# 25W Isolated DC-DC Power Module

## ATMV24V150V167MA1

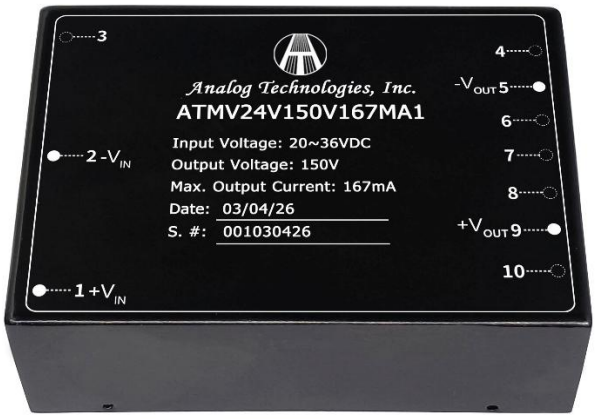



Figure 1. Top View ATMV24V150V167MA1




Figure 3. Side View



Figure 2. Side View



Figure 4. Bottom View

## FEATURES

- Wide Input Power Voltage Range: 20V to 36V
- Output Voltage: 150V
- Max. Output Current: 167mA
- High Efficiency: 84%
  @$V_{IN}$ = 24V & $V_{OUT}$ =150V & $I_{OUT}$ = 167mA
- Output Ripple Voltage: ±1% @20MHz
- Isolation Voltage: 1500VDC
- Output Short-Circuit Protection: Automatic Recovery
- Full Aluminum Housing for Complete Shielding
- Industry Standard DIP Package
- Operating Temperature Range: −40°C ~ +85°C
- 100 % Lead (Pb)-free and RoHS Compliant

## APPLICATIONS

This power module, ATMV24V150V167MA1, is designed for achieving DC-DC conversion from low voltage to high voltage as a power supply source. It is widely used in scientific research and other fields including:

- Sustaining Ion Pumps
- Spectral Analysis
- Electrophoresis
- Particle Accelerator
- Capillary Electrophoresis
- Piezo Devices
- Photo Multiplier Tubes
- Avalanche Photo Diodes


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## DESCRIPTION

This power module is a medium voltage, isolated DC−DC converter with 2:1 input voltage range. With a wide operating temperature range, built in short-circuit protection, providing this unit with high reliability and long life.

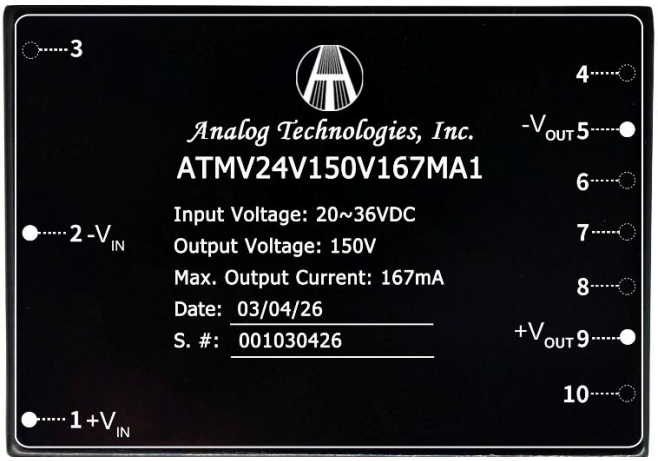



Figure 5. Top View




Figure 6. Bottom View

**Table 1. Pin Names, Functions and Specifications.**

| No. | Name | Type | Description | Min. | Typ. | Max. |
|---|---|---|---|---|---|---|
| 1 | $V_{IN+}$ | Input | Positive Input Voltage | 20V | 24V | 36V |
| 2 | $V_{IN-}$ | Input | Negative Input Voltage | | 0V | |
| 3 | NP | - | No Pin | - | - | - |
| 4 | NP | - | No Pin | - | - | - |
| 5 | $V_{OUT-}$ | Output | Negative Output Voltage | | 0V | |
| 6 | NP | - | No Pin | - | - | - |
| 7 | NP | - | No Pin | - | - | - |
| 8 | NP | - | No Pin | - | - | - |
| 9 | $V_{OUT+}$ | Output | Positive Output Voltage | | | 150V |
| 10 | NP | - | No Pin | - | - | - |


