Descriptions

6W isolated, DC/DC Converter



RoHS

UL62368-1 | EN62368-1 | BS EN62368-1

Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 3k VDC
- Operating ambient temperature range: -40℃ to +85℃
- Input under-voltage protection, output short-circuit, over-voltage, over-current protection
- Meet CISPR32/EN55032 CLASS A, without extra components
- Industry standard pin-out

Applications

- Industrial Control
- Electrical Power
- Instruments
- Telecommunication fields

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load③ (μF) Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DWP6-E2405	24 (9-36)	40	±5	±600/0	78/80	680
	DWP6-E2412			±12	±250/0	81/83	330
	DWP6-E2415			±15	±200/0	82/84	220
	DWP6-F2403			3.3	1500/0	75/77	2200
UL/EN/BS EN	DWP6-F2405			5	1200/0	79/81	2200
EN/BS EN	DWP6-F2409			9	667/0	82/84	1000
	DWP6-F2412			12	500/0	82/84	680
	DWP6-F2415			15	400/0	84/86	680
UL/EN/BS EN	DWP6-F2424			24	250/0	84/86	680
--	DWP6-F2425			25	240/0	83/85	680
EN/BS EN	DWP6-F4803	48 (18-75)	80	3.3	1500/0	77/79	2200
	DWP6-F4805			5	1200/0	81/83	2200
	DWP6-F4812			12	500/0	85/87	680
	DWP6-F4815			15	400/0	86/88	680
	DWP6-F4824			24	250/0	85/87	680

Notes:
①Exceeding the maximum input voltage may cause permanent damage;

②Efficiency is measured at nominal input voltage and rated output load;
③The specified maximum capacitive load for positive and negative output is identical;
④Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	24VDC Input	3.3V output	--	320/10	329/16	mA
			Others	--	298/10	320/16	
		48VDC Input	3.3V output	--	158/4	162/7	
			Others	--	147/4	154/7	
	Reflected Ripple Current	24VDC Input		--	20	--	
		48VDC Input		--	20	--	
	Surge Voltage (1sec. max.)	24VDC Input		-0.7	--	50	VDC
		48VDC Input		-0.7	--	100	
	Start-up Voltage	24VDC Input		--	--	9	
		48VDC Input		--	--	18	
	Input Under-voltage Protection	24VDC Input		5.5	6.5	--	
		48VDC Input		12	15.5	--	
	Start-up Time	Nominal input& constant resistance load		--	10	--	ms
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy	5%-100% load		--	±1	±3	%
		0%-5% load	Single output	--	±1	±3	
			Dual output	--	±2	±5	
	Balance of Output Voltage	Dual output, balanced load		--	±0.5	±1.5	
	Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
			Vo2	--	±0.5	±1	
	Load Regulation①	5%-100% load	Vo1	--	±0.5	±1	
			Vo2	--	±0.5	±1.5	
	Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 10%-100%		--	--	±5	
	Transient Recovery Time	25% load step change		--	300	500	μs
	Transient Response Deviation			--	±3	±5	%
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple&Noise②	20MHz bandwidth, 5%-100% load		--	85	120	mVp-p
	Over-voltage Protection	Input voltage range		110	--	160	%Vo
	Over-current Protection	Input voltage range	24V output	110	220	290	%Io
			Others	110	140	190	
	Short-circuit Protection	Input voltage range		Continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.		3000	--	--	VDC
	Isolation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
	Operating Temperature	Derating when operating temperature up to 71℃ (see Fig. 1)		-40	--	85	℃

	Storage Temperature		-55	--	125	
	Storage Humidity	Non-condensing	5	--	95	%RH
	Pin Soldering Resistance Temperature③	Soldering spot is 1.5mm away from the case, 10 seconds max.	--	--	+300	℃
		Wave soldering, maximum 10 seconds	255	260	265	
	Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
	Switching Frequency④	PWM mode	--	300	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)				
	Dimensions	31.60 × 20.30 × 10.20 mm				
	Weight	13g(Typ.)				
	Cooling method	Free air convection				

Note:
①Load regulation for 0%-100% load is ±5%;
②Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. The "parallel cable" method is used for ripple and noise test;
③The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection;
④Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig.3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig.3-② for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2kV (see Fig.3-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	±2kV (see Fig.3-①for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0-70%	perf. Criteria B

