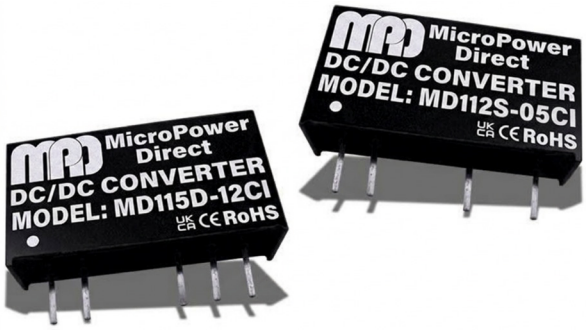
MD100CI

High Isolation, 1W SIP Single & Dual Output DC/DC Converters



Key Features:

- 1W Output Power
- Miniature SIP Case
- Efficiency to 85%
- 3000VDC Isolation
- -40°C to +105°C Temp
- >3.5 MHour MTBF
- Single/Dual Output
- Short Circuit Protected
- 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 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	
Reflected Ripple Current			15		mA
Input Filter	Capacitance Filter				

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	See Tolerance Graphs (Page 2 & 3)					
Line Regulation, See Note 3	For VIN Change of 1%	3.3VDC Output			±1.5	%
		Other Output			±1.2	
Load Regulation, See Note 4	See Model Selection Guide					
Ripple & Noise (20 MHz), See Note 5	24 VOUT Models			50	100	mV P - P
	All Other Models			30	75	
Temperature Coefficient				±0.02		%/°C
Output Short Circuit	Continuous (Autorecovery)					

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	See Note 6	3,000			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz / 0.1V		20		pF
Switching Frequency	3.3 VIN Models		220		kHz
	5 VIN Models		270		
	All Other Models		260		

Environmental

Parameter	Conditions		Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient, See Note 7		-40		+105	°C
Storage Temperature Range			-55		+125	°C
Case Temperature Rise	Ta=25°C			25		°C
Cooling	Free Air Convection					
Storage Humidity	Non-Condensing	3.3/5VDC Input			95	%RH
		Other Input	5		95	

Physical

Case Size	0.77 x 0.24 x 0.40 in (See Mechanical Drawing on Page 6)
Case Material	Flame Retardant, Non-Conductive, Black Plastic (UL94-V0)
Weight	0.074 oz (2.1g) (See Mechanical Drawing on Page 6)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	3500			kHours
Safety Standards, See Note 1	UL/cUL 62368-1 recognition (UL certificate)				

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	3.3 VDC Input	-0.7		5	VDC
	5 VDC Input	-0.7		9	
	12 VDC Input	-0.7		18	
	15 VDC Input	-0.7		21	
	24 VDC Input	-0.7		30	
Lead Temperature	1.5 mm From Case For 10 Sec			300	°C

EMI Characteristics

Parameter	Standard	Criteria	Level
Radiated Emissions, See Page 5	CISPR32/EN 55032		Class B
Radiated Emissions	CISPR32/EN 55032		Class B
ESD EN 61000-4-2	EN 61000-4-2	B	±8 kV Air
			±6 kV Contact

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Unit 1
South Easton, MA 02375
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Model Selection Guide

