Vectron International — Filter specification — TFS 416 — 1/5

Measurement condition

Ambient temperature:	23	℃
Input power level:	0	dBm
Terminating impedance:		
Input:	200	Ω
Output:	200	Ω

Characteristics

Remark:
The nominal frequency f_N is fixed at 416.0 MHz. The insertion loss a_e is defined as loss value determined at f_N. All specified data are met within the operating temperature range.

D a t a		typ. value		tolerance / limit		
Insertion loss (reference level)	a_e	1.6	dB	max.	3.5	dB
Nominal frequency	f_N	-			416.0	MHz
Centre frequency	f_C	416.0	MHz			
Bandwidth	BW					
3 dB		9.7	MHz		-	
Absolute attenuation	a_{abs}					
f_N - 1.28 MHz		2.5	dB	max.	4.5	dB
f_N - 51.84 MHz		59	dB	min.	50	dB
f_N - 52.00 MHz		59	dB	min.	50	dB
f_N - 103.68 MHz		57	dB	min.	50	dB
f_N - 104.00 MHz		57	dB	min.	50	dB
f_N - 155.52 MHz		56	dB	min.	50	dB
f_N - 156.00 MHz		56	dB	min.	50	dB
f_N - 207.36 MHz		58	dB	min.	50	dB
f_N - 208.00 MHz		58	dB	min.	50	dB
f_N - 259.20 MHz		59	dB	min.	51	dB
f_N - 260.00 MHz		59	dB	min.	51	dB
f_N - 311.04 MHz		62	dB	min.	51	dB
f_N - 312.00 MHz		62	dB	min.	51	dB
f_N - 362.88 MHz		60	dB	min.	52	dB
f_N - 364.00 MHz		60	dB	min.	52	dB
f_N + 51.84 MHz		55	dB	min.	48	dB
f_N + 52.00 MHz		55	dB	min.	48	dB
f_N + 103.68 MHz		56	dB	min.	48	dB
f_N + 104.00 MHz		56	dB	min.	48	dB
f_N + 155.52 MHz		54	dB	min.	48	dB
f_N + 156.00 MHz		54	dB	min.	48	dB
f_N + 207.36 MHz		58	dB	min.	48	dB
f_N + 208.00 MHz		58	dB	min.	48	dB
f_N + 259.20 MHz		60	dB	min.	49	dB
f_N + 260.00 MHz		60	dB	min.	49	dB
f_N + 311.04 MHz		62	dB	min.	50	dB
f_N + 312.00 MHz		62	dB	min.	50	dB
f_N + 362.88 MHz		64	dB	min.	50	dB
f_N + 364.00 MHz		64	dB	min.	50	dB
Input power level		-		max.	5	dBm
Operating temperature range	OTR	-		-40 ℃ ... +85 ℃		
Storage temperature range		-		-45 ℃ ... +95 ℃		
Temperature coefficient of frequency	TC_f *	-32	ppm/K			

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

Generated:

Checked / Approved:

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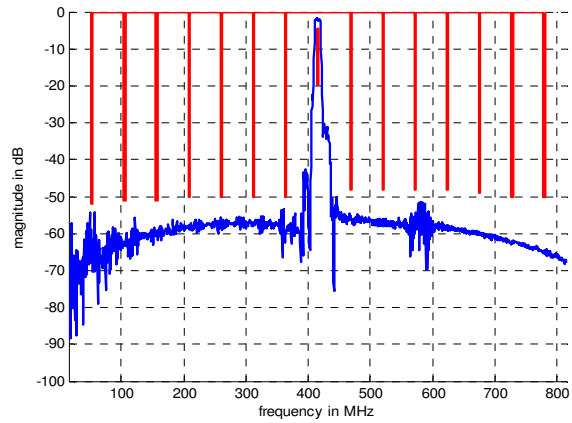
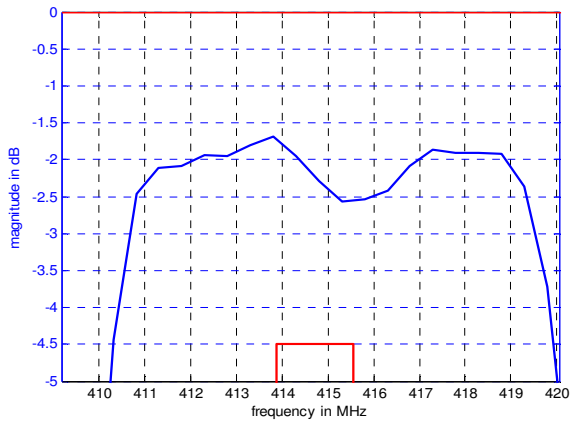
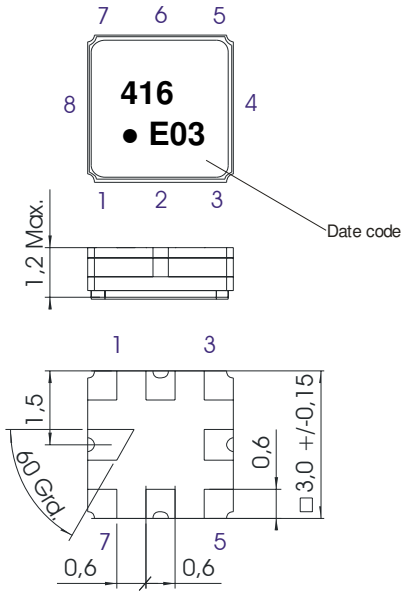
Filter characteristic





