

Vectron International**Filter specification****TFS 500****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	415 Ω -1 pF	
Output:	415 Ω -1 pF	
External Coil:	33 nH	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 500 is the minimum of the pass band attenuation. This value is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 500,0 MHz without any tolerance. 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.

D a t a		typ. value	tolerance / limit
Insertion loss (reference level)	a_e	4,4 dB	max. 5,0 dB
Nominal frequency	f_N		500,0 MHz
Passband	PB	390 kHz	$f_N \pm 0,1$ MHz
Pass band variation		1,3 dB	max. 2,0 dB
Relative attenuation	a_{rel}		
$f_N - 100$ MHz ... $f_N - 90$ MHz		48 dB	min. 40 dB
$f_N - 90$ MHz ... $f_N - 60$ MHz		42 dB	min. 38 dB
$f_N - 60$ MHz ... $f_N - 1$ MHz		47 dB	min. 40 dB
$f_N + 1$ MHz ... $f_N + 100$ MHz		42 dB	min. 40 dB
Input power level		-	max. 0 dBm
Operating temperature range	OTR	-	- 40 °C ... + 85 °C
Storage temperature range		-	- 40 °C ... + 85 °C
Frequency inversion temperature		41 °C	
Temperature coefficient of frequency	TC_f^{**}	- 0,036 ppm/K ²	

*) 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.

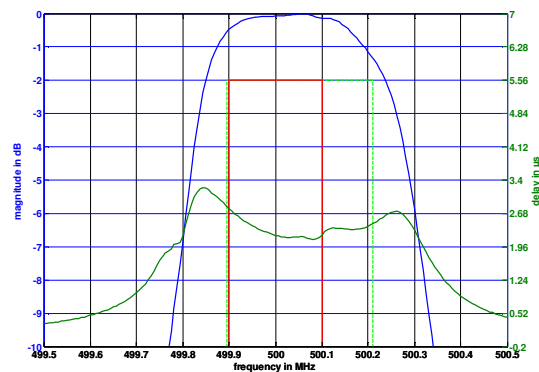
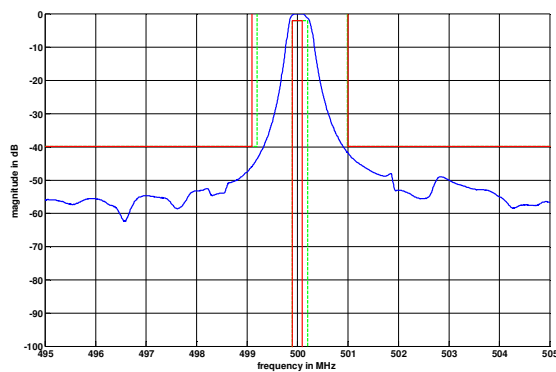
**) $\Delta f_c(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_o)^2 \times f_{T_o}(\text{MHz})$.

Generated:**Checked / Approved:**

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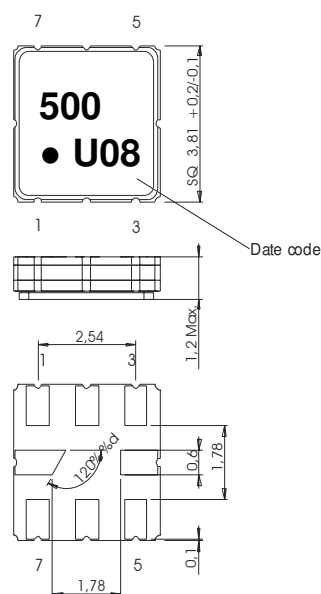
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Filter characteristic



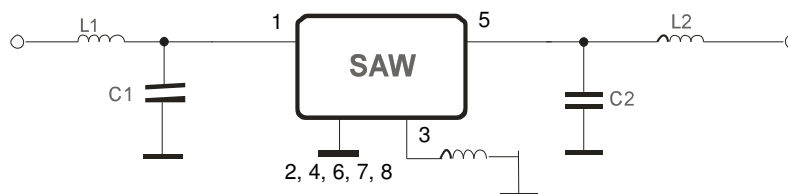
Construction and pin connection

(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
 T 2005
 U 2006
 V 2007
 ...

