



FEATURES

- Efficiency up to 92%
- Wide input range, 9V-36V
- Package Dimension:
Panel Mount:
100.0*56.0*19.0mm (3.94"* 2.20"*0.75")
Din Rail:
118.6*67.1*23.5mm (4.67"*2.64"*0.93")
- Over voltage protection, hiccup mode
- Over current protection, hiccup mode
- Positive or Negative Remote ON/OFF
- Without tantalum capacitor inside module
- Operating Temperature range - 40°C to +85°C
- Input to Output Isolation: 1500VDC
- RoHS Compliant
- 3 Years Product Warranty
- Heat-sink is option
- EN 50155 Certified for built-in module
- IEC/EN/UL/CSA 60950-1
- IEC/EN/UL/CSA 62368-1
- CE Marked (EN 55032 and EN 55024)



The PM24S12005/DR24S12005 series are designed particularly for industrial applications where no PCB mounting is possible the module has to be mounted on a panel or din-rail. the highest power density (60W), isolated power converter. The DR24S12005/PM24S12005 series comes with a host of industry-standard features, such as over current protection, over voltage protection, over temperature protection and remote on/off. An optional heatsink is available for more extreme thermal requirements. All models have an ultra-wide 4:1 input voltage range (9V to 36V). With operating temperature of -40°C to +85°C, it is suitable for customers' critical applications, such as process control and automation, transportation, data communication and telecom equipment, test equipment, medical device and everywhere where space on the PCB is critical.

ABSOLUTE MAXIMUM RATINGS

| Item | Model | Min. | Typ. | Max. | Unit |
|---|------------|------|------|------|------|
| Input Continuous Voltage | All Models | 0 | --- | 36 | VDC |
| Input Surge Voltage (100 msec) | All Models | --- | --- | 50 | VDC |
| Operating Ambient Temperature (With derating) | All Models | -40 | --- | +85 | °C |
| Case Temperature | All Models | --- | --- | +100 | °C |
| Storage Temperature | PM24S12005 | -40 | --- | +85 | °C |
| | DR24S12005 | -40 | --- | +100 | °C |
| Input/Output Isolation Voltage (rated) | All Models | --- | --- | 1500 | VDC |

INPUT CHARACTERISTICS

| Item | Model | Min. | Typ. | Max. | Unit |
|--|-------------------------------|------|------|------|------|
| Operating Input Voltage | All Models | 9 | 24 | 36 | VDC |
| Input Turn-On Voltage Threshold | All Models | 8 | 8.5 | 9 | VDC |
| Input Turn-Off Voltage Threshold | All Models | 7.2 | 7.7 | 8.2 | VDC |
| Input Under-Voltage Lockout Hysteresis | All Models | 0.2 | 1 | 1.5 | VDC |
| Maximum Input Current | All Models, Vin=24V, Max Load | --- | 2695 | --- | mA |
| No-Load Input Current | All Models, Vin=24V, No Load | --- | 62 | --- | mA |
| Off-Converter Input Current | All Models, Vin=24V | --- | 10 | --- | mA |
| Reverse Polarity Input Current | All Models | --- | --- | 0.5 | A |
| ON/OFF Control, Logic High | All Models | 2.4 | --- | 10 | VDC |
| ON/OFF Control, Logic Low | All Models | -0.7 | --- | 0.8 | VDC |

OUTPUT CHARACTERISTICS

| Item | Conditions | Min. | Typ. | Max. | Unit |
|--------------------------------|--|-------|------|-------|-------------------|
| Output Voltage Range | Vin=9V to 36V, Io=Open load, Tc=25°C | 11.88 | 12 | 12.12 | V |
| Output Voltage Accuracy | | --- | --- | ±1 | %Vo |
| Load Regulation | Vin=24V | --- | --- | ±60 | mV |
| Line Regulation | Vin=9V to 36V | --- | --- | ±0.2 | %Vo |
| Total Output Voltage Range | Over Load, Line and Temperature | --- | --- | ±3 | %Vo |
| Ripple & Noise | Vin=24V, Full Load | --- | 100 | --- | mV _{P-P} |
| Dynamic load response | 50%-75% full load, 0.1A/uS | --- | 2.5 | --- | %Vo |
| Output Current Range | Vin=9V to 36V | 0 | --- | 5000 | mA |
| Output Over Current Protection | Output Voltage 10% Low, Hiccup | 110 | --- | 150 | %Io,max |
| Short Output Protection | Long Term, Auto-recovery | | | | |
| Output Over-Voltage Protection | Hiccup, Auto-recovery | 115 | --- | 140 | %Vo |
| Output Trim Range | Pout ≅ max rated power, Io ≅ Io,max | -10 | --- | +10 | %Vo |
| Capacitive Load | Cap ESR>=10mohm;Full load;5%overshoot of Vout at startup | --- | --- | 6000 | uF |

