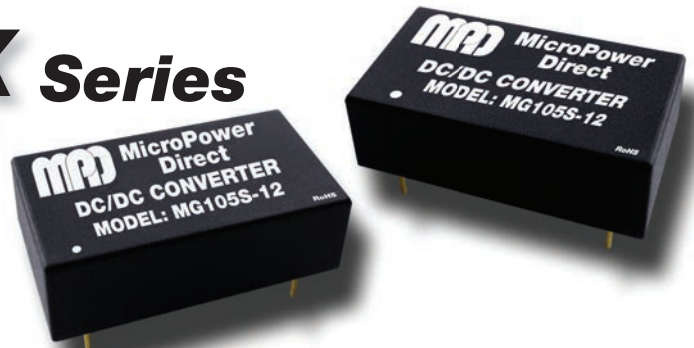


MG100x-XX Series

Isolated, 1W DIP, Single & Dual Output DC/DC Converters



Electrical Specifications

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

Key Features:

- 1W Output Power
- 1 kV to 6kV Isolation
- 96 Standard Models
- Miniature DIP Case
- EN 60950 Approved
- Efficiency to 86%
- -40°C to +85°C Operation
- Industry Standard Pin-Out
- Low Cost

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	5.0	5.5	
	12 VDC Input	10.8	12.0	13.2	
	15 VDC Input	13.5	15.0	16.5	
	24 VDC Input	21.6	24.0	26.4	
	48 VDC Input	43.2	48.0	52.8	
Input Filter	Capacitor Filter				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±3.0		%
Line Regulation	For V _{IN} Change of 1%		±1.2		%
Load Regulation	See Note 1		±10		%
Ripple & Noise (20 MHz)			75		mV P - P
Temperature Coefficient			±0.02		%/°C
Output Short Circuit	Momentary (0.5 Sec)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage, 60 Sec	1xxx-xx Models	1,000			VDC
	1xxx-xx1 Models	3,000			
	1xxx-xx14 Models	4,000			
	1xxx-xx15 Models	5,200			
	1xxx-xx16 Models	6,000			
Isolation Resistance			1,000		MΩ
Isolation Capacitance			60		pF
Switching Frequency			80		kHz

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions	EN 55022		Class B
Conducted Emissions	See Note 3 EN 55022		Class B
ESD	EN 61000-4-2	A	±6 kV/±8kV
RS	EN 61000-4-3	A	10V/m
EFT	See Note 4 EN 61000-4-4	A	±2 kV
Surge	See Note 4 EN 61000-4-5	A	±2 kV
CS	EN 61000-4-6	A	10 Vrms
PFMF	EN 61000-4-8	A	1A/m

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40	+25	+85	°C
	Case			+100	
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram (Page 4)
Case Material	Non-Conductive Black Plastic (UL94-V0)
Weight	0.09 Oz (2.6g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.121			MHours
Safety Standards	UL 60950, EN 60950				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (0.1 Sec)	3.3 VDC Input			6.0	VDC
	5 VDC Input			7.0	
	12 VDC Input			15.0	
	15 VDC Input			18.0	
	24 VDC Input			28.0	
	48 VDC Input			54.0	
Lead Temperature	1.5 mm From Case for 10 Sec			260	°C

Caution: Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.



