

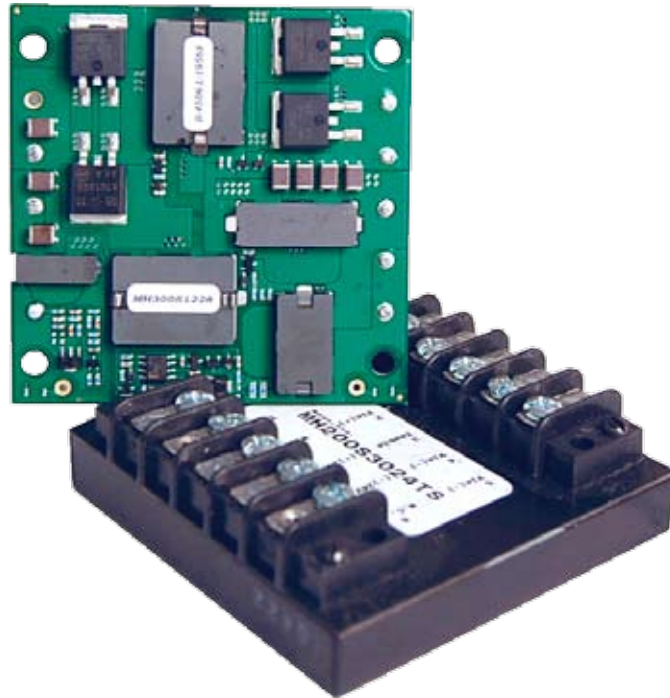
Input Ranges :
9-75 VDC

Output Voltage:
Single Output
12V - 48V

Dual Output
+5.0V/+12V
+5.0V/+15V

Triple Output
+5.0V/±12V,
+5.0V/±15V,

Output Power:
100 - 300 W



FEATURES

General:

- Small footprint : 3.0” x 3.0”
- High output power : to 300 watts
- Wide input range : 10-75Vdc
- Open frame or encapsulated
- Integral PCB transformer
- High conversion efficiency to 93%
- Line regulation to ±0.1%
- Load regulation to ±0.5%
- Fixed operating frequency

Protection:

- Output over-voltage protection
- Output over-load protection
- Hiccup mode short circuit protection
- Over-temperature protection
- Input under-voltage lock-out
- Input over-voltage shut-down

Control:

- Enable (On/Off) Control
- Output Voltage Trim

Isolation:

- Isolation Voltage > 500V

MH series is a family of high power density, high efficiency, and high reliability DC-DC Converters. It provides up to 300W output in a 3.0” x 3.0” footprint. The wide input range (2:1 & 3:1) is ideal for battery or unregulated input applications. Integral PCB transformer / inductor is used for all models in this series. This new design technique has greatly improved the magnetic coupling, reduced switching spike and provided performance consistency. It also streamlines the production process by completely eliminating the hand-wind magnetic assembly process from production lines.

MH series provides the most extensive protection to safeguard both the power converter and the load. It includes output over-voltage protection, over-current protection, hiccup mode indefinite short circuit protection, under-voltage lockout and over-temperature protection. Over-current inception point is set at about 115% of rated load. Hiccup mode cycles for 28mSec periods with 3mSec on and 25mSec off. Over-temperature shutdown, activated at +105°C of board temperature, will recover when the temperature falls below +95°C.

MH series features low output noise, very tight line and load regulation, and high efficiency. No external capacitor requirement for normal operation.

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1. Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause performance degradation, adversely effect longterm reliability, and cause permanent damage to the device.

Parameter	Voltage Range Designator / Description	Min	Max	Units
Input Voltage				
Continuous	12	-0.3	22	Vdc
	24	-0.3	38	Vdc
	48	-0.3	78	Vdc
	30	-0.3	32	Vdc
	60	-0.3	62	Vdc
Transient (100mSec.)	12	-0.3	24	Vdc
	24	-0.3	40	Vdc
	48	-0.3	80	Vdc
	30	-0.3	34	Vdc
	60	-0.3	64	Vdc
Operating Temperature	All models, base plate temperature	-40	+105	°C
Storage Temperature	Ambient	-55	+125	°C
Isolation Voltage	Input to Output		+2000	Vdc

2. Input Specifications

Parameter	Conditions / Description	Min	Nom	Max	Units
Input Voltage					
Voltage Range (Continuous)	12	10	12	20	Vdc
	24	18	24	36	Vdc
	48	36	48	75	Vdc
	30	10	24	32	Vdc
	60	20	48	60	Vdc
Under-Voltage Lockout (UVLO)					
Turn-On Threshold (Ramping Up)	12		9.7		Vdc
	24		17		Vdc
	48		35		Vdc
	30		9.7		Vdc
	60		17		Vdc
Turn-Off Threshold (Ramping Down)	12		9.7		Vdc
	24		16		Vdc
	48		33		Vdc
	30		9.2		Vdc
	60		16		Vdc

3. Enable (On-Off Control)

Parameter	Conditions / Description	Min	Nom	Max	Units
Enable Pin					
Open Circuit Voltage			10		Vdc
Source Current				1	mA
Positive Logic					
Standard					
On-Control	Logic High or Floating	2.5		10	Vdc
Off-Control		-0.5		1.8	Vdc
Negative Logic					
Optional (Please add Suffix N)					
On-Control		-0.5		1.8	Vdc
Off-Control	Logic High or Floating	2.5		10	Vdc

4. Output Specifications

Parameter	Conditions / Description	Min	Nom	Max	Units
Voltage Accuracy	Please see table				%
Output Current	Please see table				Adc
Start-Up Time			150		mSec.
Output Trim				±5	%Vout
Over Voltage Protection				120	%Vdc
Line Regulation				±0.1	%Vout
Load Regulation				±0.5	%Vout
Transient Response	50% ± 25% step load change		400		µSec.
Ripple & Noise	Please see table				mVp-p
Switching Frequency			250		KHz

5. Output Trim

Parameter	Conditions / Description	Min	Nom	Max	Units
Negative Trim	Standard				
Trim Up	Trim Pin to (-)Vout			5	%Vdc
Trim Down	Trim Pin to (+)Vout	5			%Vdc
Positive Trim	Not Available				

*Trim pin can be left floating if not used

6. Environmental and Mechanical Specifications

Parameter	Conditions / Description	Min	Nom	Max	Units
Operating Temperature	PCB Temperature				
Standard		-25		+105	°C
Extended	Optional - (Please add Suffix C)	-55		+105	°C
Storage Temperature		-55		+125	°C
Temperature Coefficient				±0.02	%/°C
Shock	Halfsine wave, 3 axes	50			g
Sinusoidal Vibration	GR-63-CORE, Section 5.4.2	1			g
Humidity	Relative Humidity, Non-Condensing			95	%R.H.
Weight					
PC Board Mount			6.4(180)		Oz(g)
Chassis Mount			7.7(218)		Oz(g)
MTBF (calculated)	Bellcore TR-NWT-000332 method 1 - parts count	1			MHrs

