

## AC/DC CONVERTERS

### M1981 SERIES

HIGH DENSITY, HIGH POWER FACTOR,  
SINGLE PHASE, SINGLE OUTPUT,  
AC / DC CONVERTERS  
Up to 200W



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applications</b><br>Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                        |
| <b>Special Features</b> <ul style="list-style-type: none"> <li>• Miniature size</li> <li>• High efficiency</li> <li>• Wide input range</li> <li>• High power factor (0.98)</li> <li>• Input / Output isolation</li> <li>• Inrush Current Limiter</li> <li>• External On/Off Inhibit</li> <li>• <u>Fixed</u> switching freq. (250 kHz)</li> <li>• Ext. synchronization capability</li> <li>• <u>EMI</u> filters included</li> <li>• Indefinite short circuit protection with auto-recovery</li> <li>• Over-voltage shutdown with auto-recovery</li> <li>• Over temperature shutdown with auto-recovery</li> </ul> |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                        |
| <b>Electrical Specifications</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                        |
| <b>AC Input</b><br>85 to 265 V <sub>AC</sub> , 50/60/400 Hz, single-phase<br>per MIL-STD-704A &<br>per MIL-STD-1399:300A (60Hz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>DC Output</b><br>Output range – 3.3V to 48V<br>Output power – 200W (peak 250W)<br>Output current – max 20A                                                                                                                                                                                                                                                                      | <b>Isolation</b><br>1000V between Input and Output<br>1000V between Input and Case<br>200V between Output and Case                                                                                                                     |
| <b>Line/Load regulation</b><br>Less than 1% (no load to full load, -55°C to +85°C).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Efficiency</b><br>Up to 80% - Typical (full load, room temperature)                                                                                                                                                                                                                                                                                                             | <b>EMC</b><br>Designed to meet MIL-STD-461D: CE101, CE102, CS101, CS114, CS115, CS116, RE101, RS101, RS103                                                                                                                             |
| <b>Ripple and Noise</b><br>100÷150mV <sub>p-p</sub> , typical (max. 1%) without external capacitance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Load Transient Overshoot and undershoot</b><br>Current change from 50%-100% output voltage change less than 0.5V within 200-300µSec                                                                                                                                                                                                                                             | <b>Turn on Transient</b><br>Voltage overshoot at during power on is less than 3% nominal voltage.                                                                                                                                      |
| <b>Protections *</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                        |
| <b>Input</b> <ul style="list-style-type: none"> <li>• <b>Inrush Current Limiter</b><br/>peak value of 5 x I<sub>IN</sub> for inrush currents lasting more than 50µSec.</li> <li>• <b>Under Voltage Lock-Out</b><br/>Unit shuts down below 75V<sub>AC</sub> ± 5V<sub>AC</sub>.</li> </ul>                                                                                                                                                                                                                                                                                                                         | <b>Output</b> <ul style="list-style-type: none"> <li>• <b>Active Overvoltage Protection</b><br/>Internal control protects unit 5-15% above nominal voltage.</li> <li>• <b>Passive Overvoltage Protection</b><br/>10-30% above nominal voltage.</li> <li>• <b>Current limiting</b><br/>Continuous protection (10-30% above maximum current) for unlimited time (Hiccup).</li> </ul> | <b>General</b> <ul style="list-style-type: none"> <li>• <b>Over temperature protection:</b><br/>Shuts down if base plate temp exceeds +105°C ± 5°C. Automatic recovery when base plate temperature drops below +95°C ± 5°C.</li> </ul> |

\* Thresholds and protections can be modified / removed – please consult factory.

## AC/DC CONVERTERS

### **Environmental**

Design to Meet MIL-STD-810F

#### **Temperature**

Operating:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
(base plate)

Storage:  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

#### **Humidity**

Method 507.4 - Up to 95%.

#### **Altitude**

Method 500.4, Procedure I & II,  
40,000 ft. and 70,000 ft. Operational

#### **Vibration and Shock**

Shock - Saw-tooth, 20g peak, 11mS.

Vibration - Figure 514.5C-17, General  
minimum integrity exposure. (1 hour  
per axis.)

#### **Salt Fog**

Method 509-4

#### **Reliability**

~143,000 hours, calculated per  
MIL-STD-217F Change Notice 2 at  
 $+85^{\circ}\text{C}$  base plate, Ground Fixed.

