

# Solder-In Style High Temp EMI Filters

## ZZ Series – .118 Dia. – Circuits Available - C



### APPLICATIONS

The ZZ series is intended for use as a high reliability alternative to a commonly available commercial filter type. Due to its smaller body diameter, capacitance is limited. It does provide effective filtering in the MICROWAVE frequency spectrum from 100 MHz through 26 GHz. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity),

it is ideal for high impedance circuits where large capacitance values are not practical.

Alternate lead lengths or special capacitance values are available upon request.

Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

### CHARACTERISTICS

- High temperature construction with-stands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.

- Glass hermetic seal on one end with epoxy seal on the opposite end.

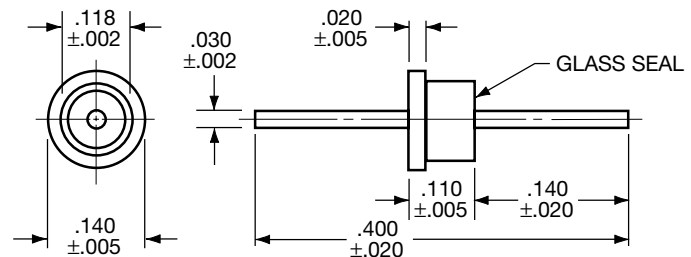
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

### SPECIFICATIONS

1. Finish: Gold standard –  
Silver and solder coat available
2. Material:  
Case: Cold rolled steel  
Leads: Alloy 52 steel
3. Operating Temperature Range:  
-55°C to +125°C
4. Insulation Resistance:  
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less  
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):  
R-level designs:  
2.0 times rated DC voltage  
Class B, Class S designs:  
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature:  
300°C
10. Supplied with 60/40 solder preform for easy installation

### STANDARD CONFIGURATION

(See Note 1)



### CIRCUIT DIAGRAMS



#### millimeters (inches)

|             |              |
|-------------|--------------|
| 0.05 (.002) | 3.05 (.120)  |
| 0.13 (.005) | 3.43 (.135)  |
| 0.51 (.020) | 3.56 (.140)  |
| 1.02 (.040) | 3.68 (.145)  |
| 2.79 (.110) | 10.16 (.400) |
| 2.95 (.116) | — —          |

(See Note 2)

#### Notes:

1. Glass seal on end opposite flange.
2. Metric equivalent dimensions given for information only.

# Solder-In Style High Temp EMI Filters

## ZZ Series – .118 Dia. – Circuits Available – C

### SPECIFICATIONS

| AVX<br>P/N | Current<br>AMP | CKT | DC<br>Voltage | CAP <sup>1</sup><br>Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |           |            |             |           |
|------------|----------------|-----|---------------|--------------------------|--|-----------|------------|-------------|-----------|
|            |                |     |               |                          | 1<br>MHz   | 10<br>MHz | 100<br>MHz | 1000<br>MHz | 10<br>GHz |
| ZZ1C3-250H | 5              | C   | 50            | 25                       | –  | –         | –          | 10          | 15        |
| ZZ1C3-500H | 5              | C   | 50            | 50                       | –  | –         | 1          | 15          | 25        |
| ZZ1C3-101H | 5              | C   | 50            | 100                      | –  | –         | 3          | 20          | 30        |
| ZZ1C3-102H | 5              | C   | 50            | 1000                     | –  | 4         | 20         | 31          | 55        |
| ZZ1C3-152H | 5              | C   | 50            | 1500                     | –  | 5         | 21         | 42          | 55        |
| ZZ1A3-250H | 5              | C   | 100           | 25                       | –  | –         | –          | 10          | 15        |
| ZZ1A3-500H | 5              | C   | 100           | 50                       | –  | –         | 1          | 15          | 25        |
| ZZ1A3-101H | 5              | C   | 100           | 100                      | –  | –         | 3          | 20          | 30        |
| ZZ1A3-102H | 5              | C   | 100           | 1000                     | –  | 4         | 18         | 36          | 55        |
| ZZ1A3-152H | 5              | C   | 100           | 1500                     | –  | 5         | 21         | 42          | 55        |
| ZZ1B3-250H | 5              | C   | 200           | 25                       | –  | –         | –          | 10          | 15        |
| ZZ1B3-500H | 5              | C   | 200           | 50                       | –  | –         | 1          | 15          | 25        |
| ZZ1B3-101H | 5              | C   | 200           | 100                      | –  | –         | 3          | 20          | 30        |
| ZZ1B3-102H | 5              | C   | 200           | 1000                     | –  | 4         | 18         | 36          | 55        |

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

For special multi-unit assemblies see Multi-Component Filter Brackets section.

