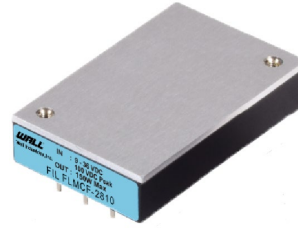




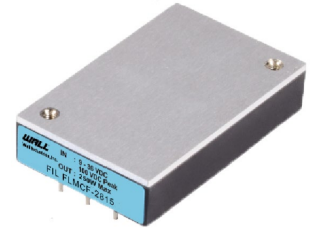
Size: 1.6in x 1in x 0.4in
(40.6mm x 25.4mm x 10.2mm)



Size: 2in x 1in x 0.4in
(50.8mm x 25.4mm x 10.2mm)



Size: 2.26in x 1.45in x 0.5in
(57.9mm x 36.8mm x 12.7mm)



Size: 2.26in x 1.45in x 0.5in
(57.9mm x 36.8mm x 12.7mm)

OPTIONS

- Thread
- No Thread

FEATURES

- Non-Isolated
- 4:1 Input Range
- Inrush Current Limit
- Reverse Polarity Protection
- High Efficiency
- Remote ON/OFF
- Over Current, Over Temperature, Over Voltage, Under Voltage, and Short Circuit Protection
- RoHS and REACH Compliant
- Designed to meet MIL-STD 1275D and MIL-STD 461G

APPLICATION

- Railway
- Defense
- Industrial

DESCRIPTION

The FIL FLMCF is a series of non-isolated EMI filter and transient protectors. This model series comes in a low profile package and offers 4:1 input range. It features reverse polarity protection, remote on/off, and over current, over temperature, over voltage, under voltage, and short circuit protection. The FIL FLMCF-2805 is RoHS and REACH compliant and are designed to meet MIL-STD 1275D and MIL-STD 461G standards.

MODEL SELECTION TABLE

| Model Number | Input Voltage Range | Maximum Output Current | Maximum Output Power | No Load Input Current | Maximum Capacitive Load | Efficiency |
|----------------|---------------------|------------------------|----------------------|-----------------------|-------------------------|------------|
| FIL FLMCF-2805 | 9~36VDC | 5A | 45W | 6mA | 1000µF | 97% |
| FIL FLMCF-2808 | | 8A | 75W | 6mA | 1000µF | 98% |
| FIL FLMCF-2810 | | 10A | 150W | 6mA | 1000µF | 98% |
| FIL FLMCF-2815 | | 15A | 250W | 6mA | 1000µF | 98% |

SPECIFICATIONS

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | | Min | Typ | Max | Unit |
|------------------------------|--|--|--------------------------------------|--------------------------|-----|------|
| | | | INPUT SPECIFICATIONS | | | |
| Operating Input Voltage | | | 9 | 28 | 36 | VDC |
| Inrush Current | With 100µF connected to the output | | | 5 | | A |
| Start Up Voltage | | | | | 9 | VDC |
| Shutdown Voltage | | | 5.5 | 6 | 6.5 | VDC |
| Transient Voltage | 1 Second, max. 50ms, max. | | | | 50 | VDC |
| Spikes | 70µs, 2J | | -250 | | 250 | VDC |
| Reverse Polarity Protection | Internal series MOSFET is held in an off state to avoid reverse current flow | | -36 | | 0 | VDC |
| OUTPUT SPECIFICATIONS | | | | | | |
| Output Voltage | | | | Vin-1 | Vin | VDC |
| Clamping Voltage | Input Transient Voltage Mode | FIL FLMCF-2805 & FIL FLMCF-2808 FIL FLMCF-2810 & FIL FLMCF-2815 | | 40 46 | | VDC |
| Output Current | | | | See Table | | |
| Output Power Range | | | | See Table | | |
| REMOTE ON/OFF | | | | | | |
| Remote ON/OFF ⁽¹⁾ | DC-DC ON DC-DC OFF | | Open or Short or 0~1.2VDC 4~12VDC | | | |
| PROTECTION | | | | | | |
| Short Circuit Protection | | | Continuous, Automatic Recovery | | | |
| Over Load Protection | Hiccup Mode | FIL FLMCF-2805 FIL FLMCF-2808 FIL FLMCF-2810 FIL FLMCF-2815 | | 12.5 20 22.5 35 | | A |
| Over Temperature Protection | | | | 115 | | °C |

