

M7027 SERIES

DC/DC POWER SUPPLY



PRODUCT HIGHLIGHTS

- **MINIATURE**
- **VERY HIGH DENSITY**
- **SINGLE OUTPUT**
- **DC/DC POWER SUPPLY**
- **UP TO 500 W (750 W PEAK)**

M7027 Series– DC/DC Power Supply

Applications

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

Special Features

- Wide input range
- Input / Output isolation
- High efficiency – up to 90%
- High Density – **up to 47 W/in³**
- EMI filters included
- Remote sense compensation
- Parallel connection option
- Fixed switching freq. (250 kHz)
- External sync. capability
- Remote inhibit (on/off)
- Non-latching protections:
 - Overload / short-circuit
 - Input OV/UV lockout
 - Output over-voltage
 - Over temperature

Electrical Specifications

DC Input

18 to 48 V_{DC},
Extended input range option:
18 to 100 V_{DC}
IAW MIL-STD-1275E.

Transient protection

IAW MIL-STD-1275A,
MIL-STD-704A
(no operation, no damage)

Output Voltage Regulation

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

Ripple and Noise

Less than 50 mV_{p-p}, typical
(max. 1% of output voltage)
without external capacitance.
When connected to system
capacitance ripple drops
significantly.

DC Output

Voltage range: 5 to 50 V_{DC}
Current range: 0 to 40 A
Power range: 0 to 500 W
Peak power: Up to 750 W for up
to 4 seconds.
After 4 seconds, the output falls
to 70% from its nominal value.

Efficiency

Typical: 88% - 90%
Extended input range: 83% -
86%
(28V_{DC} output, nominal input,
full load, room temperature)

Transient Over-and-undershoot

Output change at load transient
of 30 to 100% with T_r & T_f of
max 30 μs is 5% of output
voltage. Output recover to
steady state within less
0.5 ms.

Isolation

Input to Output: 200 V_{DC}
Input to Case: 200 V_{DC}
Output to Case: 100 V_{DC}

EMC

Design to Meet* MIL-STD-461F
CE101, CE102, CS101, CS114,
CS115, CS116, RE101, RE102,
RS101, RS103

Turn on Transient

No voltage overshoot during
power on.

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

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Protections[†]

Input

- **Input Reverse Polarity:**
Protection for unlimited time
- **Under-Voltage Lock-Out:**
Unit shuts down below $15V \pm 1V$. Resumes operation at $17V \pm 1V$. Min. hysteresis 2V.
- **Over-Voltage Lock-Out:**
Unit shuts down above $54V \pm 2V$.

Output

- **Active Over-Voltage Protection:**
Secondary control circuit takes over if output voltage exceeds $110\% \pm 5\%$ of nominal voltage.
- **Passive Over-Voltage Protection:**
Zener diode installed on output terminals, selected at $120\% \pm 10\%$ of nominal voltage.
- **Peak Load Duration Limiter**
Peak load is enabled for up to 4 seconds. Beyond this, output voltage folds to limit the output power to the nominal value.
- **Short Circuit Protection**
Output voltage turns off and on periodically with low duty-cycle (hiccup) to protect system conductors and converter from short circuit.

General

- **Over Temperature Protection:**
Output shuts down if base plate temperature exceeds $+105^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Automatic recovery when baseplate temperature returns to below $+95^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
- **POR:**
Protection Override signal (BATTLE SHORT function) overrides over temperature protection and input over/under-voltage lock-out.

Environmental Conditions

Meets MIL-STD-810F

Temperature

Operating: -55°C to $+85^{\circ}\text{C}$ (at baseplate)

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

Humidity

Method 507.4

Procedure I

Up to 95% RH

Altitude

Method 500.4

Procedures I & II

Up to 70,000 ft. Operational

Vibration (random)

Method 514.5

Category 24 – General

minimum integrity exposure

IAW Figure 514.5C-17

1 hour per axis.

Salt Fog

Method 509.4

Shock

Method 516.5

Procedure I – Functional shock

Saw-tooth, 30 g peak, 11 ms

Reliability

150,000 hours, calculated per MIL-HDBK-217F Notice 2 at $+85^{\circ}\text{C}$ baseplate, Ground Fix conditions.

