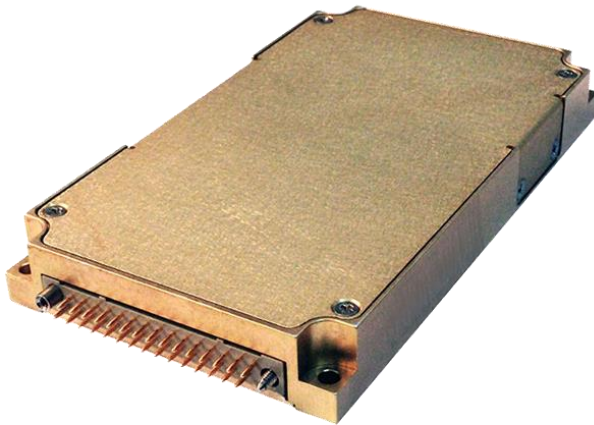


# M7028 SERIES

## DC/DC POWER SUPPLY



### PRODUCT HIGHLIGHTS

- MINIATURE
- HIGH DENSITY
- SINGLE OUTPUT
- DC/DC POWER SUPPLY
- UP TO 200 W

## M7028 SERIES DC/DC POWER SUPPLY

### Applications

Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial Power Supply

### Special Features

- Miniature size
- High efficiency
- High Density – up to 32.4 W/in<sup>3</sup>
- Wide input range
- Input / Output isolation
- Remote sense compensation
- Remote Inhibit (On/Off)
- Parallel connection (Option)
- Output voltage calibration (Option)
- Current limit calibration (Option)
- Fixed switching freq (250 kHz)
- External sync capability
- EMI filters included
- Non-latching protections:
  - Overload
  - Short circuit
  - Output Over Voltage
  - Over Temperature

### Electrical Specifications

#### DC Input

Voltage range: 18 to 48 V<sub>DC</sub>,  
IAW MIL-STD-704F

No damage due to overvoltage transients IAW:  
MIL-STD-1275A (100 V for 50 ms)  
MIL-STD-704A (80 V for 0.1 s)

#### Line/Load regulation

Better than ±1% (no load to full load, –55 °C to +85 °C and over input voltage range).

#### Ripple and Noise

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

#### DC Output

Voltage range: 3.3 to 50 V<sub>DC</sub>  
Current range: 0 to 20 A  
Power range: 0 to 200 W

#### Efficiency

Typical 86-87% - (at 28V full load, room temperature)

#### Transient Over-and-undershoot

Output change at load transient of 30%-100% with T<sub>r</sub> & T<sub>f</sub> of max 30 μs is 5% of output voltage. Output recover to steady stated within less 0.5 ms.

#### Isolation

Input to Output: 200 V<sub>DC</sub>  
Input to Case: 200 V<sub>DC</sub>  
Output to Case: 100 V<sub>DC</sub>

#### EMC

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

#### Turn on Transient

No output voltage overshoot during power on.

\* Compliance achieved with 5μH LISN, shielded harness and static resistive load.

## M7028 SERIES DC/DC POWER SUPPLY

### Protections \*

#### Input

- **Under Voltage Lockout**  
Turn off below 15 V<sub>DC</sub>.  
Turn on above 16-18 V<sub>DC</sub>.  
UVLO hysteresis is approx. 2-3 V.
- **Over Voltage Lockout**  
Turn off above 52-55 V<sub>DC</sub>.  
Turn on below 48-51 V<sub>DC</sub>.

#### Output

- **Over Voltage Protection**  
*Active protection:*  
Unit shuts down if output voltage rises 10% ± 5% above nominal voltage.  
*Passive protection:*  
Transorb selected at approx. 20% above nominal voltage.
- **Current limiting**  
Continuous protection (10-30% above maximum current) for unlimited time (Hiccup).

#### General

- **Over Temperature Protection**  
Shutdown at base plate temperature of +105 °C ± 5 °C.  
Automatic recovery at base plate temperature lower than +95 °C ± 5 °C.

