

Filters | Filter Products Group

- Lumped Elements filters
- Cavity / Comblne / Interdigital filters
- Tubular filters
- Waveguide filters
- Ceramic filters
- Suspended substrate
- Diplexers & Multiplexers
- Rapid Cell Filters



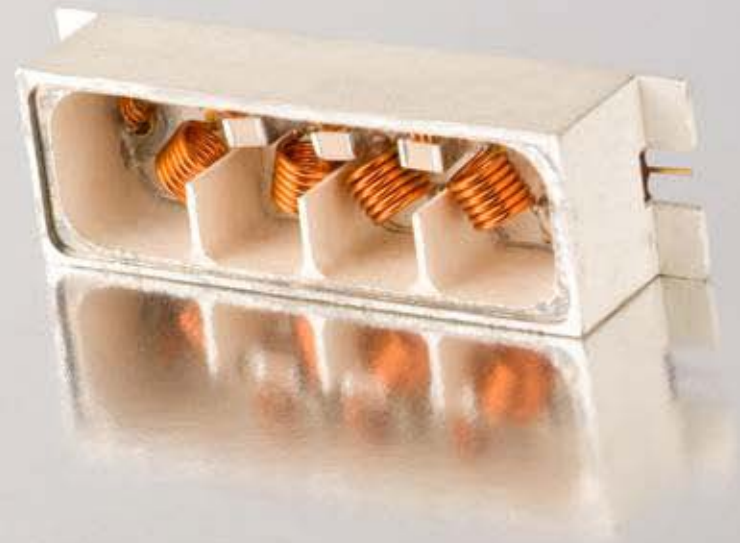
Filters | Lumped Element

- **LC Advantages**

- 300 kHz to 10 GHz
- Smallest and lightest
- Versatile topologies and transfer functions
- Ideal for moderate to very wide bandwidths
- Connectorized or surface mount
- Easily multiplexed
- Temperature stable options

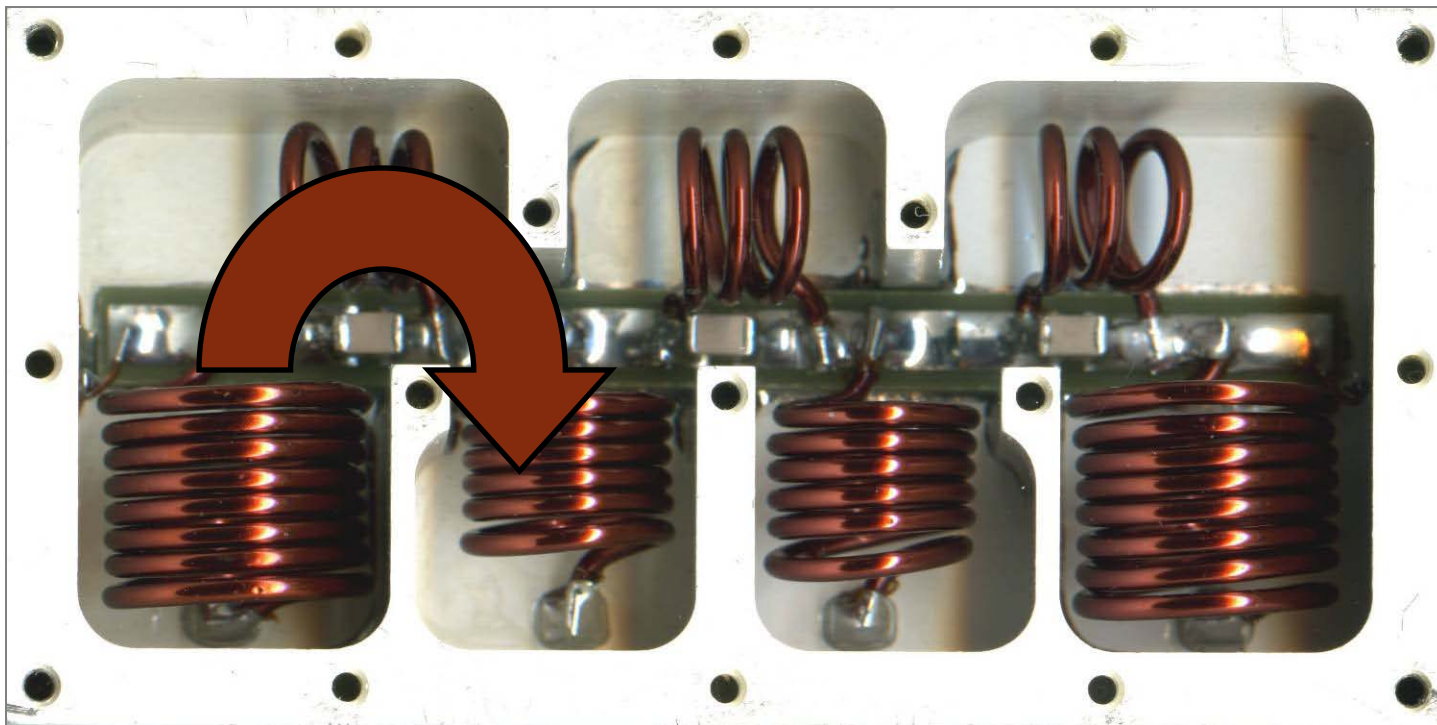
- **Applications and Technology Trends**

- Lower profile designs
- Higher frequency for surface mount applications
- RoHS Compliance



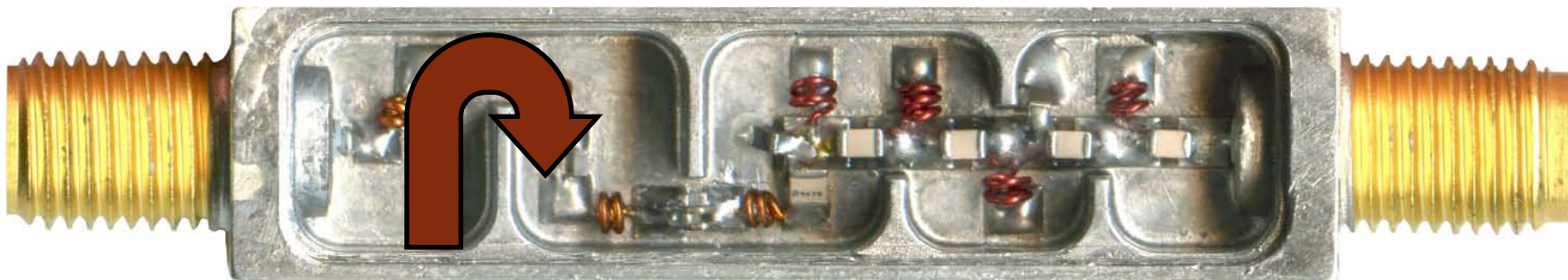
Filters | Lumped Element Designs

Our custom package concepts provide additional shielding for better ultimate rejection



Filters | Lumped Element Designs

We use creative layouts which offer reduced package sizes when needed



Filters | Cavity, Comblane & Interdigital

- **Product Features**

- 400 MHz to 40 GHz
- Low insertion loss
- High selectivity Chebyshev and pole-placed
- Temperature stable options
- High power handling capability
- 0.1 to +60% bandwidth

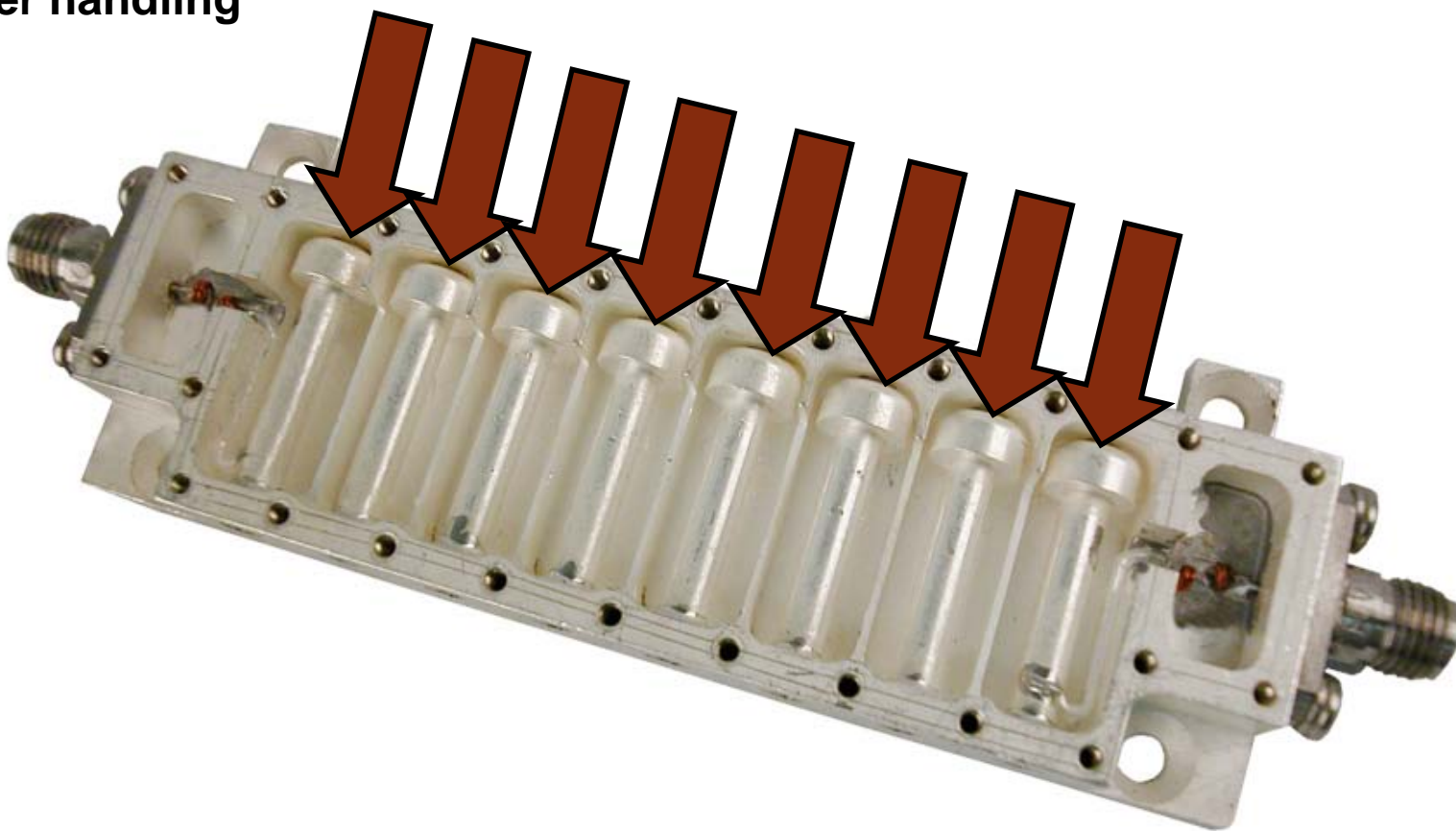
- **Applications and Technology Trends**

