

M7525 SERIES

DC/DC POWER SUPPLY



PRODUCT HIGHLIGHTS

- DC/DC CONVERTER
- 18V_{DC} to 48V_{DC} INPUT
- Extended Input Range Option
- SINGLE OUTPUT
- 3.3 V_{DC} to 50 V_{DC}
- UP TO 800W
- Peak power (short period):
1kW

M7525 Series– DC/DC Power Supply

| | | | | | |
|---|--|--|--|--|--|
| <p>Applications</p> <p>Military (Airborne, ground-fix, shipboard), Ruggedized, Telecom, Industrial</p> | | | | | |
| <p>Special Features</p> <ul style="list-style-type: none"> • Miniature size • High efficiency • Wide input range • Input-to-output isolation • Remote sense compensation • Remote inhibit (ON/OFF) • Fixed switching freq. (250 kHz) • External sync. capability • <u>EMI</u> filters included • Indefinite short circuit protection with auto-recovery • Over-voltage clamp with auto-recovery • Over temperature shutdown with auto-recovery | | | | | |
| <p>Electrical Specifications</p> <table border="0"> <tr> <td style="vertical-align: top;"> <p><u>DC Input</u> Voltage range: 18 to 48V_{DC} Transient protection: No damage due to surges IAW MIL-STD-1275A (100V for 50ms) MIL-STD-704A (80V for 0.1s)</p> <p>Extended input range option: 16-100 V_{DC} IAW MIL-STD-1275E Please consult factory for details.</p> <p><u>Output Voltage Regulation</u> Up to ±1% (no load to full load, –55°C to +85°C and over input voltage range).</p> <p><u>Ripple and Noise</u> Less than 50mV_{p-p}, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.</p> </td> <td style="vertical-align: top;"> <p><u>DC Output</u> Voltage range: 3.3V to 50V_{DC} Current range: up to 50A Power range: 800W Peak power (short period-up to 4 seconds): 1kW</p> <p><u>Efficiency</u> Typical 87% (28V_{DC} output, nominal input voltage, full load, room temperature)</p> <p><u>Transient Over- and Undershoot</u> Output resistance at load change of 50%-100% is 30-120mΩ (depending on output voltage). Output back to steady stated within 500-800μs.</p> </td> <td style="vertical-align: top;"> <p><u>Isolation</u> Input to Output: 200V_{DC} Input to Case: 200V_{DC} Output to Case: 100V_{DC}</p> <p><u>EMC</u> Designed to meets* MIL-STD-461F CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103.</p> <p><u>Turn on Transient</u> No voltage overshoot during power on.</p> </td> </tr> </table> | | | <p><u>DC Input</u> Voltage range: 18 to 48V_{DC} Transient protection: No damage due to surges IAW MIL-STD-1275A (100V for 50ms) MIL-STD-704A (80V for 0.1s)</p> <p>Extended input range option: 16-100 V_{DC} IAW MIL-STD-1275E Please consult factory for details.</p> <p><u>Output Voltage Regulation</u> Up to ±1% (no load to full load, –55°C to +85°C and over input voltage range).</p> <p><u>Ripple and Noise</u> Less than 50mV_{p-p}, typical (max. 1%) without external capacitance. When connected to system capacitance ripple drops significantly.</p> | <p><u>DC Output</u> Voltage range: 3.3V to 50V_{DC} Current range: up to 50A Power range: 800W Peak power (short period-up to 4 seconds): 1kW</p> <p><u>Efficiency</u> Typical 87% (28V_{DC} output, nominal input voltage, full load, room temperature)</p> <p><u>Transient Over- and Undershoot</u> Output resistance at load change of 50%-100% is 30-120mΩ (depending on output voltage). Output back to steady stated within 500-800μs.</p> | <p><u>Isolation</u> Input to Output: 200V_{DC} Input to Case: 200V_{DC} Output to Case: 100V_{DC}</p> <p><u>EMC</u> Designed to meets* MIL-STD-461F CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103.</p> <p><u>Turn on Transient</u> No voltage overshoot during power on.</p> |
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* Compliance achieved with 5μH LISN, shielded harness and static resistive load.