# Solder-In Style High Temp EMI Filters

ZS/ZR Series – .128 Dia. – Circuits Available – C & L



## APPLICATIONS

The ZS series provides effective filtering in the MICROWAVE frequency spectrum from 10 MHz through 26 GHz. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity), it is ideal for high impedance circuits where large capacitance values are not practical. In the “L” section version an internal ferrite bead element provides both induc-

tance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

## CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/12. See QPL listings.
- High temperature construction withstands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

## SPECIFICATIONS

1. Plating: Gold standard –  
Silver and solder coat available
2. Material:  
Case: Cold rolled steel  
Leads: Alloy 52 steel
3. Operating Temperature Range:  
-55°C to +125°C
4. Insulation Resistance:  
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less  
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):  
R-level designs:  
2.0 times rated DC voltage  
Class B, Class S designs:  
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature: 300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



### millimeters (inches)

|             |              |
|-------------|--------------|
| 0.05 (.002) | 3.25 (.128)  |
| 0.13 (.005) | 3.96 (.156)  |
| 0.51 (.020) | 5.08 (.200)  |
| 0.76 (.030) | 6.4 (.25)    |
| 0.8 (.03)   | 15.88 (.625) |
| 2.79 (.110) | 18.16 (.715) |

(See Note 4)

| Circuit Diagram | Dimensions |           |
|-----------------|------------|-----------|
|                 | A<br>±.005 | B<br>Nom. |
| L               | .200       | .715      |
| C               | .110       | .625      |

### Notes:

1. Outline drawing shows standard ZS configuration. Also available with glass seal at the opposite end, ZR reverse configuration.
2. MIL-F-28861/12 style FS70 equivalent to standard ZS configuration. Style FS71 is reverse ZR configuration.
3. For ZS2 or ZR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/12 (See Note 2)

| Dash No.                     | Style |
|------------------------------|-------|
| 001 through 016, 033 and 034 | FS70  |
| 017 through 032, 035 and 036 | FS71  |

# Solder-In Style High Temp EMI Filters

ZS/ZR Series – .128 Dia. – Circuits Available – C & L

## SPECIFICATIONS

| AVX<br>P/N | Current<br>AMP | CKT | DC<br>Voltage | CAP <sup>1</sup><br>Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |          |           |            |             |           |
|------------|----------------|-----|---------------|--------------------------|--|----------|-----------|------------|-------------|-----------|
|            |                |     |               |                          | 500<br>KHz   | 1<br>MHz | 10<br>MHz | 100<br>MHz | 1000<br>MHz | 10<br>GHz |
| ZS1C2-501H | 5              | C   | 50            | 500                      | –  | –        | –         | 15         | 30          | 50        |
| ZS1C2-102H | 5              | C   | 50            | 1000                     | –  | –        | 4         | 20         | 31          | 55        |
| ZS1C2-122H | 5              | C   | 50            | 1200                     | –  | –        | 5         | 20         | 35          | 55        |
| ZS1C2-272H | 5              | C   | 50            | 2700                     | –  | –        | 10        | 25         | 40          | 60        |
| ZS1C2-502H | 5              | C   | 50            | 5000                     | –  | –        | 15        | 30         | 45          | 60        |
| ZS1C2-103H | 5              | C   | 50            | .010                     | –  | 4        | 20        | 35         | 48          | 60        |
| ZS1C2-153H | 5              | C   | 50            | .015                     | –  | 7        | 25        | 40         | 50          | 60        |
| ZS2C2-501H | 5              | L   | 50            | 500                      | –  | –        | –         | 15         | 30          | 50        |
| ZS2C2-102H | 5              | L   | 50            | 1000                     | –  | –        | 4         | 20         | 33          | 55        |
| ZS2C2-122H | 5              | L   | 50            | 1200                     | –  | –        | 5         | 20         | 37          | 55        |
| ZS2C2-272H | 5              | L   | 50            | 2700                     | –  | –        | 10        | 25         | 40          | 60        |
| ZS2C2-502H | 5              | L   | 50            | 5000                     | –  | –        | 15        | 30         | 45          | 60        |
| ZS2C2-103H | 5              | L   | 50            | .010                     | –  | 4        | 20        | 38         | 50          | 60        |
| ZS2C2-153H | 5              | L   | 50            | .015                     | –  | 7        | 25        | 42         | 50          | 60        |
| ZS1A2-101H | 5              | C   | 100           | 100                      | –  | –        | –         | 3          | 20          | 30        |
| ZS1A2-501H | 5              | C   | 100           | 500                      | –  | –        | –         | 15         | 30          | 50        |
| ZS1A2-102H | 5              | C   | 100           | 1000                     | –  | –        | 4         | 20         | 31          | 55        |
| ZS1A2-122H | 5              | C   | 100           | 1200                     | –  | –        | 5         | 20         | 35          | 55        |
| ZS1A2-272H | 5              | C   | 100           | 2700                     | –  | –        | 10        | 25         | 40          | 60        |
| ZS1A2-502H | 5              | C   | 100           | 5000                     | –  | –        | 15        | 30         | 45          | 60        |
| ZS1A2-103H | 5              | C   | 100           | .010                     | –  | 4        | 20        | 35         | 48          | 60        |
| ZS1A2-153H | 5              | C   | 100           | .015                     | –  | 7        | 25        | 40         | 50          | 60        |
| ZS2A2-100H | 5              | L   | 100           | 10                       | –  | –        | –         | –          | 5           | 10        |
| ZS2A2-250H | 5              | L   | 100           | 25                       | –  | –        | –         | –          | 10          | 15        |
| ZS2A2-101H | 5              | L   | 100           | 100                      | –  | –        | –         | 3          | 20          | 30        |
| ZS2A2-501H | 5              | L   | 100           | 500                      | –  | –        | –         | 15         | 30          | 50        |
| ZS2A2-102H | 5              | L   | 100           | 1000                     | –  | –        | 4         | 20         | 33          | 55        |
| ZS2A2-122H | 5              | L   | 100           | 1200                     | –  | –        | 5         | 20         | 37          | 55        |
| ZS2A2-272H | 5              | L   | 100           | 2700                     | –  | –        | 10        | 25         | 40          | 60        |
| ZS2A2-502H | 5              | L   | 100           | 5000                     | –  | –        | 15        | 30         | 45          | 60        |
| ZS2A2-103H | 5              | L   | 100           | .010                     | –  | 4        | 20        | 38         | 50          | 60        |
| ZS2A2-153H | 5              | L   | 100           | .015                     | –  | 7        | 25        | 42         | 50          | 60        |