Characteristic Curve

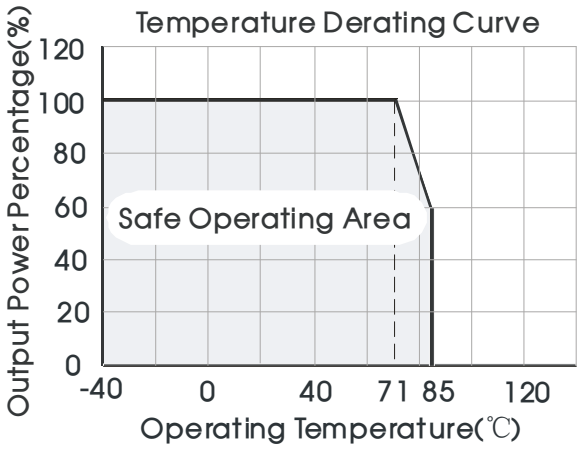
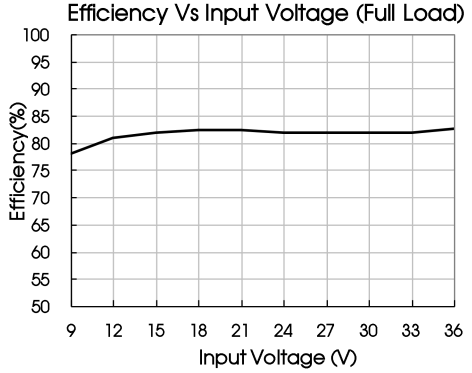


Fig. 1

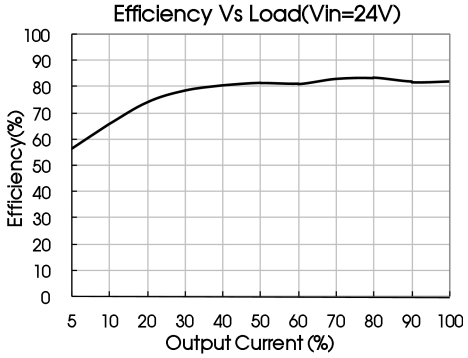
DWP6-E2405

Efficiency Vs Input Voltage (Full Load)



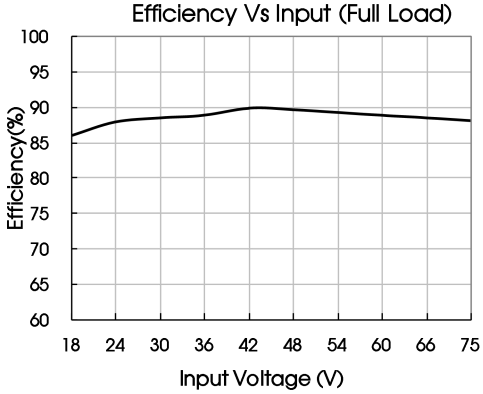
DWP6-E2405

Efficiency Vs Load(Vin=24V)



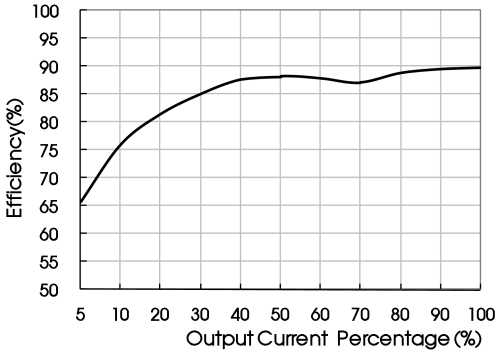
DWP6-F4815

Efficiency Vs Input (Full Load)



DWP6-F4815

Efficiency Vs Output Load(Vin=48)



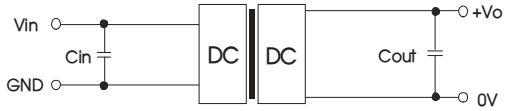
Design Reference

1. Typical application

①All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

②Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

Single



Dual



Fig. 2

Vin(VDC)	Cin	Vo(VDC)	Cout
24	100μF/50V	±5/3.3/5/9	10μF/16V
		±12/±15/12/15	10μF/25V
		24/25	10μF/50V
48	10μF/100V - 47μF/100V	3.3/5	10μF/16V
		12/15	10μF/25V
		24	10μF/50V

2. EMC compliance circuit

DWP6-Exxxx & DWP6-Fxxxx:

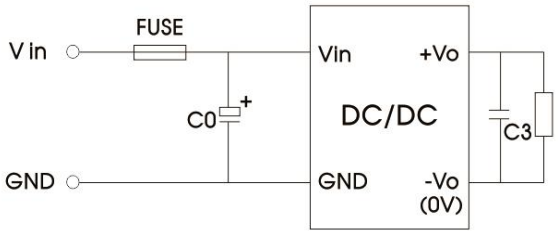
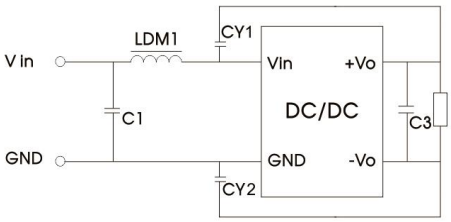


Fig. 3-①

DWP6-Exxxx:



DWP6-Fxxxx:

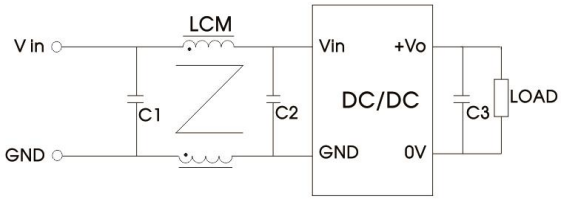


Fig. 3-②

Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description

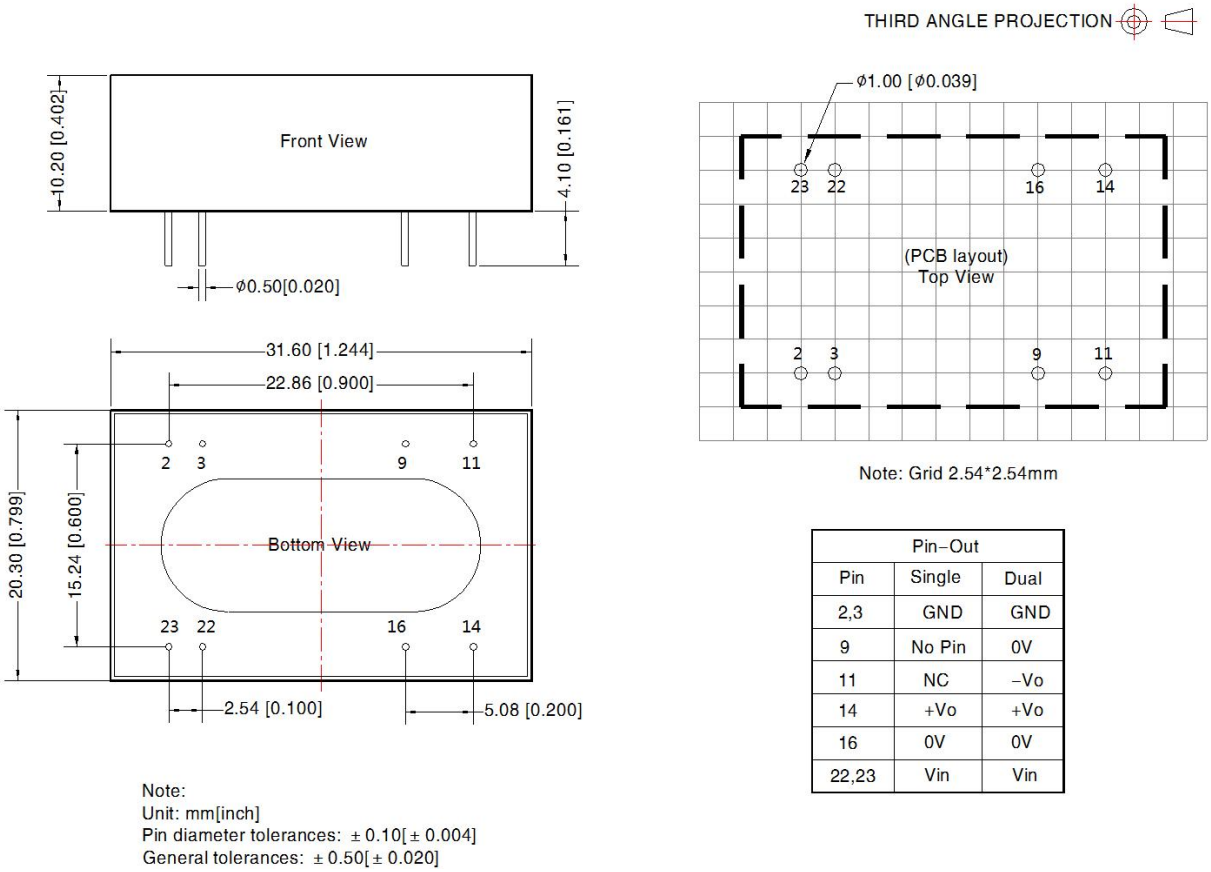
DWP6-Exxxx	
Model	**Vin: 24VDC**
FUSE	Choose according to actual input current
C0	1000μF/50V
C1	1μF/50V
C3	Refer to the Cout in Fig.2
LDM1	4.7μH
CY1/CY2	1nF/3kV

Parameter description

DWP6-Fxxxx		
Model	**Vin: 24VDC**	**Vin: 48VDC**
FUSE	Choose according to actual input current	
C0	1000μF/50V	680μF/100V
C1/C2	2.2μF/50V	2.2μF/100V
LCM	2.2 mH	
C3	Refer to the Cout in Fig.2	

3. The products do not support parallel connection of their output

Dimensions and Recommended Layout



Pin-Out		
Pin	Single	Dual
2,3	GND	GND
9	No Pin	0V
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]

Note:

1. The maximum capacitive load offered were tested at input voltage range and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
3. The recommended unbalance degree of the dual output module load is ≤±5%; if the degree exceeds ±5%, than the product performance cannot be guaranteed to comply with all parameters in the datasheet.
4. All index testing methods in this datasheet are based on our company corporate standards;
5. The performance indexes of the product models listed in this datasheet are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements;
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;
8. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.