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)**

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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 it is 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 stated 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.

Protections†

Input

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

Output

- **Active Over-Voltage Protection:** Secondary control circuit takes over if output voltage exceeds 110% ± 5% of nominal voltage.
- **Passive Over-Voltage Protection:** Zener diode installed on output terminals, selected at 120% ± 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°C ± 5°C. Automatic recovery when baseplate temperature returns to below +95°C ± 5°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 °C (at baseplate)
Storage: –55 °C to +125 °C

Altitude

Method 500.4
Procedures I & II
Up to 70,000 ft. Operational

Salt Fog

Method 509.4

Humidity

Method 507.4
Procedure I
Up to 95% RH

Vibration (random)

Method 514.5
Category 24 – General minimum integrity exposure IAW Figure 514.5C-17
1 hour per axis.

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 °C baseplate, Ground Fix conditions.

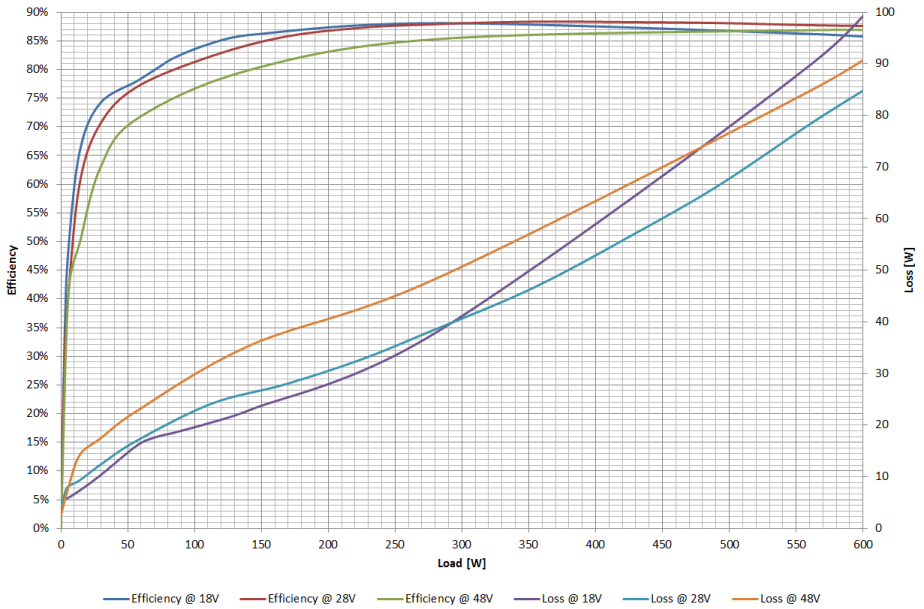
Environmental Stress Screening (ESS)

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

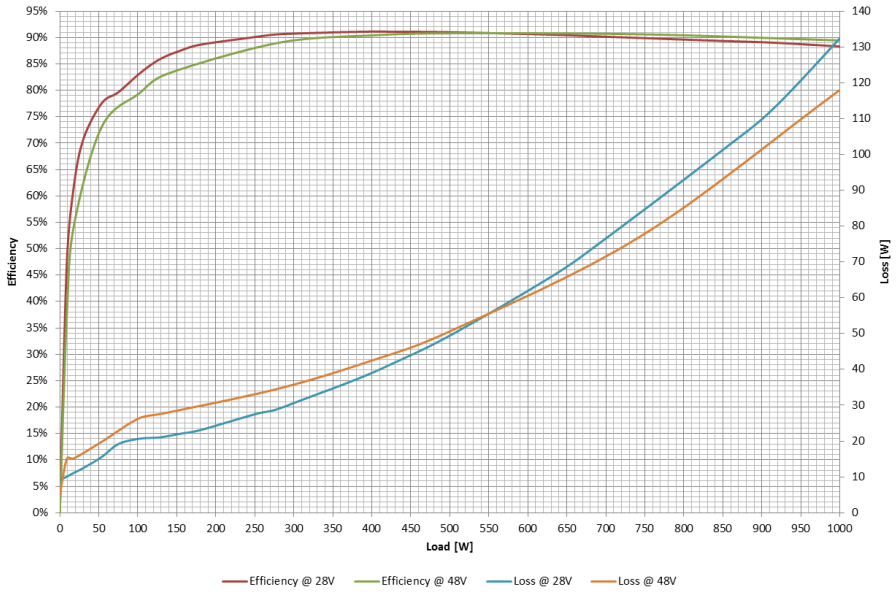
† Thresholds and protections can be modified / removed – please consult factory.

