

Vectron International**Filter specification****TFS 110W****1/5****Measurement condition**

Ambient temperature:	25	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	297 Ω	-23.3 pF
Output:	315 Ω	-24.6 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 110W 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 110.592 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	3.5 dB	max.	4.5	dB
Nominal frequency		f_N	-		110.592	MHz
Centre frequency		f_C	110.592 MHz		-	
Passband		PB		f_N	± 280	kHz
Pass band ripple			-	max.	3	dB
Relative attenuation		a_{rel}				
f_N	... $f_N \pm$	0.280 MHz	1 dB	max.	3	dB
$f_N \pm$	1.150 MHz ... $f_N \pm$	1.728 MHz	18 dB	min.	10	dB
$f_N \pm$	1.728 MHz ... $f_N \pm$	3.456 MHz	35 dB	min.	30	dB
$f_N +$	3.456 MHz ... $f_N +$	5.184 MHz	45 dB	min.	40	dB
$f_N -$	3.456 MHz ... $f_N -$	5.184 MHz	49 dB	min.	45	dB
$f_N -$	5.184 MHz		53 dB	min.	50	dB
$f_N -$	5.184 MHz ... $f_N -$	15.000 MHz	50 dB	min.	40	dB
Group delay ripple within PB		p-p	100 ns	max.	700	ns
Input power level				max.	10	dBm
Permissible DC voltage				max.	3	V
Operating temperature range		OTR	-	- 20 °C ... + 70 °C		
Operable temperature range			-	- 40 °C ... + 85 °C		
Storage temperature range			-	- 40 °C ... + 85 °C		
Temperature coefficient of frequency		TC_f **	-19 ppm/K			

*) The terminating impedances depend on parasites 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.

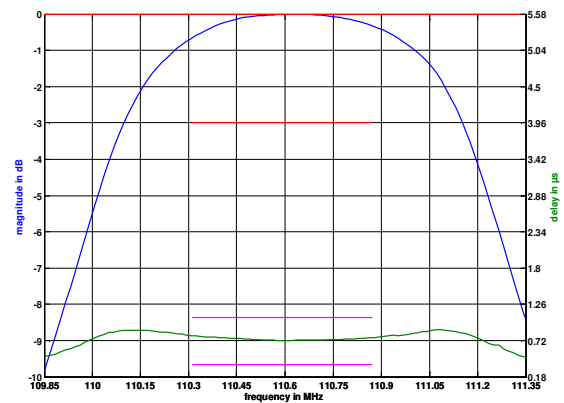
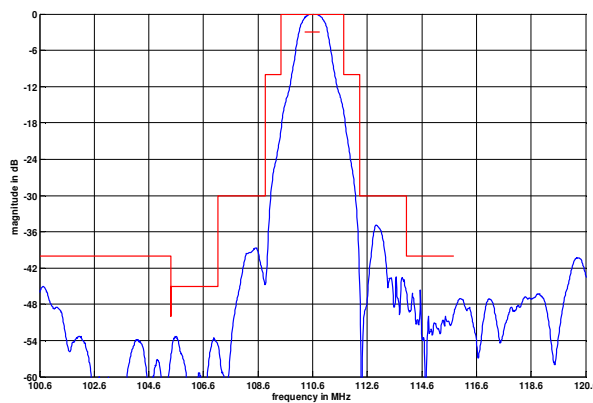
**) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T0}(\text{MHz})$.

Generated:**Checked / Approved:**

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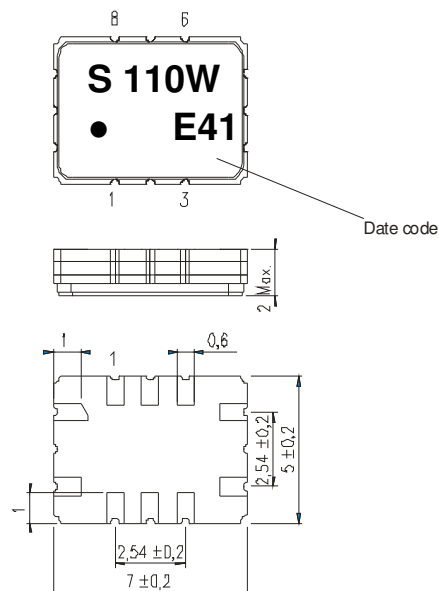
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Filter characteristic



Construction and pin connection

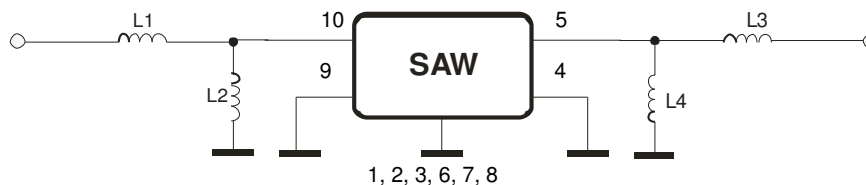
(All dimensions in mm)



1	Ground
2	Ground
3	Ground
4	Output RF Return
5	Output
6	Ground
7	Ground
8	Ground
9	Input RF Return
10	Input

Date code: Year + week
 E 2014
 F 2015
 G 2016
 ...