- Lower profile designs
- Drop-in designs to 20 GHz
- Low intermodulation products



Filters | Cavity Designs

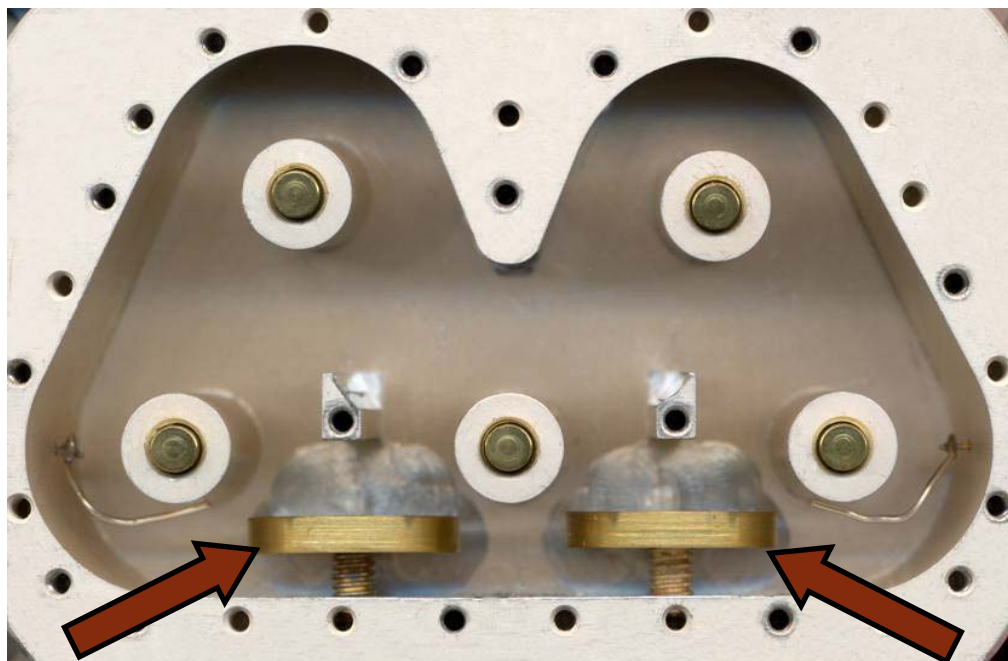
We also use unique resonator designs to **reduce overall size** and increase peak power handling



Filters | Cavity Designs

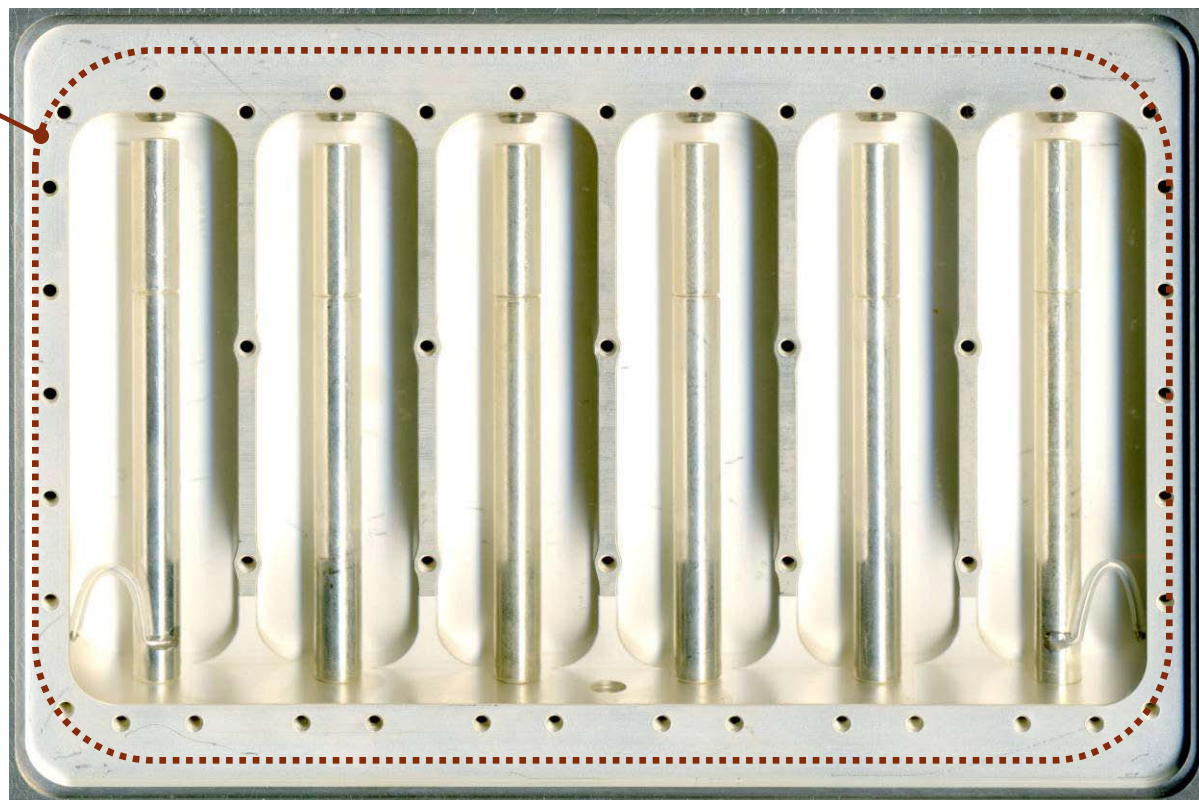
We also use innovative cross coupling techniques **to achieve optimal rejection characteristics**

Bimetallic resonators are also used **to achieve superior temperature stabilization**



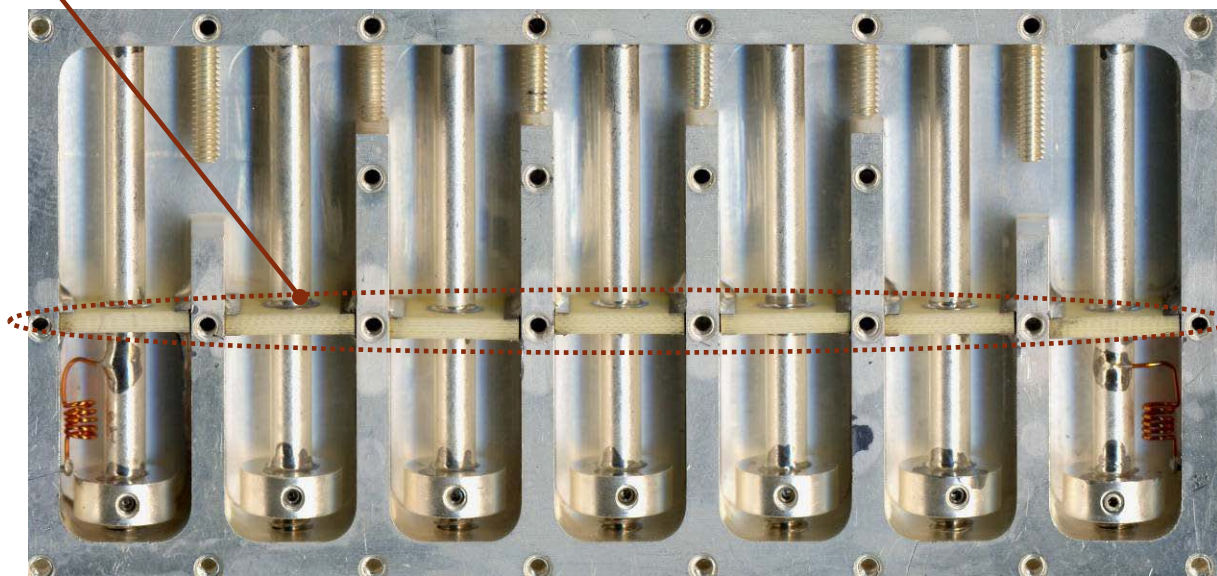
Filters | Cavity Designs

**For added environmental protection and reliability
we laser weld select designs**



Filters | Cavity Designs

We can incorporate a unique low dielectric constant stabilizing structure to **reduce overall sensitivity to shock and vibration**



