

## AFC461 SERIES

### EMI FILTER HYBRID - HIGH RELIABILITY

#### Description

The AFC461 EMI filter will reduce the input line reflected ripple current of the AHV, ATO, ATW, ATR, and AHF line of DC/DC converters to levels below the CEO3 limits of MIL-STD-461.

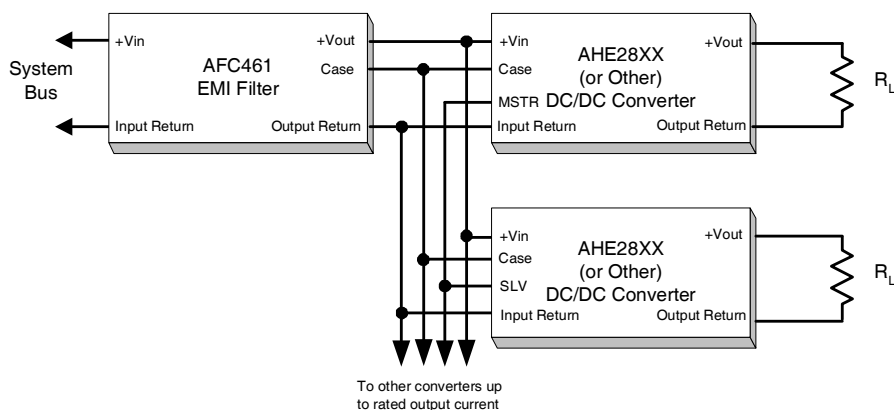
These EMI filters are manufactured in a facility certified to MIL-PRF-38534. All purposes used to manufacture these filters have been qualified to enable International Rectifier to deliver compliant devices. Three standard temperature grades are offered with screening options. Manufactured in a facility fully qualified to MIL-PRF-38534, these EMI filters are fabricated utilizing DSCC qualified processes. For available screening options, refer to device screening table in the data sheet.



#### Features

- 4.0 A Input Current - max.
- 40 dB Noise Reduction min. @100 KHz
- -55°C to +125°C Operation
- Military Screening
- Compatible with ATW, AHE, ATO, ATR and AHF Series DC/DC Converters
- No Derating for -55°C to +125°C Operation
- No Tantalum Capacitors for High Reliability
- Standard Microcircuit Drawings Available

#### Typical Application



## Specifications

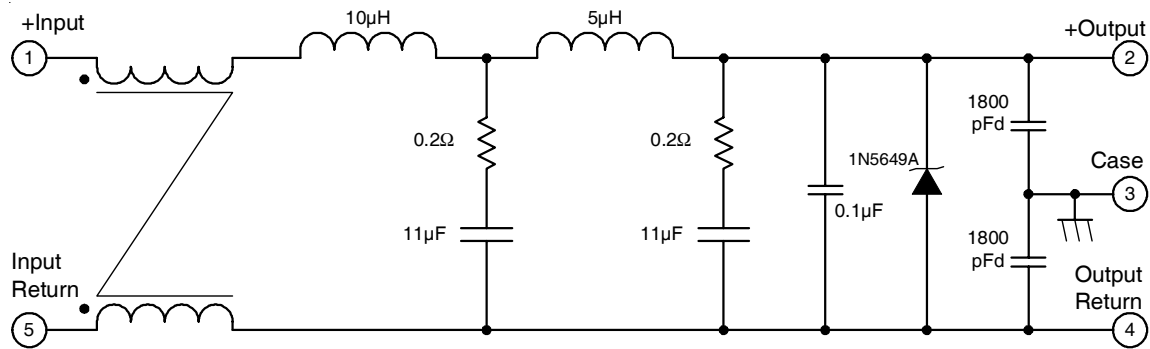
| Parameter                   | Condition                | Min                                  | Typ                  | Max                  | Unit              |
|-----------------------------|--------------------------|--------------------------------------|----------------------|----------------------|-------------------|
| Input Voltage               | Steady State             | 0                                    | 28                   | 40                   | VDC               |
| Input Current               | DC<br>Ripple             |                                      |                      | 4.0<br>1.0           | A<br>A RMS        |
| Input Clamping Voltage      | -55°C<br>+25°C<br>+125°C | 38.9<br>42.3<br>44.9                 | 43.2<br>47.0<br>49.9 | 47.5<br>51.7<br>54.8 | VDC<br>VDC<br>VDC |
| Output Voltage <sup>1</sup> | Steady State             | $V_{OUT} = V_{IN} - I_{IN} (R_{DC})$ |                      |                      | VDC               |
| Output Current              | Steady State             |                                      |                      | 4.0                  | A                 |
| DC Resistance ( $R_{DC}$ )  | Steady State             | 0.07                                 | 0.10                 | 0.15                 | $\Omega$          |
| Power Dissipation           | Max. DC Current          |                                      |                      | 1.6                  | W                 |
| Noise Reduction             | 100 KHz to 50 MHz        | 40                                   |                      |                      | dB                |
| Capacitance                 | Any pin to case          |                                      |                      | 4200                 | pF                |
| Isolation                   | Any pin to case 500VDC   | 100                                  |                      |                      | M $\Omega$        |
| Operating Temperature       | Case                     | -55                                  |                      | +125                 | °C                |
| Storage Temperature         | Case                     | -65                                  |                      | +150                 | °C                |
| Weight                      |                          |                                      |                      | 55                   | g                 |

