

NEW
FEATURES

- ▶ Industrial Standard SIP-4 Package
- ▶ Unregulated Output Voltage
- ▶ I/O Isolation 1500VDC
- ▶ Operating Ambient Temp. Range -40°C to +90°C
- ▶ Short Circuit Protection


PRODUCT OVERVIEW

The MINMAX MBSU03 series is a new range of isolated 3W DC-DC converter modules in SIP-4 package size. There are 9 models available for 5, 12 or 24VDC input. Advanced circuit topology provides continuous short circuit protection and a high efficiency up to 86 which allows operating ambient temperatures range of -40°C to +90°C. These converters offer a better solution for all applications where space critical, wide operating temp. range and fault condition protection are required.

Model Selection Guide

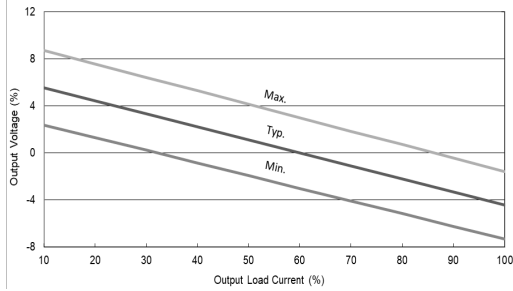
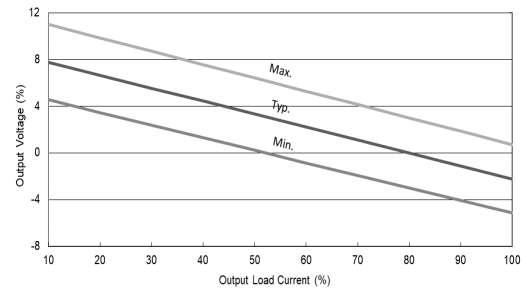
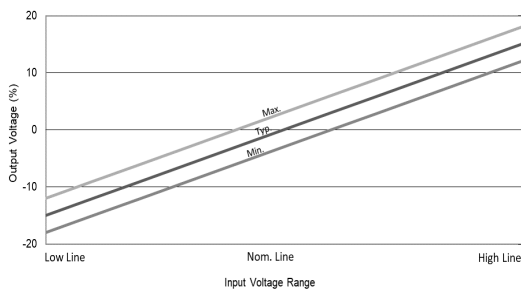
Model Number	Input Voltage (Range) VDC	Output Voltage VDC	Output Current		Input Current		Max. capacitive Load μF	Efficiency (typ.) %
			Max.		@Max. Load	@No Load		
			mA		mA(typ.)	mA(typ.)		
MBSU03-05S05	5 (4.5 ~ 5.5)	5	600		759	85	2200	79
MBSU03-05S12		12	250		723		1000	83
MBSU03-05S15		15	200		714		820	84
MBSU03-12S05	12 (10.8 ~ 13.2)	5	600		309	45	2000	81
MBSU03-12S12		12	250		294		1000	85
MBSU03-12S15		15	200		294		820	85
MBSU03-24S05	24 (21.6 ~ 26.4)	5	600		152	18	2000	82
MBSU03-24S12		12	250		145		1000	86
MBSU03-24S15		15	200		145		820	86

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Voltage Range	5V Input Models	4.5	5	5.5	VDC
	12V Input Models	10.8	12	13.2	
	24V Input Models	21.6	24	26.4	
Input Surge Voltage (1000 ms. max.)	5V Input Models	-0.7	---	9	VDC
	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
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=10% to 100%	---	---	±10	%
Ripple & Noise	0-20 MHz Bandwidth	---	100	---	mV _{P-P}
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection	Continuous, Automatic Recovery				

Output Voltage Tolerance

 Output Voltage VS Output Load Current
 For 5V Output Models

 Output Voltage VS Output Load Current
 For 12V & 15V Output Models


Output Voltage VS Input Voltage Range

Isolation, Safety Standards

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage	60 Seconds	1500	---	---	VDC
	1 Second	1800	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100kHz, 1V	---	120	160	pF

General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Switching Frequency		---	60	---	kHz
MTBF (calculated)	MIL-HDBK-217F@25°C, Ground Benign	4,963,645	---	---	Hours
Safety Approvals (Pending)	UL/cUL 62368-1 recognition(UL certificate), IEC/EN 62368-1 & 60950-1(CB report)				

