

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

1W isolated DC-DC converter
Fixed input voltage, unregulated single 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%
- Compact SMD package
- I/O isolation test voltage: 3k VDC
- Industry standard pin-out
- IEC62368, UL62368, EN62368 approved

These series are designed for use in distributed power supply systems and especially suitable in applications such as 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.		
MPF0503XT-1W	5 (4.5 to 5.5)	3.3	303/30	70/74	2400
MPF0505XT-1W		5	200/20	78/82	
MPF0509XT-1W		9	111/12	79/83	1000
MPF0512XT-1W		12	84/9		560
MPF0515XT-1W		15	67/7		
MPF0524XT-1W		24	42/4	81/85	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	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.

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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: ±1%	3.3VDC output	-	-		
		Other outputs		-		
Load Regulation	10% -100% load	3.3VDC output		15	15	%
		5VDC output		10	10	
		9VDC output		8	10	
		12VDC output		7	10	
		15VDC output		6		
		24VDC output		5		
Ripple & Noise*	20MHz bandwidth	Other outputs		30	75	mVp-p
		24VDC output		50	100	
Temperature Coefficient	Full 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.		3000	-	-	VDC
Insulation Resistance	Input-output resistance at 500VDC		1000	-	-	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		-	20	-	pF
Operating Temperature	For derating with temperature ≥100°C see Fig. 2		-40	-	105	°C
Storage Temperature			-55	-	125	
Case Temperature Rise	Ta=25°C	3.3VDC output	-	25	-	
		Other outputs	-	15	-	
Storage Humidity	Non-condensing		-	-	95	%RH
Reflow Soldering Temperature*			Peak temp. ≤245°C, maximum duration times ≤60s over 217°C.			
Switching Frequency	Full load, nominal input voltage		-	270	-	kHz
MTBF	MIL-HDBK-217F@25°C		3500	-	-	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1		Level 1			
Note: * See also IPC/JEDEC J-STD-020D.1.						

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	13.20 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. 4 for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2 Air $\pm 8kV$, Contact $\pm 4kV$ perf. Criteria B

Typical Characteristic Curves

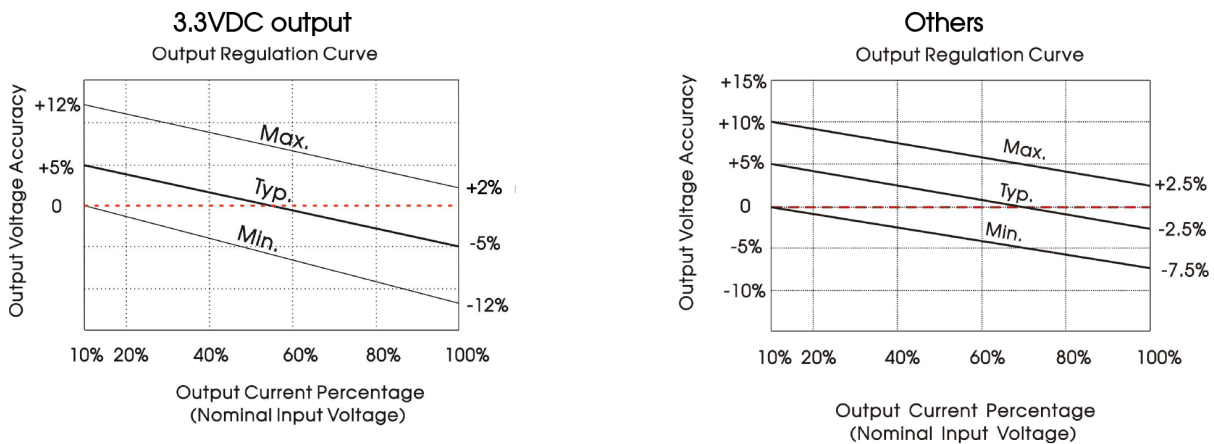


Fig. 1

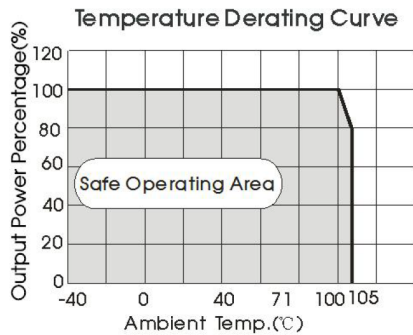
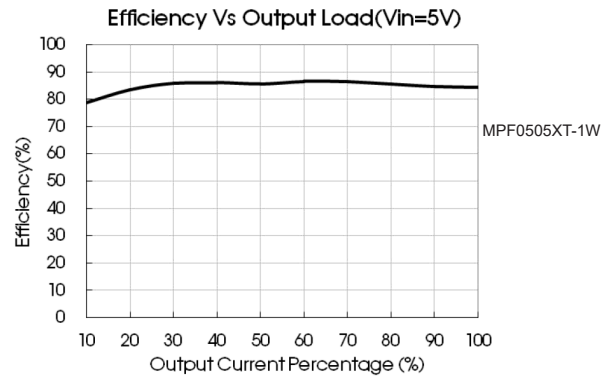
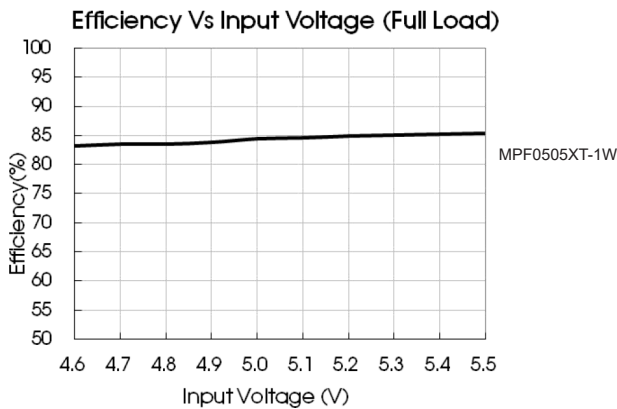


Fig. 2



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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.

