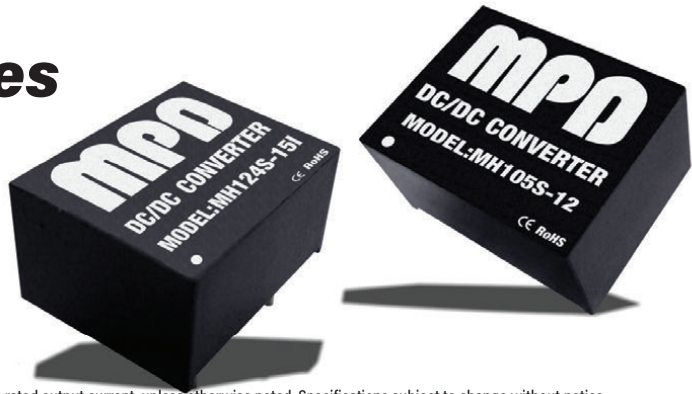


MH100S Series

Low Cost, 1W Compact "MicroDIP" DC/DC Converters



Key Features:

- 1W Output Power
- Compact "MicroDIP" Case
- 48 Standard Models
- Up To 3,000 VDC Isolation
- >1.12 MHour MTBF
- Meets EN 55032 Class B
- -40°C to +85°C Operation



