



Size:
0.67 x 0.30 x 0.43 inches
17.0 x 7.62 x 11.0 mm

FEATURES

- RoHS Compliant
- 1 Watt Output Power
- Fully Regulated Single & Dual Outputs
- 1500VDC I/O Isolation
- High Efficiency up to 80%
- Low Ripple & Noise
- Compact SIP-6 Package
- 2:1 Wide Input Voltage Ranges
- -40°C to +85°C Operating Temperature Range
- Continuous Short Circuit Protection
- CSA/UL/IEC/EN 60950-1 Safety Approvals
- Input Filter Complies to EN55022, Class A & FCC, Level A

DESCRIPTION

The DCMAW1 series of DC/DC power converters consists of fully regulated single and dual output models with 2:1 wide input voltage ranges of 4.5-9 VDC, 9-18 VDC, 18-36 VDC, and 36-75 VDC. These converters provide 1 Watt of output power in a very small SIP-6 package occupying only 0.2 square inches on the PCB. A high efficiency allows these converters to operate at a wide operating temperature range of -40°C to +85°C without derating. Further features include low ripple & noise, 1500VDC I/O isolation, and short circuit protection. These converters are RoHS compliant and have CSA/UL/IEC/EN 60950-1 safety approvals. These converters' very compact dimensions make them an ideal solution for many space critical applications in battery powered instrumentations.

MODEL SELECTION TABLE

SINGLE OUTPUT MODELS

| Model Number | Input Voltage | Output Voltage | Output Current | | Input Current | | Reflected Ripple Current | Output Power | Efficiency | Maximum Capacitive Load |
|--------------|-------------------------|----------------|----------------|-------|---------------|----------|--------------------------|--------------|------------|-------------------------|
| | | | Min | Max | No Load | Max Load | | | | |
| DCMAW1-05S05 | 5 VDC (4.5 - 9 VDC) | 5 VDC | 0mA | 200mA | 40mA | 263mA | 80mA | 1W | 76% | 1680µF |
| DCMAW1-05S12 | | 12 VDC | 0mA | 83mA | | 259mA | | 1W | 77% | 820µF |
| DCMAW1-05S15 | | 15 VDC | 0mA | 67mA | | 254mA | | 1W | 79% | 680µF |
| DCMAW1-05S24 | | 24 VDC | 0mA | 42mA | | 265mA | | 1W | 76% | 470µF |
| DCMAW1-12S05 | 12 VDC (9 - 18 VDC) | 5 VDC | 0mA | 200mA | 20mA | 108mA | 40mA | 1W | 77% | 1680µF |
| DCMAW1-12S12 | | 12 VDC | 0mA | 83mA | | 108mA | | 1W | 77% | 820µF |
| DCMAW1-12S15 | | 15 VDC | 0mA | 67mA | | 105mA | | 1W | 80% | 680µF |
| DCMAW1-12S24 | | 24 VDC | 0mA | 42mA | | 109mA | | 1W | 77% | 470µF |
| DCMAW1-24S05 | 24 VDC (18 - 36 VDC) | 5 VDC | 0mA | 200mA | 10mA | 54mA | 30mA | 1W | 77% | 1680µF |
| DCMAW1-24S12 | | 12 VDC | 0mA | 83mA | | 52mA | | 1W | 80% | 820µF |
| DCMAW1-24S15 | | 15 VDC | 0mA | 67mA | | 52mA | | 1W | 80% | 680µF |
| DCMAW1-24S24 | | 24 VDC | 0mA | 42mA | | 55mA | | 1W | 77% | 470µF |
| DCMAW1-48S05 | 48 VDC (36 - 75 VDC) | 5 VDC | 0mA | 200mA | 7mA | 27mA | 20mA | 1W | 77% | 1680µF |
| DCMAW1-48S12 | | 12 VDC | 0mA | 83mA | | 27mA | | 1W | 78% | 820µF |
| DCMAW1-48S15 | | 15 VDC | 0mA | 67mA | | 27mA | | 1W | 78% | 680µF |
| DCMAW1-48S24 | | 24 VDC | 0mA | 42mA | | 28mA | | 1W | 76% | 470µF |