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Model Number	Input				Output			Efficiency (% Typ)	Reflected Ripple Current (mA Pk-Pk)	Capacitive Load (µF Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MG103S-03xx	3.3	2.97 - 3.63	399	28	3.3	303	0.0	76	20.0	220	1,000
MG103S-05xx	3.3	2.97 - 3.63	389	22	5.0	200	0.0	78	20.0	220	1,000
MG103S-07xx	3.3	2.97 - 3.63	389	25	7.2	139	0.0	78	20.0	220	1,000
MG103S-09xx	3.3	2.97 - 3.63	379	35	9.0	111	0.0	80	20.0	220	1,000
MG103S-12xx	3.3	2.97 - 3.63	394	30	12.0	83	0.0	77	20.0	220	1,000
MG103S-15xx	3.3	2.97 - 3.63	389	30	15.0	67	0.0	78	20.0	220	1,000
MG103S-18xx	3.3	2.97 - 3.63	415	30	18.0	56	0.0	73	20.0	220	1,000
MG103S-24xx	3.3	2.97 - 3.63	415	30	24.0	42	0.0	73	20.0	220	1,000
MG103D-03xx	3.3	2.97 - 3.63	459	30	±3.3	±152	±0.0	66	20.0	±100	1,000
MG103D-05xx	3.3	2.97 - 3.63	433	30	±5.0	±100	±0.0	70	20.0	±100	1,000
MG103D-07xx	3.3	2.97 - 3.63	421	30	±7.2	±69	±0.0	72	20.0	±100	1,000
MG103D-09xx	3.3	2.97 - 3.63	404	26	±9.0	±56	±0.0	75	20.0	±100	1,000
MG103D-12xx	3.3	2.97 - 3.63	384	30	±12.0	±42	±0.0	77	20.0	±100	1,000
MG103D-15xx	3.3	2.97 - 3.63	389	25	±15.0	±33	±0.0	78	20.0	±100	1,000
MG103D-18xx	3.3	2.97 - 3.63	404	25	±18.0	±28	±0.0	75	20.0	±100	1,000
MG103D-24xx	3.3	2.97 - 3.63	404	25	±24.0	±21	±0.0	75	20.0	±100	1,000
MG105S-03xx	5	4.5 - 5.5	256	15	3.3	303	0.0	78	20.0	220	500
MG105S-05xx	5	4.5 - 5.5	247	17	5.0	200	0.0	81	20.0	220	500
MG105S-07xx	5	4.5 - 5.5	247	16	7.2	139	0.0	81	20.0	220	500
MG105S-09xx	5	4.5 - 5.5	244	15	9.0	111	0.0	82	20.0	220	500
MG105S-12xx	5	4.5 - 5.5	253	17	12.0	83	0.0	79	20.0	220	500
MG105S-15xx	5	4.5 - 5.5	233	17	15.0	67	0.0	86	20.0	220	500
MG105S-18xx	5	4.5 - 5.5	241	16	18.0	56	0.0	83	20.0	220	500
MG105S-24xx	5	4.5 - 5.5	244	20	24.0	42	0.0	82	20.0	220	500
MG105D-03xx	5	4.5 - 5.5	299	20	±3.3	±152	±0.0	67	20.0	±100	500
MG105D-05xx	5	4.5 - 5.5	270	20	±5.0	±100	±0.0	74	20.0	±100	500
MG105D-07xx	5	4.5 - 5.5	253	15	±7.2	±69	±0.0	79	20.0	±100	500
MG105D-09xx	5	4.5 - 5.5	247	15	±9.0	±56	±0.0	81	20.0	±100	500
MG105D-12xx	5	4.5 - 5.5	250	20	±12.0	±42	±0.0	80	20.0	±100	500
MG105D-15xx	5	4.5 - 5.5	244	20	±15.0	±33	±0.0	82	20.0	±100	500