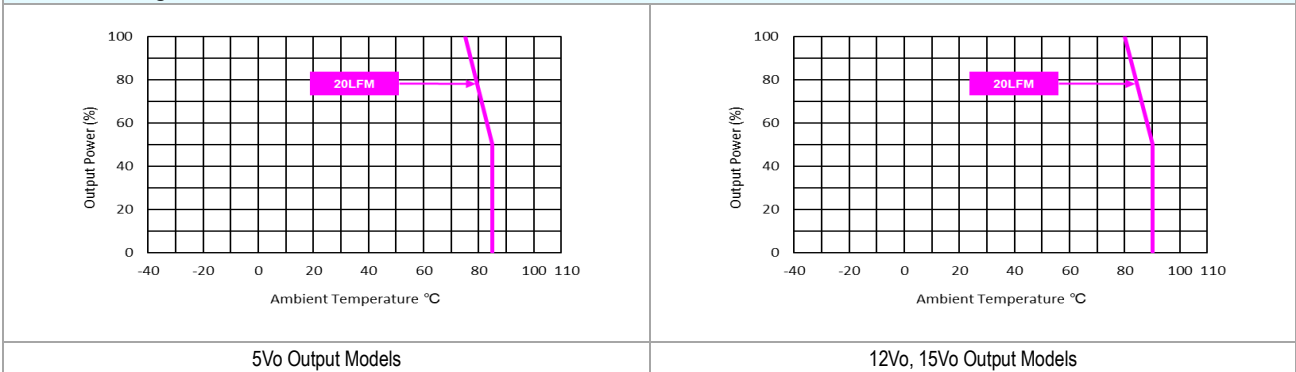
EMC Specifications

Parameter	Standards & Level			Performance
EMI	Conduction	EN 55032	With external components	Class A ⁽⁵⁾
	Radiation			
EMS	EN 55024, EN 55035			
	ESD	Direct discharge	Indirect discharge HCP & VCP	
		EN 61000-4-2 Air ± 8kV	Contact ± 6kV	
	Radiated immunity	EN 61000-4-3 10V/m		A
	Fast transient ⁽⁶⁾	EN 61000-4-4 ±2kV		A
	Surge ⁽⁶⁾	EN 61000-4-5 ±1kV		A
	Conducted immunity	EN 61000-4-6 10Vrms		A
PFMF	EN 61000-4-8 30A/m		A	

Environmental Specifications

Parameter	Model	Min.	Max.	Unit
Operating Ambient Temperature Range Nominal Vin, Load 100% Inom. (for Power Derating see relative Derating Curves)	5Vo Output Models	-40	+75	°C
	12Vo, 15Vo Output Models		+80	
Case Temperature		---	105	°C
Storage Temperature Range		-50	+125	°C
Humidity (non condensing)		---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)		---	260	°C

Power Derating Curve

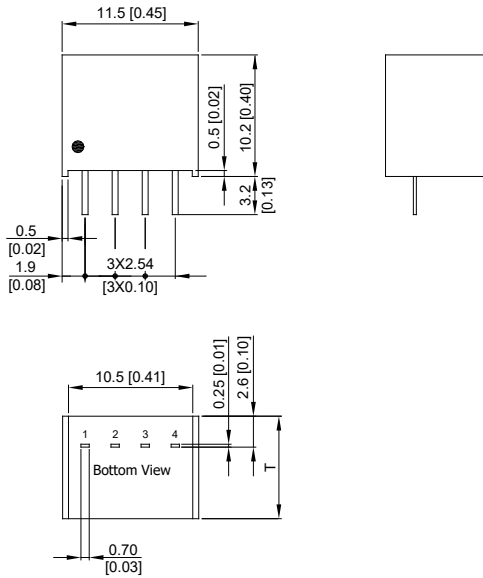


Notes

- 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 MINMAX.
- 5 To meet EN 55032 Class A with an external filter, please contact MINMAX.
- 6 To meet EN 61000-4-4 & EN 61000-4-5 an external capacitor across the input pins is required, please contact MINMAX.
- 7 Specifications are subject to change without notice.

Package Specifications

Mechanical Dimensions



Pin Connections

Pin	Single Output
1	-Vin
2	+Vin
3	-Vout
4	+Vout

T: 8.6mm(0.34 inch) for 5V & 12V Input Models

T: 9.6mm(0.38 inch) for 24V Input Models

- ▶ All dimensions in mm (inches)
- ▶ Tolerance: X.X±0.5 (X.XX±0.02)
X.XX±0.25 (X.XXX±0.01)
- ▶ Pins ±0.05 (±0.002)

Physical Characteristics

Case Size (5V & 12V Input)	: 11.5x10.2x8.6mm (0.45x0.40x0.34 inches)
Case Size (24V Input)	: 11.5x10.2x9.6mm (0.45x0.40x0.38 inches)
Case Material	: Non-Conductive Black Plastic (flammability to UL 94V-0 rated)
Pin Material	: Phosphor Bronze with Tin Plate
Weight (5V & 12V Input)	: 3.20g
Weight (24V Input)	: 3.40g