### **Environmental Stress Screening (ESS)**

Including random vibration and thermal cycles is also available. **Please consult factory for details.**

## AC/DC CONVERTERS

### Pin Assignment

**Option A: with external synchronization, without sense lines.**

| Pin No. | Function    |
|---------|-------------|
| 1       | OUT RTN (–) |
| 2       | OUT RTN (–) |
| 3       | N/C         |
| 4       | OUT (+)     |
| 5       | OUT (+)     |
| 6       | N/C         |
| 7       | SYNC        |
| 8       | INHIBIT     |
| 9       | N/C         |

| Pin No. | Function    |
|---------|-------------|
| 10      | PHASE       |
| 11      | N/C         |
| 12      | NEUTRAL     |
| 13      | NEUTRAL     |
| 14      | OUT RTN (–) |
| 15      | OUT RTN (–) |
| 16      | N/C         |
| 17      | OUT (+)     |
| 18      | OUT (+)     |

| Pin No. | Function    |
|---------|-------------|
| 19      | N/C         |
| 20      | SYNC RTN    |
| 21      | INHIBIT RTN |
| 22      | N/C         |
| 23      | PHASE       |
| 24      | N/C         |
| 25      | CHASSIS     |
|         |             |
|         |             |

**Option B: with sense lines, without external synchronization.**

| Pin No. | Function    |
|---------|-------------|
| 1       | OUT RTN (–) |
| 2       | OUT RTN (–) |
| 3       | N/C         |
| 4       | OUT (+)     |
| 5       | OUT (+)     |
| 6       | N/C         |
| 7       | SENSE (+)   |
| 8       | INHIBIT     |
| 9       | N/C         |

| Pin No. | Function    |
|---------|-------------|
| 10      | PHASE       |
| 11      | N/C         |
| 12      | NEUTRAL     |
| 13      | NEUTRAL     |
| 14      | OUT RTN (–) |
| 15      | OUT RTN (–) |
| 16      | N/C         |
| 17      | OUT (+)     |
| 18      | OUT (+)     |

| Pin No. | Function      |
|---------|---------------|
| 19      | N/C           |
| 20      | SENSE RTN (–) |
| 21      | INHIBIT RTN   |
| 22      | N/C           |
| 23      | PHASE         |
| 24      | N/C           |
| 25      | CHASSIS       |
|         |               |
|         |               |

**Note:** All pins with the identical function or designation should be connected together for best performance.

## AC/DC CONVERTERS

### Functions and Signals

#### SENSE

The SENSE line is used to achieve accurate voltage regulation at load terminals.

To use this feature, connect this pin directly to load's positive terminal.

If this function is not required, short SENSE pin to OUTPUT pins as close as possible to the unit.

#### SENSE RTN

The SENSE RTN line is used to achieve accurate voltage regulation at load terminals.

To use this feature, connect this pin directly to load's negative terminal.

If this function is not required, short SENSE RTN pin to OUTPUT RTN pins as close as possible to the unit.

Note: The use of remote sense has a limit of voltage dropout between the converter's output and the load's terminals of approximately 5% of nominal output voltage.

#### INHIBIT

The INHIBIT signal is used to turn the power supply ON and OFF.

TTL "1" or OPEN – Power supply active (output turned on).

TTL "0" or SHORT to Signal RTN – Power supply inhibited (output turned off).

If this function is not required, leave this pin unconnected.

#### SYNC

The SYNC signal is used to synchronize the power supply's switching frequency to system's clock.

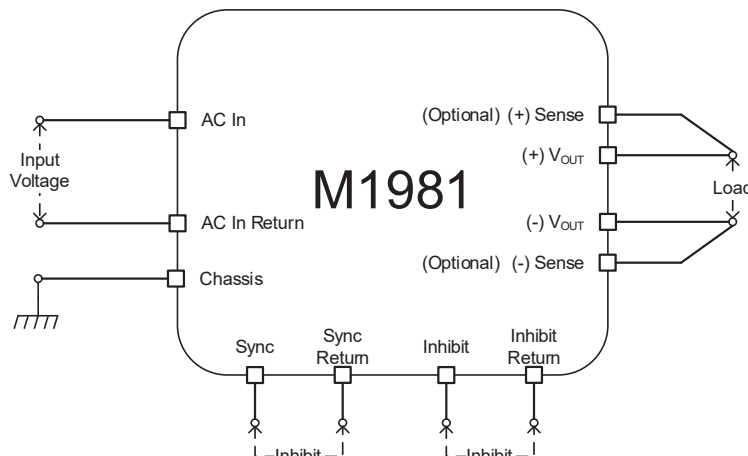
Valid external clock frequency is  $250\text{kHz} \pm 10\text{kHz}$ .

