MGWI06/MSGWI06 Series

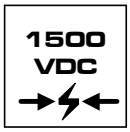
6W, Ultra-Wide Input Range DIP,SMD Single & Dual Output DC/DC Converters

RoHS Compliant

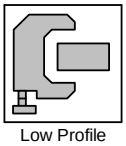
Key Features

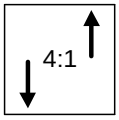
- Efficiency up to 83%
- 1500VDC Isolation
- 4:1 Wide Input Range
- Temperature Performance −40°C to +60°C
- Internal SMD Construction
- Remote On/Off Control
- Complies With EN55022 Class A

EN55022

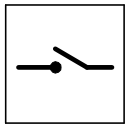


I/O Isolation


Low Profile



Wide Range


Remote on/off

The power density of Minmax's new launched MGWI06 series is 47% higher than the standard DIP−24 package! Comprising 16 different models into a 0.85x0.8x0.4 inch package and with efficiency as high as 83%, the MGWI06 has wide input ranges of 9−36VDC and 18−75VDC and is available in output voltages of 3.3V, 5V, 12V, 15V, 24V, ±5V, ±12V and ±15VDC.

Other features include soft start, continuous short circuit protection, overvoltage protection, remote on/off, six−sided shielded case, and EN55022 Class A conducted noise compliance minimizes design−in time, cost and eliminate the need for external filtering.

Standard footprint targets data communication equipments, mobile battery driven equipments, distributed power systems, telecommunication equipments, mixed analog/digital subsystems, process/machine control equipments, computer peripheral systems and industrial robot systems.

Absolute Maximum Ratings

Parameter		Min.	Max.	Unit
Input Surge Voltage (1000 mS)	24VDC Input Models	−0.7	50	VDC
	48VDC Input Models	−0.7	100	VDC
Lead Temperature (1.5mm from case for 10 Sec.)		−−−	260	°C

Exceeding the absolute maximum ratings of the unit could cause damage. These are not continuous operating ratings.

Environmental Specifications

Parameter	Conditions	Min.	Max.	Unit
Operating Temperature	Ambient	−40	+60	°C
Operating Temperature	Case	−40	+105	°C
Storage Temperature		−40	+125	°C
Humidity		−−−	95	%
Cooling	Free−Air Convection			
Conducted EMI	EN55022 Class A			

Model Selection Guide

Model Number		Input Voltage	Output Voltage	Output Current		Input Current		Efficiency
				Max.	Min.	@Max. Load	@No Load	@Max. Load
DIP Package	SMD Package	VDC	VDC	mA	mA	mA (Typ.)	mA (Typ.)	% (Typ.)
MGWI06-24S033	MSGWI06-24S033	24 (9 ~ 36)	3.3	1450	218	262	30	76
MGWI06-24S05	MSGWI06-24S05		5	1200	180	316		79
MGWI06-24S12	MSGWI06-24S12		12	500	75	301		83
MGWI06-24S15	MSGWI06-24S15		15	400	60	301		83
MGWI06-24S24	MSGWI06-24S24		24	250	38	301		83
MGWI06-24D05	MSGWI06-24D05		±5	±600	±90	301		82
MGWI06-24D12	MSGWI06-24D12		±12	±250	±38	301		83
MGWI06-24D15	MSGWI06-24D15		±15	±200	±30	301		83
MGWI06-48S033	MSGWI06-48S033	48 (18 ~ 75)	3.3	1450	218	131	20	76
MGWI06-48S05	MSGWI06-48S05		5	1200	180	158		79
MGWI06-48S12	MSGWI06-48S12		12	500	75	151		83
MGWI06-48S15	MSGWI06-48S15		15	400	60	151		83
MGWI06-48S24	MSGWI06-48S24		24	250	38	151		83
MGWI06-48D05	MSGWI06-48D05		±5	±600	±90	151		82
MGWI06-48D12	MSGWI06-48D12		±12	±250	±38	151		83
MGWI06-48D15	MSGWI06-48D15		±15	±200	±30	151		83

