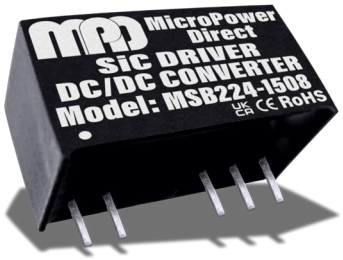
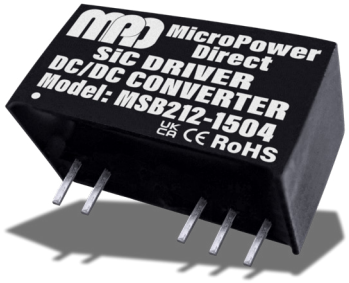
MSB200

Compact, 4 kV ISO SiC MOSFET Driver DC/DC Converter





Key Features:

- 4,000 VAC Isolation
- Efficiency to 80%
- -40°C to +105°C Temp
- Miniature SIP Case
- >3,500 kHour MBTF
- Short Circuit Protection
- Industry Standard Pin-Out

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 Current		See Model Selection Guide			
Impulse Voltage	5VDC Input	-0.7		9	VDC
	12VDC Input	-0.7		18	
	15VDC Input	-0.7		22	
	24VDC Input	-0.7		30	
Input Filter		Capacitance Filter			

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	See Tolerance Graphs on Page 2					
Line Regulation	Input Voltage Variation ±1%			±1.2		%
Load Regulation	10-100% Load	Positive Output		8	15	%
		Negative Output		10	20	
Ripple & Noise (20 MHz)				100	150	mV P - P
Temperature Coefficient	Full Load			±0.02		%/°C
Short Circuit Protection			Continuous, Self-Recovery			

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	Input-output, 1 minute, leakage curent <1mA	4,000			VAC
Isolation Resistance	Input-output, 500VDC	1,000			MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V		3.5		pF
Switching Frequency	Full Load, Nominal Input Voltage		200		kHz

EMI Characteristics

Parameter	Conditions		Criteria	Level
Radiated Emissions	CISPR32/EN 55032			Class B
Conducted Emissions	CISPR32/EN 55032			Class B
ESD	IEC/EN610004-2	5V Input	B	Contact ±6KV
		Other Input	B	Contact ±8KV

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature	Derating when operating ≥85°C	-40		+105	°C
Storage Temperature		-55		+125	°C
Case Temperature Rise	Ta=25°C, nominal input, output load		30		°C
Storage Humidity	Non-condensing			95	%RH

Physical

Case Size	0.77 x 0.39 x 0.49 in (See Mechanical Drawing on Page 3)
Case Material	Black Plastic, Flame-Retardant & Heat-Resistant (UL94V-0)
Weight	0.15 oz (4.3g) (See Mechanical Drawing on Page 3)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3.5			MHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Lead Temperature	1.5mm away from case for 10 sec			300	°C

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

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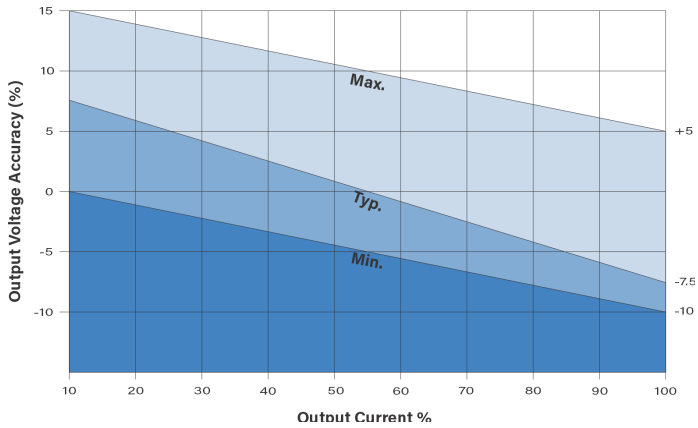
Model Selection Guide