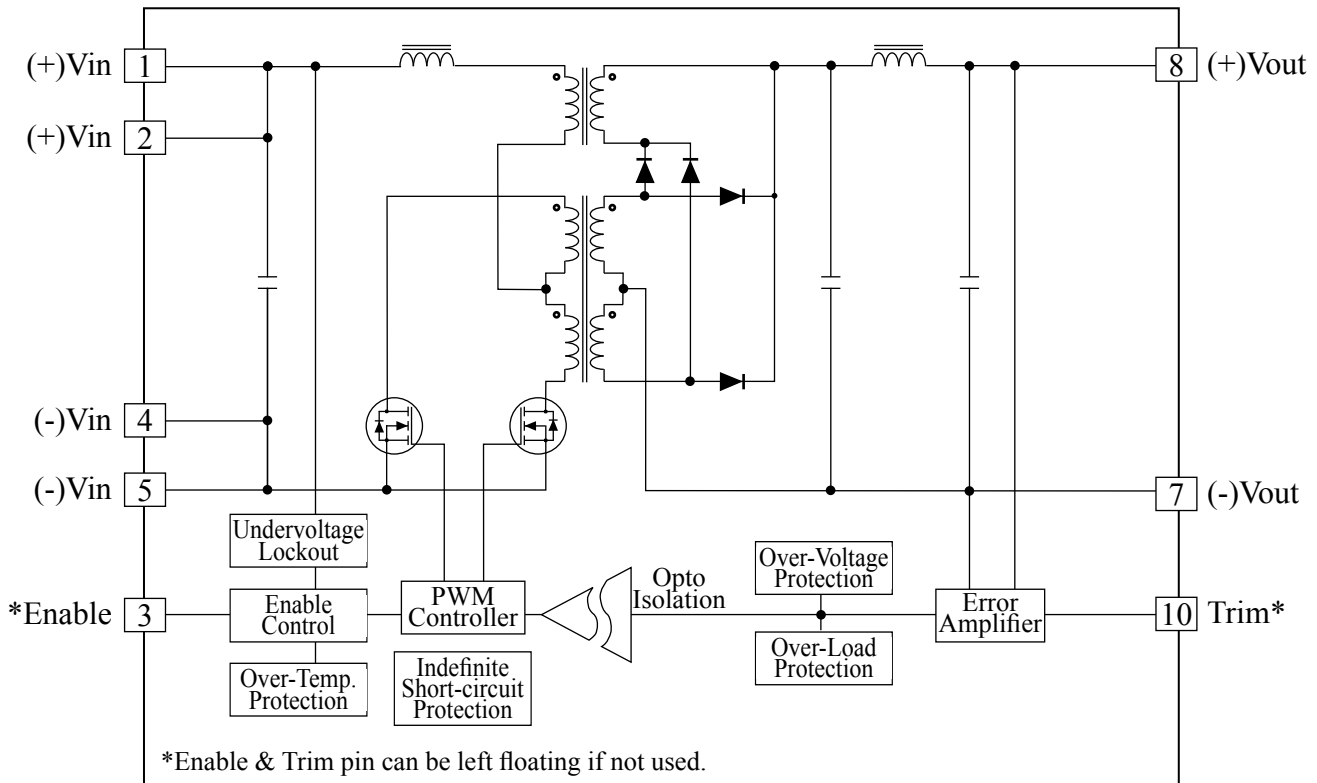
7. Isolation Specifications

Parameter	Conditions / Description	Min	Nom	Max	Units
Isolation Voltage	Input to Output	500			Vdc
	I/O to Case	500			Vdc
Isolation Resistance	Input to Output	10			MΩ
Isolation Capacitance	Input to Output		3		nF

8. Protections

Parameter	Conditions / Description	Min	Nom	Max	Units
Over-Load Protection					
Type	Current-Mode, Pulse by Pulse Current Limit				
Threshold	% Rated Load		120		%
Short-Circuit Protection					
Type	Hiccup Mode, Non-Latching, Auto-Recovery				
Threshold	Short-Circuit Resistance			65	mΩ
Over-Temperature Protection					
Type	Non-Latching, Auto-Recovery				
Threshold	PCB Temperature		105		°C
Hysteresis			15		°C
Over-Voltage Protection					
Type	Auxiliary Feedback Loop Control				
Set-Point				120	%Vout

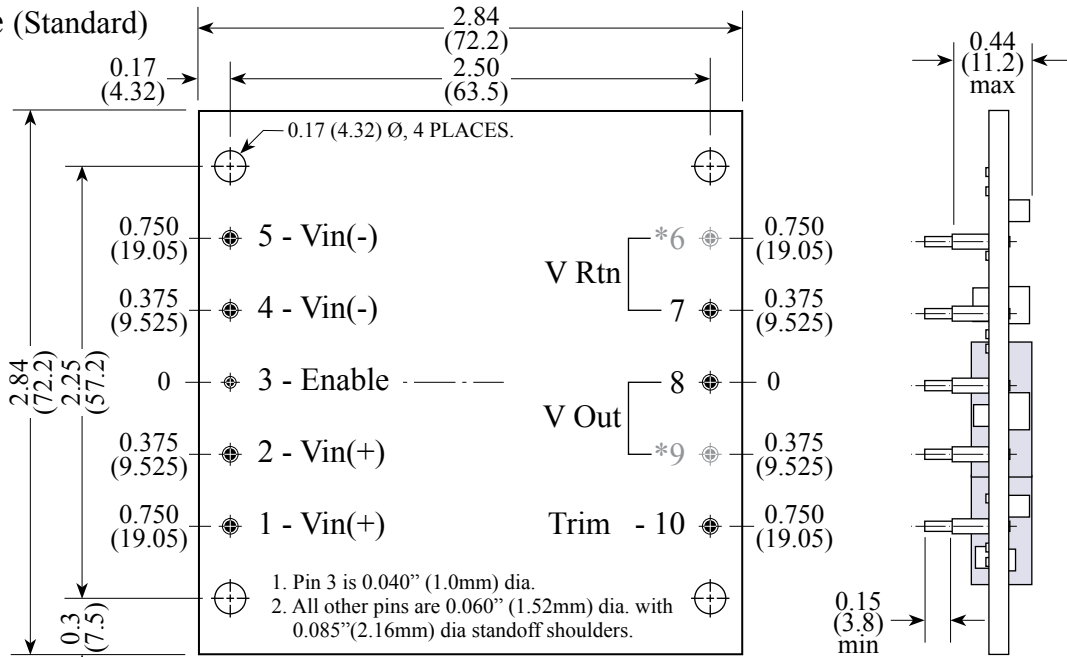
BLOCK DIAGRAM



Product Numbering System & Selection Guide

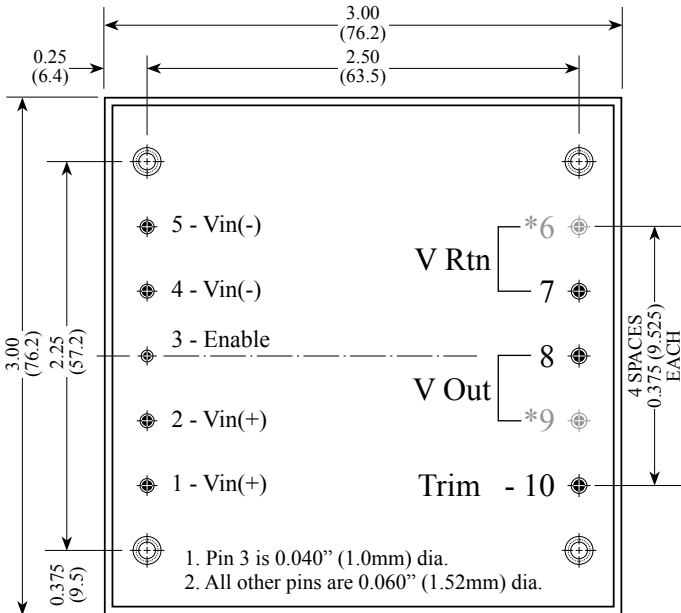
MH	150	S	60	12	TS
Series No.	Output Power	No Output	Input Voltage Range	Output Voltage	Options
MH	100 : 100W	S : Single	12 : 10-20V	12 : 12V	C : Extended Temp.
	150 : 150W		24 : 18-36V	15 : 15V	MC : Encapsulated
	200 : 200W		48 : 36-75V	24 : 24V	N : Negative Enable
	300 : 300W		30 : 10-32V	28 : 28V	TS : Chassis Mount
	400 : 400W		60 : 20-60V	48 : 48V	

Open Frame (Standard)

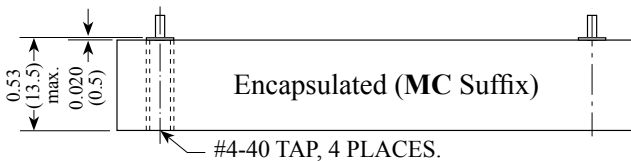


* Pins 6, 9 will be added on next revision and will be connected internally to pins 7 and 8 respectively. (Please make provisions on your design)

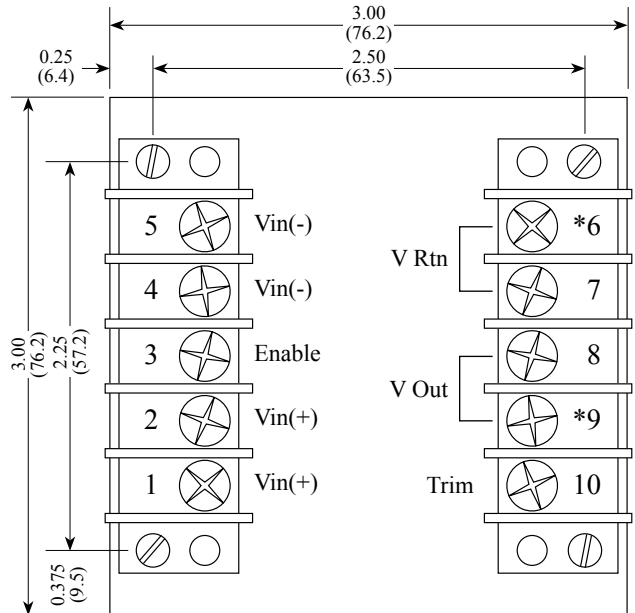
Encapsulated (Optional, MC Suffix)



