



## Fast Tune Notch Filter

Teledyne Defence & Space's fast tune notch filter (FTNF) has been designed to protect ESM receivers from high duty cycle frequency agile interference from on board (or cohort) combat radar systems.

Each FTNF provides two independently controlled notches to suppress multiple interference.

Electronic Support Measures (ESM) sensors need protection from high-level frequency-agile Radars; Common mitigating techniques include:

- Synchronous blanking of the ESM sensor:
  - Probability of intercept of ESM receiver is compromised when operating near a high duty cycle radar

### FEATURES

- Modules for both S and X band coverage
- Fast tuning speed (<250ns)
- Dual independently controlled notches
- High rejection level
- Low loss in all pass state
- Can be cascaded
- Digital Tuning Control
- Quickly switches from notch to all-pass
- Good power handling

- Multiple emitters on the same platform compounds the problem
- Front-end filtering of the Radar pulses in the ESM sensor:
  - Band-stop filters leave "holes" in ESM sensor spectral coverage
  - YIG tuned filters are too slow to keep up with modern agile radar

Teledyne Defence & Space's Fast Tuned Notch Filters (FTNF) can track the emitter's transmissions at its agility rate such that the ESM sensor's Probability of Intercept is maintained at an acceptable level.

### APPLICATIONS

- ESM Receiver Protection
- Direction Finding (DF) System Protection

See restrictions on published datasheets at [www.teledynedefence.co.uk/](http://www.teledynedefence.co.uk/)

## SPECIFICATIONS

Specification		
Part Number (Band)	ES005 (S-Band)	ES006 (X-Band)
<b>All-Pass State</b>		
Passband	2.0 to 4.8 GHz	6.0 to 13.0 GHz
Insertion Loss	2.0 dB max	2.5 dB max
Insertion Loss Ripple	1.0 dB max	1.25 dB max
Passband VSWR (Input & Output)	1.9:1 max (relative to 50 Ohms)	1.8:1 max (relative to 50 Ohms)
Harmonics (0 dBm input)	-60 dBc max	-60 dBc max
Input 3rd Order Intercept Point	+20 dBm min	+25 dBm min
<b>Notch Operation</b>		
Number of Independently Tuned Notches	2	2
Tuning Range	2.8 to 3.7 GHz	8.5 to 11.5 GHz
Tuning Resolution	4 MHz	16 MHz
Tuning Accuracy	± 3.0 MHz	± 5.0 MHz
-3dBc bandwidth	250 MHz max	1.0 GHz max
-25dBc bandwidth	12 MHz min	40 MHz min
Full range switching speed	250 ns max	250 ns max
<b>Power Handling &amp; Supply</b>		
Operating power range	+3 dBm max	+10 dBm max
Survival power range	+25 dBm max	+25 dBm max
Power Supplies	+5V @ 300mA max +15V @ 300mA max -12V @ 200mA max	+5V @ 210mA max +15V @ 225mA max -12V @ 200mA max
RF Connectors	Hermetic, SMA Female	Hermetic, SMA Female
Digital Control and Power Supplies Connector	Hermetic, 37-way MDM (Micro-D) with receptacle pins	Hermetic, 37-way MDM (Micro-D) with receptacle pins
<b>Tuning Control Input Requirement</b>		
	Single 8-bit binary Frequency Control Word - common for Notch A and B	Single 8-bit binary Frequency Control Word - common for Notch A and B
	Independent Notch A Frequency Data Strobe Bit	Independent Notch A Frequency Data Strobe Bit
	Independent Notch B Frequency Data Strobe Bit	Independent Notch B Frequency Data Strobe Bit
	N/A	1-bit Active-Low Auto-Correction Bit
	N/A	3-bit LED (red, yellow) drive output lines for auto- calibration status indication
<b>Mechanical</b>		
Weight	950 grams max	750 grams max
Dimensions	258.5 x 76 x 30 mm	206 x 76 x 30 mm
<b>Environment</b>		
Operating Temperature	-28 to +65°C	-28 to +65°C
Storage Temperature	-40 to +85°C	-40 to +85°C

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