Capacitive Load

Models by Vout	3.3V	5V	12V	15V	24V	±5V #	±12V #	±15V #	Unit
Maximum Capacitive Load	330	330	100	100	100	100	100	100	uF

 # For each output

Input Fuse Selection Guide

24V Input Models	48V Input Models
1500mA Slow-Blow Type	750mA Slow-Blow Type

Input Specifications

Parameter	Model	Min.	Typ.	Max.	Unit
Start Voltage	24V Input Models	---	---	9	VDC
	48V Input Models	---	---	18	
Under Voltage Shutdown	24V Input Models	---	---	8.5	
	48V Input Models	---	---	17	
Reverse Polarity Input Current	All Models	---	---	1.5	A
Short Circuit Input Power		---	---	3000	mW
Input Filter		Pi Filter			

Output Specifications

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		---	±1.0	±2.0	%
Output Voltage Balance	Dual Output, Balanced Loads	---	±1.0	---	%
Line Regulation	Vin=Min. to Max.	---	±0.5	±1.0	%
Load Regulation	Io=15% to 100%	---	±0.5	±1.2	%
Ripple & Noise (20MHz)		---	60	100	mV P-P
Ripple & Noise (20MHz)	Over Line, Load & Temp.	---	---	150	mV P-P
Over Power Protection		110	---	---	%
Transient Recovery Time	25% Load Step Change	---	300	600	uS
Transient Response Deviation		---	±3	---	%
Temperature Coefficient		---	±0.01	±0.02	%/°C
Output Short Circuit	Continuous				

Remote On/Off Control

Parameter	Conditions	Min.	Typ.	Max.	Unit
DC/DC on	2.5 ~ 50 VDC or Open Circuit				
DC/DC off	-0.7 ~ 0.8 VDC				
Control Input Current (on)	Vin-RC=5V	---	---	500	uA
Control Input Current (off)	Vin-RC=0V	---	---	-500	uA
Control Common	Referenced to Negative Input				
Standby Input Current		---	---	10	mA

General Specifications

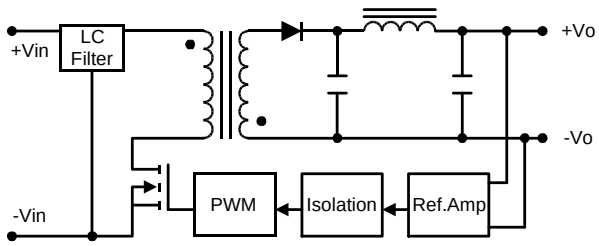
Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage Rated	60 Seconds	1500	---	---	VDC
Isolation Voltage Test	Flash Tested for 1 Second	1650	---	---	VDC
Isolation Resistance	500VDC	1000	---	---	MΩ
Isolation Capacitance	100KHz,1V	---	1200	1500	pF
Switching Frequency		---	330	---	KHz
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	350	---	---	K Hours

Notes :

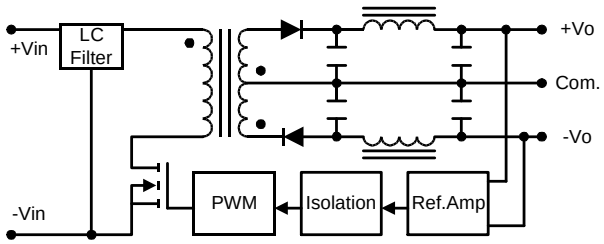
1. Specifications typical at Ta=+25°C, resistive load, nominal input voltage, rated output current unless otherwise noted.
2. Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
3. Ripple & Noise measurement bandwidth is 0-20 MHz.
4. These power converters require a minimum output loading to maintain specified regulation.
5. Operation under no-load conditions will not damage these modules; however, they may not meet all specifications listed.
6. All DC/DC converters should be externally fused at the front end for protection.
7. Other input and output voltage may be available, please contact factory.
8. Specifications subject to change without notice.

