FEATURES

- ▶ **Industrial Standard SIP-7 Package**
- ▶ **Encapsulated 1W Converter**
- ▶ **Unregulated Output Voltage**
- ▶ **I/O Isolation 3000VDC**
- ▶ **Wide Operating Ambient Temp. Range**
- ▶ **Short Circuit Protection**
- ▶ **UL/cUL/IEC/EN 62368-1, UL/cUL 60950-1 Safety Approval & CE Marking**



PRODUCT OVERVIEW

The MINMAX MAPU01H Series is an encapsulated 1W DC-DC converter in an industry-standard SIP-7 package, offering a compact and reliable isolated power solution for space-limited industrial and embedded applications. Featuring 3000 VDC I/O isolation, it provides robust protection for sensitive circuits and ensures stable performance in diverse system environments. With unregulated output voltage, short-circuit protection, and a wide operating ambient temperature range, the MAPU01H Series delivers dependable operation and design flexibility. Certified to UL/cUL/IEC/EN 62368-1 and CE marked, it ensures full compliance with international safety and EMC standards, making it an ideal choice for industrial control, sensing, and communication systems.

Model Selection Guide

Model Number	Input Voltage (Range)	Output Voltage	Output Current	Input Current		Load Regulation	Max. capacitive Load	Efficiency (typ.)
			Max.	@Max. Load	@No Load			@Max. Load
	VDC	VDC	mA	mA(typ.)	mA(typ.)	% (max.)	μF	%
MAPU01-033S033H	3.3 (2.97 ~ 3.63)	3.3	300	390	45	15	220	77
MAPU01-033S05H		5	200	394		12		77
MAPU01-033S09H		9	110	385		12		78
MAPU01-033S12H		12	84	382		10		80
MAPU01-033S15H		15	68	391		10		79
MAPU01-033D05H		±5	±100	394		11	100#	77
MAPU01-033D12H		±12	±42	387		9		79
MAPU01-033D15H		±15	±34	391		9		79
MAPU01-05S033H	5 (4.5 ~ 5.5)	3.3	300	261	30	12	220	76
MAPU01-05S05H		5	200	256		10		78
MAPU01-05S09H		9	110	247		8		81
MAPU01-05S12H		12	84	246		8		82
MAPU01-05S15H		15	68	246		8		83
MAPU01-05D05H		±5	±100	247		10	100#	81
MAPU01-05D12H		±12	±42	249		8		81
MAPU01-05D15H		±15	±34	252		9		81
MAPU01-12S033H	12 (10.8 ~ 13.2)	3.3	300	104	17	10	220	79
MAPU01-12S05H		5	200	104		8		80
MAPU01-12S09H		9	110	101		7		82
MAPU01-12S12H		12	84	99		7		84
MAPU01-12S15H		15	68	102		7		83
MAPU01-12D05H		±5	±100	103		7	100#	81
MAPU01-12D12H		±12	±42	102		6		82
MAPU01-12D15H		±15	±34	104		6		82
MAPU01-24S033H	24 (21.6 ~ 26.4)	3.3	300	54	10	10	220	76
MAPU01-24S05H		5	200	51		8		81
MAPU01-24S09H		9	110	52		8		79
MAPU01-24S12H		12	84	51		8		82
MAPU01-24S15H		15	68	52		9		82
MAPU01-24D05H		±5	±100	52		8	100#	80
MAPU01-24D12H		±12	±42	52		8		81
MAPU01-24D15H		±15	±34	53		8		80

*Please refer to the attached graph for the minimum load value. # For each output

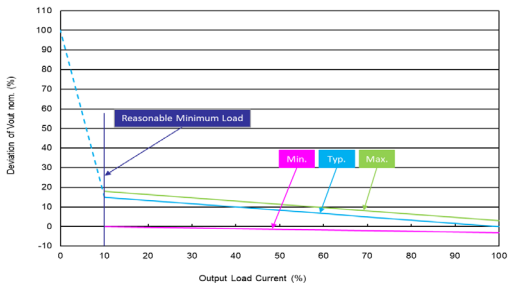
Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	3.3V Input Models	2.97	3.3	3.63	VDC
	5V Input Models	4.5	5	5.5	
	12V Input Models	10.8	12	13.2	
	24V Input Models	21.6	24	26.4	
Input Surge Voltage (1 sec. max.)	3.3V Input Models	-0.7	---	6	
	5V Input Models	-0.7	---	9	
	12V Input Models	-0.7	---	18	
	24V Input Models	-0.7	---	30	
Input Filter	All Models	Internal Capacitor			