SPECIFICATIONS

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | | Min | Typ | Max | Unit |
|-------------------------------------|---|---|--|-------------------------|------|-------|
| ENVIRONMENTAL SPECIFICATIONS | | | | | | |
| Operating Ambient Temperature | With Derating | | -40 | | +105 | °C |
| Storage Temperature Range | | | -55 | | +125 | °C |
| Maximum Case Temperature | | | | | 105 | °C |
| Relative Humidity | | | 5 | | 95 | % |
| Thermal Shock | | | MIL-STD-810F | | | |
| Vibration | | | MIL-STD-810F | | | |
| MTBF | MIL-HDBK-217F, Full Load | FIL FLMCF-2805 | | 2.718 x 10 ⁶ | | Hours |
| | | FIL FLMCF-2808 | | 1.146 x 10 ⁶ | | |
| | | FIL FLMCF-2810 | | 1.307 x 10 ⁶ | | |
| | | FIL FLMCF-2815 | | 6.095 x 10 ⁶ | | |
| GENERAL SPECIFICATIONS | | | | | | |
| Efficiency | | | See Table | | | |
| Isolation Voltage | 1 minute | Input (Output) to Case | 2250 | | | VDC |
| PHYSICAL SPECIFICATIONS | | | | | | |
| Weight | FIL FLMCF-2805 | | 0.069oz (19.7g) | | | |
| | FIL FLMCF-2808 | | 0.99oz (28g) | | | |
| | FIL FLMCF-2810 & FIL FLMCF-2815 | | 2.26oz (64g) | | | |
| Dimensions (L x W x H) | FIL FLMCF-2805 | | 1.6in x 1in x 0.4in (40.6mm x 25.4mm x 10.2mm) | | | |
| | FIL FLMCF-2808 | | 2in x 1in x 0.4in (50.8mm x 25.4mm x 10.2mm) | | | |
| | FIL FLMCF-2810 & FIL FLMCF-2815 | | 2.26in x 1.45in x 0.5in (57.9mm x 36.8mm x 12.7mm) | | | |
| Case Material | FIL FLMCF-2805 | | Non-Conductive Black Plastic | | | |
| | FIL FLMCF-2808 | | Copper | | | |
| | FIL FLMCF-2810 & FIL FLMCF-2815 | | Plastic | | | |
| Base Material | FIL FLMCF-2805 | | Non-Conductive Black Plastic | | | |
| | FIL FLMCF-2808 | | FR4PCB | | | |
| | FIL FLMCF-2810 & FIL FLMCF-2815 | | Aluminum Base-Plate | | | |
| Potting Material | | | Silicone (UL94 V-0) | | | |
| SAFETY CHARACTERISTICS | | | | | | |
| Standard Meets | Compliant with standards voltage transient immunity | | MIL-STD-1275E Surge Susceptibility MIL-STD-704F Surge Susceptibility RTCA DO-160G Surge Susceptibility | | | |
| EMI | CE101-4 | Curve #2 | With external components | MIL-STD-461G | | |
| | CE102-1 | Basic Curve | | | | |
| | RE101-2 | Navy | | | | |
| | RE102-3 | Fixed Wing Internal, ≥25 Meters Nose to Tail | | | | |
| Class of Equipment | CS101-1 | Curve #2 | With external components | MIL-STD-461G | | |
| | CS114-1 | Curve #5 | | | | |
| | CS115-1 | Basic Waveform | | | | |
| | CS116-2 | I _{max} =10A | | | | |

