Descriptions

10W isolated, DC/DC Converter



RoHS

CE Report
EN62368-1

UKCA Report
BS EN62368-1

Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 84%
- Operating ambient temperature range: -40℃ to +85℃
- Reinforced insulation, I/O isolation test voltage 6k VDC
- Transformer creepage 8mm, Transformer clearance 8mm
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Industry standard pin-out

Applications

- Industrial Control
- Electrical Power
- Instrumentation

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load (μF) Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DWLP10-H2405	24 (9-36)	40	5	2000/0	82/84	1000
	DWLP10-H2412			12	833/0	82/84	1000

Note:
①Exceeding the maximum input voltage may cause permanent damage;
②Product 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	--	497/40	509/50	mA
	Reflected Ripple Current		--	30	--	
	Surge Voltage (1sec. max.)		-0.7	--	50	VDC
	Start-up Voltage		--	--	9	
	Input Under-voltage Protection		5.5	6.5	--	
	Input Filter		Pi filter			
	Hot Plug		Unavailable			
	Ctrl ①	Module on	Ctrl pin open or pulled high (3.5-12VDC)			
		Module off	Ctrl pin pulled low to GND (0-1.2VDC)			
		Input current when off	--	4	8	mA
Output Specifications	Voltage Accuracy	5%-100% load	--	±1	±2	%
	Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
	Load Regulation②	5%-100% load	--	±0.5	±1	
	Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	μs
	Transient Response Deviation		--	±5	±8	%
	Temperature Coefficient	Full load	--	--	±0.03	%/℃
	Ripple & Noise③	20MHz bandwidth	--	100	250	mVp-p
	Over-current Protection	Input voltage range	110	180	260	%Io
	Over-voltage Protection		110	--	160	%Vo
	Short-circuit Protection		Continuous, self-recovery			
	Trim		--	±10	--	%Vo
General Specifications	Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.	6000	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC	10000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	40	--	pF
	Reinforced Insulation	Transformer creepage	8.0	--	--	mm
		Transformer clearance	8.0	--	--	
	Operating Temperature	See Fig. 1	-40	--	85	℃
	Storage Humidity	Non-condensing	5	--	95	%RH
	Storage Temperature		-55	--	125	℃
	Pin Soldering Resistance Temperature④	Soldering spot is 1.5mm away from the case, 10 seconds max.	--	--	+300	
		Wave soldering, maximum 10 seconds	255	260	265	
	Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency⑤	PWM mode (nominal input voltage, full load)	--	280	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours

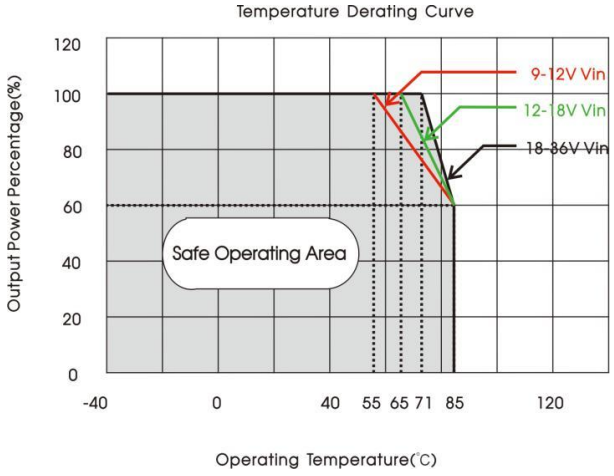
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
	Dimensions	51.50 x 26.50 x 12.00 mm
	Weight	27.0g (Typ.)
	Cooling Method	Free air convection

Note:
①The Ctrl pin voltage is referenced to input GND;
②Load regulation for 0%-100% load is ±5% max.;
③Under 0% -5% load conditions, Ripple & Noise does not exceed 5%Vo. The " parallel cable" method is used for Ripple and Noise test;
④The 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;
⑤Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

