

TOTAL POWER INT'L

MIW1300 Series

3 Watts 3:1 Wide Input Range DC/DC Converters

Single and Dual Outputs

Key Features

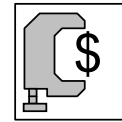
- High Efficiency up to 81%
- 3:1 Input Range
- Industry Standard Pinout
- SMT Technology
- I/O Isolation 1000VDC
- Short Circuit Protection
- EMI Complies With EN55022 Class A
- MTBF > 1,000,000 Hours



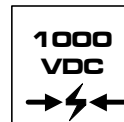
MIW1300-Series power modules are low-profile dc-dc converters that operate over an input voltage range of 10–30VDC and provide precisely regulated output voltages of 5V and 12V in both single and dual output configurations.

The -25°C to +75°C operating temperature range makes it ideal for data communication equipments, mobile battery driven equipments, distributed power systems, telecommunication equipments, mixed analog/digital subsystems, process/machine control equipments, computer peripheral systems and industrial robot systems.

The modules have a maximum power rating of 3W and a typical full-load efficiency of 80%, continuous short circuit, 60mA output ripple, built-in filtering for both input and output minimizes the need for external filtering.



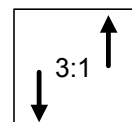
Low Cost



I/O Isolation



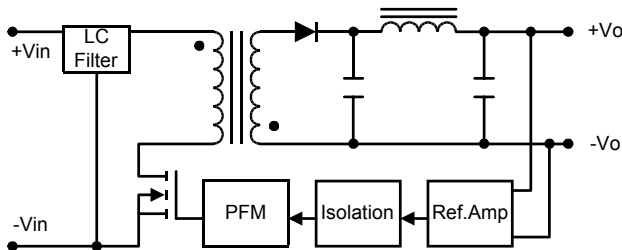
EN55022



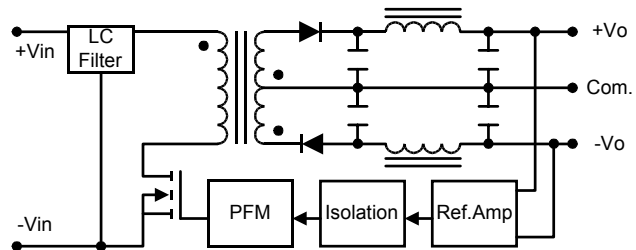
Wide Range

Block Diagram

Single Output



Dual Output



MIW1300 Series

Model Selection Guide

| Model Number | Input Voltage | Output Voltage | Output Current | | Input Current | | Reflected Ripple Current | Efficiency |
|--------------|-----------------|----------------|----------------|-------|---------------|-----------|--------------------------|------------|
| | | | Max. | Min. | @Max. Load | @No Load | | @Max. Load |
| | VDC | VDC | mA | mA | mA (Typ.) | mA (Typ.) | mA (Typ.) | % (Typ.) |
| MIW1322 | 20 (10 ~ 30) | 5 | 600 | 60 | 188 | 5 | 20 | 80 |
| MIW1323 | | 12 | 250 | 25 | 188 | | | 80 |
| MIW1324 | | 15 | 200 | 20 | 188 | | | 80 |
| MIW1326 | | ±12 | ±125 | ±12.5 | 188 | | | 80 |
| MIW1327 | | ±15 | ±100 | ±10 | 188 | | | 80 |
| | | | | | | | | |

Absolute Maximum Ratings

| Parameter | Min. | Max. | Unit |
|------------------------------------------------|------|-------|------|
| Input Surge Voltage | -0.7 | 50 | VDC |
| Lead Temperature (1.5mm from case for 10 Sec.) | --- | 260 | °C |
| Internal Power Dissipation | --- | 2,500 | mW |

Exceeding these values can damage the module. These are not continuous operating ratings.

Note :

1. Specifications typical at $T_a=+25^{\circ}\text{C}$, resistive load, nominal input voltage, rated output current unless otherwise noted.
2. Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
3. Ripple & Noise measurement bandwidth is 0-20 MHz.
4. These power converters require a minimum output loading to maintain specified regulation.
5. Operation under no-load conditions will not damage these devices; however they may not meet all listed specifications.
6. All DC/DC converters should be externally fused at the front end for protection.
7. Other input and output voltage may be available, please contact factory.
8. Specifications subject to change without notice.