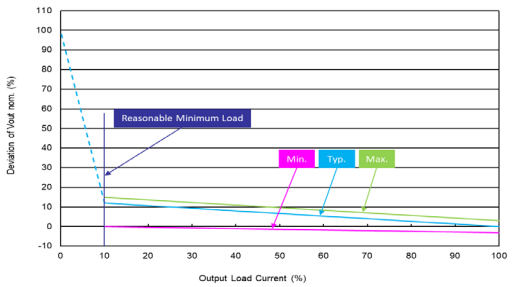
Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Setting Accuracy		---	±1.0	±3.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±0.1	±1.0	%
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=10% to 100%	See Model Selection Guide			
Ripple & Noise	0-20 MHz Bandwidth	---	65	100	mV_{P-P}
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection	Continuous, Automatic Recovery				

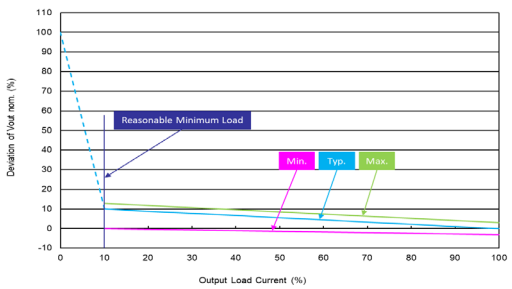
Output Voltage Tolerance



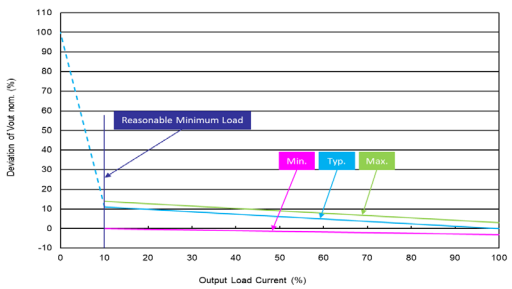
MAPU01-033S033H Output Voltage VS Output Load Current



MAPU01-033S05H, MAPU01-033S09H, MAPU01-05S033H
Output Voltage VS Output Load Current

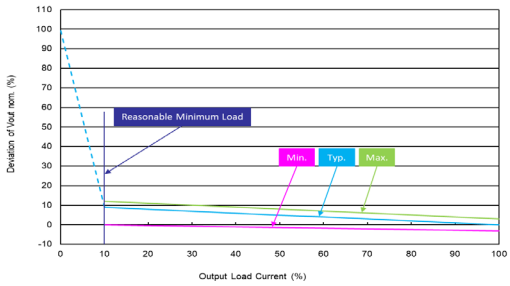


MAPU01-033S12H, MAPU01-033S15H, MAPU01-05S05H
MAPU01-05D05H, MAPU01-12S033H, MAPU01-24S033H
Output Voltage VS Output Load Current

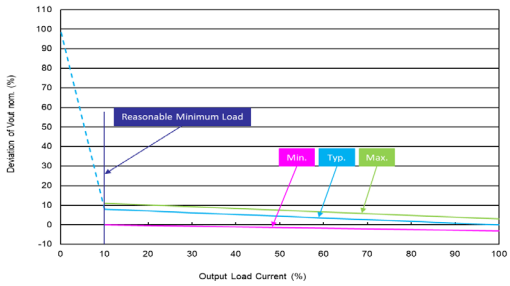


MAPU01-033D05H Output Voltage VS Output Load Current

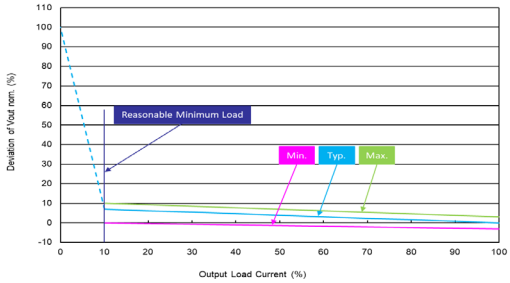
Output Voltage Tolerance



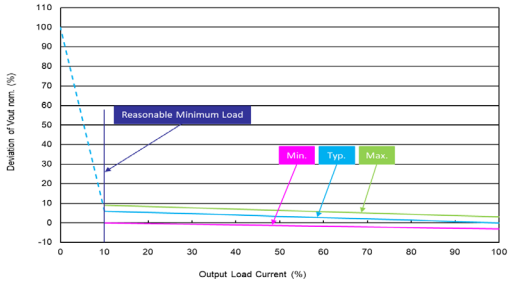
MAPU01-033D12H, MAPU01-033D15H, MAPU01-05D15H, MAPU01-24S15H
Output Voltage VS Output Load Current