EFFICIENCY

| Item | Conditions | Min. | Typ. | Max. | Unit |
|----------|--------------------------------|------|------|------|------|
| Max Load | Vin=24V, Io=Full Load, Tc=25°C | --- | 92.3 | --- | % |

GENERAL CHARACTERISTICS

| Item | Conditions | Min. | Typ. | Max. | Unit |
|---------------------------|------------|------|------|------|------|
| I/O Isolation Resistance | | 10 | --- | --- | MΩ |
| I/O Isolation Capacitance | | --- | 6800 | --- | pF |
| Switching Frequency | | --- | 330 | --- | KHz |

ENVIRONMENTAL SPECIFICATIONS

| Parameter | Model | Conditions | Min. | Max. | Unit |
|---------------------------|------------|------------|---------------------|------|----------|
| Humidity (non condensing) | All Models | | --- | 95 | % rel. H |
| Altitude | All Models | | | 2000 | m |
| Cooling | All Models | | Free-Air convection | | |

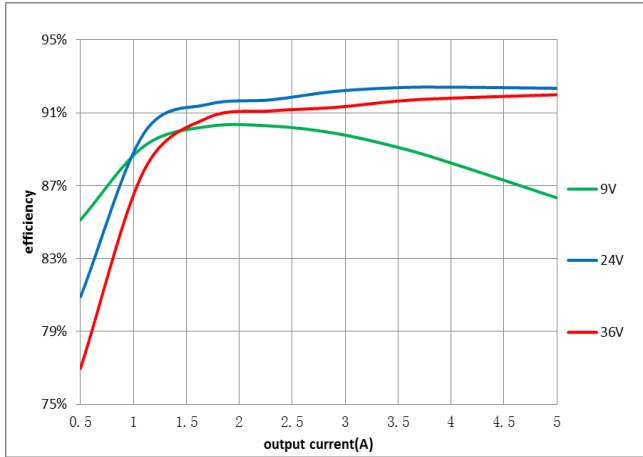
EMC SPECIFICATIONS

| Parameter | Standards & Level | Performance |
|-----------------------------|--|-------------|
| EMI | EN55022 ClassB | compliance |
| ESD | EN61000-4-2 air ± 8KV , Contact ± 6KV Perf. Criteria B | compliance |
| Radiated immunity | EN61000-4-3 20V/m Perf. Criteria A | compliance |
| Fast transient (See Note 5) | EN61000-4-4 ±2KV Perf. Criteria A | compliance |
| Surge (See Note 5) | EN61000-4-5 ±1KV Perf. Criteria A | compliance |
| Conducted immunity | EN61000-4-6 10V/m Perf. Criteria A | compliance |

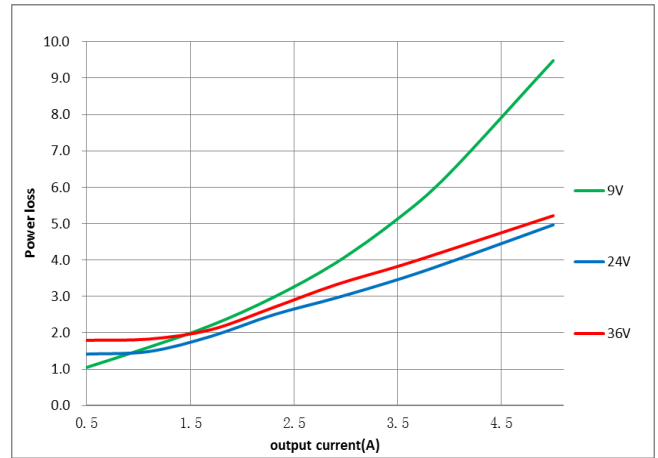
NOTES

- Specifications typical at Ta=+25°C, resistive load, nominal input voltage and rated output current unless otherwise noted.
- Ripple & Noise measurement bandwidth is 0-20MHz, with 10μF, tantalum capacitor and 1μF ceramic capacitor.
- Specifications are subject to change without notice.