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## SPECIFICATIONS

**Table 2.**

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit/Note |
|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | 20 | 24 | 36 | V |
| Input Quiescent Current | $I_{IN_QC}$ | $V_{IN}$ = 24V<br>$I_{OUT}$ = 0mA | | 60 | | mA |
| Input Current | $I_{IN}$ | $I_{OUT}$ = 167mA | | 1200 | | mA |
| Leakage Current | $I_L$ | | | 2 | | mA |
| Output Voltage | $V_{OUT}$ | $V_{IN}$ = 20V ~ 36V<br>$I_{OUT}$ = 0 ~ 167mA | 0 | | 150 | V |
| Output Voltage Accuracy | | $V_{IN}$ = 20V ~ 36V | | ±2 | | % |
| Output Current Range | $I_{OUTMAX}$ | $V_{IN}$ = 20V ~ 36V | 0 | | 167 | mA |
| Output Voltage Ripple | $V_{OUT_RP}$ | Bandwidth = 20MHz | | ±1 | | % |
| Output Short-Circuit Protection Time | $t_{SC}$ | | Sustainable short-circuit operation | | | |
| Switching Frequency | $f_{SW}$ | $V_{VPS}$ = 24V<br>$I_{OUT}$ = 167mA | | 125 | | kHz |
| Line Regulation | $\Delta V_{OUT}/\Delta V_{VPS}$ | $V_{VPS}$ = 24V<br>$I_{OUT}$ = 167mA | | ±1 | | % |
| Load Regulation | $\Delta V_{OUT}/\Delta I_{OUT}$ | $V_{VPS}$ = 24V<br>Load change from 10% to 100% | | ±1 | | % |
| Isolation Voltage | $V_{IS}$ | | | 1500 | | VDC |
| Isolation Resistance | | Input to Output, 500VDC, $T_A$ = 25°C, 70%RH | | 1000 | | MΩ |
| Output Voltage Temperature Coefficient | $TCV_{OUT}$ | $V_{VPS}$ = 24V<br>$I_{OUT}$ = 167mA | | | 0.03 | %/°C |
| Cooling Method | | | Air Cooling | | | |
| Mean Time Between Failure | MTBF | MIL-HDBK-217F@25°C | | 1000 | | Kh |
| Operating Temperature Range | $T_{opr}$ | | −40 | | 85 | °C |
| Storage Temperature Range | $T_{stg}$ | | −40 | | 105 | °C |
| Maximum Soldering Temperature on Connection Pins | $T_{sld}$ | Soldering Time:10s | | | 300 | °C |
| Case Temperature Rise | $T_{cs}$ | $V_{VPS}$ = 24V<br>$I_{OUT}$ = 167mA<br>$T_A$ = 25°C | | 35 | | °C |
| Storage Relative Humidity Range | RH | | | | 95 | % |
| Case Material | | | Aluminum | | | |
| External Dimensions (Exclude Connection Pins) | | | 72.00×40.00×24.00 | | | mm |
| | | | 2.835×1.575×0.945 | | | inch |
| Weight | | | | 120 | | g |
| | | | | 0.265 | | lbs |
| | | | | 4.233 | | Oz |


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## TYPICAL PERFORMANCE CHARACTERISTICS