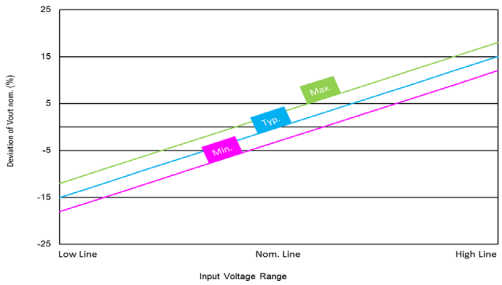
MAPU01-05S09H, MAPU01-05S12H, MAPU01-05S15H, MAPU01-05D12H
MAPU01-12S05H, MAPU01-24S05H, MAPU01-24S09H, MAPU01-24S12H
MAPU01-24D05H, MAPU01-24D12H, MAPU01-24D15H
Output Voltage VS Output Load Current



MAPU01-12S09H, MAPU01-12S12H, MAPU01-12S15H, MAPU01-12D05H
Output Voltage VS Output Load Current



MAPU01-12D12H, MAPU01-12D15H
Output Voltage VS Output Load Current



Output Voltage VS Input Voltage Range

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	60 Seconds	3000	---	---	VDC
I/O Isolation Resistance	500 VDC	10	---	---	GΩ
I/O Isolation Capacitance	100kHz, 1V	---	20	---	pF
Switching Frequency		40	75	110	kHz
MTBF (calculated)	MIL-HDBK-217F@25℃, Ground Benign	3,711,000	---	---	Hours
Safety Approvals	UL/cUL 60950-1 recognition(UL certificate)				
	UL/cUL 62368-1 recognition(UL certificate), IEC/EN 62368-1(CB-report)				

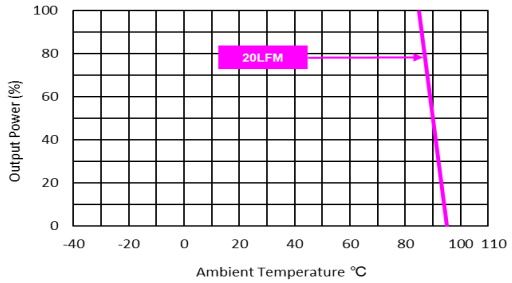
EMC Specifications

Parameter	Standards & Level			Performance
EMI(5)	Conduction	EN 55032	With external components	Class A
	Radiation			
EMS(5)	EN 55035			
	ESD	EN 61000-4-2 Air ± 8kV , Contact ± 6kV		A
	Radiated immunity	EN 61000-4-3 10V/m		A
	Fast transient	EN 61000-4-4 ±2kV		A
	Surge	EN 61000-4-5 ±1kV		A
	Conducted immunity	EN 61000-4-6 10Vrms		A
	PFMF	EN 61000-4-8 3A/m		A

Environmental Specifications

Parameter	Min.	Max.	Unit
Operating Ambient Temperature Range (For Power Derating see relative Derating Curve)	-40	+90	℃
Case Temperature	---	+95	℃
Storage Temperature Range	-50	+125	℃
Humidity (non condensing)	---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)	---	260	℃

Power Derating Curve

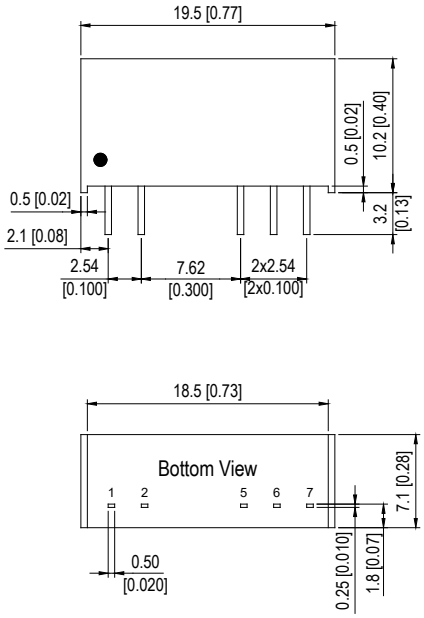


Notes

1 Specifications typical at Ta=+25℃, resistive load, nominal input voltage and rated output current unless otherwise noted.
2 Please do not operate the product without a minimum load condition.
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 MINMAX.
5 The external components might be required to meet EMI/EMS standard for some of test items. Please contact MINMAX for the solution in detail.
6 Specifications are subject to change without notice.
7 The repeated high voltage isolation testing of the converter can degrade isolation capability, to a lesser or greater degree depending on materials, construction, environment and reflow solder process. Any material is susceptible to eventual chemical degradation when subject to very high applied voltages thus implying that the number of tests should be strictly limited. We therefore strongly advise against repeated high voltage isolation testing, but if it is absolutely required, that the voltage be reduced by 20% from specified test voltage. Furthermore, the high voltage isolation capability after reflow solder process should be evaluated as it is applied on system.

