

# AMH461

Hybrid - High Reliability  
EMI Filter

## DESCRIPTION

The AMH Series EMI filter has been designed to provide full compliance with the input line reflected ripple current requirement specified by CE03 of MIL-STD-461C over the extended military temperature range while operating in conjunction with the corresponding AHF series of DC/DC converters. These filters are offered as part of a family of high reliability conversion products providing single, dual and triple output voltages while operating from nominal +28 volt input line. Other converters operating with a similar switching frequency will also benefit from use of this device.

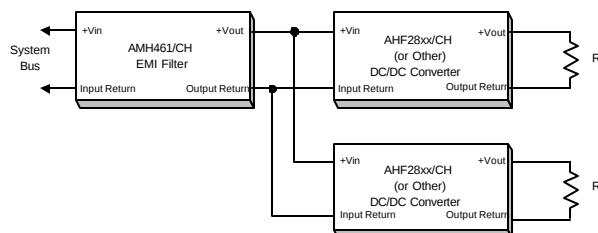
These EMI filters are hermetically packaged in a seam welded enclosure utilizing axially oriented copper-core pins which minimize resistive DC losses. This package has been configured to complement the AHF package as a convenience in system installation and is fabricated with Advanced Analog / M-3's rugged ceramic lead-to-package seal assuring long term hermetic seal integrity in harsh environments.

Designed to meet the the stringent requirements of military and aerospace use, these devices are manufactured in a facility fully qualified to MIL-PRF-38534, and are available in two screening grades. The CH grade intended for flight use is fully compliant to the requirements of MIL-PRF-38534 for class H. The HB grade is processed and screened to the class H requirement, but does not include element evaluation. The ES grade is processed and screened to a lower level requirement. Class CH grade and class HB grade are tested to meet the complete group "A" test specification over the full military temperature range with no derating. Variations in electrical, mechanical and screen requirements can be accommodated. Contact Advanced Analog / M-3 for special requirements.

## FEATURES

- Up to 2.0 Ampere Output Current
- Attenuation > 60dB at 500KHz
- Low Profile Seam Welded Package
- Ceramic Insulated Copper Core Pins
- Operation Over Full Military Temp Range
- No Derating for -55°C to +125°C

## Typical Connection Diagram



## SPECIFICATIONS

AMH461

### ABSOLUTE MAXIMUM RATINGS *Note 1*

|                            |                            |                 |
|----------------------------|----------------------------|-----------------|
| Input Voltage              | -80V to +80V <i>Note 2</i> |                 |
| Input Current              | 3.0 A                      |                 |
| Lead Soldering Temperature | 300°C for 10 seconds       |                 |
| Case Temperature           | Operating                  | -55°C to +125°C |
|                            | Storage                    | -65°C to +135°C |

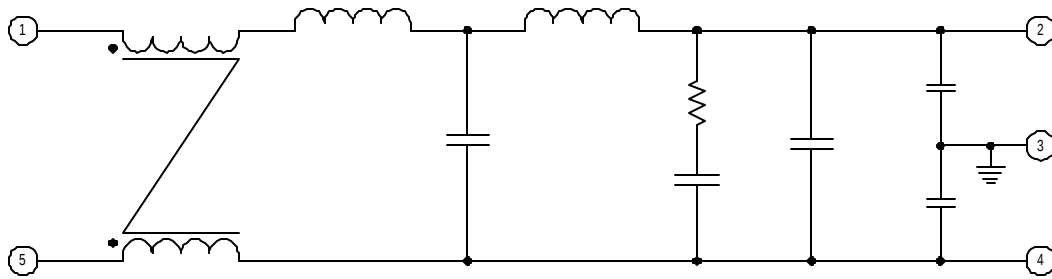
### Electrical Characteristics -55°C ≤ T<sub>CASE</sub> ≤ +125°C, -50 ≤ V<sub>IN</sub> ≤ +50 unless otherwise specified.