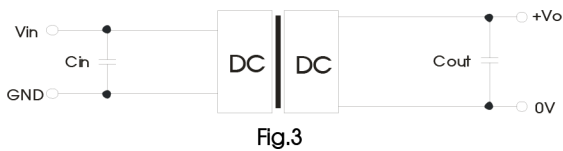


Table 1: Recommended input and output capacitor values

Vin(VDC)	Cin(μ F)	Vo (VDC)	Cout(μ F)
5	4.7	3.3/5	10
		9	4.7
		12	2.2
		15	1
		24	10.47

EMC (CLASS B) compliance circuit

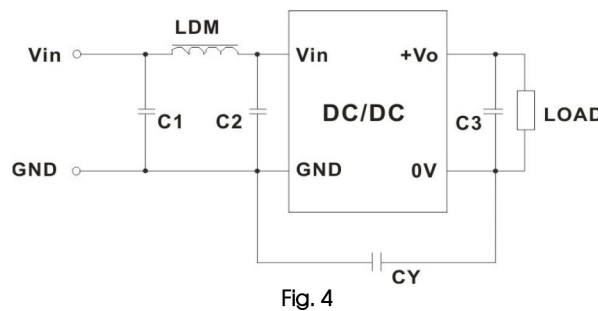


Table 2: Recommended EMC filter values

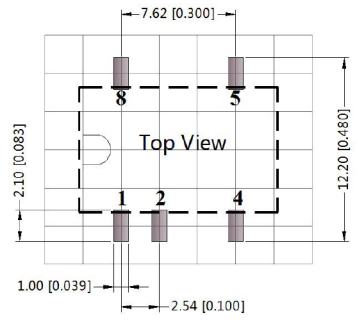
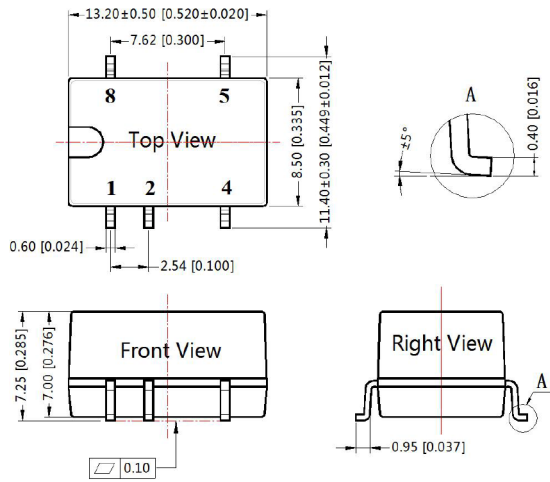
Input voltage 5VDC	Output voltage (VDC)		3.3/5/9	12/15/24
	Emissions	C1/C2	4.7 μ F /25V	4.7 μ F /25V
CY		-	1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA	
C3		Refer to the Cout in table 1		
LDM		6.8 μ H	6.8 μ H	

Note: In the case of actual use, the requirements for Emissions are high, it is subject to CY.

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Dimensions and Recommended Layout

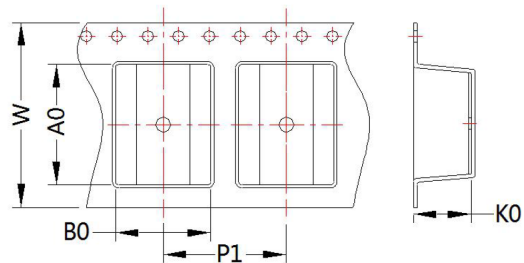
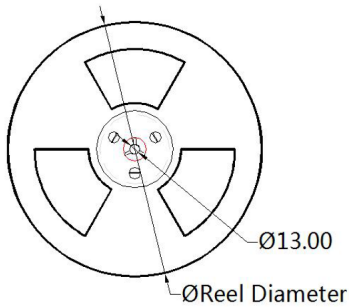
THIRD ANGLE PROJECTION



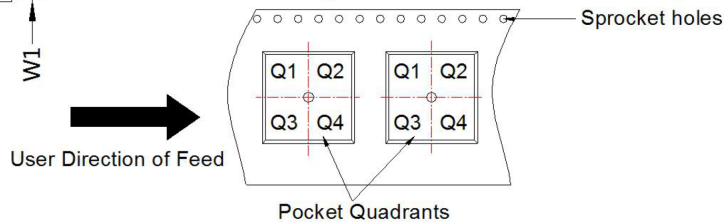
Note: Grid 2.54*2.54mm

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

NC: Pin to be isolated from circuitry



Quadrant assignments for PIN 1 orientation in tape



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

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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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