

Vectron International**Filter specification****TFS 644****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	150 Ω 0 pF	
Output:	150 Ω 0 pF	

Characteristics

Remark:

The nominal frequency f_N is fixed at 644.5313 MHz. The insertion loss a_e is defined as loss value determined at f_N . Reference level for the relative attenuation a_{rel} of the TFS 644 is the insertion loss a_e . All specified data are met within the operating temperature range.

D a t a		typ. value		tolerance / limit		
Insertion loss (reference level)		a_e	2.3 dB	max.	4.5	dB
Nominal frequency		f_N	-		644.5313	MHz
Centre frequency		f_c	644.5313 MHz		-	
Bandwidth		BW				
3	dB		23.2 MHz		-	
Absolute attenuation		a_{abs}				
f_N -	4.5313 MHz		3.2 dB	max.	5.5	dB
f_N -	80 MHz		61.5 dB	min.	52	dB
f_N -	160 MHz		69 dB	min.	60	dB
f_N -	161.13 MHz		68.6 dB	min.	60	dB
f_N -	240 MHz		69 dB	min.	60	dB
f_N -	320 MHz		70 dB	min.	60	dB
f_N -	322.27 MHz		69 dB	min.	60	dB
f_N -	400 MHz		70 dB	min.	60	dB
f_N -	480 MHz		70 dB	min.	60	dB
f_N -	483.40 MHz		69 dB	min.	60	dB
f_N -	560 MHz		59 dB	min.	55	dB
f_N +	80 MHz		59 dB	min.	52	dB
f_N +	160 MHz		73 dB	min.	60	dB
f_N +	161.13 MHz		78 dB	min.	60	dB
f_N +	240 MHz		71 dB	min.	60	dB
f_N +	320 MHz		68 dB	min.	55	dB
f_N +	322.27 MHz		66 dB	min.	55	dB
f_N +	400 MHz		66 dB	min.	55	dB
f_N +	480 MHz		66 dB	min.	55	dB
f_N +	483.40 MHz		66 dB	min.	55	dB
Input power level			-	max.	0	dBm
Operating temperature range		OTR	-	-40 °C ... +85 °C		
Storage temperature range			-	-55 °C ... +25 °C		
Temperature coefficient of frequency		TC_f *	-73 ppm/K	-		

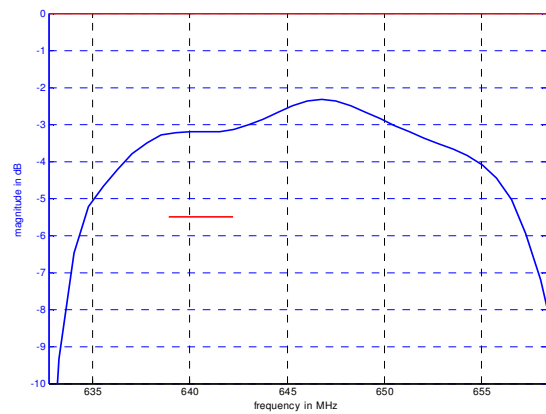
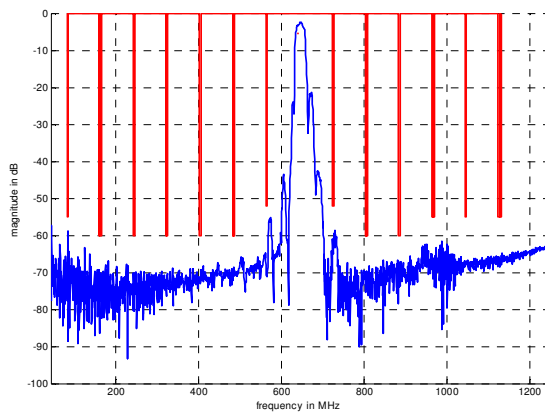
*) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{CAT}(\text{MHz})$. Material: LiNbO₃_64° black, so in principle pyrofree.

Generated:**Checked / Approved:**

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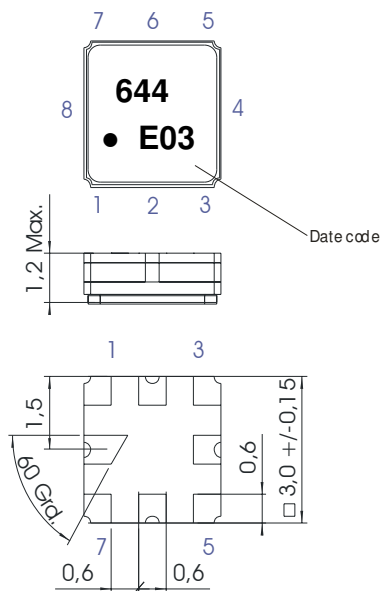
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Filter characteristic