50 Ohm 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 refer to the attached "Air reflow temperature conditions" on page 4;
5. ESD ANSI/ESD S20.20-1999, class 1A for HBM

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

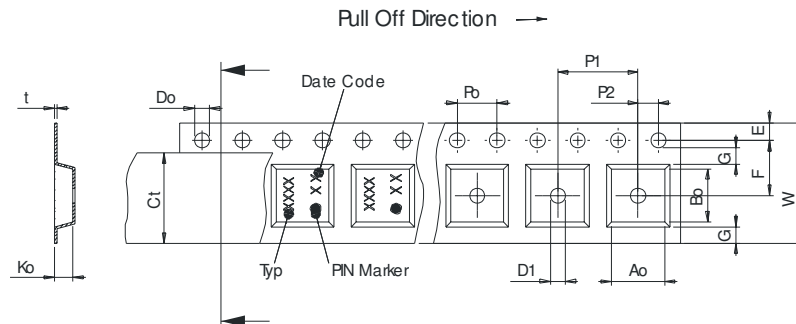
Packing

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;

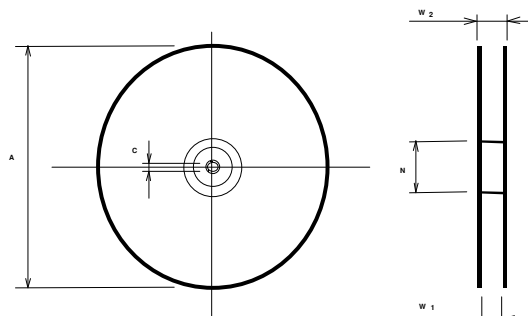
max. pieces of filters per reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

W	: 16.00 ± 0.3
Po	: 4.00 ± 0.1
Do	: 1.50 +0.1/-0
E	: 1.75 ± 0.1
F	: 7.50 ± 0.1
G(min)	: 0.60
P2	: 2.00 ± 0.1
P1	: 8.00 ± 0.1
D1(min)	: 1.50
Ao	: 5.50 ± 0.1
Bo	: 7.50 ± 0.1
Ct	: 13.5 ± 0.1

**Reel (all dimensions in mm)**

A	: 330
W1	: 16.4 +2/-0
W2(max)	: 22.4
N(min)	: 50
C	: 13.0 +0.5/-0.2



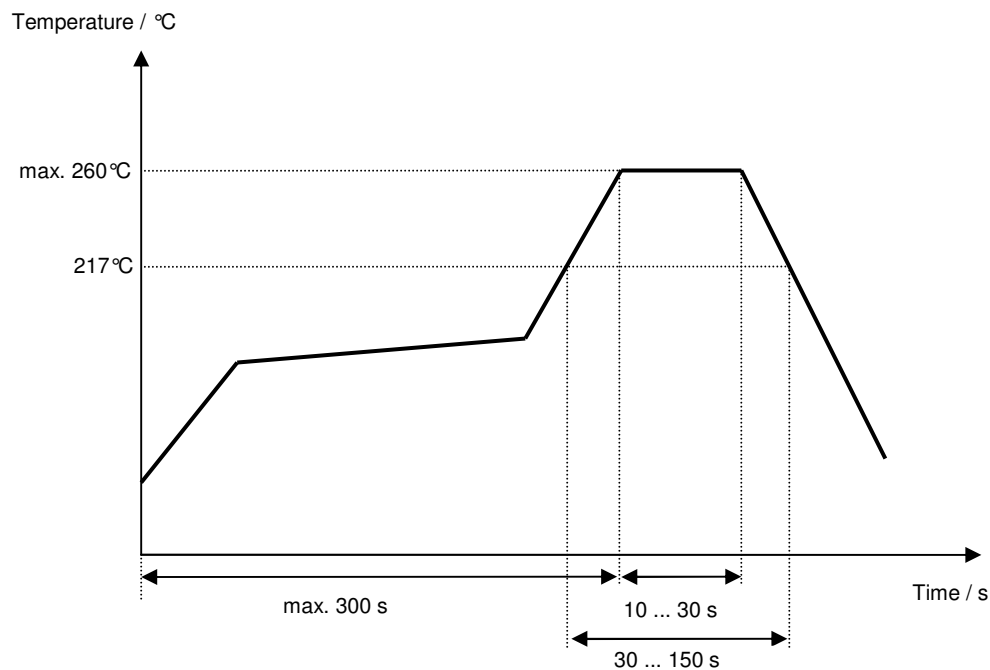
The minimum bending radius is 45 mm.

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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

Vectron International**Filter specification****TFS 110W****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- generation of development specification	Strehl	10.06.2005
1.1	- change pass band and relative attenuation	Strehl	13.07.2005
1.2	- terminating impedance (preliminary value), typical values and filter characteristic added - matching configuration changed	Pfeiffer	02.09.2005
1.3	- terminating impedance fixed - typical values and filter characteristic changed	Pfeiffer	07.10.2005
1.4	- Input power level increased to 10dBm max, (was 0dBm). - Added operable temperature range -40 °C ...+85 °C. - Update headers and footers. - Update stability characteristics, reliability	TCUK	26.03.2014

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