1. Typical Applications result in Vout within 2 % of Vin

## Standard Microcircuit Drawing Equivalence Table

| Standard Microcircuit<br>Drawing Number | Vendor Cage<br>Code | IR Standard<br>Part Number |
|-----------------------------------------|---------------------|----------------------------|
| 91020-01HXA                             | 52467               | AFC461/CH                  |
| 91020-01HZA                             | 52467               | AFC461F/CH                 |

### Block Diagram



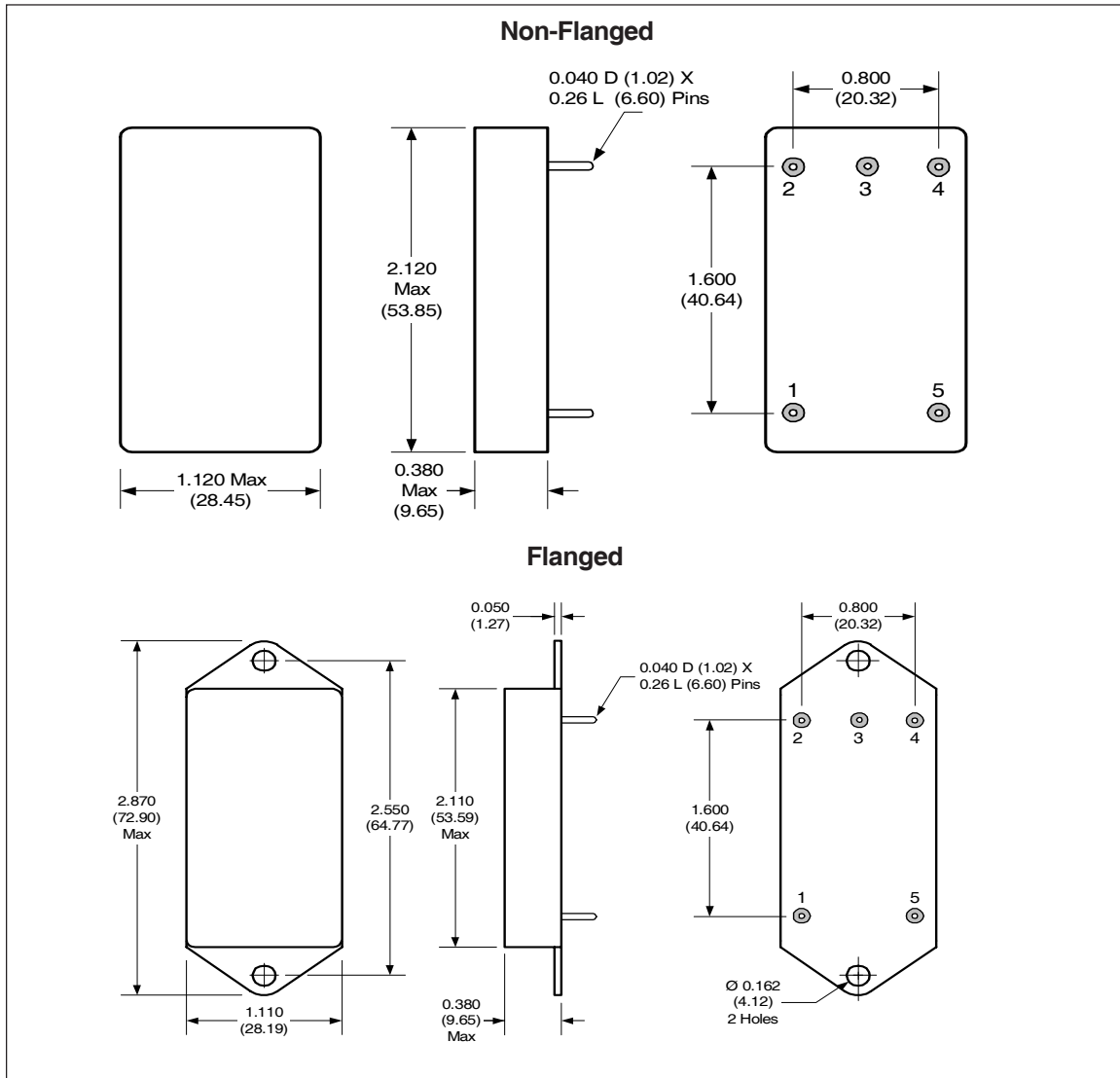
Refer to page 4 for Pin Designation Table