If this function is not required, leave this pin unconnected - the power supply will use its internal clock.

#### CHASSIS

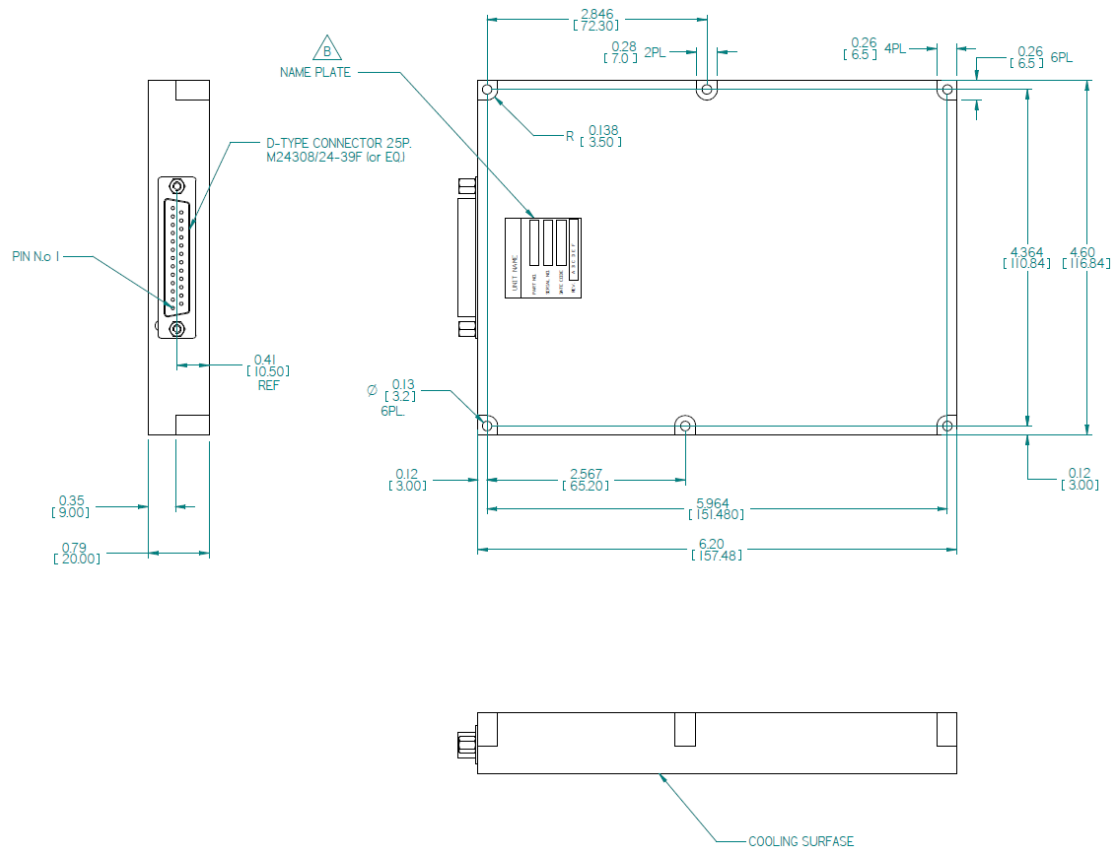
The CHASSIS pin allows additional connection of unit's chassis to system ground.

### Typical Connection

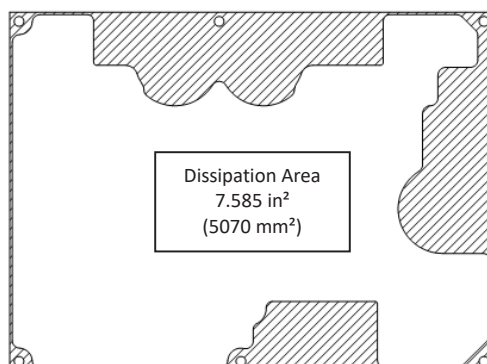


## AC/DC CONVERTERS

### Outline Drawing



### Heat Dissipation Surface



### Notes

1. Dimensions are in Inches [mm]
2. Tolerance is:  
.XX ±0.01 IN  
.XXX ±0.005 IN
3. Weight: Approx. 23 Oz (650 gr)
4. Parasolid 3D module is available for download on site.