Efficiency Plots

28 V_{DC} variant:



50 V_{DC} variant:



Pin Assignment

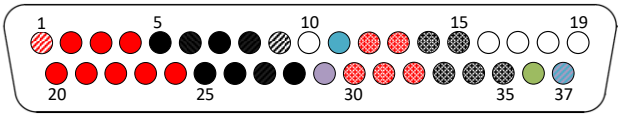
Connector type: M24308/24-34F or eq.

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	+	⊗

Pin No.	Function	P	
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	–	●

Pin No.	Function	P	
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 ± 10 kHz.
When not connected the power supply will work at 250 kHz ± 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**.

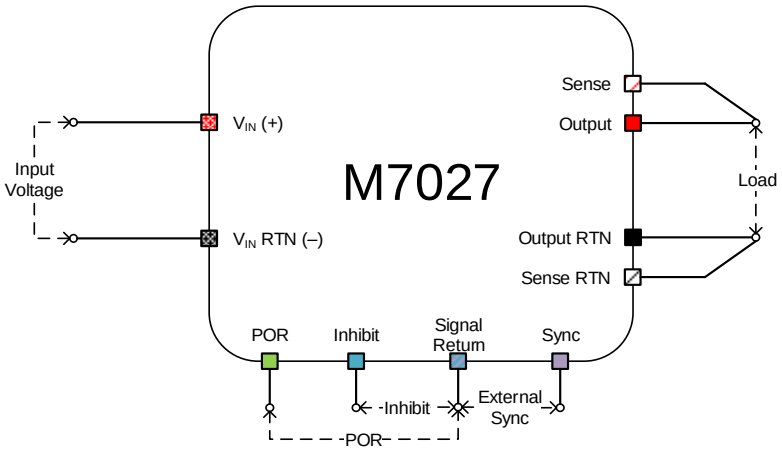
SIGNAL RTN

The **SIGNAL RTN** is referenced to **IN RETURN**.
This is used as grounding for **SYNC IN**, **INHIBIT** and **POR** signals.