| Parameter                    | Group A Subgroups | Test Conditions                                                         | Min | Nom | Max | Unit            |
|------------------------------|-------------------|-------------------------------------------------------------------------|-----|-----|-----|-----------------|
| INPUT VOLTAGE                |                   | Steady State                                                            | -40 | —   | +40 | V <sub>DC</sub> |
|                              |                   | Transient <i>Note 2</i>                                                 | -50 |     | +50 |                 |
| OUTPUT VOLTAGE               | 1, 2, 3           | V <sub>OUT</sub> = V <sub>IN</sub> - I <sub>IN</sub> (R <sub>DC</sub> ) |     |     |     | V <sub>DC</sub> |
| OUTPUT CURRENT <i>Note 3</i> |                   |                                                                         |     |     | 2.0 | A <sub>DC</sub> |
| DC RESISTANCE <i>Note 4</i>  | 1                 | T <sub>C</sub> = 25°C                                                   |     | 150 | 250 | mΩ              |
| POWER DISSIPATION            |                   | Maximum Current<br>T <sub>C</sub> = 25°C                                |     |     | 1.0 | W               |
| NOISE REDUCTION              |                   | T <sub>C</sub> = 25°C                                                   |     |     |     | dB              |
|                              |                   | 1KHz                                                                    | -1  | +1  |     |                 |
|                              |                   | 200 KHz - 500 KHz                                                       | 40  | 50  |     |                 |
|                              |                   | 500 KHz – 10 MHz                                                        | 70  | 80  |     |                 |
|                              |                   | 10 MHz – 50 MHz                                                         | 60  | 70  |     |                 |
| ISOLATION                    | 1                 | Any Pin to Case<br>Tested @ 500VDC                                      | 100 |     |     | MΩ              |
| CAPACITANCE                  |                   | Measured Between Any Pin and Case                                       |     | 44  |     | nF              |
| DEVICE WEIGHT                |                   | Slight Variations with Case Style                                       |     | 30  |     | gms             |

#### Notes to Specifications:

1. Operation above maximum ratings may cause permanent damage to the device. Operation at maximum ratings may degrade performance and affect reliability.
2. Device can tolerate ± 100 Volt transient whose duration is ≤ 100 ms when R<sub>S</sub> ≥ 0.5 Ω
3. Derate Output Current linearly from 100% at 125°C to 0 at 135°C.
4. DC resistance is the total resistance of the device and includes the sum of the *input* to *output* resistance and the *return in* to *return out* resistance paths.

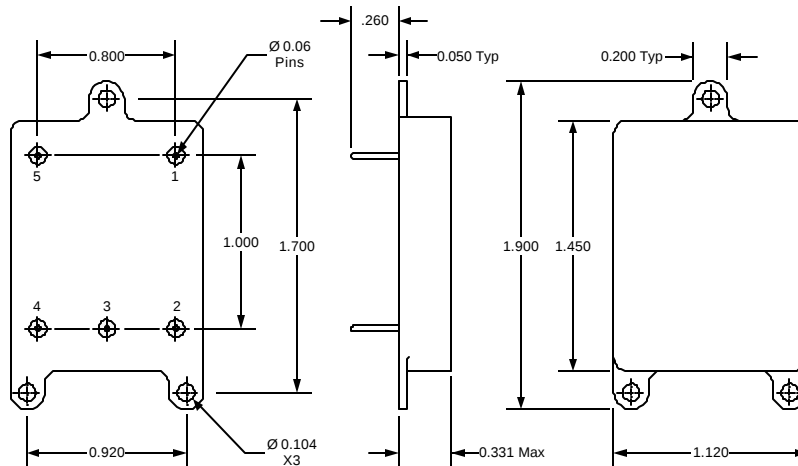
### AMH461 Block Diagram



### AMH461 PIN DESIGNATION

| Pin Number | Designation     |
|------------|-----------------|
| 1          | Positive Input  |
| 2          | Positive Output |
| 3          | Case Ground     |
| 4          | Output Common   |
| 5          | Input Common    |

### AMH461 Case Outline



Note: Flanged case shown. Non-flange case identical size but without three mounting ears.