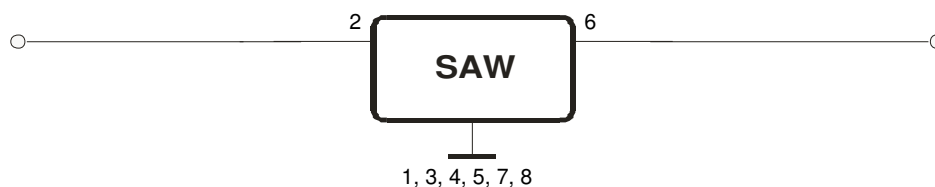
Construction and pin connection

(All dimensions in mm)



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

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

150 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)

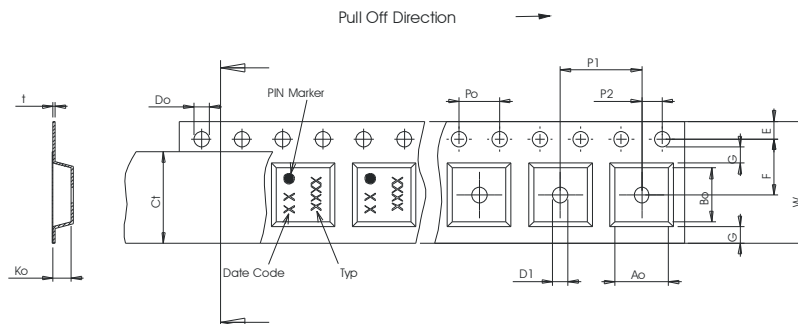
Packing

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;

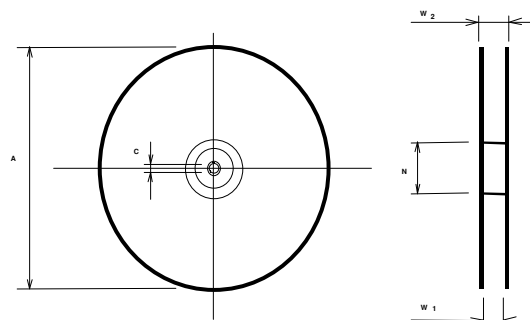
max. pieces of filters per reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

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



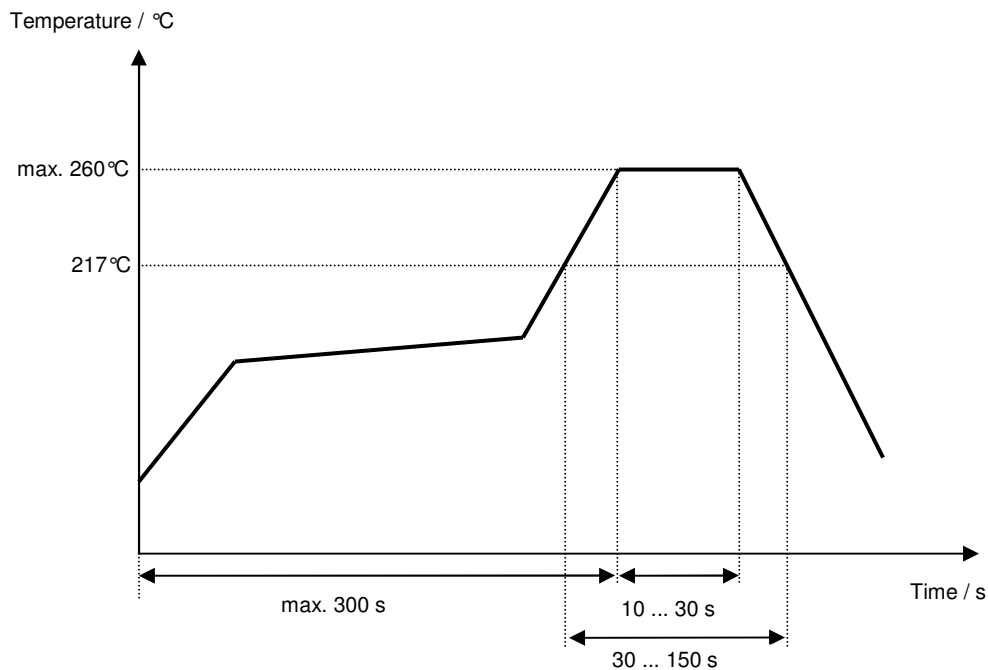
The minimum bending radius is 45 mm.

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Air reflow temperature conditions

Conditions	Exposure
Average ramp-up rate (30°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 644****5/5****History**

Version	Reason of Changes	Name	Date
1.0	Generation of development specification	Strehl	18.10.2005
1.1	Add typical values, add filter characteristic Generate filter specification from development specification	Channaa	30.01.2006
1.2	Increase operating temperature range Add additional frequencies for absolute attenuation	Channaa	19.05.2006
1.3	Change characteristics Strehl		24.09.2007
2.0	Change pull off direction from reel	Schönbein	11.05.2012
2.1	Remark on pyrofree material added to data table	Schönbein	24.04.2013
2.2	Maximum input power updated	Kortenbeutel	16.01.2014

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