continued

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

**NOTE:** AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end. All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.

# Solder-In Style High Temp EMI Filters

ZS/ZR Series – .128 Dia. – Circuits Available – C & L

## SPECIFICATIONS

| AVX<br>P/N | Current<br>AMP | CKT | DC<br>Voltage | CAP <sup>1</sup><br>Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |          |           |            |             |           |
|------------|----------------|-----|---------------|--------------------------|--|----------|-----------|------------|-------------|-----------|
|            |                |     |               |                          | 500<br>KHz   | 1<br>MHz | 10<br>MHz | 100<br>MHz | 1000<br>MHz | 10<br>GHz |
| ZS1B2-100H | 5              | C   | 200           | 10                       | –  | –        | –         | –          | 4           | 10        |
| ZS1B2-250H | 5              | C   | 200           | 25                       | –  | –        | –         | –          | 10          | 15        |
| ZS1B2-101H | 5              | C   | 200           | 100                      | –  | –        | –         | 3          | 20          | 30        |
| ZS1B2-501H | 5              | C   | 200           | 500                      | –  | –        | –         | 15         | 30          | 50        |
| ZS1B2-102H | 5              | C   | 200           | 1000                     | –  | –        | 4         | 20         | 31          | 55        |
| ZS1B2-122H | 5              | C   | 200           | 1200                     | –  | –        | 5         | 20         | 35          | 55        |
| ZS1B2-272H | 5              | C   | 200           | 2700                     | –  | –        | 10        | 25         | 40          | 60        |
| ZS2B2-100H | 5              | L   | 200           | 10                       | –  | –        | –         | –          | 5           | 10        |
| ZS2B2-250H | 5              | L   | 200           | 25                       | –  | –        | –         | –          | 10          | 15        |
| ZS2B2-101H | 5              | L   | 200           | 100                      | –  | –        | –         | 3          | 20          | 30        |
| ZS2B2-501H | 5              | L   | 200           | 500                      | –  | –        | –         | 15         | 30          | 50        |
| ZS2B2-102H | 5              | L   | 200           | 1000                     | –  | –        | 4         | 20         | 33          | 55        |
| ZS2B2-122H | 5              | L   | 200           | 1200                     | –  | –        | 5         | 20         | 37          | 55        |
| ZS2B2-272H | 5              | L   | 200           | 2700                     | –  | –        | 10        | 25         | 40          | 60        |

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

**NOTE:** AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end. All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see **Multi-Component Filter Brackets** section.

# Solder-In Style High Temp EMI Filters

YS/YR Series – .165 Dia. – Circuits Available – C & L



## APPLICATIONS

The YS series provides increased filtering in the MICROWAVE frequency spectrum from 1 MHz through 10 GHz. Previously unavailable in the industry as a solder-in device, this unique design offers higher values of capacitance than were previously available. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity), it is ideal for high impedance circuits where large capacitance values are not practical. In the “L”

section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

## CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/15. See QPL listings.
- High temperature construction with-stands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

## SPECIFICATIONS

1. Plating: Gold standard – Silver available
2. Material:  
Case: Cold rolled steel  
Leads: Alloy 52 steel
3. Operating Temperature Range:  
-55°C to +125°C
4. Insulation Resistance:  
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less  
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):  
R-level designs:  
2.0 times rated DC voltage  
Class B, Class S designs:  
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature:  
300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