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Protections *

Input

- **Under Voltage Lock Out**
Unit shuts down when input voltage falls below $16.5V_{DC} \pm 1V_{DC}$
For Extended input range option - Please consult factory for details.
- **Over Voltage Lock Out**
Unit shuts down when input voltage rises above $52V_{DC} \pm 2V_{DC}$
For Extended input range option - Please consult factory for details.
- **Input Reverse Polarity:**
Protection for unlimited time

Output

- **Active Over-Voltage Protection**
The converter output voltage clamp if it exceeds $110\% \pm 5\%$ of the nominal voltage.
- **Passive Over-Voltage Protection**
Load protected by a transorb rated $120\% \pm 10\%$ above nominal output voltage.
- **Overload Protection (Hiccup)**
Continuous protection ($20\% \pm 10\%$ above maximum current) for unlimited time.

General

- **Over Temperature Protection**
The converter shuts down if baseplate temperature exceeds $+105^{\circ}C \pm 5^{\circ}C$. The converter automatically recovers when its baseplate temperature falls back below $+95^{\circ}C \pm 5^{\circ}C$.

Environmental

Design to Meet MIL-STD-810F

Temperature

Operating: $-55^{\circ}C$ to $+85^{\circ}C$
(base plate)
Storage: $-55^{\circ}C$ to $+125^{\circ}C$

Humidity

Method 507.4
Procedure I

Up to 95% RH

Altitude

Method 500.4

Procedure I & II,
Up to 70,000 ft. operational

Vibration (random)

Method 514.5
Category 4 - General minimum integrity exposure

IAW Figure 514.5C-17
1 hour per axis.

Salt Fog

Method 509-4

Shock

Method 516.5
Procedure I

30g, 11ms terminal peak saw-tooth.

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Reliability

150,000 hours, calculated per MIL-STD-217F Notice 2 at +85°C baseplate, Ground Fixed environment.

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

Input connector - J1

Connector type: M24308/24-39F or eq.

Mates with: M24308/2-3F or eq.

| Pin No. | Function | P | Pin No. | Function | P | Pin No. | Function | P |
|---------|-----------|---|---------|------------|---|---------|-----------|---|
| 1 | INPUT | + | 10 | INPUT RTN | - | 19 | INPUT RTN | - |
| 2 | INPUT | + | 11 | CHASSIS | | 20 | INPUT RTN | - |
| 3 | INPUT | + | 12 | INHIBIT | + | 21 | INPUT RTN | - |
| 4 | INPUT | + | 13 | SIGNAL RTN | - | 22 | INPUT RTN | - |
| 5 | INPUT | + | 14 | INPUT | + | 23 | INPUT RTN | - |
| 6 | N.C. | | 15 | INPUT | + | 24 | N.C. | |
| 7 | INPUT RTN | - | 16 | INPUT | + | 25 | SYNC | + |
| 8 | INPUT RTN | - | 17 | INPUT | + | | | |
| 9 | INPUT RTN | - | 18 | N.C. | | | | |

Output connector – J2

Connector type: M24308/23-39F or eq.

Mates with: M24308/4-3F or eq.

| Pin No. | Function | P | Pin No. | Function | P | Pin No. | Function | P |
|---------|------------|---|---------|------------|---|---------|------------|---|
| 1 | SENSE | + | 10 | OUTPUT RTN | - | 19 | N.C. | |
| 2 | OUTPUT | + | 11 | OUTPUT RTN | - | 20 | N.C. | |
| 3 | OUTPUT | + | 12 | OUTPUT RTN | - | 21 | OUTPUT RTN | - |
| 4 | OUTPUT | + | 13 | SENSE RTN | - | 22 | OUTPUT RTN | - |
| 5 | OUTPUT | + | 14 | OUTPUT | + | 23 | OUTPUT RTN | - |
| 6 | OUTPUT | + | 15 | OUTPUT | + | 24 | OUTPUT RTN | - |
| 7 | N.C. | | 16 | OUTPUT | + | 25 | OUTPUT RTN | - |
| 8 | OUTPUT RTN | - | 17 | OUTPUT | + | | | |
| 9 | OUTPUT RTN | - | 18 | OUTPUT | + | | | |

NOTE: All pins with identical function/designation should be connected together for best performance.

