MG200BI

2W, High Isolation, Compact MiniDIP DC/DC Converters

Key Features:

- 2W Output Power
- 3,000 VDC Isolation
- Efficiency to 90%
- -40°C to +105°C Temp
- Meets EN 55032 B
- >3,500 kHour MBTF

CE

RoHS

Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	3.3 VDC Input	2.97	3.3	3.63	VDC
	5 VDC Input	4.5	5	5.5	
	12 VDC Input	10.8	12	13.2	
	15 VDC Input	13.5	15	16.5	
	24 VDC Input	21.6	24	26.4	
Reflected Ripple Current	12 VDC Input		15		mA
Impulse Voltage	5VDC Input	-0.7		9	VDC
	9VDC Input	-0.7		12	
	12VDC Input	-0.7		18	
	15VDC Input	-0.7		21	
	24VDC Input	-0.7		30	
Input Filter		Capacitance Filter			

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy			See Accuracy Curve on Page 3			
Line Regulation	3.3V Output			±1.5		%/%Vin
	Other Outputs			±1.2		
Load Regulation	10-100% Load	3.3 VDC Output		14		%
		5 VDC Output		10		
		9 VDC Output		9		
		12 VDC Output		8		
		15 VDC Output		7		
		24 VDC Output		6		
Ripple & Noise	20 MHz Bandwidth			60	120	mV P - P
Temperature Coefficient					±0.03	%/°C
Short Circuit Protection			Continuous, Self-Recovery			

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	See Note 2	3,000			VDC
Isolation Resistance	Input-Output, 500VDC	1000			MΩ
Isolation Capacitance	Input-Output, 100kHz/0.1V		20		pF
Switching Frequency			220		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range		-40		+105	°C
Storage Temperature Range		-55		+125	
Cooling	Free Air Convection				
Storage Humidity	Non-Condensing		25		%RH

Physical

Case Size	0.77 x 0.39 x 0.31 in (See Mechanical Drawing on Page 5)
Case Material	Black plastic, flame-retardant and heat-resistant (UL 94V-0 rated)
Weight	0.083 oz (2.35g) (See Mechanical Drawing on Page 5)

EMI Characteristics

Parameter	Standard		Criteria	Level
Radiated Emissions	CISPR32/EN 55032	See EMI Circuit on		B
Conducted Emissions	CISPR32/EN 55032	Page 4		B
ESD	MG2xxS-xx	IEC/EN61000-4-2	B	Contact ±6KV/Air ±8KV
	MG2xxD-xx	IEC/EN61000-4-2	B	Contact ±4KV/Air ±9KV

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3.5			MHours
Lead Temperature	1.5mm away for 10 seconds			300	°C

MicroPower Direct
46 Eastman Street
Unit 1
Easton, MA 02375
USA

T: (781) 344-8226
F: (781) 344-8481
E: sales@micropowerdirect.com
W: www.micropowerdirect.com