### Environmental Conditions

Designed to Meet MIL-STD-810F

#### Temperature

Methods 501.4 & 502.4  
Operating: -55 °C to +85 °C (at baseplate)  
Storage: -55 °C to +125 °C (ambient)

#### Altitude

Method 500.4  
Procedures I – Storage/Air transport: up to 70 kft  
Procedure II – Operation/Air Carriage: up to 70 kft

#### Humidity

Method 507.4  
Up to 95% RH

#### Vibration

Method 514.5  
Procedure I  
Category 24 - General minimum integrity exposure

#### Shock

Method 516.5  
30 g, 11 ms terminal peak saw-tooth

#### Salt Fog

Method 509.4

### Reliability

150,000 hours, calculated IAW MIL-HDBK-217F Notice 2 at +85 °C baseplate, Ground Fix conditions.

### Environmental Stress Screening (ESS)

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

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

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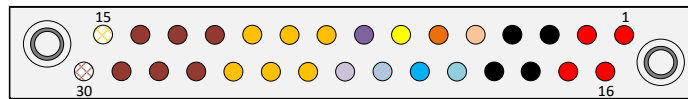
## Pin Assignment

**Connector:** WTB30PR7J –D23 or eq.

**Mating connector options** (Other options available - consult factory):

- Solder cup sockets: WTAX30SACJT# or eq.
- Removable crimp sockets: WTDXA30SJT# or eq.

Pin No.	Function	Color	Pin No.	Function	Color	Pin No.	Function	Color
1	INPUT	Red	11	OUTPUT	Yellow	21	VLTG CAL	Blue
2	INPUT	Red	12	OUTPUT RTN	Brown	22	SIGNAL RTN	Grey
3	INPUT RTN	Black	13	OUTPUT RTN	Brown	23	SYNC IN	Grey
4	INPUT RTN	Black	14	OUTPUT RTN	Brown	24	OUTPUT	Yellow
5	PAR IN	Orange	15	SENSE	White	25	OUTPUT	Yellow
6	PAR OUT	Orange	16	INPUT	Red	26	OUTPUT	Yellow
7	CRNT LMT CAL	Yellow	17	INPUT	Red	27	OUTPUT RTN	Brown
8	SYNC OUT	Grey	18	INPUT RTN	Black	28	OUTPUT RTN	Brown
9	OUTPUT	Yellow	19	INPUT RTN	Black	29	OUTPUT RTN	Brown
10	OUTPUT	Yellow	20	INHIBIT	Blue	30	SENSE RTN	White



## ***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” or short– 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 250 kHz  $\pm$  10 kHz.

When not connected the power supply will work at 250 kHz  $\pm$  10 kHz.

### **SYNC OUT signal**

The SYNC OUT signal is a buffered clock used to synchronize other units to the switching frequency of this unit. The signal amplitude is 12V. It is recommended to source and sink up to 1A on this pin.

### **PAR IN signal**

The PAR IN signal is used to connect the power supply in parallel to other power supplies and have them almost equally divide the power between one another. All the power supplies should connect PAR IN signals together except the master unit where the PAR OUT signal connects to all the PAR IN signals.

### **PAR OUT signal**

The PAR OUT signal is used to connect the power supply in parallel to other power supplies and have them almost equally divide the power between one another. The master unit connects the PAR OUT signals to all PAR IN pins of the slave units.

### **VLTG CAL signal**

The VLTG CAL signal is used to control and adjust the output voltage of the power supply by up to  $\pm$ 5%. The calibration upwards is performed by connecting a resistor between this pin to SENSE pin.

The calibration downwards is performed by connecting a resistor between this pin to SENSE RTN pin.

Use a 1M $\Omega$  potentiometer set to full resistance and slowly decrease resistance until required output voltage reached.

### **CRNT LMT CAL signal**

The CRNT LMT CAL signal is used to adjust the output current limit of the power supply.

### **SIGNAL RTN**

The SIGNAL RTN is referred to the output.

This is used as grounding for all signals.