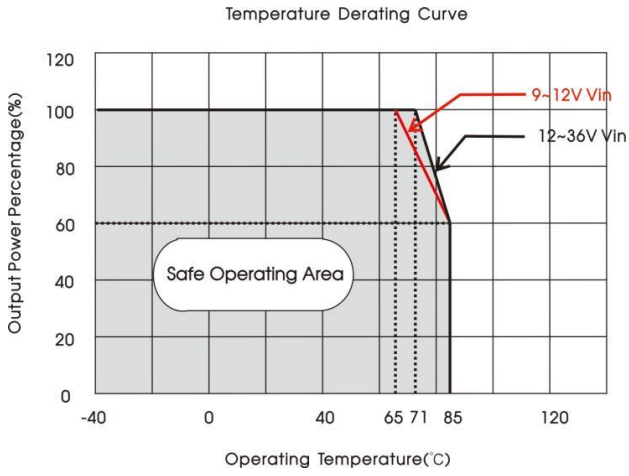
Electromagnetic Compatibility (EMC)

Emissions	CE	DWLP10-H2412	CISPR32/EN55032 CLASS A (without external components), CLASS B (see Fig.3 for recommended circuit)	
		others	CISPR32/EN55032 CLASS A (without external components), CLASS B (see Fig.4-② for recommended circuit)	
	RE	DWLP10-H2412	CISPR32/EN55032 CLASS B (without external components)	
		others	CISPR32/EN55032 CLASS A (without external components), CLASS B (see Fig.4-② 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 100kHz ±2kV (see Fig.4-① for recommended circuit)	perf. Criteria B
	Surge		IEC/EN61000-4-5 line to line ±2kV (see Fig.4-① for recommended circuit)	perf. Criteria B
	CS		IEC/EN61000-4-6 10 Vr.m.s	perf. Criteria A
	PFM		IEC/EN61000-4-8 30 A/m, continuous	perf. Criteria A

Characteristic Curve



DWLP10-H2405 Temperature Derating Curve



DWLP10-H2412 Temperature Derating Curve

Fig. 1

Characteristic Curve

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.

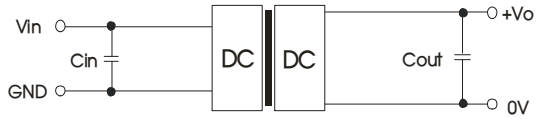


Fig. 2

Vo (VDC)	Cin	Cout
5	100μF/50V	10μF/16V
12		10μF/25V

2. EMC compliance circuit

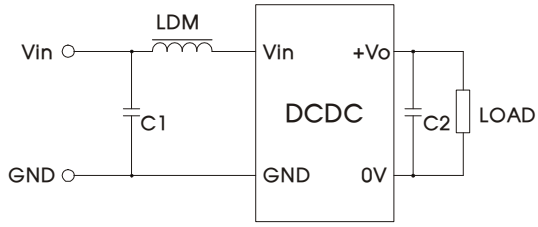


Fig. 3

Parameter description:

Model	DWLP10-H2412/DWLP10-H2405
C1	10μF/50V
C2	Refer to the Cout in Fig.2
LDM	4.7μH

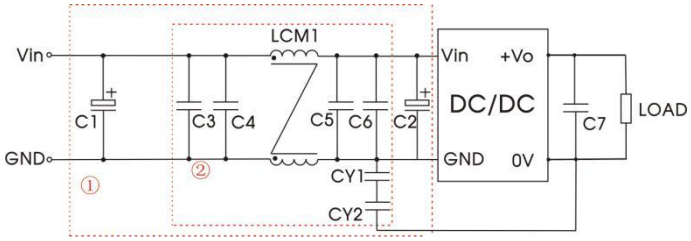


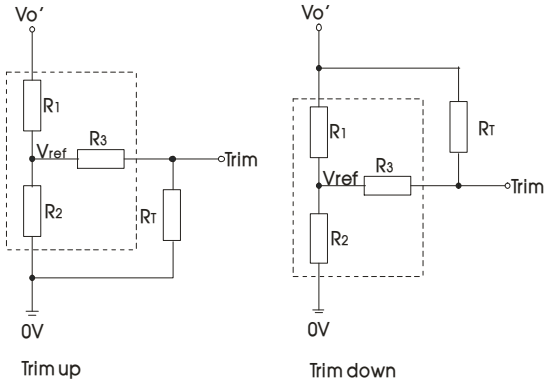
Fig. 4

Notes: For EMC tests we use Part ① in Fig. 4 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description:

