



# M7338 SERIES

MINIATURE, HIGH DENSITY,  
TRIPLE OUTPUT,  
DC / DC CONVERTERS  
Up to 600 W



## Applications

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

## Special Features

- Miniature size
- High efficiency
- High density – up to 27.7 W/in<sup>3</sup>
- Wide input range
- Input / Output isolation
- EMI filters included
- Fixed switching freq. (250 kHz)
- External sync. capability
- Remote Inhibit (On/Off)
- Remote sense compensation
- Non-latching protections:
  - Overload/short-circuit
  - Output overvoltage
  - Input UVLO/OVLO
  - Over temperature

## Electrical Specifications

### DC Input

Normal range: 18 to 48 V<sub>DC</sub>  
Abnormal voltage transient:  
No damage\* due to exposure to  
100 V / 50 ms IAW MIL-STD-  
1275A and 80 V / 0.1 s IAW MIL-  
STD-704A

### Output Voltage Regulation

Less than ±1%  
(no load to full load; across input  
voltage range; –55 °C to +85 °C  
baseplate temperature).

### Ripple & Noise

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

### DC Outputs

For each output:  
Voltage range: 1.8 to 50 V<sub>DC</sub>  
Current range: 0 to 16 A  
Power range: 0 to 200 W  
Total power range: 0 to 600 W

### Efficiency

Typical 76% to 85%  
(28V<sub>DC</sub> output, full load, room  
temperature)

### Transient Over-and-undershoot

Output resistance at load change  
of 50% to 100% is typically 50 mΩ  
(for 28 V<sub>DC</sub> output).  
Output back to steady stated  
within 300 to 500 μs.

### Isolation

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

### EMC

Designed to meet<sup>†</sup> MIL-STD-461C  
CE03, CE07, CS01, CS02, CS06,  
RE02, RS02, RS03

### Turn-On Transient

Voltage overshoot at during  
power on is less than 1% nominal  
voltage.

\* The power supply may shut down during the transient once out of the normal operation range, and restart once back within normal operation range.

† Compliance achieved with shielded harness.  
Compliance with MIL-STD-461F/G may be achieved with 5 μH LISNs.



### **Protections<sup>‡</sup>**

#### **Input**

- **Under Voltage Lock-Out**  
Unit turns off below 200 V<sub>DC</sub>.
- **Over Voltage Lock-Out**  
Unit turns off above 380 V<sub>DC</sub>

#### **Output**

- **Active Over Voltage Protection**  
Internal control shuts down unit 10 ± 5% above nominal voltage.
- **Passive Over Voltage Protection**  
Transorb protects unit and load 20 ± 10% above nominal voltage.
- **Current limiting**  
Output shuts down and attempts to restart periodically, until fault condition removed (hiccup).

#### **General**

- **Over temperature protection**  
Unit shuts down if baseplate temperature exceeds +105 ± 5 °C.  
Automatic recovery upon cooldown to below +95 ± 5 °C.

### **Environmental Conditions**

Designed to meet MIL-STD-810G

#### **Temperature**

Methods 501.5 & 502.5  
Operating: -55°C to +85°C (at baseplate)  
Storage: -55°C to +125°C (ambient)

#### **Vibration**

Method 514.6  
Procedure I, Category 24  
General minimum integrity exposure  
1 hour per axis.

#### **Altitude**

Method 500.5  
Procedures I – Storage/Air transport:  
up to 70,000 ft. (non-operational)  
Procedure II – Operation/Air Carriage:  
up to 70,000 ft. (operational)

#### **Shock**

Method 516.6  
Procedure I  
20 g / 11 ms terminal peak sawtooth shock pulse

#### **Humidity**

Method 507.5  
Up to 95% RH

#### **Salt Fog**

Method 509.5

### **Reliability**

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

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

100% of delivered power supplies are tested at low ambient temperature, high baseplate temperature and at standard room temperature.  
Additional tests, such as random vibration and thermal cycling can be added. Consult factory for details.