DUAL OUTPUT MODELS

| Model Number | Input Voltage | Output Voltage | Output Current | | Input Current | | Reflected Ripple Current | Output Power | Efficiency | Maximum Capacitive Load |
|--------------|-------------------------|----------------|----------------|-------|---------------|----------|--------------------------|--------------|------------|-------------------------|
| | | | Min | Max | No Load | Max Load | | | | |
| DCMAW1-05D12 | 5 VDC (4.5 - 9 VDC) | ±12 VDC | 0mA | ±42mA | 40mA | 262mA | 80mA | 1W | 77% | ±470µF |
| DCMAW1-05D15 | | ±15 VDC | 0mA | ±33mA | | 254mA | | 1W | 78% | ±330µF |
| DCMAW1-12D12 | 12 VDC (9 - 18 VDC) | ±12 VDC | 0mA | ±42mA | 20mA | 106mA | 40mA | 1W | 79% | ±470µF |
| DCMAW1-12D15 | | ±15 VDC | 0mA | ±33mA | | 106mA | | 1W | 78% | ±330µF |
| DCMAW1-24D12 | 24 VDC (18 - 36 VDC) | ±12 VDC | 0mA | ±42mA | 10mA | 53mA | 30mA | 1W | 80% | ±470µF |
| DCMAW1-24D15 | | ±15 VDC | 0mA | ±33mA | | 52mA | | 1W | 80% | ±330µF |
| DCMAW1-48D12 | 48 VDC (36 - 75 VDC) | ±12 VDC | 0mA | ±42mA | 7mA | 27mA | 20mA | 1W | 79% | ±470µF |
| DCMAW1-48D15 | | ±15 VDC | 0mA | ±33mA | | 26mA | | 1W | 79% | ±330µF |

SPECIFICATIONS: DCMW1 SERIES

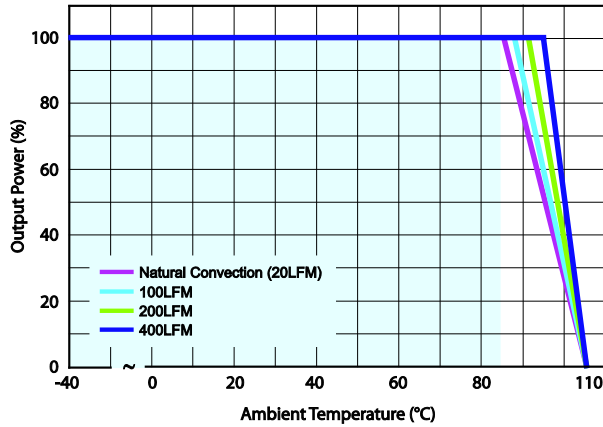
All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
 We reserve the right to change specifications based on technological advances.

| SPECIFICATION | TEST CONDITIONS | Min | Typ | Max | Unit |
|-------------------------------------|--------------------------------------|--|-----|-------|-------|
| INPUT SPECIFICATIONS | | | | | |
| Input Voltage Range | 5VDC nominal input models | 4.5 | 5 | 9 | VDC |
| | 12VDC nominal input models | 9 | 12 | 18 | |
| | 24VDC nominal input models | 18 | 24 | 36 | |
| | 48VDC nominal input models | 36 | 48 | 75 | |
| Input Surge Voltage (1 sec. max.) | 5VDC nominal input models | -0.7 | | 15 | VDC |
| | 12VDC nominal input models | -0.7 | | 25 | |
| | 24VDC nominal input models | -0.7 | | 50 | |
| | 48VDC nominal input models | -0.7 | | 100 | |
| Start-up Threshold Voltage | 5VDC nominal input models | | | 4.5 | VDC |
| | 12VDC nominal input models | | | 9 | |
| | 24VDC nominal input models | | | 18 | |
| | 48VDC nominal input models | | | 36 | |
| Input Current | | See Table | | | |
| Reflected Ripple Current | | See Table | | | |
| Input Fuse | 5VDC nominal input models | 500mA slow-blow type | | | |
| | 12VDC nominal input models | 250mA slow-blow type | | | |
| | 24VDC nominal input models | 120mA slow-blow type | | | |
| | 48VDC nominal input models | 60mA slow-blow type | | | |
| Internal Filter Type | All models | capacitor | | | |
| OUTPUT SPECIFICATIONS | | | | | |
| Output Voltage | | See Table | | | |
| Output Voltage Setting Accuracy | At 50% load and nominal Vin | | | ±1.0 | %Vnom |
| Line Regulation | Low line to high line | | | ±0.2 | % |
| Load Regulation | No load to full load | Single Output Models | | ±1.0 | % |
| | | Dual Output Models | | ±1.0 | % |
| | 10% load to 90% load | Single Output Models | | ±0.5 | % |
| | | Dual Output Models | | ±0.8 | % |
| Minimum Load | | No minimum load requirements | | | |
| Output Power | | | 1 | | W |
| Output Current | | See Table | | | |
| Ripple & Noise | 20MHz bandwidth | | 50 | | mVp-p |
| Transient Recovery Time | 25% load step change | | 250 | | µs |
| Temperature Coefficient | | | | ±0.02 | %/°C |
| PROTECTION | | | | | |
| Short Circuit Protection | | Continuous | | | |
| GENERAL | | | | | |
| Efficiency | | See Table | | | |
| Switching Frequency | | | 220 | | KHz |
| Isolation Voltage (Input to Output) | 60 seconds | 1500 | | | VDC |
| Isolation Resistance | 500VDC | 1000 | | | MΩ |
| Isolation Capacitance | 100kHz, 1V | | | 50 | pF |
| Maximum Capacitive Load | | See Table | | | |
| ENVIRONMENTAL SPECIFICATIONS | | | | | |
| Operating Temperature Range | Natural convection | -40 | | +85 | °C |
| Case Temperature | | | | +105 | °C |
| Storage Temperature | | -55 | | +125 | °C |
| Humidity | Non-condensing | | | 95 | % RH |
| Cooling | | natural convection | | | |
| Lead Temperature | 1.5mm from case for 10 seconds | | | 260 | °C |
| MTBF (calculated) | MIL-HDBK-217F at 25°C, Ground Benign | 2,800,000 | | | hours |
| PHYSICAL SPECIFICATIONS | | | | | |
| Weight | | 0.46oz (12.9g) | | | |
| Dimensions (L x W x H) | | 0.67 x 0.30 x 0.43 inch (17.0 x 7.62 x 11.0 mm) | | | |
| Case Material | Flammability to UL 94V-0 rated | Non-conductive black plastic | | | |
| Pin Material | | Alloy 42 | | | |
| SAFETY & EMC | | | | | |
| Safety Approvals ⁽¹⁾ | | UL/cUL 60950-1 recognition (CSA Certificate), IEC/EN 60950-1 (CB-scheme) | | | |

