FEATURES

- ▶ **Industrial Standard SIP-4 Package**
- ▶ **Encapsulated 3W Converter**
- ▶ **Unregulated Output Voltage**
- ▶ **I/O Isolation 1500VDC**
- ▶ **Wide Operating Ambient Temp. Range**
- ▶ **Short Circuit Protection**



PRODUCT OVERVIEW

The MINMAX MBSU03 Series is an encapsulated 3W DC-DC converter in a compact SIP-4 package, offering a highly cost-effective and space-saving solution for isolated power requirements in industrial and embedded systems. The series includes 9 models, supporting 5 VDC, 12 VDC, or 24 VDC input voltages, providing excellent flexibility for various design needs. Featuring 1500 VDC I/O isolation, unregulated output voltage, and built-in short-circuit protection, the MBSU03 Series ensures reliable performance and long-term durability across a wide operating ambient temperature range. Combining compact design, robust isolation, and outstanding price-performance ratio, the MBSU03 Series is an ideal choice for signal isolation, distributed power systems, and cost-sensitive industrial applications.

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	%
MBSU03-05S05	5 (4.5 ~ 5.5)	5	600	759	85	10	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

*Please refer to the attached graph for the minimum load value.

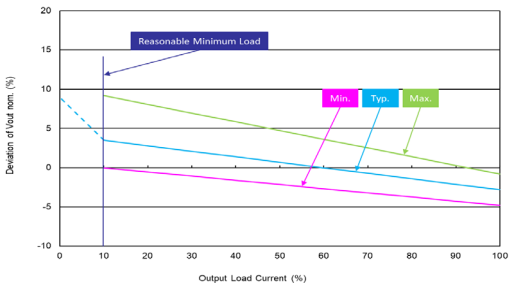
Input Specifications

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	
	12V Input Models	-0.7	---	18	
	24V Input Models	-0.7	---	30	
Input Filter	All Models	Internal Capacitor			

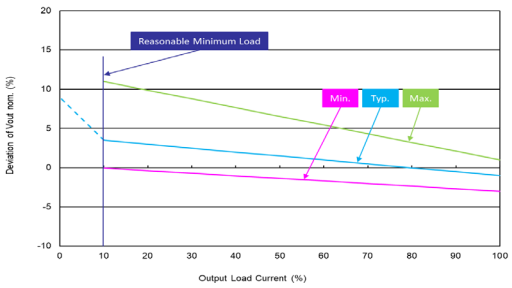
Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Line Regulation	For Vin Change of 1%	---	±1.2	±1.5	%
Load Regulation	Io=10% to 100%	See Model Selection Guide (Operation at lower load will not damage the converter, but it may not meet all specifications)			
Ripple & Noise	0-20 MHz Bandwidth	---	100	---	mV P-P
Temperature Coefficient		---	±0.01	±0.02	%/°C
Short Circuit Protection	Continuous, Automatic Recovery				

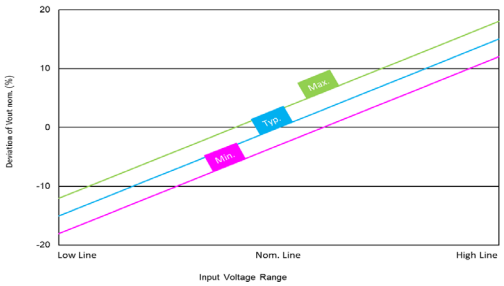
Output Voltage Tolerance



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℃, Ground Benign	4,963,645	---	---	Hours

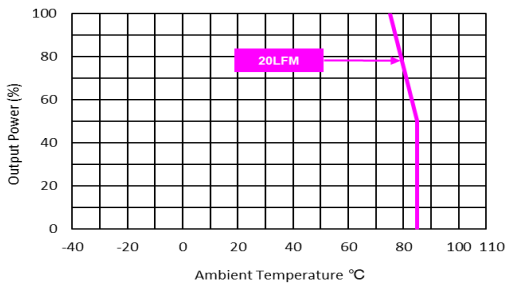
EMC Specifications

Parameter	Standards & Level			Performance
EMI(5)	Conduction	EN 55032	With external components	Class A
	Radiation			
EMS(5)	EN 55035			
	ESD	Direct discharge	Indirect discharge HCP & VCP	A
		EN 61000-4-2 Air ± 8kV	Contact ± 6kV	
	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 30A/m		A

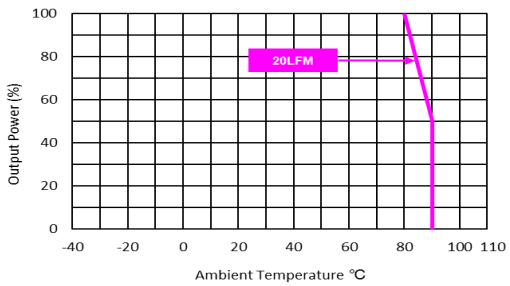
Environmental Specifications

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	℃
	12Vo, 15Vo Output Models		+80	
Case Temperature		---	105	℃
Storage Temperature Range		-50	+125	℃
Humidity (non condensing)		---	95	% rel. H
Lead Temperature (1.5mm from case for 10Sec.)		---	260	℃

Power Derating Curve



5Vo Output Models



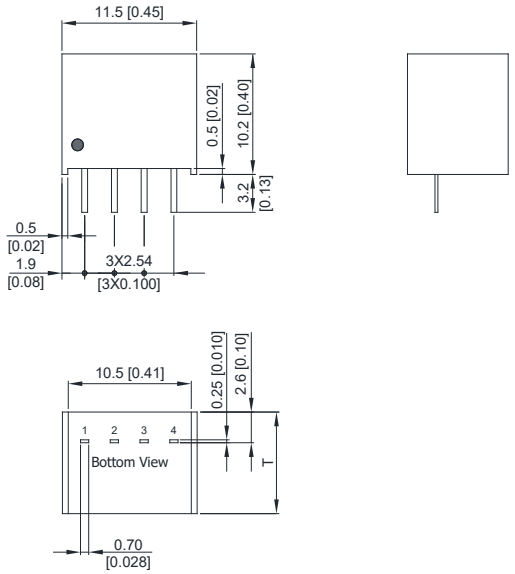
12Vo, 15Vo Output Models

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
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±0.010)
- 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	:	Plastic resin (flammability to UL 94V-0 rated)
Pin Material	:	Phosphor Bronze
Weight (5V & 12V Input)	:	3.20g
Weight (24V Input)	:	3.40g