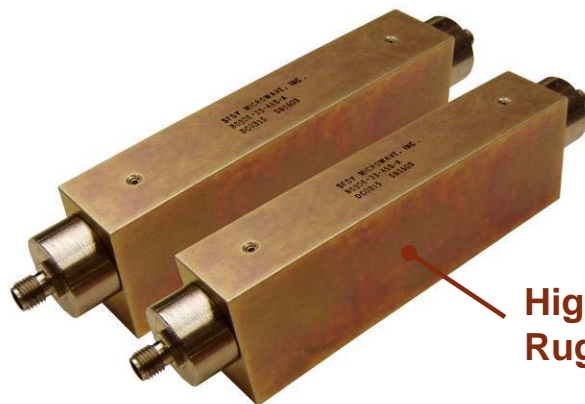
Filters | Tubular Filters

- **Tubular Advantages**

- 30 MHz to 5 GHz
- Broad stopbands
- Ideal for harmonic rejection
- Moderate bandwidths (2% to 50%)
- Chebyshev transfer functions
- High power handling capability

- **Applications and Technology Trends**

- Mature technology - most current military applications are better served through LC or cavity filters



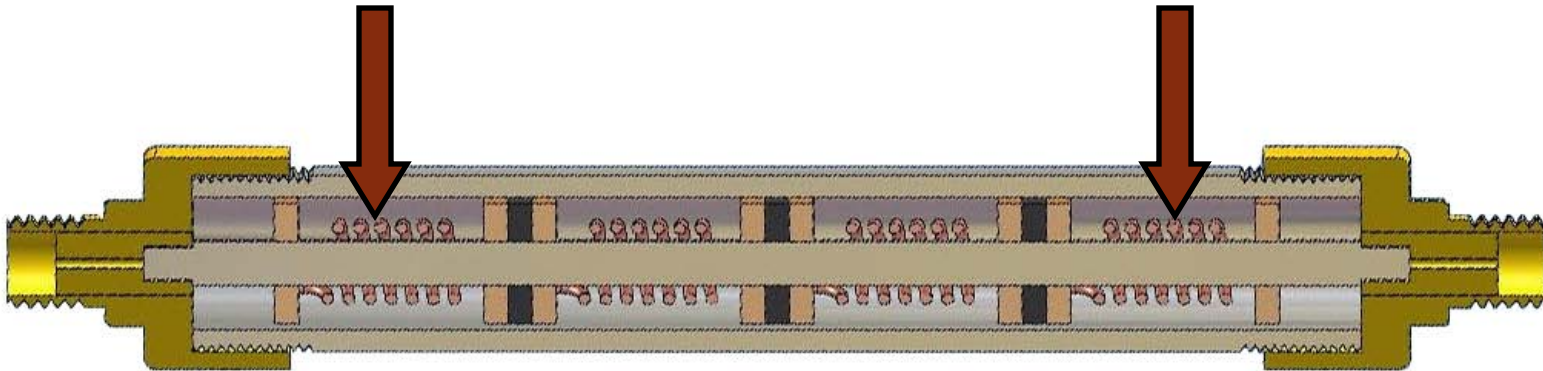
**High Power
Rugged Mounting**

**We have experience
in high power tubular
designs up to 5000 watts**



Filters | Tubular Filter Designs

**Precision centerless ground stock allows
extremely tight tolerances and thereby yields
consistent unit to unit performance**



Filters | Tubular Filters Designs

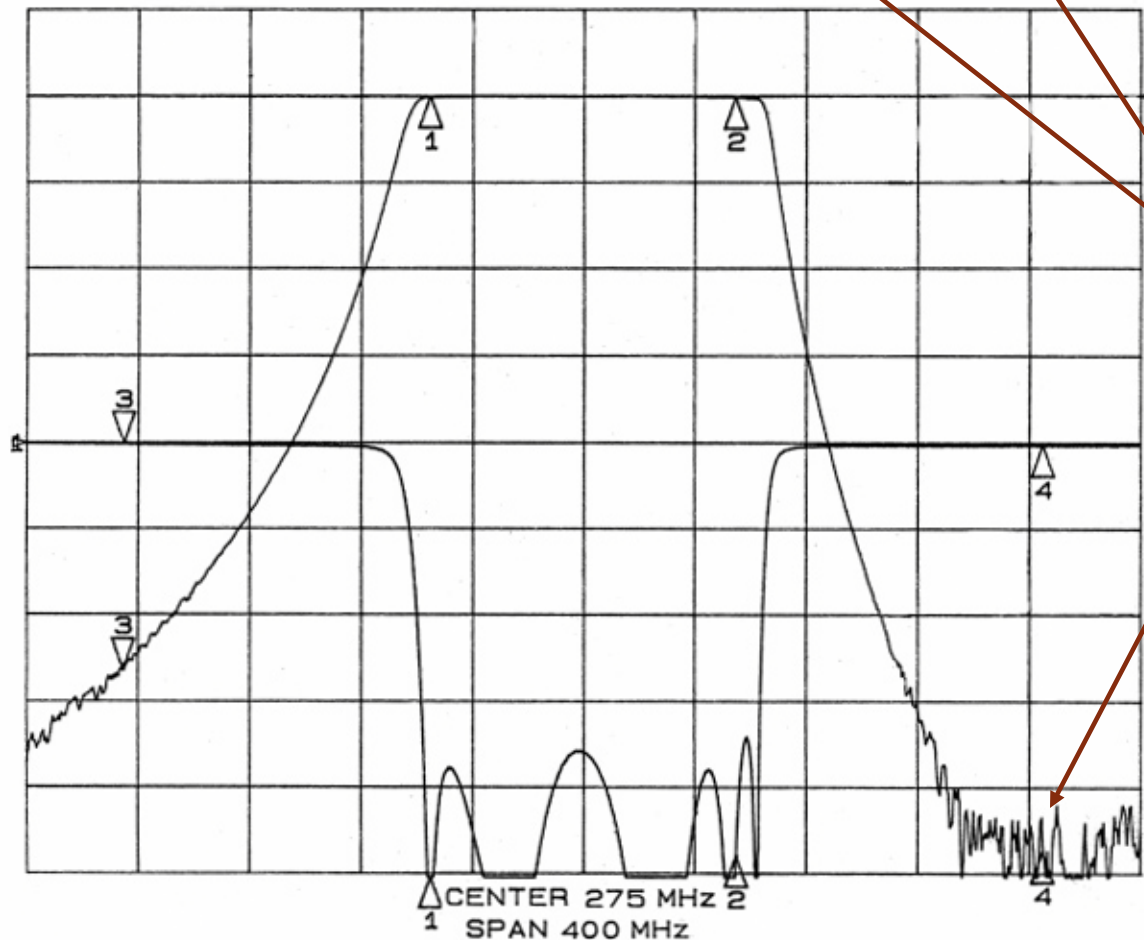
S11: CH1
 S21: CH2

5 dB/REF 0 dB
 10 dB/REF -.273 dB

1: -.05 dB
 110 MHz

2: -.45 dB
 330 MHz

4: 87 dB
 440 MHz



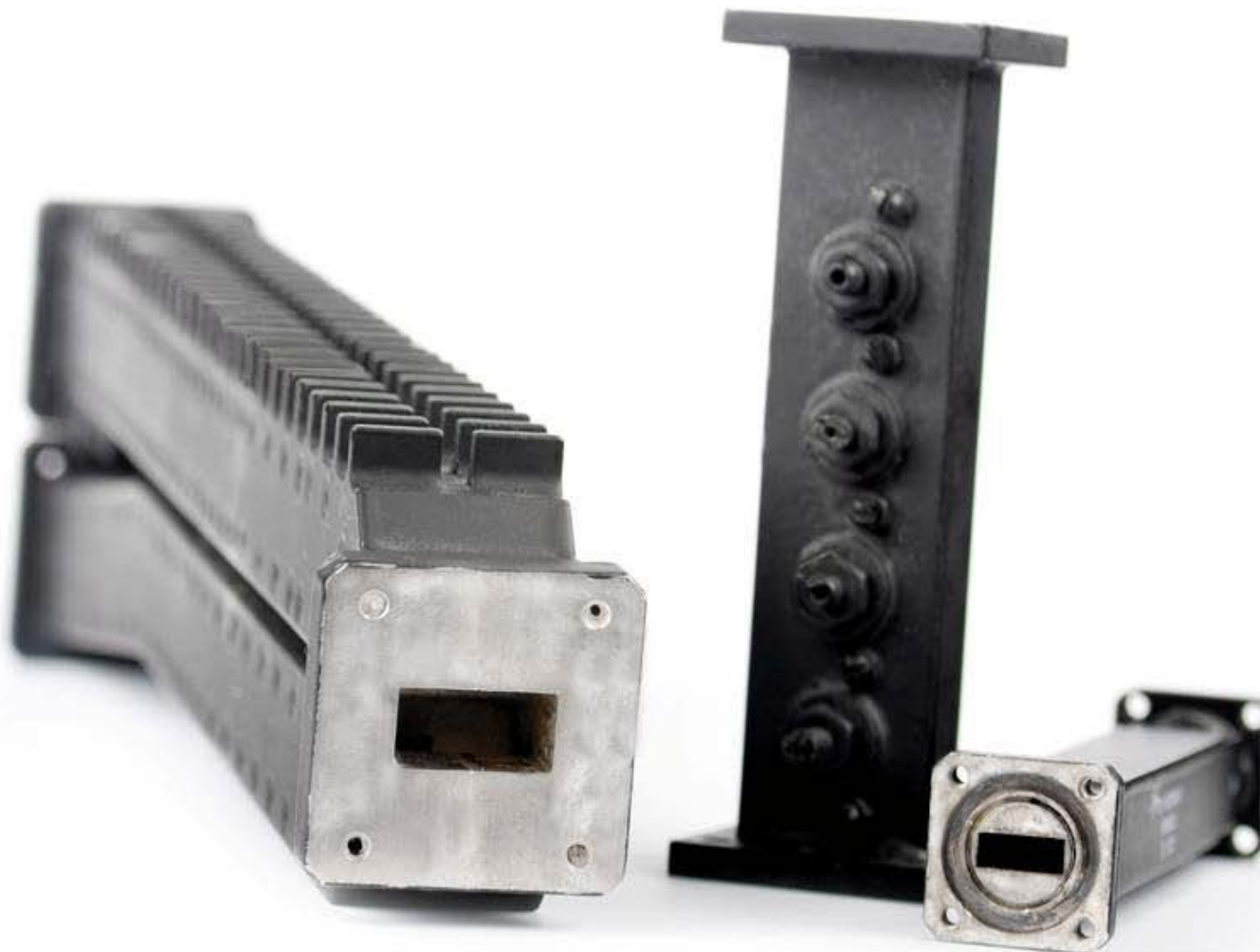
In addition to high
 Power handling, our
 Tubular filters offer
Low Loss and...