MICROPOWER DIRECT

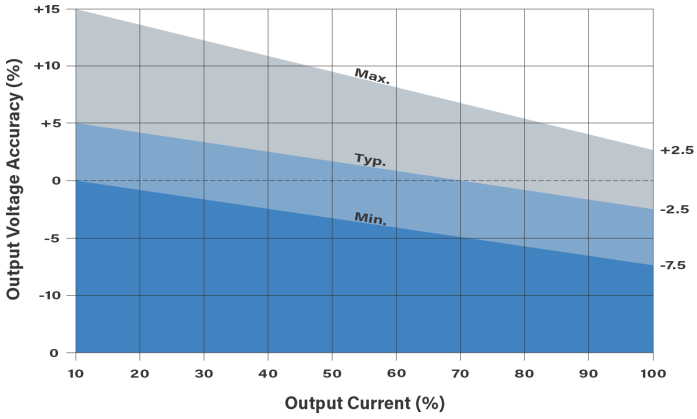
Model Selection Guide

Model Number	Input				Output			Efficiency (%, Typ)	Capacitive Load (uF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full Load	No Load						
MG203S-03BI	3.3	2.97 - 3.63	520	4	3.3	400	40	77	2400	1700
MG203S-05BI	3.3	2.97 - 3.63	758	4	5	400	40	79	2400	1700
MG203S-09BI	3.3	2.97 - 3.63	758	4	9	222	22	80	1000	1700
MG203S-12BI	3.3	2.97 - 3.63	758	4	12	167	16	81	820	1700
MG205S-03BI	5	4.5 - 5.5	506	4	3.3	400	40	83	2400	1100
MG205S-05BI	5	4.5 - 5.5	506	4	5	400	40	85	2400	1100
MG205S-09BI	5	4.5 - 5.5	506	4	9	222	22	85	1000	1100
MG205S-12BI	5	4.5 - 5.5	506	4	12	167	16	86	820	1100
MG205S-15BI	5	4.5 - 5.5	506	4	15	133	13	87	680	1100
MG205S-24BI	5	4.5 - 5.5	506	4	24	83	8	88	560	1100
MG205D-03BI	5	4.5 - 5.5	506	4	±3.3	±303	±30	83	#1000	1100
MG205D-05BI	5	4.5 - 5.5	506	4	±5	±200	±20	85	#1000	1100
MG205D-09BI	5	4.5 - 5.5	506	4	±9	±111	±11	85	#560	1100
MG205D-12BI	5	4.5 - 5.5	506	4	±12	±83	±8	86	#560	1100
MG205D-15BI	5	4.5 - 5.5	506	4	±15	±67	±6	87	#220	1100
MG212S-03BI	12	10.8 - 13.2	208	4	3.3	400	40	84	2400	500
MG212S-05BI	12	10.8 - 13.2	208	4	5	400	40	85	2400	500
MG212S-09BI	12	10.8 - 13.2	208	4	9	222	22	86	1000	500
MG212S-12BI	12	10.8 - 13.2	208	4	12	167	16	87	820	500
MG212S-15BI	12	10.8 - 13.2	208	4	15	133	13	88	680	500
MG212S-24BI	12	10.8 - 13.2	208	4	24	83	8	89	560	500
MG212D-03BI	12	10.8 - 13.2	208	4	±3.3	±303	±30	84	#1000	500
MG212D-05BI	12	10.8 - 13.2	208	4	±5	±200	±20	85	#1000	500
MG212D-09BI	12	10.8 - 13.2	208	4	±9	±111	±11	86	#560	500
MG212D-12BI	12	10.8 - 13.2	208	4	±12	±83	±8	87	#560	500
MG212D-15BI	12	10.8 - 13.2	208	4	±15	±67	±6	88	#220	500
MG215S-03BI	15	13.5 - 16.5	167	4	3.3	400	40	84	2400	350
MG215S-05BI	15	13.5 - 16.5	167	4	5	400	40	85	2400	350
MG215S-09BI	15	13.5 - 16.5	167	4	9	222	22	86	1000	350
MG215S-12BI	15	13.5 - 16.5	167	4	12	167	16	87	820	350
MG215S-15BI	15	13.5 - 16.5	167	4	15	133	13	88	680	350
MG215S-24BI	15	13.5 - 16.5	167	4	24	83	8	89	560	350
MG215D-03BI	15	13.5 - 16.5	167	4	±3.3	±303	±30	84	#1000	350
MG215D-05BI	15	13.5 - 16.5	167	4	±5	±200	±20	85	#1000	350
MG215D-09BI	15	13.5 - 16.5	167	4	±9	±111	±11	86	#560	350
MG215D-12BI	15	13.5 - 16.5	167	4	±12	±83	±8	87	#560	350
MG215D-15BI	15	13.5 - 16.5	167	4	±15	±67	±6	88	#220	350
MG224S-03BI	24	21.6 - 26.4	104	4	3.3	400	40	84	2400	250
MG224S-05BI	24	21.6 - 26.4	104	4	5	400	40	86	2400	250
MG224S-09BI	24	21.6 - 26.4	104	4	9	222	22	87	1000	250
MG224S-12BI	24	21.6 - 26.4	104	4	12	167	16	88	820	250
MG224S-15BI	24	21.6 - 26.4	104	4	15	133	13	89	680	250
MG224S-24BI	24	21.6 - 26.4	104	4	24	83	8	90	560	250

