

VTF Frequency Hopping Filter Series

VTF1-225-400-1-5-SMA



The VTF series of frequency hopping filters offer the user the capability of tuning over multi-octave ranges while maintaining very tight tolerances on performance.

Trilithic has designed the VTF series of filters to help mitigate the issues that many sites can have when interference created by an RF crowded environment can present problems, such as shipboard and ground vehicle mounted systems.

Because of the smaller footprint and better performance, this product line is ideal for new system applications as well as existing system modifications. Trilithic has several frequency ranges available for your system needs.

Electrical Specifications

Tunable Frequency Range	225 - 400 MHz
Impedance	50 Ω
Insertion Loss	5.0 dB (avg) / 6.0 dB (max)
3 dB Bandwidth	2.6% (avg) / 2.8% (max)
Shape Factor (30 dB / 3 dB)	6.6:1 (avg) / 7.0:1 (max)
VSWR	1.4:1 (avg) / 2.0:1 (max)
Inband RF Power Handling	30 dBm (input)
Inband IP3	40 dBm (input)
Inband IP2	100 dBm (input)
Tuning Control	8-Bit Parallel
Tuning Steps	250 Steps
Tuning Speed	50 μ s
DC Power	5 VDC @ 500 mA

Environmental Specifications

Operating Temperature	-40° to +85° C
Center Frequency Drift	80 ppm / °C

Mechanical Specifications

RF Connectors	SMA Female
Control Connector	DB-15
Dimensions	3.25" x 2.50" x 1.50"

PIN No.	Reference	Description	Max Rating
1	A2	Tune Bit 2	+6 VDC
2	A3	Tune Bit 3	
3	A4	Tune Bit 4	
4	A5	Tune Bit 5	
5	A6	Tune Bit 6	
6	A7	Tune Bit 7 (MSB)	
7	GND	Ground	
8	VCC	+5 VDC \pm 10%	+6 VDC
9	GND	Ground	
10	-	N/C	
11	GND	Ground	
12	GND	Ground	
13	STB	Strobe	+6 VDC
14	A0	Tune Bit 0 (LSB)	
15	A1	Tune Bit 1	

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FREQUENCY TUNING ADDRESS

There are 250 equally spaced tuning increments across each standard filter band, resulting in 251 tune words from 00000000 to 11111010. The last 5 tune words are reserved for housekeeping functions:

Tune Code	Result
00000000 thru 11111010	Lowest tuned frequency (251 total tune codes) Highest tuned frequency
11111011 thru 11111111	RF in/out isolation Filter blanked

CALCULATING A TUNE ADDRESS

The binary tuning word is determined by the following relationship:

$$\text{tune word} = \left(\frac{F \text{ desired} - F \text{ low}}{F \text{ high} - F \text{ low}} \right) \times 250$$

Example: To tune to 322 MHz using a 225 to 400 MHz filter, the tune word is:

$$\left(\frac{322 - 225}{400 - 225} \right) \times 250 = 138.57 \text{ (10001011 binary)}$$

NOTE: Round off to the nearest decimal integer!

DC CONTROL INTERFACE CHARACTERISTICS

Symbol	Parameter	Condition	Min	Max	Units
V _{IL}	Input low voltage	CTL signal except A0-A7	0.0	0.2 VCC	Volts (V)
V _{IH}	Input high voltage	CTL signal except A0-A7	0.7 VCC	VCC	Volts (V)
V _{IL1}	Input low voltage	A0-A7	0.0	0.15 VCC	Volts (V)
V _{IH1}	Input high voltage	A0-A7	0.7 VCC	VCC	Volts (V)
R _{in}	Input resistance	All CTL ports	4 K		Ohms (Ω)

SWITCHING CHARACTERISTICS

Symbol	Parameter	Min	Max	Units
t _s	Setup time, A0-A7 to STB	200		nS
t _H	Hold time, A0-A7 from STB	6		μS
t _{SH}	STB high time	25		μS
t _W	STB pulse width	20		nS
t _{DW}	Strobe dwell time (from STB falling edge to next STB falling edge)	15		μS
t _{ACC}	Access time from STB to Fo		15	μS