SFMC28-461
EMI FILTER
2.7 AMP

EMI INPUT FILTER
28 VOLT INPUT

FEATURES

- **Fully qualified to Class H or K**
- **Passive components for maximum tolerance in space environments**
- **–55° to +125°C operation**
- 28 volt input
- Up to 2.7 amps throughput current
- Up to 55 dB attenuation at 500 kHz
- Up to 60 dB attenuation at 1 MHz and 5 MHz
- Compliant to MIL-STD-461C, CE03
- Compatible with MIL-STD-704E DC power bus

MODEL	
SFMC28-461	2.7 amp

Size (max.): Non-flanged, case H1
2.125 x 1.125 x 0.400 (53.98 x 28.56 x 10.16 mm)
Flanged, case K2
2.910 x 1.125 x 0.400 inches (73.91 x 28.58 x 10.16 mm)
See Section B8, cases H1 and K2, for dimensions.
Weight: 48 grams maximum
Screening: Standard, Class H, or Class K (MIL-PRF-38534)
See Section C2 for screening options, see Section A5 for ordering information.

DESCRIPTION

The SFMC28-461™ EMI filters provide an off-the-shelf filtering solution for use in your space system. SFMC28-461 filters reduce the input line reflected ripple current of DC/DC converters. Use an SFMC28-461 filter with Interpoint's converters to meet MIL-STD-461C levels of conducted emission (CE01, CE03). The SFMC filters are designed exclusively with passive components providing maximum tolerance for space environments. The filters are available compliant to Class H or Class K of MIL-PRF-38534,

SCREENING AND REPORTS

The SFMC28-461 filter offers three screening options – Standard, Class H, or Class K. See Section C2, Quality Assurance, pages C2-7 through C2-9, for descriptions. Detailed reports on product performance are also available and are listed on page C2-9.

RIPPLE REDUCTION

The SFMC28-461 EMI filter reduces reflected input ripple current by a minimum of 55 dB at 500 kHz and 60 dB at 1 MHz when used with Interpoint's converters. The filter and converter combination performance exceeds the CEO3 requirements of MIL-STD-461C.

INSERTION LOSS

The maximum DC insertion loss for the SFMC28-461 filter (at a load of 22 watts) represents an output power loss of less than 2%.

FILTER DESIGN

SFMC28-461 filters incorporate thick-film hybrid technology and use only high quality ceramic capacitors for reliable high temperature operation.

Derating according to the requirements of MIL-STD-975 assures dependable performance in the harsh environments of space. MIL-STD-975 derating applies to operating temperatures at or below 90°C. More information is available in the Electrical/Thermal Analysis and Derating Report . See Section C2, Screening for details on obtaining the report.

All SFMC28-461 filters are built to the same assembly drawing regardless of environmental screening. Filters designated level OO, indicating standard environmental screening, are electrically comparable to filters designated level KH, the highest environmental screening level. This ensures consistency between your prototype or test system using level OO filters and your flight system using filters with higher levels of environmental screening. Element evaluation (screening at the component level) of Class H or Class K filters ensures even greater reliability. Refer to the Section C2, Screening Options, for more information.

OPERATING TEMPERATURE

The filter operates at full load over the temperature range of -55°C to +125°C case. Above +125°C, the current must be derated to zero at 135°C case temperature.

PACKAGING FOR SPACE

SFMC28-461 EMI filters are packaged in high-reliability, hermetically-sealed metal packages and weigh just 48 grams. A small footprint of 2.110 Inches (53.59 mm) by 1.115 inches (28.32 mm) by 0.400 inches (10.16 mm) minimizes the board area needed for the filter. Cover marking inks are NASA approved to Total Mass Loss (TML) and Collected Volatile Condensable Material (CVCM) outgassing requirements for operation in space environments.

For more information, contact your Interpoint representative listed in Section A5.

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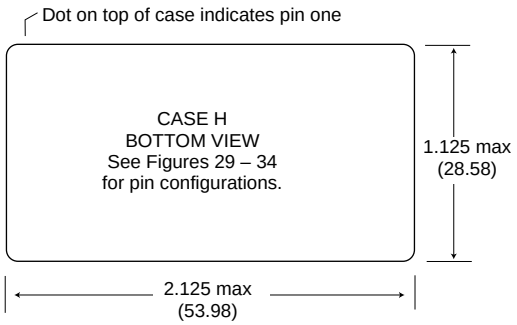


Materials

Header Cold Rolled Steel/Nickel/Gold
cases H1 and H2
Cold Rolled Steel/Nickel/Tin
cases H3, H4, and H5

Cover Kovar/Nickel
cases H1 and H2
Cold Rolled Steel/Nickel/Tin
cases H3, H4, and H5

Pins #52 alloy
ceramic seal
case H1
case H2 (except MHV Series Single and Dual)
compression glass seal
MHV Series Single and Dual
case H3, H4, H5

CAUTION
Heat from reflow or wave soldering may damage the device. Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places
±0.01 (0.3) for two decimal places
unless otherwise specified