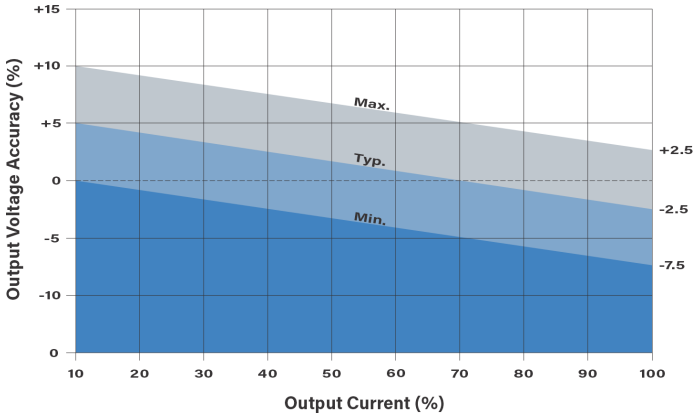
Model Number	Input				Output			Efficiency (%, Typ)	Capacitive Load (uF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)			
	Nominal	Range	Full Load	No Load						
MG224D-03BI	24	21.6 - 26.4	104	4	±3.3	±303	±30	84	#1000	250
MG224D-05IB	24	21.6 - 26.4	104	4	±5	±200	±20	86	#1000	250
MG224D-09BI	24	21.6 - 26.4	104	4	±9	±111	±11	87	#560	250
MG224D-12BI	24	21.6 - 26.4	104	4	±12	±83	±8	88	#560	250
MG224D-15BI	24	21.6 - 26.4	104	4	±15	±67	±6	89	#220	250

Notes:
1. Output short circuit protection is continuous. The unit recovers automatically when the fault condition is removed.
2. Input-output isolation is tested for 60 seconds with a leakage current of <1 mA.
3. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed expectations.
4. Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators.

