

**Vectron International****Filter specification****TFS 609****1/5****Measurement condition**

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

**Characteristics**

## Remark:

The maximum attenuation in the passband is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 609 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.

<b>D a t a</b>	<b>typ. value</b>		<b>tolerance / limit</b>	
<b>Insertion loss within PB</b>	$a_e$	2.5 dB	max.	4.0 dB
<b>Nominal frequency</b>	$f_N$	-		609 MHz
<b>Passband</b>	PB	-	$f_N \pm$	16.0 MHz
<b>Passband variation</b>		0.9 dB	max.	2.0 dB
<b>Absolute attenuation</b>	$a_{abs}$			
$f_N \pm 80$ MHz ... $f_N \pm 149$ MHz		49 dB	min.	33.5 dB
$f_N + 149$ MHz ... $f_N + 300$ MHz		48 dB	min.	45 dB
1 MHz ... 30 MHz		52 dB	min.	45 dB
30 MHz ... 200 MHz		57 dB	min.	50 dB
200 MHz ... $f_N - 149$ MHz		65 dB	min.	55 dB
<b>Group delay ripple within PB</b>	p-p	0.02 μs	max.	0.2 μs
<b>IIP3</b>	*	-	min.	36 dBm
<b>Input power level</b>		-	max.	10 dBm
<b>Operating temperature range</b>	OTR	-		23 °C
<b>Storage temperature range</b>		-		- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>	$TC_f$ **	-76 ppm/K		

\*)  $f_{in1} = f_C - 14$  MHz;  $f_{in2} = f_C - 14.4$  MHz;  $P_{in} = 0$  dBm;  $f_{measurement1} = f_C - 13.6$  MHz;  $f_{measurement2} = f_C - 14.8$  MHz. 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  $a_e$ .

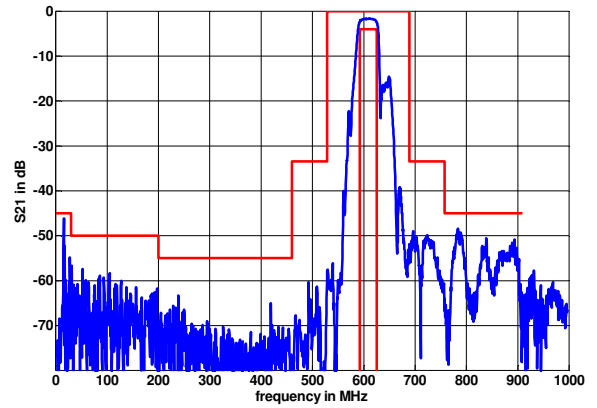
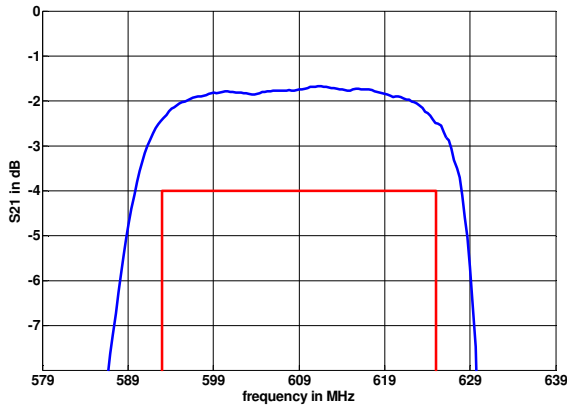
\*\*)  $\Delta f(\text{Hz}) = TC_f (\text{ppm/K}) \times (T - T_0) \times f_{T0} (\text{MHz})$

**Generated:****Checked / Approved:**

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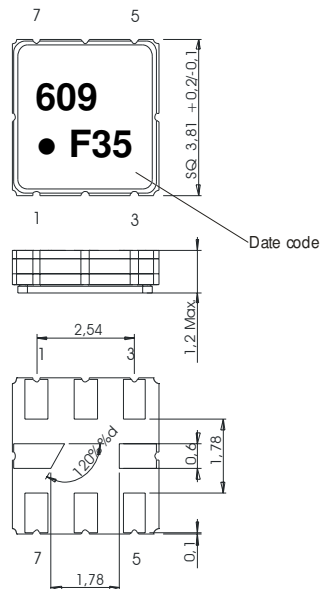
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**Filter characteristic**



**Construction and pin connection**

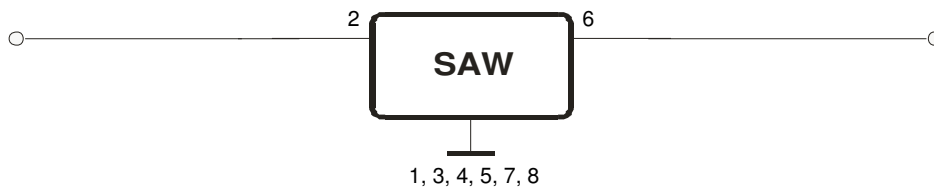
(All dimensions in mm)



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

Date code: Year + week  
 F 2015  
 G 2016  
 H 2017  
 ...