Environmental Specifications

| Parameter | Conditions | Min. | Max. | Unit |
|-----------------------|---------------------|------|------|------|
| Operating Temperature | Ambient | -25 | +75 | °C |
| Operating Temperature | Case | -40 | +90 | °C |
| Storage Temperature | | -40 | +125 | °C |
| Humidity | | --- | 95 | % |
| Cooling | Free-Air Convection | | | |
| Conducted EMI | EN55022 Class A | | | |

Input Specifications

| Parameter | Model | Min. | Typ. | Max. | Unit |
|--------------------------------|------------|-----------|------|------|------|
| Start Voltage | All Models | 4.5 | 7 | 9 | VDC |
| Under Voltage Shutdown | | --- | 6.5 | 8.5 | |
| Reverse Polarity Input Current | | --- | --- | 1 | A |
| Short Circuit Input Power | | --- | 1000 | 1500 | mW |
| Input Filter | | Pi Filter | | | |

MIW1300 Series

Output Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|--------------------------------|------|------------|------------|-----------------------|
| Output Voltage Accuracy | | --- | ± 0.5 | ± 2.0 | % |
| Output Voltage Balance | Dual Output Balance Load | --- | ± 0.5 | ± 2.0 | % |
| Line Regulation | $V_{in} = \text{Min. to Max.}$ | --- | ± 0.2 | ± 0.5 | % |
| Load Regulation | $I_o = 10\% \text{ to } 100\%$ | --- | ± 0.2 | ± 0.5 | % |
| Ripple & Noise (20MHz) | | --- | 45 | 60 | mV P-P |
| Ripple & Noise (20MHz) | Over Line, Load & Temp | --- | --- | 80 | mV P-P |
| Ripple & Noise (20MHz) | | --- | --- | 28 | mV rms. |
| Over Power Protection | | 120 | --- | --- | % |
| Transient Recovery Time | 25% Load Step Change | --- | 300 | 500 | μs |
| Transient Response Deviation | | --- | ± 3 | ± 5 | % |
| Temperature Coefficient | | --- | ± 0.01 | ± 0.05 | %/ $^{\circ}\text{C}$ |
| Output Short Circuit | Continuous | | | | |

General Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------|-------------------------------------------------------|------|------|------|------------|
| Isolation Voltage | 60 Seconds | 1000 | --- | --- | VDC |
| Isolation Test Voltage | Flash Tested for 1 Second | 1100 | --- | --- | VDC |
| Isolation Resistance | 500VDC | 1000 | --- | --- | M Ω |
| Isolation Capacitance | 100KHz, 1V | --- | --- | 500 | pF |
| Switching Frequency | | --- | 300 | --- | KHz |
| MTBF | MIL-HDBK-217F @ 25 $^{\circ}\text{C}$, Ground Benign | 1000 | --- | --- | K Hours |

Capacitive Load

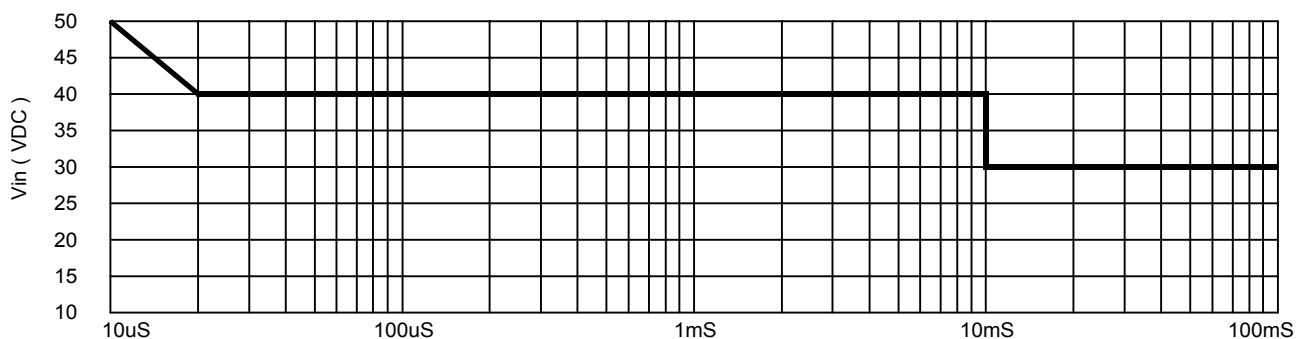
| Models by Vout | 5V | 12V | 15V | $\pm 12\text{V}$ # | $\pm 15\text{V}$ # | Unit |
|-------------------------|------|------|------|--------------------|--------------------|---------------|
| Maximum Capacitive Load | 4000 | 4000 | 4000 | 470 | 470 | μF |

