FEATURES

- High Power Density in SIP-8 Package
- Small Footprint: 21.8 x 9.2 mm (0.86"x 0.36")
- Ultra-wide 4:1 Input Ranges
- Fully Regulated Output
- Operating Temp. Range -40°C to +85°C
- Overload Protection
- I/O-isolation Voltage 1600VDC
- Remote On/Off Control
- 3 Years Product Warranty

NEW

RoHS Compliant

3 year warranty

PRODUCT OVERVIEW

The MINMAX MCWI03 series is a range of isolated 3W DC/DC converter modules featuring fully regulated output and ultra-wide 4:1 input voltage ranges. The product comes in a SIP-8 package with a very small footprint occupying only 2.0 cm2 (0.3 square in.) on the PCB.
An excellent efficiency allows an operating temperature range of -40°C to +85°C (with derating). Further features include remote On/Off control and over load protection. The very compact dimensions of these DC/DC converters make them an ideal solution for many space critical applications in battery-powered equipment and instrumentation.

Model Selection Guide

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Capacitive Load	Efficiency
			Max.	Min.	@Max. Load	@No Load		@Max. Load
	VDC	VDC	mA	mA	mA(Typ.)	mA(Typ.)	uF	% (Typ.)
MCWI03-12S033	12 (4.5 ~ 18)	3.3	700	175	260	60	1760	74
MCWI03-12S05		5	600	150	320		1000	78
MCWI03-12S12		12	250	63	313		170	80
MCWI03-12S15		15	200	50	313		110	80
MCWI03-12D05		±5	±300	±75	313		470 #	80
MCWI03-12D12		±12	±125	±31	313		100 #	80
MCWI03-12D15		±15	±100	±25	313		47 #	80
MCWI03-24S033	24 (9 ~ 36)	3.3	700	175	128	25	1760	75
MCWI03-24S05		5	600	150	156		1000	80
MCWI03-24S12		12	250	63	154		170	81
MCWI03-24S15		15	200	50	154		110	81
MCWI03-24D05		±5	±300	±75	158		470 #	79
MCWI03-24D12		±12	±125	±31	156		100 #	80
MCWI03-24D15		±15	±100	±25	154		47 #	81
MCWI03-48S033	48 (18 ~ 75)	3.3	700	175	65	15	1760	74
MCWI03-48S05		5	600	150	79		1000	79
MCWI03-48S12		12	250	63	79		170	79
MCWI03-48S15		15	200	50	79		110	79
MCWI03-48D05		±5	±300	±75	79		470 #	79
MCWI03-48D12		±12	±125	±31	79		100 #	79
MCWI03-48D15		±15	±100	±25	78		47 #	80

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	
	48V Input Models	-0.7	---	100	
Start-Up Voltage	12V Input Models	3	4	4.5	
	24V Input Models	4.5	6	9	
	48V Input Models	8.5	12	18	
Under Voltage Shutdown	12V Input Models	---	3.5	4	
	24V Input Models	---	---	8	
	48V Input Models	---	---	16	
Reverse Polarity Input Current	All Models	---	---	1	A
Short Circuit Input Power		---	---	2500	mW
Input Filter		Capacitor type			
Internal Power Dissipation		---	---	2600	mW

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.	---	±0.3	±0.5	%
Load Regulation	Io=25% to 100%	---	±0.5	±1.0	%
Ripple & Noise (20MHz)		---	50	75	mV P-P
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	100	mV P-P
Transient Recovery Time	25% Load Step Change	---	300	500	uS
Transient Response Deviation	25% Load Step Change	---	±3	±5	%
Temperature Coefficient		---	---	±0.02	%/°C
Output Short Circuit	Continuous				

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage Rated	60 Seconds	1600	---	---	VDC
I/O Isolation Test Voltage	Flash Tested For 1 Second	1760	---	---	VDC_{PK}
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	200	---	pF
Switching Frequency		---	350	---	KHz

Input Fuse

12V Input Models	24V Input Models	48V Input Models
1500mA Slow-Blow Type	700mA Slow-Blow Type	350mA Slow-Blow Type