Environmental Stress Screening (ESS)

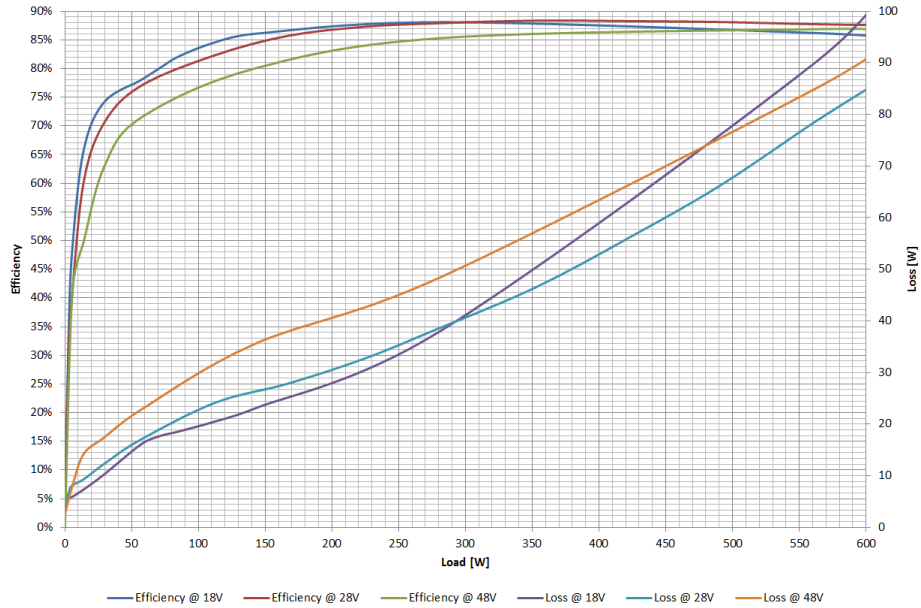
Including random vibration and thermal cycles is also available. **Please consult factory for details.**

[†] Thresholds and protections can be modified / removed – please consult factory.

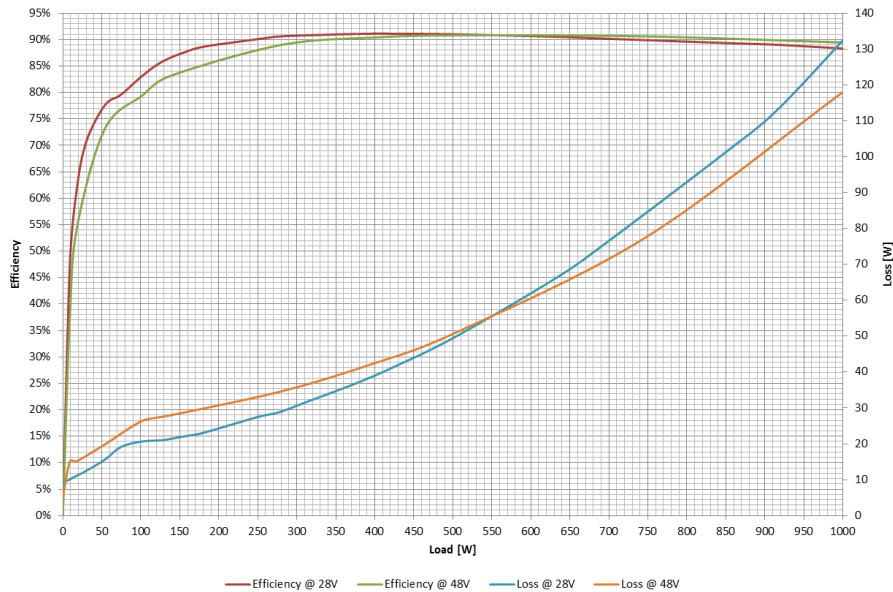
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Efficiency Plots

28 V_{DC} variant:



50 V_{DC} variant:



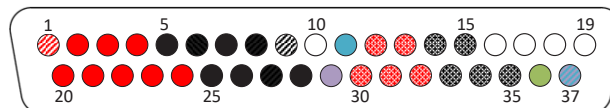
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Pin Assignment

Connector type: M24308/24-34F or eq.

Mates with: M24308/2-4F or eq.

