Planar X Series
Board level ceramic based thick film RF filter capability

Planar X Series is part of an over arching initiative by Smiths Interconnect that entails the creation of best-in-class planar RF filter solutions designed and tested to support various applications markets.

Planar X Series compliments Smiths Interconnect’s broad portfolio of RF/Microwave components with bandpass, bandstop, lowpass and highpass configurations up to 30 GHz (Ku-Band) offering premium performance in a small package. The frequency of operation can be further extended with added material and process capabilities.

Planar X Series leverages Smiths Interconnect’s existing thick film process technology on various dielectric substrates which are designed for use in harsh high-reliability environments. The small footprint, light weight and surface mountable configuration allow for high volume pick and place applications and are ideal for SATCOM, Radar and Broadcasting industries. In addition, Smiths Interconnect offers value added high-reliability test options providing assurance in mission critical defence and space applications.

Regardless of the application, our internal processes and procedures help ensure that all filters are fully compliant to customers’ specifications.

Features & Benefits
- Small Footprint – Reduced PCB Footprint
- Light Weight – Reducing overall system mass in critical space applications
- Surface Mountable – Ideal solutions for Pick and Place Applications
- Frequency Offerings up to 30 GHz – Suitable for a wide array of applications
- Light weight and surface mountable

Application
- Transmit/Receive Modules
- Up/Down Converters
- Instrumentation
- Satellite Communications
- Radar
- Broadcast
Cavity Filters
Very low insertion loss and high selectivity

Smiths Interconnect’s cavity filters offer the user very low insertion loss, steep skirt selectivity, and narrower bandwidths compared to discrete component filters. Designs are available in the frequency range of 30 MHz to 40 GHz and with bandwidth options from less than 0.5% to over 66%.

High “Q” standard and custom designed models offer the lowest insertion loss and best selectivity available for military and commercial applications.

Standard cavity filters generally are designed using aluminium as the base metal. As most raw metals are inherently lossy, filter housings are silver plated for improved electrical characteristics and current flow. Brass, copper, aluminium or bi-metal resonators are used to minimize frequency drift over temperature.

Each filter is semi custom-designed to your exact specification so that you will receive the optimum performance at the lowest cost. Filter performance is easily predicted using our proprietary software, while CAD files are generated for our CNC machine and fabrication center. Complex designs and working drawings can be generated in a matter of a few hours...not weeks.

Features & Benefits
- 30 MHz to 40 GHz
- Bandwidth: 3 dB from 0.5% to 66%
- High “Q”, low loss
- High power
- Helical, combline, inter digital, and waveguide

Application
- Military
- Commercial Aerospace
- Satellite Communications
- Test and Measurement
Ceramic Filters
High volume and various mounting configurations

Features & Benefits
- 400 MHz to 6,000 MHz
- Bandwidth: 0.5% to 10%
- Surface mount, PC mount, connectorized options
- Stand-alone or diplexed
- Cost effective and easy to use

Application
- Military
- Commercial Aerospace
- Wireless Area Network
- UAV

Ceramic Filters are manufactured in two basic styles for both commercial and military applications. The high volume, cost effective units in open frame, non-hermetic packages are most often used in commercial applications. The lower volume, custom designed hermetic packages find wide usages in military applications. Both styles are available in various mounting configurations. In both instances the same high “Q” coaxial resonators are used which yield low insertion loss and excellent stability over temperature. A low ripple Chebyshev transfer function is standard with bandpass filters, notch filters and diplexer available.

Our rigorous design, manufacturing & inspection criteria processes and procedures ensure RF filter products that are fully compliant to customer application’s unique specifications.

Regardless of the application, our internal processes and procedures help ensure that all filters are fully compliant to customers’ specifications.
Discrete Filters
Bandpass, lowpass, highpass, or notch

Optimal performance and small in size RF & microwave filters

Features & Benefits
- 5 MHz to 10 GHz
- Bandwidth: <0.5% db to >100%
- Band-pass, low-pass, high-pass, or notch
- Surface mounts, pins or connectors
- Monotonic and elliptic responses

Application
- Transmit/Receive Modules
- Up/Down Converters
- Instrumentation
- Satellite Communications
- Radar
- Broadcast

Miniature discrete component filters are designed to give optimal performance where small size is critical. Electrical and mechanical requirements for each design are computer-generated, taking into consideration realizable “Q” and environmental conditions, then analyzed using our unique software, thereby reducing the amount of trial and error alignment.