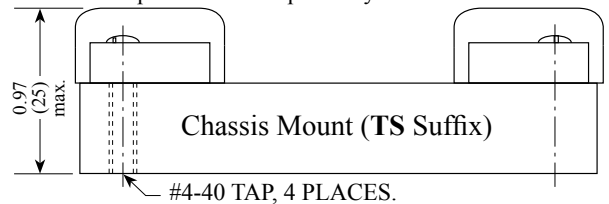
* Pins 6, 9 will be added on next revision and will be connected internally to pins 7 and 8 respectively. (Please make provisions on your design)



Chassis Mount (Optional, TS Suffix)



* Pins 6, 9 will be connected internally to pins 7 and 8 respectively on next revision



INPUT			OUTPUT										Over Temp. Shutdown /Recover	EFF. (typ.)	MODEL NO.				
Range Designator (Range)	UVL (On/Off)	OVP (Max)	Power (Watts)	Voltage (V)			Current (A)		Ripple & Noise		OVP	Short Circuit Protection							
				Set Point	Min.*	Max.*	Min.	Max.	Peak-Peak	R.M.S.									
12 (10 - 20)	9.8V/ 9.5V	22V	100	12V	11.8	12.2	0.8	8.4	80mV	15mV	15V	Hiccup Mode Indefinite	+105/+95°C	88%	MH100S1212				
				15V	14.8	15.2	0.6	6.7	100mV	20mV	18V			88%	MH100S1215				
				24V	23.8	24.2	0.4	4.2	150mV	30mV	28V			90%	MH100S1224				
				28V	27.5	28.5	0.3	3.6	180mV	40mV	33V			90%	MH100S1228				
			48V	47.0	49.0	0.2	2.1	300mV	60mV	57V	90%		MH100S1248						
			150	12V	11.8	12.2	1.2	12.5	80mV	15mV	15V		+105/+95°C	88%	MH150S1212				
				15V	14.8	15.2	1.0	10.0	100mV	20mV	18V			88%	MH150S1215				
				24V	23.8	24.2	0.6	6.3	150mV	30mV	28V			90%	MH150S1224				
				28V	27.5	28.5	0.5	5.4	180mV	40mV	33V			90%	MH150S1228				
			48V	47.0	49.0	0.3	3.2	300mV	60mV	57V	90%		MH150S1248						
			200	12V	11.8	12.2	0.1	16.7	80mV	15mV	15V		+100/+90°C	88%	MH200S1212				
				15V	14.8	15.2	1.3	13.4	100mV	20mV	18V			89%	MH200S1215				
				24V	23.8	24.2	0.8	8.4	150mV	30mV	28V			90%	MH200S1224				
				28V	27.5	28.5	0.7	7.2	180mV	40mV	33V			90%	MH200S1228				
			48V	47.0	49.0	0.4	4.2	300mV	60mV	57V	90%		MH200S1248						
			300	12V	11.8	12.2	0.1	25	80mV	15mV	15V		+95/+85°C	88%	MH300S1212				
				15V	14.8	15.2	0.1	20	100mV	20mV	18V			90%	MH300S1215				
				24V	23.8	24.2	1.2	12.5	150mV	30mV	28V			90%	MH300S1224				
				28V	27.5	28.5	1.0	10.8	180mV	40mV	33V			90%	MH300S1228				
			48V	47.0	49.0	0.6	6.3	300mV	60mV	57V	90%		MH300S1248						
			30 (10 -32)	9.8V/ 9.5V	34V	100	12V	11.8	12.2	0.8	8.4		80mV	15mV	15V	Hiccup Mode Indefinite	+105/+95°C	87%	MH100S3012
							15V	14.8	15.2	0.6	6.7		100mV	20mV	18V			87%	MH100S3015
							24V	23.8	24.2	0.4	4.2		150mV	30mV	28V			88%	MH100S3024
							28V	27.5	28.5	0.3	3.6		180mV	40mV	33V			88%	MH100S3028
48V	47.0	49.0				0.2	2.1	300mV	60mV	57V	88%	MH100S3048							
150	12V	11.8				12.2	1.2	12.5	80mV	15mV	15V	+105/+95°C	87%	MH150S3012					
	15V	14.8				15.2	1.0	10.0	100mV	20mV	18V		87%	MH150S3015					
	24V	23.8				24.2	0.6	6.3	150mV	30mV	28V		88%	MH150S3024					
	28V	27.5				28.5	0.5	5.4	180mV	40mV	33V		88%	MH150S3028					
48V	47.0	49.0				0.3	3.2	300mV	60mV	57V	88%	MH150S3048							
200	12V	11.8				12.2	0.8	16.7	80mV	15mV	15V	+100/+90°C	87%	MH200S3015					
	15V	14.8				15.2	1.3	13.4	100mV	20mV	18V		87%	MH200S3015					
	24V	23.8				24.2	0.8	8.4	150mV	30mV	28V		88%	MH200S3024					
	28V	27.5				28.5	0.7	7.2	180mV	40mV	33V		88%	MH200S3028					
48V	47.0	49.0				0.4	4.2	300mV	60mV	57V	88%	MH200S3048							
300	12V	11.8				12.2	0.1	25	80mV	15mV	15V	+95/+85°C	86%	MH300S1212					
	15V	14.8				15.2	0.1	20	100mV	20mV	18V		86%	MH300S1215					
	24V	23.8				24.2	1.2	12.5	150mV	30mV	28V		88%	MH300S3024					
	28V	27.5				28.5	1.0	10.8	180mV	40mV	33V		88%	MH300S3028					
48V	47.0	49.0				0.6	6.3	300mV	60mV	57V	88%	MH300S3048							
24 (18 - 36)	17.7V/ 17.5V	38V				100	12V	11.8	12.2	0.8	8.4	80mV	15mV	15V	Hiccup Mode Indefinite		+105/+95°C	88%	MH100S2412
							15V	14.8	15.2	0.6	6.7	100mV	20mV	18V				88%	MH100S2415
							24V	23.8	24.2	0.4	4.2	150mV	30mV	28V				90%	MH100S2424
							28V	27.5	28.5	0.3	3.6	180mV	40mV	33V				90%	MH100S2428
			48V	47.0	49.0	0.2	2.1	300mV	60mV	57V	90%	MH100S2448							
			150	12V	11.8	12.2	1.2	12.5	80mV	15mV	15V	+105/+95°C	88%	MH150S2412					
				15V	14.8	15.2	1.0	10.0	100mV	20mV	18V		88%	MH150S2415					
				24V	23.8	24.2	0.6	6.3	150mV	30mV	28V		90%	MH150S2424					
				28V	27.5	28.5	0.5	5.4	180mV	40mV	33V		90%	MH150S2428					
			48V	47.0	49.0	0.3	3.2	300mV	60mV	57V	90%	MH150S2448							
			200	12V	11.8	12.2	0.1	16.7	80mV	15mV	15V	+100/+90°C	90%	MH200S2412					
				15V	14.8	15.2	1.3	13.4	100mV	20mV	18V		90%	MH200S2415					
				24V	23.8	24.2	0.8	8.4	150mV	30mV	28V		92%	MH200S2424					
				28V	27.5	28.5	0.7	7.2	180mV	40mV	33V		92%	MH200S2428					
			48V	47.0	49.0	0.4	4.2	300mV	60mV	57V	92%	MH200S2448							
			300	12V	11.8	12.2	0.1	25	80mV	15mV	15V	+95/+85°C	92%	MH300S1212					
				15V	14.8	15.2	0.1	20	100mV	20mV	18V		92%	MH300S1215					
				24V	23.8	24.2	1.2	12.5	150mV	30mV	28V		94%	MH300S1224					
				28V	27.5	28.5	1.0	10.8	180mV	40mV	33V		92%	MH300S1228					
			48V	47.0	49.0	0.6	6.3	300mV	60mV	57V	92%	MH300S1248							
			400	12V	11.8	12.2	0.1	33	80mV	15mV	15V	+95/+85°C	92%	MH400S2412					
				15V	14.8	15.2	0.1	27	100mV	20mV	18V		92%	MH400S2415					
				24V	23.8	24.2	1.2	16.7	150mV	30mV	28V		94%	MH400S2424					
				28V	27.5	28.5	1.0	14.3	180mV	40mV	33V		92%	MH400S2428					
48V	47.0	49.0	0.6	8.3	300mV	60mV	57V	92%	MH400S2448										