...High Ultimate Rejection

Filters | Waveguide Filters

- **Product Features**

- 2 to 40 GHz
- Bandwidths 0.1% to 10%
- Extremely low insertion loss
- High power handling



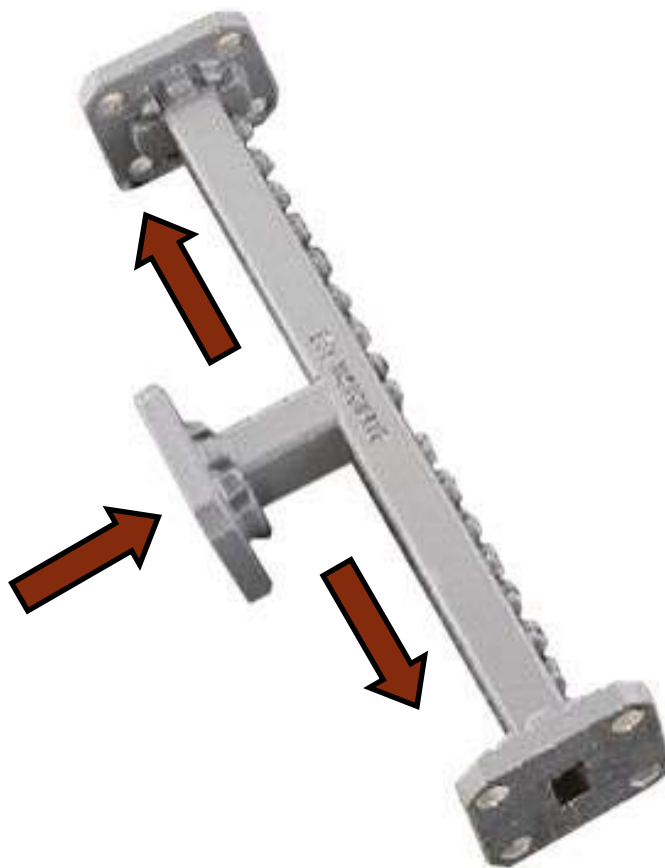
Filters | Waveguide Filter Designs

To eliminate expensive adaptors, we can offer **SMA, TNC** and **Type-N** connectors on select waveguide designs



Filters | Waveguide Filter Designs

We can provide **RX/TX waveguide duplexers**
in custom configurations



Filters | Waveguide Filter Designs

**We offer higher power handling,
diplexed waveguides through the
use of integral heat dissipation methods**



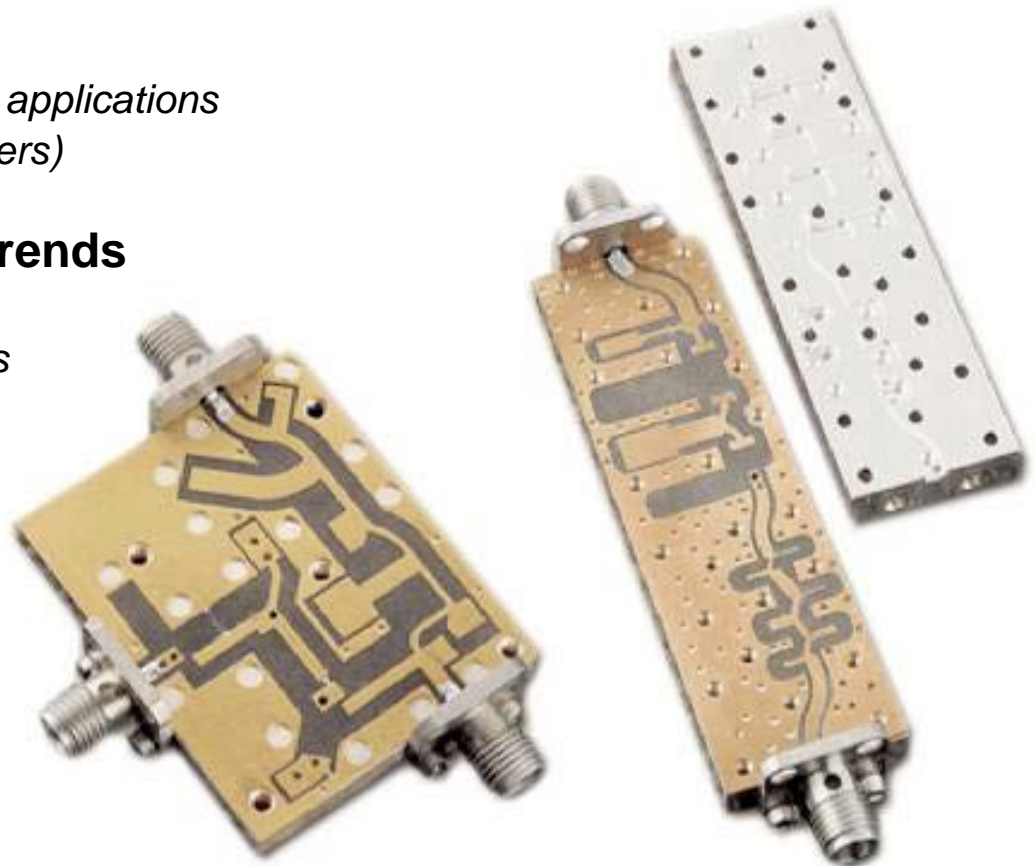
Filters | Suspended Substrate

- **Suspended Substrate Advantages**

- 2 to 18 GHz
- Ideal for broadband multiplexing
- Chebyshev and elliptic response
- Well suited for high shock and vibration applications
- Highly repeatable (ideal for matched filters)

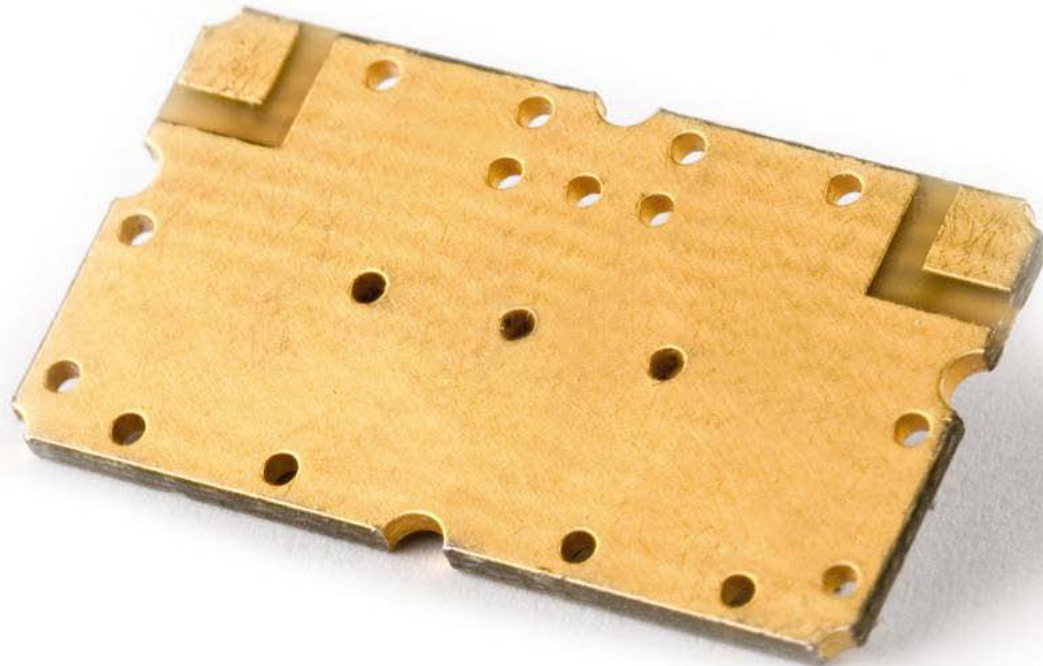
- **Applications and Technology Trends**

- Broadband receivers
- Easily integrated with other components



Filters | Ceramic Filter Designs

We use gold plating on surface mount packages which offers better solderability and **corrosion resistance than other finishes**



