

# M2786 SERIES

*DC/DC POWER SUPPLY*



## PRODUCT HIGHLIGHTS

- MINIATURE, HIGH DENSITY
- DUAL OUTPUT
- DC/DC POWER SUPPLY
- UP TO 30 W

## M2786 Series– DC/DC Power Supply

<p><b>Applications</b>  <i>Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial</i></p>					
<p><b>Special Features</b></p> <ul style="list-style-type: none"> <li>• Miniature size</li> <li>• Wide input range</li> <li>• Input / Output isolation</li> <li>• Remote sense compensation</li> <li>• Remote Inhibit (On/Off)</li> <li>• <u>Fixed</u> switching freq. (250 kHz)</li> <li>• External sync. capability</li> <li>• <u>EMI</u> filters included</li> <li>• Non-latching protections: <ul style="list-style-type: none"> <li>○ Overload/short-circuit</li> <li>○ Over temperature</li> </ul> </li> </ul>					
<p><b>Electrical Specifications</b></p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%; vertical-align: top;"> <p><b><u>DC Input</u></b>  Voltage range: 18 to 48 V<sub>DC</sub>,  IAW MIL-STD-704E.</p> <p><b>No damage</b> (but may restart) if exposed to <b>over-voltage surges</b> IAW MIL-STD-1275A (100 V / 50 ms) &amp; MIL-STD-704A (80 V / 0.1 s)</p> <p><b><u>Line/Load regulation</u></b>  Less than ±1% (Low to high line voltage, no load to full load, –55 °C to +85 °C baseplate temperature).</p> <p><b><u>Ripple and Noise</u></b>  Less than 50 mV<sub>p-p</sub>, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.</p> </td> <td style="width: 33%; vertical-align: top;"> <p><b><u>DC Output</u></b></p> <p><b>Output #1</b>  Voltage range: 2.5 to 28 V<sub>DC</sub>  Current range: 0 to 3 A.  Power range: 0 to 15 W</p> <p><b>Output #2</b>  Voltage range: 2.5 to 28 V<sub>DC</sub>  Current range: 0 to 3 A.  Power range: 0 to 15 W  <b>Total power range: 0 to 30 W</b></p> <p><b><u>Efficiency</u></b>  75% Typical (full load, nominal line voltage, room temperature)</p> <p><b><u>Step Load Over-and-undershoot</u></b> Output resistance at load change of 50%-100% is 30-120 mΩ (depending on output voltage). Output back to steady stated within 300-500 μs</p> </td> <td style="width: 33%; vertical-align: top;"> <p><b><u>Isolation</u></b>  Input to Output: 200 V<sub>DC</sub>  Input to Case: 200 V<sub>DC</sub>  Output to Case: 100 V<sub>DC</sub></p> <p><b><u>EMC</u></b>  Designed to meet* MIL-STD-461F  CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103</p> <p><b><u>Turn-on Transient</u></b>  No voltage overshoot during power on.</p> </td> </tr> </table>			<p><b><u>DC Input</u></b>  Voltage range: 18 to 48 V<sub>DC</sub>,  IAW MIL-STD-704E.</p> <p><b>No damage</b> (but may restart) if exposed to <b>over-voltage surges</b> IAW MIL-STD-1275A (100 V / 50 ms) &amp; MIL-STD-704A (80 V / 0.1 s)</p> <p><b><u>Line/Load regulation</u></b>  Less than ±1% (Low to high line voltage, no load to full load, –55 °C to +85 °C baseplate temperature).</p> <p><b><u>Ripple and Noise</u></b>  Less than 50 mV<sub>p-p</sub>, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.</p>	<p><b><u>DC Output</u></b></p> <p><b>Output #1</b>  Voltage range: 2.5 to 28 V<sub>DC</sub>  Current range: 0 to 3 A.  Power range: 0 to 15 W</p> <p><b>Output #2</b>  Voltage range: 2.5 to 28 V<sub>DC</sub>  Current range: 0 to 3 A.  Power range: 0 to 15 W  <b>Total power range: 0 to 30 W</b></p> <p><b><u>Efficiency</u></b>  75% Typical (full load, nominal line voltage, room temperature)</p> <p><b><u>Step Load Over-and-undershoot</u></b> Output resistance at load change of 50%-100% is 30-120 mΩ (depending on output voltage). Output back to steady stated within 300-500 μs</p>	<p><b><u>Isolation</u></b>  Input to Output: 200 V<sub>DC</sub>  Input to Case: 200 V<sub>DC</sub>  Output to Case: 100 V<sub>DC</sub></p> <p><b><u>EMC</u></b>  Designed to meet* MIL-STD-461F  CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103</p> <p><b><u>Turn-on Transient</u></b>  No voltage overshoot during power on.</p>
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\* Compliance achieved with 5μH LISN, shielded harness and static resistive load.