* Combined Line & Load Regulation (Low Line to High Line & Min. Load to Full Load)

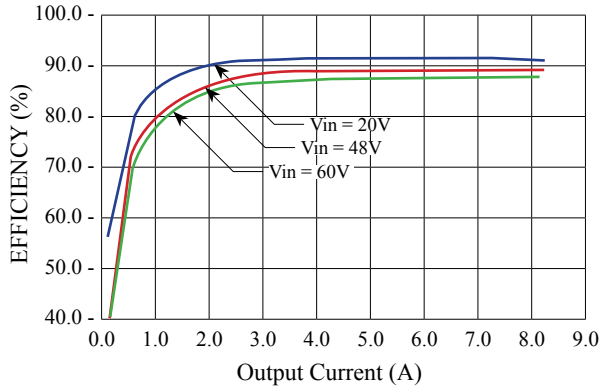
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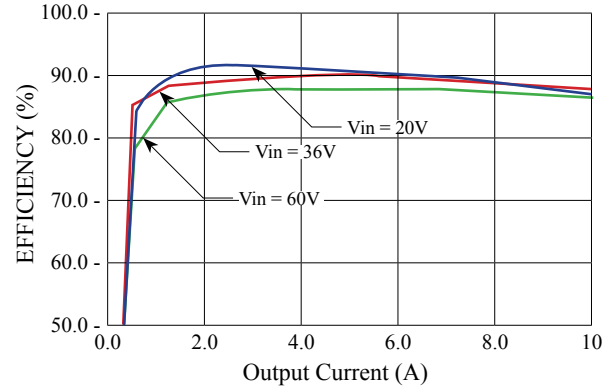
Range Designator (Range)	INPUT			OUTPUT								Over Temp. Shutdown /Recover	EFF. (typ.)	MODEL NO.	
	UVL (On/Off)	OVP (Max)	Power (Watts)	Voltage (V)			Current (A)		Ripple & Noise		OVP				Short Circuit Protection
				Set Point	Min.*	Max.*	Min.	Max.	Peak-Peak	R.M.S.					
48 (36-75)	35V/34V	75V	100	12V	11.8	12.2	0.8	8.4	80mV	15mV	15V	Hiccup Mode Indefinite	+105/+95°C	90%	MH100S4812
				15V	14.8	15.2	0.6	6.7	100mV	20mV	18V			90%	MH100S4815
				24V	23.8	24.2	0.4	4.2	150mV	30mV	28V			92%	MH100S4824
				28V	27.5	28.5	0.3	3.6	180mV	40mV	33V			92%	MH100S4828
				48V	47.0	49.0	0.2	2.1	300mV	60mV	57V			92%	MH100S4848
			150	12V	11.8	12.2	1.2	12.5	80mV	15mV	15V		+105/+95°C	90%	MH150S4812
				15V	14.8	15.2	1.0	10.0	100mV	20mV	18V			90%	MH150S4815
				24V	23.8	24.2	0.6	6.3	150mV	30mV	28V			92%	MH150S4824
				28V	27.5	28.5	0.5	5.4	180mV	40mV	33V			92%	MH150S4828
				48V	47.0	49.0	0.3	3.2	300mV	60mV	57V			93%	MH150S4848
			200	12V	11.8	12.2	0.8	16.7	80mV	15mV	15V		+100/+90°C	90%	MH200S4812
				15V	14.8	15.2	1.3	13.4	100mV	20mV	18V			90%	MH200S4815
				24V	23.8	24.2	0.8	8.4	150mV	30mV	28V			92%	MH200S4824
				28V	27.5	28.5	0.7	7.2	180mV	40mV	33V			92%	MH200S4828
				48V	47.0	49.0	0.4	4.2	300mV	60mV	57V			92%	MH200S4848
			300	12V	11.8	12.2	0.1	25	80mV	15mV	15V		+95/+85°C	90%	MH300S4812
				15V	14.8	15.2	0.1	20	100mV	20mV	18V			90%	MH300S4815
				24V	23.8	24.2	1.2	12.5	150mV	30mV	28V			90%	MH300S4824
				28V	27.5	28.5	1.0	10.8	180mV	40mV	33V			90%	MH300S4828
				48V	47.0	49.0	0.6	6.3	300mV	60mV	57V			90%	MH300S4848
400	12V	11.8	12.2	0.1	33	80mV	15mV	15V	+95/+85°C	92%	MH400S4812				
	15V	14.8	15.2	0.1	27	100mV	20mV	18V		92%	MH400S4815				
	24V	23.8	24.2	1.2	16.7	150mV	30mV	28V		94%	MH400S4824				
	28V	27.5	28.5	1.0	14.3	180mV	40mV	33V		94%	MH400S4828				
	48V	47.0	49.0	0.6	8.3	300mV	60mV	57V		94%	MH400S4848				
60 (20-60)	17.7V/ 17.5V	62V	100	12V	11.8	12.2	0.8	8.4	80mV	15mV	15V	Hiccup Mode Indefinite	+105/+95°C	88%	MH100S6012
				15V	14.8	15.2	0.6	6.7	100mV	20mV	18V			88%	MH100S6015
				24V	23.8	24.2	0.4	4.2	150mV	30mV	28V			90%	MH100S6024
				28V	27.5	28.5	0.3	3.6	180mV	40mV	33V			90%	MH100S6028
				48V	47.0	49.0	0.2	2.1	300mV	60mV	57V			90%	MH100S6048
			150	12V	11.8	12.2	1.2	12.5	80mV	15mV	15V		+105/+95°C	88%	MH150S6012
				15V	14.8	15.2	1.0	10.0	100mV	20mV	18V			88%	MH150S6015
				24V	23.8	24.2	0.6	6.3	150mV	30mV	28V			90%	MH150S6024
				28V	27.5	28.5	0.5	5.4	180mV	40mV	33V			90%	MH150S6028
				48V	47.0	49.0	0.3	3.2	300mV	60mV	57V			90%	MH150S6048
			200	12V	11.8	12.2	0.8	16.7	80mV	15mV	15V		+100/+90°C	88%	MH200S6012
				15V	14.8	15.2	1.3	13.4	100mV	20mV	18V			88%	MH200S6015
				24V	23.8	24.2	0.8	8.4	150mV	30mV	28V			90%	MH200S6024
				28V	27.5	28.5	0.7	7.2	180mV	40mV	33V			90%	MH200S6028
				48V	47.0	49.0	0.4	4.2	300mV	60mV	57V			90%	MH200S6048
			300	12V	11.8	12.2	0.1	25	80mV	15mV	15V		+95/+85°C	88%	MH300S6012
				15V	14.8	15.2	0.1	20	100mV	20mV	18V			88%	MH300S6015
				24V	23.8	24.2	1.2	12.5	150mV	30mV	28V			90%	MH300S6024
				28V	27.5	28.5	1.0	10.8	180mV	40mV	33V			90%	MH300S6028
				48V	47.0	49.0	0.6	6.3	300mV	60mV	57V			90%	MH300S6048
400	12V	11.8	12.2	0.1	33	80mV	15mV	15V	+95/+85°C	88%	MH400S6012				
	15V	14.8	15.2	0.1	27	100mV	20mV	18V		88%	MH400S6015				
	24V	23.8	24.2	1.2	16.7	150mV	30mV	28V		92%	MH400S6024				
	28V	27.5	28.5	1.0	14.3	180mV	40mV	33V		92%	MH400S6028				
	48V	47.0	49.0	0.6	8.3	300mV	60mV	57V		92%	MH400S6048				

* Combined Line & Load Regulation (Low Line to High Line & Min. Load to Full Load)