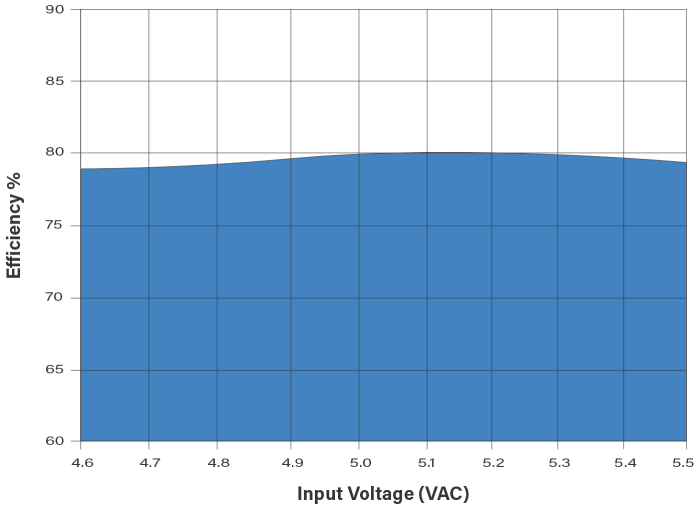
Output Voltage Accuracy: 3.3VDC Output



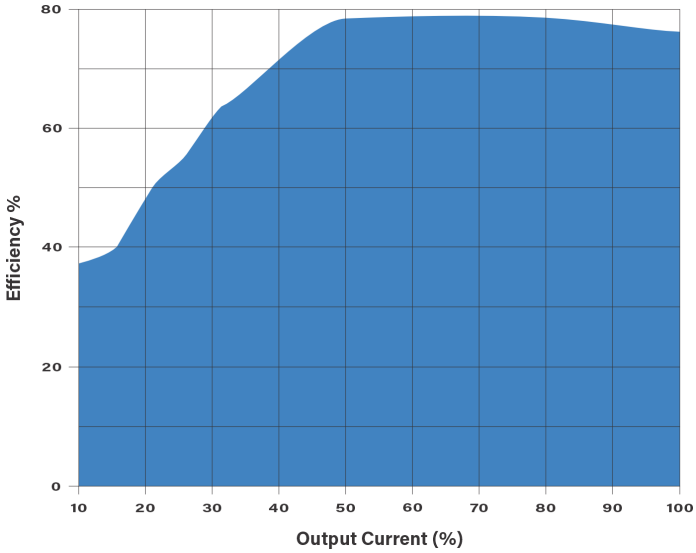
Output Voltage Accuracy: Other Outputs



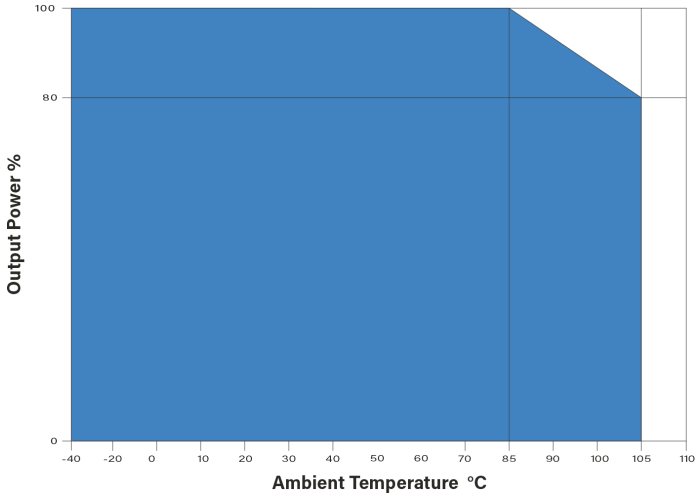
Efficiency vs Input Voltage: MG205S-05



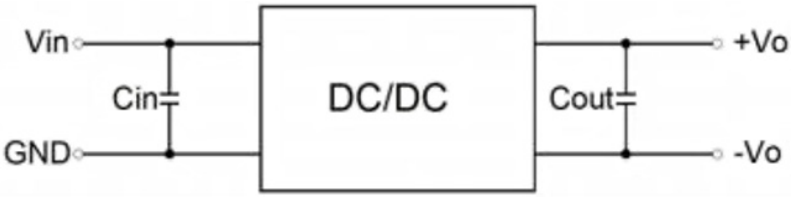
Efficiency vs Output Voltage: MG205S-05



Temperature Derating

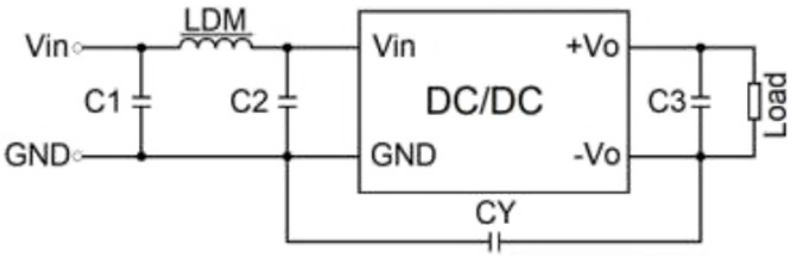


Typical Application Circuit



Vin (VDC)	Cin (uF)	Single Output Vo (VDC)	Cout (uF)	Dual Output Vo (VDC)	Cout (uF)
3.3/5	4.7	3.3/5	10	±3.3/±5	4.7
9/12	2.2	9/12	2.2	±9/±12	1.0
15	2.2	15/24	1.0	±15/±24	0.47
24	1.0	-	-	-	-