NOTES

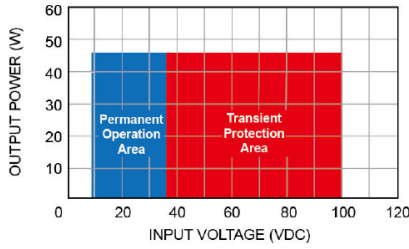
1. Referred to -Vin pin
2. The FIL FLMCF series is a DC front-end module that provides EMI filtering and transient protection. The module enables designers using certain Wall 24V DC/DC converters to meet conducted emission and conducted susceptibility per MIL-STD-461G. For list of compliant 24V DC/DC converter series, please contact factory.
3. Contact factory for more details on recommended external components.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

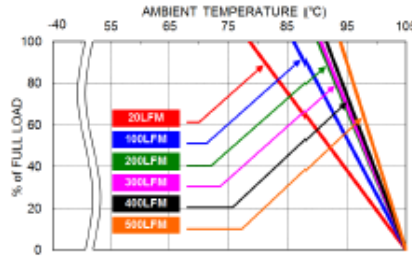
**Due to advances in technology, specifications subject to change without notice.*

CHARACTERISTIC CURVES

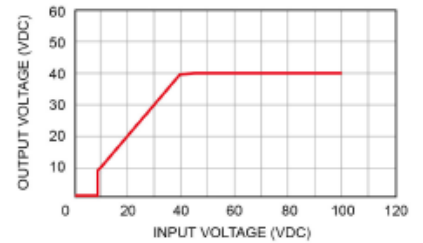
FIL FLMCF-2805 Pout vs. Input Voltage



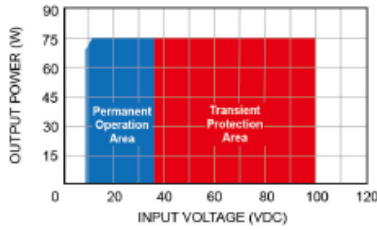
FIL FLMCF-2805 Derating Curve



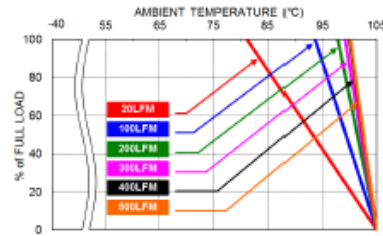
FIL FLMCF-2805 Transfer Function



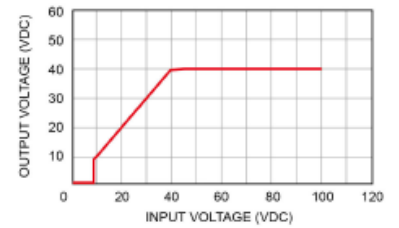
FIL FLMCF-2808 Pout vs. Input Voltage



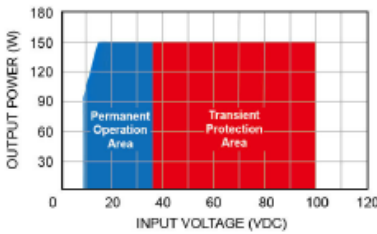
FIL FLMCF-2808 Derating Curve