MG105D-18xx	5	4.5 - 5.5	247	22	±18.0	±28	±0.0	81	20.0	±100	500
MG105D-24xx	5	4.5 - 5.5	247	22	±24.0	±21	±0.0	81	20.0	±100	500
MG112S-03xx	12	10.8 - 13.2	111	12	3.3	303	0.0	75	20.0	220	300
MG112S-05xx	12	10.8 - 13.2	105	14	5.0	200	0.0	79	20.0	220	300
MG112S-07xx	12	10.8 - 13.2	111	14	7.2	139	0.0	75	20.0	220	300
MG112S-09xx	12	10.8 - 13.2	104	9	9.0	111	0.0	80	20.0	220	300
MG112S-12xx	12	10.8 - 13.2	105	13	12.0	83	0.0	79	20.0	220	300
MG112S-15xx	12	10.8 - 13.2	102	10	15.0	67	0.0	82	20.0	220	300
MG112S-18xx	12	10.8 - 13.2	103	11	18.0	56	0.0	81	20.0	220	300
MG112S-24xx	12	10.8 - 13.2	110	20	24.0	42	0.0	76	20.0	220	300
MG112D-03xx	12	10.8 - 13.2	123	13	±3.3	±152	±0.0	68	20.0	±100	300
MG112D-05xx	12	10.8 - 13.2	113	10	±5.0	±100	±0.0	74	20.0	±100	300
MG112D-07xx	12	10.8 - 13.2	110	10	±7.2	±69	±0.0	76	20.0	±100	300
MG112D-09xx	12	10.8 - 13.2	107	13	±9.0	±56	±0.0	78	20.0	±100	300
MG112D-12xx	12	10.8 - 13.2	102	10	±12.0	±42	±0.0	82	20.0	±100	300
MG112D-15xx	12	10.8 - 13.2	102	10	±15.0	±33	±0.0	82	20.0	±100	300
MG112D-18xx	12	10.8 - 13.2	102	10	±18.0	±28	±0.0	82	20.0	±100	300
MG112D-24xx	12	10.8 - 13.2	111	20	±24.0	±21	±0.0	75	20.0	±100	300
MG115S-03xx	15	13.5 - 16.5	83	10	3.3	303	0.0	80	20.0	220	200
MG115S-05xx	15	13.5 - 16.5	82	7	5.0	200	0.0	81	20.0	220	200
MG115S-07xx	15	13.5 - 16.5	85	10	7.2	139	0.0	78	20.0	220	200
MG115S-09xx	15	13.5 - 16.5	85	10	9.0	111	0.0	78	20.0	220	200
MG115S-12xx	15	13.5 - 16.5	83	8	12.0	83	0.0	80	20.0	220	200
MG115S-15xx	15	13.5 - 16.5	84	12	15.0	67	0.0	79	20.0	220	200
MG115S-18xx	15	13.5 - 16.5	83	10	18.0	56	0.0	80	20.0	220	200
MG115S-24xx	15	13.5 - 16.5	80	5	24.0	42	0.0	83	20.0	220	200
MG115D-03xx	15	13.5 - 16.5	89	20	±3.3	±152	±0.0	75	20.0	±100	200
MG115D-05xx	15	13.5 - 16.5	89	20	±5.0	±100	±0.0	75	20.0	±100	200
MG115D-07xx	15	13.5 - 16.5	89	18	±7.2	±69	±0.0	75	20.0	±100	200
MG115D-09xx	15	13.5 - 16.5	87	18	±9.0	±56	±0.0	77	20.0	±100	200
MG115D-12xx	15	13.5 - 16.5	87	20	±12.0	±42	±0.0	77	20.0	±100	200
MG115D-15xx	15	13.5 - 16.5	87	20	±15.0	±33	±0.0	77	20.0	±100	200
MG115D-18xx	15	13.5 - 16.5	89	15	±18.0	±28	±0.0	75	20.0	±100	200
MG115D-24xx	15	13.5 - 16.5	89	15	±24.0	±21	±0.0	75	20.0	±100	200