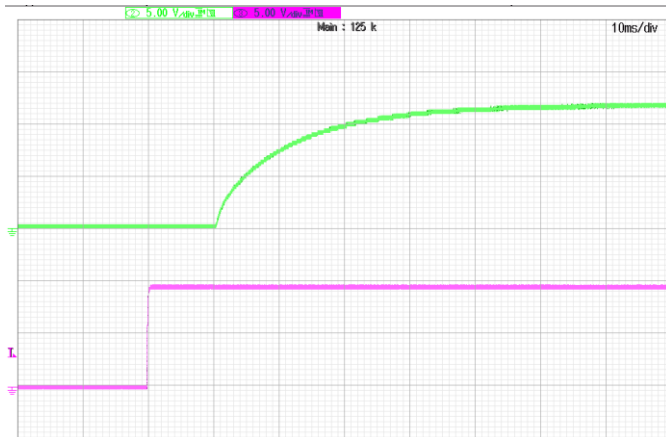
ELECTRICAL CHARACTERISTICS CURVES



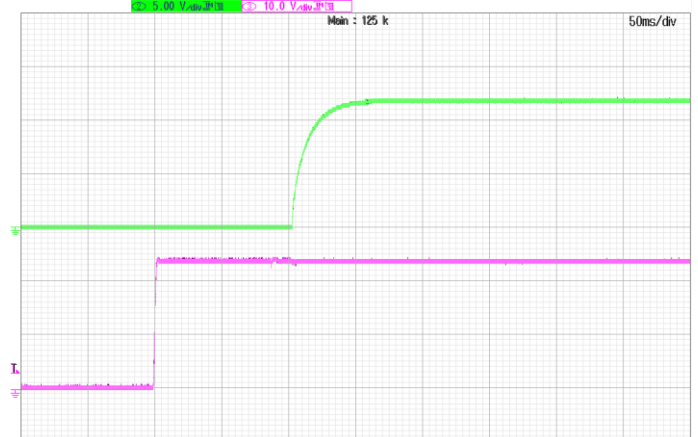
Efficiency vs. load current for various input voltage at 25°C.



Power dissipation vs. load current at 25°C.



Turn-on transient at full load current (10ms/div).
Top Trace: Vout; 2V/div; Bottom Trace: ON/OFF input: 5V/div.



Turn-on transient at full load current (50ms/div).
Top Trace: Vout; 2V/div; Bottom Trace: input voltage: 10V/div.

FEATURES DESCRIPTIONS

Over-Current Protection

The modules include an internal output over-current protection circuit, which will endure current limiting for an unlimited duration during output overload. If the output current exceeds the OCP set point, the modules will shut down (hiccup mode).

The modules will try to restart after shutdown. If the overload condition still exists, the module will shut down again. This restart trial will continue until the overload condition is corrected.

Over-Voltage Protection

The modules include an internal output over-voltage protection circuit, which monitors the voltage on the output terminals. If this voltage exceeds the over-voltage set point, the modules will shut down, and then restart after a hiccup-time (hiccup mode).

If latch mode is needed, please contact with Delta.

Over-Temperature Protection

The over-temperature protection consists of circuitry that provides protection from thermal damage. If the temperature exceeds the over-temperature threshold the module will shut down. The module will restart after the temperature is within specification.

Remote On/Off

The remote on/off feature on the module can be either negative or positive logic depend on the part number options on the last page.

- ❖ For Negative logic version, turns the module on during a external logic low and off during a logic high. If the remote on/off feature is not used, please short the on/off pin to Vi (-).
- ❖ For Postive logic version, turns the modules on during a external logic high and off during a logic low. If the remote on/off feature is not used, please leave the on/off pin to floating.

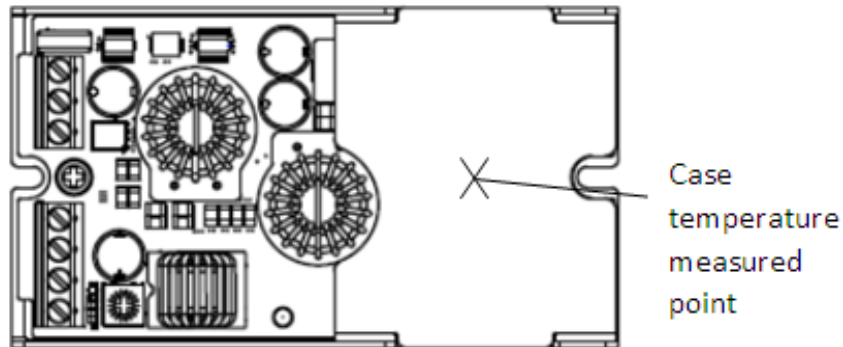
Remote on/off can be controlled by an external switch between the on/off terminal and the Vi (-) terminal. The switch can be an open collector or open drain.

Output Voltage Adjustment (TRIM)

Turn potentiometer on front panel:
clockwise to increase voltage value;
counter clockwise to decrease voltage value.