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Functions and Signals

INHIBIT

Description: Inhibits output.

Use: Apply short circuit or TTL "LOW" to turn off the power supply.

Leave open or apply TTL "HIGH" to turn on the power supply.

Referenced to: SIGNAL RTN

SYNC

Description: Synchronizes internal switching frequency to system clock. Use: Apply TTL level, 250 kHz \pm 10 kHz, 50% duty-cycle clock.

Leave open if unused. In this case, the switching frequency will be set by the internal clock (250 kHz)

Referenced to: SIGNAL RTN

SIGNAL RTN

Description: Signals return reference.

Referenced to: Connected by a 100 Ω resistor to INPUT RTN

SENSE

Description: Used to achieve accurate voltage regulation at load terminals, to compensate for voltage drop across the leads connecting the converter to the load, 0.25 V \pm 0.1 V

Use: Connect SENSE line directly to the load's positive terminal, and SENSE RTN directly to the load's negative terminal.

If not used, connect SENSE to OUTPUT and SENSE RTN to OUTPUT RTN. Do not leave open!

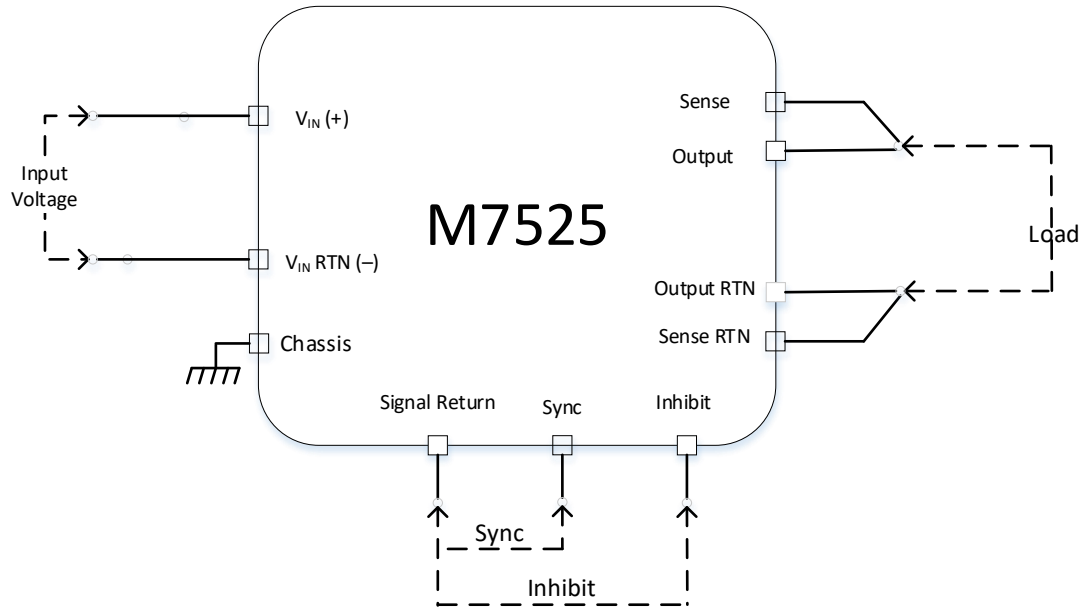
POR (Protection Override) - Optional

Description: The **POR** signal disables the input under voltage lockout, input over voltage lockout, over temperature protection and peak load duration limiter.

Please consult factory for details.