Note: # For each output .

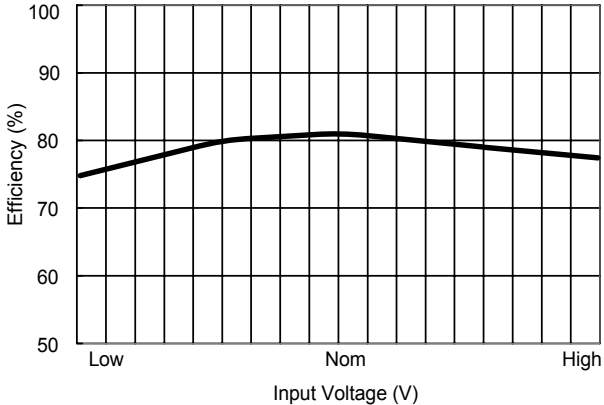
Input Fuse Selection Guide

| |
|------------------------|
| All Models |
| 600mA Slow - Blow Type |

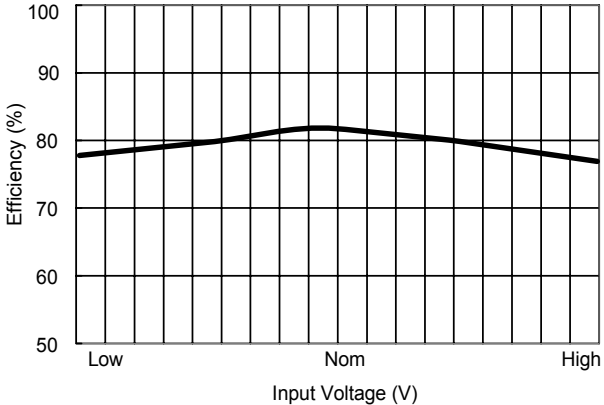
Input Voltage Transient Rating



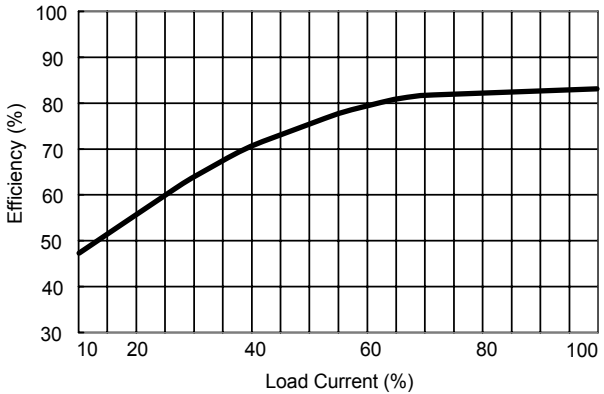
MIW1300 Series



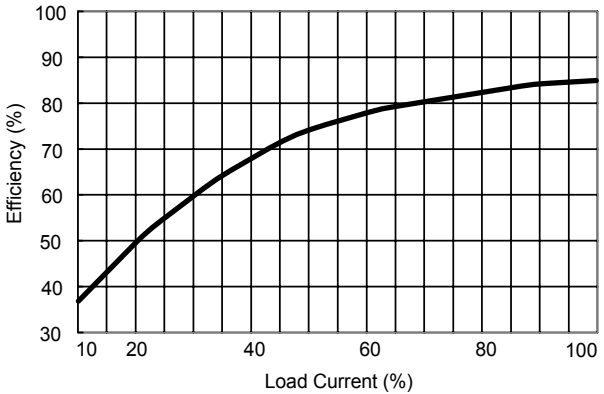
Efficiency vs Input Voltage (Single Output)



