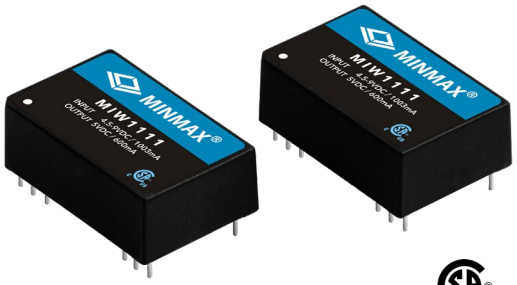
FEATURES

- ▶ **Industrial Standard DIP-24 Package**
- ▶ **Wide 2:1 & 3:1 Input Voltage Range**
- ▶ **Fully Regulated Output Voltage**
- ▶ **I/O Isolation 1500 VDC**
- ▶ **Operating Ambient Temp. Range -40℃ to +85℃**
- ▶ **Overload and Short Circuit Protection**
- ▶ **UL/cUL/IEC/EN 60950-1 Safety Approval**



CSA 60950-1

PRODUCT OVERVIEW

The MINMAX MIW1100 series is a range of isolated 3W DC-DC converter modules featuring fully regulated output voltages and wide input voltage ranges. The product comes in a DIP-24 plastic package with 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.)	μF	%
MIW1111	5 (4.5 ~ 9)	5	600	60	857	40	100	2000	70
MIW1112		12	250	25	811				74
MIW1113		15	200	20	811				74
MIW1114		±12	±125	±12.5	811			1000#	74
MIW1115		±15	±100	±10	811				74
MIW1121	12 (9 ~ 18)	5	600	60	329	20	30	2000	76
MIW1122		12	250	25	313				80
MIW1123		15	200	20	313				80
MIW1124		±12	±125	±12.5	313			1000#	80
MIW1125		±15	±100	±10	313				80
MIW1131	24 (18 ~ 36)	5	600	60	162	5	15	2000	77
MIW1132		12	250	25	154				81
MIW1133		15	200	20	154				81
MIW1134		±12	±125	±12.5	154			1000#	81
MIW1135		±15	±100	±10	154				81
MIW1141	48 (36 ~ 75)	5	600	60	81	3	10	2000	77
MIW1142		12	250	25	77				81
MIW1143		15	200	20	77				81
MIW1144		±12	±125	±12.5	77			1000#	81
MIW1145		±15	±100	±10	77				81
MIW1151	20 (10 ~ 30)	5	600	60	188	5	20	4000	80
MIW1152		12	250	25	188				80
MIW1153		15	200	20	188				80
MIW1154		±12	±125	±12.5	188			470#	80
MIW1155		±15	±100	±10	188				80

For each output

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (1 sec. max.)	5V Input Models	-0.7	---	11	VDC
	12V Input Models	-0.7	---	25	
	20V Input Models	-0.7	---	50	
	24V Input Models	-0.7	---	50	
	48V Input Models	-0.7	---	100	
Start-Up Voltage	5V Input Models	3.5	4	4.5	
	12V Input Models	4.5	7	9	
	20V Input Models	4.5	7	10	
	24V Input Models	8	12	18	
	48V Input Models	16	24	36	
Under Voltage Shutdown	5V Input Models	---	3.5	4	
	12V Input Models	---	6.5	8.5	
	20V Input Models	---	6.5	8.5	
	24V Input Models	---	11	17	
	48V Input Models	---	22	34	
Short Circuit Input Power	All Models	---	1000	1500	mW
Internal Power Dissipation		---	---	2500	mW
Input Filter		Internal Pi Type			
Conducted EMI		Compliance to EN 55022, class A			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy		---	±0.5	±2.0	%Vnom.
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.5	±2.0	%
Line Regulation	Vin=Min. to Max. @Full Load	---	±0.2	±0.5	%
Load Regulation	Io=10% to 100%	---	±0.2	±0.5	%
Ripple & Noise	0-20 MHz Bandwidth	---	45	60	mV_{P-P}
Transient Recovery Time	25% Load Step Change	---	300	500	uS
Transient Response Deviation		---	±3	±5	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Over Current Protection	Foldback	120	---	---	%
Short Circuit Protection	Continuous, Automatic Recovery				

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	60 Seconds	1500	---	---	VDC
	1 Seconds	1800	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100kHz, 1V	---	---	150	pF
I/O Isolation Capacitance	MIW115X Models	---	---	500	pF
Switching Frequency		150	330	450	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-report)				

