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.						

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 time≤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

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 Characteristic Curves

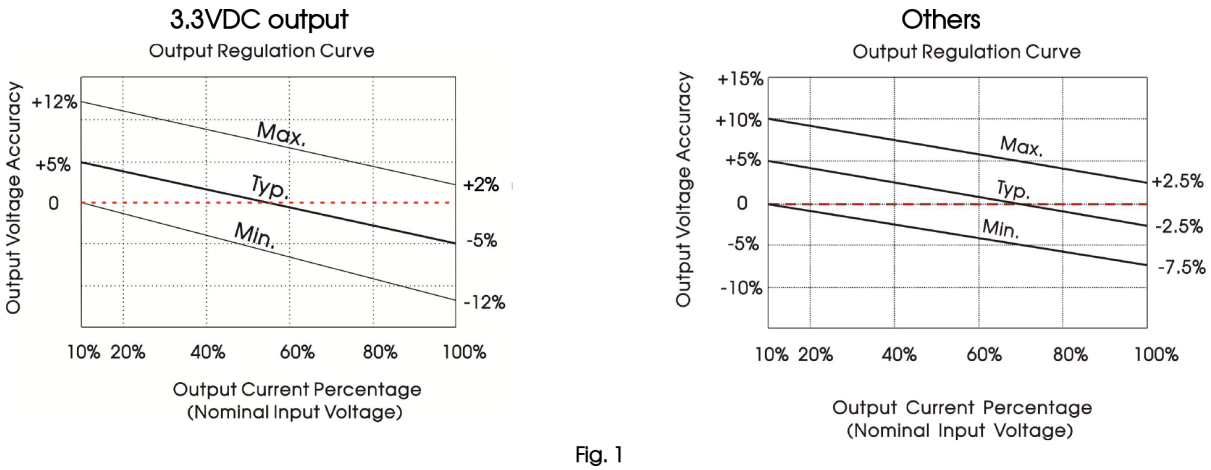


Fig. 1

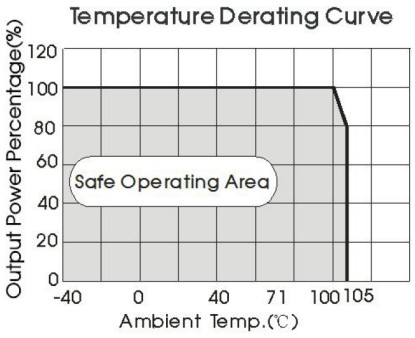
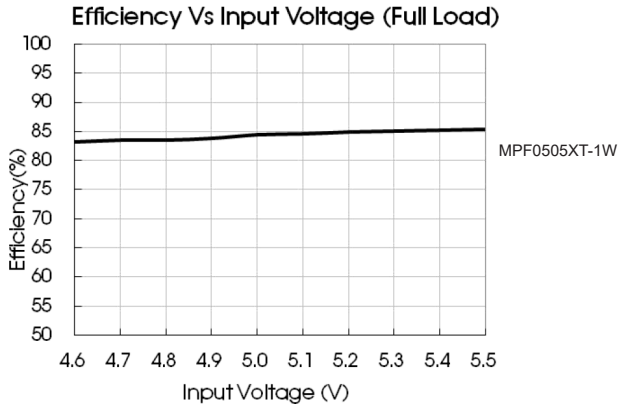
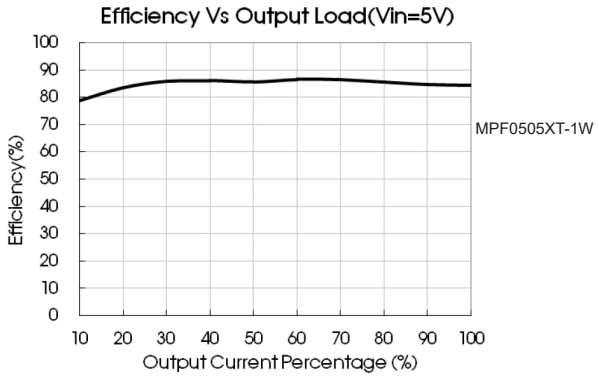