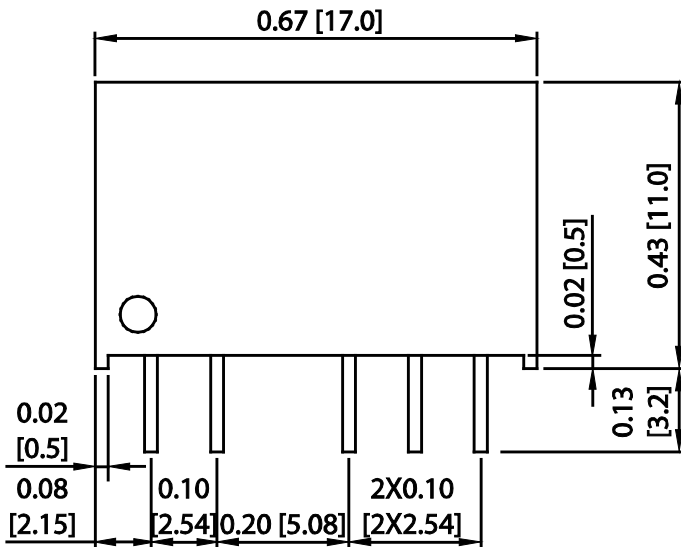
NOTES

- This product is Listed to applicable standards and requirements by UL.
**Due to advances in technology, specifications subject to change without notice.*

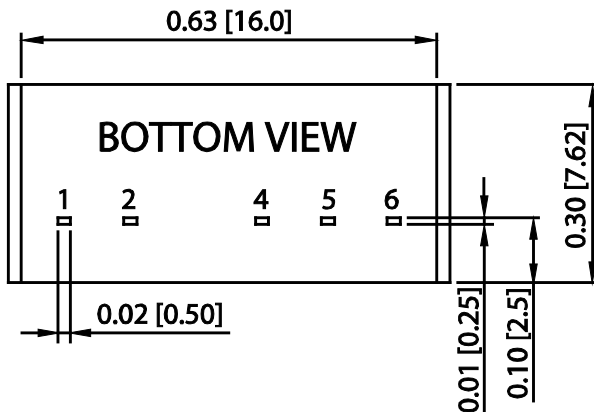
DERATING CURVE



MECHANICAL DRAWINGS



| PIN CONNECTIONS | | |
|-----------------|----------------|--------------|
| Pin | Single Outputs | Dual Outputs |
| 1 | -Vin | -Vin |
| 2 | +Vin | +Vin |
| 4 | +Vout | +Vout |
| 5 | No Pin | Common |
| 6 | -Vout | -Vout |



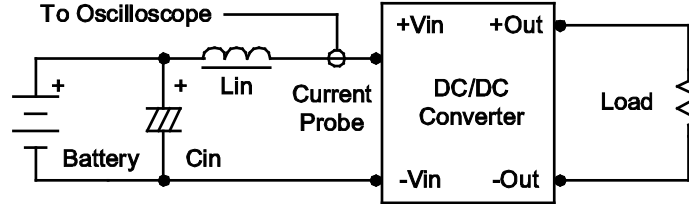
NOTES

- Unit: inches [mm]
- Tolerance: X.XX±0.02 [X.X±0.5]
X.XXX±0.01 [X.XX±0.25]
- Pins: ±0.002 [±0.05]
- Case Material: Non-conductive black plastic (flammability to UL 94V-0 rated)
- Pin Material: Alloy 42
- Weight: 0.46oz (12.9g)