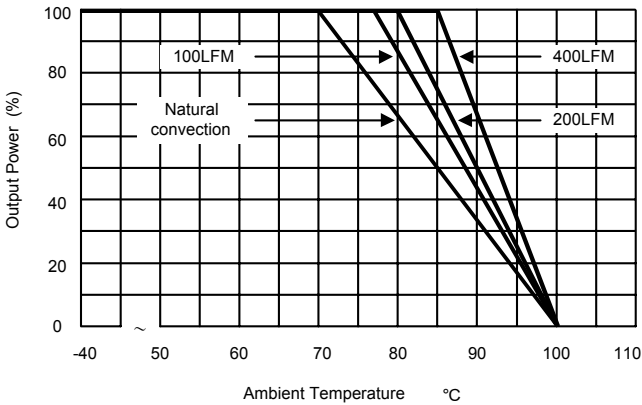
Efficiency vs Input Voltage (Dual Output)



Efficiency vs Output Load (Single Output)



Efficiency vs Output Load (Dual Output)

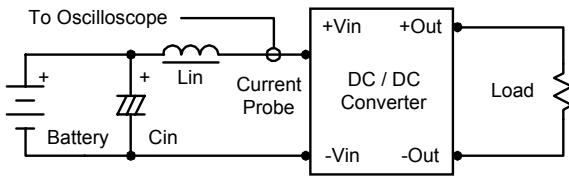


Derating Curve

MIW1300 Series

Test Configurations

Input Reflected-Ripple Current Test Setup



Input reflected-ripple current is measured with an inductor L_{in} (4.7uH) and C_{in} (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.

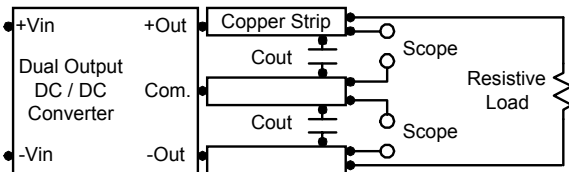
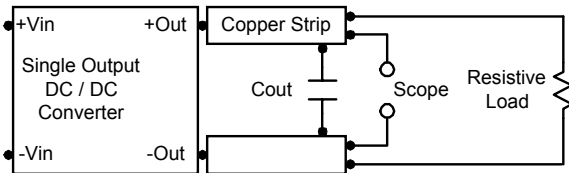
Capacitor C_{in} , offsets possible battery impedance.

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 C_{out} 0.47uF ceramic capacitor.

Scope measurement should be made by using a BNC socket, measurement bandwidth is 0–20 MHz. Position the load between 50 mm and 75 mm from the DC/DC Converter.



Design & Feature Considerations

Maximum Capacitive Load

The MIW1300 series has limitation of maximum connected capacitance at the output.

The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time.

For optimum performance we recommend 470uF maximum capacitive load for dual outputs and 4000uF capacitive load for single outputs.

The maximum capacitance can be found in the data.

Overcurrent Protection

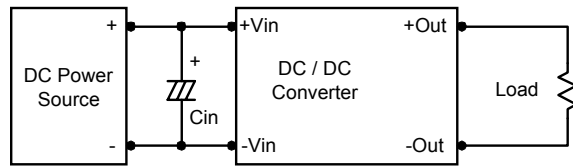
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally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

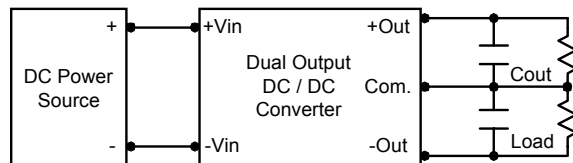
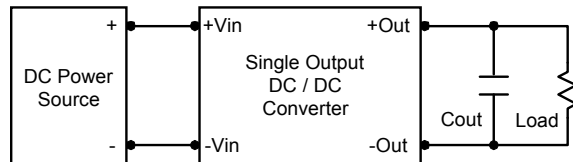
Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 KHz) capacitor of a 3.3uF for the devices.



Output Ripple Reduction

A good quality low ESR capacitor placed as close as practicable across the load will give the best ripple and noise performance.