UL	Model Number	Input				Output			Load Regulation (%, Typ)	Output Capacitive Load (µF Max)	Efficiency (%, Typ)	Fuse Rating Slow-Blow (mA)	Output Volt. Tol. Chart
		Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)					
		Nominal	Range	Full-Load	No-Load								
	MD103S-03CI	3.3	2.97 - 3.63	384	10	3.3	303	30	±12	2,400	79	800	A
▪	MD103S-05CI	3.3	2.97 - 3.63	370	18	5	200	20	±8	2,400	82	800	B
	MD103S-09CI	3.3	2.97 - 3.63	370	18	9	111	11	±8	1,000	85	800	B
	MD103S-12CI	3.3	2.97 - 3.63	370	18	12	83	8	±8	560	82	800	B
	MD103S-15CI	3.3	2.97 - 3.63	370	18	15	67	7	±8	560	82	800	B
	MD103S-24CI	3.3	2.97 - 3.63	370	18	24	42	4	±8	220	84	800	B
	MD103D-03CI	3.3	2.97 - 3.63	384	10	±3.3	±150	±15	±12	1,200	78	800	A
	MD103D-05CI	3.3	2.97 - 3.63	370	18	±5	±100	±10	±8	1,200	82	800	B
	MD103D-09CI	3.3	2.97 - 3.63	370	18	±9	±56	±6	±8	470	85	800	B
	MD103D-12CI	3.3	2.97 - 3.63	370	18	±12	±42	±5	±8	220	82	800	B
	MD103D-15CI	3.3	2.97 - 3.63	370	18	±15	±34	±4	±8	220	82	800	B
	MD103D-24CI	3.3	2.97 - 3.63	370	18	±24	±21	±2	±8	100	84	800	B
	MD105S-03CI	5	4.5 - 5.5	270	8	3.3	303	30	±15	2,400	74	600	A
▪	MD105S-05CI	5	4.5 - 5.5	270	8	5	200	20	±10	2,400	82	600	B
	MD105S-09CI	5	4.5 - 5.5	241	12	9	111	12	±8	1,000	83	600	B
	MD105S-12CI	5	4.5 - 5.5	241	12	12	84	9	±7	560	83	600	B
	MD105S-15CI	5	4.5 - 5.5	241	18	15	67	7	±6	560	83	600	B
▪	MD105S-24CI	5	4.5 - 5.5	241	18	24	42	4	±5	220	85	600	B
▪	MD105D-03CI	5	4.5 - 5.5	270	8	±3.3	±152	±15	±15	1,200	74	600	A
▪	MD105D-05CI	5	4.5 - 5.5	270	8	±5	±100	±10	±10	1,200	82	600	B
▪	MD105D-09CI	5	4.5 - 5.5	241	12	±9	±56	±6	±8	470	83	600	B
▪	MD105D-12CI	5	4.5 - 5.5	241	12	±12	±42	±5	±7	220	83	600	B
▪	MD105D-15CI	5	4.5 - 5.5	241	18	±15	±34	±4	±6	220	83	600	B
▪	MD105D-24CI	5	4.5 - 5.5	241	18	±24	±21	±3	±5	100	85	600	B
	MD109S-09CI	9	8.1 - 9.9	137	8	9	111	12	±8	470	81	350	B
	MD112S-03CI	12	10.8 - 13.2	112	8	3.3	303	30	±15	2,400	75	200	A
▪	MD112S-05CI	12	10.8 - 13.2	105	8	5	200	20	±10	2,400	80	200	C
▪	MD112S-09CI	12	10.8 - 13.2	105	8	9	111	12	±8	1,000	80	200	C
▪	MD112S-12CI	12	10.8 - 13.2	103	8	12	83	9	±8	560	80	200	C
	MD112S-15CI	12	10.8 - 13.2	103	8	15	67	7	±8	560	81	200	C
	MD112S-24CI	12	10.8 - 13.2	105	8	24	42	5	±8	220	81	200	C
▪	MD112D-03CI	12	10.8 - 13.2	112	8	±3.3	±152	±15	±15	1,200	75	200	A
▪	MD112D-05CI	12	10.8 - 13.2	105	8	±5	±100	±10	±10	1,200	80	200	C
▪	MD112D-09CI	12	10.8 - 13.2	105	8	±9	±56	±5	±8	470	80	200	C
▪	MD112D-12CI	12	10.8 - 13.2	103	8	±12	±42	±5	±8	220	81	200	C
▪	MD112D-15CI	12	10.8 - 13.2	103	8	±15	±34	±4	±8	220	81	200	C
▪	MD112D-24CI	12	10.8 - 13.2	105	8	±24	±21	±2	±8	100	80	200	C
	MD115S-05CI	15	13.5 - 16.5	84	8	5	200	20	±10	2,400	80	200	C
	MD115S-09CI	15	13.5 - 16.5	84	8	9	111	12	±8	1,000	80	200	C
	MD115S-12CI	15	13.5 - 16.5	84	8	12	83	9	±8	560	80	200	C
	MD115S-15CI	15	13.5 - 16.5	83	8	15	67	7	±8	560	81	200	C
	MD115S-24CI	15	13.5 - 16.5	83	8	24	42	5	±8	220	81	200	C
	MD115D-05CI	15	13.5 - 16.5	84	8	±5	±100	±10	±10	1,200	80	200	C
	MD115D-09CI	15	13.5 - 16.5	84	8	±9	±56	±5	±8	470	80	200	C
	MD115D-12CI	15	13.5 - 16.5	84	8	±12	±42	± 5	±8	220	80	200	C
	MD115D-15CI	15	13.5 - 16.5	83	8	±15	±34	±4	±8	220	81	200	C
	MD115D-24CI	15	13.5 - 16.5	83	8	±24	±21	±2	±8	100	81	200	C