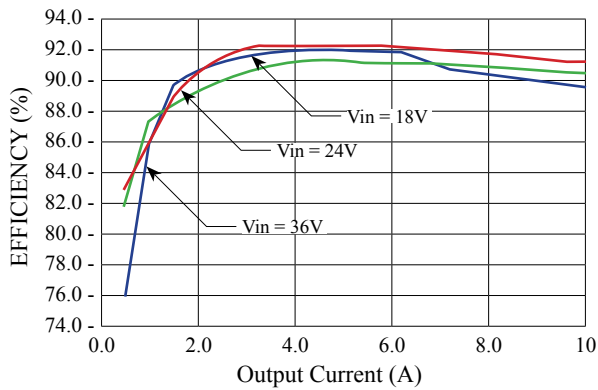
Efficiency Curves



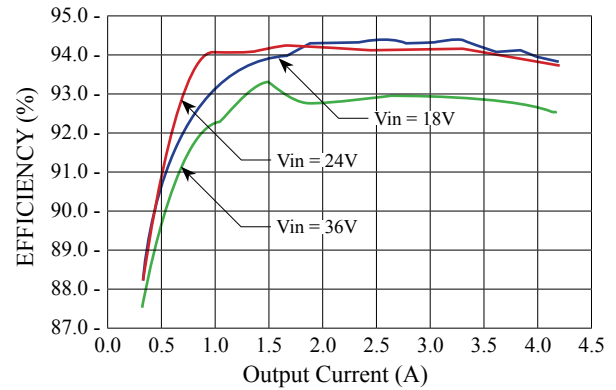
MH100S48W12



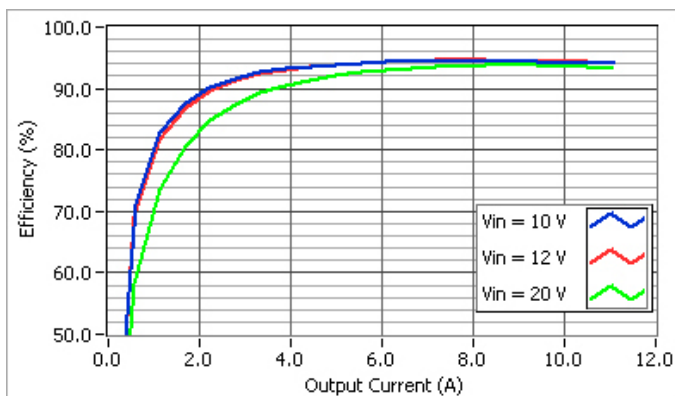
MH300S6030



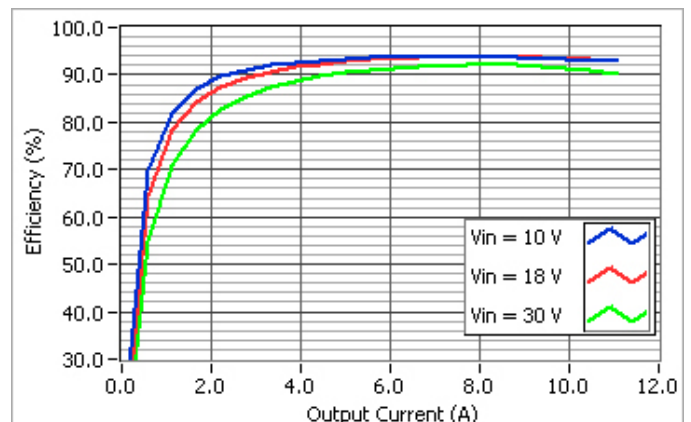
MH150S2415



MH200S2448



MH300S1228



MH300S3028

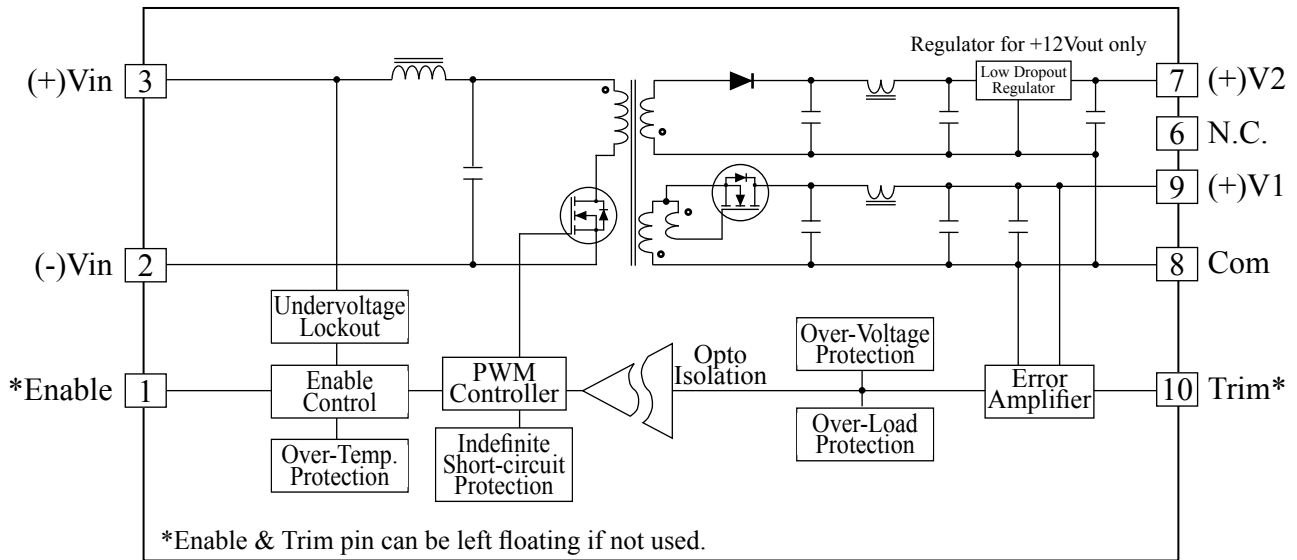
INPUT		Power (Watt)	Voltage (V)				Current (A)			Ripple & Noise		OVP (V)	Short Circuit Protection	Over Temp. Shutdown /Recover	EFF. (typ.)	MODEL NO.	
Nominal (Range)	UVLO On/Off		#	Set Point	Min.*	Max.*	#	Min.	Max.	Peak-Peak	R.M.S.						
12 (10 - 20)	9.7/9.5	50W	+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+6.0	75mV	15mV	5.9	Hi-cup Mode Indefinite	+105°C/ +95°C	84%	MH50D1205+12
			+12V	+V2	+12.00	+11.60	+12.30	+I2	+0.05	+1.0	100mV	25mV				86%	MH50D1205+15
			+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+6.0	75mV	15mV	5.9			84%	MH75D1205+12
		75W	+15V	+V2	+15.00	+14.70	+15.50	+I2	+0.05	+1.0	120mV	30mV				86%	MH75D1205+15
			+5V	+V1	+5.00V	+4.90V	+5.10V	+I1	+1.0	+8.0	75mV	15mV	5.9			84%	MH50D2405+12
			+12V	+V2	+12.0V	+11.60	+12.30	+I2	+0.01	+2.0	100mV	25mV				88%	MH50D2405+15
24 (18 - 36)	17/16	50W	+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+6.0	75mV	15mV	5.9			86%	MH50D2405+12
			+12V	+V2	+12.0	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV				88%	MH50D2405+15
			+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+5.0	75mV	15mV	5.9			86%	MH75D2405+12
		75W	+12V	+V2	+12.0V	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV				88%	MH75D2405+15
			+5V	+V1	+5.00V	+4.90V	+5.10V	+I1	+1.0	+5.0	75mV	15mV	5.9			86%	MH50D4805+12
			+15V	+V2	+15.0V	+14.5V	+15.5V	+I2	+0.01	+1.0	120mV	30mV				88%	MH50D4805+15
48 (36 - 75)	34/33	50W	+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+6.0	75mV	15mV	5.9	86%	MH50D4805+12		
			+12V	+V2	+12.0	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV		88%	MH50D4805+15		
			+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+5.0	75mV	15mV	5.9	86%	MH75D4805+12		
		75W	+12V	+V2	+12.0V	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV		88%	MH75D4805+15		
			+5V	+V1	+5.00V	+4.90V	+5.10V	+I1	+1.0	+5.0	75mV	15mV	5.9	84%	MH50D24W05+12		
			+15V	+V2	+15.0V	+14.5V	+15.5V	+I2	+0.01	+1.0	120mV	30mV		86%	MH50D24W05+15		
24W (10 - 30)	9.7/9.5	50W	+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+6.0	75mV	15mV	5.9	84%	MH50D24W05+12		
			+12V	+V2	+12.0	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV		86%	MH50D24W05+15		
			+5V	+V1	+5.00V	+4.90V	+5.10V	+I1	+1.0	+6.0	75mV	15mV	5.9	84%	MH75D24W05+12		
		75W	+12V	+V2	+12.0V	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV		86%	MH75D24W05+15		
			+5V	+V1	+5.00V	+4.90V	+5.10V	+I1	+1.0	+5.0	75mV	15mV	5.9	86%	MH50D48W05+12		
			+15V	+V2	+15.0V	+14.5V	+15.5V	+I2	+0.01	+1.0	120mV	30mV		88%	MH50D48W05+12		
48W (18 - 36)	17/16	50W	+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+6.0	75mV	15mV	5.9	86%	MH50D48W05+12		
			+12V	+V2	+12.0	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV		88%	MH50D48W05+12		
			+5V	+V1	+5.00	+4.90	+5.10	+I1	+1.0	+5.0	75mV	15mV	5.9	86%	MH75D48W05+12		
		75W	+15V	+V2	+15.0	+14.5	+15.5	+I2	+0.01	+1.0	120mV	30mV		86%	MH75D48W05+12		
			+5V	+V1	+5.00V	+4.90V	+5.10V	+I1	+1.0	+6.0	75mV	15mV	5.9	86%	MH50D48W05+12		
			+12V	+V2	+12.0V	+11.60	+12.30	+I2	+0.01	+1.0	100mV	25mV		88%	MH75D48W05+12		

