

# 1W Isolated DC to DC Converters - Dual Output

**multicomp** PRO

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

**RoHS  
Compliant**



Continuous Short  
Circuit Protection

## 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%
- Compact SMD package
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out
- IEC62368, UL62368, EN62368 approved

These series are specially designed for applications where 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.		
MPA0505XT-1W	5 (4.5 to 5.5)	±5	±100/±10	78/82	1200
MPA0512XT-1W		±12	±42/±5	79/83	220
MPA0515XT-1W		±15	±34/±4	79/83	
MPA0524XT-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	
Input Current (full load / no-load)	5VDC input	5VDC output	-	244/5	257/10	mA
		±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.

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## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy		See output regulation curves (Fig. 1)				
Linear Regulation	Input voltage change: $\pm 1\%$		-	1.2	-	
Load Regulation	10% -100% load	-	$\pm 5\text{VDC}$ output	10	15	%
			$\pm 12\text{VDC}$ output	7	10	
			$\pm 15\text{VDC}$ output	6	10	
			$\pm 24\text{VDC}$ output	5	10	
Ripple & Noise*	20MHz bandwidth	-	Other output	30	75	mVp-p
			24VDC output	50	100	
Temperature Coefficient	100% load		$\pm 0.02$	-	$\%/^{\circ}\text{C}$	
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	-	-	M $\Omega$
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	-	20	-	pF
Operating Temperature	Derating when operating temperature $\geq 85^{\circ}\text{C}$ , (see Fig. 2)	-40	-	105	$^{\circ}\text{C}$
Storage Temperature		-55	-	125	
Case Temperature Rise	Ta=25 $^{\circ}\text{C}$	-	15	-	
Storage Humidity	Non-condensing	-	-	95	%RH
Reflow Soldering Temperature*		Peak temp. $\leq 245^{\circ}\text{C}$ , maximum duration time $\leq 60\text{s}$ over $217^{\circ}\text{C}$ .			
Switching Frequency	Full load, nominal input voltage	-	270	-	kHz
MTBF	MIL-HDBK-217F@25 $^{\circ}\text{C}$	3500	-	-	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

Note: \* For actual application, please refer to IPC/JEDEC J-STD-020D.1.

## Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	15.24 x 11.40 x 7.25 mm
Weight	1.4g(Typ.)
Cooling Method	Free air convection

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## Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 5 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Air $\pm 8\text{kV}$ , Contact $\pm 4\text{kV}$ perf. Criteria B

## Typical Performance Curves

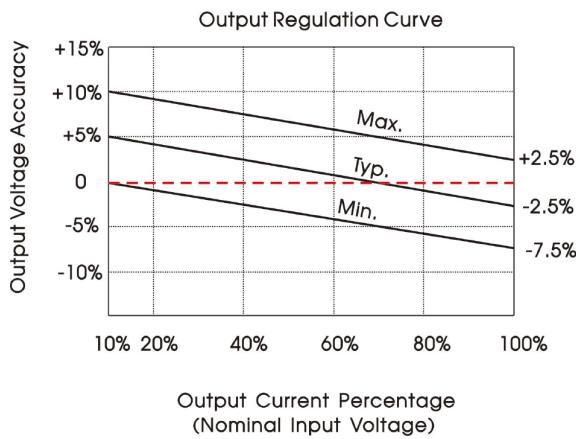


Fig. 1

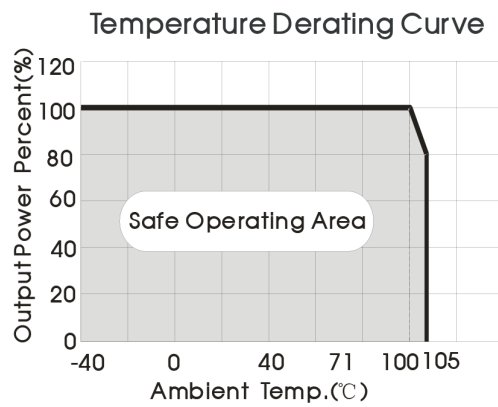
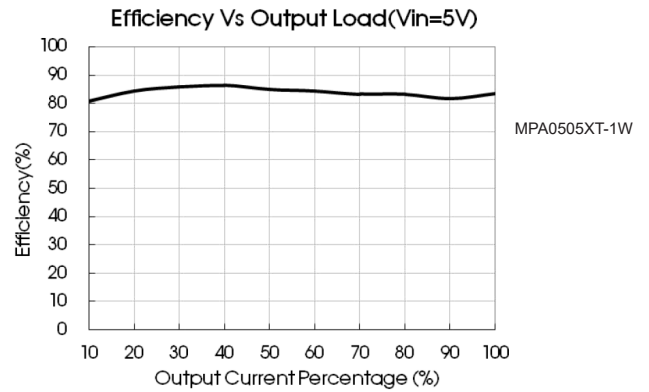
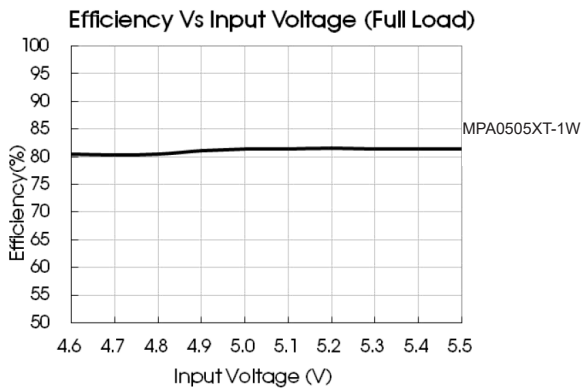