Also Available In
Ultra-Miniature
SIP Case

MicroPower Direct

292 Page Street
Suite D
Stoughton, MA 02072
USA

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



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	4.50	5.0	5.50		
	12 VDC Input	10.80	12.0	13.20		
	15 VDC Input	13.50	15.0	16.50		
	24 VDC Input	21.60	24.0	26.40		
	48 VDC Input	43.20	48.0	52.80		
Input Reflected Ripple Current			20		mA P - P	
Input Filter	Internal Capacitors					
Output						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Output Voltage Accuracy			±3.0		%	
Line Regulation	For VIN Change of 1%		±1.2		%	
Load Regulation, See Note 1	See Model Selection Guide					
Ripple & Noise (20 MHz)			100		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 Seconds	1,000			VDC	
	Units With "I" Suffix	3,000				
Isolation Resistance		1,000			MΩ	
Isolation Capacitance			60		pF	
Switching Frequency	See Note 2		80		kHz	
EMI Characteristics (See Page 3)						
Parameter	Standard	Criteria	Level			
Radiated Emissions	EN 55032		Class B			
Conducted Emissions	See Note 4 EN 55032		Class B			
ESD	EN 61000-4-2	A	±8 kV Air			
			±6 kV Contact			
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	±0.5 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		+85	°C	
	Case			+100		
Storage Temperature Range		-40		+125	°C	
Cooling	Free Air Convection					
Humidity	RH, Non-condensing			95	%	
Physical						
Case Size & Weight	See Mechanical Diagram (Page 4)					
Case Material	Non-Conductive Black Plastic (UL-94V0)					
Reliability Specifications						
Parameter	Conditions	Min.	Typ.	Max.	Units	
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	1.121			MHours	
Absolute Maximum Ratings						
Parameter	Conditions	Min.	Typ.	Max.	Units	
Input Voltage Surge (1 Sec)	3.3 VDC Input			5.0	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		Load Regulation (% Typ)	Efficiency (% Typ)	Capacitive Load (µF, Max)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)				
	Nominal	Range	Full-Load	No-Load						
MH103S-03(I)	3.3	2.97 - 3.63	421	25	3.3	303.0	±20	72	220	1,000
MH103S-05(I)	3.3	2.97 - 3.63	394	25	5.0	200.0	±10	77	220	1,000
MH103S-07(I)	3.3	2.97 - 3.63	384	25	7.2	138.9	±10	79	220	1,000
MH103S-09(I)	3.3	2.97 - 3.63	404	30	9.0	111.1	±10	75	220	1,000
MH103S-12(I)	3.3	2.97 - 3.63	473	45	12.0	100.0	±10	77	220	1,000
MH103S-15(I)	3.3	2.97 - 3.63	384	35	15.0	66.6	±10	79	220	1,000
MH103S-18(I)	3.3	2.97 - 3.63	399	35	18.0	55.5	±10	76	220	1,000
MH103S-24(I)	3.3	2.97 - 3.63	461	53	24.0	50.0	±10	79	220	1,000
MH105S-03(I)	5.0	4.5 - 5.5	257	20	3.3	303.0	±20	78	220	550
MH105S-05(I)	5.0	4.5 - 5.5	247	25	5.0	200.0	±10	81	220	550
MH105S-07(I)	5.0	4.5 - 5.5	241	16	7.2	138.9	±10	83	220	550
MH105S-09(I)	5.0	4.5 - 5.5	250	26	9.0	111.1	±10	80	220	550
MH105S-12(I)	5.0	4.5 - 5.5	300	25	12.0	100.0	±10	80	220	550
MH105S-15(I)	5.0	4.5 - 5.5	244	35	15.0	66.6	±10	82	220	550
MH105S-18(I)	5.0	4.5 - 5.5	247	25	18.0	55.5	±10	81	220	550
MH105S-24(I)	5.0	4.5 - 5.5	289	35	24.0	50.0	±10	83	220	550
MH112S-03(I)	12	10.8 - 13.2	107	15	3.3	303.0	±20	78	220	250
MH112S-05(I)	12	10.8 - 13.2	105	16	5.0	200.0	±10	79	220	250
MH112S-07(I)	12	10.8 - 13.2	100	16	7.2	138.9	±10	83	220	250
MH112S-09(I)	12	10.8 - 13.2	107	15	9.0	111.1	±10	78	220	250
MH112S-12(I)	12	10.8 - 13.2	125	20	12.0	100.0	±10	80	220	250
MH112S-15(I)	12	10.8 - 13.2	105	15	15.0	66.6	±10	79	220	250
MH112S-18(I)	12	10.8 - 13.2	104	20	18.0	55.5	±10	80	220	250
MH112S-24(I)	12	10.8 - 13.2	123	25	24.0	50.0	±10	71	220	250
MH115S-03(I)	15	13.5 - 16.5	89	15	3.3	303.0	±20	75	220	200
MH115S-05(I)	15	13.5 - 16.5	82	9	5.0	200.0	±10	81	220	200
MH115S-07(I)	15	13.5 - 16.5	88	12	7.2	138.9	±10	76	220	200
MH115S-09(I)	15	13.5 - 16.5	90	10	9.0	111.1	±10	74	220	200
MH115S-12(I)	15	13.5 - 16.5	100	13	12.0	100.0	±10	80	220	200
MH115S-15(I)	15	13.5 - 16.5	84	15	15.0	66.6	±10	79	220	200
MH115S-18(I)	15	13.5 - 16.5	85	12	18.0	55.5	±10	78	220	200
MH115S-24(I)	15	13.5 - 16.5	99	10	24.0	50.0	±10	81	220	200
MH124S-03(I)	24	21.6 - 26.4	54	8	3.3	303.0	±20	77	220	125
MH124S-05(I)	24	21.6 - 26.4	52	8	5.0	200.0	±10	80	220	125
MH124S-07(I)	24	21.6 - 26.4	54	10	7.2	138.9	±10	77	220	125
MH124S-09(I)	24	21.6 - 26.4	54	7	9.0	111.1	±10	77	220	125
MH124S-12(I)	24	21.6 - 26.4	62	8	12.0	100.0	±10	80	220	125
MH124S-15(I)	24	21.6 - 26.4	51	8	15.0	66.6	±10	81	220	125
MH124S-18(I)	24	21.6 - 26.4	52	8	18.0	55.5	±10	80	220	125
MH124S-24(I)	24	21.6 - 26.4	60	9	24.0	50.0	±10	83	220	125
MH148S-03(I)	48	43.2 - 52.8	29	6	3.3	303.0	±20	73	220	60
MH148S-05(I)	48	43.2 - 52.8	28	6	5.0	200.0	±10	74	220	60
MH148S-07(I)	48	43.2 - 52.8	27	7	7.2	138.9	±10	77	220	60
MH148S-09(I)	48	43.2 - 52.8	27	5	9.0	111.1	±10	78	220	60
MH148S-12(I)	48	43.2 - 52.8	32	5	12.0	100.0	±10	77	220	60
MH148S-15(I)	48	43.2 - 52.8	27	5	15.0	66.6	±10	76	220	60
MH148S-18(I)	48	43.2 - 52.8	28	8	18.0	55.5	±10	75	220	60
MH148S-24(I)	48	43.2 - 52.8	31	8	24.0	50.0	±10	80	220	60