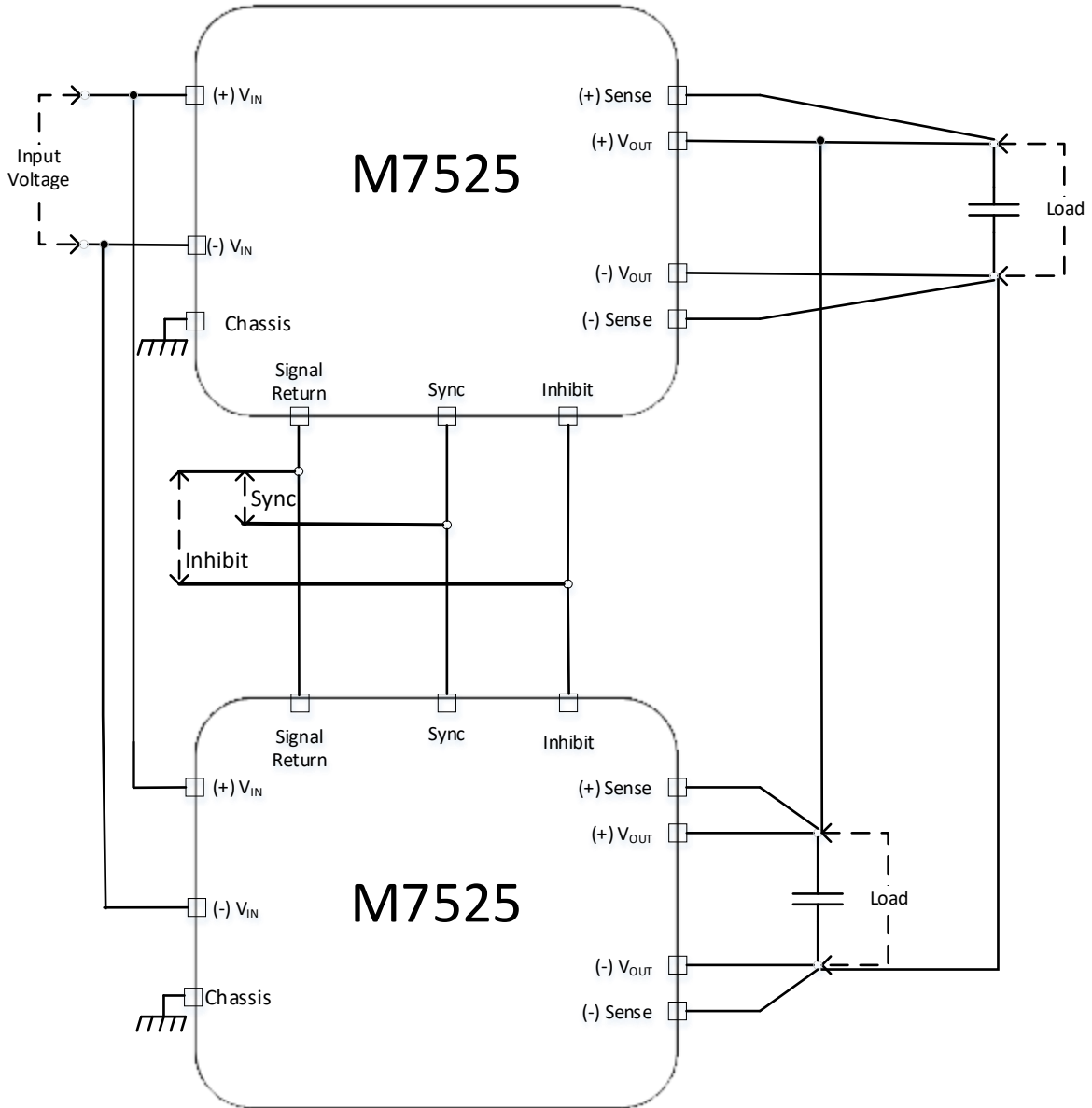
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Typical Connection



