

## M6500 SERIES

DC/DC POWER SUPPLY



### PRODUCT HIGHLIGHTS

- MINIATURE
- HIGH DENSITY
- HIGH EFFICIENCY
- SINGLE OUTPUT
- DC/DC POWER SUPPLY
- UP TO 500 W



**Applications**

Military (ground-fix, shipboard), Ruggedized, Telecom, Industrial

**Special Features**

- Miniature size
- High efficiency
- Wide input range
- Input / Output isolation
- Remote sense
- External On/Off Inhibit
- Zero Voltage Switching Technology
- Fixed switching frequency (250 kHz)
- External synchronization capability
- EMI filters included
- Optional parallel connection
- Indefinite short circuit protection with auto-recovery
- Over-voltage shutdown with auto-recovery
- Over temperature shutdown with auto-recovery

**Electrical Specifications**

**DC Input:**

18 to 48V<sub>DC</sub> per MIL-STD-704E.  
 No damage for:  
 MIL-STD-1275A (100V for 50mSec)  
 MIL-STD-704A (80V for 0.1 Sec)

**DC Output:**

Output range – 3.3V to 28V  
 Output current – max 70A  
 Output power – max 500W

**Isolation:**

200V between Input and Output  
 200V between Input and Case  
 100V between Output and Case

**Line/Load regulation:**

Less than 1% (no load to full load, –55°C to +85°C).

**Efficiency:**

Typical 88-90% - (full load, room temperature)

**EMC:**

Designed to meet † MIL-STD-461F  
 CE101, CE102, CS101, CS114,  
 CS115, CS116, RE101, RE102,  
 RS101, RS103

**Ripple and Noise:**

Less than 50mV<sub>p-p</sub>, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.

**Load Transient Overshoot and undershoot**

Output resistance at load change of 50%-100% is 30-120mΩ (depending on output voltage). Output back to steady stated within 300-500μSec

**Turn on Transient**

No Voltage over shoot during power on.

† EMC compliance achieved when tested with 5 μH LISNs, shielded harness and static resistive load.

**Protections \***

**Input**

- **Inrush Current Limiter**  
Peak value of  $5 \times I_{IN}$  for less than 50 $\mu$ Sec.
- **Under voltage protection** Unit shuts down if input voltage falls below  $14 \text{ V} \pm 1 \text{ V}$ , and turns back on at  $16 \text{ V} \pm 1 \text{ V}$
- **Over voltage protection** Unit shuts down if input voltage rises above  $54 \text{ V} \pm 2 \text{ V}$ , and turns back on at  $50 \text{ V} \pm 2 \text{ V}$ . Extended versions available for compliance with various standards.

**Output**

- **Electronic Over Voltage Protection** Internal control protects unit (no damage) 10% above nominal voltage.
- **Passive transorb on outputs** 20% above nominal voltage.
- **Current limiting** Continuous protection (Hiccup) set at 10-30% above nominal current.

**General**

- **Over temperature protection** Shutdown at base plate temperature of  $+105^{\circ}\text{C} (\pm 5^{\circ}\text{C})$  Automatic recovery at base plate temperature lower than  $+95^{\circ}\text{C} (\pm 5^{\circ}\text{C})$

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

**Environmental**

Design to Meet MIL-STD-810F

**Temperature:**

Operating:  $-55^{\circ}\text{C}$  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:**

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

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

**Salt Fog:**

Method 509-4

**Reliability**

150,000 hours, calculated per MIL-STD-217F 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.**

**Pin Assignment Standard**

Pin No.	Function
1	+ SENSE
2	SIGNAL RTN
3	SYNC IN
4	INHIBIT
5	- SENSE
6	N.C
7	SYNC OUT

Pin No.	Function
A1	+ OUT
A2	+ OUT
A3	- OUT
A4	- OUT
A5	- VIN
A6	+ VIN

\* All pins with the same name and function should be connected together for best performance.

**Pin Assignment for Parallel connection**

Pin No.	Function
1	+ SENSE
2	SIGNAL RTN
3	SYNC IN
4	INHIBIT
5	- SENSE
6	CURRENT SHARE
7	SYNC OUT

Pin No.	Function
A1	+ OUT
A2	+ OUT
A3	- OUT
A4	- OUT
A5	- VIN
A6	+ VIN

\* All pins with the same name and function should be connected together for best performance.

## ***Functions and Signals***

### **INHIBIT signal**

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

TTL "1" or OPEN – will turn on the power supply. (For normal operation leave the signal not connected.)

TTL "0" – will turn off the power supply.

### **SYNC IN signal**

The SYNC IN signal is used to allow the power supply frequency to sync with the system frequency. The system frequency should be 250kHz  $\pm$  10kHz.