Model Number	Input			Output		Capacitive Load (μF Max)	Efficiency (% Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA) (Full/No Load)	Voltage (VDC) (+Vo/-Vo)	Current (mA Max) (+Io/-Io)			
	Nominal	Range						
MSB205-2005	5	4.5 - 5.5	456/53	+20/-5	±100	#220/220	78	550
MSB212-1503	12	10.8 - 13.2	158/16	+15/-3.5	±111	#220/220	78	550
MSB212-1504	12	10.8 - 13.2	205/20	+15/-4	±120	#220/220	78	550
MSB212-2004	12	10.8 - 13.2	240/20	+20/-4	±100	#220/220	78	550
MSB212-2005	12	10.8 - 13.2	260/20	+20/-5	±100	#220/220	78	550
MSB215-152R5	15	13.5 - 16.5	151/15	+15/-2.5	±100	#220/220	78	450
MSB215-1504	15	13.5 - 16.5	151/15	+15/-4.5	±100	#220/220	79	450
MSB215-1803	15	13.5 - 16.5	152/16	+18/-3	±100	#220/220	78	450
MSB215-2004	15	13.5 - 16.5	169/16	+20/-4	±100	#220/220	80	450
MSB215-2005	15	13.5 - 16.5	169/16	+20/-5	±100	#220/220	80	450
MSB215-1508	15	13.5 - 16.5	152/16	+15/-8	±120	#220/220	79	450
MSB215-1509	15	13.5 - 16.5	151/15	+15/-8.7	±100	#220/220	79	450
MSB224-1508	24	21.6 - 26.4	95/13	+15/-8	±120	#220/220	79	250
MSB224-1509	24	21.6 - 26.4	95/13	+15/-8.7	±120	#220/220	79	250
MSB224-2004	24	21.6 - 26.4	125/13	+20/-4	±100	#220/220	80	250

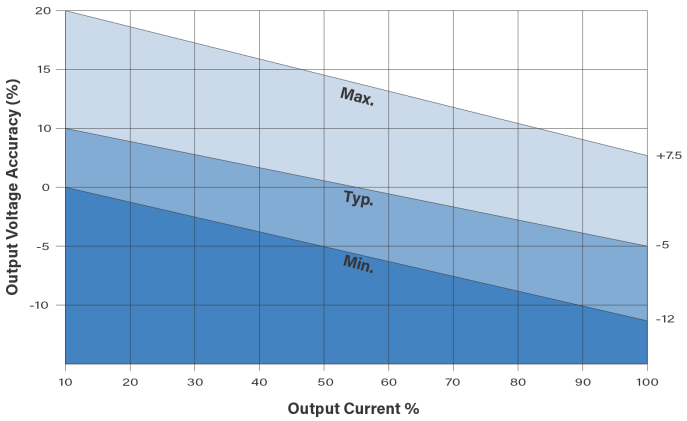
Notes:

1. The input voltage cannot exceed the specified range value, otherwise permanent and irreparable damage may occur.
2. Unless otherwise specified, the parameters in this datasheet were measured at 25°C, humidity 40%-70%, nominal input voltage and output pure resistance mode under full load.
3. It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection Guide table above for the correct rating.

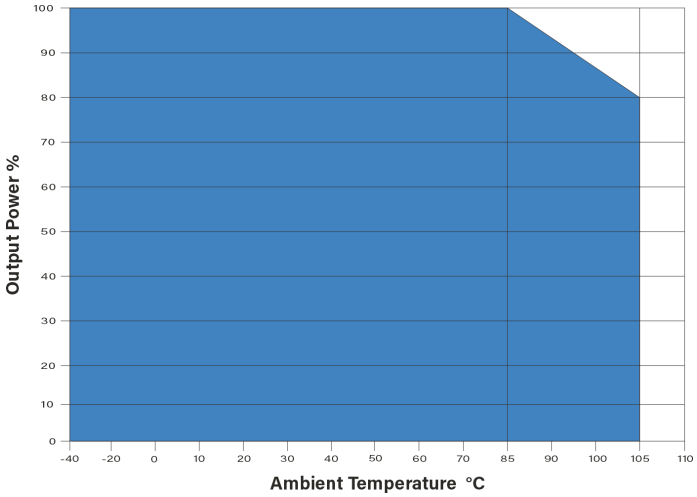
+Vo Output Regulation (Nominal Input Voltage)



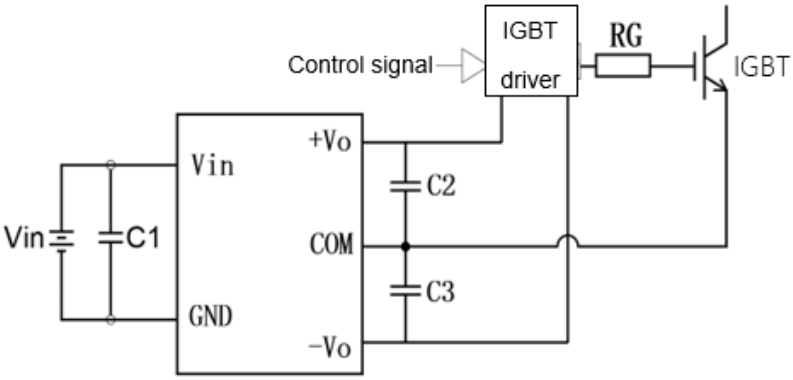
-Vo Output Regulation (Nominal Input Voltage)

