MHI2000BRWI8 Series

Compact 1″ x 2″, 20W Ultra-High Isolation DC/DC Converters



Key Features:

- 20W Output Power
- 8.0 kV Isolation
- 15 kV/μS CMTI
- Reinforced Insulation
- EN 60950 Approved (Pend.)
- Wide 2:1 Input Range
- Compact 1″ x 2″ Case
- Wide Temp Range

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	12 VDC Input	9.0	12.0	18.0	VDC
	24 VDC Input	18.0	24.0	36.0	
	48 VDC Input	36.0	48.0	75.0	
Start-Up Threshold Voltage	12 VDC Input			9.0	VDC
	24 VDC Input			18.0	
	48 VDC Input			36.0	
Under Voltage Shutdown	12 VDC Input		7.5		VDC
	24 VDC Input		15.0		
	48 VDC Input		30.0		
Start Up Time	Nominal Input, Constant Resistive Load			30	mS
Input Filter	π (Pi) Filter				

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy				±1.0	%
Output Voltage Balance	Dual Output, Balanced Loads			±2.0	%
Line Regulation	V_{IN} = Min to Max			±0.5	%
Load Regulation, See Note 2	Single Output			±0.5	%
	Dual Output			±1.0	
Ripple & Noise (20 MHz)< See Note 3	5 & 5.1 VDC Output Models		50		mV P - P
	All Other Models		100		
Transient Recovery Time, See Note 4	25% Load Step Change			300	μSec
Transient Response Deviation			±3.0	±5.0	%
Output Power Protection	Hiccup Mode		150		%
Temperature Coefficient				±0.02	%/°C
Output Short Circuit	Continuous (Hiccup Mode)				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage, 60 Sec	Rated For 60 Sec	4,200			VAC rms
	Tested For 1 Sec	8,000			VDC
Isolation Resistance	500 VDC	10			GΩ
Isolation Capacitance	100 kHz, 1V			60	pF
Common Mode Transient Immunity		15			kV/μS
Switching Frequency			285		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	See Chart on Page 2			
	Case			+95	°C
Storage Temperature Range		-50		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	See Mechanical Diagram (Page 3)
Case Material	Non-Conductive Black Plastic (UL94-V0)
Weight	0.86 Oz (24.5g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.0			MHours
Safety Standards	UL 60950, EN 60950 (Pending)				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (0.1 Sec)	12 VDC Input			25.0	VDC
	24 VDC Input			50.0	
	48 VDC Input			100.0	
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 Selection Guide