* Combined Line & Load (Low Line to High Line, Min. Load to Full Load)

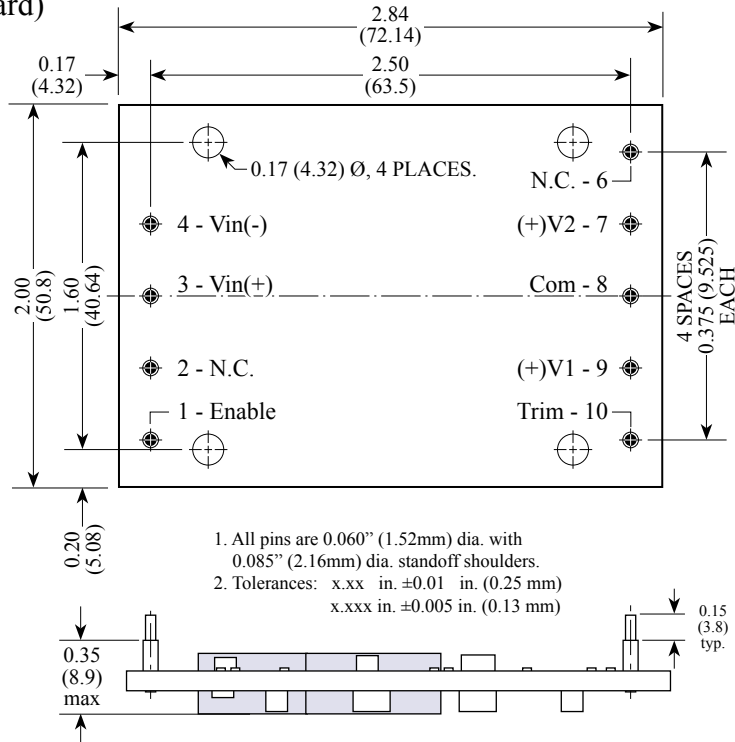
Product Numbering System & Selection Guide

MH	50	D	24	05	+12	MC
Series No.	Output Power	No Output	Input Voltage	V1 Output	V2/V3 Output	Options
MH	50 : 50W 75 : 75W	D : Dual	12 : 10-20V 24 : 18-36V 48 : 36-75V 24W : 10-36V 48W : 20-75V	05 : 5.0V	+12 : +12V +15 : +15V	C : -55°C Operation MC : Metal Case TS : Terminal Strip

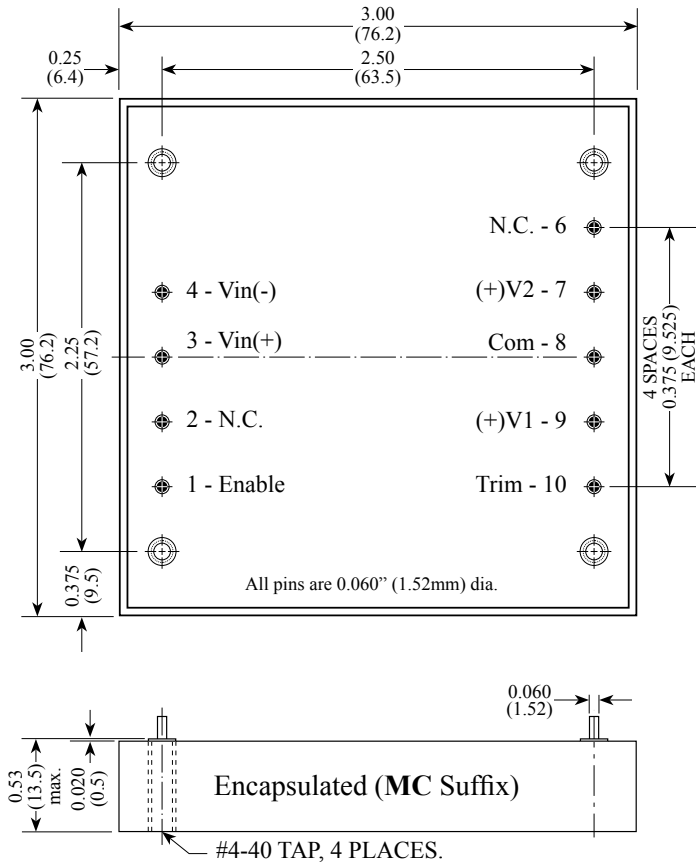
BLOCK DIAGRAM



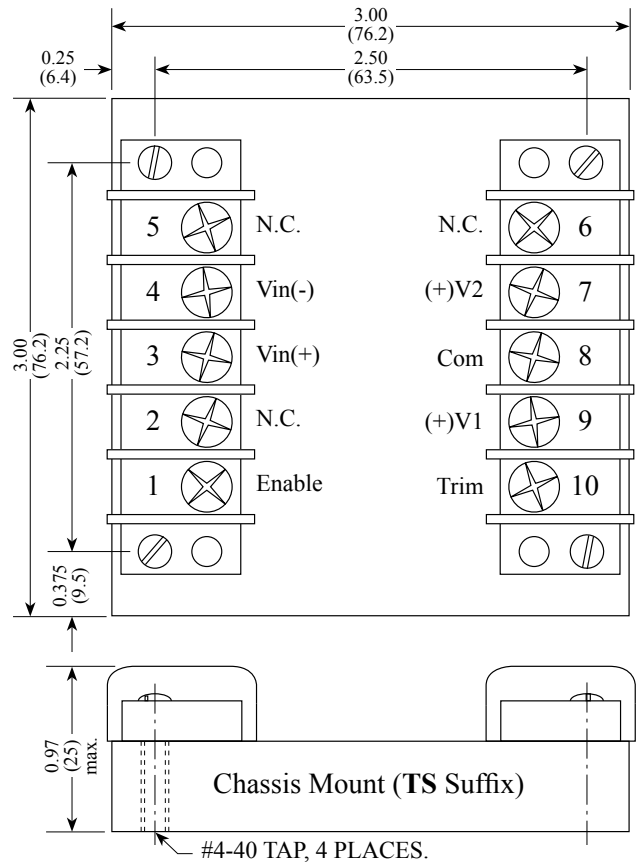
Open Frame (Standard)



Encapsulated (Optional, MC Suffix)