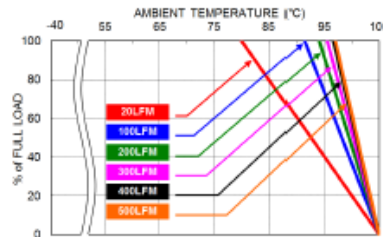
FIL FLMCF-2808 Transfer Function



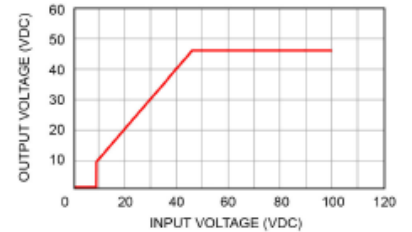
FIL FLMCF-2810 Pout vs. Input Voltage



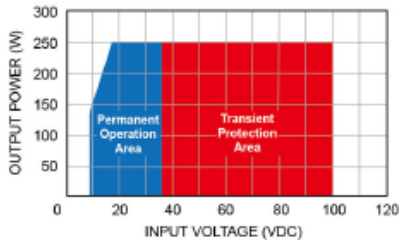
FIL FLMCF-2810 Derating Curve



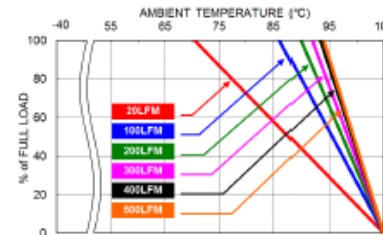
FIL FLMCF-2810 Transfer Function



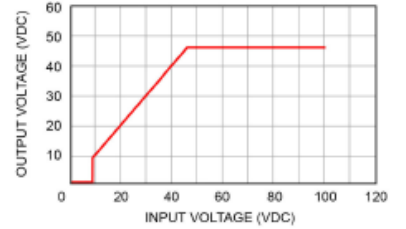
FIL FLMCF-2815 Pout vs. Input Voltage



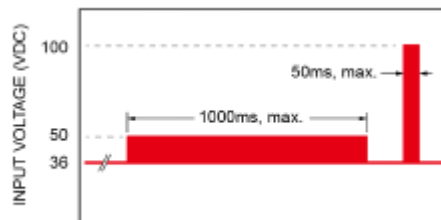
FIL FLMCF-2815 Derating Curve



FIL FLMCF-2815 Transfer Function

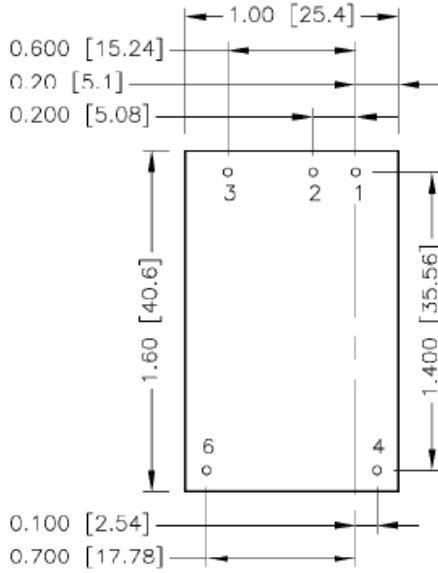


Transient Limitation

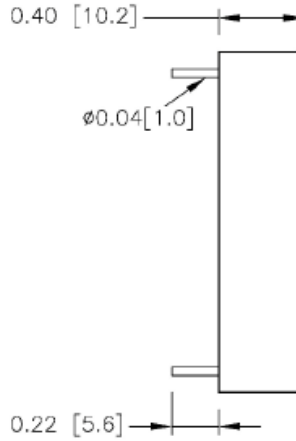


MECHANICAL DRAWINGS

FIL FLMCF-2805



BOTTOM VIEW



PIN CONNECTION

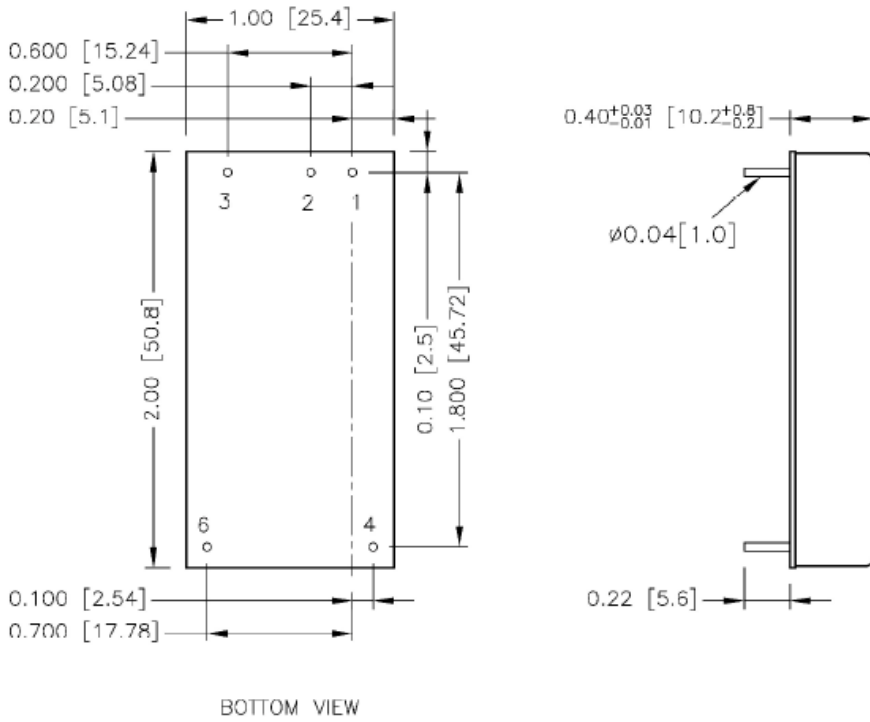
| PIN | PIN CONNECTION | DIAMETER |
|-----|----------------|-----------|
| 1 | +Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | -Vin | 0.04 Inch |
| 4 | +Vout | 0.04 Inch |
| 6 | -Vout | 0.04 Inch |

1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]
3. Pin dimension tolerance ±0.004 [0.10]