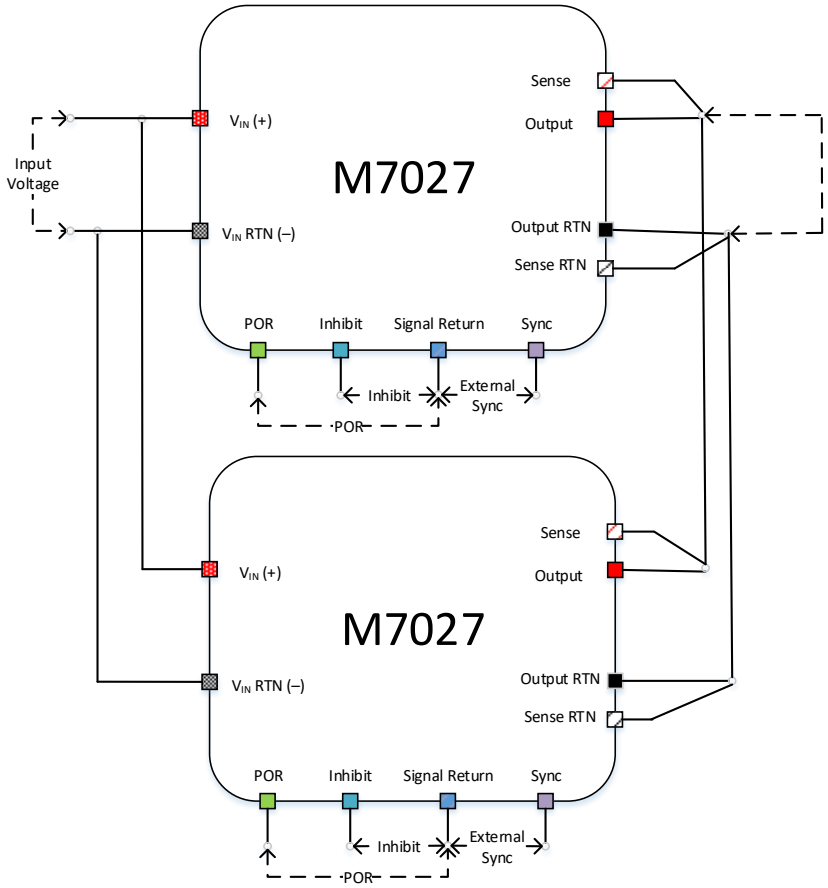
SENSE

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**.