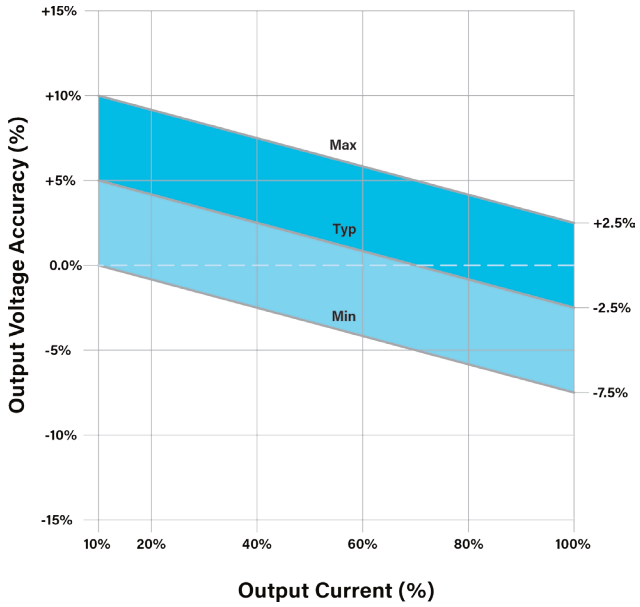
Model Selection Guide, Cont.

UL	Model Number	Input				Output			Load Regulation (%, Typ)	Output Capacitive Load (μF Max)	Efficiency (%, Typ)	Fuse Rating Slow-Blow (mA)	Output Volt. Tol. Chart
		Voltage (VDC)		Current (mA)		Voltage (VDC)	Current (mA, Max)	Current (mA, Min)					
		Nominal	Range	Full-Load	No-Load								
	MD124S-03CI	24	21.6 - 26.4	55	8	3.3	303	30	±15	2,400	75	100	A
▪	MD124S-05CI	24	21.6 - 26.4	53	8	5	200	20	±10	2,400	79	100	C
	MD124S-07CI	24	21.6 - 26.4	53	8	7	139	13	±8	1,000	80	100	C
	MD124S-09CI	24	21.6 - 26.4	53	8	9	111	12	±8	1,000	80	100	C
▪	MD124S-12CI	24	21.6 - 26.4	53	8	12	83	9	±8	560	81	100	C
	MD124S-15CI	24	21.6 - 26.4	53	8	15	67	7	±8	560	81	100	C
▪	MD124S-24CI	24	21.6 - 26.4	53	8	24	42	5	±8	220	81	100	C
	MD124D-03CI	24	21.6 - 26.4	55	8	±3.3	±150	±15	±15	1,200	76	100	C
	MD124D-05CI	24	21.6 - 26.4	53	8	±5	±100	±10	±10	1,200	80	100	C
	MD124D-09CI	24	21.6 - 26.4	53	8	±9	±56	±5	±8	470	80	100	C
	MD124D-12CI	24	21.6 - 26.4	53	8	±12	±42	±5	±8	220	81	100	C
	MD124D-15CI	24	21.6 - 26.4	53	8	±15	±34	±4	±8	220	79	100	C
	MD124D-24CI	24	21.6 - 26.4	53	8	±24	±21	±2	±8	100	80	100	C