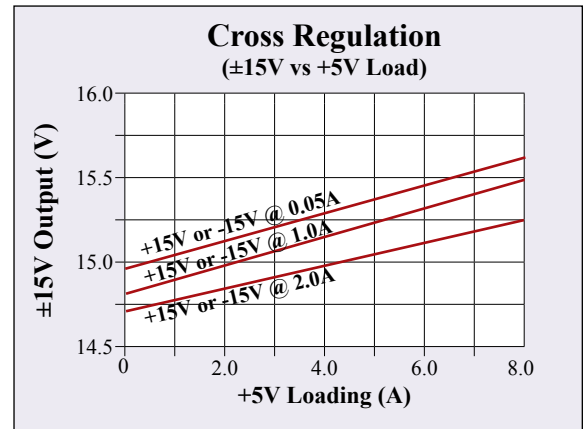
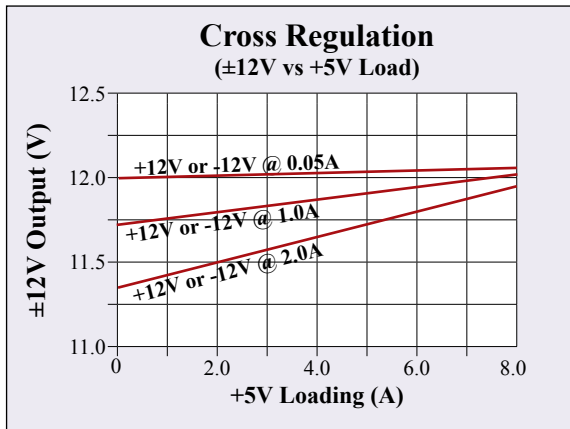
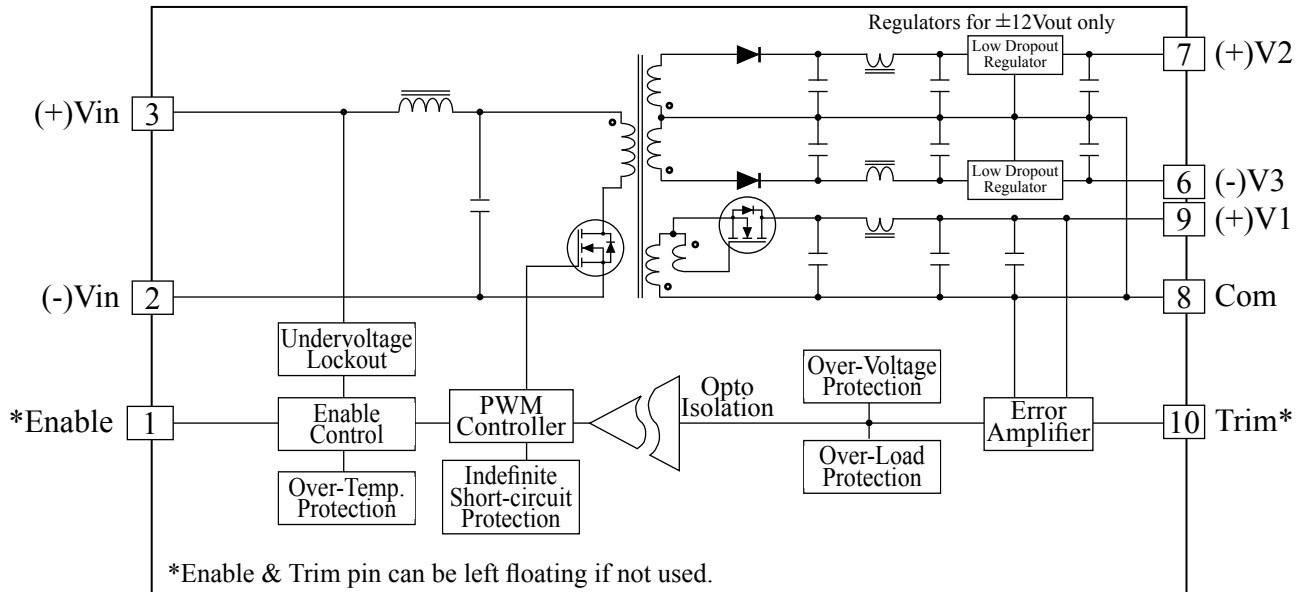
Chassis Mount (Optional, TS Suffix)



INPUT			OUTPUT											Over Temp. Shutdown /Recover	EFF. (typ.)	MODEL NO.	
Nominal (Range)	UVLO On/Off	Power (Watt)	Voltage (V)				Current (A)			Ripple & Noise		OVP (V)	Short Circuit Protection				
			#	Set Point	Min.*	Max.*	#	Min.	Max.	Peak-Peak	R.M.S.						
12 (10 - 20)	9.7/9.5	50W	+5V ±12V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+6.0	75mV	15mV	5.9	Hiccup Mode Indefinite	+105°C/ +95°C	84%	MH50T1205-12
				+V2	+12.00	+11.70	+12.20	+12	+0.05	+1.0	100mV	25mV					
				-V3	-12.00	-11.70	-12.20	+13	-0.05	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+6.0	75mV	15mV	5.9			86%	MH50T1205-15
				+V2	+15.00	+14.50	+15.50	+12	+0.05	+1.0	120mV	30mV					
				-V3	-15.00	-14.50	-15.50	+13	-0.05	-1.0	120mV	30mV					
		75W	+5V ±12V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+8.0	75mV	15mV	5.9			84%	MH75T1205-12
				+V2	+12.0V	+11.70	+12.20	+12	+0.01	+2.0	100mV	25mV					
				-V3	-12.0V	-11.70	-12.20	+13	-0.01	-2.0	100mV	25mV					
			+5V ±15V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+5.0	75mV	15mV	5.9			86%	MH75T1205-15
				+V2	+15.0V	+14.5V	+15.5V	+12	+0.05	+2.5	120mV	30mV					
				-V3	-15.0V	-14.5V	-15.5V	+13	-0.05	-2.5	120mV	30mV					
24 (18 - 36)	17/16	50W	+5V ±12V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+6.0	75mV	15mV	5.9	86%	MH50T2405-12		
				+V2	+12.0	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH50T2405-15		
				+V2	+15.0	+14.5	+15.5	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0	-14.5	-15.5	+13	-0.01	-1.0	120mV	30mV					
		75W	+5V ±12V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+6.0	75mV	15mV	5.9	86%	MH75T2405-12		
				+V2	+12.0V	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0V	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH75T2405-15		
				+V2	+15.0V	+14.5V	+15.5V	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0V	-14.5V	-15.5V	+13	-0.01	-1.0	120mV	30mV					
48 (36 - 75)	34/33	50W	+5V ±12V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+6.0	75mV	15mV	5.9	86%	MH50T4805-12		
				+V2	+12.0	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH50T4805-15		
				+V2	+15.0	+14.5	+15.5	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0	-14.5	-15.5	+13	-0.01	-1.0	120mV	30mV					
		75W	+5V ±12V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+6.0	75mV	15mV	5.9	86%	MH75T4805-12		
				+V2	+12.0V	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0V	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH75T4805-15		
				+V2	+15.0V	+14.5V	+15.5V	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0V	-14.5V	-15.5V	+13	-0.01	-1.0	120mV	30mV					
24W (10 - 30)	9.7/9.5	50W	+5V ±12V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+6.0	75mV	15mV	5.9	84%	MH50T24W05-12		
				+V2	+12.0	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH50T24W05-15		
				+V2	+15.0	+14.5	+15.5	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0	-14.5	-15.5	+13	-0.01	-1.0	120mV	30mV					
		75W	+5V ±12V	+V1	+5.00V	+11.70	+12.20	+11	+1.0	+6.0	75mV	15mV	5.9	84%	MH75T24W05-12		
				+V2	+12.0V	-11.70	-12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0V	-11.5V	-12.5V	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH75T24W05-15		
				+V2	+15.0V	+14.5V	+15.5V	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0V	-14.5V	-15.5V	+13	-0.01	-1.0	120mV	30mV					
48W (18 - 36)	17/16	50W	+5V ±12V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+6.0	75mV	15mV	5.9	86%	MH50T48W05-12		
				+V2	+12.0	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00	+4.90	+5.10	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH50T48W05-12		
				+V2	+15.0	+14.5	+15.5	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0	-14.5	-15.5	+13	-0.01	-1.0	120mV	30mV					
		75W	+5V ±12V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+6.0	75mV	15mV	5.9	86%	MH75T48W05-12		
				+V2	+12.0V	+11.70	+12.20	+12	+0.01	+1.0	100mV	25mV					
				-V3	-12.0V	-11.70	-12.20	+13	-0.01	-1.0	100mV	25mV					
			+5V ±15V	+V1	+5.00V	+4.90V	+5.10V	+11	+1.0	+5.0	75mV	15mV	5.9	88%	MH75T48W05-12		
				+V2	+15.0V	+14.5V	+15.5V	+12	+0.01	+1.0	120mV	30mV					
				-V3	-15.0V	-14.5V	-15.5V	+13	-0.01	-1.0	120mV	30mV					

* Combined Line & Load (Low Line to High Line, Min. Load to Full Load)