### millimeters (inches)

|             |              |
|-------------|--------------|
| 0.05 (.002) | 4.19 (.165)  |
| 0.13 (.005) | 5.08 (.200)  |
| 0.64 (.025) | 6.35 (.250)  |
| 0.8 (.03)   | 16.51 (.650) |
| 0.81 (.032) | 19.05 (.750) |
| 3.81 (.150) | —            |

(See Note 4)

| Circuit Diagram | Dimensions |           |
|-----------------|------------|-----------|
|                 | A<br>±.005 | B<br>Ref. |
| L               | .250       | .750      |
| C               | .150       | .650      |

### Notes:

1. Outline drawing shows standard YS configuration. Also available with glass seal at the opposite end, YR reverse configuration.
2. MIL-F-28861/15 style A equivalent to standard YS configuration. Style B is reverse YR configuration.
3. For YS2 or YR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/15 (See Note 2)

| Dash No.        | Config. |
|-----------------|---------|
| 001 through 004 | A       |
| 005 through 008 | B       |

# Solder-In Style High Temp EMI Filters

YS/YR Series – .165 Dia. – Circuits Available – C & L

## SPECIFICATIONS

| AVX P/N    | Current AMP | CKT | DC Voltage | CAP <sup>1</sup> Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |       |        |         |          |        |
|------------|-------------|-----|------------|-----------------------|--|-------|--------|---------|----------|--------|
|            |             |     |            |                       | 500 KHz  | 1 MHz | 10 MHz | 100 MHz | 1000 MHz | 10 GHz |
| YS1C2-152H | 5           | C   | 50         | 1500                  | –  | –     | 5      | 21      | 42       | 55     |
| YS1C2-502H | 5           | C   | 50         | 5000                  | –  | –     | 15     | 34      | 50       | 60     |
| YS1C2-103H | 5           | C   | 50         | .010                  | –  | 4     | 20     | 35      | 53       | 60     |
| YS1C2-153H | 5           | C   | 50         | .015                  | –  | 7     | 25     | 40      | 55       | 60     |
| YS1C2-203H | 5           | C   | 50         | .020                  | –  | 8     | 27     | 41      | 60       | 65     |
| YS1C2-273H | 5           | C   | 50         | .027                  | 4  | 10    | 30     | 42      | 65       | 70     |
| YS1C2-503H | 5           | C   | 50         | .050                  | 9  | 15    | 35     | 44      | 70       | 70     |
| YS1C2-753H | 5           | C   | 50         | .075                  | 12   | 18    | 37     | 46      | 70       | 70     |
| YS1C2-104H | 5           | C   | 50         | .1                    | 14   | 20    | 38     | 48      | 70       | 70     |
| YS2C2-152H | 5           | L   | 50         | 1500                  | –  | –     | 6      | 22      | 48       | 55     |
| YS2C2-502H | 5           | L   | 50         | 5000                  | –  | –     | 15     | 35      | 55       | 60     |
| YS2C2-103H | 5           | L   | 50         | .010                  | –  | 4     | 20     | 36      | 57       | 60     |
| YS2C2-153H | 5           | L   | 50         | .015                  | –  | 7     | 25     | 45      | 60       | 60     |
| YS2C2-203H | 5           | L   | 50         | .020                  | –  | 8     | 27     | 46      | 62       | 65     |
| YS2C2-273H | 5           | L   | 50         | .027                  | 4  | 10    | 30     | 48      | 65       | 70     |
| YS2C2-503H | 5           | L   | 50         | .050                  | 9  | 15    | 36     | 50      | 70       | 70     |
| YS2C2-753H | 5           | L   | 50         | .075                  | 12   | 18    | 37     | 51      | 70       | 70     |
| YS2C2-104H | 5           | L   | 50         | .1                    | 14   | 20    | 39     | 52      | 70       | 70     |
| YS1A2-152H | 5           | C   | 100        | 1500                  | –  | –     | 5      | 21      | 42       | 55     |
| YS1A2-502H | 5           | C   | 100        | 5000                  | –  | –     | 15     | 34      | 50       | 60     |
| YS1A2-103H | 5           | C   | 100        | .010                  | –  | 4     | 20     | 35      | 53       | 60     |
| YS1A2-153H | 5           | C   | 100        | .015                  | –  | 7     | 25     | 40      | 55       | 60     |
| YS1A2-203H | 5           | C   | 100        | .020                  | –  | 8     | 27     | 41      | 60       | 65     |
| YS1A2-273H | 5           | C   | 100        | .027                  | –  | 10    | 30     | 42      | 65       | 70     |
| YS1A2-503H | 5           | C   | 100        | .050                  | 9  | 15    | 35     | 44      | 70       | 70     |
| YS1A2-753H | 5           | C   | 100        | .075                  | 12   | 18    | 37     | 46      | 70       | 70     |
| YS2A2-152H | 5           | L   | 100        | 1500                  | –  | –     | 6      | 22      | 48       | 55     |
| YS2A2-502H | 5           | L   | 100        | 5000                  | –  | –     | 15     | 35      | 55       | 60     |
| YS2A2-103H | 5           | L   | 100        | .010                  | –  | 4     | 20     | 36      | 57       | 60     |
| YS2A2-153H | 5           | L   | 100        | .015                  | –  | 7     | 25     | 45      | 60       | 60     |
| YS2A2-203H | 5           | L   | 100        | .020                  | –  | 8     | 27     | 46      | 62       | 65     |
| YS2A2-273H | 5           | L   | 100        | .027                  | –  | 10    | 30     | 48      | 65       | 70     |
| YS2A2-503H | 5           | L   | 100        | .050                  | 9  | 15    | 36     | 50      | 70       | 70     |
| YS2A2-753H | 5           | L   | 100        | .075                  | 12   | 18    | 37     | 51      | 70       | 70     |

