FEATURES

- DIP-24 Metal Package
  31.8 x 20.3 x 10.2 mm (1.25 x 0.8 x 0.4 inches)
- Wide 2:1 Input Range
- 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
- UL/cUL/IEC/EN 60950-1 Safety Approval
- 3 Years Product Warranty

CSA 60950-1 CB Scheme RoHS Compliant 3 year warranty

PRODUCT OVERVIEW

The MINMAX MIW3000 series is a range of isolated 5-6W DC/DC converter modules featuring fully regulated output voltages and wide 2:1 input voltage ranges. The product comes in a shielded metal DIP-24 package with industry standard pinout. An excellent efficiency allows an operating temperature range of –40° to +85°C (with derating). 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)	Output	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.)	μF	%
MIW3011	5 (4.5 ~ 7)	3.3	1200	60	1056	80	100	6800	75
MIW3012		5	1000	50	1265				79
MIW3013		12	500	25	1463				82
MIW3014		15	400	20	1463				82
MIW3015		±5	±500	±25	1265			1000#	79
MIW3016		±12	±250	±12.5	1463				82
MIW3017		±15	±200	±10	1463				82
MIW3021	12 (9 ~ 18)	3.3	1200	60	429	30	25	6800	77
MIW3022		5	1000	50	514				81
MIW3023		12	500	25	595				84
MIW3024		15	400	20	595				84
MIW3025		±5	±500	±25	514			1000#	81
MIW3026		±12	±250	±12.5	595				84
MIW3027		±15	±200	±10	595				84
MIW3031	24 (18 ~ 36)	3.3	1200	60	209	15	15	6800	79
MIW3032		5	1000	50	251				83
MIW3033		12	500	25	291				86
MIW3034		15	400	20	291				86
MIW3035		±5	±500	±25	251			1000#	83
MIW3036		±12	±250	±12.5	291				86
MIW3037		±15	±200	±10	291				86
MIW3041	48 (36 ~75)	3.3	1200	60	104	8	10	6800	79
MIW3042		5	1000	50	126				83
MIW3043		12	500	25	145				86
MIW3044		15	400	20	145				86
MIW3045		±5	±500	±25	126			1000#	83
MIW3046		±12	±250	±12.5	145				86
MIW3047		±15	±200	±10	145				86

For each output

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	10	VDC
	12V Input Models	-0.7	---	25	
	24V Input Models	-0.7	---	50	
	48V Input Models	-0.7	---	100	
Start-Up Threshold Voltage	5V Input Models	3	3.5	4.4	
	12V Input Models	4.5	6	8	
	24V Input Models	8	12	16	
	48V Input Models	16	24	32	
Under Voltage Shutdown	5V Input Models	---	---	4	
	12V Input Models	---	---	8	
	24V Input Models	---	---	16	
	48V Input Models	---	---	32	
Reverse Polarity Input Current	All Models	---	---	1	A
Short Circuit Input Power		---	1000	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 Setting Accuracy		---	---	±1.0	%Vom.
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	0-20 MHz Bandwidth	---	50	75	mV_{P-P}
Transient Recovery Time	25% Load Step Change	---	150	300	µsec
Transient Response Deviation		---	±2	±6	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Over Current Protection	Foldback	120	150	---	%
Short Circuit Protection	Continuous				

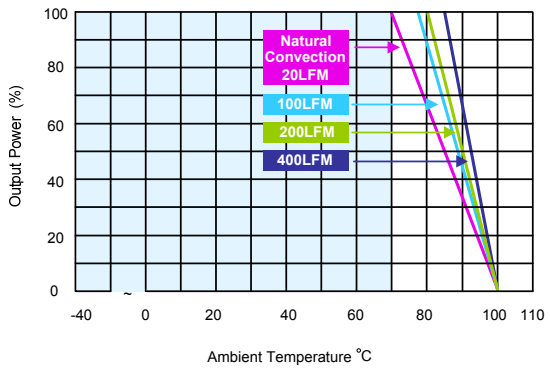
General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	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°C, Ground Benign	1,000,000			Hours
Safety Approvals	UL/cUL 60950-1 recognition (CSA certificate), IEC/EN 60950-1(CB-report)				