Environmental Specifications

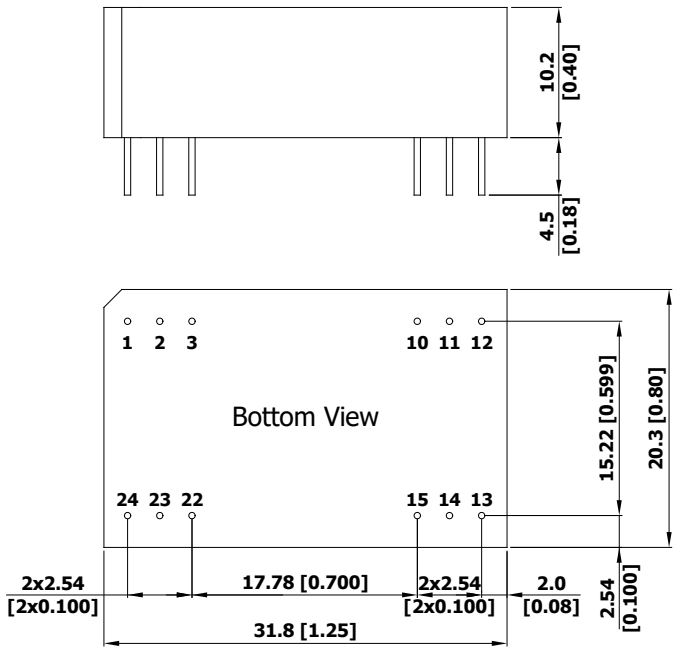
Parameter	Model	Min.	Max.	Unit
Operating Temperature Range (See Power Derating Curve)		-40	+85	°C
Operating Temperature Range (See Power Derating Curve)	MIW115X Models	-25	+85	°C
Case Temperature		---	+100	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

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 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 fast blow fuse in the input supply line.
5 Other input and output voltage may be available, please contact MINMAX.
6 Specifications are subject to change without notice.

Package Specifications

Mechanical Dimensions



Pin Connections

Pin	Single Output	Dual Output	Diameter mm (inches)
1	+Vin	+Vin	Ø 0.5 [0.02]
2	NC	-Vout	Ø 0.5 [0.02]
3	NC	Common	Ø 0.5 [0.02]
10	-Vout	Common	Ø 0.5 [0.02]
11	+Vout	+Vout	Ø 0.5 [0.02]
12	-Vin	-Vin	Ø 0.5 [0.02]
13	-Vin	-Vin	Ø 0.5 [0.02]
14	+Vout	+Vout	Ø 0.5 [0.02]
15	-Vout	Common	Ø 0.5 [0.02]
22	NC	Common	Ø 0.5 [0.02]
23	NC	-Vout	Ø 0.5 [0.02]
24	+Vin	+Vin	Ø 0.5 [0.02]

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 tolerance: X.X±0.05 (X.XX±0.002)

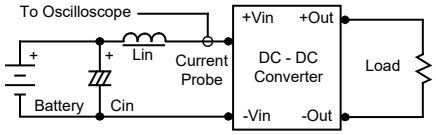
Physical Characteristics

Case Size	:	31.8x20.3x10.2 mm (1.25x0.80x0.40 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Pin Material	:	Phosphor Bronze
Weight	:	12.4g

Test Setup

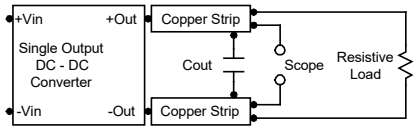
Input Reflected-Ripple Current Test Setup

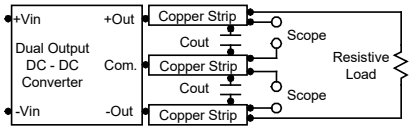
Input reflected-ripple current is measured with a inductor Lin (4.7uH) and Cin (220μF, ESR < 1.0Ω at 100 kHz) to simulate source impedance.
Capacitor Cin, offsets possible battery impedance. Current ripple is measured at the input terminals of the module, measurement bandwidth is 0-500 kHz.



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.





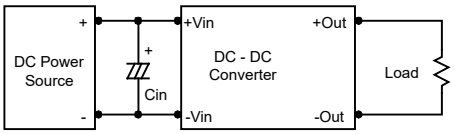
Technical Notes

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.

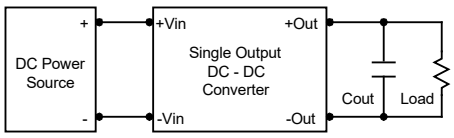
Input Source Impedance

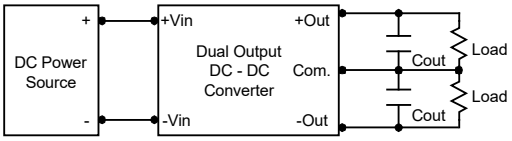
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.
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 8.2μF for the 5V input devices, a 3.3μF for the 12V input devices and a 1.5μF 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 MIW1100 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.