FEATURES

- **Smallest Encapsulated 50W Converter!**
- **Package Size 2.0”x 1.0”x 0.4”**
- **Wide 2:1 Input Range**
- **Excellent Efficiency up to 92%**
- **Over-Temperature Protection**
- **I/O-isolation Voltage 1500VDC**
- **Remote On/Off Control**
- **Shielded Metal Case with Isolated Baseplate**
- **Optional Heatsink**
- **3 Years Product Warranty**

NEW

RoHS Compliant

3 year warranty

PRODUCT OVERVIEW

The MINMAX MKW50 series is the latest generation of high performance dc-dc converter modules setting a new standard concerning power density. The product offers fully 50W in an encapsulated, shielded metal package with dimensions of just 2.0”x1.0”x0.4”.All models provide wide 2:1 input voltage range and precisely regulated output voltages.

Advanced circuit topology provides a very high efficiency up to 92% which allows an operating temperature range of -40°C to +80°C . Further features include remote On/Off, trimmable output voltage, under-voltage shutdown as well as overload and over-temperature protection.

Typical applications for these converters are battery operated equipment, instrumentation, distributed power architectures in communication and industrial electronics and many other space critical applications.

Model Selection Guide

Model Number	Input Voltage (Range)	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Over Voltage Protection	Max. capacitive Load	Efficiency (typ.)
			Max.	Min.	@Max. Load	@No Load				@Max. Load
	VDC	VDC	mA	mA	mA(typ.)	mA(typ.)	mA(typ.)	VDC	uF	%
MKW50-12S033	12 (9 ~ 18)	3.3	10000	0	3090	85	50	3.9	25757	89
MKW50-12S05		5	10000	0	4630	110		6.2	17000	90
MKW50-12S12		12	4167	0	4579	160		15	2950	91
MKW50-12S15		15	3333	0	4579	160		18	1887	91
MKW50-24S033	24 (18 ~ 36)	3.3	10000	0	1545	50	40	3.9	25757	89
MKW50-24S05		5	10000	0	2264	70		6.2	17000	92
MKW50-24S12		12	4167	0	2264	85		15	2950	92
MKW50-24S15		15	3333	0	2264	85		18	1887	92
MKW50-48S033	48 (36 ~ 75)	3.3	10000	0	772	35	30	3.9	25757	89
MKW50-48S05		5	10000	0	1132	45		6.2	17000	92
MKW50-48S12		12	4167	0	1132	50		15	2950	92
MKW50-48S15		15	3333	0	1132	50		18	1887	92

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Input Surge Voltage (100ms. max)	12V Input Models	-0.7	---	25	VDC
	24V Input Models	-0.7	---	50	
	48V Input Models	-0.7	---	100	
Start-Up Vlotage	12V Input Models	---	---	9	
	24V Input Models	---	---	18	
	48V Input Models	---	---	36	
Shutdown Voltage	12V Input Models	---	8.3	---	
	24V Input Models	---	16.5	---	
	48V Input Models	---	33	---	
Start Up Time	All Models	---	25	---	mS
Short Circuit Input Power		---	---	TBD	mW
Input Filter		Pi Filter			
Conducted EMI		Compliance to EN 55022,class A and FCC part 15,class A (see Note 7)			

Input Fuse

12V Input Models	24V Input Models	48V Input Models
10000mA Slow-Blow Type	5000mA Slow-Blow Type	2500mA Slow-Blow Type

Remote On/Off Control

Parameter	Conditions	Min.	Typ.	Max.	Unit
DC/DC On	3.5V ~ 12V or Open Circuit				
DC/DC Off	0V ~ 1.2V or Short Circuit				
Control Input Current (on)	Vctrl = 5.0V	---	0.5	---	mA
Control Input Current (off)	Vctrl = 0V	**---**	-0.5	**---**	mA
Control Common	Referenced to Negative Input				
Standby Input Current	Nominal Vin	**---**	2.5	**---**	mA

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full Load and Nominal Vin	---	---	±1.0	%
Line Regulation	Vin=Min. to Max. @ Full Load	---	---	±0.5	%
Load Regulation	Min. Load to Full Load	---	---	±0.5	%
Ripple & Noise (20MHz bandwith)	3.3V & 5V Models(3)	---	100	---	mV P-P
	12V & 15V Models(3)	---	150	---	mV P-P
Transient Recovery Time	25% Load Step Change(2)	---	250	---	uS
Temperature Coefficient		---	---	±0.02	%/℃
Over Load Protection	Hiccup @ Nominal Vin	115	130	---	%
Short Circuit Protection	Hiccup Automatic Recovery				