I/O Isolation

Models are available with input/output isolation levels ranging from 1 kVDC to 6 kVDC. To order units with higher isolation levels an "x" is added to the Model number, as shown in the table at right.

Model No	Isolation Level
MG1xxx-xx	1 kVDC
MG1xxx-xxl	3 kVDC
MG1xxx-xxl4	4 kVDC
MG1xxx-xxl5	5.2 kVDC
MG1xxx-xxl6	6 kVDC

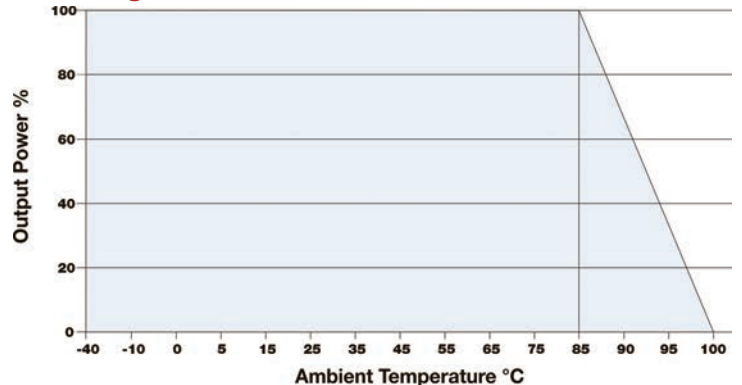


Model Number	Input				Output			Efficiency (% Typ)	Reflected Ripple Current (mA Pk-Pk)	Capacitive Load (µF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MG124S-03xx	24	21.6 - 26.4	56	8	3.3	303	0.0	74	20.0	220	100
MG124S-05xx	24	21.6 - 26.4	54	6	5.0	200	0.0	77	20.0	220	100
MG124S-07xx	24	21.6 - 26.4	57	6	7.2	139	0.0	73	20.0	220	100
MG124S-09xx	24	21.6 - 26.4	55	6	9.0	111	0.0	76	20.0	220	100
MG124S-12xx	24	21.6 - 26.4	53	6	12.0	83	0.0	78	20.0	220	100
MG124S-15xx	24	21.6 - 26.4	52	5	15.0	67	0.0	80	20.0	220	100
MG124S-18xx	24	21.6 - 26.4	51	5	18.0	56	0.0	82	20.0	220	100
MG124S-24xx	24	21.6 - 26.4	52	8	24.0	42	0.0	80	20.0	220	100
MG124D-03xx	24	21.6 - 26.4	62	7	±3.3	±152	±0.0	67	20.0	±100	100
MG124D-05xx	24	21.6 - 26.4	56	6	±5.0	±100	±0.0	74	20.0	±100	100
MG124D-07xx	24	21.6 - 26.4	53	7	±7.2	±69	±0.0	78	20.0	±100	100
MG124D-09xx	24	21.6 - 26.4	53	7	±9.0	±56	±0.0	78	20.0	±100	100
MG124D-12xx	24	21.6 - 26.4	52	6	±12.0	±42	±0.0	80	20.0	±100	100
MG124D-15xx	24	21.6 - 26.4	52	8	±15.0	±33	±0.0	80	20.0	±100	100
MG124D-18xx	24	21.6 - 26.4	51	6	±18.0	±28	±0.0	81	20.0	±100	100
MG124D-24xx	24	21.6 - 26.4	51	8	±24.0	±21	±0.0	82	20.0	±100	100
MG148S-03xx	48	43.2 - 52.8	29	5	3.3	303	0.0	73	20.0	220	75
MG148S-05xx	48	43.2 - 52.8	29	5	5.0	200	0.0	73	20.0	220	75
MG148S-07xx	48	43.2 - 52.8	28	5	7.2	139	0.0	75	20.0	220	75
MG148S-09xx	48	43.2 - 52.8	27	5	9.0	111	0.0	76	20.0	220	75
MG148S-12xx	48	43.2 - 52.8	27	5	12.0	83	0.0	76	20.0	220	75
MG148S-15xx	48	43.2 - 52.8	27	5	15.0	67	0.0	77	20.0	220	75
MG148S-18xx	48	43.2 - 52.8	28	5	18.0	56	0.0	75	20.0	220	75
MG148S-24xx	48	43.2 - 52.8	27	6	24.0	42	0.0	76	20.0	220	75
MG148D-03xx	48	43.2 - 52.8	34	6	±3.3	±152	±0.0	62	20.0	±100	75
MG148D-05xx	48	43.2 - 52.8	31	5	±5.0	±100	±0.0	68	20.0	±100	75
MG148D-07xx	48	43.2 - 52.8	29	5	±7.2	±69	±0.0	72	20.0	±100	75
MG148D-09xx	48	43.2 - 52.8	29	5	±9.0	±56	±0.0	73	20.0	±100	75
MG148D-12xx	48	43.2 - 52.8	28	6	±12.0	±42	±0.0	74	20.0	±100	75
MG148D-15xx	48	43.2 - 52.8	27	5	±15.0	±33	±0.0	77	20.0	±100	75
MG148D-18xx	48	43.2 - 52.8	28	5	±18.0	±28	±0.0	75	20.0	±100	75
MG148D-24xx	48	43.2 - 52.8	28	6	±24.0	±21	±0.0	74	20.0	±100	75

Notes:

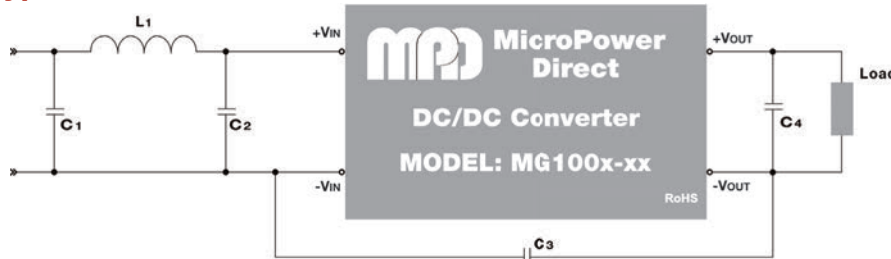
1. Load regulation is measured over a range of 20% load to 100% load. Load regulation for 3.3 VDC output models is specified at ±20% typical.
2. Operation at no-load will not damage the unit, but they may not meet all specifications.
3. With the addition of input filter components, all models will meet EN 55022 class B. A suggested circuit is shown in the connection diagram below. Contact the factory for more information.
4. To meet the requirements of EN 61000-4-4 and EN 61000-4-5, external components are needed. The diagram below shows a typical connection. Contact the factory for more information.
5. It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection tables for the correct rating.

Derating Curve



For applications that require meeting EMC standards, the diagram above illustrates a typical connection of the MG100x-xx series. The units do not require external components to operate as specified. All components should be mounted as close to the unit as possible.