TEST CONFIGURATIONS

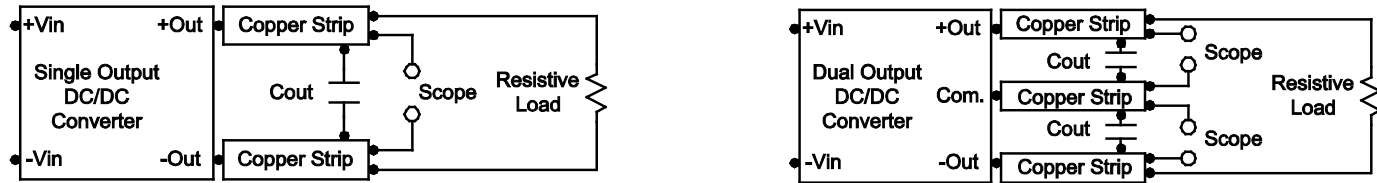
Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} ($4.7\mu H$) and C_{in} ($220\mu F$, $ESR < 1.0\Omega$ at 100 KHz) to simulate source impedance. Capacitor C_{in} offsets possible battery impedance. Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0-500 KHz.



Peak-to-Peak Output Noise Measurement Test

Use a $0.47\mu F$ ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 50mm and 75mm from the DC/DC converter.



DESIGN & FEATURE CONSIDERATIONS

Maximum Capacitive Load

The DCMAW1 series has a limitation of maximum connected capacitance on the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the start-up time. The maximum capacitance can be found in the model selection table.

Over Current Protection

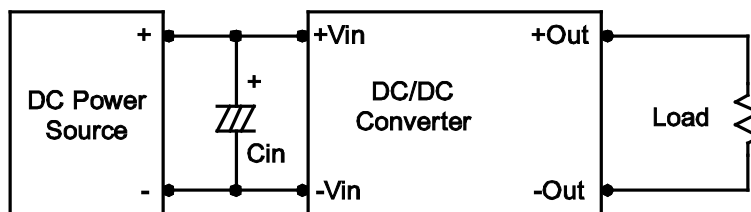
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure overload for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.

In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

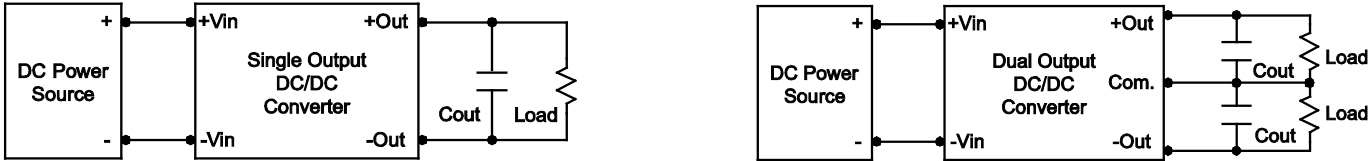
A Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance ($ESR < 1.0\Omega$ at 100KHz) capacitor of $8.2\mu F$ for 5VDC nominal input models, a $3.3\mu F$ for 12VDC input models, and a $1.5\mu F$ for 24VDC and 48VDC input models.



DESIGN & FEATURE CONSIDERATIONS

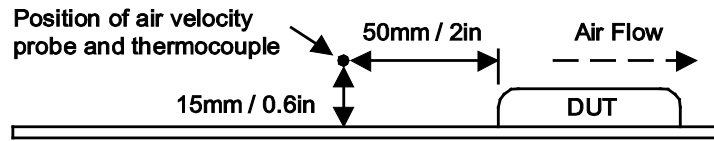
Output Ripple Reduction

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 3.3µF capacitors at the output.



Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105°C. The derating curves are determined from measurements obtained in a test setup.



MODEL NUMBER SETUP

| DCMAW | 1 | - | 12 | S | 12 |
|-------------|--------------|---|---|--|---|
| Series Name | Output Power | | Input Voltage | No. of Outputs | Output Voltage |
| | 1: 1 Watt | | 05: 4.5 – 9 VDC 12: 9 – 18 VDC 24: 18 – 36 VDC 48: 36 – 75 VDC | S: Single Output D: Dual Output | 05: 5 VDC 12: 12 VDC 15: 15 VDC 24: 24 VDC 12: ±12 VDC 15: ±15 VDC |

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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