THERMAL CONSIDERATIONS

To enhance system reliability, the power module's case temperature should always be operated below 100°C. If the case temperature exceeds the maximum operating temperature, reliability of the unit may be affected.



THERMAL CURVES

The module is tested in the temperature chamber under natural convection.

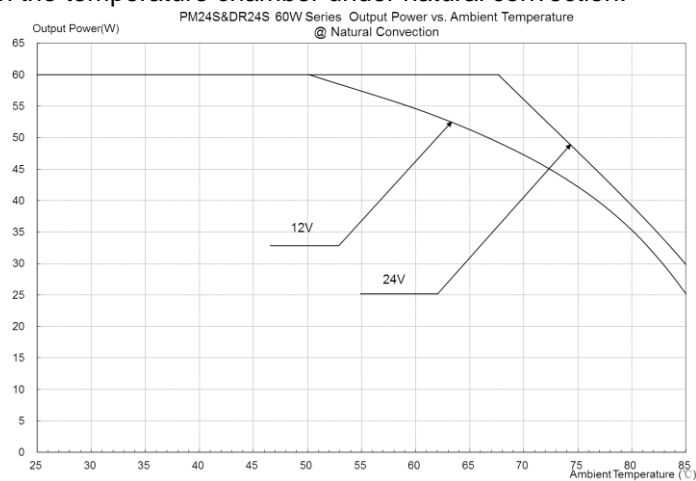
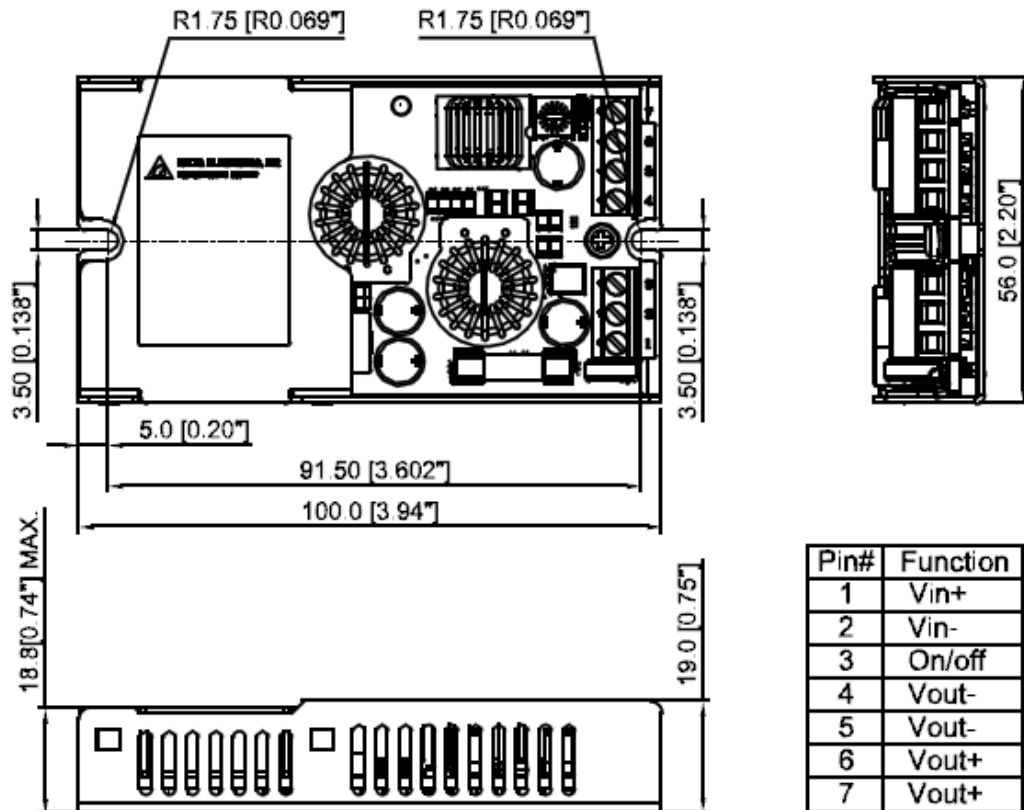


Figure1: PM24S12005&DR24S12005 60W series Output power vs Ambient temperature@Natural convection

MECHANICAL DRAWING (PANEL-MOUNT PACKAGE)

Mechanical Dimensions



Product Size: 100.0*56.0*19.0(3.94** 2.20**0.75")