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

continued

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

**NOTE:** AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end. All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.

# Solder-In Style High Temp EMI Filters

YS/YR Series – .165 Dia. – Circuits Available – C & L

## SPECIFICATIONS

| AVX<br>P/N | Current<br>AMP | CKT | DC<br>Voltage | CAP <sup>1</sup><br>Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |          |           |            |             |           |
|------------|----------------|-----|---------------|--------------------------|--|----------|-----------|------------|-------------|-----------|
|            |                |     |               |                          | 500<br>KHz   | 1<br>MHz | 10<br>MHz | 100<br>MHz | 1000<br>MHz | 10<br>GHz |
| YS1B2-152H | 5              | C   | 200           | 1500                     | –  | –        | 5         | 21         | 42          | 55        |
| YS1B2-502H | 5              | C   | 200           | 5000                     | –  | –        | 15        | 34         | 50          | 60        |
| YS1B2-103H | 5              | C   | 200           | .010                     | –  | 4        | 20        | 35         | 53          | 60        |
| YS1B2-153H | 5              | C   | 200           | .015                     | –  | 7        | 25        | 40         | 55          | 60        |
| YS1B2-203H | 5              | C   | 200           | .020                     | –  | 8        | 27        | 41         | 60          | 65        |
| YS1B2-273H | 5              | C   | 200           | .027                     | 4  | 10       | 30        | 42         | 65          | 70        |
| YS2B2-152H | 5              | L   | 200           | 1500                     | –  | –        | 6         | 22         | 48          | 55        |
| YS2B2-502H | 5              | L   | 200           | 5000                     | –  | –        | 15        | 35         | 55          | 60        |
| YS2B2-103H | 5              | L   | 200           | .010                     | –  | 4        | 20        | 36         | 57          | 60        |
| YS2B2-153H | 5              | L   | 200           | .015                     | –  | 7        | 25        | 45         | 60          | 60        |
| YS2B2-203H | 5              | L   | 200           | .020                     | –  | 8        | 27        | 46         | 62          | 65        |
| YS2B2-273H | 5              | L   | 200           | .027                     | 4  | 10       | 30        | 48         | 65          | 70        |

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

**NOTE:** AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end. All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

**For special multi-unit assemblies see Multi-Component Filter Brackets section.**



# Solder-In Style High Temp EMI Filters

XS/XR Series – .250 Dia. – Circuits Available – C & L



## APPLICATIONS

The XS series expands upon the YS offering by providing additional filtering in the HF through MICROWAVE frequency spectrum from 500 KHz up to 10 GHz. The larger diameter of the XS series means that even higher values of capacitance and a rated DC current of 10 Amps are available. Designed to be soldered into a package, bracket or bulkhead (and maintain hermeticity), it is ideal for medium to high impedance circuits where significant amounts of capacitance

to ground can be tolerated. In the “L” section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

## CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/14. See QPL listings.
- High temperature construction withstands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

## SPECIFICATIONS

1. Plating: Gold standard – Silver available
2. Material:  
Case: Cold rolled steel  
Leads: Alloy 52 steel
3. Operating Temperature Range:  
-55°C to +125°C
4. Insulation Resistance:  
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less  
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):  
R-level designs:  
2.0 times rated DC voltage  
Class B, Class S designs:  
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 5 Amps, maximum
9. Maximum Installation Temperature:  
300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



### millimeters (inches)

|             |              |
|-------------|--------------|
| 0.05 (.002) | 3.81 (.150)  |
| 0.13 (.005) | 6.35 (.250)  |
| 0.64 (.025) | 7.37 (.290)  |
| 0.8 (.03)   | 16.51 (.650) |
| 0.81 (.032) | 19.05 (.750) |

(See Note 4)

| Circuit Diagram | Dimensions |        |
|-----------------|------------|--------|
|                 | A ±.005    | B Ref. |
| L               | .250       | .750   |
| C               | .150       | .650   |

### Notes:

1. Outline drawing shows standard XS configuration. Also available with glass seal at the opposite end, XR reverse configuration.
2. MIL-F-28861/14 configuration A is equivalent to standard XS configuration. B is reverse XR configuration.
3. For XS2 or XR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/14 (See Note 2)

| Dash No.        | Config. |
|-----------------|---------|
| 001 through 006 | A STD   |
| 007 through 012 | B REV   |