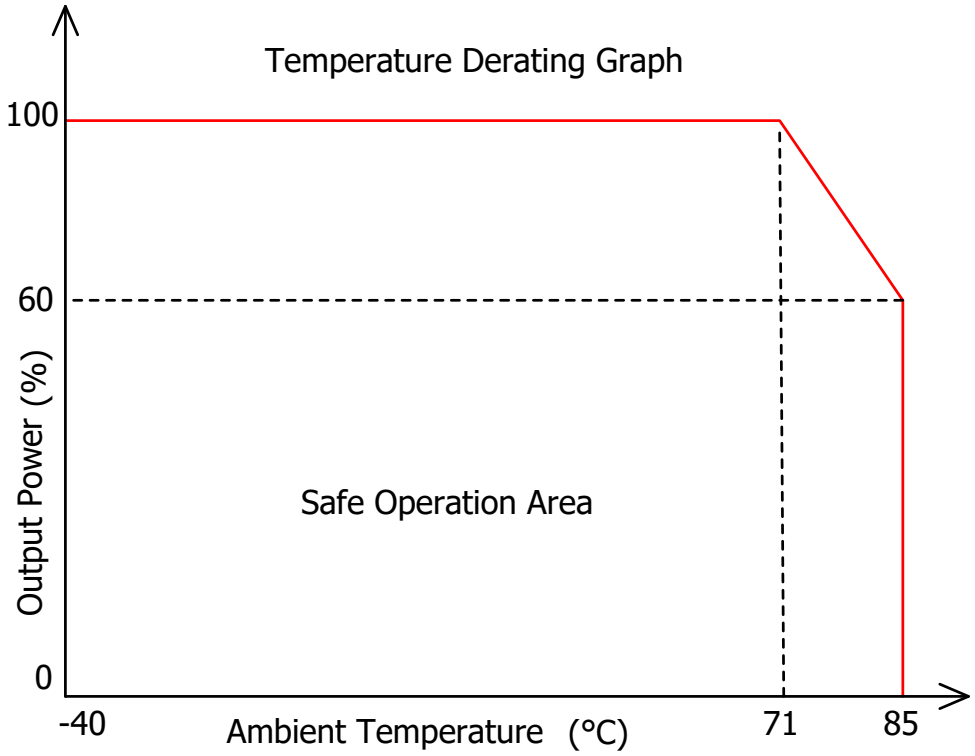



Figure 7. Derating Curve

## TYPICAL APPLICATIONS

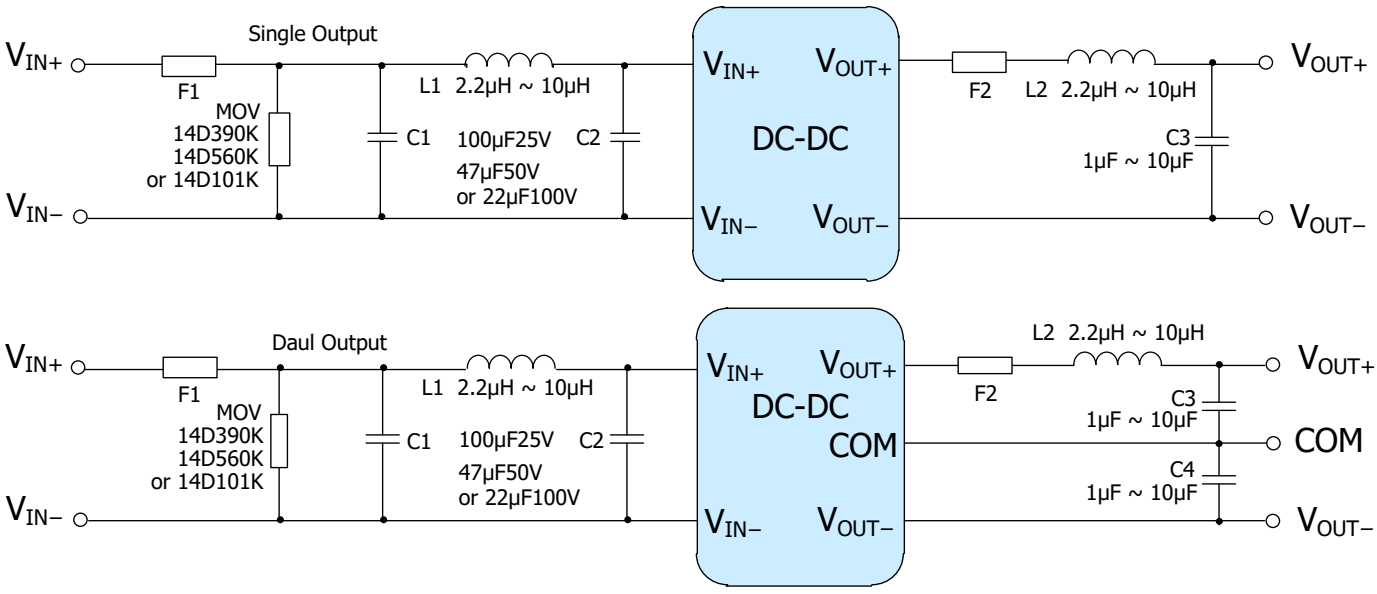



Figure 8. Typical Applications


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**Table 3. Recommended Values**

| | | |
|---|---|---|
| F1 | Input Time-delay Fuse | |
| F2 & F3 | Output Time-delay Fuse, or Resettable Fuse (PTC) | |
| MOV | 14D390K | Input Voltage: 12VDC |
| | 14D560K | Input Voltage: 24VDC |
| | 14D101K | Input Voltage: 48VDC |
| C1 & C2 | 100μF/25V | Input Voltage: 2VDC |
| | 47μF/50V | Input Voltage: 24VDC |
| | 22μF/100V | Input Voltage: 48VDC |
| C3 & C4 | 1.0μF ~ 10μF (High Frequency ESR) | |
| L1, L2 & L3 | 2.2μH ~ 10μH | |

To further reduce the input and output ripple, the parameters of the LC filter can be appropriately increased, but it should be noted that the external capacitor at the output end should not be too large, and should be lower than the maximum capacitive load of the product.

