

DC/DC CONVERTER 1W

FEATURES

- Industrial Standard DIP-8 Package
- I/O Isolation 3000 VDC
- Operating Ambient Temp. Range -40°C to +85°C
- UL/cUL/IEC/EN 60950-1 Safety Approval



PRODUCT OVERVIEW

The MINMAX MFU100 series is a range of 1W DC/DC converters in a miniature DIP Package featuring I/O-isolation of 3000VDC. A high efficiency allows an operating temperature range of -40°C to +85°C.

These converters offer an economical solution for many space critical applications where a voltage has to be isolated i.e for noise reduction, ground loop elimination, digital interfaces or for board level power distribution.

Model Selection Guide

Model	Input	Output	Output Current Input Current		Current	Load	Max. capacitive	Efficiency	
Number	Voltage	Voltage					Regulation	Load	(typ.)
	(Range)		Max.	Min.	@Max. Load	@No Load			@Max. Load
	VDC	VDC	mA	mA	mA(typ.)	mA(typ.)	% (max.)	μF	%
MFU102	5 (4.5 ~ 5.5)	5	200	4	290	30	11	33	69
MFU103		9	110	2	260		8		76
MFU104		12	84	1.5	262		7		77
MFU105		15	67	1	257		6		78
MFU112	12	5	200	4	117	13	9	33	71
MFU113		9	110	2	107		5		77
MFU114	(10.8 ~ 13.2)	12	84	1.5	106		5		79
MFU115		15	67	1	106		4		79
MFU122		5	200	4	60	10	8	- 33 -	70
MFU123	24 (21.6 ~ 26.4)	9	110	2	54		5		76
MFU124		12	84	1.5	53		4	ు	79
MFU125		15	67	1	53		4		79

For each output

Input Specifications						
Parameter	Model	Min.	Тур.	Max.	Unit	
Input Voltage Range	5V Input Models	4.5	5	5.5		
	12V Input Models	10.8	12	13.2		
	24V Input Models	21.6	24	26.4		
	5V Input Models	-0.7		7	VDC	
Input Surge Voltage (1 sec. max.)	12V Input Models	-0.7		15		
	24V Input Models	-0.7		28		
nput Filter	All Models	Internal Capacitor				



MFU100 SERIES

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Output Specifications

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Parameter	Conditions	Min.	Тур.	Max.	Unit
Output Voltage Setting Accuracy			±1.0	±3.0	%Vnom.
Line Regulation	For Vin Change of 1%		±1.2	±1.5	%
Load Regulation	lo=20% to 100%		See Model Selection Guide		
Ripple & Noise	0-20 MHz Bandwidth		100	150	mV _{P-P}
Temperature Coefficient			±0.01	±0.02	%/°C
Short Circuit Protection	0.5 Second Max., Automatic Recovery.				

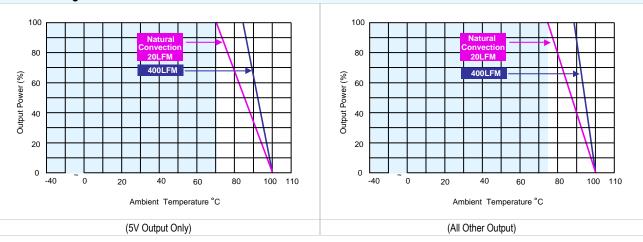
General Specifications

Parameter	Conditions	Min.	Тур.	Max.	Unit
I/O Isolation Voltage	60 Seconds	3000			VDC
I/O Isolation Resistance	500 VDC	10			GΩ
I/O Isolation Capacitance	100KHz, 1V		60	100	pF
Switching Frequency		50	90	110	KHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	2,000,000			Hours

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	Natural 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 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.
- 3 We recommend to protect the converter by a slow blow fuse in the input supply line.
- 4 Other input and output voltage may be available, please contact factory.
- 5 That "natural convection" is about 20LFM but is not equal to still air (0 LFM).
- 6 Specifications are subject to change without notice.

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Package Specifications

Weight(24V Input)

Mechanical Dimensions			Pin Connections		
		Pin	Function		
		1	-Vin		
	0.4 [0.02]	4	+Vin		
		5	+Vout		
		7	-Vout		
	2.54				
	[0.10] [0.02]	L=7.0 [0.28] for 5V & 12V Input Models			
	7.62 [0.30] 2.6 [0.10] [0.10] 1 4 [000] Bottom View 0 7 7 5 1 6 1 1 1 4 1 1 5 1 6 7 5 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	► All di ► Toler	0.31] for 24V Input Models mensions in mm (inches) ance: X.X±0.25 (X.XX±0.01) X.XX±0.13 (X.XX±0.005) liameter Ø 0.5 ±0.05 (0.02±0.002)		
Physical Characteristi	ics				
Case Size(5V&12V Input)	: 12.7x7.0x10.2mm (0.50x0.28x0.40 inches)				
Case Size(24V Input)	: 12.7x8.0x10.2mm (0.50x0.31x0.40 inches)				
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)				
Pin Material	: Phosphor bronze				
Weight(5V&12V Input)	: 1.3g				
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: 1.7g

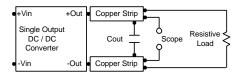
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Test Setup

Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.33µF 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.



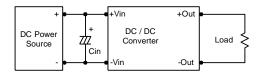
Technical Notes

Maximum Capacitive Load

The MFU100 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 33µF maximum capacitive load for devices. The maximum capacitance can be found in the data sheet.

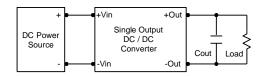
Input Source Impedance

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 1.5μ F for the 5V input devices, a 1.0μ F for the 12V input devices and a 0.47μ F 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 1µF 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 a test setup.