### Device Synchronization

Whenever multiple DC/DC converters are utilized in a single system, significant low frequency noise may be generated due to slight difference in the switching frequencies of the converters (beat frequency noise). Because of the low frequency nature of this noise (typically less than 10KHz), it is difficult to filter out and may interfere with proper operation of sensitive systems (communications, radar or telemetry). International Rectifier offers an option, which provides synchronization of multiple AHE/ATW type converters, thus eliminating this type of noise. To take advantage of this capability, the system designer must assign one of the converters as the master. Then, by definition, the remaining converters become slaves and will operate at the masters' switching frequency. The user should be aware that the synchronization system is fail-safe; that is, the slaves

will continue operating should the master frequency be interrupted for any reason. The layout must be such that the synchronization output of the master device is connected to the synchronization input of each slave device. It is advisable to keep this run short to minimize the possibility of radiating the 250KHz switching frequency. A typical connection is illustrated on the cover sheet of this document.

The appropriate converters must be ordered to take advantage of this feature. After selecting the converters required for the system, a 'MSTR' suffix is added for the master converter part number and an 'SLV' suffix is added for slave part number. See Part Number section of the applicable converter data sheets.

**Pin Designation**

| Pin # | Designation   |
|-------|---------------|
| 1     | + Input       |
| 2     | + Output      |
| 3     | Case Ground   |
| 4     | Output Return |
| 5     | Input Return  |

**Device Screening**

| Requirement                     | MIL-STD-883 Method               | No Suffix      | ES ②            | HB                      | CH                      |
|---------------------------------|----------------------------------|----------------|-----------------|-------------------------|-------------------------|
| Temperature Range               | —                                | -20°C to +85°C | -55°C to +125°C | -55°C to +125°C         | -55°C to +125°C         |
| Element Evaluation              | MIL-PRF-38534                    |                | N/A             | N/A                     | Class H                 |
| Non-Destructive<br>Bond Pull    | 2023                             | N/A            | N/A             | N/A                     | N/A                     |
| Internal Visual                 | 2017                             | ①              | Yes             | Yes                     | Yes                     |
| Temperature Cycle               | 1010                             | N/A            | Cond B          | Cond C                  | Cond C                  |
| Constant Acceleration           | 2001, Y1 Axis                    | N/A            | 500 Gs          | 3000 Gs                 | 3000 Gs                 |
| PIND                            | 2020                             | N/A            | N/A             | N/A                     | N/A                     |
| Burn-In                         | 1015                             | N/A            | 48 hrs@hi temp  | 160 hrs@125°C           | 160 hrs@125°C           |
| Final Electrical<br>( Group A ) | MIL-PRF-38534<br>& Specification | 25°C           | 25°C ②          | -55°C, +25°C,<br>+125°C | -55°C, +25°C,<br>+125°C |
| PDA                             | MIL-PRF-38534                    | N/A            | N/A             | N/A                     | 10%                     |
| Seal, Fine and Gross            | 1014                             | Cond A         | Cond A, C       | Cond A, C               | Cond A, C               |
| Radiographic                    | 2012                             | N/A            | N/A             | N/A                     | N/A                     |
| External Visual                 | 2009                             | ①              | Yes             | Yes                     | Yes                     |

**Notes:**

- ① Best commercial practice
- ② Sample tests at low and high temperatures

**Part Numbering**