Output Voltage Trim

Parameter	Conditions	Min.	Typ.	Max.	Unit
Trim Up / Down Range	% of Nominal Output Voltage	±10	**---**	**---**	%

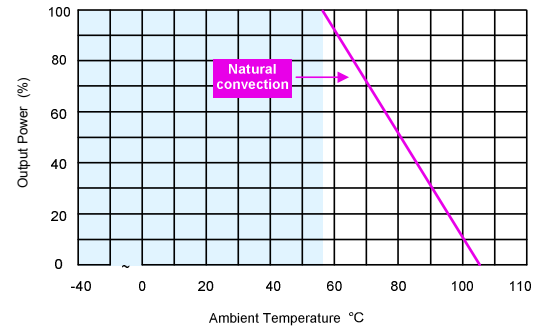
General Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
I/O Isolation Voltage (rated)	60 Seconds	1500	---	---	VDC
I/O Isolation Resistance	500 VDC	1000	---	---	MΩ
I/O Isolation Capacitance	100KHz, 1V	---	---	2200	pF
Switching Frequency		---	320	---	KHz
MTBF(calculated)	MIL-HDBK-217F@25℃ Full Load, Ground Benign	TBD	-----	-----	Hours
Safety Approvals(pending)	UL/cUL 60950-1 recognition(CSA certificate), IEC/EN 60950-1(CB-scheme)				

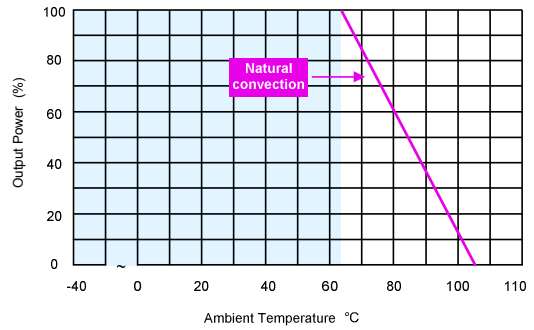
Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature Range (with Derating)	Ambient	-40	+80	℃
Case Temperature		---	+105	℃
Storage Temperature Range		-50	+125	℃
Thermal Impedance	Nature Convection (20LFM)	12	---	℃/W
Thermal Impedance (with Heatsink)	Heat-sink with 20LFM	10	---	℃/W
Humidity (non condensing)		---	95	% rel. H
Cooling	Free-Air convection			
RFI	Six-Sided Shielded, Metal Case			
Lead Temperature (1.5mm from case for 10Sec.)		---	260	℃

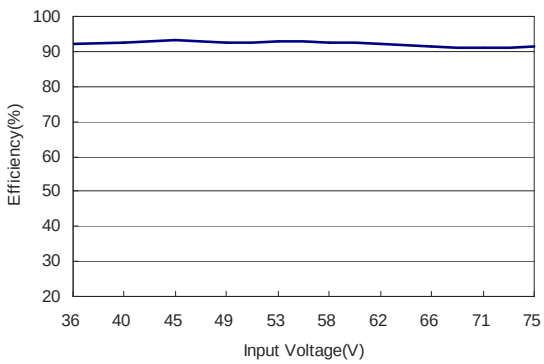
Power Derating Curve



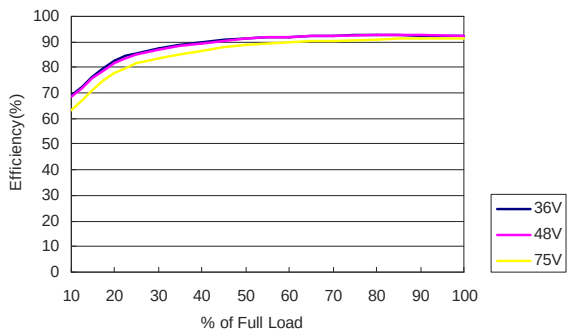
Derating Curve Without Heatsink (MKW50-48S05)



Derating Curve With Heatsink (MKW50-48S05H)