Pin No.	Function	P	
1	SENSE	+	⊗
2	OUT	+	●
3	OUT	+	●
4	OUT	+	●
5	OUT RTN	-	●
6	OUT RTN	-	●
7	OUT RTN	-	●
8	OUT RTN	-	●
9	SENSE RTN	-	
10	N.C.		
11	INHIBIT		
12	IN	+	⊗
13	IN	+	⊗
14	IN RTN	-	⊗
15	IN RTN	-	⊗
16	N.C.		
17	N.C.		
18	N.C.		
19	N.C.		
20	OUT	+	●
21	OUT	+	●
22	OUT	+	●
23	OUT	+	●
24	OUT	+	●
25	OUT RTN	-	●
26	OUT RTN	-	●
27	OUT RTN	-	●
28	OUT RTN	-	●
29	SYNC IN		
30	IN	+	⊗
31	IN	+	⊗
32	IN	+	⊗
33	IN RTN	-	⊗
34	IN RTN	-	⊗
35	IN RTN	-	⊗
36	POR	+	
37	SIGNAL RTN	-	



Note: All pins with identical function/designation should be connected together for optimal performance.

Functions and Signals

INHIBIT

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

To turn the power supply OFF, apply a TTL “0” signal or SHORT to **SIGNAL RTN**.

To turn the power supply ON, apply a TTL “1” signal or leave this pin OPEN.

If not used (always ON), leave this pin OPEN.

This signal is referenced to **SIGNAL RTN**.

SYNC IN

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.

This signal is referenced to **SIGNAL RTN**.

POR (Protection Override)

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

TTL “0” or short to **SIGNAL RTN** – Protections are disabled (BATTLE SHORT mode).

TTL “1” or open circuit – Protections are enabled (Protected mode).

For normal protected operation, leave this pin OPEN.

This signal is referenced to **SIGNAL RTN**.

SIGNAL RTN

The **SIGNAL RTN** is referenced to **IN RETURN**.

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

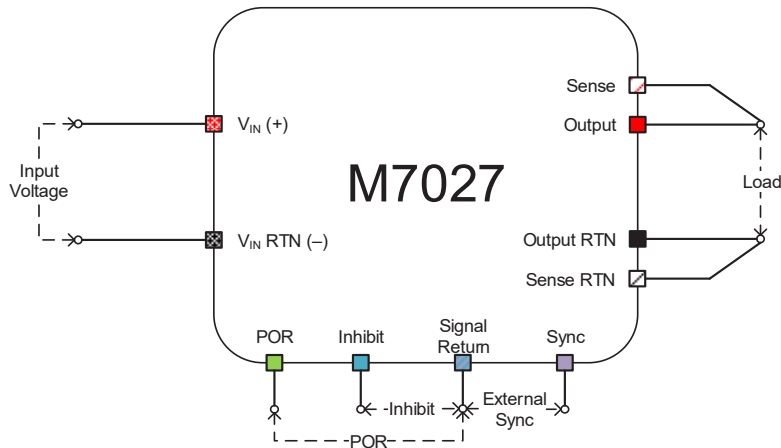
SENSE

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.

