FEATURES

- **DIP-24 Plastic Package**
- **Wide 2:1 Input Range**
- **High Efficiency up to 86%**
- **Operating Temp. Range –40°C to +85°C**
- **Short Circuit Protection**
- **I/O-isolation 1500VDC**
- **Cost optimized Design**
- **3 Years Product Warranty**

PRODUCT OVERVIEW

The MINMAX MIW3100 series is a range of isolated 6W DC/DC converter modules featuring fully regulated output voltages and wide 2:1 input voltage ranges. The product comes in a DIP-24 plastic package with industry standard pinout. An excellent efficiency allows an operating temperature range of –40°C to +85°C.These DC/DC converters offer an economical solution for many cost critical applications in battery-powered equipment and instrumentation.

Model Selection Guide

Model Number	Input Voltage (Range)	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Max. capacitive Load	Efficiency (typ.)
			Max.	Min.	@Max. Load	@No Load			@Max. Load
	VDC	VDC	mA	mA	mA(typ.)	mA(typ.)	mA(typ.)	uF	%
MIW3121	12 (9 ~ 18)	3.3	1200	60	429	20	25	6800	77
MIW3122		5	1000	50	514				81
MIW3123		12	500	25	595				84
MIW3126		±12	±250	±12.5	595			1000#	84
MIW3127		±15	±200	±10	595				84
MIW3131	24 (18 ~ 36)	3.3	1200	60	209	5	15	6800	79
MIW3132		5	1000	50	251				83
MIW3133		12	500	25	291				86
MIW3136		±12	±250	±12.5	291			1000#	86
MIW3137		±15	±200	±10	291				86

For each output

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	12V Input Models	-0.7	---	25	VDC
	24V Input Models	-0.7	---	50	
Start-Up Voltage	12V Input Models	4.5	6	8	
	24V Input Models	8	12	16	
Under Voltage Shutdown	12V Input Models	---	---	8	
	24V Input Models	---	---	16	
Reverse Polarity Input Current	All Models	---	---	1	A
Short Circuit Input Power		---	1000	3000	mW
Internal Power Dissipation		---	---	2500	mW
Conducted EMI (with **suffix A** only)		Compliance to EN 55022,class A and FCC part 15,class A			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±0.5	±1.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.5	±2.0	%
Line Regulation	Vin=Min. to Max.	---	±0.1	±0.3	%
Load Regulation	Io=20% to 100%	---	±0.3	±1.0	%
Ripple & Noise (20MHz)		---	50	75	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	---	150	300	uS
Transient Response Deviation		---	±2	±6	%
Temperature Coefficient		---	±0.01	±0.02	%/℃
Over Load Protection	Foldback	120	150	---	%
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	---	380	500	pF
Switching Frequency		---	300	---	KHz
MTBF (calculated)	MIL-HDBK-217F@25℃, Ground Benign	1,000,000	---	---	Hours
Safety Approvals	UL/cUL 60950-1 recognition(CSA certificate), IEC/EN 60950-1(CB-scheme)				

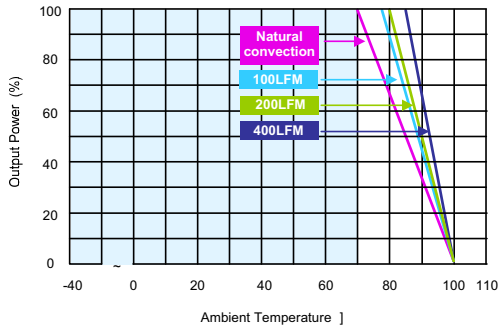
Input Fuse

12V Input Models	24V Input Models
1500mA Slow-Blow Type	700mA Slow-Blow Type

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+85	℃
Case Temperature		---	+90	℃
Storage Temperature Range		-50	+125	℃
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	℃

Power Derating Curve

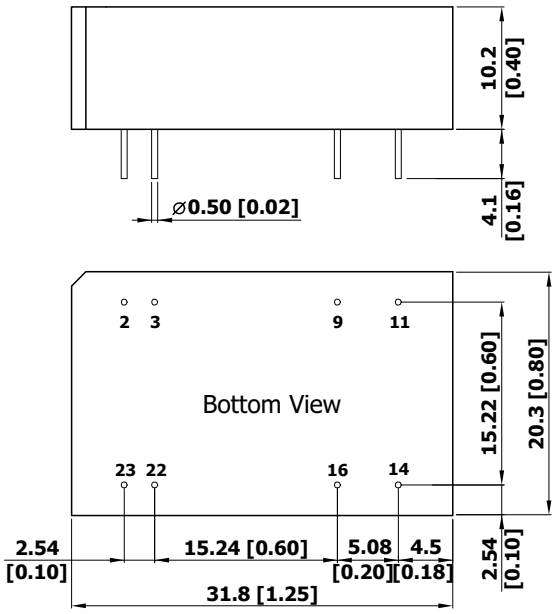


Notes

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 To order the converter with input filter meeting EN55022, Class A , add **suffix A** (e.g. MIW3121A) to order code.
8 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 ⌀ 0.5 ±0.05 (0.02±0.002)

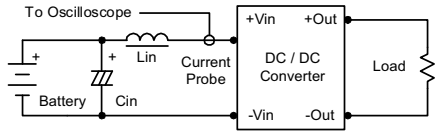
Physical Characteristics

ase Size	:	31.8x20.3x10.2mm (1.25x0.80x0.40 Inches)
Case Material	:	Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Weight	:	16.9g

Test Configurations

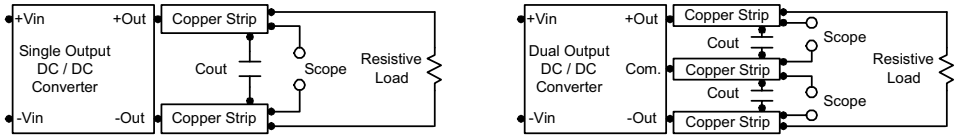
Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with a inductor Lin (4.7uH) and Cin (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.
Capacitor Cin, 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 Cout 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.



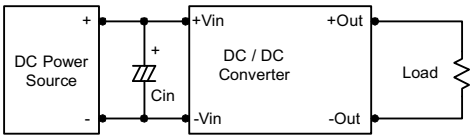
Design & Feature Considerations

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 3.3uF for the 12V input devices and a 2.2uF for the 24V 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

MIW3100 series have 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 1000uF maximum capacitive load for dual outputs and 6800uF capacitive load for single outputs. 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 90°C.
The derating curves are determined from measurements obtained in a test setup.