift of the filter within the operating temperature range is included in the production tolerance scheme.

Data		typ. value		tolerance / limit		
Insertion loss in PB1	a_e	2.0	dB	max.	3.0	dB
Nominal frequency	f_N	-			1601.5	MHz
Passband 1	PB ₁	-		$f_N \pm$	8.5	MHz
Passband 2	PB ₂	-		$f_N \pm$	4.0	MHz
Passband variation within PB1	PBV ₁	0.5	dB	max.	2.0	dB
Absolute attenuation	a_{abs}					
0.3 MHz ... 1560.0 MHz		38	dB	min.	35	dB
1645.0 MHz ... 2500.0 MHz		48	dB	min.	35	dB
Group delay ripple within PB1	GDR ₁	6	ns	max.	15	ns
Group delay ripple within PB2	GDR ₂	4	ns	max.	10	ns
Group delay variation (unit to unit)	*)	+/-2	ns	max.	+/-4	ns
VSWR within PB1		1.6 : 1		max.	2.3 : 1	
Input power level in PB1		-		max.	20	dBm
Operating temperature range	OTR	-			-40 °C ... +85 °C	
Storage temperature range		-			-55 °C ... +125 °C	
Temperature coefficient of frequency	TC_f **)	-43	ppm/K			

*) measured at: f_N , $f_N + 4$ MHz, $f_N - 4$ MHz

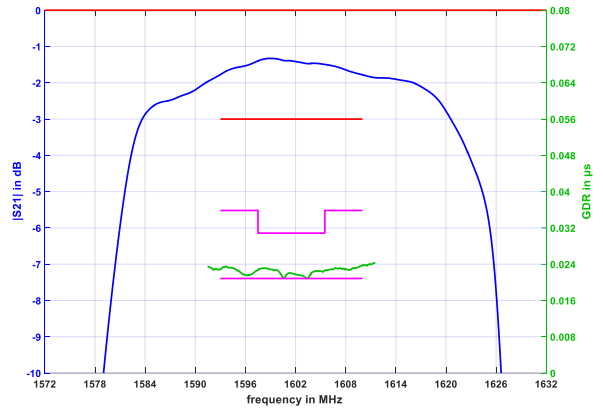
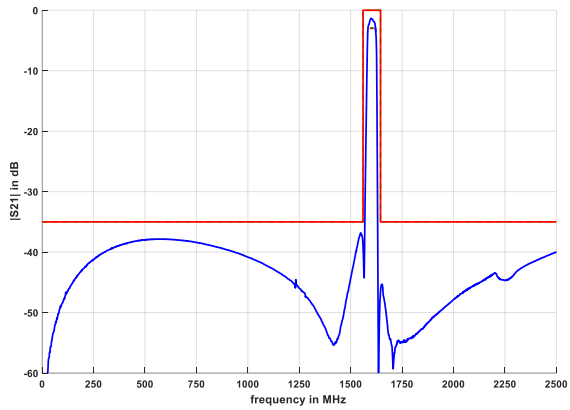
**) $\Delta f = TC_f (T - T_A) f_N$

Generated:**Checked / Approved:**

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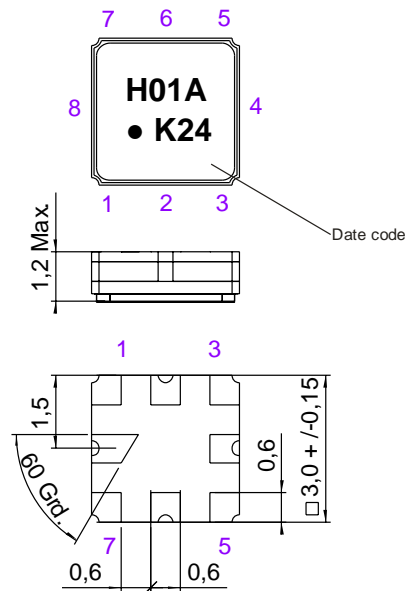
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Filter characteristic



Construction and pin connection

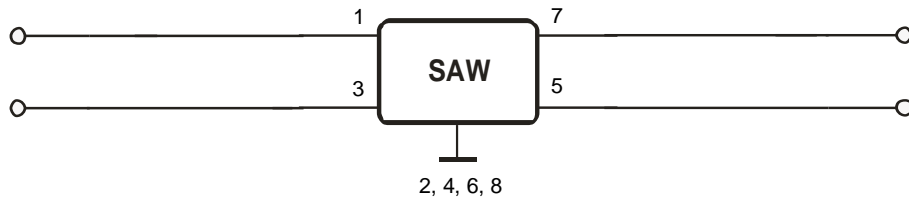
(All dimensions in mm)



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

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

200 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)