When not connected the power supply will work at 250kHz

### **SYNC OUT signal**

The SYNC OUT signal is used to sync the system with the power supply frequency.

### **SIGNAL RTN**

The INPUT SIGNAL RTN is referred to the input.

This is used as grounding for SYNC IN, SYNC OUT and INHIBIT signals.

### **SENSE**

The SENSE is used to achieve accurate load regulations at load terminals (this is done by connecting the pins directly to the load's terminals).

The use of remote sense has a limit of voltage dropout between converter's output and load terminals of 2-10% of voltage output.

When not used connect + SENSE to +VOUT and –SENSE to –VOUT

### **CURRENT SHARE [PARALLEL OPERATION VERSION ONLY]**

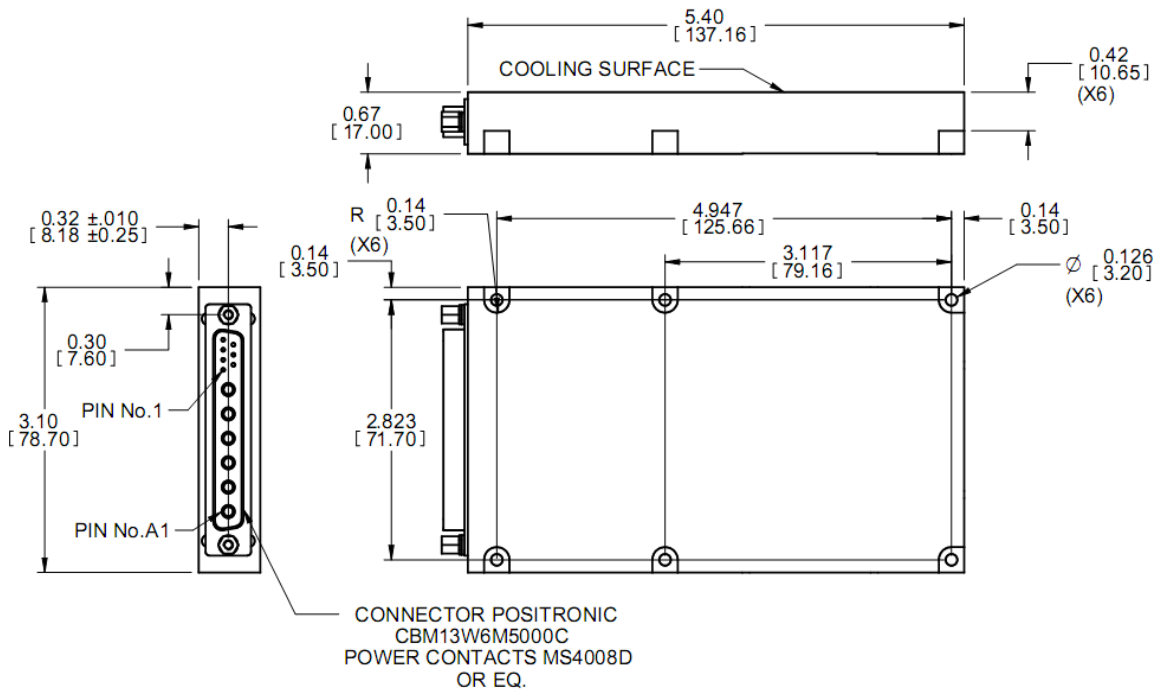
The **CURRENT SHARE** signal is used to connect the power supply in parallel to other power supplies and have them divide equally the power between one another.

Connect all CURRENT SHARE signals of all paralleled power supplies together.

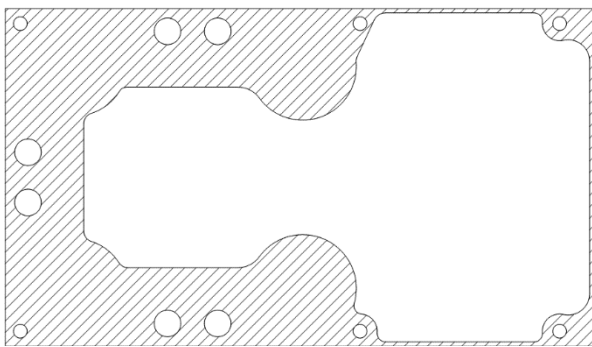
This signal is referenced to - SENSE.



Outline Drawing



Heat Dissipation Surface



Dissipation Area  
6.603 in<sup>2</sup>  
(4260 mm<sup>2</sup>)

**Notes**

1. Dimensions are in Inches [mm]
2. Tolerance is:  
.XX ±0.01 IN  
.XXX ±0.005 IN
3. Weight: Approx. 355g (12.52 oz)
4. Mounting holes can be modified – please consult factory.
5. Parasolid 3D module is available for download on site.

**\* Specifications are subject to change without prior notice by the manufacturer**