For the 3 kV isolation models, add suffix "I" to model number (i.e. MH124S-05I)

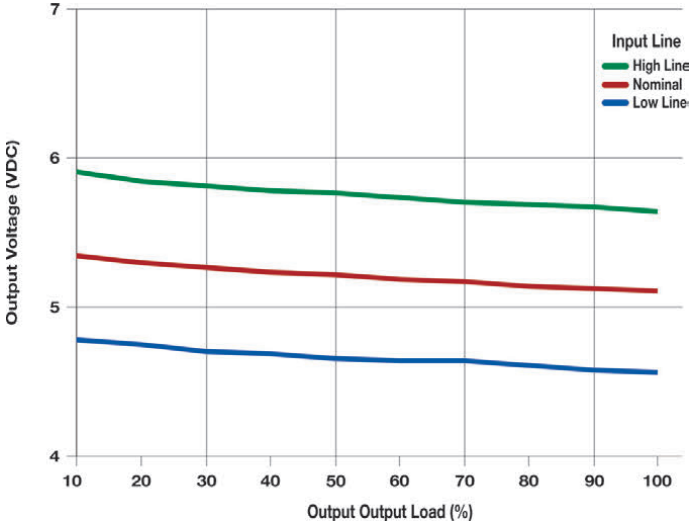
Notes:

1. Output load regulation is specified for a load change of 20% to 100%.
2. Switching frequency is typically 80 kHz, but may vary with differing operating conditions.
3. Operation at no-load will not damage these units. However, they may not meet all specifications.

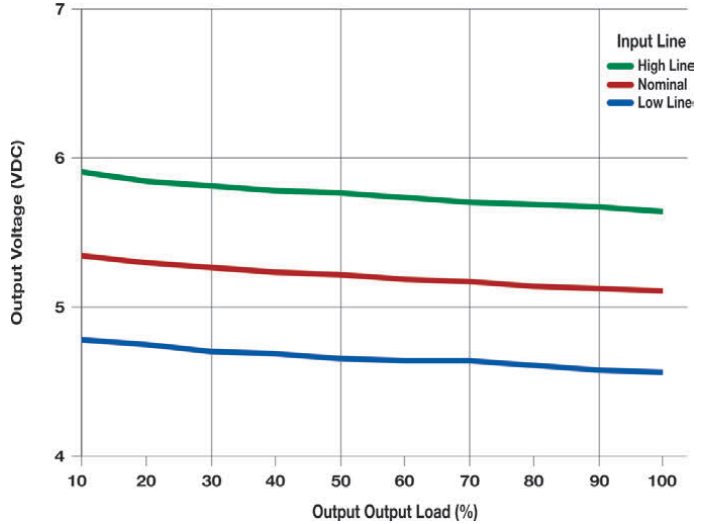
4. These converters will operate without external components. However, to meet the specified EMI limits, a simple external input filter is required. See the input filter note on page 3 for more information.
5. All units are rated for operation at full output power to +85°C. Operation over +85°C without airflow is not recommended.

6. It is recommended that a fuse be used on the input of a power supply for protection. See the Model Selection table above for the correct rating.