Filters | Ceramic Filters

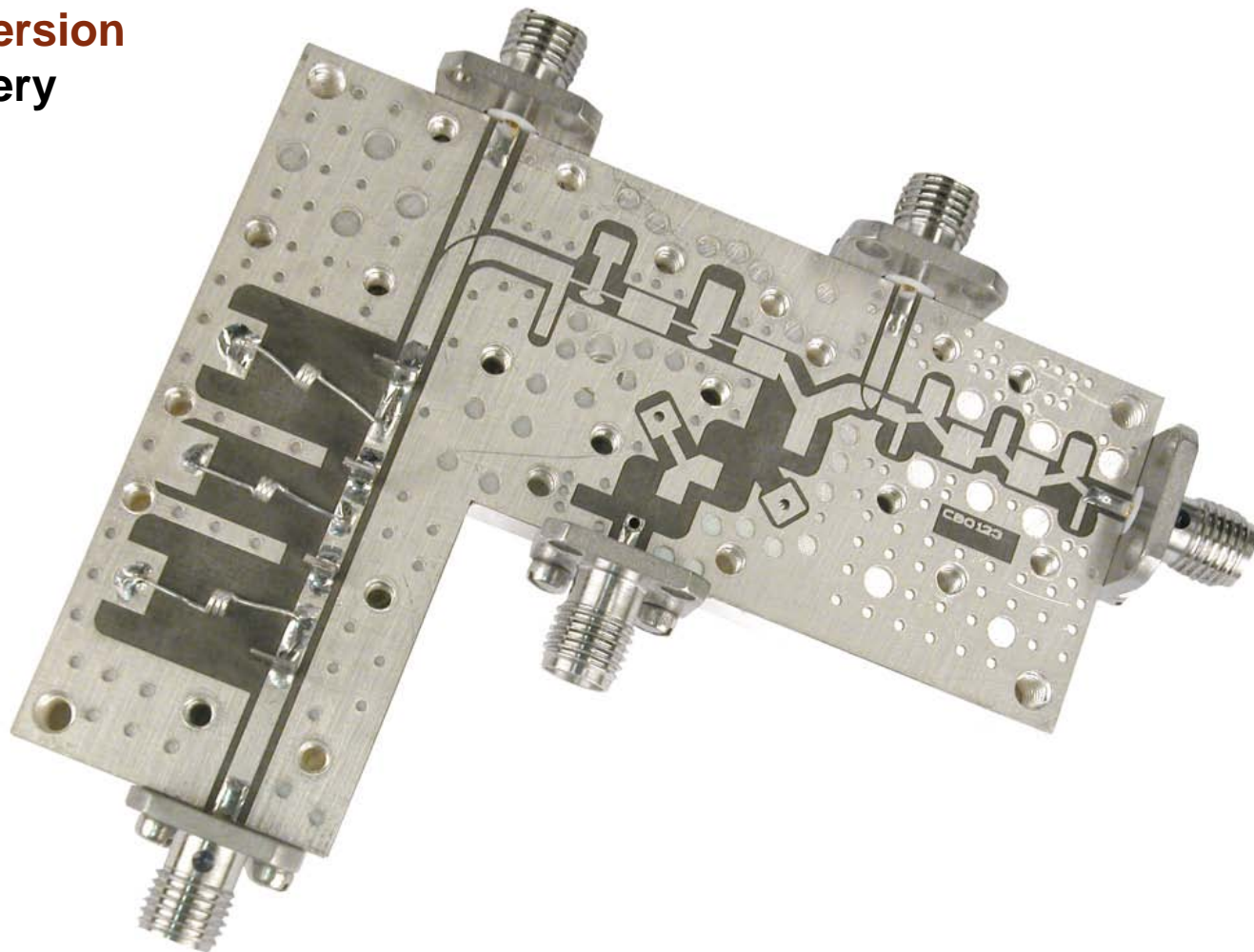
• Product Features

- Frequency range - 400 MHz to 6 GHz
- Bandwidths - 1 to 10%
- Bandpass, bandreject and duplexer
- 2 to 6+ sections, custom packages available
- Low cost, small size
- Good I.L. relative to size
- Surface mount or leaded
- Open frame or sealed for hi-rel
- Typical applications are:
 - GPS
 - ISM
 - WLAN
 - IFF
 - ManPack