FIGURE 28: CASE H MAXIMUM DIMENSIONS

BOTTOM VIEW CASE H1
FMC EMI Filter: Screening – Standard, ES, or 883
SFMC EMI Filter: Screening – Space Standard, H, or K

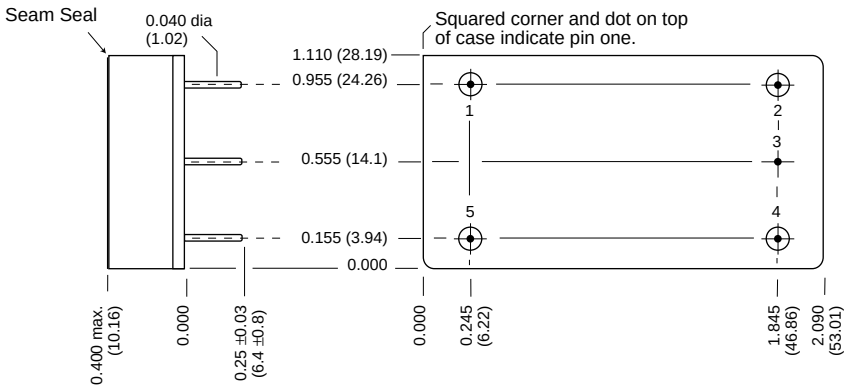
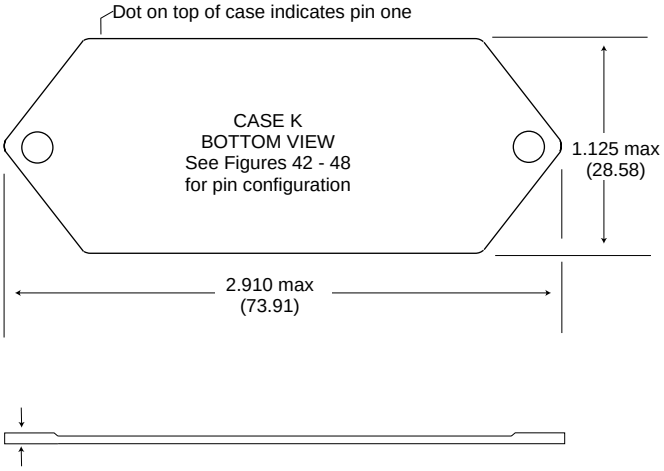


FIGURE 29: CASE H1

Note: Although every effort has been made to render the case drawings at actual size, variations in the printing process may cause some distortion. Please refer to the numerical dimensions for accuracy.

CASES



Flange Thickness:

Cases K1, K2, K3 and MLP Series (K5)
0.060 (1.52)
Cases K4, K5 (except MLP Series), K6, K7, and K8
0.067 +0.005/-0.007 (1.70 +0.13/-0.8)

Materials

Header Case K1 - K3
Cold Rolled Steel/Nickel/Gold
Cases K4 - K8
Cold Rolled Steel/Nickel/Tin
Cover Case K1 - K3
Kovar/Nickel
Case K4 - K8
Cold Rolled Steel/Nickel/Tin
Pins #52 alloy (all cases)
Case K1, K2, and K3 (except MHV Series Single and Dual)
ceramic seal
Cases K4 - K8 and MHV Series Single and Dual (K3)
compression glass seal

Case dimensions in inches (mm)

Tolerance ±0.005 (0.13) for three decimal places
±0.01 (0.2) for two decimal places
unless otherwise specified

CAUTION
Heat from reflow or wave soldering may damage the device. Solder pins individually with heat application not exceeding 300°C for 10 seconds per pin.

FIGURE 41: CASE K MAXIMUM DIMENSIONS

BOTTOM VIEW CASE K1

Flanged case
FM-704A EMI Filter: Screening – Standard, ES, or 883

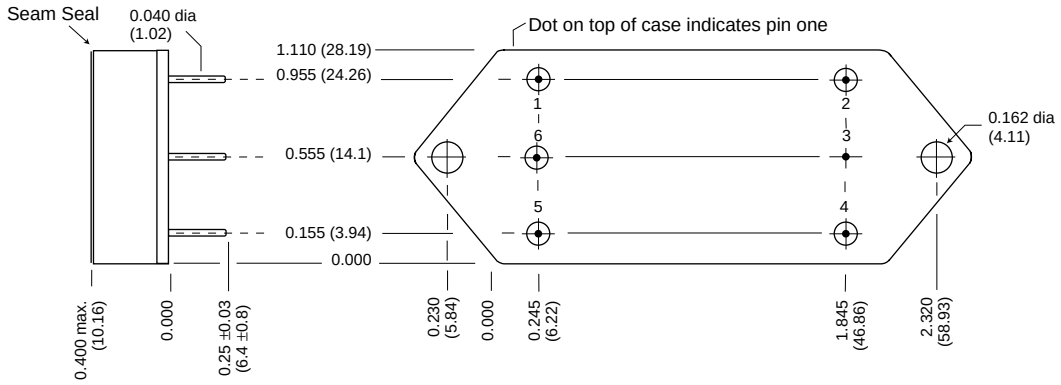


FIGURE 42: CASE K1

BOTTOM VIEW CASE K2

Flanged cases: Designator required in Case Option position of model number.
FMC EMI Filter: Screening – Standard, ES, or 883
SFMC EMI Filter: Screening – Space Standard, H, or K