Block Diagram

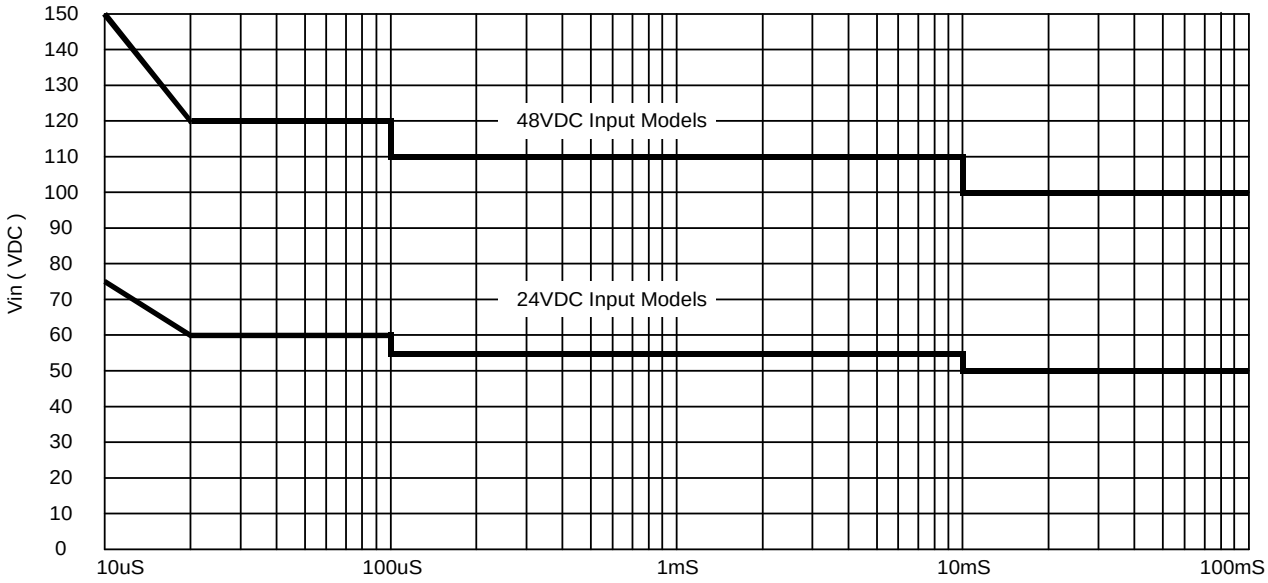
Single Output

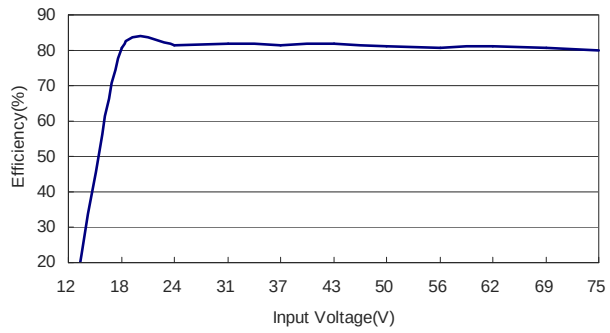


Dual Output

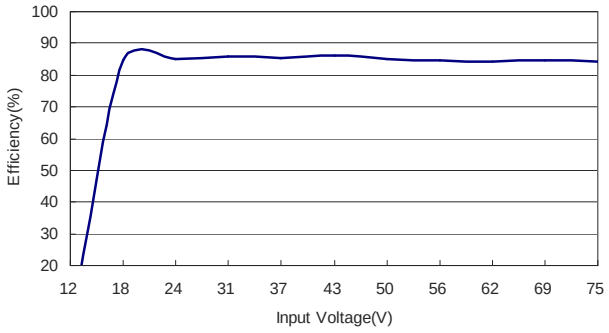


Input Voltage Transient Rating

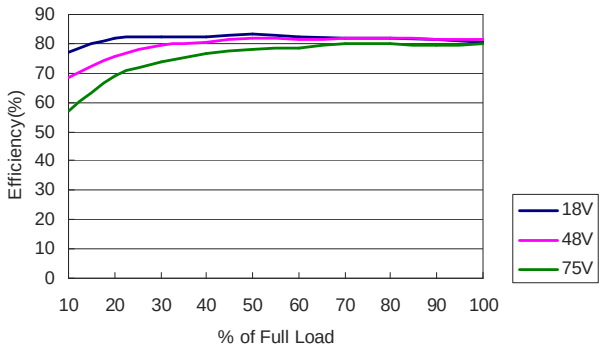




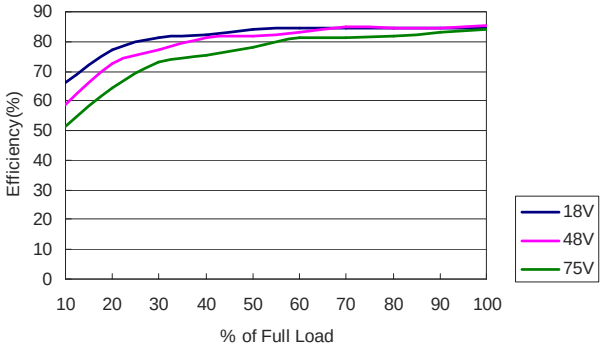
Efficiency vs Input Voltage (MGWI06-48S05)



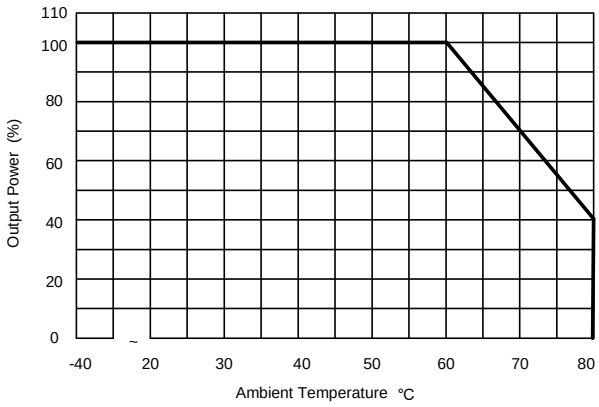
Efficiency vs Input Voltage (MGWI06-48D15)



Efficiency vs Output Load (MGWI06-48S05)



Efficiency vs Output Load (MGWI06-48D15)



Derating Curve

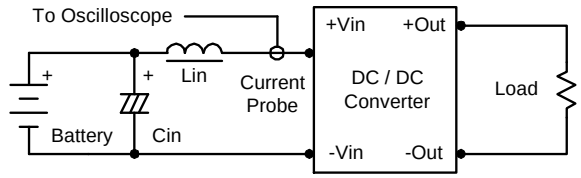
Test Configurations

Input Reflected-Ripple Current Test Setup

Input reflected−ripple current is measured with a inductor Lin (4.7uH) and Cin (220uF, ESR < 1.0Ω at 100 KHz) to simulate source impedance.

Capacitor Cin, offsets possible battery impedance.

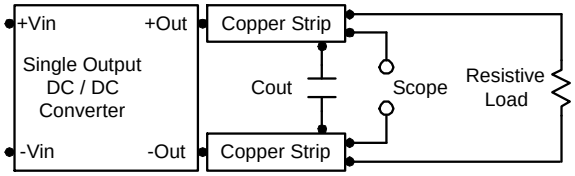
Current ripple is measured at the input terminals of the module, measurement bandwidth is 0−500 KHz.

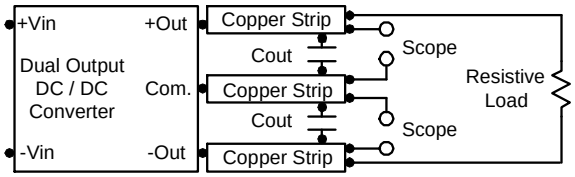


Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.47uF 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.





Design & Feature Considerations

Remote On/Off

Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and off during a logic low.

To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the −Vin terminal.

The switch can be an open collector or equivalent.

A logic low is −0.7V to 0.8V.

A logic high is 2.5V to 50V.

The maximum sink current of the switch at on/off terminal during a logic low is −500 uA.

The maximum sink current of the switch at on/off terminal during a logic high is 500uA or open.

Maximum Capacitive Load

The MGWI06/MSGWI06 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.