FIL FLMCF-2808

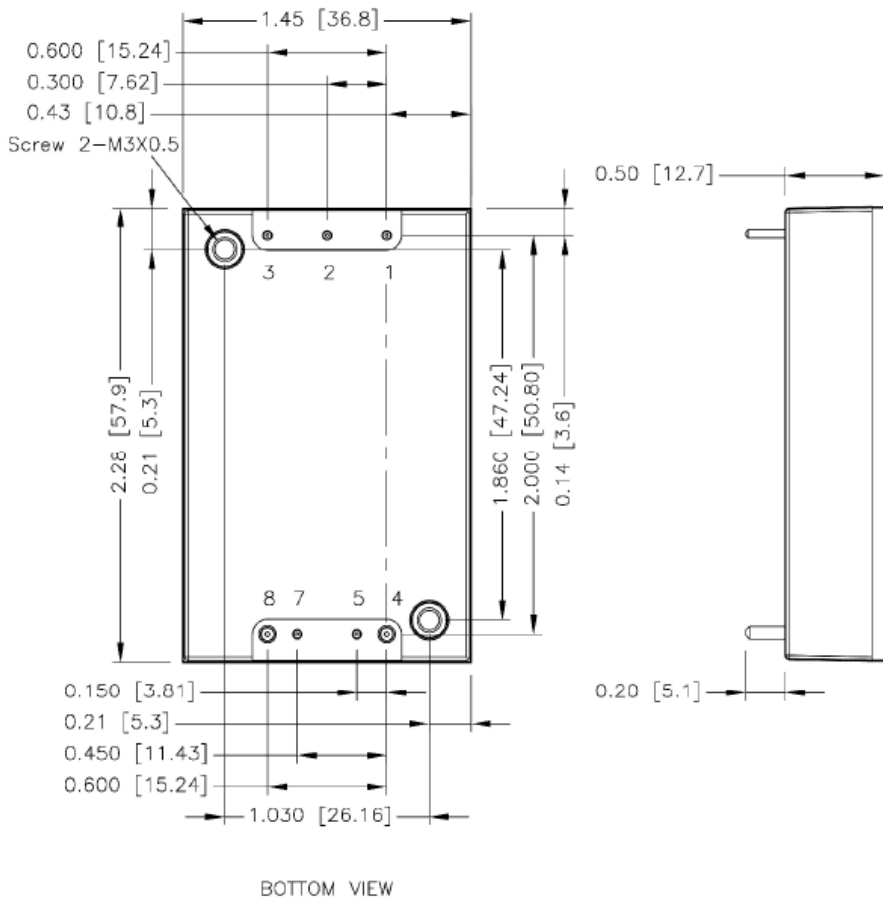
PIN CONNECTION

| PIN | PIN CONNECTION | DIAMETER |
|-----|----------------|-----------|
| 1 | +Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | -Vin | 0.04 Inch |
| 4 | +Vout | 0.04 Inch |
| 6 | -Vout | 0.04 Inch |



1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]
3. Pin dimension tolerance ±0.004 [0.10]

FIL FLMCF-2810 & FIL FLMCF-2815



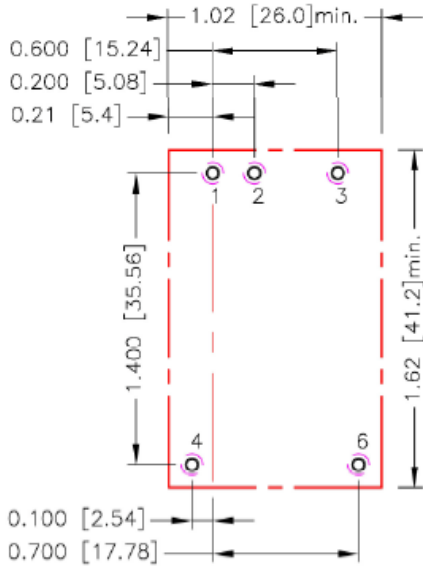
PIN CONNECTION

| PIN | PIN CONNECTION | DIAMETER |
|-----|----------------|-----------|
| 1 | -Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | +Vin | 0.04 Inch |
| 4 | -Vout | 0.06 Inch |
| 5 | -EMI | 0.04 Inch |
| 7 | +EMI | 0.04 Inch |
| 8 | +Vout | 0.06 Inch |