Case material: Aluminum alloy

Baseplate material: Aluminum alloy

Input terminal: M3 Screw Terminal

Input wire range: 28~16 AWG

Output Terminal: M3 Screw Terminal

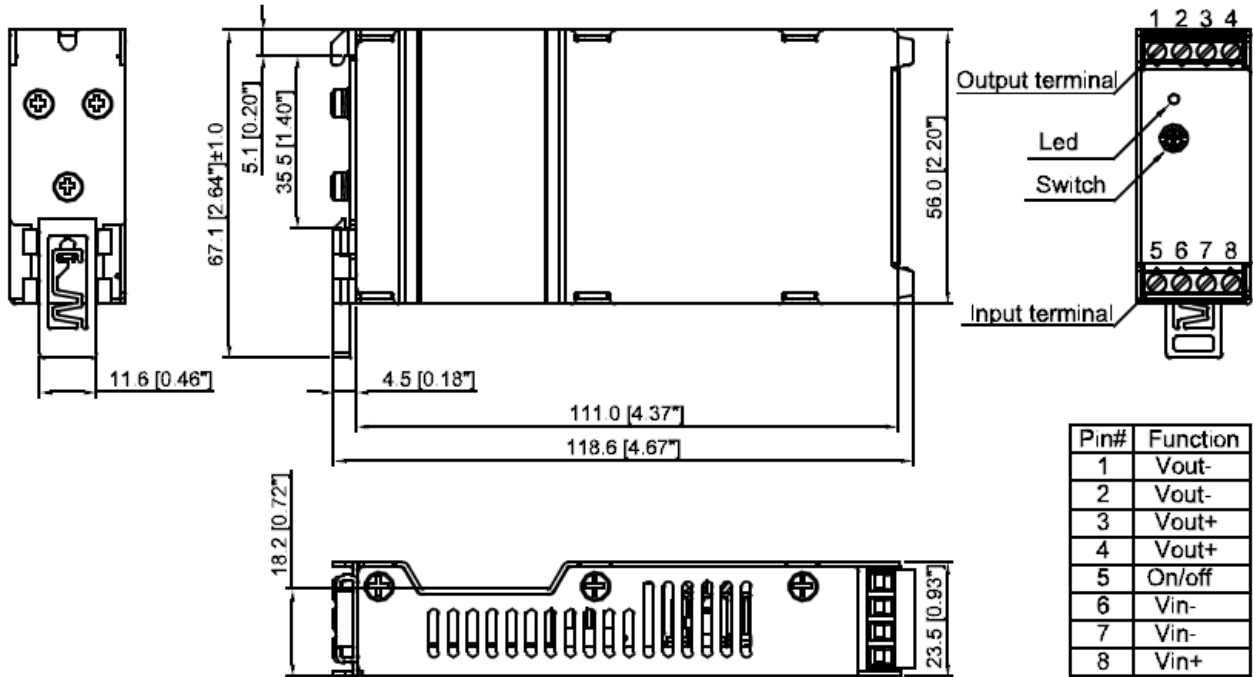
Output wire range: 28~16 AWG

Weight: 114 grams

- All dimensions in mm (inches)
- Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.010)

MECHANICAL DRAWING (DIN-RAIL PACKAGE)

Mechanical Dimensions



Product Size: 118.6*67.1*23.5(4.67"*2.64"*0.93")

Case material: Aluminum alloy

Baseplate material: Aluminum alloy

Input terminal: M3 Screw Terminal

Input wire range: 28~16 AWG

Output Terminal: M3 Screw Terminal

Output wire range: 28~16 AWG

Weight: 135 grams

- All dimensions in mm (inches)
- Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.010)

PART NUMBERING SYSTEM

| PM | 24 | S | 120 | 05 | P | A | F | A |
|------------------|---------------|------------------|----------------|----------------|------------------------------|--------------------|--------------------------|---------------------|
| Form factor | Input voltage | Number of output | Output voltage | Output current | On/off logic | Terminal Type | RoHS | Option Code |
| PM - Panel Mount | 24 - 9~36V | S - Single | 120 - 12V | 05 - 5A | N - Negative P - Positive | A - Screw terminal | F - RoHS 6/6 (Lead Free) | A - With EMI filter |

| DR | 24 | S | 120 | 05 | P | A | F | A |
|---------------------|---------------|------------------|----------------|----------------|------------------------------|--------------------|--------------------------|---------------------|
| Form factor | Input voltage | Number of output | Output voltage | Output current | On/off logic | Terminal Type | RoHS | Option Code |
| DR - Din-rail Mount | 24 - 9~36V | S - Single | 120 - 12V | 05 - 5A | N - Negative P - Positive | A - Screw terminal | F - RoHS 6/6 (Lead Free) | A - With EMI filter |

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