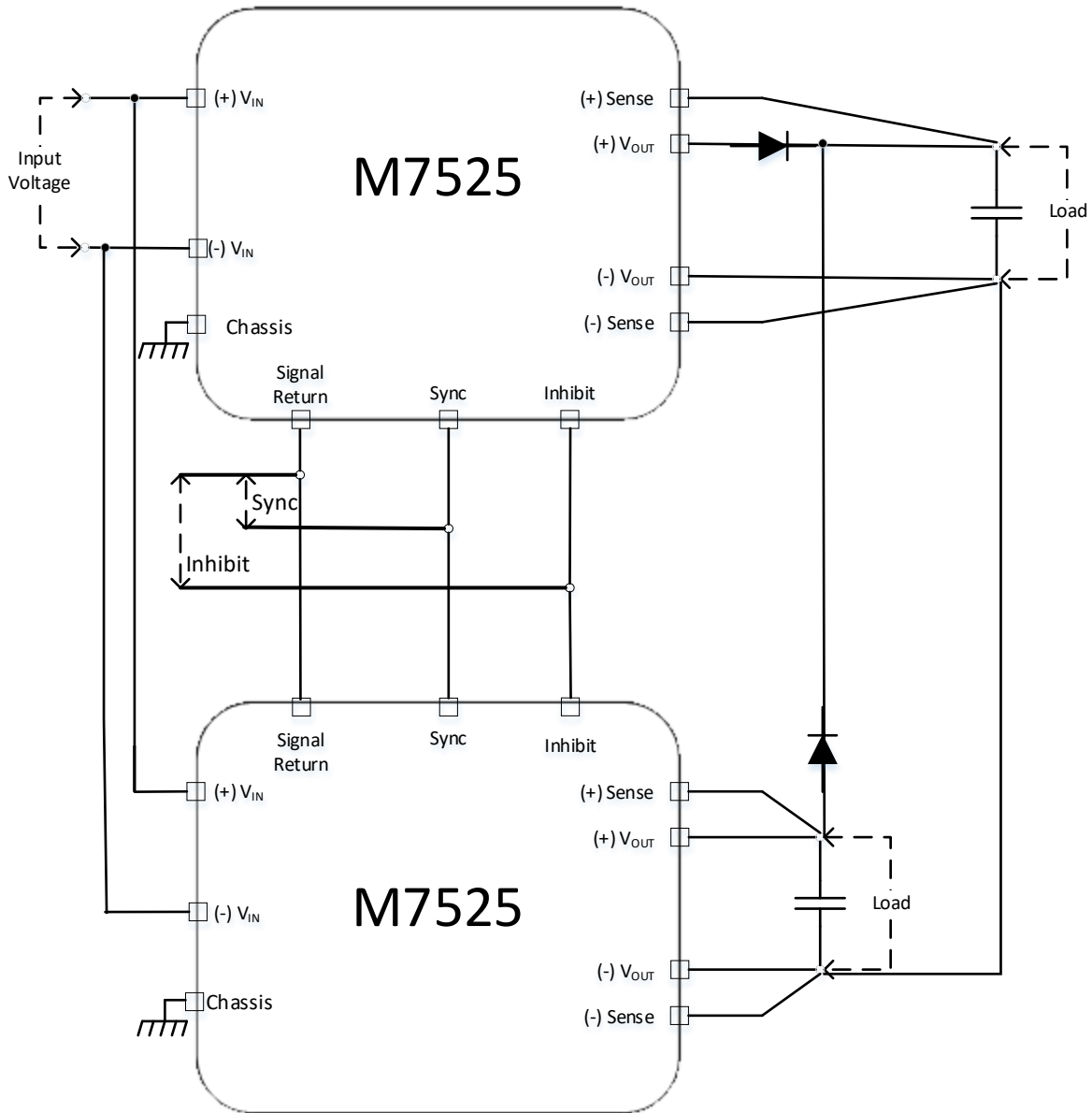
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Parallel Connection Diagram