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 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"
5. ESD ANSI/ESD S20.20-1999, class 1A for HBM

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

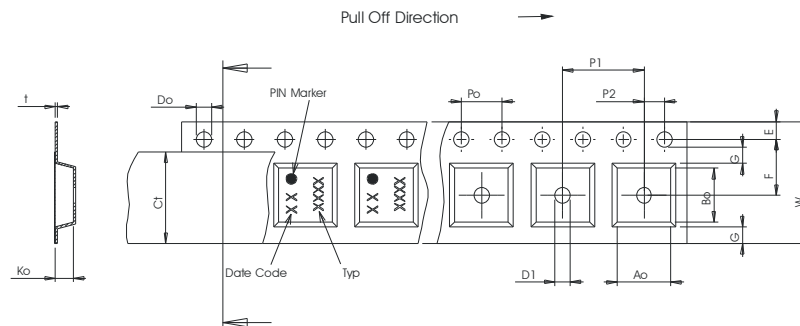
Packing

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;

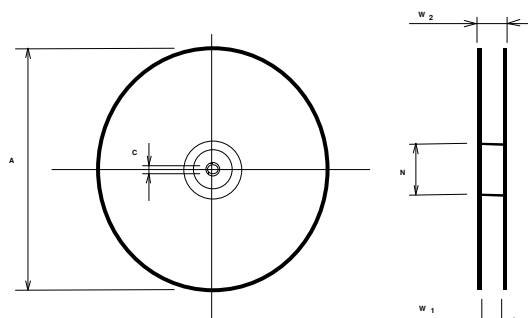
max. pieces of filters per reel: 3000
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

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



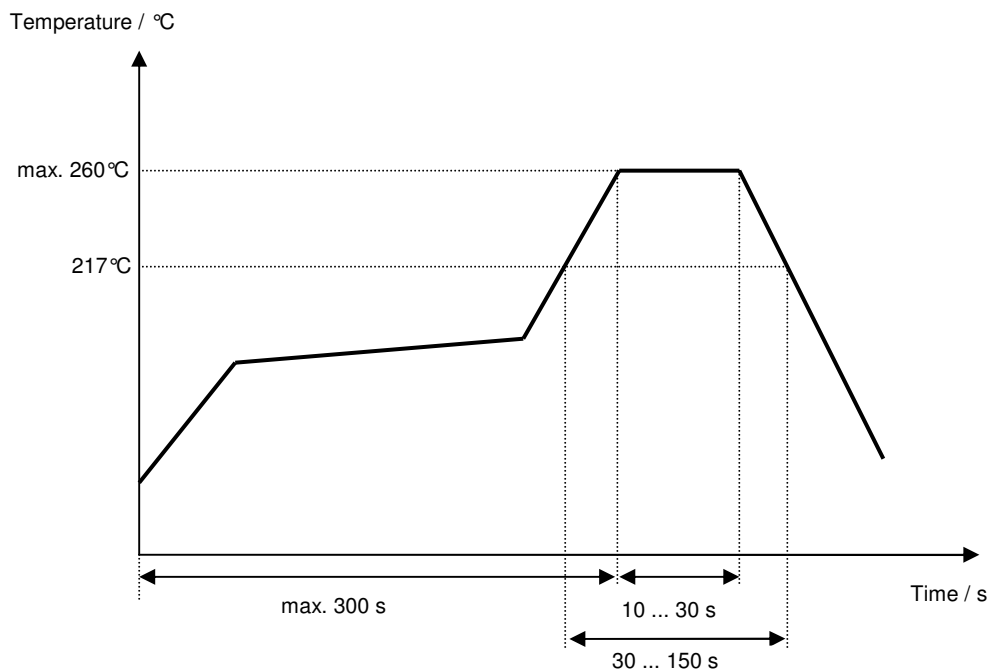
The minimum bending radius is 45 mm.

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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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Vectron International**Filter specification****TFS 500****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Strehl	10.11.2005
1.1	- Add operating temperature range - Add frequency inversion temperature	Channaa	21.11.2005
1.2	- Add typical values - Add filter characteristic - Add test circuit - Add terminating impedances	Martens	23.02.2006
1.3	- Change from development specification to filter specification - Change relative attenuation	Alawneh	28.04.2006
1.4	- Updated header and footer to current standards	Raura	08.11.2012
1.5	- Change Input power level - Update Reel dimensions - Update Stability characteristics, reliability - Update Filter characteristic - Add ESD	Bonnen	17.06.2014

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