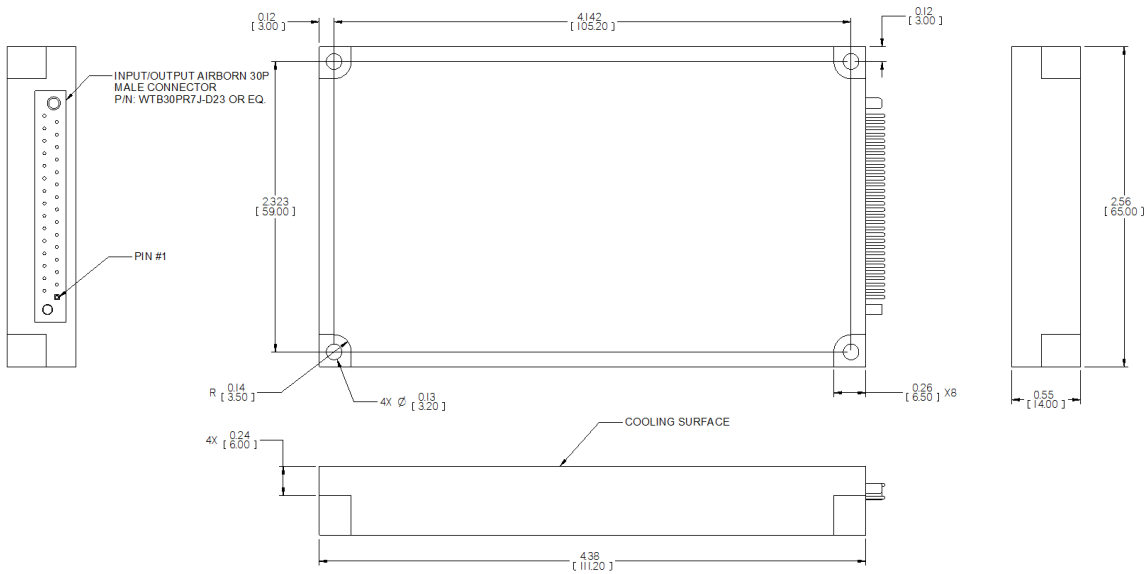
### **SENSE**

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 up to 0.5V. When not used connect + SENSE to +VOUT and –SENSE to –VOUT.

**M7028 SERIES DC/DC POWER SUPPLY**

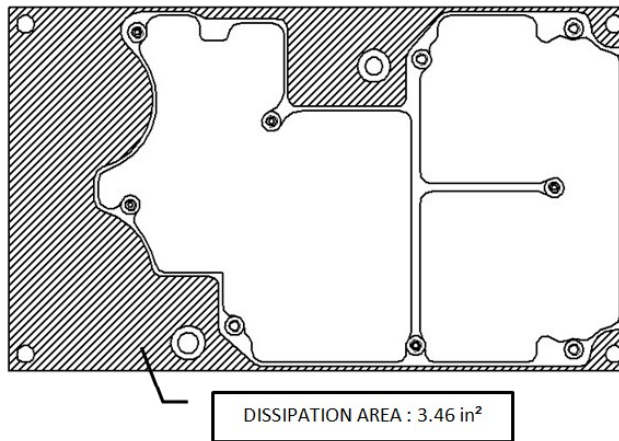
**Outline Drawing**



**Notes**

1. Dimensions are in inches [mm]
2. Tolerance is:  
.XX  $\pm$  0.02 in  
.XXX  $\pm$  0.008 in
3. Weight: Approx. 6.4 oz [180 g]

**Heat Dissipation Surface**



### Standard Configurations

Part number	Input voltage range	Output Voltage	Output Current
M7028-100	18 to 48 V <sub>DC</sub>	5 V <sub>DC</sub>	20 A
M7028-101	18 to 48 V <sub>DC</sub>	12 V <sub>DC</sub>	16 A
M7028-102	18 to 48 V <sub>DC</sub>	15 V <sub>DC</sub>	13 A
M7028-103	18 to 48 V <sub>DC</sub>	24 V <sub>DC</sub>	8 A
M7028-104	18 to 48 V <sub>DC</sub>	28 V <sub>DC</sub>	7 A
M7028-105	18 to 48 V <sub>DC</sub>	48 V <sub>DC</sub>	4 A

**Note: Specifications are subject to change without prior notice by the manufacturer.**