1. All dimensions in inch [mm]
2. Tolerance: x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

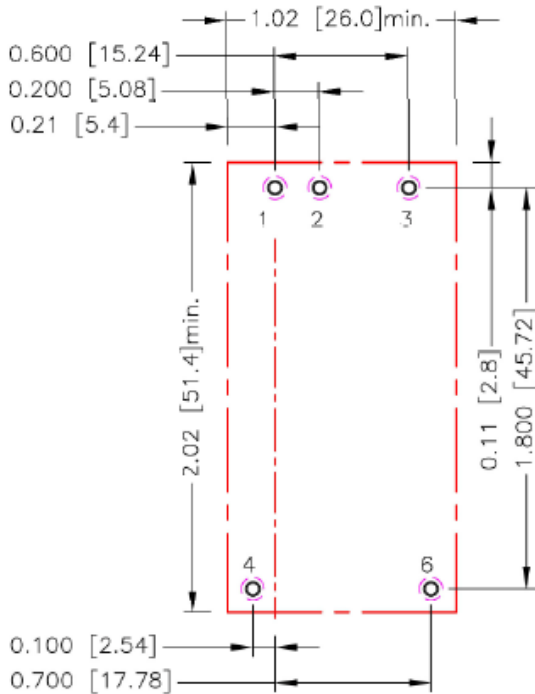
RECOMMENDED PAD LAYOUT

FIL FLMCF-2805



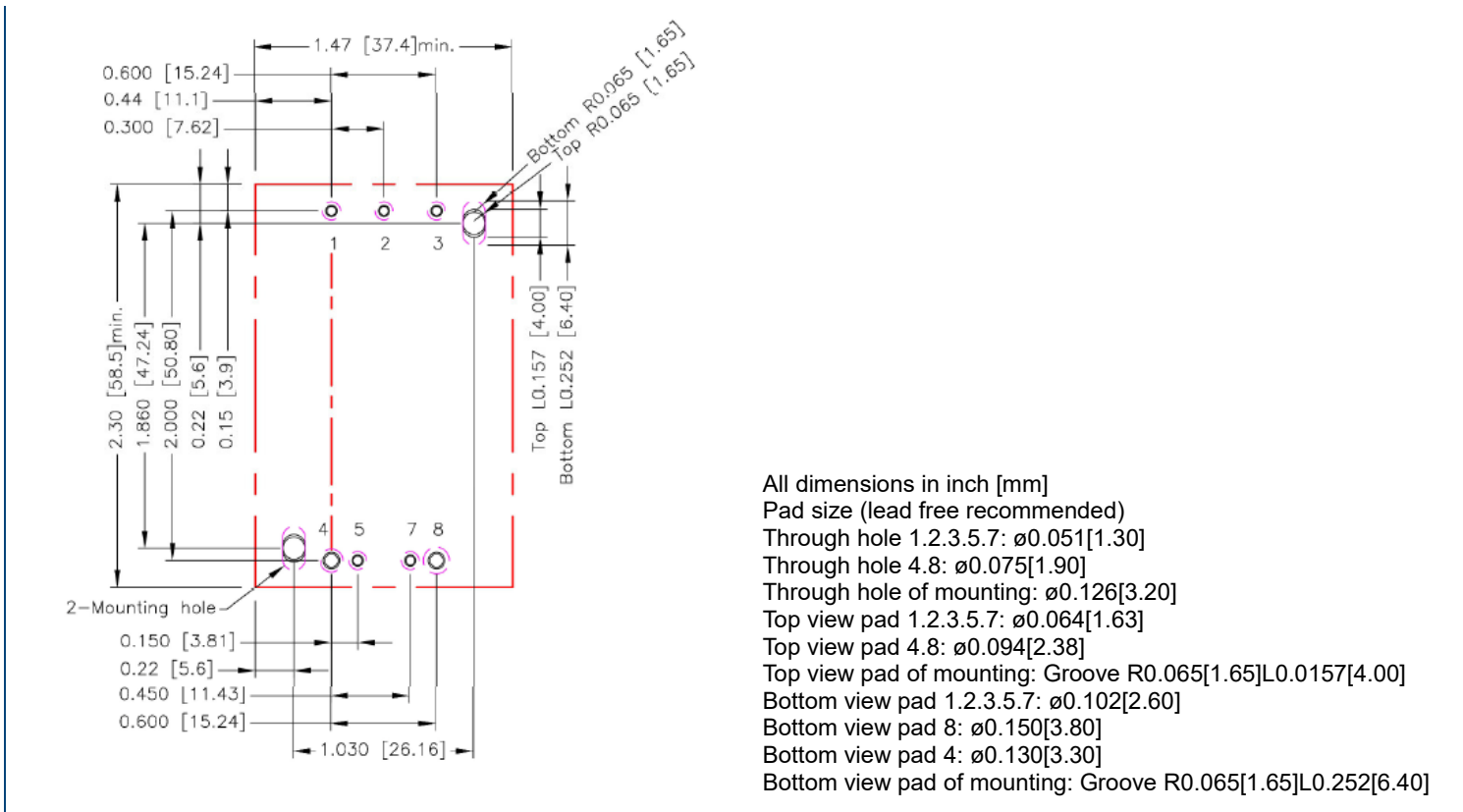
All dimensions in inch [mm]
 Pad size (lead free recommended)
 Through hole 1.2.3.4.6: $\varnothing 0.051$ [1.30]
 Top view pad 1.2.3.4.6: $\varnothing 0.064$ [1.63]
 Bottom view pad 1.2.3.4.6: $\varnothing 0.102$ [2.60]

FIL FLMCF-2808



All dimensions in inch [mm]
 Pad size (lead free recommended)
 Through hole 1.2.3.4.6: $\varnothing 0.051$ [1.30]
 Top view pad 1.2.3.4.6: $\varnothing 0.064$ [1.63]
 Bottom view pad 1.2.3.4.6: $\varnothing 0.102$ [2.60]