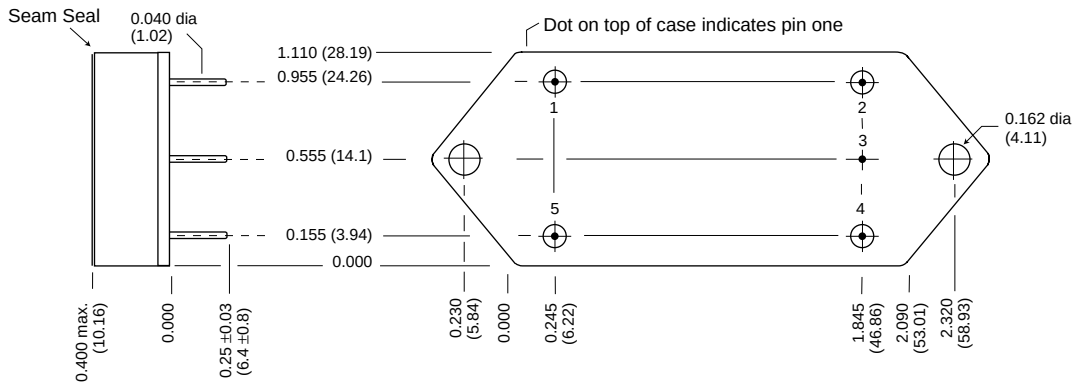


FIGURE 43: CASE K2

SPACE PRODUCTS

ELEMENT EVALUATION TEST PERFORMED (COMPONENT LEVEL)	STANDARD (O)		CLASS H		CLASS K	
	M/S	P	M/S	P	M/S	P
Element Electrical	yes	no	yes	yes	yes	yes
Element Visual	no	no	yes	yes	yes	yes
Internal Visual	no	no	yes	no	yes	no
Temperature Cycling	no	no	no	no	yes	yes
Constant Acceleration	no	no	no	no	yes	yes
Interim Electrical	no	no	no	no	yes	no
Burn-in	no	no	no	no	yes	no
Post Burn-in Electrical	no	no	no	no	yes	no
Steady State Life	no	no	no	no	yes	no
Voltage Conditioning /Aging	no	no	no	no	no	yes
Visual Inspection	no	no	no	no	no	yes
Final Electrical	no	no	yes	yes	yes	yes
Wire Bond Evaluation*	no	no	yes	yes	yes	yes
SEM	no	no	no	no	yes	no
SLAM™/C-SAM: Input capacitors only (Add'l test, not req. by H or K)	no	no	no	yes	no	yes

Notes

M/S	Active components (Microcircuit and Semiconductor Die)
P	Passive components
*	Not applicable to EMI filters that have no wirebonds

Definitions
Element Evaluation: Component testing/screening per MIL-STD-883 as determined by MIL-PRF-38534
SEM: Scanning Electron Microscopy
SLAM™: Scanning Laser Acoustic Microscopy
C-SAM: C - Mode Scanning Acoustic Microscopy

Applies to the following products:

SMFLHP Series
SMFL Series
SMHP Series (O&H only)
SMTR Series
SSP Series
SMHF Series
SMSA Series
SLH Series
SLIM Module
SFME120 EMI Filter
SFME28 EMI Filter
SFCS EMI Filter
SFMC EMI Filter
STF EMI Filter

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QA SCREENING
SPACE PRODUCTS

ENVIRONMENTAL SCREENING TEST PERFORMED (END ITEM LEVEL)	STANDARD (O)	CLASS H	CLASS K
Non-destruct bond pull*			
Method 2023	no	no	yes
Pre-cap inspection			
Method 2017, 2032	yes	yes	yes
Temperature cycle			
Method 1010, Cond. C	yes	yes	yes
Constant acceleration			
Method 2001, 3000 g	yes	yes	yes
PIND Test			
Method 2020, Cond. B	no	no	yes
Radiography			
Method 2012	no	no	yes
Pre burn-in test	yes	yes	yes
Burn-in, Method 1015, 125°C			
96 hours	yes	no	no
160 hours	no	yes	no
2 x 160 hour (includes mid BI test)	no	no	yes
Final electrical test			
MIL-PRF-38534, Group A	yes	yes	yes
Hermeticity test			
Fine Leak,			
Method 1014, Cond. A	yes	yes	yes
Gross Leak,			
Method 1014, Cond. C	yes	yes	yes
Final visual inspection			
Method 2009	yes	yes	yes

Test methods are referenced to MIL-STD-883 as determined by MIL-PRF-38534.

Note
* Not applicable to EMI filters that have no wirebonds.

Applies to the following products:

SMFLHP Series
SMFL Series
SMHP Series (O&H only)
SMTR Series
SSP Series
SMHF Series
SMSA Series
SLH Series
SLIM Module
SFME120 EMI Filter
SFME28 EMI Filter
SFCS EMI Filter
SFMC EMI Filter
STF EMI Filter