

**Vectron International**

**Filter specification**

**TFS 360L**

**1/5**

**Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 84 Ω || -15,7 pF  
     Output: 64 Ω || -18,2 pF

**Characteristics**

**Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 360L is the maximum attenuation in the pass band. The maximum attenuation in the pass band is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 360 MHz without any tolerance or limit. The values of relative attenuation  $a_{rel}$  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</b> (reference level)	$a_e$	8 dB	max. 10,0 dB
<b>Nominal frequency</b>	$f_N$		360,0 MHz
<b>Passband</b>	PB	50 MHz	$f_N \pm 20,0$ MHz
<b>Pass band ripple**</b>	p-p	0,2 dB	max. 0,5 dB
<b>Relative attenuation</b>	$a_{rel}$		
$f_N \dots f_N \pm 20$ MHz		0,2 dB	max. 1 dB
$f_N - 80$ MHz ... $f_N - 70$ MHz		59 dB	min. 45 dB
$f_N - 70$ MHz ... $f_N - 50$ MHz		46 dB	min. 35 dB
$f_N - 50$ MHz ... $f_N - 40$ MHz		35 dB	min. 20 dB
$f_N + 40$ MHz ... $f_N + 50$ MHz		25 dB	min. 10 dB
$f_N + 50$ MHz ... $f_N + 80$ MHz		40 dB	min. 25 dB
$f_N + 80$ MHz ... $f_N + 100$ MHz		44 dB	min. 35 dB
<b>Group delay ripple within PB</b>		15 ns	max. 50 ns
<b>Return loss</b>		12 dB	min. 10 dB
<b>Input power level ***</b>		27 dBm	max. 20 dBm
<b>Operating temperature range</b>	OTR		- 40 °C ... + 85 °C
<b>Storage temperature range</b>			- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>	$TC_f$ ****	-85 ppm/K	-

\*) 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.

\*\*) over any 5MHz , fixed 3<sup>rd</sup> order detrend allowed if necessary

\*\*\*) This power level is allowed for short term operation (<100 hours) only, the max. input power for continuous operation is 5 dBm.

\*\*\*\*)  $\Delta f_c(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_o) \times f_N(\text{MHz})$ .

**Generated:**

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**Checked / Approved:**

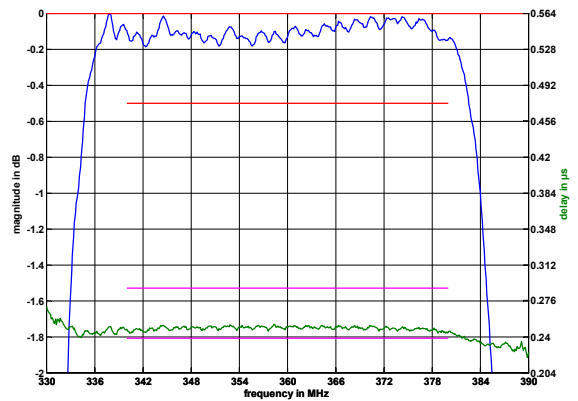
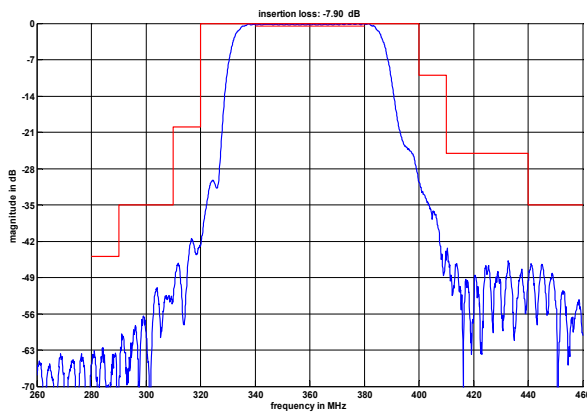
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**Filter characteristic**

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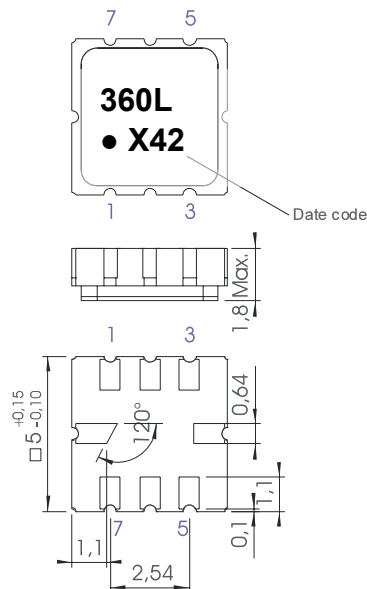
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**Filter characteristic**



**Construction and pin connection**

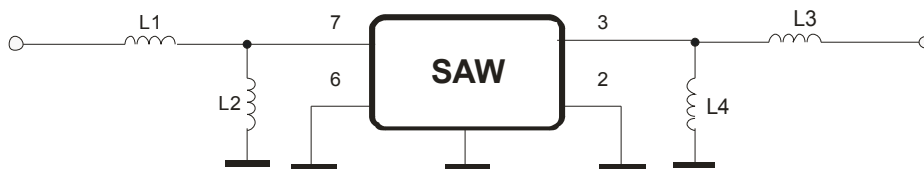
(All dimensions in mm)



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

Date code: Year + week  
 X 2009  
 A 2010  
 B 2011  
 ...