# Solder-In Style High Temp EMI Filters

XS/XR Series – .250 Dia. – Circuits Available – C & L

## SPECIFICATIONS

| AVX<br>P/N | Current<br>AMP | CKT | DC<br>Voltage | CAP <sup>1</sup><br>Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |          |           |            |             |           |
|------------|----------------|-----|---------------|--------------------------|--|----------|-----------|------------|-------------|-----------|
|            |                |     |               |                          | 500<br>KHz   | 1<br>MHz | 10<br>MHz | 100<br>MHz | 1000<br>MHz | 10<br>GHz |
| XS1C2-503H | 5              | C   | 50            | .050                     | 9  | 15       | 35        | 44         | 70          | 70        |
| XS1C2-753H | 5              | C   | 50            | .075                     | 12   | 18       | 37        | 46         | 70          | 70        |
| XS1C2-104H | 5              | C   | 50            | .1                       | 14   | 20       | 38        | 48         | 70          | 70        |
| XS1C2-154H | 5              | C   | 50            | .15                      | 17   | 24       | 38        | 50         | 70          | 70        |
| XS1C2-254H | 5              | C   | 50            | .25                      | 21   | 31       | 40        | 55         | 70          | 70        |
| XS2C2-503H | 5              | L   | 50            | .050                     | 9  | 15       | 36        | 50         | 70          | 70        |
| XS2C2-753H | 5              | L   | 50            | .075                     | 12   | 18       | 37        | 51         | 70          | 70        |
| XS2C2-104H | 5              | L   | 50            | .1                       | 14   | 20       | 39        | 52         | 70          | 70        |
| XS2C2-154H | 5              | L   | 50            | .15                      | 17   | 26       | 40        | 53         | 70          | 70        |
| XS2C2-254H | 5              | L   | 50            | .25                      | 21   | 31       | 40        | 56         | 70          | 70        |
| XS1A2-503H | 5              | C   | 100           | .050                     | 9  | 15       | 35        | 44         | 70          | 70        |
| XS1A2-753H | 5              | C   | 100           | .075                     | 12   | 18       | 37        | 46         | 70          | 70        |
| XS1A2-104H | 5              | C   | 100           | .1                       | 14   | 20       | 38        | 48         | 70          | 70        |
| XS2A2-503H | 5              | L   | 100           | .050                     | 9  | 15       | 36        | 50         | 70          | 70        |
| XS2A2-753H | 5              | L   | 100           | .075                     | 12   | 18       | 37        | 51         | 70          | 70        |
| XS2A2-104H | 5              | L   | 100           | .1                       | 14   | 20       | 39        | 52         | 70          | 70        |
| XS1B2-153H | 5              | C   | 200           | .015                     | –  | 5        | 25        | 40         | 55          | 60        |
| XS1B2-223H | 5              | C   | 200           | .022                     | 2  | 8        | 26        | 40         | 58          | 70        |
| XS2B2-153H | 5              | L   | 200           | .015                     | –  | 5        | 25        | 45         | 60          | 60        |
| XS2B2-223H | 5              | L   | 200           | .022                     | 2  | 8        | 27        | 45         | 65          | 70        |
| XS1L2-103H | 5              | C   | 300           | .010                     | –  | 3        | 20        | 35         | 52          | 60        |
| XS2L2-103H | 5              | L   | 300           | .010                     | –  | 3        | 20        | 38         | 55          | 60        |

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

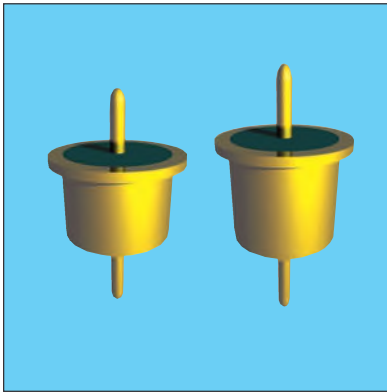
<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

**NOTE:** AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end. All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.

# Solder-In Style High Temp EMI Filters

WS/WR Series – .400 Dia. – Circuits Available – C & L



## APPLICATIONS

The WS series expands greatly upon the XS and YS offerings by providing increased filtering in the HF through MICROWAVE frequency spectrum from 500 KHz up to 10 GHz. The larger diameter of the WS series means even higher values of capacitance, a rated DC current of 15 Amps, plus 125 VAC/400 Hz ratings are available. Designed to be soldered into a package, bracket or bulk-head (and maintain hermeticity), it is ideal for low to medium impedance circuits where large amounts of capacitance to

ground can be tolerated. In the “L” section version an internal ferrite bead element provides both inductance and series resistance (lossy characteristic) which improves insertion loss and provides superior transient performance.

Alternate lead lengths or special capacitance values may be ordered.