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Ambient Temperature Range (See Power Derating Curve)	Natural Convection	-40	+85	°C
Case Temperature		---	+90	°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

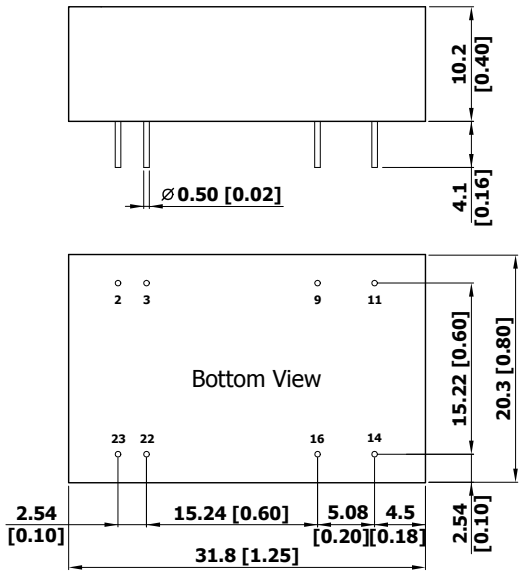


Notes

1 Specifications typical at Ta=+25℃, 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 50% to 100%
3 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.
4 We recommend to protect the converter by a slow blow fuse in the input supply line.
5 Other input and output voltage may be available, please contact factory.
6 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
7 Specifications are 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)

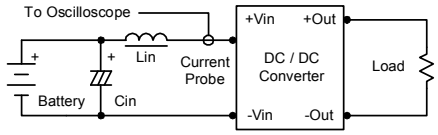
Physical Characteristics

Case Size	:	31.8x20.3x10.2mm (1.25x0.80x0.40 inches)
Case Material	:	Metal With Non-Conductive Baseplate
Pin Material	:	Phosphor bronze
Weight	:	16.9g

Test Setup

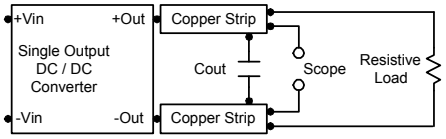
Input Reflected-Ripple Current Test Setup

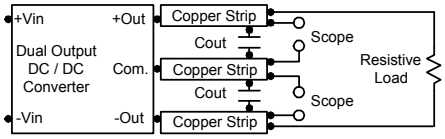
Input reflected-ripple current is measured with a inductor Lin (4.7μH) and Cin (220μF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.
Capacitor Cin, offsets possible battery impedance. Current ripple is measured at the input terminals of the module, measurement bandwidth is 0-500 KHz.



Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.47μF 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.





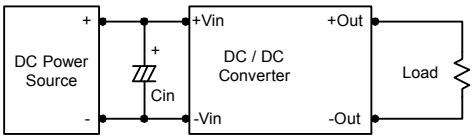
Technical Notes

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.

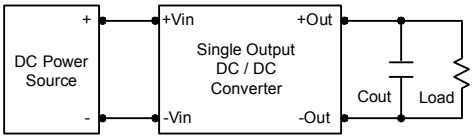
Input Source Impedance

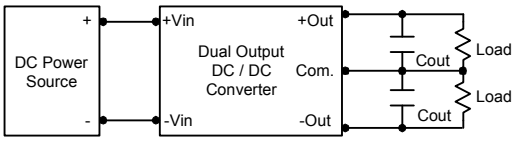
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.
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 10μF for the 5V input devices, a 3.3μF for the 12V input devices and a 2.2μF for the 24V and 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 3.3μF capacitors at the output.





Maximum Capacitive Load

The MIW3000 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 1000μF maximum capacitive load for dual outputs and 6800μF 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.