Fig. 2





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

EMC (CLASS B) compliance circuit

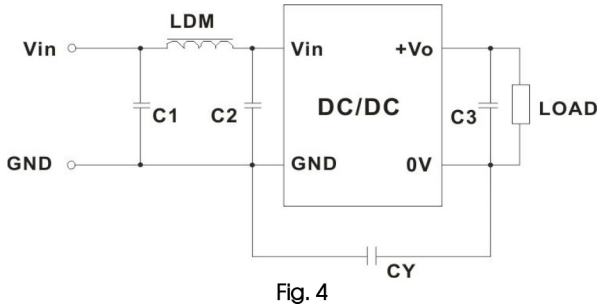


Fig. 4

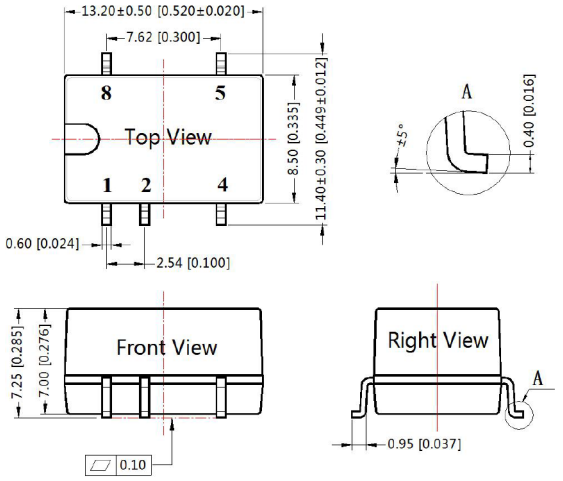
Table 2: Recommended EMC filter values

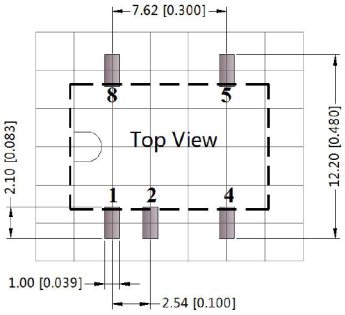
Input voltage 5VDC	Output voltage (VDC)		3.3/5/9	12/15/24
	Emissions	C1/C2	4.7μF /25V	4.7μF /25V
		CY	-	1nF/4KVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
		C3	Refer to the Cout in table 1	
		LDM	6.8μH	6.8μH

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



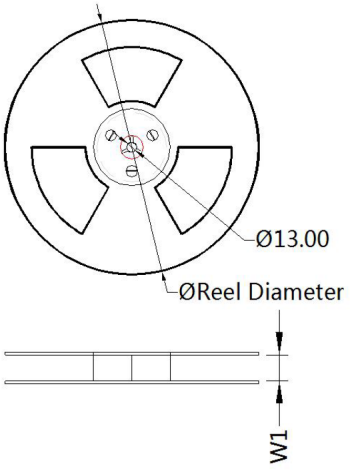


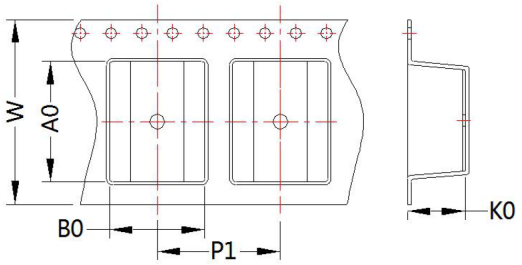
Note: Grid 2.54*2.54mm

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

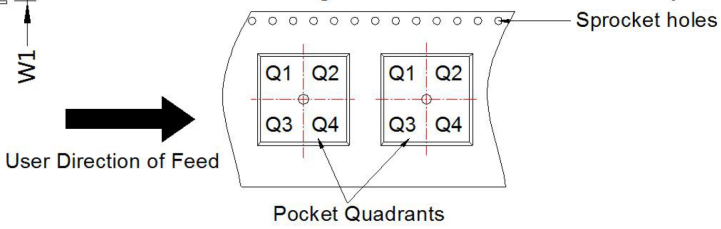
Pin-Out	
Pin	Function
1	GND
2	Vin
4	0V
5	+Vo
8	NC

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

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.