## NAMING PRINCIPLE

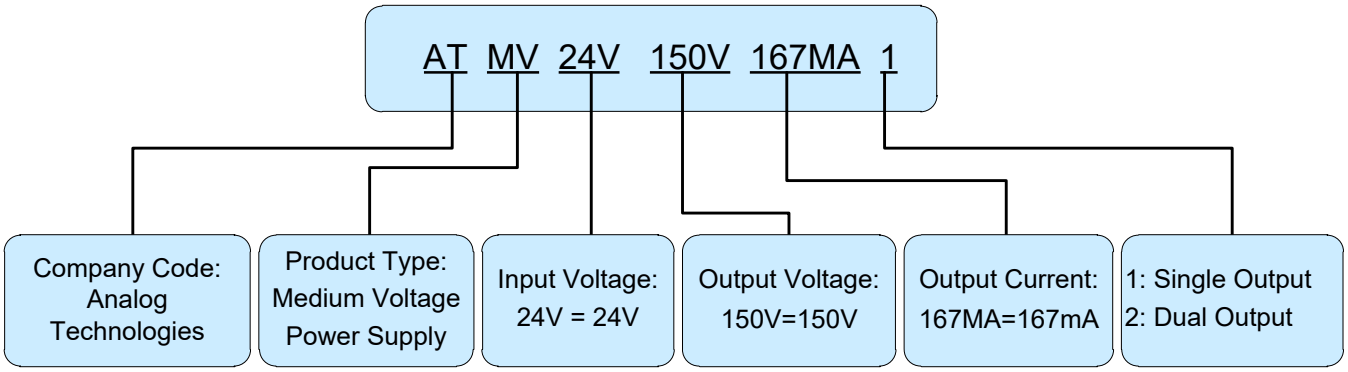
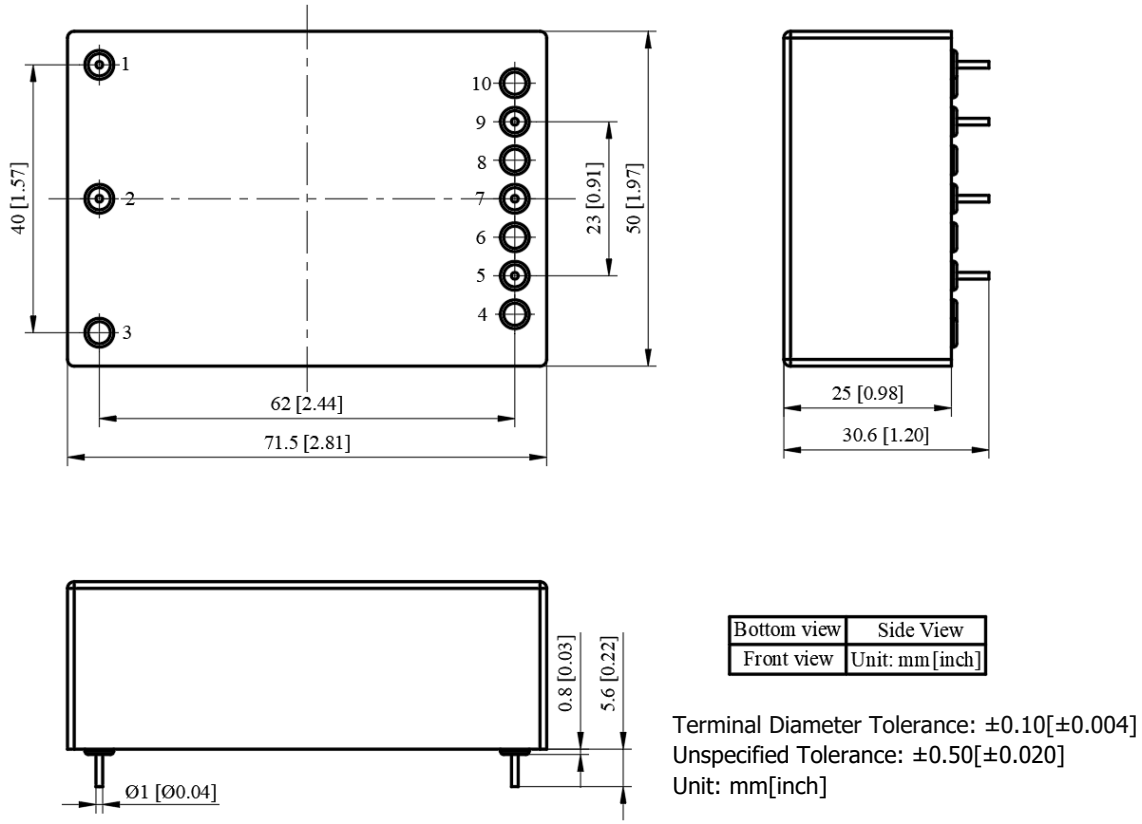