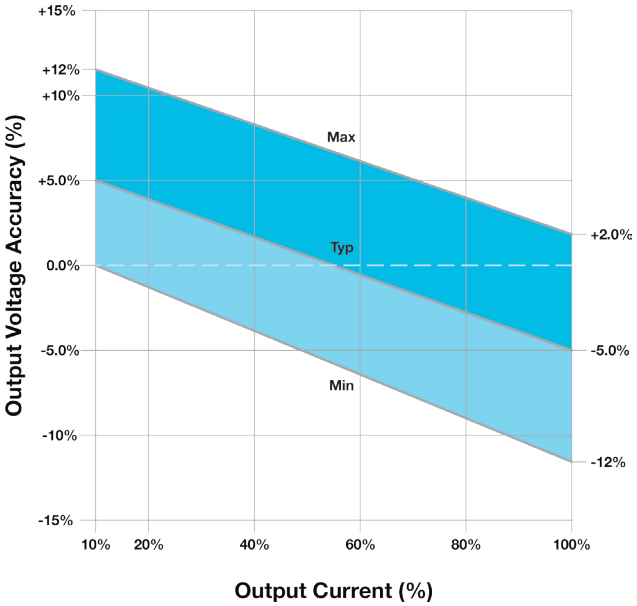
Notes:

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage.
2. The "parallel cable" method is used for ripple and noise test.
3. The maximum capacitive load is tested within the input voltage range and under full load conditions.
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25 °C, humidity <75% RH, nominal input voltage, and rated output load.

