

# 1W Isolated DC to DC Converters - Single Output **multicomp**PRO

1W isolated DC-DC converter Fixed input voltage, unregulated single output



## Features

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage: 3k VDC
- Industry standard pin-out

**RoHS  
Compliant**

These series are specially designed for applications where an 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.		
MPF1205XT-1W	12 (10.8 to 13.2)	5	200/20	78/82	2400
MPF1209XT-1W		9	111/12		
MPF1212XT-1W		12	84/9	79/83	1000
MPF1215XT-1W		15	67/7		
MPF1224XT-1W		24	42/4		
MPF1505XT-1W	15 (13.5 to 16.5)	5	200/20	78/82	2400
MPF1515XT-1W		15	67/7	79/83	560
MPF2405XT-1W	24 (21.6 to 26.4)	5	200/20	76/82	2400
MPF2409XT-1W		9	111/12		
MPF2412XT-1W		12	84/9	77/83	1000
MPF2415XT-1W		15	67/7		
MPF2424XT-1W		24	42/4		
				79/85	220

## Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12V input	5VDC output	-	102/8	107/--	mA
		9VDC/12VDC/15VDC output	-	101/8	106/--	
		24VDC output	-	99/8	103/--	
	15VDC input	5VDC output	-	82/8	86/--	
		15VDC output	-	81/8	85/--	
	24V input	5VDC/9VDC/12VDC/15VDC output	-	51/8	55/--	
24VDC output		-	50/8	53/--		
Reflected Ripple Current*			-	30	-	
Surge Voltage(1sec. max.)	12VDC input		-0.7	-	18	V DC
	15VDC input				21	
	24VDC input				30	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			

Note: \* Reflected ripple current testing method please see DC-DC Converter Application Notes for specific operation.

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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	%
			$\pm 9\text{VDC}$ output	8	10	
			$\pm 12\text{VDC}$ output	7	10	
			$\pm 15\text{VDC}$ output	6	10	
			$\pm 24\text{VDC}$ output	5	10	
Ripple & Noise*	20MHz bandwidth	-	$\pm 5\text{VDC}/\pm 9\text{VDC}/\pm 12\text{VDC}/\pm 15\text{VDC}$ output	30	75	mVp-p
			$\pm 24\text{VDC}$ output	50	100	
Temperature Coefficient	100% load		$\pm 0.02$	-	%/°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.	3000	-	-	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 $\geq 100^\circ\text{C}$ , (see Fig. 2)	-40	-	105	°C
Storage Temperature		-55	-	125	
Case Temperature Rise	Ta=25°C	-	25	-	
Storage Humidity	Non-condensing	5	-	300	
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	-	260	-	kHz
MTBF	MIL-HDBK-217F@25°C	3500	-	-	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

## Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	13.2 x 11.4 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. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B(see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Contact $\pm 6\text{kV}$ perf. Criteria B