Custom packages or bracket assemblies utilizing this feedthru can be furnished to your specifications.

## CHARACTERISTICS

- Meets or exceeds the applicable portions of MIL-F-28861/13. See QPL listings.
- High temperature construction with-stands 300°C installation temperatures.
- Features rugged monolithic discoidal capacitor construction.
- Glass hermetic seal on one end with epoxy seal on the opposite end.
- High purity gold plating provides excellent solderability or compatibility with thermal and ultrasonic wire bonding.

## SPECIFICATIONS

1. Plating: Gold standard – Silver available
2. Material:  
Case: Cold rolled steel  
Leads: Alloy 52 steel
3. Operating Temperature Range:  
-55°C to +125°C
4. Insulation Resistance:  
At 25°C: 1,000 megohm-microfarad min., or 100,000 megohms min., whichever is less  
At 125°C: 100 megohm-microfarad min., or 10,000 megohms min., whichever is less
5. Dielectric Withstanding Voltage (DWW):  
R-level designs:  
2.0 times rated DC voltage  
Class B, Class S designs:  
2.5 times rated DC voltage
6. DC Resistance (DCR): .01 ohm, maximum
7. Dissipation Factor (DF): 3% maximum
8. Rated DC Current: 15 Amps, maximum
9. Maximum Installation Temperature: 300°C
10. Supplied with 60/40 solder preform for easy installation
11. Insertion Loss for the “C” and “L” circuits are equivalent due to the saturation characteristic of the ferrite bead element at full rated current. At lower currents the “L” becomes much more effective.



### millimeters (inches)

|             |              |
|-------------|--------------|
| 0.05 (.002) | 6.35 (.250)  |
| 0.13 (.005) | 7.62 (.300)  |
| 0.64 (.025) | 10.16 (.400) |
| 0.8 (.03)   | 11.43 (.450) |
| 1.27 (.050) | 17.78 (.700) |
| 5.08 (.200) | 20.32 (.800) |

(See Note 4)

| Circuit Diagram | Dimensions |           |
|-----------------|------------|-----------|
|                 | A<br>±.005 | B<br>Ref. |
| L               | .300       | .800      |
| C               | .200       | .700      |

### Notes:

1. Outline drawing shows standard WS configuration. Also available with glass seal at the opposite end, WR reverse configuration.
2. MIL-F-28861/13 configuration “A” is equivalent to standard WS configuration. “B” is reverse WR configuration.
3. For WS2 or WR2 L-Section Filters inductor always positioned at epoxy-filled end.
4. Metric equivalent dimensions given for information only.

MIL-F-28861/13 (See Note 2)

| Dash No.        | Config. |
|-----------------|---------|
| 001 through 008 | A       |
| 009 through 016 | B       |

# Solder-In Style High Temp EMI Filters

WS/WR Series – .400 Dia. – Circuits Available – C & L

## SPECIFICATIONS

| AVX<br>P/N | Current<br>AMP | Circuit | DC<br>Voltage | CAP <sup>1</sup><br>Min. | Insertion Loss <sup>2</sup> Per MIL-STD-220, +25°C |          |           |            |             |           |
|------------|----------------|---------|---------------|--------------------------|--|----------|-----------|------------|-------------|-----------|
|            |                |         |               |                          | 500<br>KHz   | 1<br>MHz | 10<br>MHz | 100<br>MHz | 1000<br>MHz | 10<br>GHz |
| WS1C2-154H | 15             | C       | 50            | .15                      | 17   | 24       | 38        | 50         | 70          | 70        |
| WS1C2-504H | 15             | C       | 50            | .50                      | 26   | 34       | 42        | 58         | 70          | 70        |
| WS1C2-754H | 15             | C       | 50            | .75                      | 31   | 37       | 43        | 62         | 70          | 70        |
| WS1C2-125H | 15             | C       | 50            | 1.2                      | 33   | 37       | 52        | 70         | 70          | 70        |
| WS2C2-154H | 15             | L       | 50            | .15                      | 17   | 26       | 40        | 53         | 70          | 70        |
| WS2C2-504H | 15             | L       | 50            | .50                      | 26   | 36       | 44        | 60         | 70          | 70        |
| WS2C2-754H | 15             | L       | 50            | .75                      | 31   | 40       | 44        | 64         | 70          | 70        |
| WS2C2-125H | 15             | L       | 50            | 1.2                      | 33   | 38       | 53        | 70         | 70          | 70        |
| WS1N2-704H | 15             | C       | 70            | .70                      | 30   | 36       | 41        | 60         | 70          | 70        |
| WS2N2-704H | 15             | L       | 70            | .70                      | 30   | 38       | 42        | 62         | 70          | 70        |
| WS1A2-154H | 15             | C       | 100           | .15                      | 17   | 24       | 38        | 50         | 70          | 70        |
| WS1A2-504H | 15             | C       | 100           | .50                      | 26   | 34       | 42        | 58         | 70          | 70        |
| WS1A2-754H | 15             | C       | 100           | .75                      | 31   | 37       | 43        | 62         | 70          | 70        |
| WS1A2-105H | 15             | C       | 100           | 1.0                      | 31   | 40       | 48        | 64         | 70          | 70        |
| WS2A2-154H | 15             | L       | 100           | .15                      | 17   | 26       | 40        | 53         | 70          | 70        |
| WS2A2-504H | 15             | L       | 100           | .50                      | 26   | 34       | 44        | 60         | 70          | 70        |
| WS2A2-754H | 15             | L       | 100           | .75                      | 31   | 40       | 44        | 64         | 70          | 70        |
| WS2A2-105H | 15             | L       | 100           | 1.0                      | 31   | 41       | 50        | 65         | 70          | 70        |
| WS1L2-503H | 15             | C       | 200*          | .050                     | 7  | 15       | 34        | 42         | 70          | 70        |
| WS1L2-154H | 15             | C       | 200*          | .15                      | 17   | 24       | 38        | 50         | 70          | 70        |
| WS2L2-503H | 15             | L       | 200*          | .050                     | 7  | 15       | 34        | 44         | 70          | 70        |
| WS2L2-154H | 15             | L       | 200*          | .15                      | 17   | 26       | 40        | 53         | 70          | 70        |
| WS1E2-103H | 15             | C       | 400           | .010                     | –  | 4        | 20        | 34         | 50          | 60        |
| WS1E2-503H | 15             | C       | 400           | .050                     | 7  | 15       | 34        | 44         | 70          | 70        |
| WS2E2-103H | 15             | L       | 400           | .010                     | –  | 4        | 20        | 35         | 55          | 60        |
| WS2E2-503H | 15             | L       | 400           | .050                     | 7  | 15       | 34        | 44         | 70          | 70        |