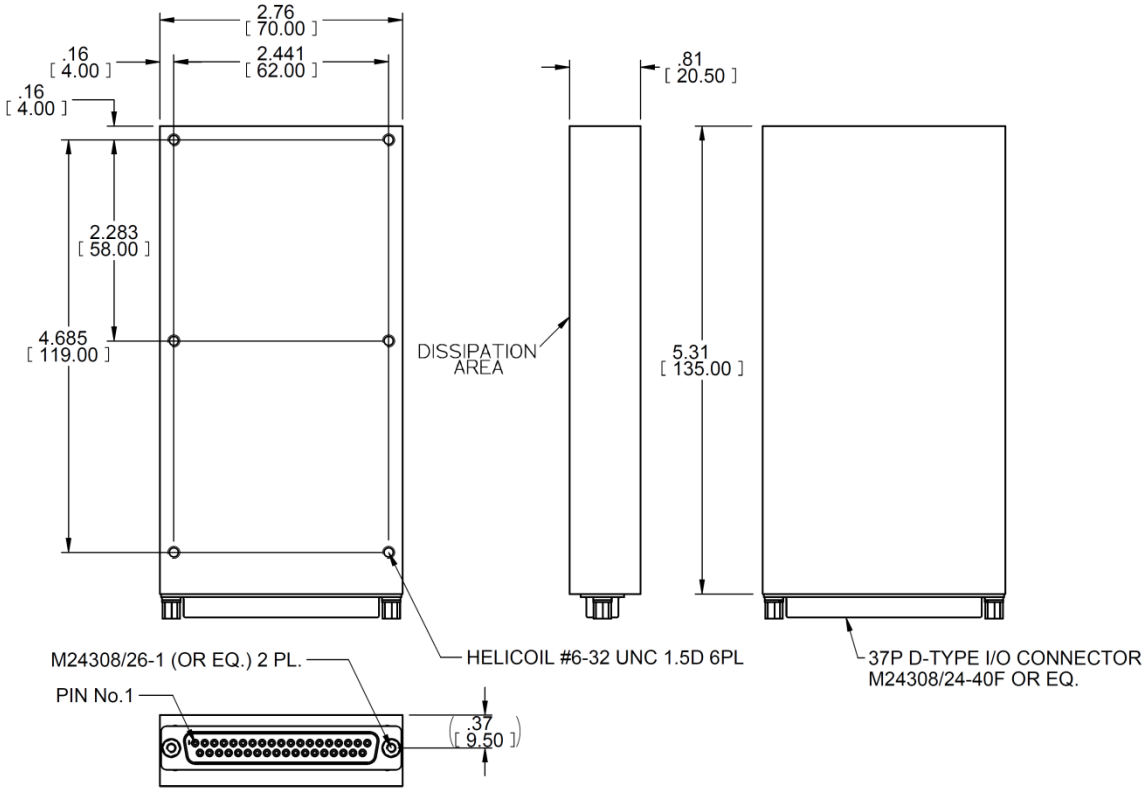
Typical Connection Diagram



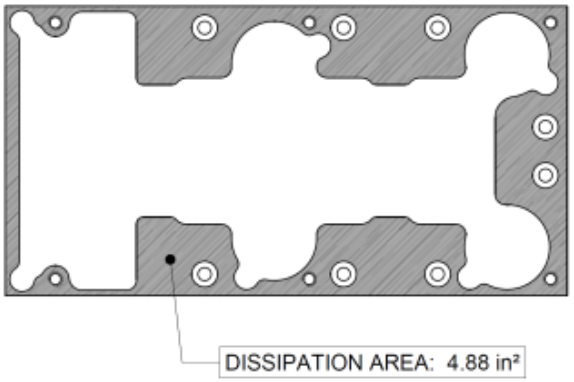
Parallel Operation - Typical Connection Diagram



Outline Drawing



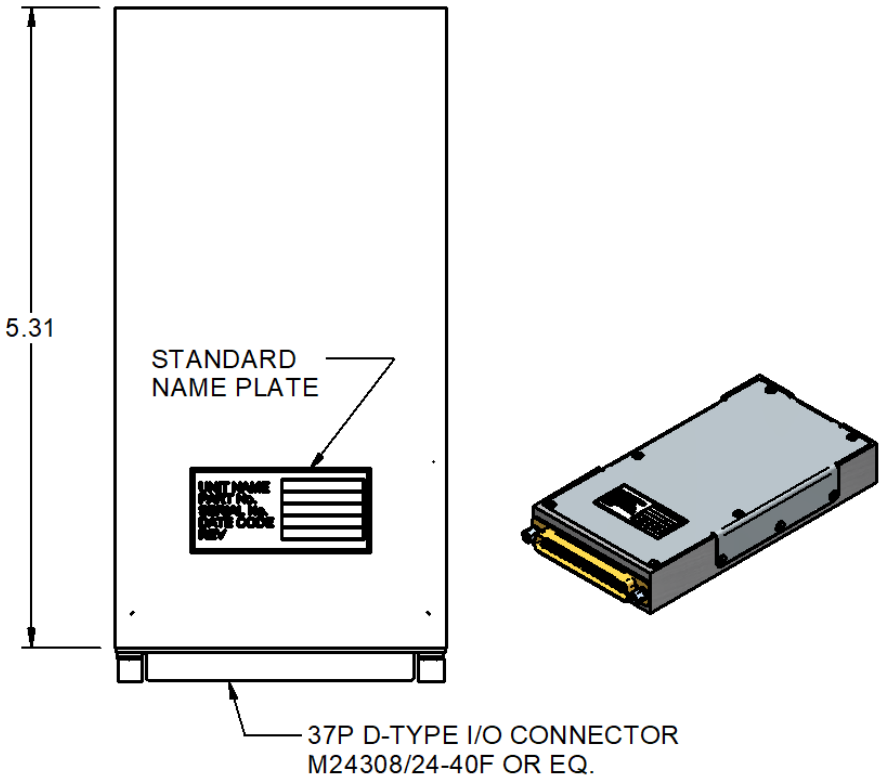
Heat Dissipation Surface



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]

Label location



Standard Configurations

Part Number	Input	Output		Special features
	Voltage range	Voltage	Current	
M7027-100	18 to 48 V_{DC}	5 V_{DC}	40 A	
M7027-101	18 to 48 V_{DC}	12 V_{DC}	40 A	
M7027-102	18 to 48 V_{DC}	15 V_{DC}	33 A	
M7027-103	18 to 48 V_{DC}	24 V_{DC}	21 A	
M7027-104	18 to 48 V_{DC}	28 V_{DC}	18 A	
M7027-105	18 to 48 V_{DC}	48 V_{DC}	10.5 A	
M7027-106	18 to 48 V_{DC}	28 V_{DC}	20 A	Parallel operation via output voltage droop. Voltage regulation is ±2%. ***See catalog page for additional information.***

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