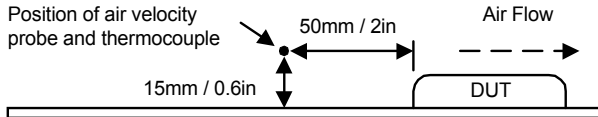
To reduce output ripple, it is recommended to use 3.3uF capacitors at the output.



Thermal Considerations

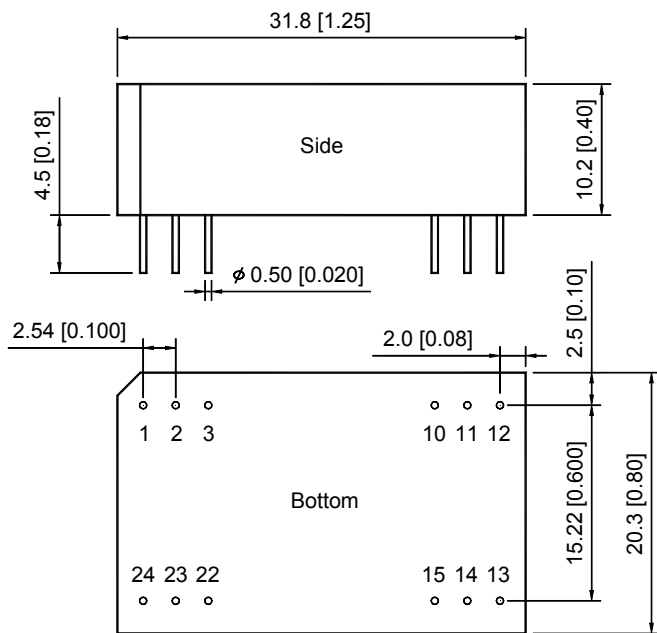
Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 90°C.

The derating curves are determined from measurements obtained in an experimental apparatus.



MIW1300 Series

Mechanical Data

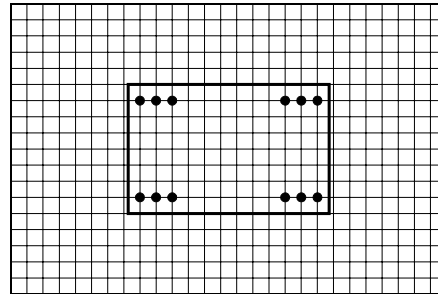


| Tolerance | Millimeters | Inches |
|-----------|----------------|-----------------|
| | .X \pm 0.25 | .XX \pm 0.01 |
| | .XX \pm 0.25 | .XXX \pm 0.01 |
| Pin | \pm 0.05 | \pm 0.002 |

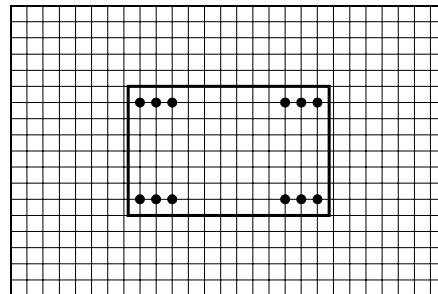
Connecting Pin Patterns

Top View (2.54 mm / 0.1 inch grids)

Single Output



Dual Output



Pin Connections

| Pin | Single Output | Dual Output |
|-----|---------------|-------------|
| 1 | +Vin | +Vin |
| 2 | NC | -Vout |
| 3 | NC | Common |
| 10 | -Vout | Common |
| 11 | +Vout | +Vout |
| 12 | -Vin | -Vin |
| 13 | -Vin | -Vin |
| 14 | +Vout | +Vout |
| 15 | -Vout | Common |
| 22 | NC | Common |
| 23 | NC | -Vout |
| 24 | +Vin | +Vin |

NC: No Connection

Physical Characteristics

| | |
|---------------|--------------------------------------------|
| Case Size | : 31.8x20.3x10.2 mm 1.25x0.8x0.4 inches |
| Case Material | : Non-Conductive Black Plastic |
| Weight | : 12.4g |
| Flammability | : UL94V-0 |

Units are encapsulated in a low thermal resistance molding compound which has excellent chemical resistance and electrical properties in high humidity environment and over a wide operating temperature range. The encapsulant and outer shell of the unit have UL94V-0 ratings. The leads are golden plated for better soldering.