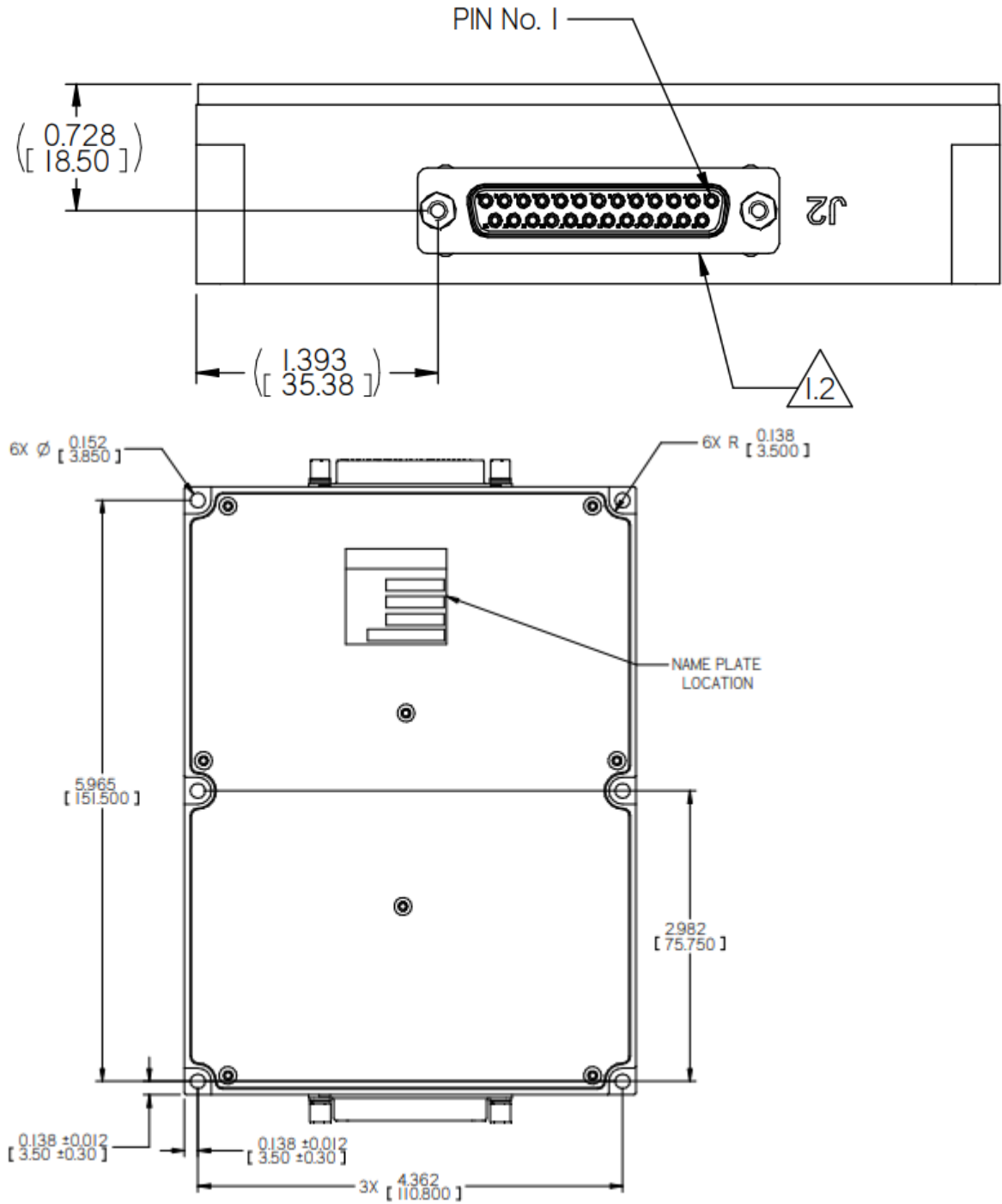
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Redundant Connection Diagram