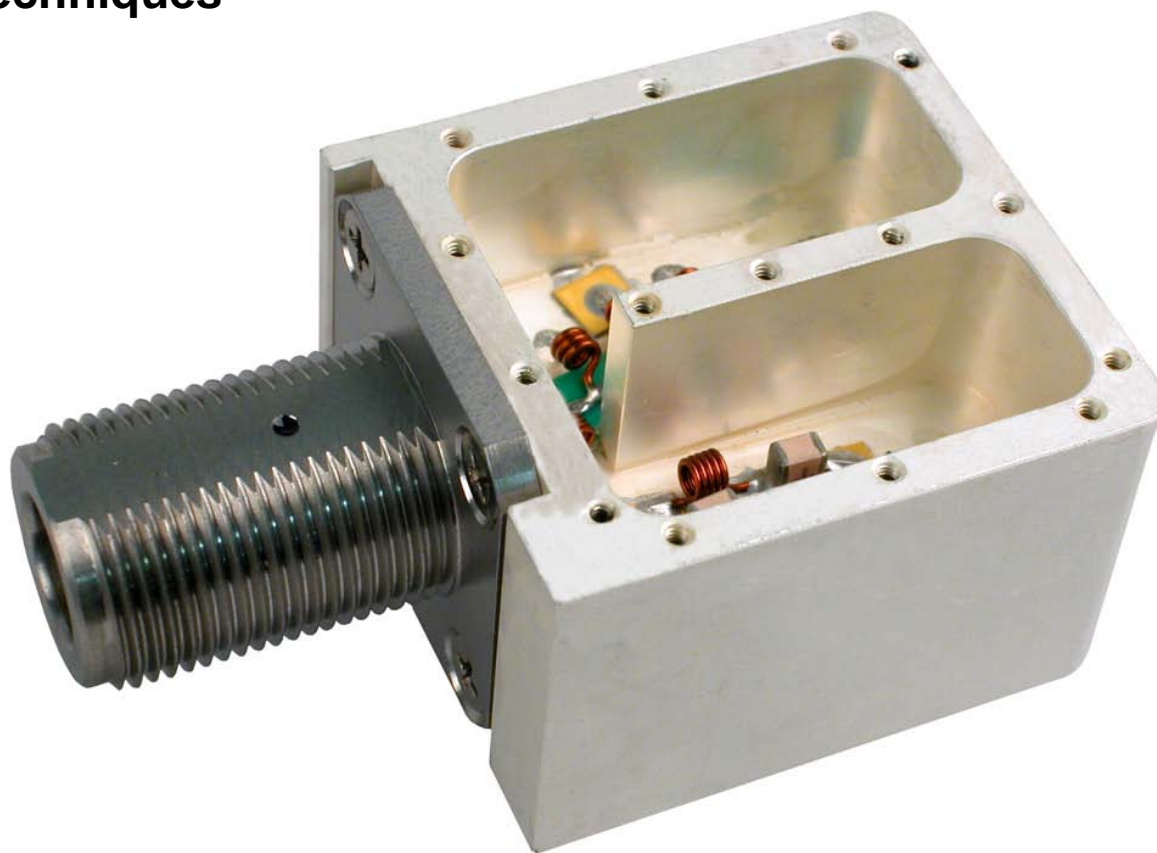
Filters | Suspended Substrate Designs

We also offer **immersion silver plating** for very low loss designs



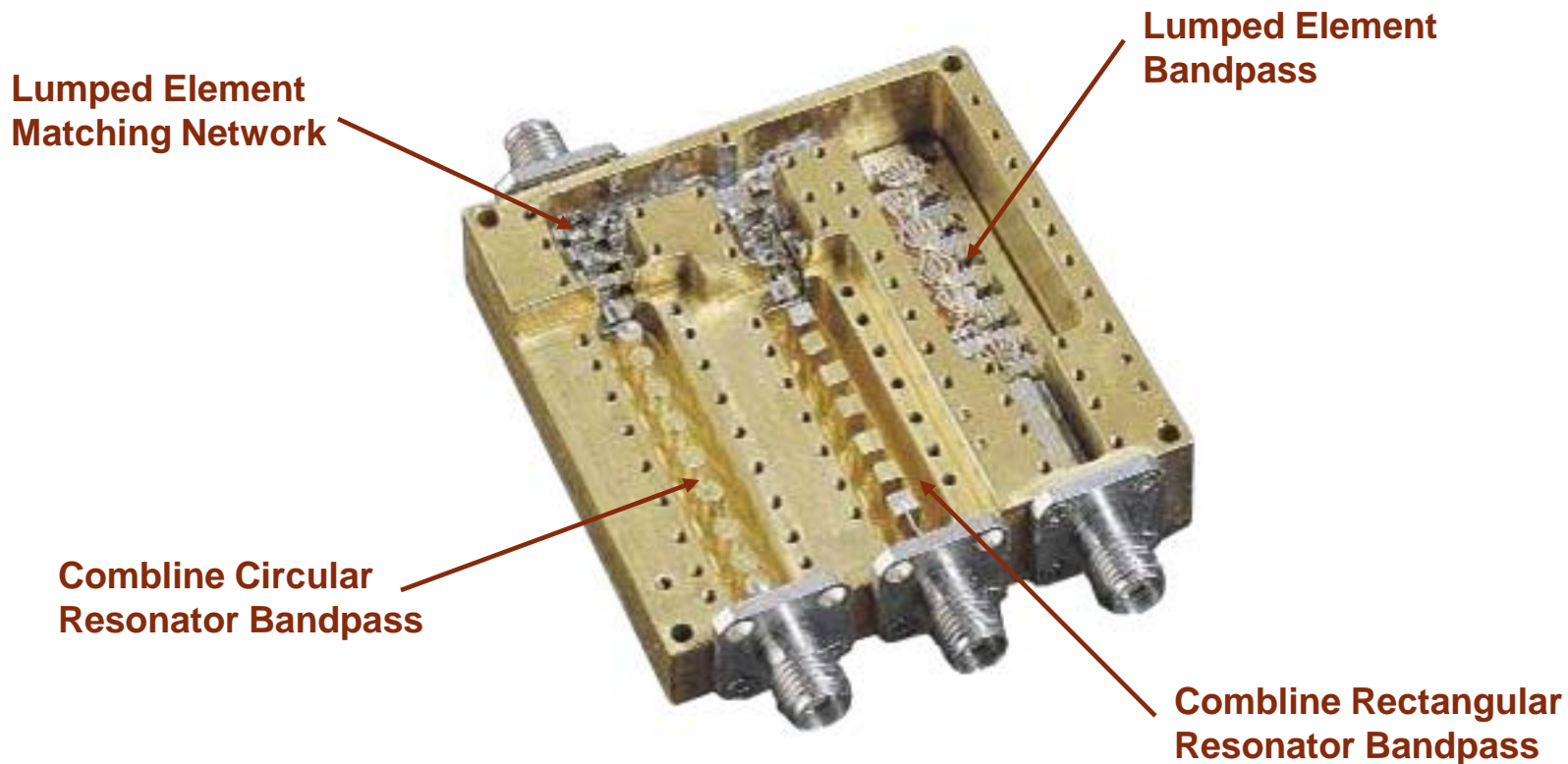
Filters | Diplexers/Multiplexers

**Spectrum Microwave designs and manufactures
Diplexers, Triplexers, and Multiplexers to 40 GHz,
using proven design techniques**



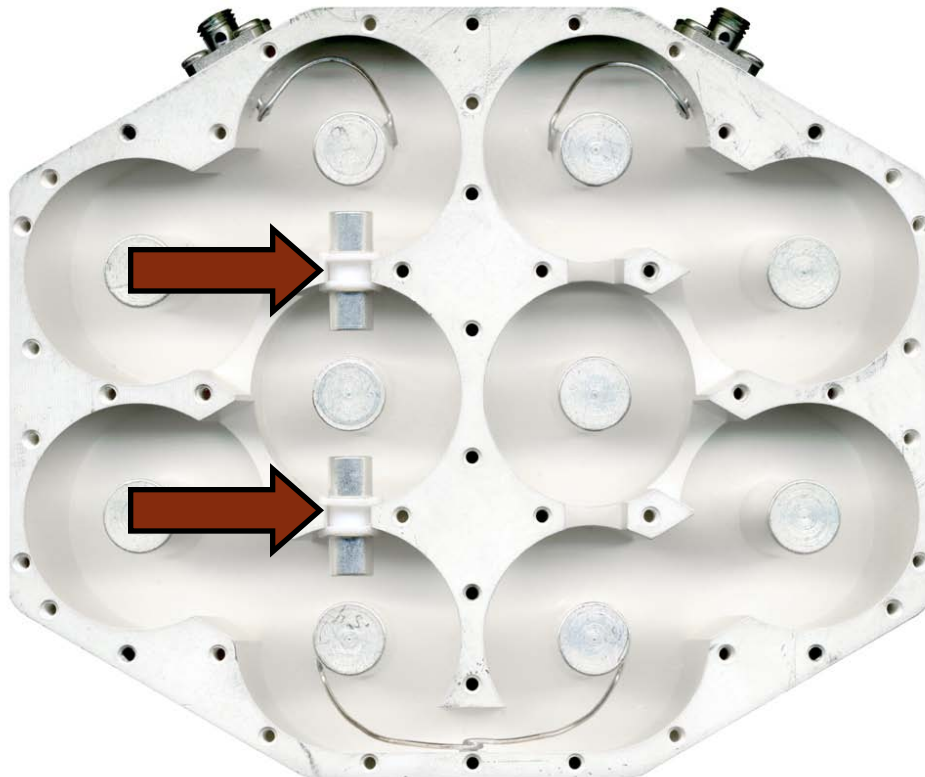
Filters | Diplexer/Multiplexer Designs

For broad frequency coverage, multiple topologies can be integrated within a single package



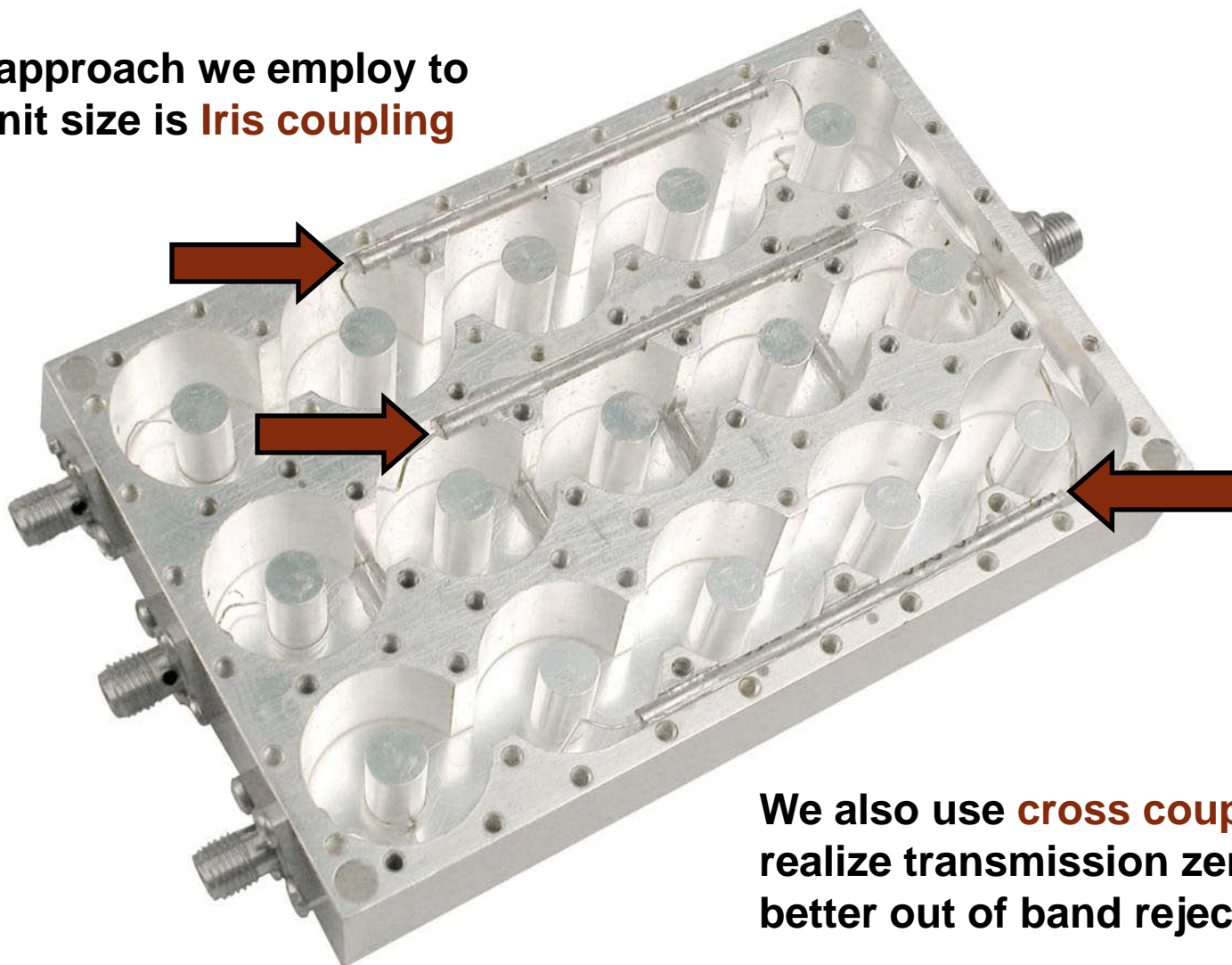
Filters | Diplexer/Triplexer Designs

Spectrum Microwave's pseudo-elliptic designs incorporate cross coupling to create transmission zeros resulting in enhanced rejection performance