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<sup>‡</sup> Thresholds and protections can be modified / removed – please consult factory



## Pin Assignment

### J1 - INPUT CONNECTOR

**Type:** M24308/24-33F or eq.

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

Pin Assignment	Pin Numbers	P
INPUT	9, 10, 11, 12, 13, 22, 23, 24, 25	+
INPUT RTN	5, 6, 7, 8, 17, 18, 19, 20, 21	-
INHIBIT 1	1	+
INHIBIT 2	2	+
INHIBIT 3	15	+
MAIN INHIBIT	16	+
SYNC	4	+
SIGNAL RTN	3	-
CHASSIS	14	0

### J2 - OUTPUT CONNECTOR

**Type:** M24308/23-34F or eq.

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

Pin Assignment	Pin Numbers	P
OUTPUT 1	8, 9, 10, 27, 28	+
OUTPUT 1 RTN	11, 12, 29, 30, 31	-
SENSE 1	26	+
SENSE 1 RTN	13	-
OUTPUT 2	2, 3, 4, 21, 22	+
OUTPUT 2 RTN	5, 6, 23, 24, 25	-
SENSE 2	1	+
SENSE 2 RTN	7	-
OUTPUT 3	14, 15, 16, 33, 34	+
OUTPUT 3 RTN	17, 18, 35, 36, 37	-
SENSE 3	32	+
SENSE 3 RTN	19	-
N.C.	20	



### Signals Description

**SENSE #** (connector J2: pin 26 for output #1, pin 1 for output #2 and pin 32 for output #3)

The **SENSE #** lines are used to achieve accurate voltage regulation at their respective load terminals. To use this feature, connect these pins directly to their respective load's positive terminal.

**SENSE # RTN** (connector J2: pin 13 for output #1, pin 7 for output #2 and pin 19 for output #3)

The **SENSE # RTN** lines are used to achieve accurate voltage regulation at their respective load terminals. To use this feature, connect these pins directly to their respective load's negative terminal.

If this function is not required, short **SENSE #** directly to its respective output pins and **SENSE # RTN** to its respective output return pins, as close as possible to the connector.

**Note:** The use of remote sense has a limit of voltage dropout between the converter's output and the load's terminals of approximately 5% of nominal output voltage or 0.5 V – the lesser of the two.

### **INHIBIT**

The **MAIN INHIBIT** (connector J1, pin 16) signal is used to turn all outputs ON and OFF together.

The **INHIBIT #** (connector J1, pins 1 for output #1, pin 2 for output #2 and pin 15 for output #3) signals are used to turn their respective outputs ON and OFF individually.

Leaving these pins open will result in active outputs (according to table truth table).

Shorting these pins to **SIGNAL RTN** will result in inhibited outputs (according to table truth table).

MAIN INHIBIT	INHIBIT 1	INHIBIT 2	INHIBIT 3	Output #1	Output #2	Output #3
OPEN	OPEN	OPEN	OPEN	ON	ON	ON
OPEN	OPEN	OPEN	SHORT	ON	ON	OFF
OPEN	OPEN	SHORT	OPEN	ON	OFF	ON
OPEN	OPEN	SHORT	SHORT	ON	OFF	OFF
OPEN	SHORT	OPEN	OPEN	OFF	ON	ON
OPEN	SHORT	OPEN	SHORT	OFF	ON	OFF
OPEN	SHORT	SHORT	OPEN	OFF	OFF	ON
X	SHORT	SHORT	SHORT	OFF	OFF	OFF
SHORT	X	X	X	OFF	OFF	OFF

If this function is not required, leave these pins unconnected.

This signal is referenced to **SIGNAL RTN** (connector J1 pin 3).



**SYNC** (connector J1, pin 4)

The **SYNC** signal is used for synchronizing the power supply's switching frequency to external clock. Valid external clock frequency is 250 kHz  $\pm$  10 kHz, and duty cycle is 50%  $\pm$  10%.

If this function is not required, leave this pin unconnected - the power supply will use its internal clock.