FIL FLMCF-2810 & FIL FLMCF-2815

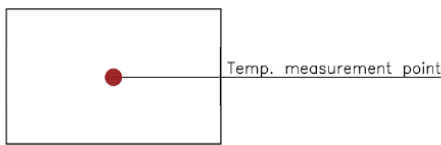


THERMAL CONSIDERATIONS

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point as the figure below. The temperature at this location should not exceed "Maximum case temperature". When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature". You can limit this temperature to a lower value for extremely high reliability.

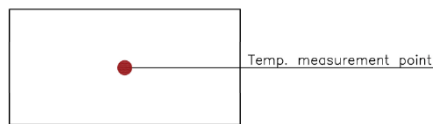
- Thermal test condition with vertical direction by natural convection (20LFM).

FIL FLMCF-2805



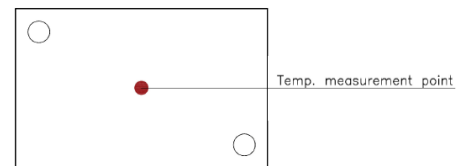
TOP VIEW

FIL FLMCF-2808



TOP VIEW

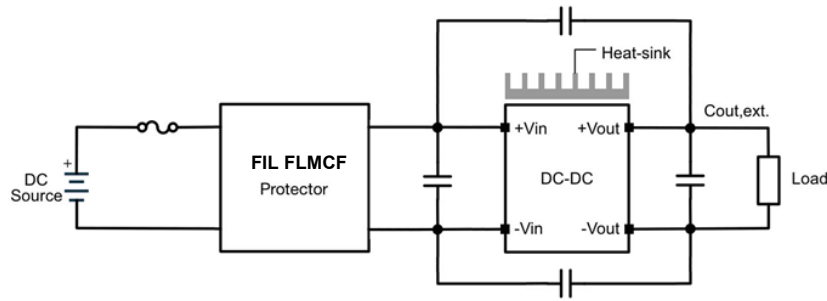
FIL FLMCF-2810 & FIL FLMCF-2815



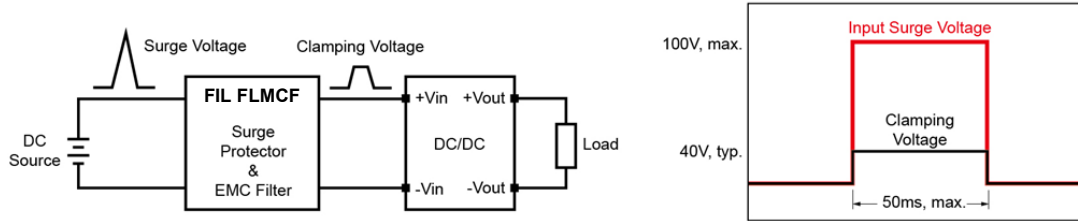
BASE PLATE

TYPICAL APPLICATION

- The schematic for typical application is shown as below.



2. Surge protector clamps over-voltage to a safe value in order to protect the power module from damaging. According to MIL-STD-1275E, the module should keep working during input surge occurs.



3. This surge protector can be used for 28V battery system of MIL-STD-1275E application. Input range of DC-DC converter also has to meet 24V system input range.

| Standard | Un (VDC) | Permanent Operating Input Range (VDC) | Transient | Spike |
|-----------------------|----------|---------------------------------------|----------------------------|--------------|
| MIL-STD-1275E | 28 | 23 – 33 | 40V / 500ms 100V / 50ms | ±250V / 70µs |
| MIL-STD-704F | 28 | 22 – 29 | 50V / 50ms | N/A |
| RTCA DO-160G Cat. A/Z | 28 | 20.5 – 32.2 | 80V / 100ms | ±600V / 10µs |

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

Contact **Wall Industries** for further information:

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