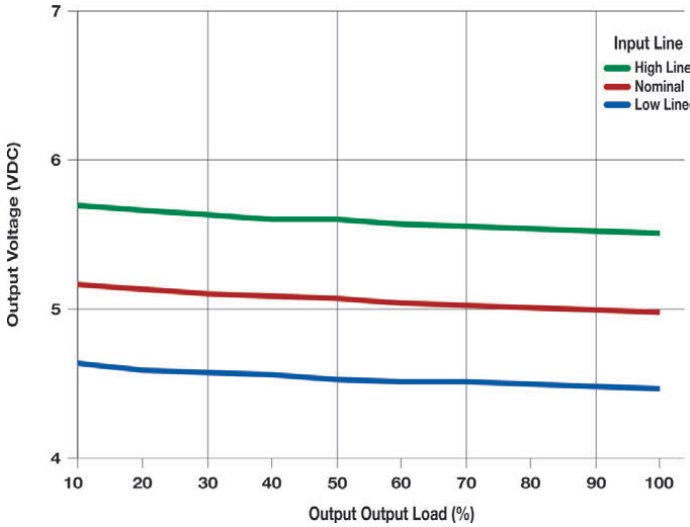
Output Voltage vs Load: MH105S-05



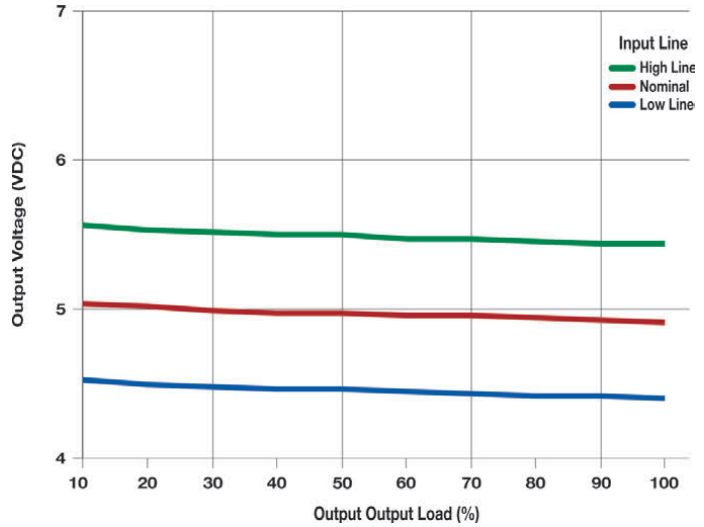
Output Voltage vs Load: MH112S-05



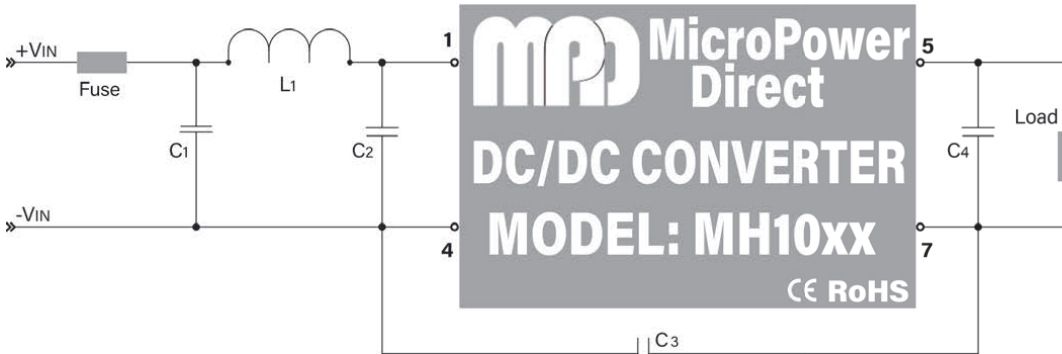
Output Voltage vs Load: MH124S-05



Output Voltage vs Load: MH148S-05



Typical Connection



The recommended component values are:

Input V	Fuse	C1	L1	C2	C3	C4
3.3 VIN	1,000 mA (Slow Blow)	1210, 2.2 μ F/100V	18 μ H	---	---	4.7 μ F to 10 μ F
5.0 VIN	550 mA (Slow Blow)	1210, 2.2 μ F/100V	18 μ H	---	---	4.7 μ F to 10 μ F
12 VIN	250 mA (Slow Blow)	1210, 2.2 μ F/100V	18 μ H	---	---	4.7 μ F to 10 μ F
15 VIN	200 mA (Slow Blow)	1210, 2.2 μ F/100V	18 μ H	---	---	4.7 μ F to 10 μ F
24 VIN	125 mA (Slow Blow)	1210, 2.2 μ F/100V	18 μ H	1210, 2.2 μ F/100V	1206, 470 pF/2 kV	4.7 μ F to 10 μ F
48 VIN	60 mA (Slow Blow)	10 μ F/100V	18 μ H	1210, 2.2 μ F/100V	1206, 470 pF/2 kV	4.7 μ F to 10 μ F

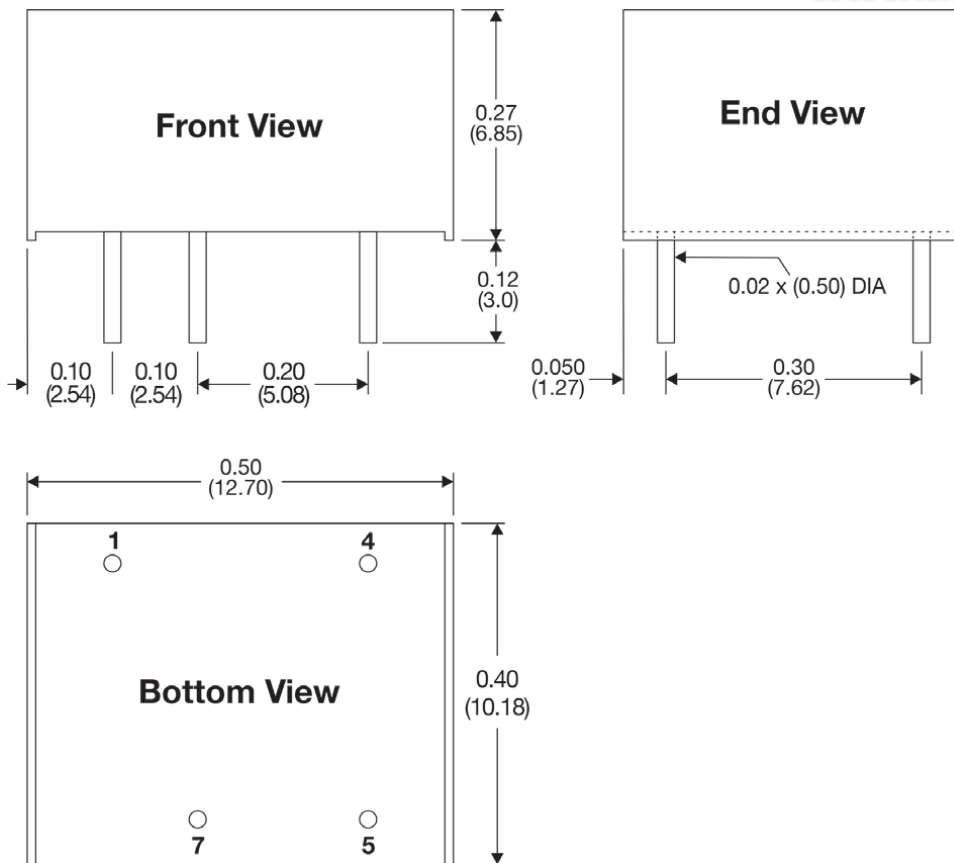
For many applications, the MH100S series will operate fine with minimum external components. However, if meeting the requirements of EMI/EMC standards (such as EN 55032) is required, a simple external filter circuit should be sufficient. This is illustrated in the typical connection diagram at left.