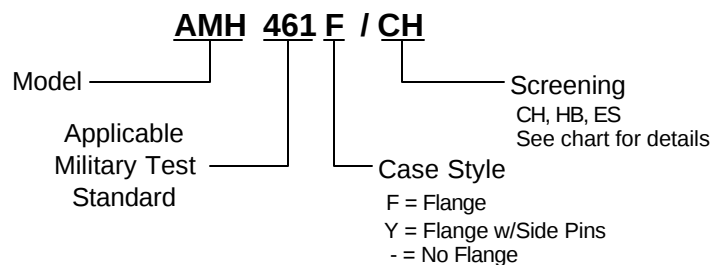
Tolerances, unless otherwise specified: .XX =  $\pm 0.010$

.XXX = ±0.005

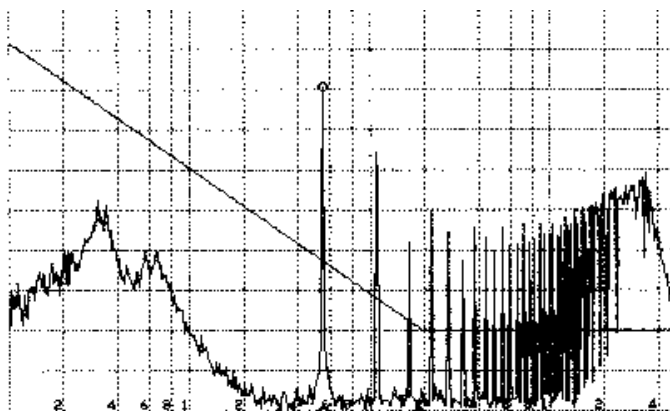
Available Screening Levels and Process Variations for AMH461 EMI Filters.

| Requirement                                      | MIL-STD-883 Method               | /CH Suffix       | /HB Suffix       | /ES Suffix      |
|--------------------------------------------------|----------------------------------|------------------|------------------|-----------------|
| Temperature Range                                |                                  | -55°C to +125°C  | -55°C to +125°C  | -55°C to +125°C |
| Element Evaluation                               |                                  | MIL-PRF-38534    | —                | —               |
| Internal Visual                                  | 2017                             | Yes              | Yes              | Yes             |
| Temperature Cycle                                | 1010                             | Cond C           | Cond C           | Cond B          |
| Constant Acceleration                            | 2001,                            | Cond A           | Cond A           | 500g            |
| Burn-in<br>Interim Electrical @ 0 hrs            | 1015                             | 160 hrs @ 125°C  | 160 hrs @ 125°C  | 96 hrs @ 125°C  |
| Final Electrical (Group A)<br>Read & Record Data | MIL-PRF-38534<br>& Specification | -55, +25, +125°C | -55, +25, +125°C | +25°C           |
| PDA (25°C, interim to final)                     |                                  | 10%              | 10%              | —               |
| Seal, Fine & Gross                               | 1014                             | Cond A, C        | Cond A, C        | Cond A, C       |
| External Visual                                  | 2009                             | Yes              | Yes              | Yes             |

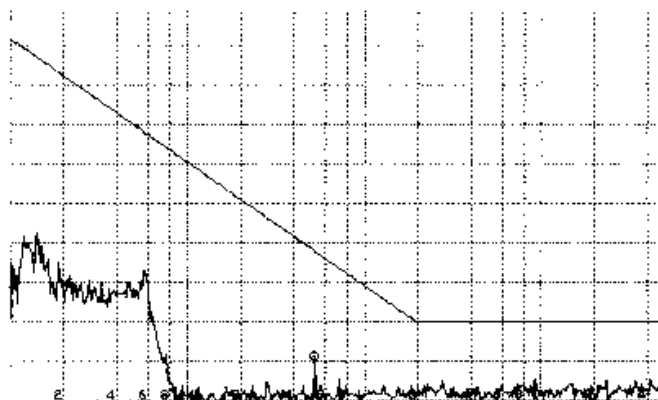
## Part Numbering/Ordering Information



## Typical Filter CE03 Performance



AHF2805S CE03 Performance Without AMH461 filter



AHF2805S CE03 Performance With AMH461 filter

©Advanced Analog / M-3

The information in this data sheet has been carefully checked and is believed to be accurate; however no responsibility is assumed for possible errors. These specifications are subject to change without notice.

0020

**ADVANCED ANALOG / M-3 INC.**  $\lambda$   $\triangle$

**MIL-PRF-38534 Qualified**  
**ISO 9001 Registered**

2270 Martin Avenue  
 Santa Clara CA 95050-2781  
 (408) 988-4930 FAX (408) 988-2702