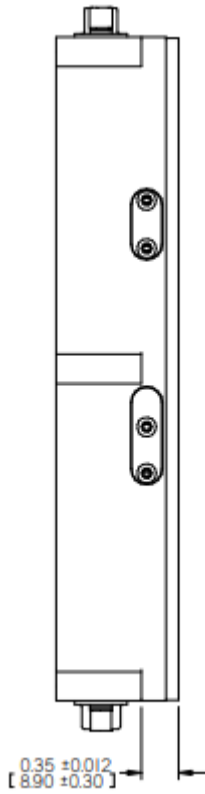


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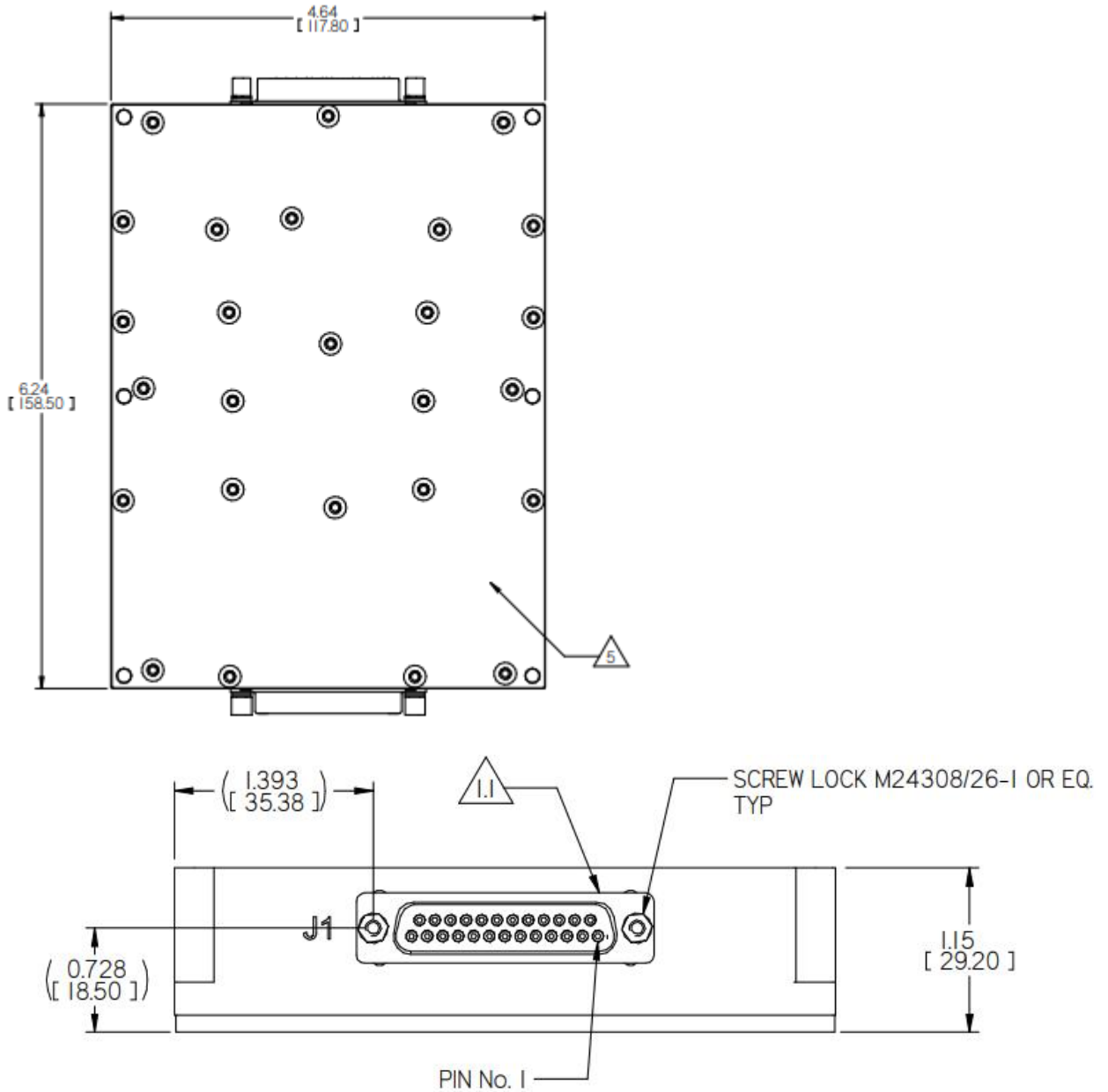
Outline Drawing



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NOTES :

I. CONNECTORS:

I.1 - INPUT PLUG D-TYPE CONN. 25P, P/N: M24308/24-39F OR EQ.