\* Rated 200 VDC or 125 VAC/400 Hz.

<sup>1</sup> Decimal point values indicate capacitance in microfarads.  
Non-decimal point values indicate capacitance in picofarads.

<sup>2</sup> Insertion loss limits are based on theoretical values.  
Actual measurements may vary due to internal capacitor resonances and other design constraints.

**NOTE:** AVX Filters' Standard configurations (e.g. ZS, YS, XS, WS) have the hermetic glass seal opposite the flange end. All parts are capable of the reverse configuration with the glass seal at the flange end. All parameters are otherwise identical. The part number changes from "S" to "R" (e.g., standard = ZS1C2-153H; reverse = ZR1C2-153H).

For special multi-unit assemblies see Multi-Component Filter Brackets section.

# Advanced Technology Filters



## Hermetic High Temperature Solder-Ins

### AVX FILTERS SOLDER-IN STYLE FILTER



### GENERAL DESCRIPTION

These are high frequency filters in space saving solder-in designs which will operate under harsh environments and meet the high reliability requirements of MIL-F-28861 without outgassing. AVX Filters Corporation has designed a filter which sets a new standard for the industry. These feed-thru filters are constructed with hi-rel semiconductor materials and rugged MLC discoidal capacitors. They are also manufactured at high temperatures (>500°C) without fluxes, epoxies or other polymers, thus eliminating failure mechanisms associated with conventional solder-ins. These solder-ins withstand short temperature excursions as high as 400°C, and can actually be operated at temperatures to 200°C. Available either as discrete packages in standard case sizes or as multiple filter brackets, all have hermetic glass-to-metal seals on both ends.

### FEATURES

- Standard sizes
- Epoxy free construction
- Hermetic on both ends
- MIL-C-123 Discoidal Capacitor
- 400°C installation

### STYLE

- Discrete, hermetically sealed solder-in filters  
AVX Filters Series\*  
WQ: .400" Case Diameter  
XQ: .250" Case Diameter  
YQ: .165" Case Diameter  
ZQ: .128" Case Diameter
- \*Equivalent to MIL-F-28861 Series FS70, FS71, FS72, FS73 and FS74
- Custom design available
- Multiple filter arrays
  - Custom bracket housing employing discrete hermetic filters
  - Custom rugged bracket housings with inter-rated hermetic filtered feed-thrus

### SPECIFICATIONS

- Operating temperature range: -55°C to 200°C
- 400°C rated installation temperature
- Voltage range: 50 to 300 VDC/up to 200 VAC
- Capacitance Range: 10 pF to 1.4 mF
- Hermeticity:  $1 \times 10^{-7}$  ATM cm<sup>3</sup>/sec minimum
- Rated current: up to 25 amps
- Circuits: C
- Designed to meet or exceed requirements of MIL-F-28861

### CHARACTERISTICS

- Rugged monolithic ceramic capacitor construction
- Capacitor attached with solderless, fluxless, high temperature metallurgical bond
- Hermetic glass-to-metal seals on both ends
- No epoxies, resins or polymers to outgas or degrade in harsh environments