Filters | Diplexer/Triplexer Designs

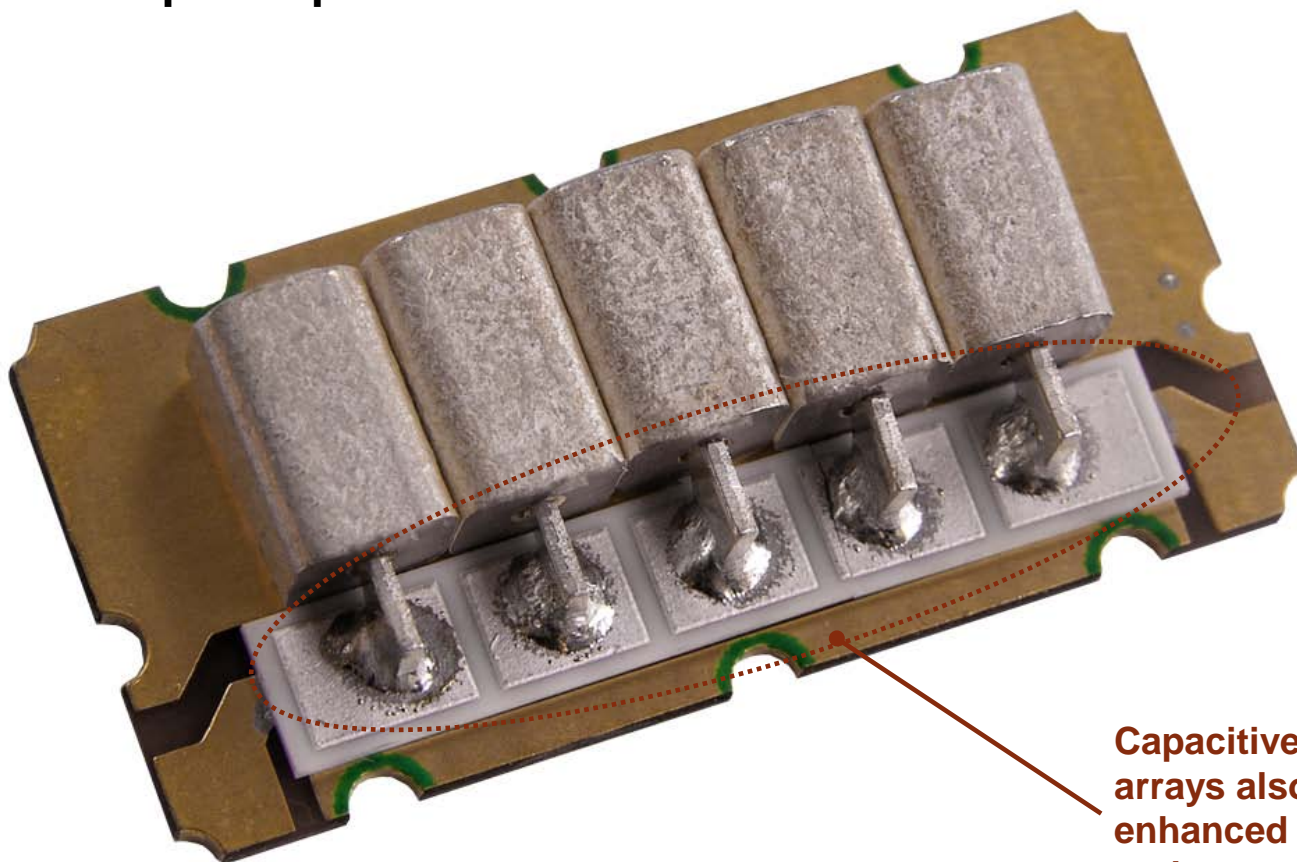
Another approach we employ to reduce unit size is **Iris coupling**



We also use **cross coupling** to realize transmission zeros for better out of band rejection

Filters | Ceramic Filter Designs

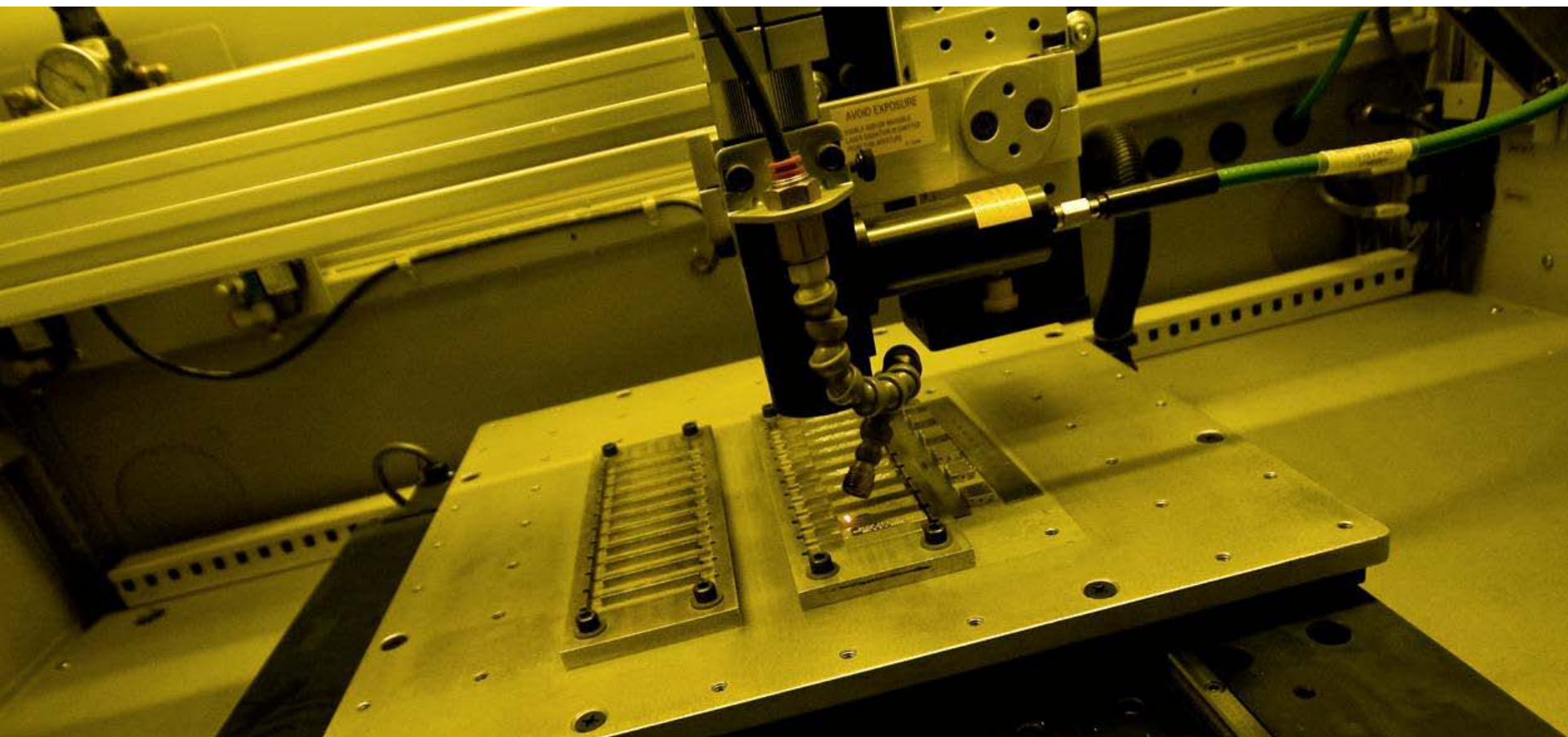
Alternative coupling structures offers design flexibility and superior performance



Capacitive coupling arrays also offer enhanced reliability and repeatability

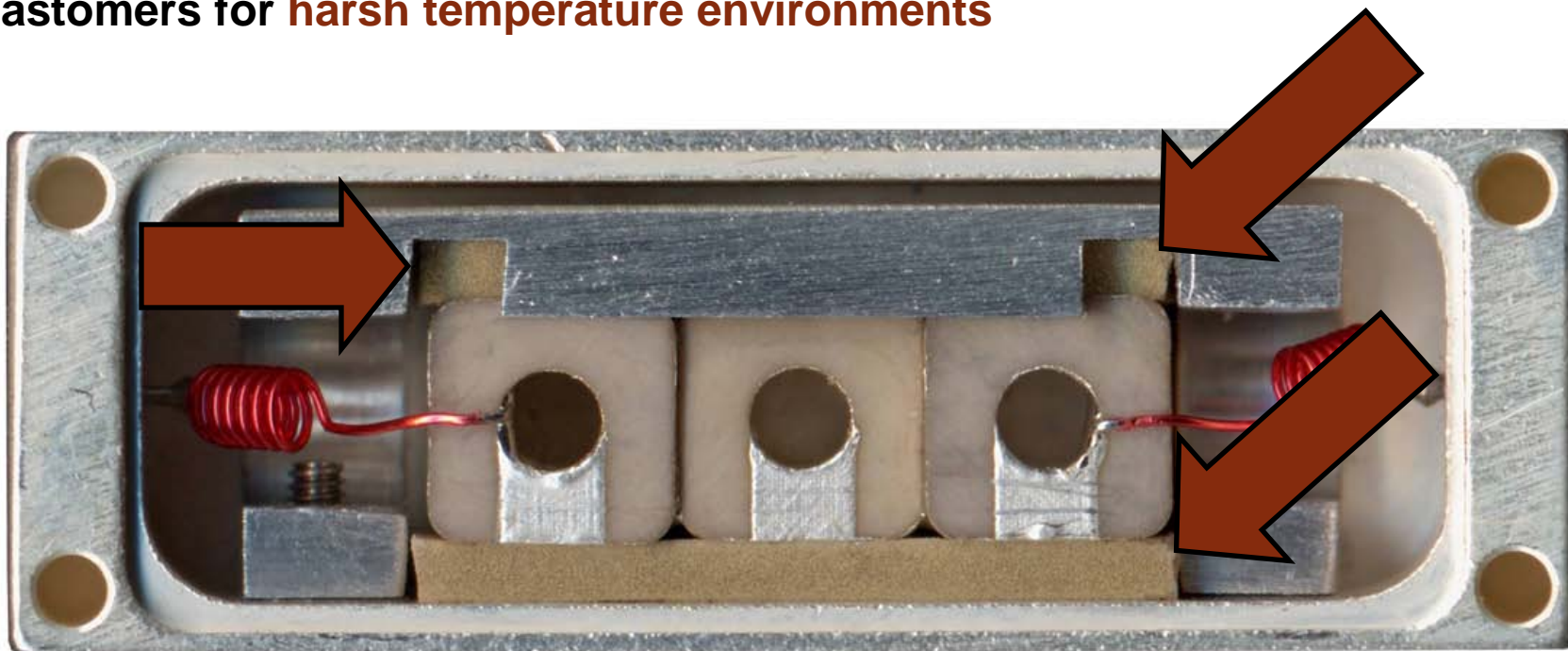
Filters | Ceramic Filter Designs

For added protection and reliability,
we **laser weld** select ceramic designs



Filters | Ceramic Filter Designs

We can also utilize temperature stabilizing elastomers for **harsh temperature environments**