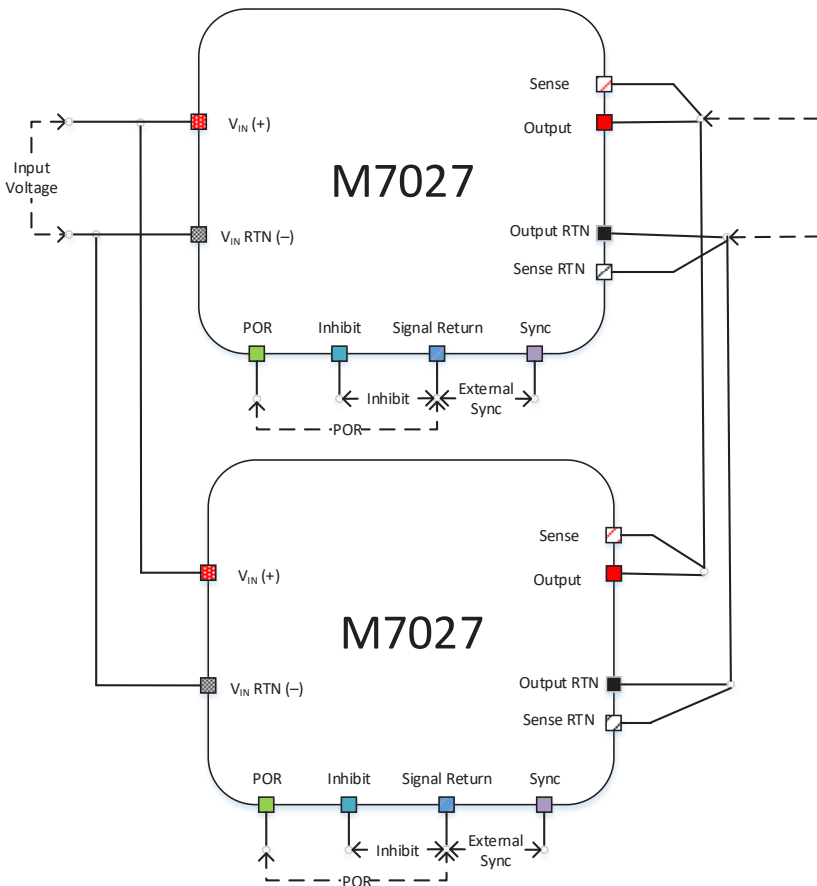
When not used connect **SENSE** to **OUT** and **SENSE RTN** to **OUT RTN**.