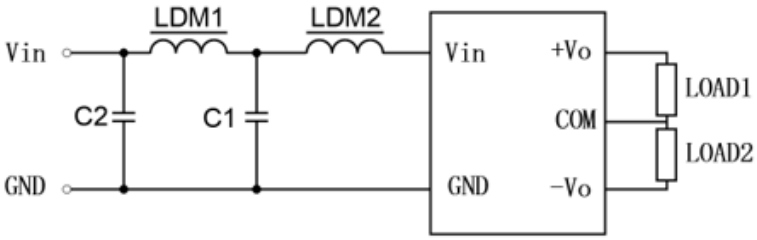


Temperature Derating



Typical Application Circuit





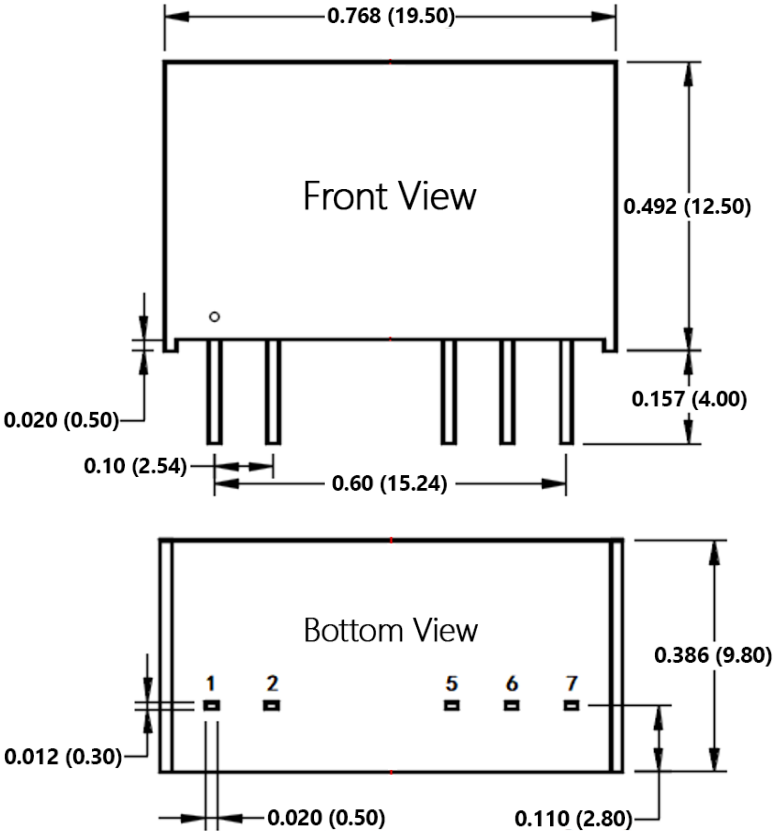
Recommended Capacitative Load Value	
C1, C2, C3	100uF/35V (low internal resistance capacitance)
Note: A ceramic capacitor with a capacity of 1uF-10uF can be connected in parallel at the C2 and C3 ends respectively to reduce ripple noise.	

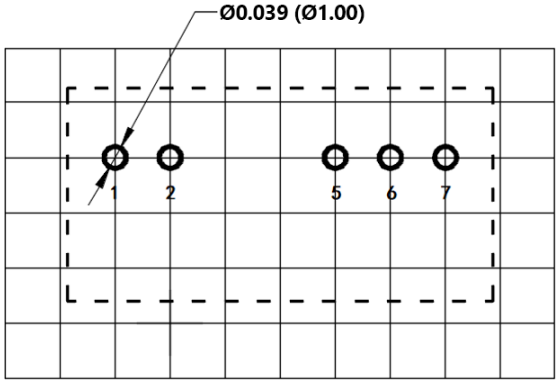
EMI Recommended Parameters		
Input Voltage (VDC)	5	12, 15, 24
C1/C2	10uF/16V	4.7uF/50V
C3/C4	10uF/50V	
LDM1	6.8uH	
CY1	330pF	

Notes:

1. The lead connecting the power module to the IGBT driver should be as short as possible.
2. The output filter capacitor should be as close to the power module and IGBT driver as possible.
3. The gate driving current of the IGBT driver has a high peak value. It is recommended that the output filter capacitor of the power module should be an electrolytic capacitor with low internal resistance.
4. The average output power of the driver must be smaller than that of the PSU.
5. If used in a vibration setting, please consider fixing the module with glue.
6. The maximum capacitative load is tested under the input voltage range and full load condition.

Mechanical Diagrams





Grid distance is 2.54 x 2.54mm

Pin-Out	
Pin	**Function**
1	Vin
2	GRND
5	-Vo
6	COM
7	+Vo

Notes:

- All dimensions are typical in inches (mm)
- Pin section tolerances: ±0.004 (±0.10)
- General tolerances: ±0.039 (±1.00)

Weight:

- 0.15 oz (4.3g)

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