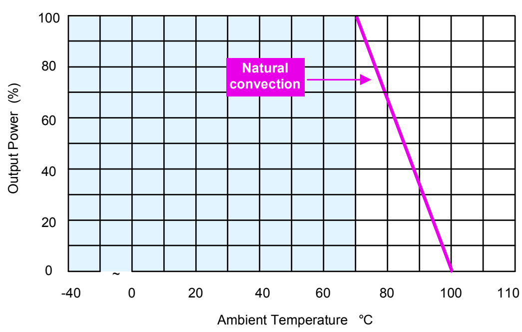
Remote On/Off Control

Parameter	Conditions	Min.	Typ.	Max.	Unit
Supply On	Under 0.6 VDC or Open Circuit, drops down to 0VDC by 2mV/°C				
Supply Off		2.7	---	15	VDC
Device Standby Input Current		---	1	2.5	mA
Control Input Current (on)	Vin = 0V	---	---	1	mA
Control Input Current (off)	Vin = 5.0V	---	---	1	mA
Control Common	Referenced to Negative Input				

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range With Derating	Ambient	-40	+85	℃
Case Temperature Range		-40	105	℃
Storage Temperature Range		-55	+125	℃
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	℃

Derating Curve

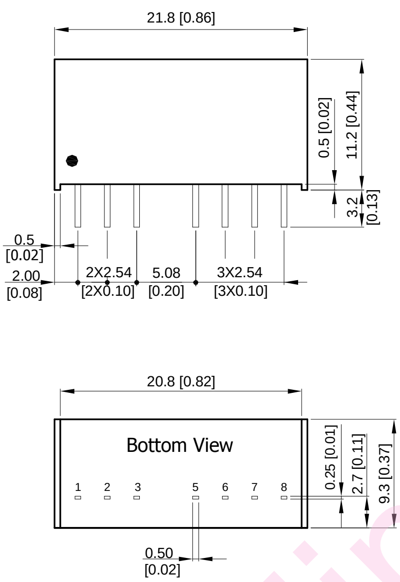


Notes

1 Specifications typical at Ta=+25°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 modules; however, they may not meet all specifications listed.
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.

Package Specifications

Mechanical Dimensions



Pin Connections

Pin	Single Output	Dual Output
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	Remote On/Off
5	NC	NC
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

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 pitch tolerance: ±0.25 (0.01)

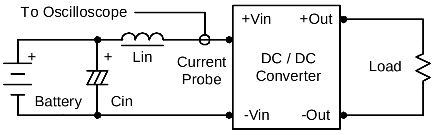
Physical Characteristics

Case Size	:	21.8X9.3X11.2 mm (0.86X0.37X0.44 inches)
Case Material	:	Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Weight	:	4.8g

Test Configurations

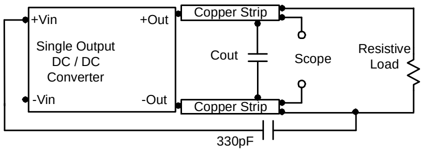
Input Reflected-Ripple Current Test Setup

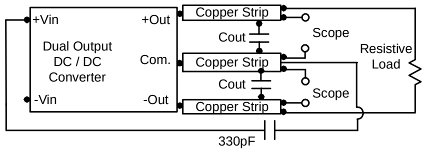
Input reflected-ripple current is measured with a inductor Lin (4.7uH) and Cin (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance. Capacitor Cin, offsets possible battery impedance.
Current ripple is measured at the input terminals of the module, measurement bandwidth is 0-500 KHz.



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

Remote On/Off

Negative logic remote on/off turns the module off during a logic high voltage on the remote on/off pin, and on during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent.
A logic high is 2.7V to 15V. A logic low is under 0.6 VDC or open circuit, drops down to 0VDC by 2mV/°C. The maximum sink current at on/off terminal during a logic low is 1 mA. The maximum allowable leakage current of the switch at on/off terminal= (under 0.6VDC or open circuit) is 1mA.

Maximum Capacitive Load

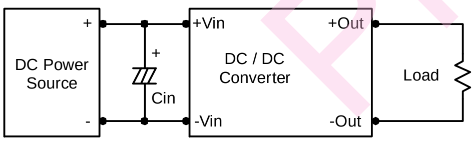
The MCWI03 series has limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. The maximum capacitance can be found in the data sheet.

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.

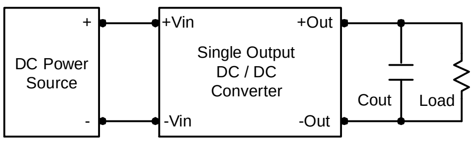
Input Source Impedance

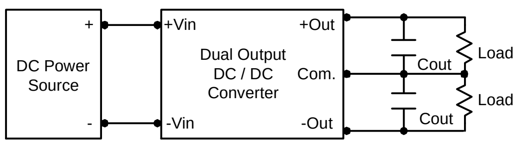
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.
Capacitor mounted close to the power module helps ensure stability of the unit, it is commended 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 1.5uF 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 3.3uF 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.