**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 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles  
DIN IEC 68 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. ESD MIL-STD-883E using coupling network of ISO 10605 and EN 6100-4-2  
HBM:250V;

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

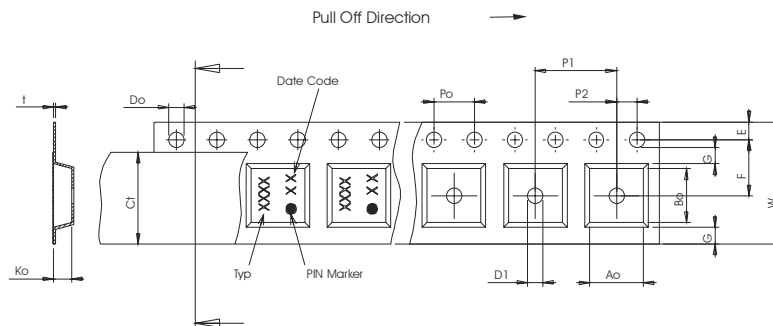
**Packing**

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

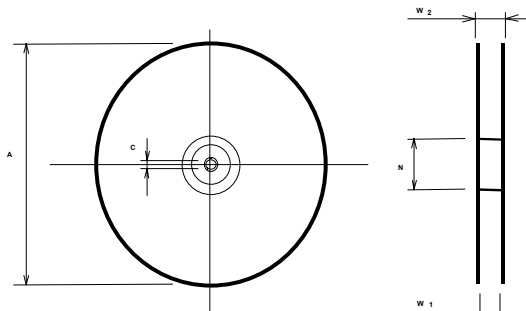
**Tape (all dimensions in mm)**

- W : 12,00
- Po : 4,00
- Do : 1,50
- E : 1,75
- F : 5,50
- G(min) : 0,75
- P2 : 2,00
- P1 : 8,00
- D1(min) : 1,50
- Ao : 5,30
- Bo : 5,30
- Ct : 9,5



**Reel (all dimensions in mm)**

- A : 330
- W1 : 12,4
- W2(max) : 18,4
- N(min) : 50
- C : 13,0



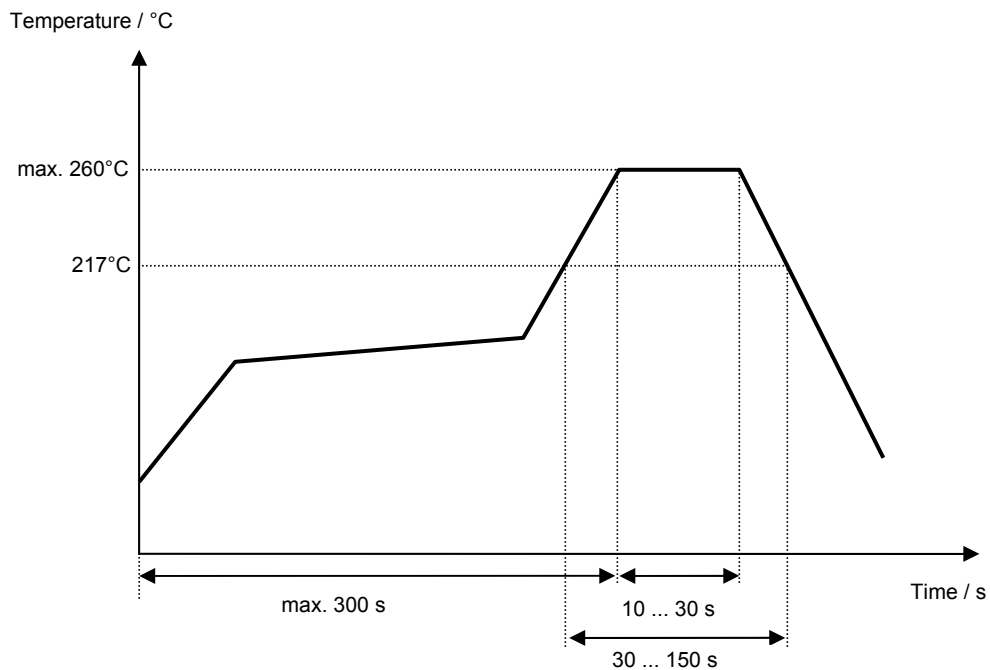
The minimum bending radius is 45 mm.

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**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**

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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	Strehl	02.10.2008
1.1	- Added max. input power	Chilla	21.10.2008
1.2	- Changed relative attenuation	Chilla	16.02.2009
1.3	- Created filter specification - Added terminating impedance - Added typical values - Added filter characteristic - Added filter test circuit	Chilla	15.10.2009
1.4	- Added input power level	Chilla	23.11.2009