Model	Vin: 24VDC
C1/C2	680μF/50V
C3/C4 C5/C6	10μF/50V
C7	Refer to the Cout in Fig.2
LCM1	2.2mH
CY1/CY2	Y1：47pF/400VAC (No need for 12V output)

3. Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection (dashed line shows internal resistor network)

Calculating Trim resistor values:

$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

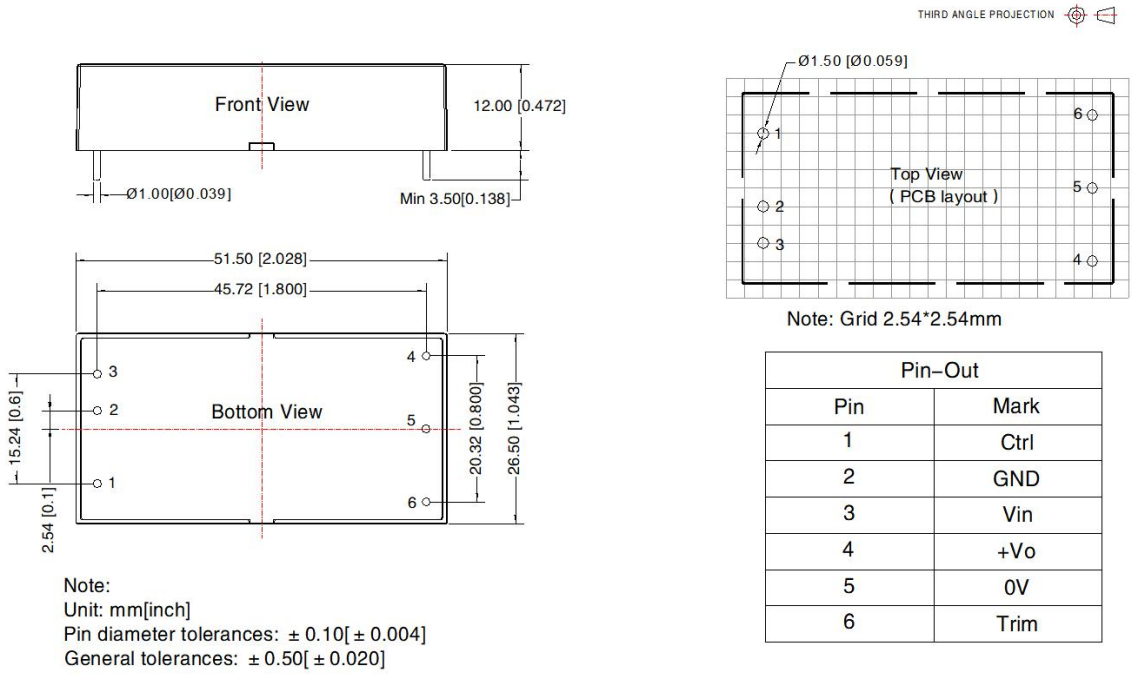
RT= Trim Resistor value;

a= self-defined parameter.

Vout(V)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
5	2.883	2.87	8.2	2.5
12	10.909	2.87	15	2.5

4. 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]

Pin–Out	
Pin	Mark
1	Ctrl
2	GND
3	Vin
4	+Vo
5	0V
6	Trim

Note:

1. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
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. All index testing methods in this datasheet are based on 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;
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.