Efficiency vs Input Voltage



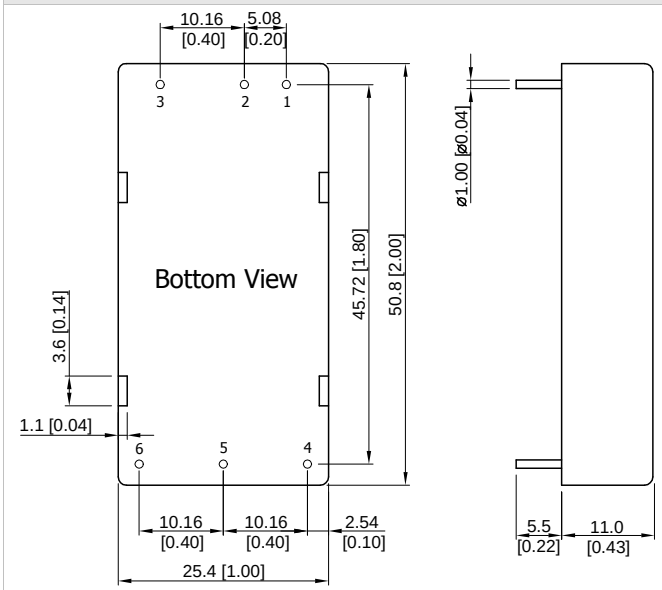
Efficiency vs Output Load

Notes

1. Specifications typical at Ta=+25℃, resistive load, nominal input voltage and 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 0-20MHz, measured with a 1uF MLCC and a 10uF Tantalum Capatitor.
4. All DC/DC converters should be externally fused at the front end for protection.
5. Other input and output voltage may be available, please contact factory.
6. To order the converter with heatsink, please add a **suffix -HS** (e.g. MKW50-12S05-HS).
7. The MKW50 series can meet EN55022 Class A with parallel an external capacitor to the input pins. (12Vin: 22uF/25V 1210 MLCC, 24Vin: 3.3uF/50V 1210 MLCC, 48Vin: 2.2uF/100V 1210 MLCC.
8. Specifications subject to change without notice.

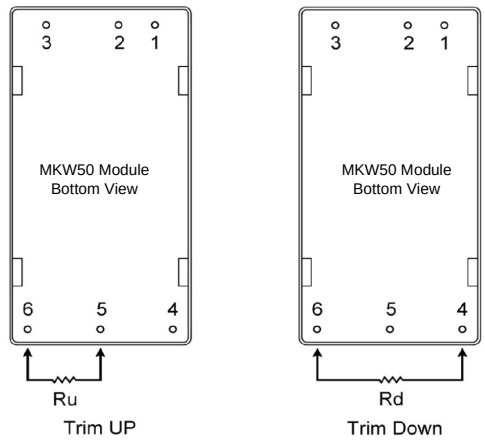
Package Specifications

Mechanical Dimensions



External Output Trimming

Output can be externally trimmed by an external resistor as shown below (for values see application note)



- ▶ 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)
- ▶ Pin tolerance: ±0.05 (0.002)

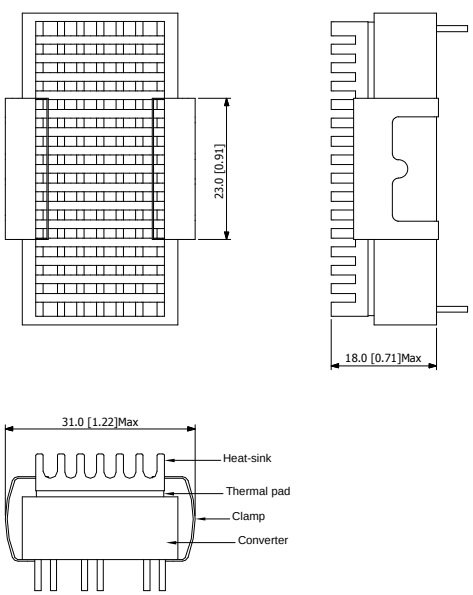
Pin Connections

Pin	Function
1	+Vin
2	-Vin
3	Remote On/Off
4	+Vout
5	-Vout
6	Trim

Physical Characteristics

Case Size	:	50.8x25.4x11mm (2.0x1.0x0.43 Inches)
Case Material	:	Aluminium Alloy, Black Anodized Coating
Base Material	:	FR4 PCB (flammability to UL 94-V0 rated)
Potting Material	:	Epoxy (UL94-V0)
Weight	:	30g

Heatsink (Option –HS)



Physical Characteristics

Heatsink Material	:	Aluminum
Finish	:	Black Anodized Coating
Weight	:	9g

▶ The advantages of adding a heatsink are:

1. To help heat dissipation and increase the stability and reliability of DC/DC converters at high operating temperature atmosphere.
2. To upgrade the operating temperature of DC/DC converters, please refer to Derating Curve.