Notes:

- All input/output filtering capacitors should have a low equivalent impedance. Voltage derating of all capacitors should be 60% or greater. All components should be mounted as close to the converter as possible.
- To meet EN 55032, the external components C1, L1, C2 and C3 are required. This is illustrated in the typical connection diagram at left. Values for these components are given in the table below. Contact the factory for more information.
- To meet EN 61000-4-4, a larger external input capacitor is needed. In this case, the value of capacitor C1 should be changed to 470 μ F/100V. Contact the factory for more info.
- To meet EN 61000-4-5, a larger external input capacitor is needed. In this case, the value of capacitor C1 should be changed to 470 μ F/100V. Contact the factory for more info.
- For noise sensitive applications, it is recommended that the external capacitor C4 be placed from the +VOUT pin to the -VOUT pin. Recommended values are given in the table. Care must be taken in choosing capacitors not to exceed the capacitive load specification for the unit.

Mechanical Dimensions

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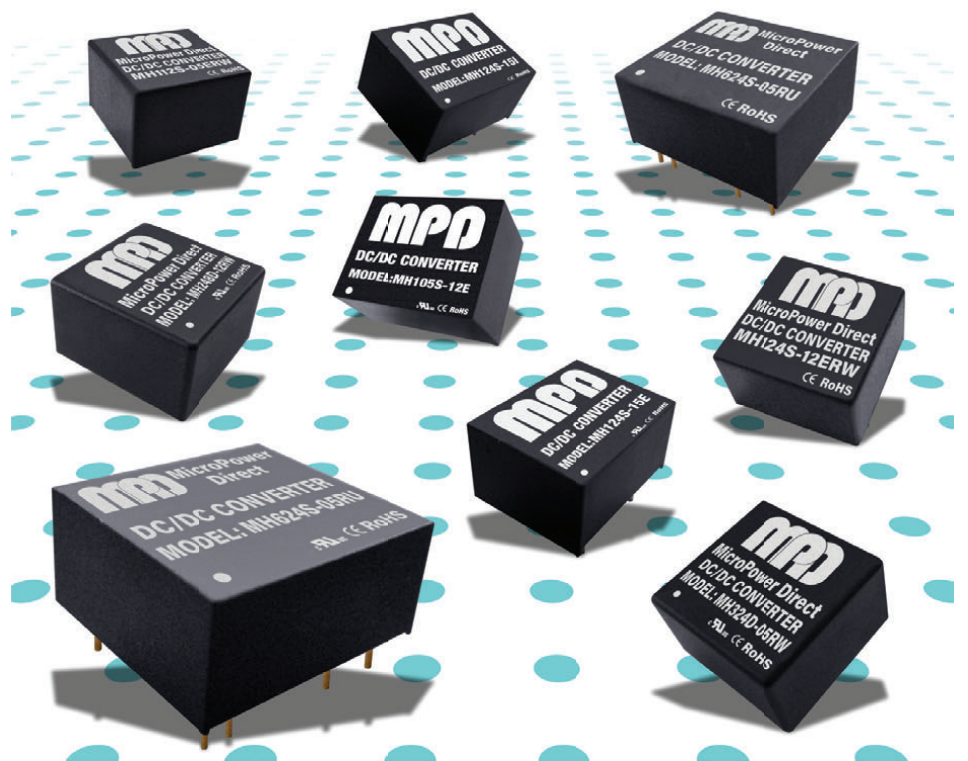
Pin Connections

Pin	Description
1	-VIN
4	+VIN
5	+VOUT
7	-VOUT

Notes:

- All dimensions are typical in inches (mm)
- Pin 1 is marked by a "dot" or indentation on the unit
- General Tolerance = ± 0.02 (± 0.50)
- Pin Tolerance = ± 0.002 (± 0.05)
- Recommended pin hole size (on the application PC Board) is $\varnothing 0.039$ ($\varnothing 1.00$)
- Weight (Typ) = 0.059 Oz (1.8g)

MPD offers a wide range of small DC/DC converters. These include a full line of products in very small "MicroDIP" packages (also called a "DIP-8" case). Models range from 0.25W to 6W and offer a variety of input/output voltage combinations, I/O isolation levels and wide temperature operation. Many models meet international EMC/EMI standards and some are approved to EN 62368 or EN 60950. For full information, go to our website or contact the factory.



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