Package Specifications

Mechanical Dimensions



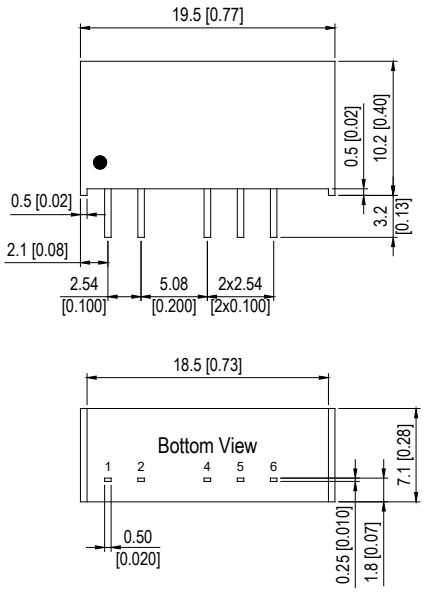
Pin Connections

Pin	Single Output	Dual Output
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	No Pin	Common
7	+Vout	+Vout

- All dimensions in mm (inches)
- Tolerance: X.X±0.5 (X.XX±0.02)
  X.XX±0.25 (X.XXX±0.010)
- Pins ±0.05(±0.002)

Package Specifications with "A" Pinning (order code suffix A)

Mechanical Dimensions



Pin Connections

Pin	Single Output	Dual Output
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No Pin	Common
6	+Vout	+Vout

- All dimensions in mm (inches)
- Tolerance: X.X±0.5 (X.XX±0.02)
  X.XX±0.25 (X.XXX±0.010)
- Pins ±0.05(±0.002)

Physical Characteristics

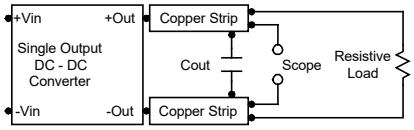
Case Size	:	19.5x7.1x10.2mm (0.77x0.28x0.40 inches)
Case Material	:	Plastic resin (flammability to UL 94V-0 rated)
Pin Material	:	Alloy 42
Weight	:	3.1g

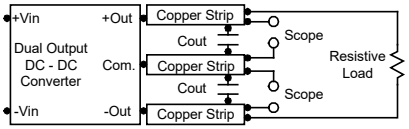
Order Code Table	
Standard	With "A" Pinning
MAPU01-033S033H	MAPU01-033S033HA
MAPU01-033S05H	MAPU01-033S05HA
MAPU01-033S09H	MAPU01-033S09HA
MAPU01-033S12H	MAPU01-033S12HA
MAPU01-033S15H	MAPU01-033S15HA
MAPU01-033D05H	MAPU01-033D05HA
MAPU01-033D12H	MAPU01-033D12HA
MAPU01-033D15H	MAPU01-033D15HA
MAPU01-05S033H	MAPU01-05S033HA
MAPU01-05S05H	MAPU01-05S05HA
MAPU01-05S09H	MAPU01-05S09HA
MAPU01-05S12H	MAPU01-05S12HA
MAPU01-05S15H	MAPU01-05S15HA
MAPU01-05D05H	MAPU01-05D05HA
MAPU01-05D12H	MAPU01-05D12HA
MAPU01-05D15H	MAPU01-05D15HA
MAPU01-12S033H	MAPU01-12S033HA
MAPU01-12S05H	MAPU01-12S05HA
MAPU01-12S09H	MAPU01-12S09HA
MAPU01-12S12H	MAPU01-12S12HA
MAPU01-12S15H	MAPU01-12S15HA
MAPU01-12D05H	MAPU01-12D05HA
MAPU01-12D12H	MAPU01-12D12HA
MAPU01-12D15H	MAPU01-12D15HA
MAPU01-24S033H	MAPU01-24S033HA
MAPU01-24S05H	MAPU01-24S05HA
MAPU01-24S09H	MAPU01-24S09HA
MAPU01-24S12H	MAPU01-24S12HA
MAPU01-24S15H	MAPU01-24S15HA
MAPU01-24D05H	MAPU01-24D05HA
MAPU01-24D12H	MAPU01-24D12HA
MAPU01-24D15H	MAPU01-24D15HA

Test Setup

Peak-to-Peak Output Noise Measurement Test

Cout uses a 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.





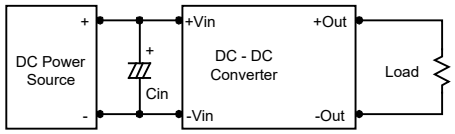
Technical Notes

Overload 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.

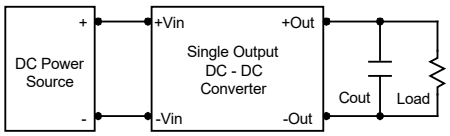
Input Source Impedance

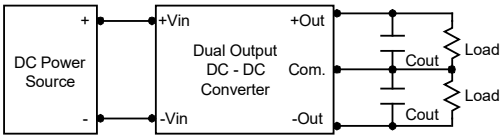
The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. 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 2.2μF for all the 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 MAPU01H 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 95℃.
The derating curves are determined from measurements obtained in a test setup.