## M2786 Series– DC/DC Power Supply

### **Protections \***

#### **Input**

- **Under-Voltage Lockout**  
Unit shuts down when input voltage is below  $16.5\text{ V} \pm 1\text{ V}$ .
- **Over-Voltage Lockout**  
Unit shuts down when input voltage is above  $52\text{ V} \pm 2\text{ V}$ .

#### **Output**

- **Passive Overvoltage Protection**  
Transorbs available on both outputs, rated to  $115\% \pm 10\%$  of nominal output voltage.
- **Current limiting**  
Continuous protection (10-30% above maximum current) for unlimited time (Hiccup).

#### **General**

- **Over temperature protection**  
Shutdown if base plate temperature rises above  $+105\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .  
Automatic recovery at base plate temperature falls below  $+95\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ .

### **Environmental Conditions**

Designed to meet environmental conditions IAW MIL-STD-810G:

#### **Temperature**

Method 501.5 Procedures I & II  
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Operating:  $-55\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  (baseplate)  
Storage:  $-55\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$  (ambient)

#### **Altitude**

Method 500.5  
Procedures I & II  
Up to 70000 ft. operational

#### **Salt Fog**

Method 509.5

#### **Humidity**

Method 507.5  
Up to 95% RH.

#### **Vibration (Random)**

Method 514.6  
Random Vibration, Category 24,  
Fig 514.6E-1.

#### **Shock**

Method 516.6  
30 g, 11 ms terminal peak saw-tooth (all directions)

### **Reliability**

150,000 hours, calculated per MIL-STD-217F Notice 2 at  $+85\text{ }^{\circ}\text{C}$  base plate, Ground fixed.

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

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

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

**Pin Assignment**

**Connector type:** Airborne RM272-020-312-2900 or eq.

**Mating connector:** Airborne RM242-020-571-5900 or eq. (other options available)

Pin Number	Function	Polarity
1	VOUT 1 **	(+)
2	VOUT 1 SENSE RTN	(-)
3	VOUT 1 RTN**	(-)
4	SIGNAL RTN	
5	INHIBIT	
6	VIN RTN	(-)
7	VIN	(+)
8	VOUT 2 SENSE RTN	(-)
9	VOUT 2 RTN *	(-)
10	VOUT 2 *	(+)

Pin Number	Function	Polarity
11	VOUT 1 **	(+)
12	VOUT 1 SENSE	(+)
13	VOUT 1 RTN**	(-)
14	SYNC	
15	VIN RTN	(-)
16	VIN	(+)
17	CHASSIS	
18	VOUT 2 RTN *	(-)
19	VOUT 2 *	(+)
20	VOUT 2 SENSE	(+)

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\* Master output

\*\* Slave output

**Notes:**

1. Slave output is sequenced after master output. **Please consult factory for details.**
2. All pins with identical function/designation should be connected together for proper operation.

**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 signal**

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

The system frequency can be 250 kHz  $\pm$  10 kHz.

When not connected, the power supply will work at internal frequency, close to 250 kHz  $\pm$  10 kHz.

**SIGNAL RTN**

The SIGNAL RTN is used as grounding for **SYNC** and **INHIBIT** signals.

This is referenced to the **VIN RTN** pin.

**VOUT SENSE**

The **SENSE** is used to achieve accurate load regulation at the load terminals. This is done by connecting these pins directly to their respective load 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.

