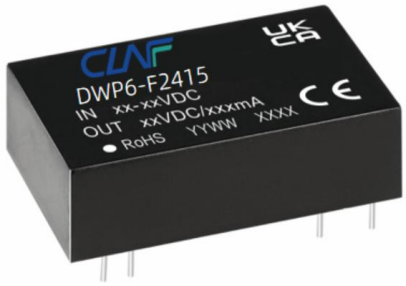
DWP6-E&F Series

DESCRIPTIONS

6W, DC/DC Converter



RoHS

CE Report UKCA Report

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 3kVDC
- 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
- Home appliances
- Instrumentation
- Communication
- Civil applications

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ② (%) Min./Typ.	Capacitive Load③ (μF) Max.
		Nominal (Range)	Max. ①	Voltage (VDC)	Current (mA) Max./Min.		
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
	DWP6-F2405			5	1200/0	79/81	2200
	DWP6-F2409			9	667/0	82/84	1000
	DWP6-F2412			12	500/0	82/84	680
	DWP6-F2415			15	400/0	84/86	680
	DWP6-F2424			24	250/0	84/86	680
--	DWP6-F2425			25	240/0	83/85	680

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.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
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	VDC
	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

Item	Operating Conditions		Min.	Typ.	Max.	Unit
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			

Note: ① Load regulation for 0%-100% load is ±5%;

② Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. 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
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 Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	℃
Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
Switching Frequency	PWM mode	--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

Note:*Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

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

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

Typical Characteristic Curves

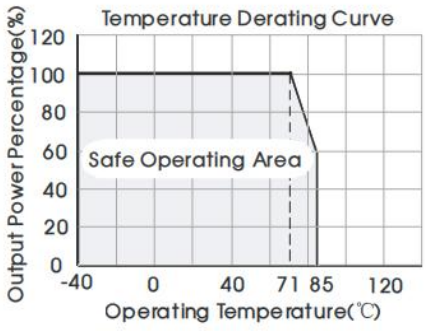
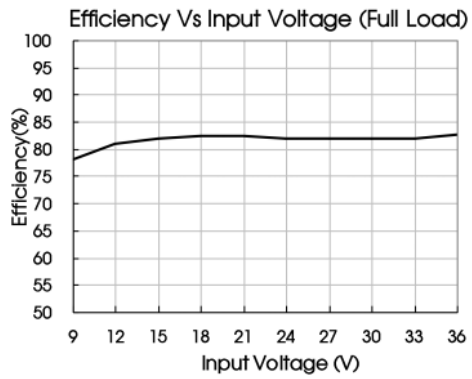
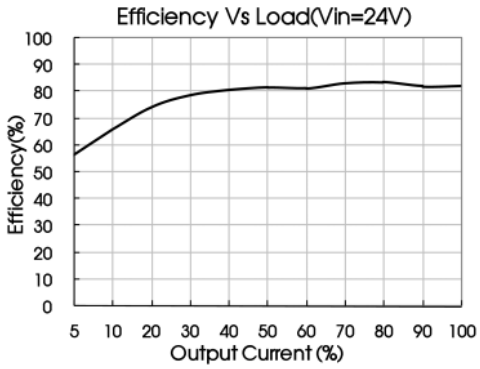


Fig. 1



DWP6-E2405



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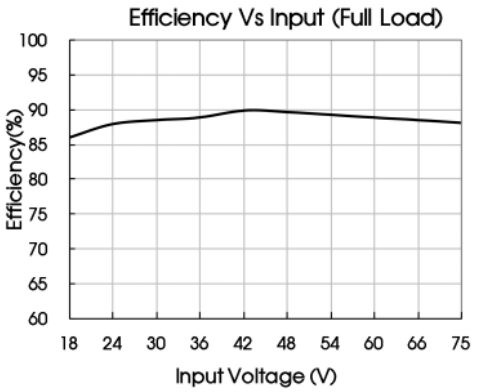
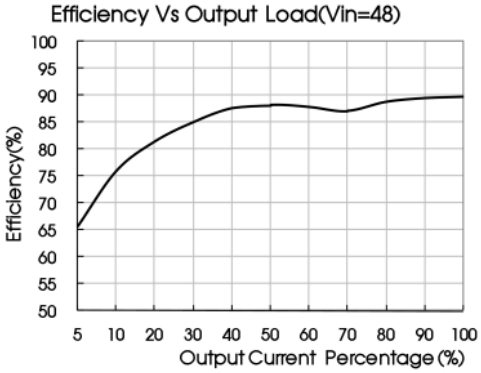


DWP6-F4815



DWP6-F4815

Design Reference

1. Typical application

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

Input 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.