**50 Ω Test circuit**



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**Stability characteristics, reliability**

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

1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0.35 mm or g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 15 min. each / 100 cycles  
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: three times max.;  
for temperature conditions, see page 4: "Air reflow temperature conditions"

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

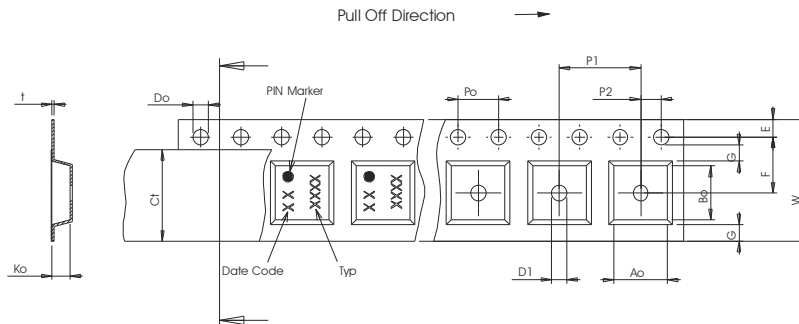
**Packing**

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;

max. pieces of filters per 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

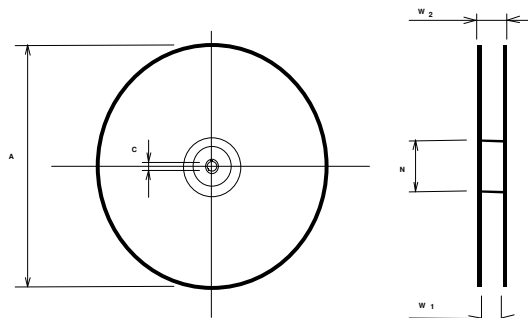
**Tape (all dimensions in mm)**

- 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 : 9,2 ± 0,1



**Reel (all dimensions in mm)**

- A : 330 or 180
- 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.

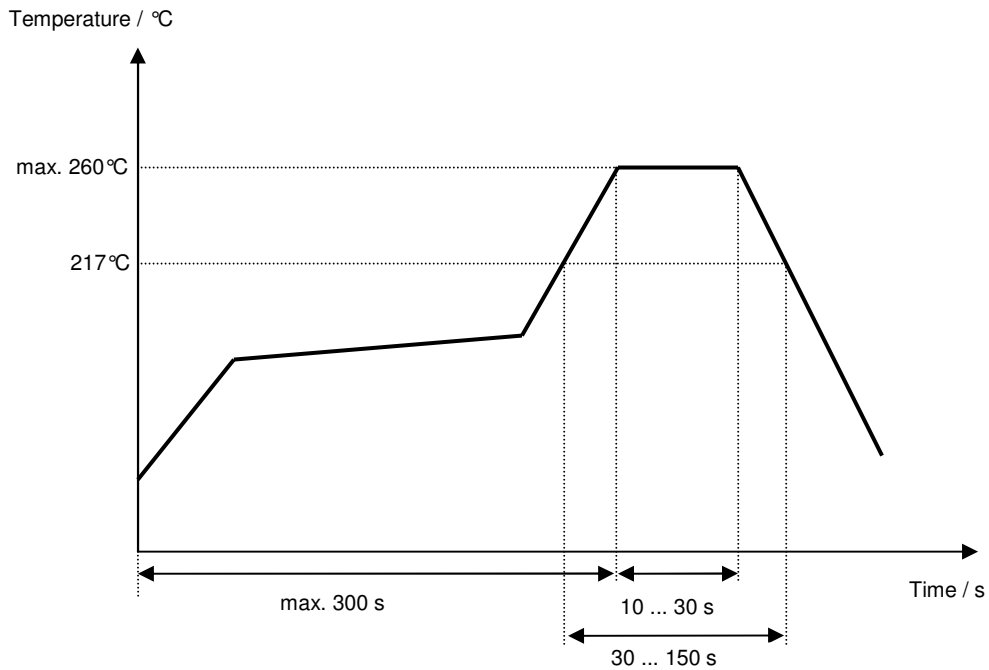
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**Air reflow temperature conditions**

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**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification	Molke	06.05.2014
2.0	- Absolute attenuation relaxed (1 ... 30 MHz)	Molke	22.08.2014
2.1	- Change from development spec to filter spec - Typical values added - Filter characteristic added	Molke	25.08.2015