Figure 9. Naming Convention of ATMV24V100V250MA1


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## OUTLINE DIMENSIONS




| Bottom view | Side View |
|---|---|
| Front view | Unit: mm [inch] |

Terminal Diameter Tolerance: ±0.10[±0.004]
Unspecified Tolerance: ±0.50[±0.020]
Unit: mm[inch]

| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Single channel | $V_{IN+}$ | $V_{IN-}$ | NP | NP | $V_{OUT-}$ | NP | NP | NP | $V_{OUT+}$ | NP |
| Dual channel | $V_{IN+}$ | $V_{IN-}$ | NP | NP | $V_{OUT-}$ | NP | COM | NP | $V_{OUT+}$ | NP |

Figure 10. Outline Dimensions

## ORDERING INFORMATION

| Part Number | Buy Now |
|---|---|
| ATMV24V150V167MA1 | |

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**Table 4. ATMV24V150V167MA1 and Its Families**

| Product Model | Input Voltage | | Output Voltage | Output Current | Efficiency | MAX. Capacitive Load |
|---|---|---|---|---|---|---|
| | Typ. | Range | V | mA | % | µF |
| ATMV12V50V160MA1 | 12 | 9 ~ 18 | 50 | 160 | 78 | 100 |
| ATMV12V100V80MA1 | | | 100 | 80 | 76 | 100 |
| ATMV12V200V40MA1 | | | 200 | 40 | 75 | 68 |
| ATMV12V300V20MA1 | | | 300 | 20 | 74 | 47 |
| ATMV12V400V10MA1 | | | 400 | 10 | 73 | 33 |
| ATMV12V500V8MA1 | | | 500 | 8 | 72 | 22 |
| ATMV12V600V6.7MA1 | | | 600 | 6.7 | 70 | 10 |
| ATMV12V700V4.3MA1 | | | 700 | 4.3 | 68 | 4.7 |
| ATMV24V50V160MA1 | 24 | 18 ~ 36 | 100 | 80 | 78 | 100 |
| ATMV24V200V40MA1 | | | 200 | 40 | 77 | 68 |
| ATMV24V300V20MA1 | | | 300 | 20 | 75 | 47 |
| ATMV24V400V10MA1 | | | 400 | 10 | 74 | 33 |
| ATMV24V500V8MA1 | | | 500 | 8 | 73 | 22 |
| ATMV24V600V6.7MA1 | | | 600 | 6.7 | 71 | 10 |
| ATMV24V700V4.3MA1 | | | 700 | 4.3 | 70 | 4.7 |
| ATMV12V50V80MA2 | 12 | 9 ~ 18 | ±50 | ±80 | 76 | 68 |
| ATMV12V100V40MA2 | | | ±100 | ±40 | 75 | 68 |
| ATMV12V150V20MA2 | | | ±150 | ±20 | 74 | 47 |
| ATMV12V200V10MA2 | | | ±200 | ±10 | 73 | 33 |
| ATMV12V250V8MA2 | | | ±250 | ±8.0 | 72 | 22 |
| ATMV12V300V6.6MA2 | | | ±300 | ±6.6 | 70 | 10 |
| ATMV24V50V80MA2 | 24 | 18 ~ 36 | ±50 | ±80 | 78 | 68 |
| ATMV24V100V40MA2 | | | ±100 | ±40 | 77 | 68 |
| ATMV24V150V20MA2 | | | ±150 | ±20 | 75 | 47 |
| ATMV24V200V10MA2 | | | ±200 | ±10 | 74 | 33 |
| ATMV24V250V8MA2 | | | ±250 | ±8.0 | 73 | 22 |
| ATMV24V300V6.6MA2 | | | ±300 | ±6.6 | 71 | 10 |


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