This innovative technique also allows us to **meet demanding shock and vibration specifications**

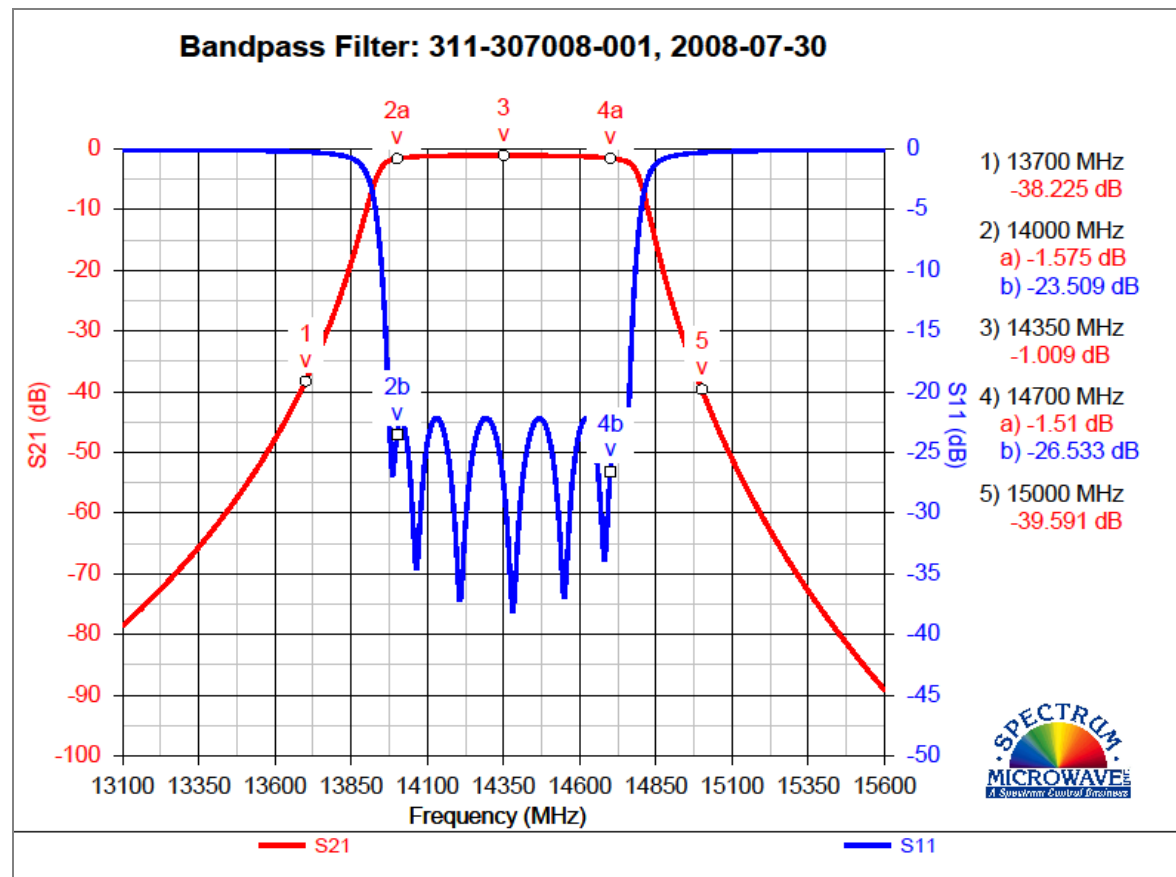
Filters | Rapid Filter Centers



Spectrum Microwave's Rapid Filter Centers have reduced delivery times on custom Bandpass, Lowpass, Highpass & Notch filters to as little as 1-2 weeks in most cases.

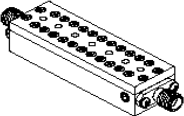

Filters | Rapid Filter Centers

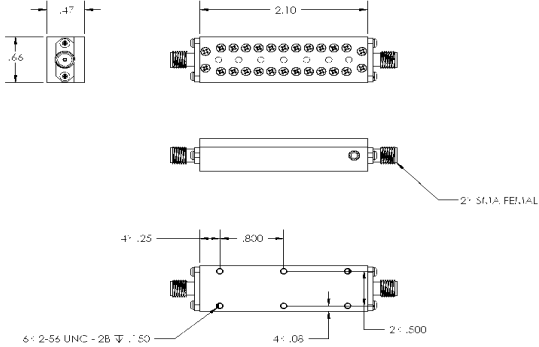
Our Rapid Filter Centers not only deliver custom filters in a few weeks, but supply simulations with each design.



Filters | Rapid Filter Centers

Our Rapid Filter Centers also supply
mechanical outline drawings
with every proposal

DWG NO. 089-10202-0001		SH 1 OF 2		REV 0																																													
<table border="1"> <thead> <tr> <th>ECN</th> <th>REV.</th> <th>DESCRIPTION</th> <th>CHNG/DATE</th> <th>APPRV/DATE</th> </tr> </thead> <tbody> <tr> <td></td> <td>0</td> <td>PRELIMINARY</td> <td>2008-07-31/MDP</td> <td></td> </tr> </tbody> </table>						ECN	REV.	DESCRIPTION	CHNG/DATE	APPRV/DATE		0	PRELIMINARY	2008-07-31/MDP																																			
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<p>ELECTRICAL SPECIFICATIONS: C.F. = 14.35 GHz NOMINAL I.L. = 2.0 dB MAX OVER 14.00 TO 14.70 GHz VSWR = 1.5:1 MAX OVER 14.00 TO 14.70 GHz (REF 50 OHMS) 30 dBc MIN @ 13.70 GHz 30 dBc MIN @ 15.00 GHz OPERATING TEMPERATURE: 0 TO 60 °C</p>																																																	
																																																	
<p align="center">APPLIES TO MODEL 311-307008-001</p>																																																	
<p>BANDPASS</p>  <p>FILTER</p>		<table border="1"> <tr> <td colspan="2">UNLESS OTHERWISE SPECIFIED</td> <td colspan="2">SPECTRUM MICROWAVE, INC</td> </tr> <tr> <td>ANSI</td> <td>DATE 2008-07-31</td> <td colspan="2">1900 West College Avenue</td> </tr> <tr> <td>DRAWN MDP</td> <td>DATE</td> <td colspan="2">State College, PA 16801-2723 (USA)</td> </tr> <tr> <td>CHECKED</td> <td></td> <td colspan="2">TITLE</td> </tr> <tr> <td>ENG'D</td> <td></td> <td colspan="2">OUTLINE DRAWING,</td> </tr> <tr> <td>MFG</td> <td></td> <td colspan="2">COMBINE BANDPASS FILTER</td> </tr> <tr> <td>QA</td> <td></td> <td>SUB A</td> <td>52747</td> </tr> <tr> <td></td> <td></td> <td>DWG NO.</td> <td>089-10202-0001</td> </tr> <tr> <td></td> <td></td> <td>REV</td> <td>0</td> </tr> <tr> <td colspan="2">DO NOT SCALE DRAWING</td> <td>SCALE</td> <td>1:1</td> </tr> <tr> <td colspan="2"></td> <td>SHEET</td> <td>1 OF 2</td> </tr> </table>				UNLESS OTHERWISE SPECIFIED		SPECTRUM MICROWAVE, INC		ANSI	DATE 2008-07-31	1900 West College Avenue		DRAWN MDP	DATE	State College, PA 16801-2723 (USA)		CHECKED		TITLE		ENG'D		OUTLINE DRAWING,		MFG		COMBINE BANDPASS FILTER		QA		SUB A	52747			DWG NO.	089-10202-0001			REV	0	DO NOT SCALE DRAWING		SCALE	1:1			SHEET	1 OF 2
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DWG NO. 089-10202-0001		SH 2 OF 2		REV 0	
<p>NOTES: 1. MATERIAL: HOUSING - BRASS, LID - BRASS 2. FINISH: NONE 3. CONNECTORS MIL-C-39012 COMPLIANT</p>					
					
<p>SERIES A CASE CODE 52747</p>		<p>DWG NO. 089-10202-0001 REV 0</p>			
SCALE 1:1		SHEET 2 OF 2			

ISO 9001:2000 Quality Operating System

- **MIL-PRF-38534 Product Screening and qualification capability**
 - Device screening and groups A, B, C, and D qualification (when required by order)
 - Environment testing per MIL-STD-883 test methods
- **Other specifications guidelines**
 - J-STD-001 Class 3 and IPC-A-610, for eutectic attach and general soldering processes
 - IPC-7711 and IPC-7721, for rework and authorized repair operations
- **Quality assurance programs**
 - Calibration recall program for test and measurement equipment
 - Facility ESD program
 - Failure analysis and corrective action system
 - Internal ISO audit program
 - Operator training program