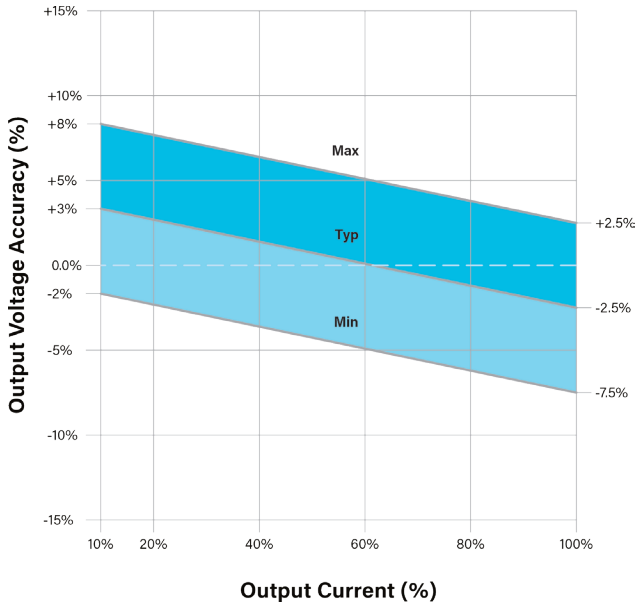
Output Voltage Tolerance: Chart B



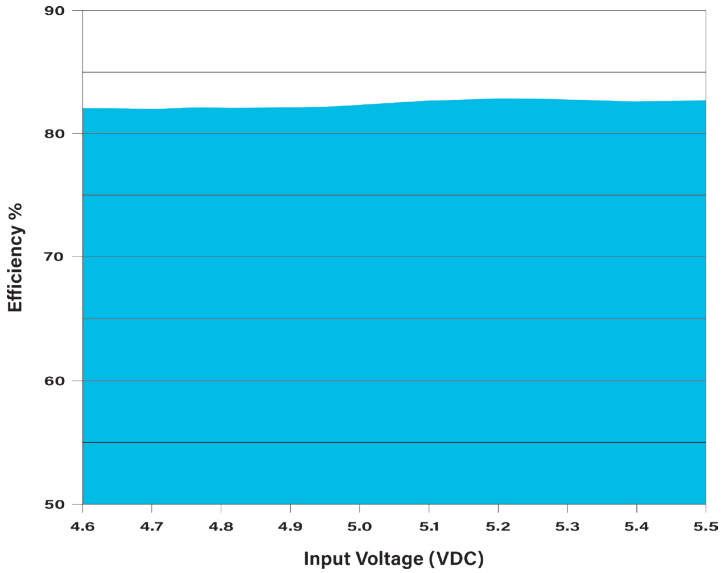
Output Voltage Tolerance: Chart A



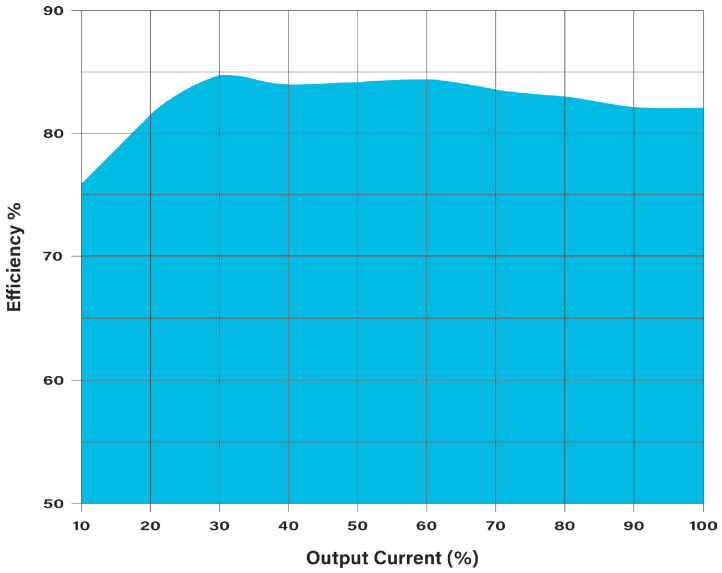
Output Voltage Tolerance: Chart C



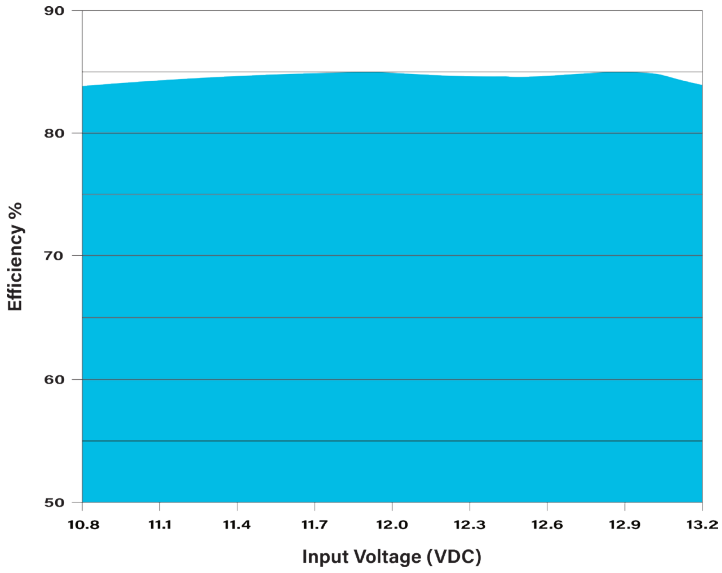
Efficiency vs Input: MD105S-05CI



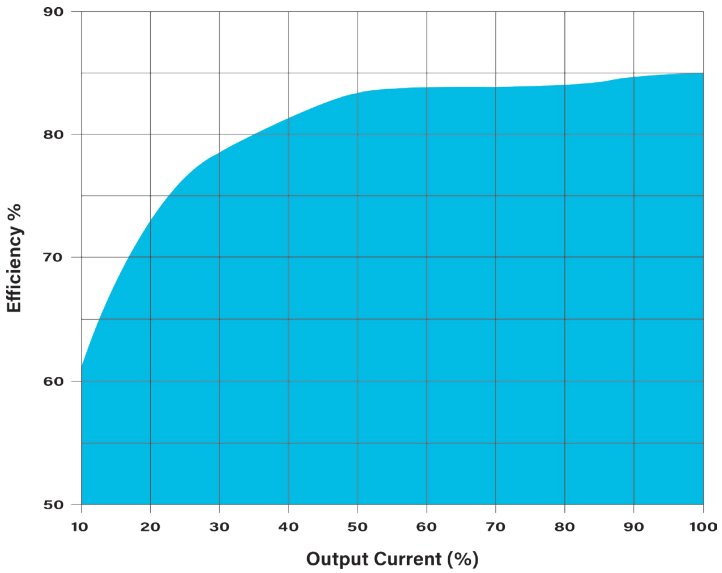
Efficiency vs Output Load: MD105S-05CI



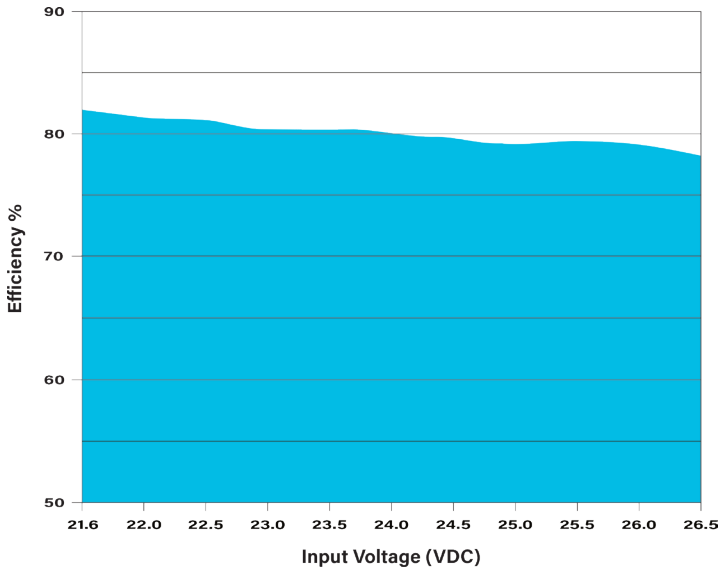