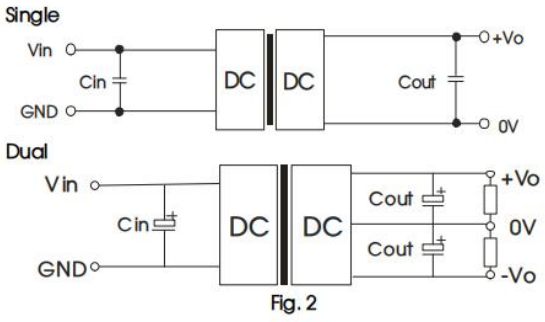


Fig. 2

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-E & DWP6-F:

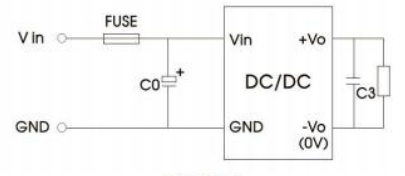
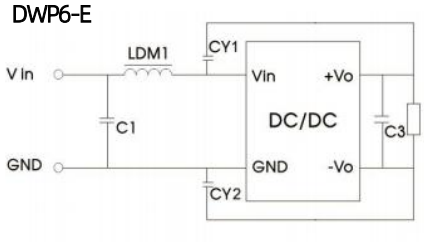


Fig. 3-①

DWP6-E



DWP6-F

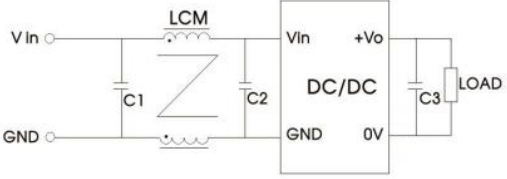


Fig. 3-②

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

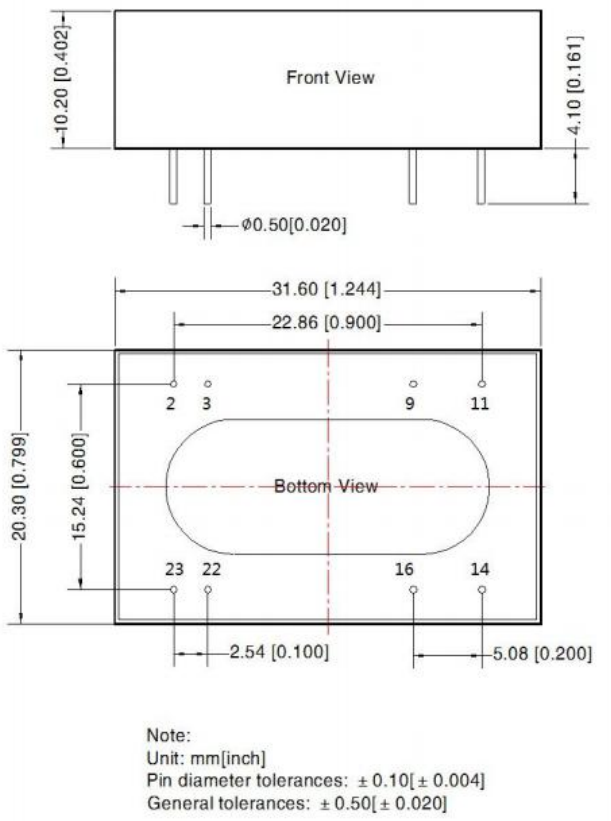
DWP6-E	
Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0	1000μF/50V
C1	1μF/50V
C3	Refer to the Cout in Fig.2
LDM1	4.7μH
CY1/CY2	1nF/3kV

Parameter description

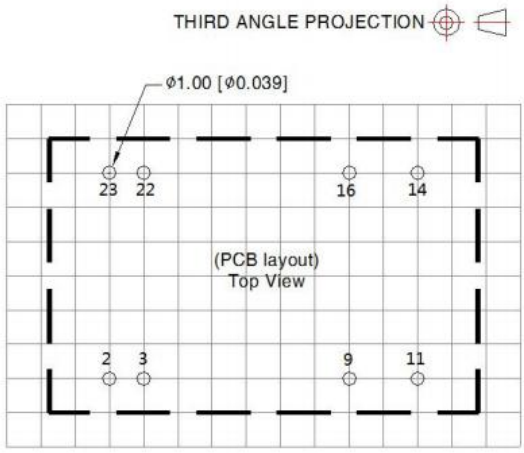
DWP6-F		
Model	Vin: 24VDC	Vin: 48VDC
FUSE	Choose according to actual input current	
C0	1000μF/50V	680μF/100V
C1/C2	2.2μF/50V	2.2μF/100V
LCM	2.2 mH	
C3	Refer to the Cout in Fig.2	

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

Dimensions and Recommended Layout



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



Note: Grid 2.54*2.54mm

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:

1. For additional information on Product Packaging please contact CLAF power;
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℃, humidity<75%RH with nominal input voltage and rated output load;
4. 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. Please contact our technicians directly for specific information;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. 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, and please directly contact our technicians for specific information;
7. We can provide product customization service;
8. Products are related to laws and regulations: see "Features" and "EMC";
9. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.