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Typical Connection Diagram

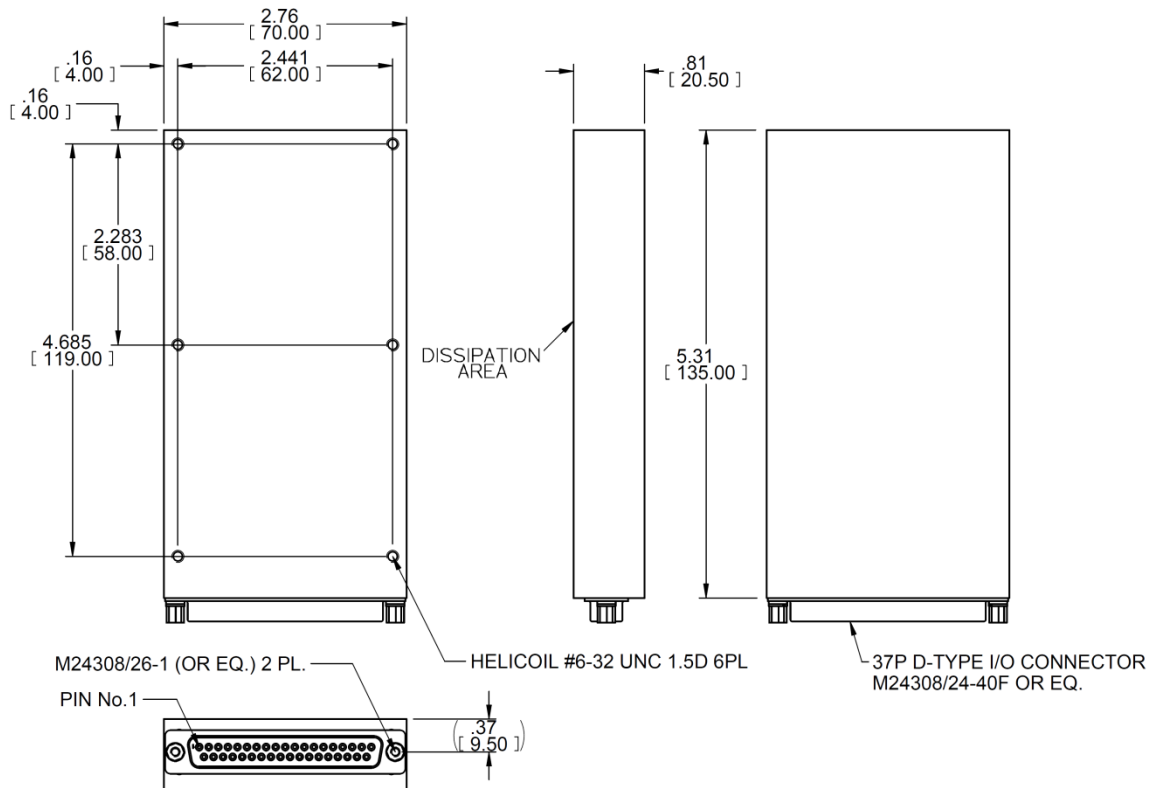


Parallel Operation - Typical Connection Diagram

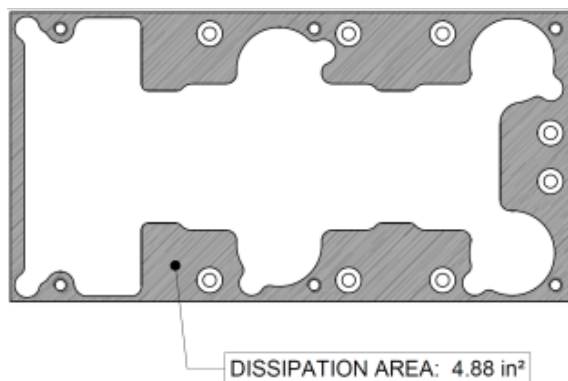


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Outline Drawing



Heat Dissipation Surface

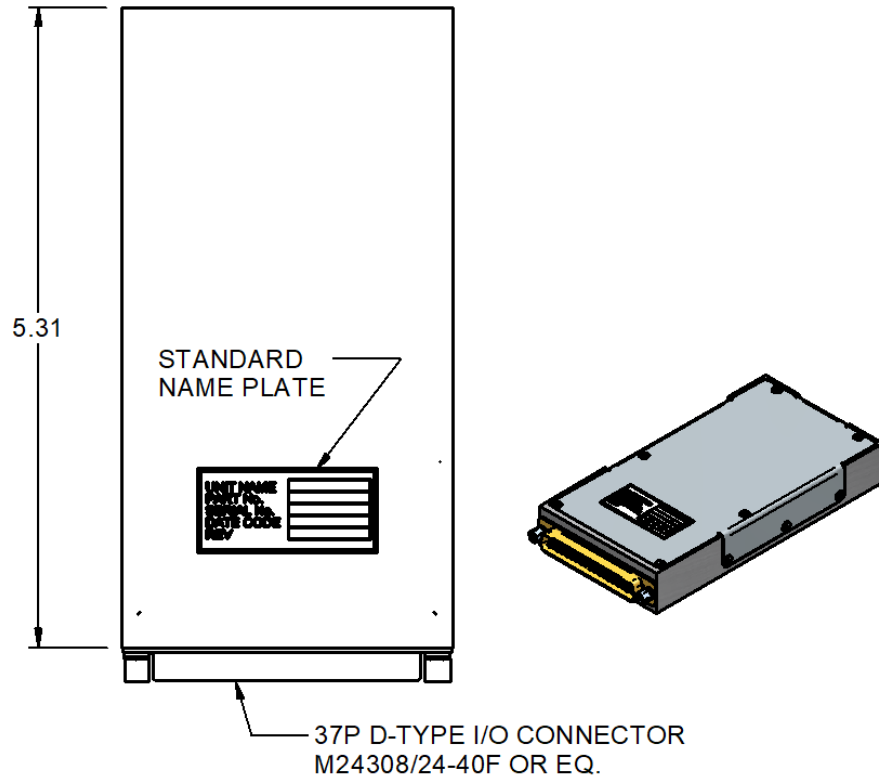


Notes

1. Dimensions are in inches [mm]
2. Tolerance is:
 .XX ± 0.02 in
 .XXX ± 0.008 in
3. Weight: Approx. 14.1 oz
 [400 g]

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Label location



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Standard Configurations

Part Number	Input	Output		Special features
	Voltage range	Voltage	Current	
M7027100	18 to 48 V _{DC}	5 V _{DC}	40 A	
M7027101	18 to 48 V _{DC}	12 V _{DC}	40 A	
M7027102	18 to 48 V _{DC}	15 V _{DC}	33 A	
M7027103	18 to 48 V _{DC}	24 V _{DC}	21 A	
M7027104	18 to 48 V _{DC}	28 V _{DC}	18 A	
M7027105	18 to 48 V _{DC}	48 V _{DC}	10.5 A	
M7027106	18 to 48 V _{DC}	28 V _{DC}	20 A	Parallel operation via output voltage droop. Voltage regulation is ±2%. <i>See catalog page for additional information.</i>

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