Efficiency vs Input: MD112S-05CI



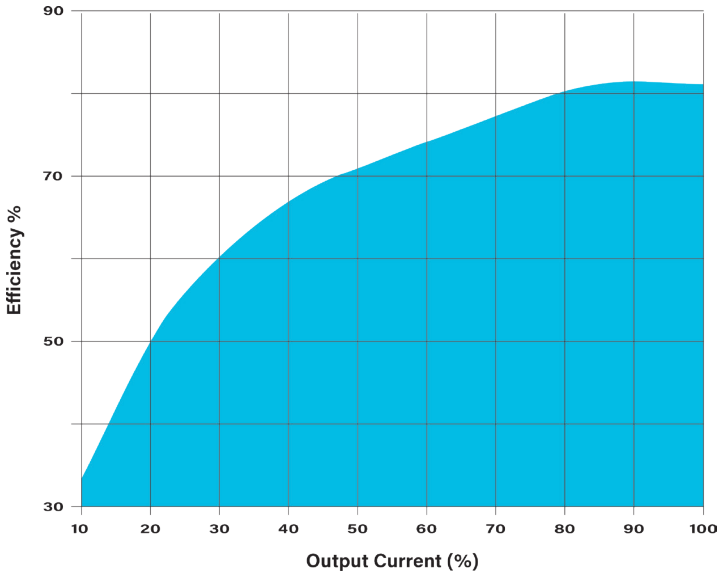
Efficiency vs Output Load: MD112S-05CI



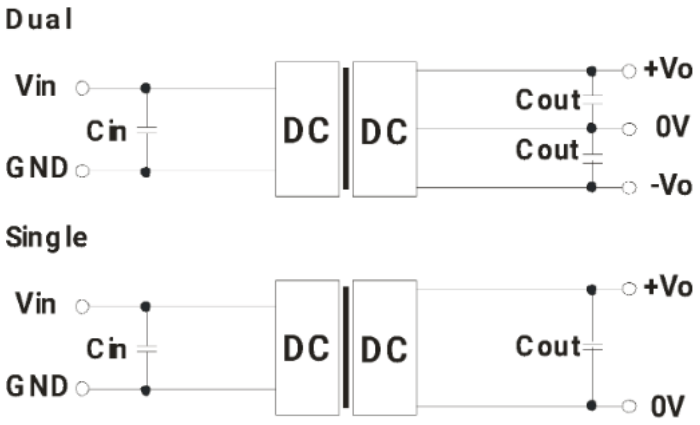
Efficiency vs Input: MD124S-05CI



Efficiency vs Output Load: MD124S-05CI



Typical Application Circuit



Notes:

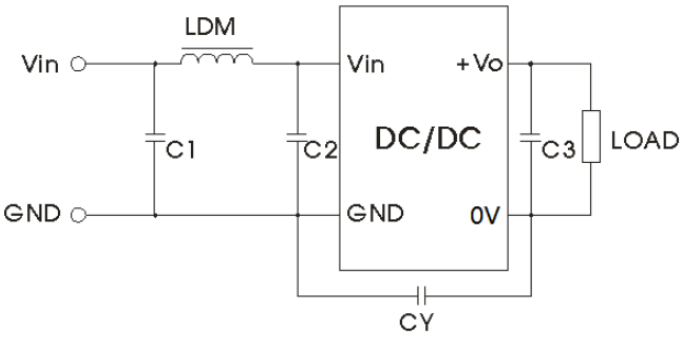
1. Input and/or output ripple can be further reduced by connecting a filter capacitor from the input and/or output terminals to ground as shown above.
2. Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

Vin (VDC)	Cin	Single Vout (VDC)	Cout	Dual Vout (VDC)	Cout
3.3	10uF/16V	3.3	10uF/16V	±3.3	4.7uF/16V
5	4.7uF/16V	5		±5	
9	2.2uF/25V	7.2	2.2uF/16V	±9	1uF/16V
12		9		±12	1uF/25V
15		12	2.2uF/25V	±15	0.47uF/25V
24	1uF/50V	15	1uF/25V	±24	0.47uF/50V
--	--	24	1uF/50V	--	--

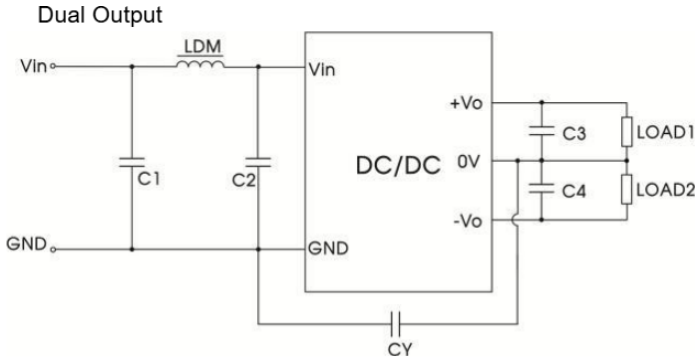
Table 1: Recommended input and output capacitor values