Filter designs are available to satisfy bandpass, lowpass, highpass, or bandreject applications. We have found through our years of service that one design does not fit all needs. In order to achieve today’s required electrical performance, Smiths Interconnect’s engineers use a variety of electrical circuits ranging from coupled tank, mesh, resonant ladder, highpass/lowpass, or helical to achieve the desired performance. In some cases, a combination of circuit designs is used. This enables our engineers to provide you with the highest performance filters available.

Smiths Interconnect has developed a series of package types to satisfy the majority of industry needs. These range from small TO8 packages to 1/4-wave designs. Actual package selection will depend upon your specific performance needs. All machining is done on computer-controlled machines, thereby reducing error and assuring repeatability of critical processes. Our designs incorporate high “Q” air wound or toroidal inductors and monolithic ceramic capacitors.

Regardless of the application, our internal processes and procedures help ensure that all filters are fully compliant to customers’ specifications.
RF Tunable Filters
Bandpass and bandreject

Tunable filter products are designed to provide high performance in a single package. While typically used in test and measurement applications, these products can also be ruggedized for mobile and remote applications.

We offers several standard Bandpass and Bandreject Tuners covering the frequency range of 24 MHz to 3000 MHz in octave bands. Cellular and PCS units cover less than full octaves, however offer greater dial resolution. All standard units offer direct frequency read-out, high power, and narrow bandwidth.

Smiths Interconnect’s standard products may be customized to meet specific requirements; including diplexed, and ruggedized options. Contact the factory for your specific requirements.

Features & Benefits
- 24 MHz to 3,000 MHz
- Direct readout
- Octave tuning
- High power
- Diplexer configuration

Application
- Military
- Test and Measurement
Additional Test Capabilities

Smiths Interconnect can provide a wide array of add-on test services to suit market and program needs. Below is a list of standard available RF Filter test options. Please consult factory for individual program needs.

### Per MIL-PRF-55342

<table>
<thead>
<tr>
<th>Test Option</th>
<th>Test Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outgassing (space level only)</td>
<td>Thermal Shock</td>
</tr>
<tr>
<td>Visual and Mechanical</td>
<td>Power Conditioning (space level only)</td>
</tr>
<tr>
<td>Precap Visual Inspection</td>
<td>Low Temperature Operation</td>
</tr>
<tr>
<td>Solderability</td>
<td>Short Time Overload</td>
</tr>
<tr>
<td>Solder Mounting Integrity</td>
<td>High Temperature Exposure</td>
</tr>
<tr>
<td>Bondable Mounting Integrity</td>
<td>Moisture Resistance</td>
</tr>
<tr>
<td>Wire Bonding Integrity</td>
<td>Life Testing</td>
</tr>
<tr>
<td>Resistance to Solvents</td>
<td>Resistance to Soldering Heat</td>
</tr>
<tr>
<td>Marking Legibility Test</td>
<td>Resistance to Bonding Exposure</td>
</tr>
</tbody>
</table>

### Per MIL-STD-883

<table>
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<tr>
<th>Test Option</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Barometric Pressure, Reduced (Altitude Operation)</td>
<td>Moisture Resistance</td>
</tr>
<tr>
<td>Insulation Resistance</td>
<td>Salt Fog</td>
</tr>
</tbody>
</table>

Smiths Interconnect Filter Select Tool

Smiths Interconnect filters are available to suit a wide range of applications in the military, commercial and aerospace fields. Superior performance is achieved through the use of high “Q” components and computer modeling.

Please visit our Filter Select Plus Tool for additional support or to find your next filter application.

For bandreject filters or custom filters, please contact your local sales representative.
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