I.2 - OUTPUT SOCKET D-TYPE CONN. 25P, P/N: M24308/23-39F OR EQ.

2. WORKMANSHIP SHALL BE MIL-STD-454, REQ. 9

3. MTL. AL 6061-T651& AL 5052-H32

4. CHROMATE CONVERSION COATING PER
MIL -DTL-554IF, TYPE I OR 2 CLASS IA

5. HEAT DISSIPATION SURFACE: 17,700 mm²

6. ENGRAVING:

CHARACTERS HEIGHT: 4 (mm), DEPTH: 0.4 (mm).

ENGRAVING FILLED WITH BLACK COLOR.

Notes

1. Dimensions are in mm [inch]
2. Tolerance is:
. .XX ± .02 [0.50]
.XXX ± .006 [0.15]
3. Weight: TBD

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Standard Configurations

| Part Number | Input | Output | | Special features |
|-------------|--------------------------|--------------------|---------|---|
| | Voltage range | Voltage | Current | |
| M7525-100 | 18 to 48 V _{DC} | 5 V _{DC} | 50 A | |
| M7525-101 | 18 to 48 V _{DC} | 12 V _{DC} | 50 A | |
| M7525-102 | 18 to 48 V _{DC} | 15 V _{DC} | 50 A | |
| M7525-103 | 18 to 48 V _{DC} | 24 V _{DC} | 33 A | |
| M7525-104 | 18 to 48 V _{DC} | 28 V _{DC} | 28 A | |
| M7525-105 | 18 to 48 V _{DC} | 48 V _{DC} | 16 A | |
| M7525-106 | 18 to 48 V _{DC} | 28 V _{DC} | 28 A | Parallel operation via output voltage droop. Voltage regulation is ±2%. |
| M7525-107 | 18 to 48 V _{DC} | 48 V _{DC} | 16 A | Parallel operation via output voltage droop. Voltage regulation is ±2%. |
| M7525-108 | 18 to 48 V _{DC} | 24 V _{DC} | 33 A | Parallel operation via output voltage droop. Voltage regulation is ±2%. |
| M7525-800 | 18 to 48 V _{DC} | 5 V _{DC} | 50 A | |
| M7525-801 | 18 to 48 V _{DC} | 12 V _{DC} | 50 A | |
| M7525-802 | 18 to 48 V _{DC} | 15 V _{DC} | 50 A | |
| M7525-803 | 18 to 48 V _{DC} | 24 V _{DC} | 33 A | |
| M7525-804 | 18 to 48 V _{DC} | 28 V _{DC} | 28 A | |
| M7525-805 | 18 to 48 V _{DC} | 48 V _{DC} | 16 A | |
| M7525-806 | 18 to 48 V _{DC} | 28 V _{DC} | 28 A | Parallel operation via output voltage droop. Voltage regulation is ±2%. |
| M7525-807 | 18 to 48 V _{DC} | 48 V _{DC} | 16 A | Parallel operation via output voltage droop. Voltage regulation is ±2%. |
| M7525-808 | 18 to 48 V _{DC} | 24 V _{DC} | 33 A | Parallel operation via output voltage droop. Voltage regulation is ±2%. |

Special Features for M7525-800 to 808:

- M7525-8xx: this variant is REACH Compliant
- M7525-8xx: The aluminum parts comprising this converter are chromate conversion coated per MIL-DTL-5541F, Type II CLASS 1A or eq.
- M7525-8xx: The shell of the connectors are Zinc:
 - **Input connector - J1**
Connector type: M24308/24-39Z or eq.
 - **Output connector – J2**
Connector type: M24308/23-39Z or eq.

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