Typical Connection



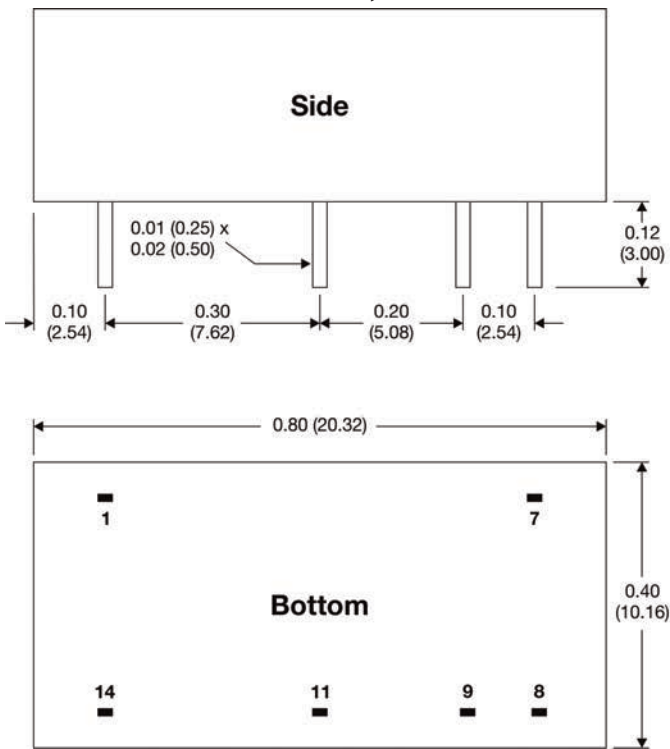
Recommended values for components are:

The voltage rating on capacitor C3 needs to be greater than the isolation voltage rating of the unit. To meet the requirements of EN 61000-4-4 and EN 61000-4-5, the value of capacitor C1 should be changed to 470 µF/100V.

Capacitor C4 is not required to meet specifications, but may be used if a lower level of output ripple is required.

Component	C1	L1	C2	C3	C4
MG103x-xxxx	2.2 µF/100V	18 µH			10 µF
MG105x-xxxx	2.2 µF/100V	18 µH			10 µF
MG112x-xxxx	2.2 µF/100V	18 µH			10 µF
MG115x-xxxx	2.2 µF/100V	18 µH			10 µF
MG124x-xxxx	2.2 µF/100V	18 µH	1210, 2.2 µF/100V	1206, 470 pF/2kV	10 µF
MG148x-xxxx	2.2 µF/100V	18 µH	1210, 2.2 µF/100V	1206, 470 pF/2kV	10 µF

Mechanical Dimensions, MG100X-xx Models

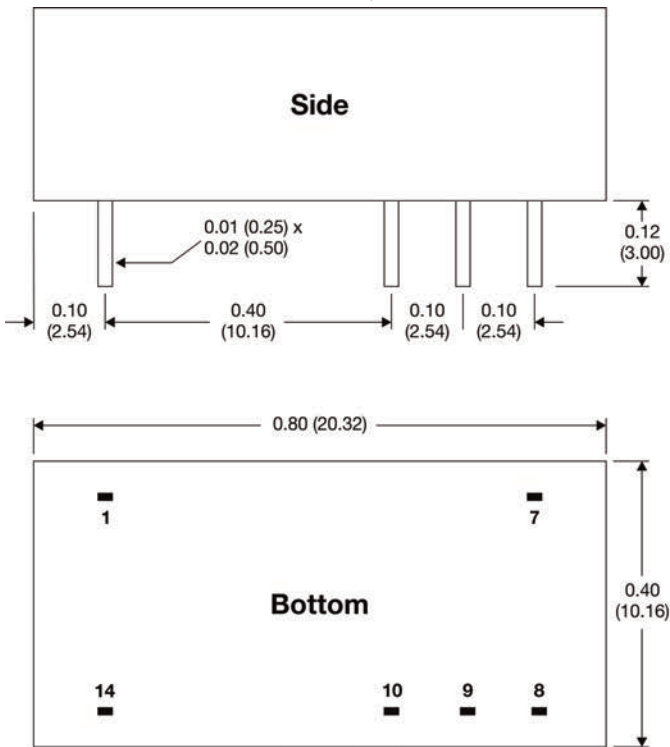


Pin Connections

Pin	Single Output
1	-VIN
7	No Connection
8	No Pin
9	+VOUT
11	-VOUT
14	+VIN

Pin	Dual Output
1	-VIN
7	No Connection
8	Common
9	+VOUT
11	-VOUT
14	+VIN

Mechanical Dimensions, MG100X-xxlx Models



Pin Connections

Pin	Single Output
1	-VIN
7	No Connection
8	+VOUT
9	No Pin
10	-VOUT
14	+VIN

Pin	Dual Output
1	-VIN
7	No Connection
8	+VOUT
9	Common
10	-VOUT
14	+VIN

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance x.xx = ±0.02 (±0.5)
- Pin 1 is marked by a "dot" or indentation on the unit



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