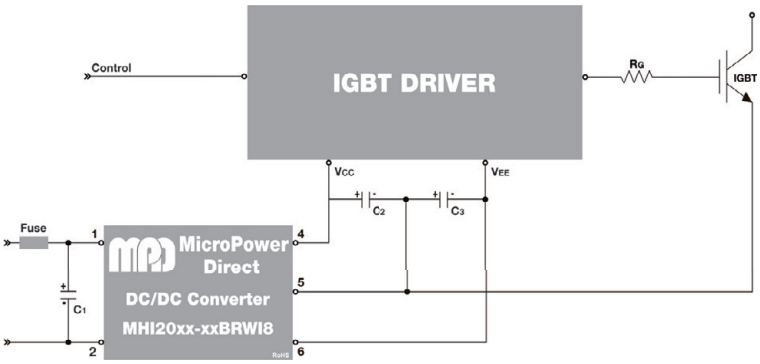
Model Number	Input				Output			Efficiency (%, Typ)	Reflected Ripple (mA)	Capacitive Load (µF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)				
	Nominal	Range	Full-Load	No-Load							
MHI2012S-05BRWI8	12	9.0 - 18.0	1,961	20	5.0	4,000	0.0	85	100	6,800	4,000
MHI2012S-05.1BRWI8	12	9.0 - 18.0	2,000	20	5.1	4,000	0.0	85	100	6,800	4,000
MHI2012S-12BRWI8	12	9.0 - 18.0	1,897	20	12.0	1,670	0.0	88	100	1,160	4,000
MHI2012D-12BRWI8	12	9.0 - 18.0	1,888	20	±12.0	±840	±0.0	89	100	590	4,000
MHI2012D-15BRWI8	12	9.0 - 18.0	1,882	20	±15.0	±670	±0.0	89	100	380	4,000
MHI2024S-05BRWI8	24	18.0 - 36.0	969	15	5.0	4,000	0.0	86	50	6,800	2,000
MHI2024S-05.1BRWI8	24	18.0 - 36.0	988	15	5.1	4,000	0.0	86	50	6,800	2,000
MHI2024S-12BRWI8	24	18.0 - 36.0	948	15	12.0	1,670	0.0	88	50	1,160	2,000
MHI2012D-12BRWI8	24	18.0 - 36.0	933	15	±12.0	±840	±0.0	90	50	590	2,000
MHI2012D-15BRWI8	24	18.0 - 36.0	941	15	±15.0	±670	±0.0	89	50	380	2,000
MHI2048S-05BRWI8	48	36.0 - 75.0	479	10	5.0	4,000	0.0	87	30	6,800	1,000
MHI2048S-05.1BRWI8	48	36.0 - 75.0	489	10	5.1	4,000	0.0	87	30	6,800	1,000
MHI2048S-12BRWI8	48	36.0 - 75.0	474	10	12.0	1,670	0.0	88	30	1,160	1,000
MHI2048D-12BRWI8	48	36.0 - 75.0	477	10	±12.0	±840	±0.0	88	30	590	1,000
MHI2048D-15BRWI8	48	36.0 - 75.0	471	10	±15.0	±670	±0.0	89	30	380	1,000

Notes:
1. The specified maximum capacitive load is for each output.
2. Load regulation is measured over a range of 0% IOUT to 100% IOUT.
3. When measuring output ripple & noise, it is recommended that an external capacitor (0.47 µF typ.) be placed from the +VOUT to the -VOUT pins for single output units and from each output to common for dual output models.
4. Transient recovery is measured to within a 1% error band for a load step change of 75% to 100%.
5. The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter. In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up. In this case, it is recommended that a low ESR (ESR <1.0Ω at 100 kHz) capacitor be mounted close to the converter. For 12V input units a 10 µF is recommended; for 12V input units, a 4.7 µF; and for 24V units a 2.2 µF.
6. Operation at no-load will not damage the unit, but they may not meet all specifications.
7. 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.

Operating Temperature Range

Model	Min.	Typ.	Max.	Units
MHI2024D-12BRWI8	-40	+25	+66	°C
MHI2012D-12BRWI8 MHI2012D-15BRWI8 MHI2024D-15BRWI8 MHI2048D-15BRWI8	-40	+25	+62	°C
MHI2012S-12BRWI8 MHI2024S-12BRWI8 MHI2048S-12BRWI8 MHI2048D-12BRWI8	-40	+25	+58	°C
MHI2048S-05.1BRWI8 MHI2048S-05BRWI8	-40	+25	+55	°C
MHI2024S-05BRWI8 MHI2024S-05.1BRWI8	-40	+25	+51	°C
MHI2012S-05BRWI8 MHI2012S-05.1BRWI8	-40	+25	+48	°C