Fig. 2



# 1W Isolated DC to DC Converters - Dual Output

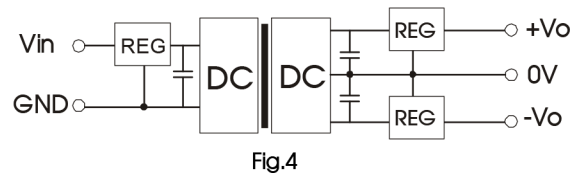
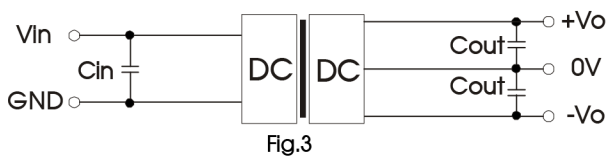
## Design Reference

### 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. The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with

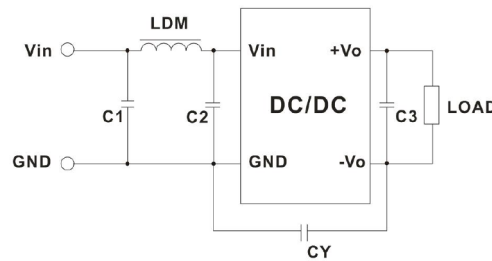
protection that is connected to the input or output end in series (see Fig. 4).



Recommended capacitive load value table (Table 1)

Vin(VDC)	Cin( $\mu$ F)	Vo (VDC)	Cout( $\mu$ F)
5	4.7	$\pm 5$	4.7
		$\pm 12$	1
		$\pm 15/\pm 24$	

### EMC (CLASS B) compliance circuit



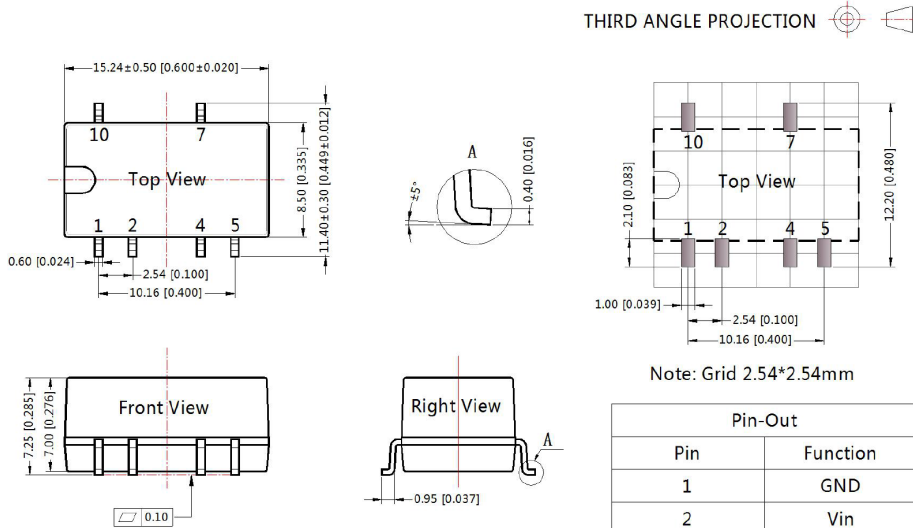
EMC recommended circuit value table (Table 2)

Input voltage 5VDC	Output voltage (VDC)		5/9	12/15/24
	EMI	C1/C2		4.7 $\mu$ F /25V
CY			-	1nF/2KVDC HEC C1206X102K202T JOHANSON 202R18W102KV4E
C3			Refer to the Cout in table 1	
LDM			6.8 $\mu$ H	6.8 $\mu$ H

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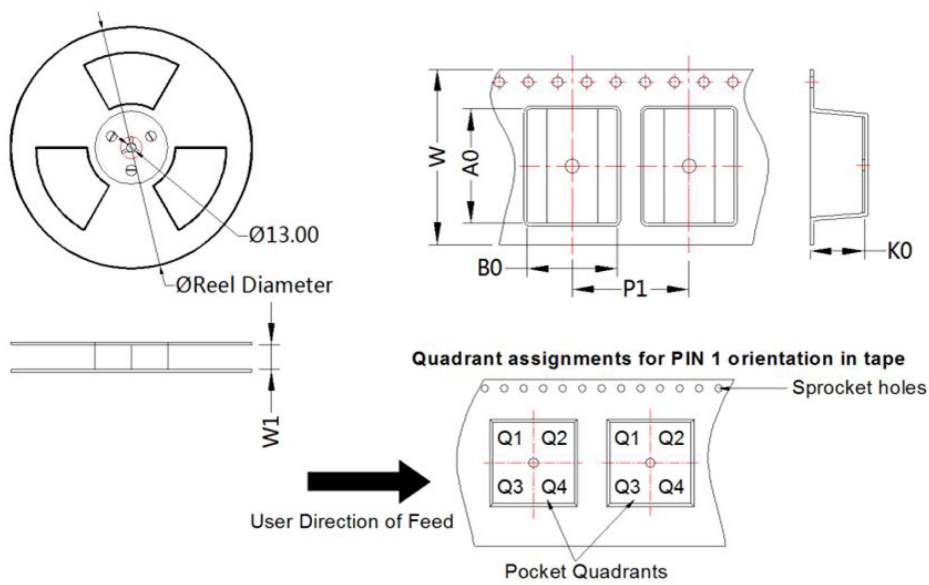
## Dimensions and Recommended Layout



Note: Grid 2.54\*2.54mm

Pin-Out	
Pin	Function
1	GND
2	Vin
4	0V
5	-Vo
7	+Vo
10	NC

NC: Pin to be isolated from circuitry



Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	6	500	330.0	24.5	15.64	12.4	7.45	16.0	24.0	Q1

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## 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  $T_a=25^{\circ}\text{C}$  , 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.

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