## Typical Performance Curves

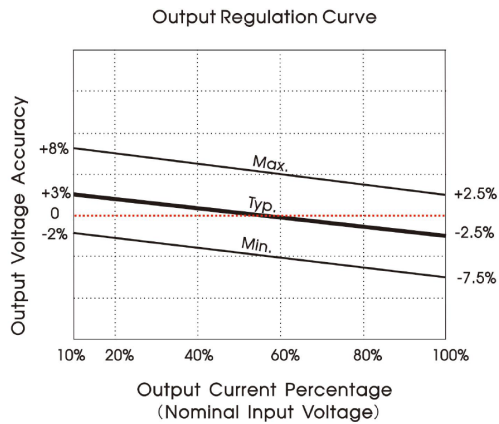


Fig. 1

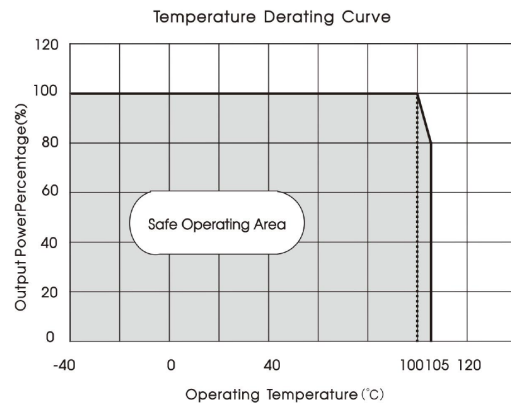
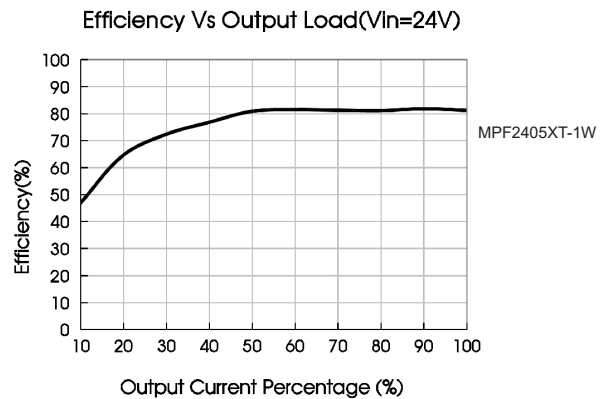
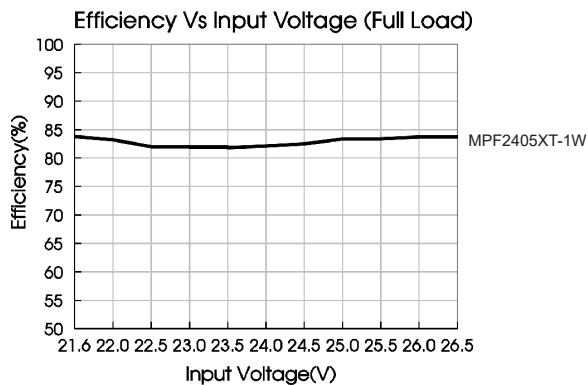
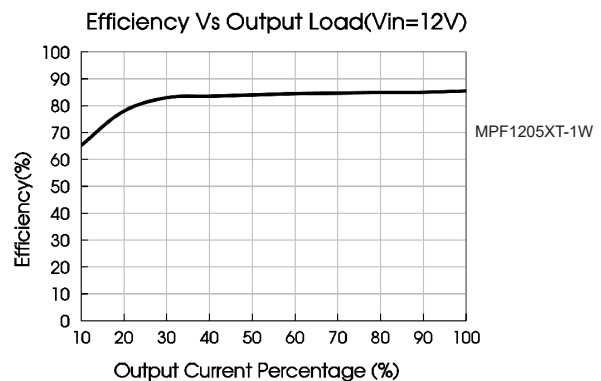
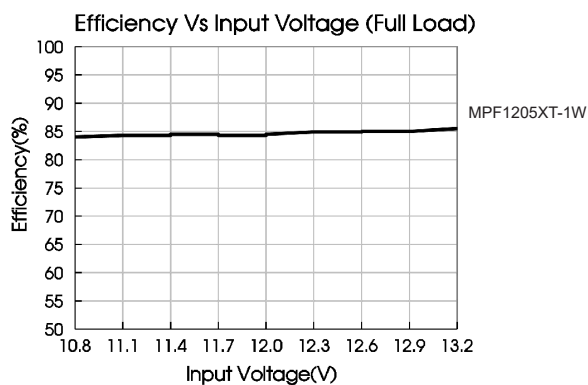


Fig. 2



# 1W Isolated DC to DC Converters - Single Output

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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.



Fig.3

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
12VDC	2.2µF/25V	5VDC	10µF/16V
15VDC	2.2µF/25V	9VDC	2.2µF/16V
24VDC	1µF/50V	12VDC	2.2µF/25V
-	-	15VDC	1µF/25V
-	-	24VDC	1µF/50V