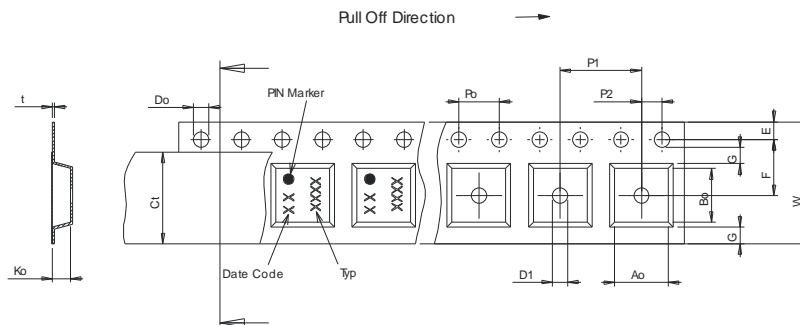
Packing

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

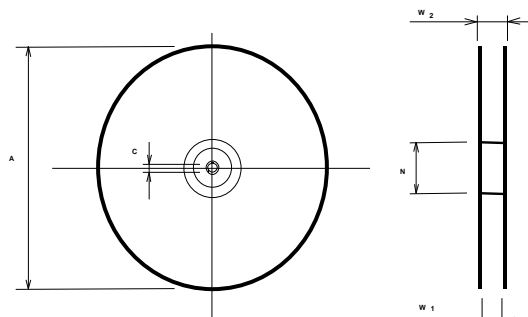
Tape (all dimensions in mm)

- W : 8.00 ±0.3
- Po : 4.00 ±0.1
- Do : 1.50 +0.1/-0
- E : 1.75 ±0.1
- F : 3.50 ±0.05
- G(min) : 0.75
- P2 : 2.00 ±0.05
- P1 : 4.00 ±0.1
- D1(min) : 1.50
- Ao : 3.25 ±0.1
- Bo : 3.25 ±0.1
- Ct : 5.30 ±0.1
- Ko : 1.50 ±0.1
- t : 0.25 ±0.05



Reel (all dimensions in mm)

- A : 330 or 180
- W1 : 8.40 +1.5/-0
- W2(max) : 14.40
- N(min) : 60.00
- C : 13.0 ±0.2



The minimum bending radius is 45 mm.

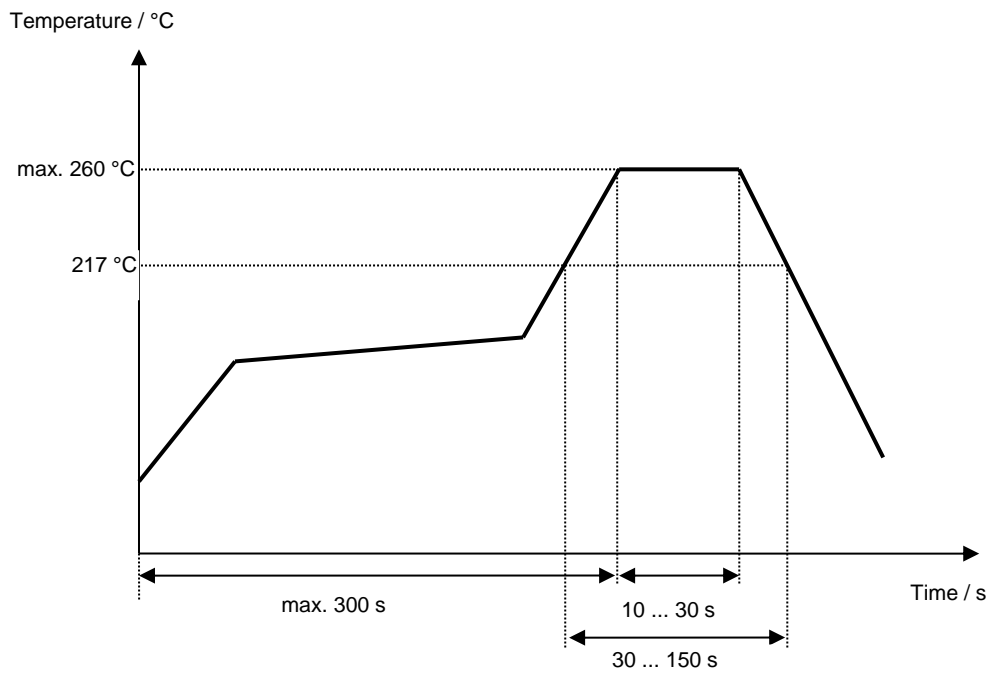
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Air reflow temperature conditions

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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Microchip**Filter specification****TFS1601A****5/5****History**

Version	Reason of Changes	Name	Date
1.0	Generation of filter specification	Molke	27.08.2013
2.0	updated data table updated construction updated Tape & Reel	P. Jaster	02.05.2018
3.0	updated filter characteristic updated package	P. Jaster	11.06.2018

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