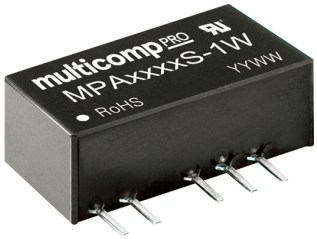
1W Isolated DC to DC Converters - Dual Output

1W isolated DC-DC converter
Fixed input voltage and unregulated dual output

RoHS Compliant



Features

- Continuous short-circuit protection
- No-load input current as low as 5mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 85%
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out
- SIP package
- IEC62368, UL62368, EN62368 approved

These series are specially designed for applications where an isolated (two isolated) voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

Selection Guide

Part Number	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF)* Max.
	Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
MPA0503S-1W	5 (4.5 to 5.5)	±3.3	±152/±15	70/74	1200
MPA0505S-1W		±5	±100/±10	78/82	
MPA0512S-1W		±12	±42/±5	79/83	220
MPA0515S-1W		±15	±34/±4	79/83	
MPA0524S-1W		±24	±21/±3	81/85	100

Note: *The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Current (full load / no-load)	3.3VDC/5VDC output	-	270/5	286/10	mA
	9VDC/12VDC output	-	241/12	254/20	
	15VDC/24VDC output	-	241/18	254/30	
Reflected Ripple Current*		-	15	-	
Surge Voltage(1sec. max.)	5VDC input	-0.7	-	9	V DC
Input Filter		Capacitance filter			
Hot Plug		Unavailable			

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	-	-	1.5	-
		Others		-	1.2	
Load Regulation	10% -100% load	3.3VDC output	-	15	20	%
		5VDC output		10	15	
		9VDC output		8	10	
		12VDC output		7	10	
		15VDC output		6	10	
		24VDC output		5	10	
Ripple & Noise*	20MHz bandwidth	Others		30	75	mVp-p
		24VDC output		50	100	
Temperature Coefficient	100% load			±0.02	-	%/°C
Short-Circuit Protection			Continuous, self-recovery			
Note: * The “parallel cable” method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.						

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		1500	-	-	VDC
Insulation Resistance	Input-output resistance at 500VDC		1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		-	20	-	pF
Operating Temperature	Derating when operating temperature≥85°C, (see Fig. 2)		-40	-	105	°C
Storage Temperature			-55	-	125	
Case Temperature Rise	Ta=25°C	3.3VDC output	-	25	-	
		Others	-	15		
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		-	-	300	
Storage Humidity	Non-condensing		-	-	95	
Switching Frequency	100% load, nominal input voltage		-	270	-	kHz
MTBF	MIL-HDBK-217F@25°C		3500	-	-	k hours

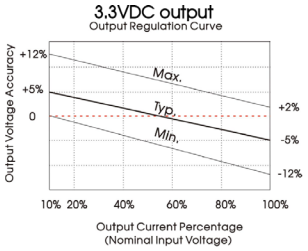
Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	19.65 × 6 × 10.16mm
Weight	2.1g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B(see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B(see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV , Contact ±4kV perf. Criteria B

Typical Performance Curves



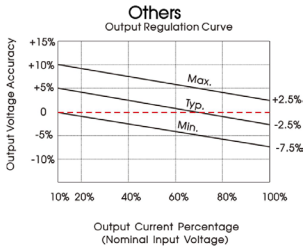


Fig. 1

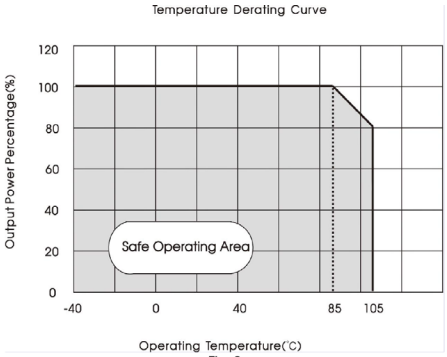
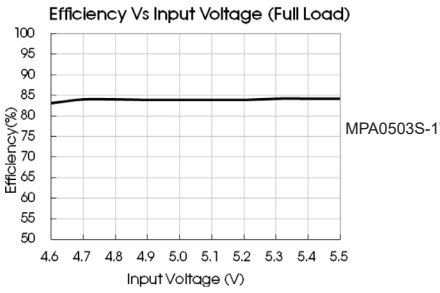
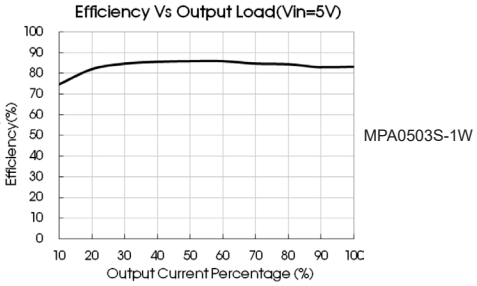


