

FEATURES

- ▶ DIP-24 Metal Package
31.8 x 20.3 x 10.2 mm (1.25 x 0.8 x 0.4 inches)
- ▶ Ultra-wide 4:1 Input Range
- ▶ Excellent Load and Line Regulation
- ▶ Operating Temp. Range -40°C to +85°C
- ▶ Short Circuit Protection
- ▶ I/O-isolation 1500VDC
- ▶ Input Filter meets EN55022, class A and FCC, level A
- ▶ 3 Years Product Warranty



PRODUCT OVERVIEW

The MINMAX MIW4100 series is a range of isolated DC/DC converter modules with 5-6W output power featuring fully regulated output voltages and ultra-wide 4:1 input voltage ranges. The product comes in a shielded metal DIP-24 package with standard pinout. A high efficiency allows an operating temperature range of -40°C to +85°C. The product features an input filter meeting EN 55022, class A and FCC, level A.

Typical applications for these converters are in battery operated equipment and instrumentation, distributed power systems, data communication and general industrial electronics.

Model Selection Guide

Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current		Input Current		Reflected Ripple Current mA(typ.)	Max. capacitive Load uF	Efficiency (typ.) @Max. Load %
			Max.	Min.	@Max. Load	@No Load			
			mA	mA	mA(typ.)	mA(typ.)			
MIW4121	24 (9 ~ 36)	3.3	1200	120	220	20	20	470	75
MIW4122		5	1000	100	267				78
MIW4123		12	500	50	301				83
MIW4124		15	400	40	305			82	
MIW4125		±5	±500	±50	267			100#	78
MIW4126		±12	±250	±25	301				83
MIW4127		±15	±200	±20	305				82
MIW4131	48 (18 ~ 75.)	3.3	1200	120	110	10	15	470	75
MIW4132		5	1000	100	134				78
MIW4133		12	500	50	151				83
MIW4134		15	400	40	152			82	
MIW4135		±5	±500	±50	134			100#	78
MIW4136		±12	±250	±25	151				83
MIW4137		±15	±200	±20	152				82

For each output

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	24V Input Models	-0.7	---	50	VDC
	48V Input Models	-0.7	---	100	
Start-Up Voltage	24V Input Models	7	8	9	
	48V Input Models	14	16	18	
Under Voltage Shutdown	24V Input Models	---	---	8.5	
	48V Input Models	---	---	16	
Reverse Polarity Input Current	All Models	---	---	1	A
Short Circuit Input Power		---	---	3000	mW
Internal Power Dissipation		---	---	2500	mW
Conducted EMI		Compliance to EN 55022, class A and FCC part 15, class A			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±1.0	±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±1.0	±2.0	%
Line Regulation	Vin=Min. to Max.	---	±0.1	±0.5	%
Load Regulation	Io=10% to 100%	---	±0.5	±1.0	%
Cross Regulation (Dual)	Asymmetrical load 25% / 100% FL	---	---	±5.0	%
Ripple & Noise (20MHz)		---	50	80	mV _{P-P}
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	100	mV _{P-P}
Ripple & Noise (20MHz)		---	---	15	mV _{rms}
Transient Recovery Time	25% Load Step Change	---	300	500	uS
Transient Response Deviation		---	±3	---	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Over Load Protection	Foldback	110	250	350	%
Short Circuit Protection	Continuous				

General Specifications

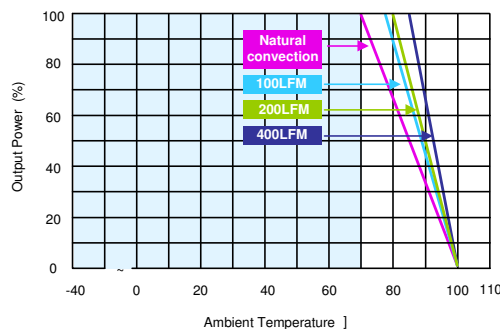
Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage (rated)	60 Seconds	1500	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	1000	1200	pF
Switching Frequency		---	450	---	KHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	800,000	---	---	Hours
Safety Approvals	UL/cUL 60950-1 recognition(CSA certificate), IEC/EN 60950-1				