This signal is referenced to **SIGNAL RTN** (connector J1, pin 3)

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Both **INHIBIT** and **SYNC** signals are referenced to this pin.

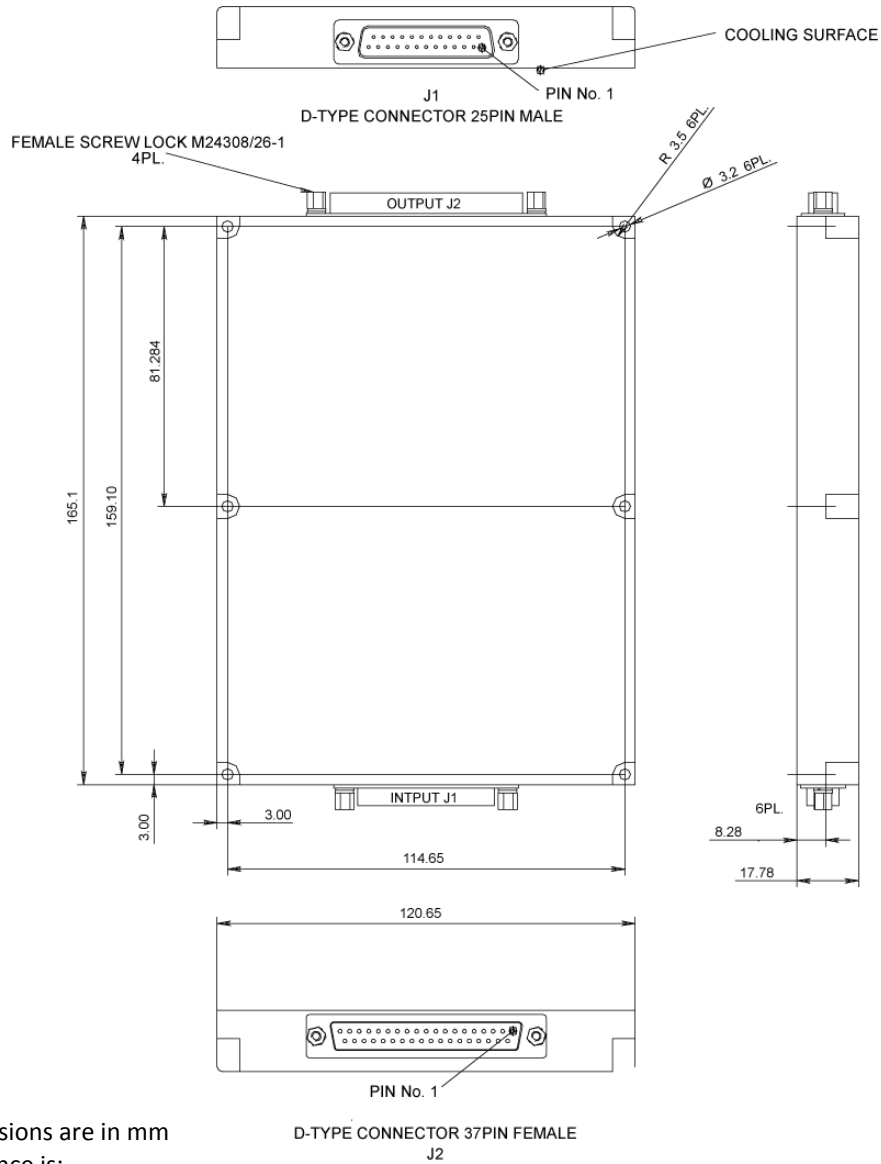
This pin is referenced to **INPUT RTN** (connector J1, pins 5, 6, 7, 8, 17, 18, 19, 20 and 21).

**CHASSIS** (connector J1, pin 14)

This pin is connected to the converter's chassis.



**Outline Drawing**



**Notes**

1. Dimensions are in mm
2. Tolerance is:  
 .X ±0.2 mm  
 .XXX ±0.1 mm
3. Weight: Approx. 510 g

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