Overcurrent Protection

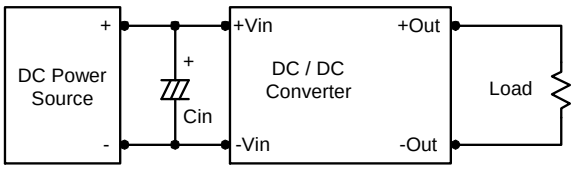
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current−limit inception, the unit shifts from voltage control to current control. The unit operates normally 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.

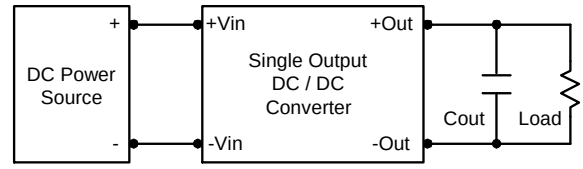
Capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100 KHz) capacitor of a 4.7uF for the 24V input devices and a 2.2uF for the 48V devices.

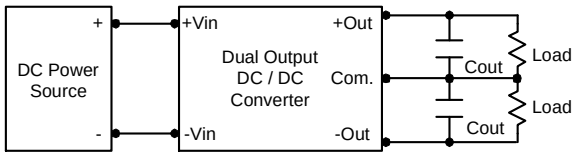


Output Ripple Reduction

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 3.3uF capacitors at the output.

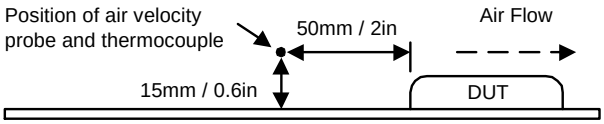




Thermal Considerations

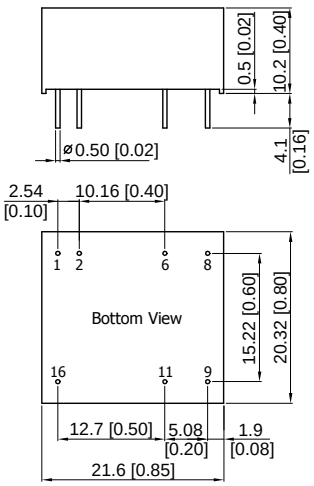
Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 90° C.

The derating curves are determined from measurements obtained in an experimental apparatus.

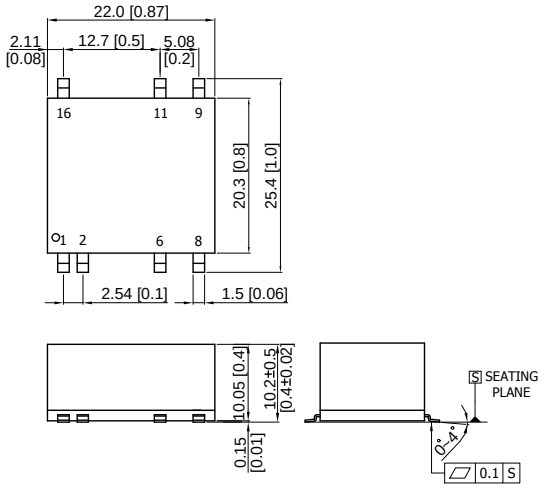


Mechanical Dimensions

DIP Package



SMD Package



Physical Characteristics

Case Size	:	21.6×20.32×10.2mm 0.85×0.8×0.4 inches
Case Material	:	Non−Conductive Black Plastic
Weight	:	9.1g

Case Size	:	22.0×20.3×10.2mm 0.87×0.8×0.4 inches
Case Material	:	Non−Conductive Black Plastic
Weight	:	7.8g

Pin Connections

Pin	Single Output	Dual Output
1	Remote On/Off	Remote On/Off
2	−Vin	−Vin
6	NC	Common
8	NC	−Vout
9	+Vout	+Vout
11	−Vout	Common
16	+Vin	+Vin

NC: No Connection

Tolerance	Millimeters	Inches
	X.X±0.25	X.XX±0.01
	X.XX±0.13	X.XXX±0.005
Pin	±0.05	±0.002