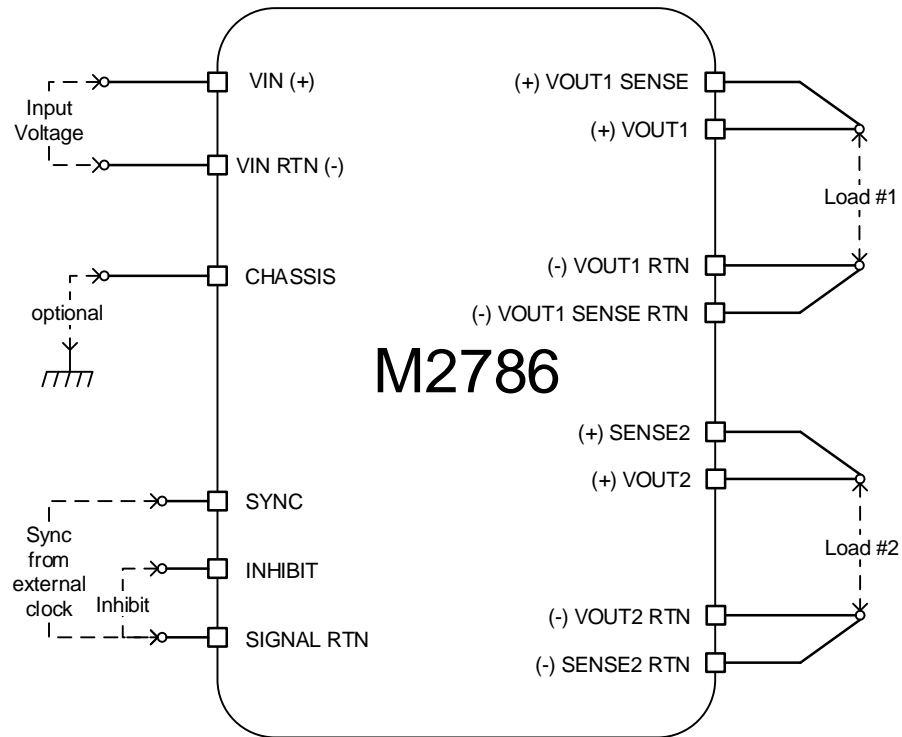
When not used connect **SENSE** to **VOUT** and **SENSE RTN** to **VOUT RTN** for each of the outputs.

**Chassis PIN**

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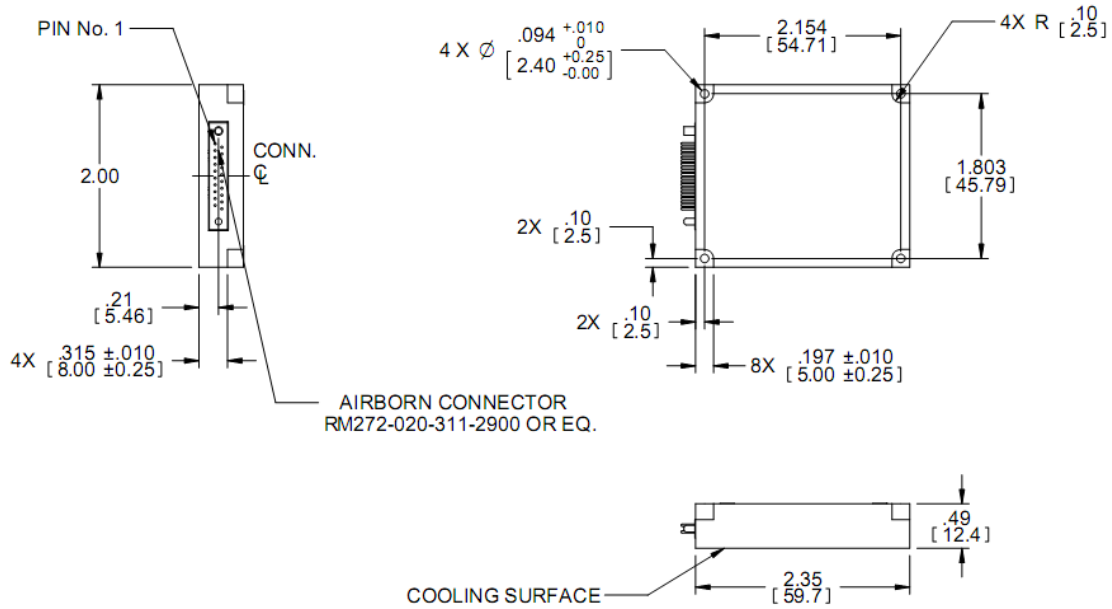
This chassis pin allows connection of the unit chassis to system chassis.

**Typical Connection Diagram**

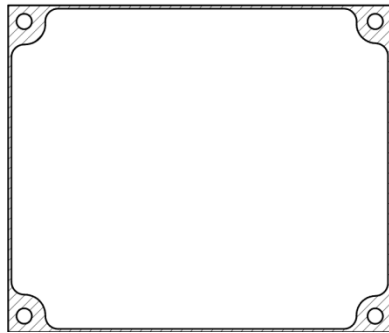


**Outline Drawing**

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**Heat Dissipation Surface**



Dissipation  
Area  
0.21 in<sup>2</sup>

**Notes**

1. Dimensions are in inches [mm]
2. Tolerance is:  
.XX ± 0.01 in  
.XXX ± 0.005 in

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