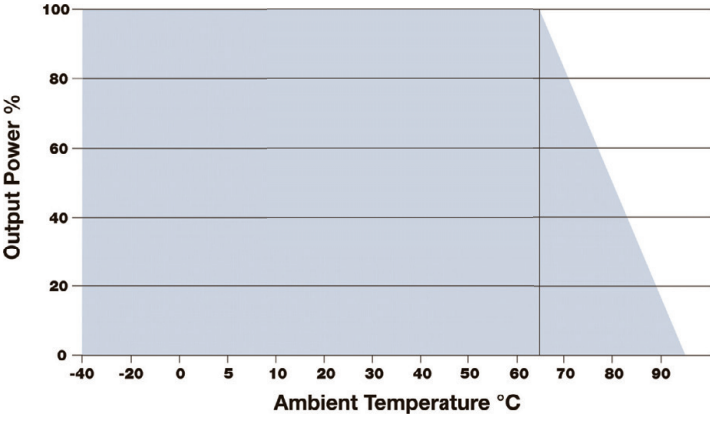
IGBT Applications



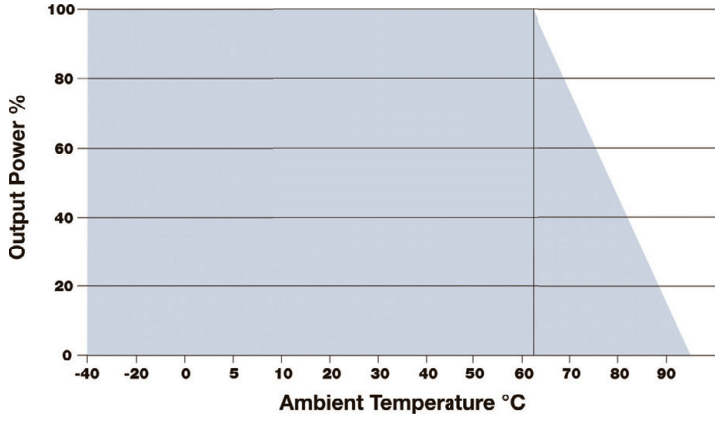
Notes:
The **MHI2000x-xxB** series is a good choice for applications involving high speed switching, such as driving IGBTs. They are designed to withstand the extra stress caused by the high voltage switching transients present in IGBT drive circuits.

All of the **MHIxxx** series have isolation levels that range from 5.2 to 8 kV. Many of these have reinforced insulation. The high isolation levels (and the correspondingly low capacitive coupling rates) allow them to be safely used in applications with highly dynamic switched AC or DC.