Fig. 2



MPA0503S-1W



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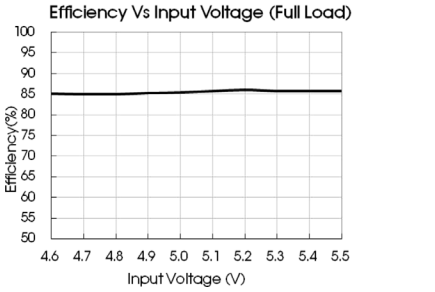
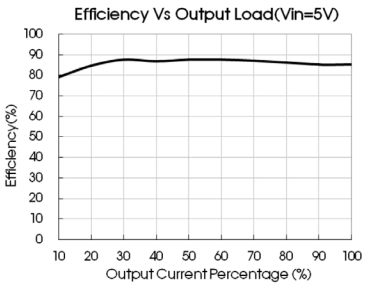




Design Reference

Typical application

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 in Fig.3.

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.

Dual

Table 1: Recommended input and output capacitor values

Vin (VDC)	Cin (µF)	Cout (µF)	Dual Vout (VDC)	Cout (µF)
5	4.7	10	±5	4.7
-	-	2.2	±9/±12	1
-	-	1	±15/±24	0.47

EMC (CLASS B) compliance circuit

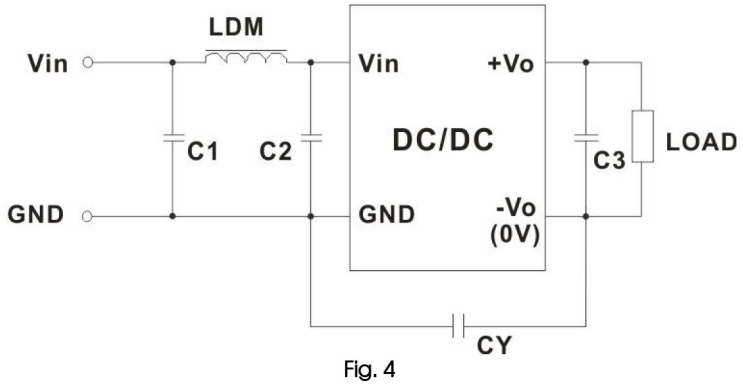
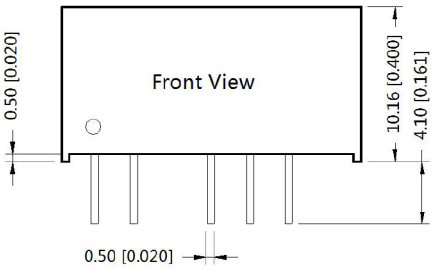


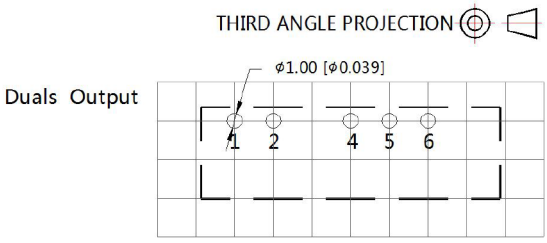
Fig. 4

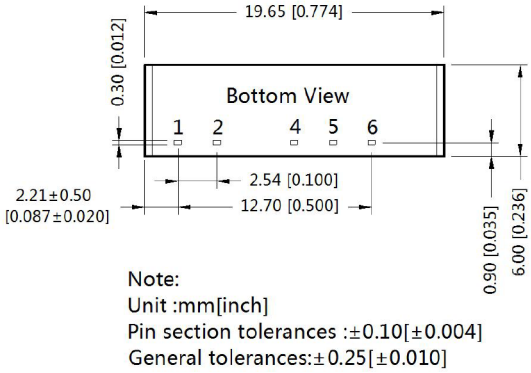
EMC recommended circuit value table (Table 2)

Input voltage 5VDC	Output voltage (VDC)	3.3/5/9	12/15/24
	C1/C2	4.7µF /25V	4.7µF /25V
	CY	-	1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
	C3	Refer to the Cout in table 1	
	LDM	6.8µH	6.8µH

Dimensions and Recommended Layout







Note:
Unit :mm[inch]
Pin section tolerances :±0.10[±0.004]
General tolerances:±0.25[±0.010]

Pin-Out	
Pin	Duals
1	Vin
2	GND
4	-Vo
5	OV
6	+Vo

Notes:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25°C , humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.