EMI Recommended Circuit

Single Output

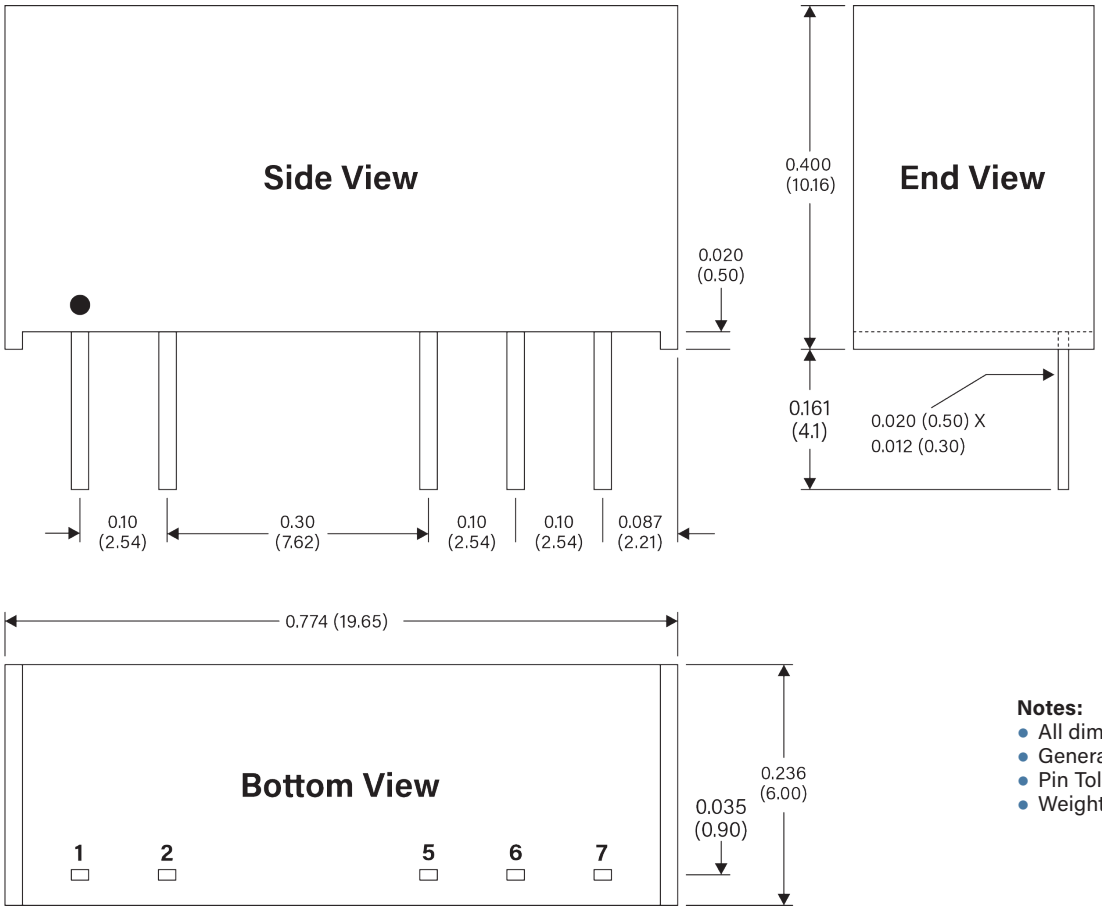


Dual Output



Input Voltage		3.3VDC		5VDC		Other Input
Output Voltage		3.3/5VDC	9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC	--
EMI	C1/C2	4.7uF/16V		4.7uF/25V		4.7uF/50V
	CY	--	270pF/4kVDC Vishay HGZ102MBP TDK CD45-E2GA102M-GKA	100pF/4kV	1000pF/4kV	270pF/3kVDC
	C3/C4	Refer to Cout in Table 1				
	LDM	6.8uH				

Mechanical Dimensions



Pin Connections

Pin	Single Output
1	Vin
2	GND
5	0V
6	No Pin
7	+Vo

Pin	Dual Output
1	Vin
2	GND
5	-Vo
6	0V
7	+Vo

Notes:
- All dimensions are typical in inches (mm)
- General Tolerances: ±0.01 (±0.25)
- Pin Tolerance: ±0.004 (±0.10)
- Weight (Typ) = 0.07 oz (2.1g)

MPD has a very wide range of high performance AC/DC power supplies ranging from 600W UChannel units to 1W units in miniature Single-In-Line (SIP) packages. All are designed and certified to international safety and EMC/EMI standards.
We have AC/DC supplies approved for use in medical equipment, DIN rail supplies, "Green" energy supplies and constant power supplies.
We also offer a wide variety of DC/DC converters, POL regulators and IGBT drivers. All products are available with short lead times. Call today for complete information or product samples. Or go to our website:

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