Derating Curves

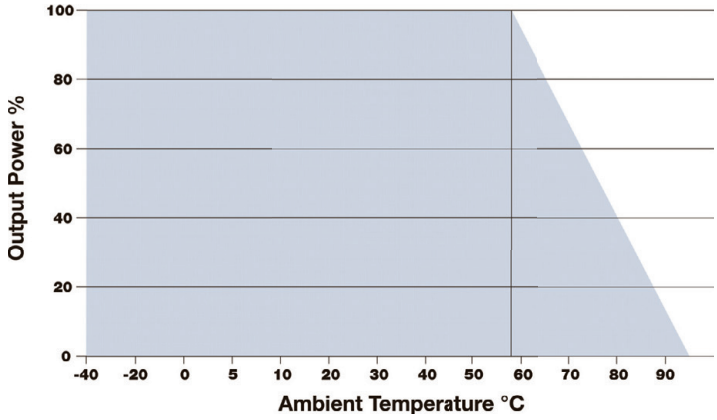


MHI2024D-12BRWI8

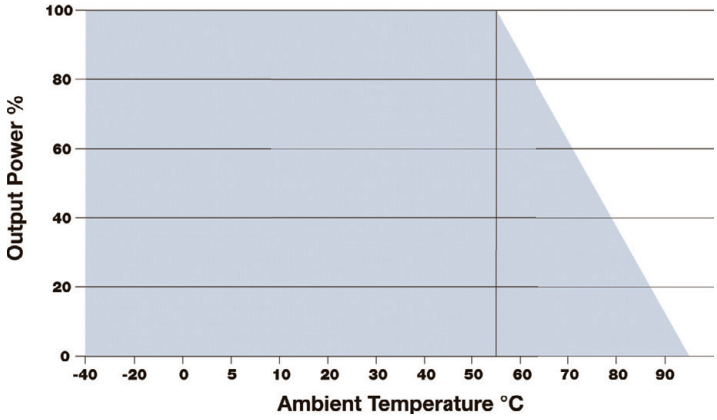


MHI2012D-12BRWI8, MHI2012D-15BRWI8, MHI2048D-15BRWI8

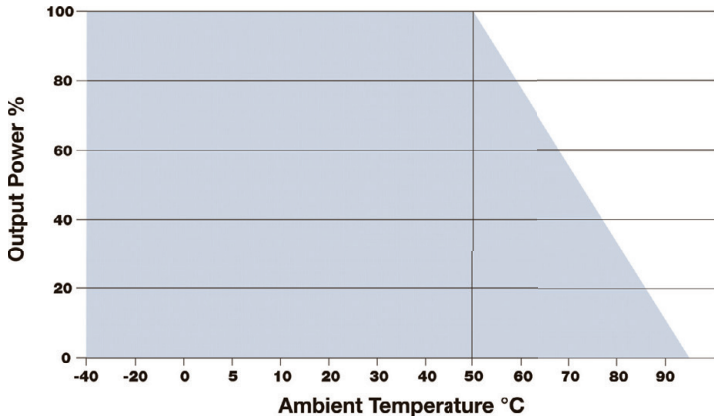
Derating Curves, Cont.



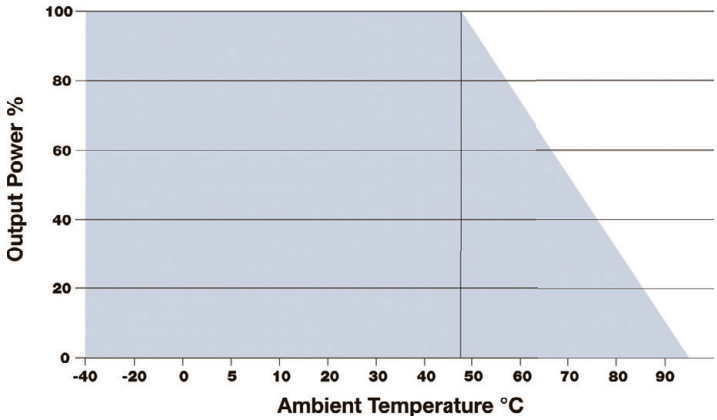
MHI2012S-12BRWI8, MHI2024S-12BRWI8, MHI2048S-12BRWI8, MHI2048D-12BRWI8



MHI2048S-05BRWI8, MHI2048S-05.1BRWI8

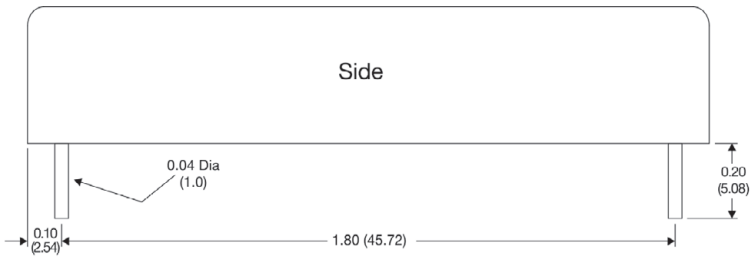


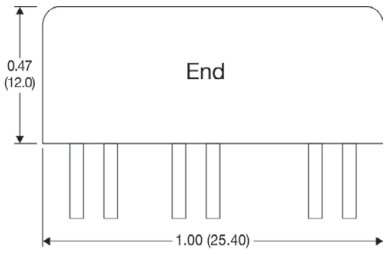
MHI2024S-05RWI8, MHI2024S-05.1BRWI8



MHI2012S-05BRWI8, MHI2012S-05.1BRWI8

Mechanical Dimensions







Pin Connections

Pin	Single Output
1	+VIN
2	-VIN
4	+VOUT
5	No Pin
6	-VOUT

Pin	Dual Output
1	+VIN
2	-VIN
4	+VOUT
5	Common
6	-VOUT

Notes:

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.02 (±0.50)