### 2. EMC (CLASS B) compliance circuit

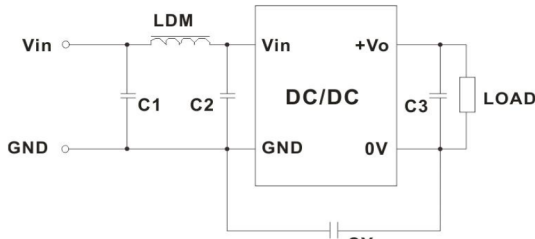


Fig.4

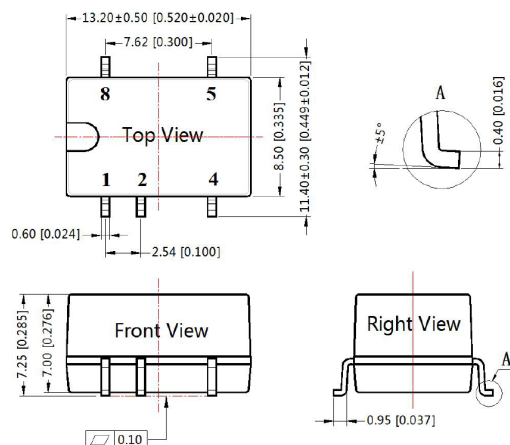
Table 2: EMC recommended circuit value table

Emissions	C1	4.7µF /50V
	C2	4.7µF /50V
	CY	270pF/3kV
	C3	Refer to the Cout in table 1
	LDM	6.8µH

### Minimum Output Load Requirement

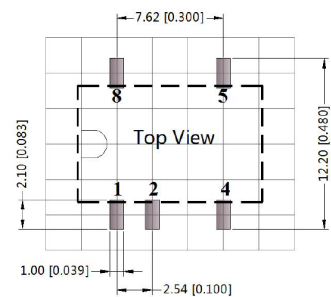
For a reliable and efficient operation of the converter, the minimum load should never be less than 1% of the rated output load. If the total required output power is below 1%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 1% minimum.

### Dimensions and Recommended Layout



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

THIRD ANGLE PROJECTION



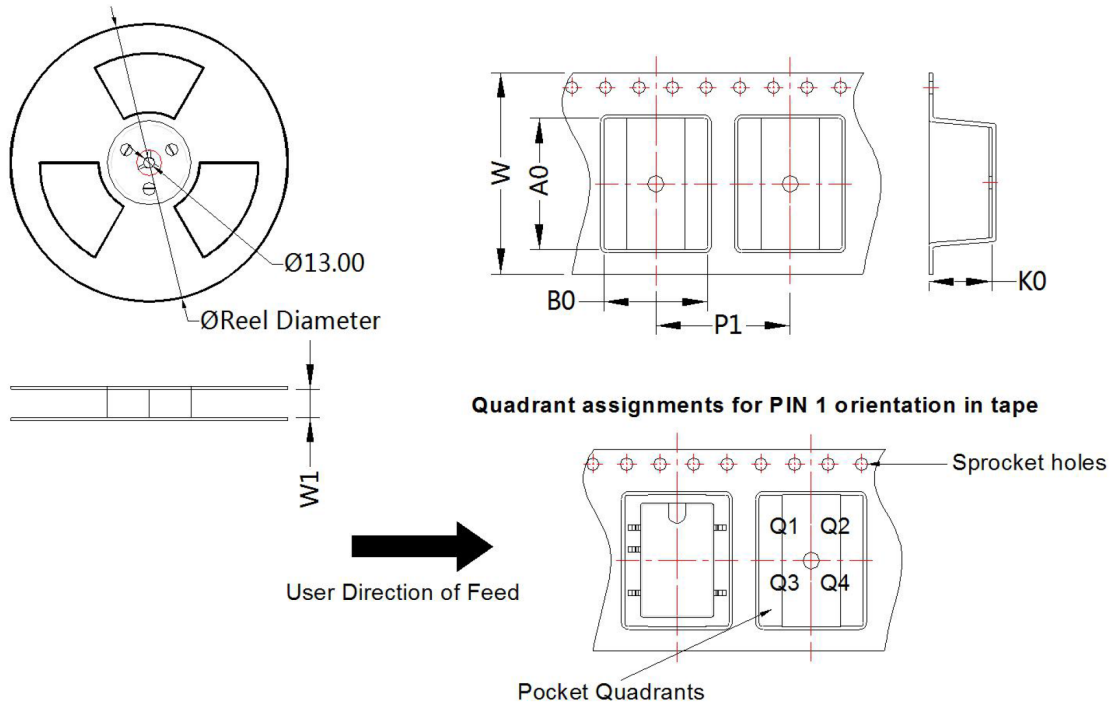
Note: Grid 2.54\*2.54mm

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

NC: Pin to be isolated from circuitry

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## Tape and Reel Info



Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SMD	5	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1

### 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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