Input Fuse

24V Input Models	48V Input Models
1200mA Slow-Blow Type	750mA Slow-Blow Type

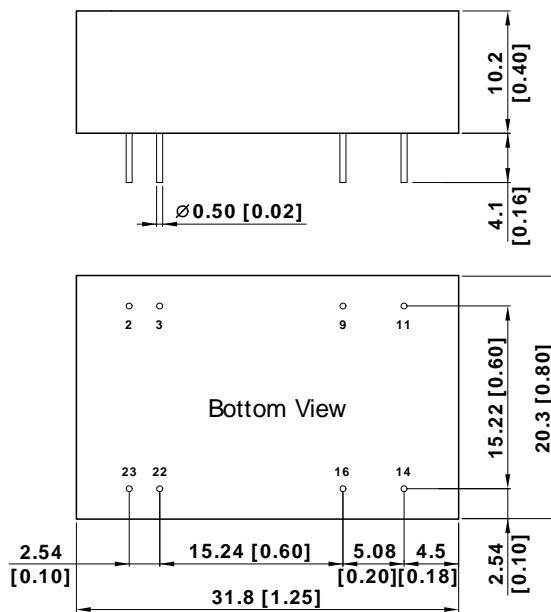
Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+85	°C
Case Temperature		---	+100	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

Power Derating Curve


Notes

- 1 Specifications typical at Ta=+25°C, resistive load, nominal input voltage and 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 0-20MHz.
- 4 These power converters require a minimum output loading to maintain specified regulation, operation under no-load conditions will not damage these modules; however they may not meet all specifications listed.
- 5 All DC/DC converters should be externally fused at the front end for protection.
- 6 Other input and output voltage may be available, please contact factory.
- 7 Specifications subject to change without notice.

Package Specifications
Mechanical Dimensions

Pin Connections

Pin	Single Output	Dual Output
2	-Vin	-Vin
3	-Vin	-Vin
9	No Pin	Common
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin	+Vin
23	+Vin	+Vin

NC: No Connection

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.25 (X.XX±0.01)
X.XX±0.13 (X.XXX±0.005)
- ▶ Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02±0.002)

Physical Characteristics

Case Size : 31.8x20.3x10.2mm (1.25x0.80x0.40 Inches)

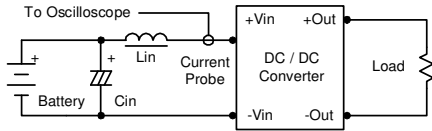
Case Material : Aluminum Anodizing Treatment in Black

Weight : 13.9g

Test Configurations

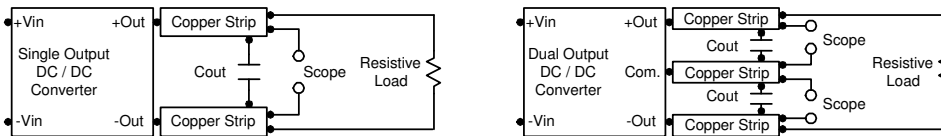
Input Reflected-Ripple Current Test Setup

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.



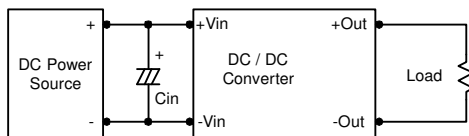
Design & Feature Considerations

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.

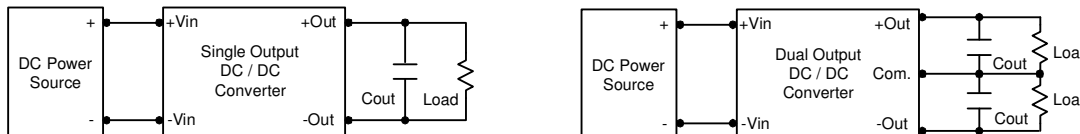
Input Source Impedance

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 4.7uF for the 24V input devices and a 2.2uF for the 48V 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.



Maximum Capacitive Load

The MIW4100 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. The maximum capacitance can be found in the data sheet.

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 100°C.

The derating curves are determined from measurements obtained in a test setup.