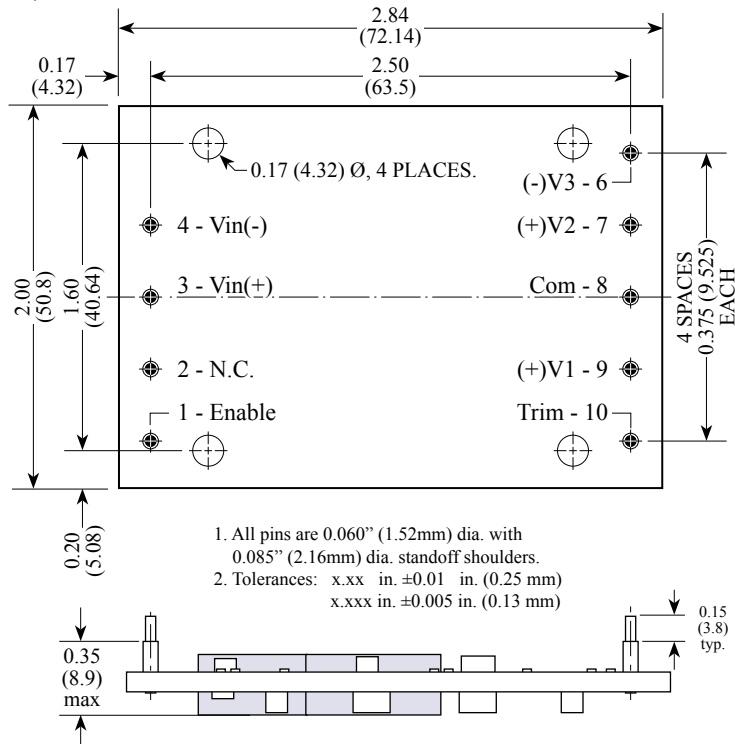
BLOCK DIAGRAM



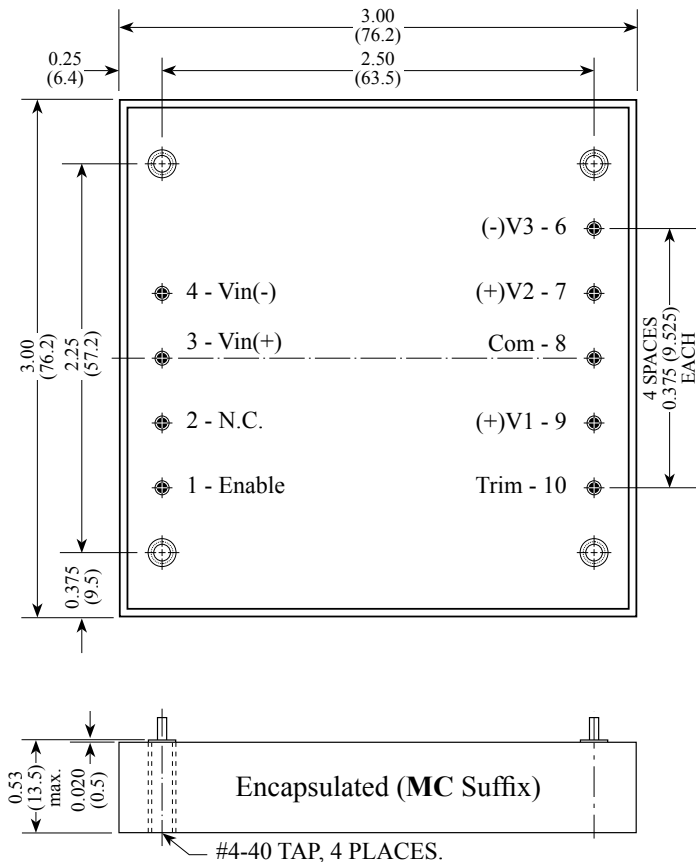
Product Numbering System & Selection Guide

Series No.	Output Power	No Output	Input Voltage	V1 Output	V2/V3 Output	Options
MH	50 : 50W 75 : 75W	T : Triple	12 : 10-20V 24 : 18-36V 48 : 36-75V 24W : 10-36V 48W : 20-75V	05 : 5.0V	-12 : ±12V -15 : ±15V	C : -55°C Operation MC : Metal Case TS : Terminal Strip

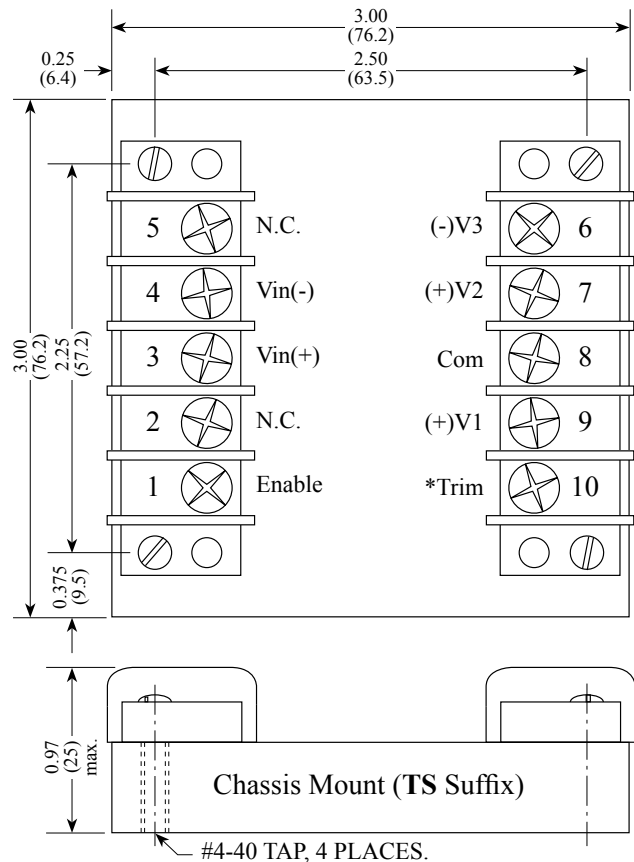
Open Frame (Standard)



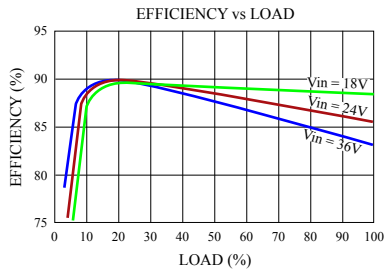
Metal Case (Optional, MC Suffix)



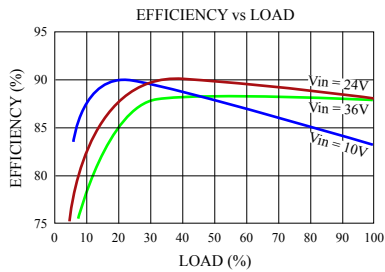
Chassis Mount (Optional, TS Suffix)



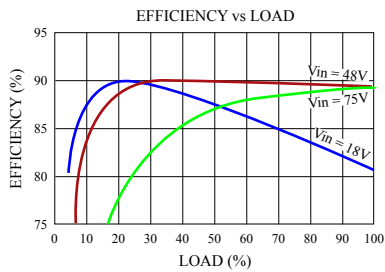
Efficiency Curve



MH75T2405-12

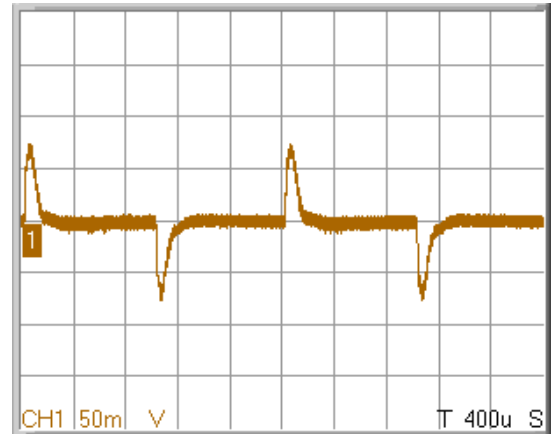


MH75T24W05-12

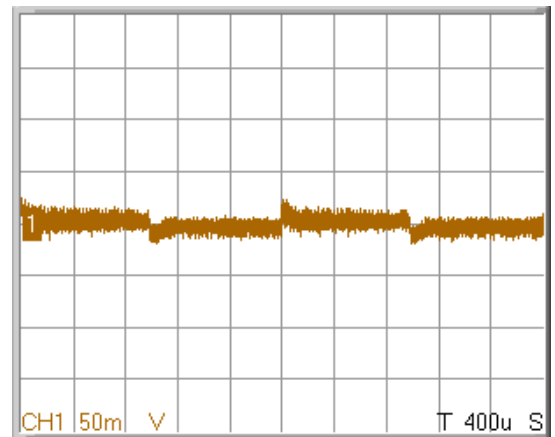


MH75T48W05-12

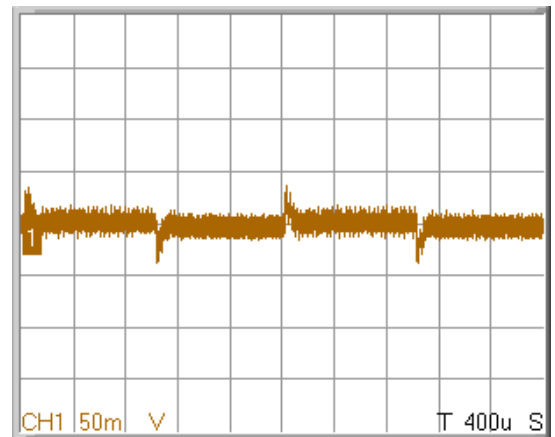
Transient Response



+5V



+12V



-12V