Construction and pin connection

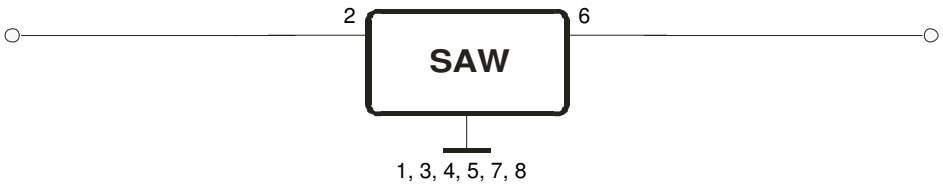
(All dimensions in mm)



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

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

200 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)

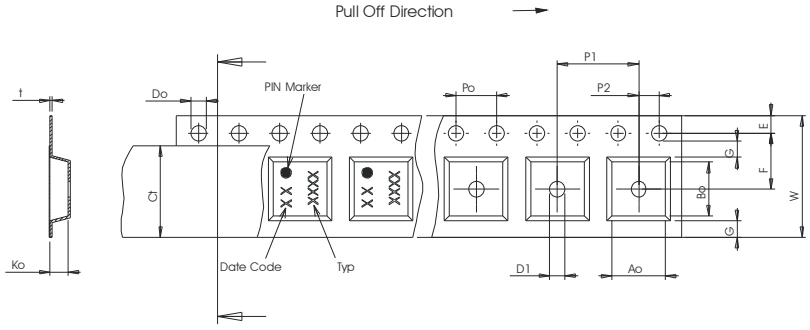
Packing

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

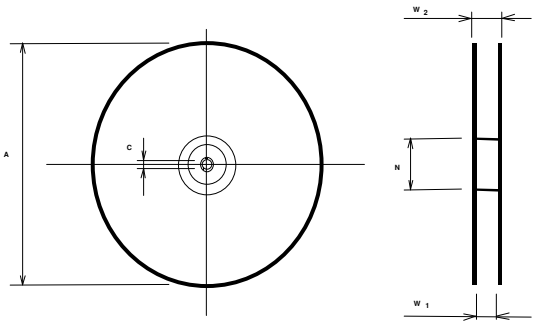
Tape (all dimensions in mm)

W	:	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	:	5,3	± 0,1



Reel (all dimensions in mm)

A	:	180	
W1	:	8,4	+1,5/-0
W2(max)	:	14,4	
N(min)	:	60	
C	:	13,0	± 0,2



The minimum bending radius is 45 mm.

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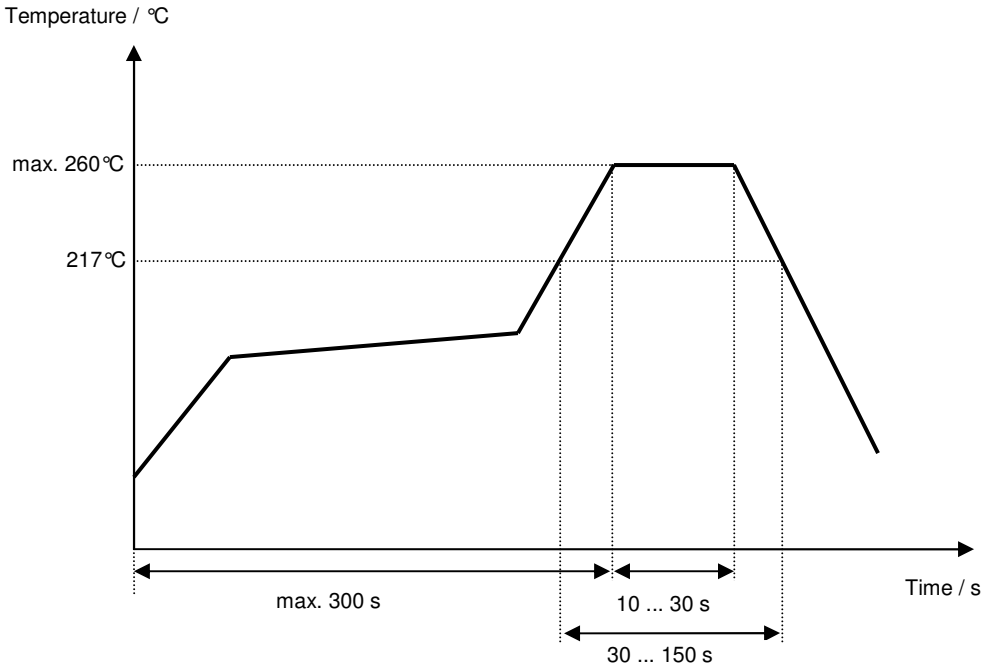
Air reflow temperature conditions

Conditions	**Exposure**
Average ramp-up rate (30℃ to 217℃)	less than 3℃/second
> 100℃	between 300 and 600 seconds
> 150℃	between 240 and 500 seconds
> 217℃	between 30 and 150 seconds
Peak temperature	max. 260℃
Time within 5℃ of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50℃)	less than 6℃/second
Time from 30℃ to Peak temperature	no greater than 300 seconds

Chip-mount air reflow profile



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History

Version	Reason of Changes	Name	Date
1.0	Generation of development specification	Strehl	18.05.2006
1.1	Add absolute attenuation	Strehl	25.07.2006
1.2	Add typical values, add filter characteristic Generation of filter specification	Channaa	12.09.2006
2.0	Changed pull off direction from reel	Schönbein	25.04.2013
2.1	maximum input power updated	Kortenbeutel	16.01.2014

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