EMI Recommended Circuit

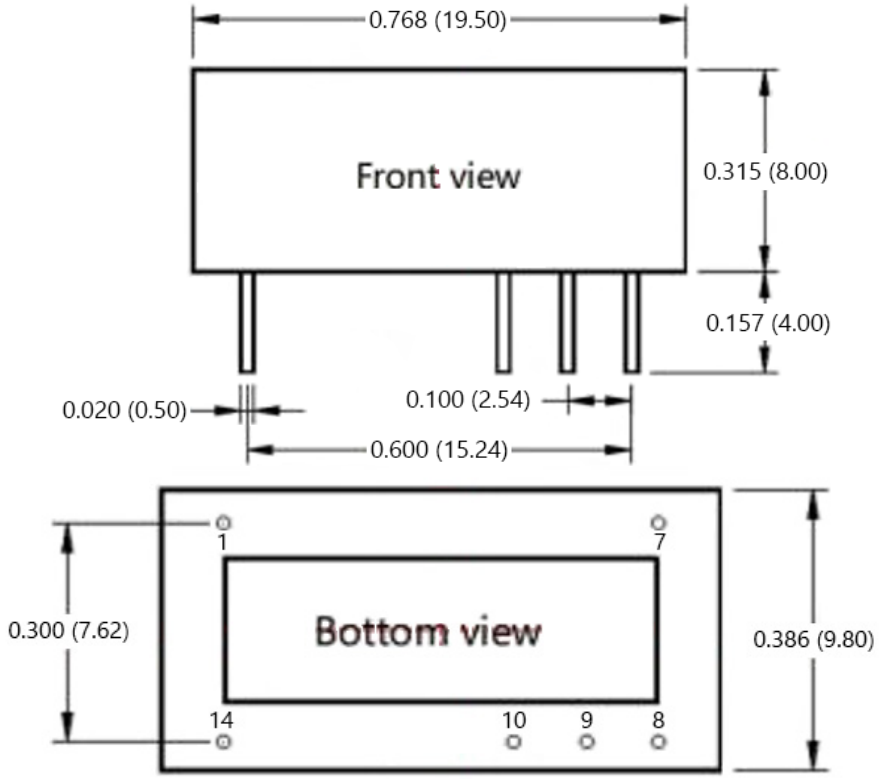


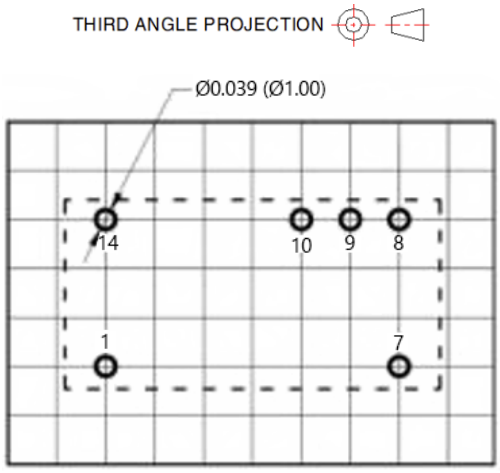
EMI Recommended Parameters	
C1/C2	4.7uF/50V
CY	1nF/2KV
C3	Refer to Table Above
LDM	6.8uH

Notes:

1. If further reduction of input and output ripple is required, a capacitor filtering network can be connected at the input and output terminals.
2. Attention should be paid to selecting appropriate filtering capacitors. If the capacitance is too large, it is likely to cause startup problems. For each output, while ensuring safe and reliable operation, the recommended capacitive load values are detailed in the table.
3. To ensure the efficient and reliable operation of the module, its minimum output load should not be less than 10% of the rated load when in use. If your required power is indeed small, please connect a resistor in parallel at the output end (the sum of the power consumed by the resistor and the actual power used is greater than or equal to 10% of the rated power).

Mechanical Diagrams





Grid Distance: 2.54 x 2.54mm

Pin	Single	Dual
1	GND	GND
7	NC	NC
8	+Vo	+vo
9	No Pin	COM
10	-Vo	-Vo
14	Vin	Vin

Notes:
- All dimensions are typical in inches (mm)
- Pin tolerances: ±0.004 (±0.10)
- General tolerances: ±0.020 (±0.50)

Weight:
- 0.083 oz (2.35g)

MPD has a very wide range of high performance AC/DC power supplies ranging from 600W UChannel units to 1W units in miniature Single-In-Line (SIP) packages. All are designed and certified to international safety and EMC/EMI standards.
We have AC/DC supplies approved for use in medical equipment, DIN rail supplies, "Green" energy supplies and constant power supplies.
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