Descriptions

10W isolated, DC-DC Converter



RoHS

3 Years Warranty

c UL us Report UL62368-1

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 88%
- I/O isolation test voltage 1.5k VDC
- High power density
- Input under-voltage protection, output short- circuit, over-current protection
- Operating ambient temperature range: -40℃ to +85℃/-40℃ to +105℃
- Compact SIP package
- Industry standard pin-out

Applications

- Medical care
- Industrial control
- Electric power
- Instruments
- Communication

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max. ①	Voltage(VDC)	Current (mA) Max./Min.		
EN/BS EN	DWS10-B2403	24 (9-36)	40	3.3	2400/0	82/84	2200
UL/EN/BS EN	DWS10-B2405			5	2000/0	85/87	2200
EN/BS EN	DWS10-B2409			9	1111/0	85/88	680
	DWS10-B2412			12	833/0	86/88	470
	DWS10-B2415			15	667/0	86/88	330
	DWS10-B2424			24	417/0	85/87	220
--	DWS10-B4803	48 (18-75)	80	3.3	2400/0	82/84	2200
	DWS10-B4805			5	2000/0	86/88	2200
	DWS10-B4812			12	833/0	85/87	470
	DWS10-B4824			24	417/0	84/86	220
	DWS10-B4828			28	360/0	84/86	200

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured at nominal input voltage and rated output load;
③Product images are for reference only; the actual product shall prevail.

Selection Guide

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load/no-load)	24VDC nominal input series	3.3VDC Output	--	389/25	398/45	mA
			5VDC Output	--	474/25	485/45	
			Others	--	474/9	485/18	
		48VDC nominal input series	3.3VDC Output	--	777/15	796/25	
			Others	--	969/15	992/25	
	Reflected Ripple Current			--	50	--	
	Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	VDC
		48VDC nominal input series		-0.7	--	100	
	Start-up Voltage	24VDC nominal input series		--	--	9	
		48VDC nominal input series		--	--	18	
	Input Under-voltage Protection	24VDC nominal input series		5.5	6.5	--	
		48VDC nominal input series		13	16	--	
	Input Filter			Capacitance Filter			
	Hot Plug			Unavailable			
	Ctrl①	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		--	6	10	mA
Output Specifications	Voltage Accuracy②	5% -100% load	24VDC nominal input series	--	±1.5	±2	%
		0% -100% load	48VDC nominal input series	--	±1.5	±3	
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation③	5% -100% load		--	±0.5	±1.5	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation	25% load step change, nominal input voltage	3.3V/5VDC output	--	±5	±8	%
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise④	20MHz bandwidth, 5% -100% load	24VDC nominal input series	--	75	150	mVp-p
			48VDC nominal input series	--	100	250	
	Over-current Protection	Input voltage range		110	160	230	%Io
	Short-circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.		1500	--	--	VDC
		Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
	Operating Temperature	See Fig. 1	24VDC nominal input series	-40	--	+85	℃
			48VDC nominal input series	-40	--	+105	

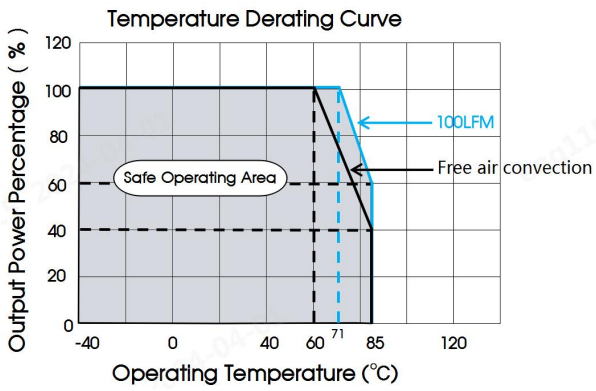
	Storage Humidity	Non-condensing	5	--	95	%RH
	Storage Temperature		-55	--	+125	℃
	Pin Soldering Resistance Temperature⑤	Soldering spot is 1.5mm away from the case, 10 seconds max.	--	--	+300	
		Wave soldering, maximum 10 seconds	255	260	265	
	Vibration		10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency⑥	PWM mode	--	400	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)				
	Dimensions	22.00 × 9.50 × 12.00 mm				
	Weight	24VDC nominal input series	5.5 g (Typ.)			
		48VDC nominal input series	5.8g (Typ.)			
	Cooling method	Free air convection (20LFM)				

Note:
①The Ctrl pin voltage is referenced to input GND;
②Under 0%-5% load conditions, the 24VDC nominal input series maximum output voltage accuracy is ±3%;
③Load regulation for 0%-100% load is ±3%;
④Under 0% -5% load conditions, ripple & noise does not exceed 300mV, please refer to Fig.2 for testing method;
⑤The 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;
⑥Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

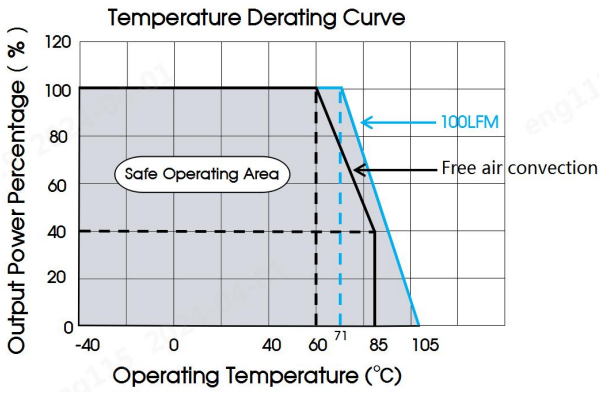
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig.4/5-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.4/5-② for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6kV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±2kV (see Fig.4/5-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig.4/5-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Characteristic Curve

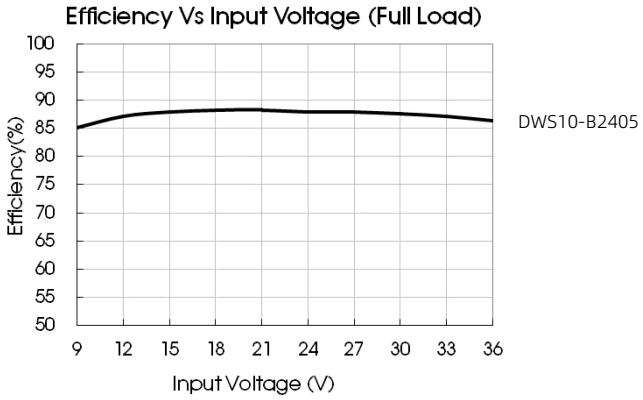


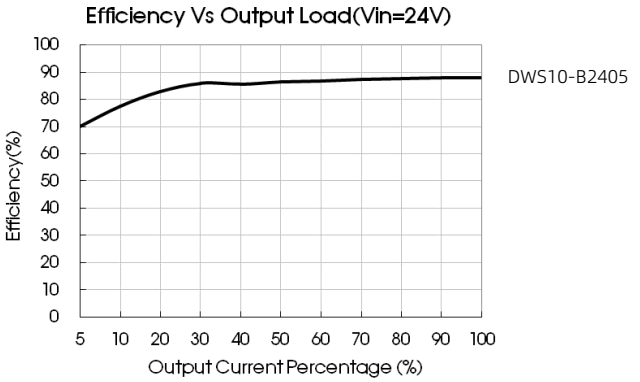
24VDC nominal input series

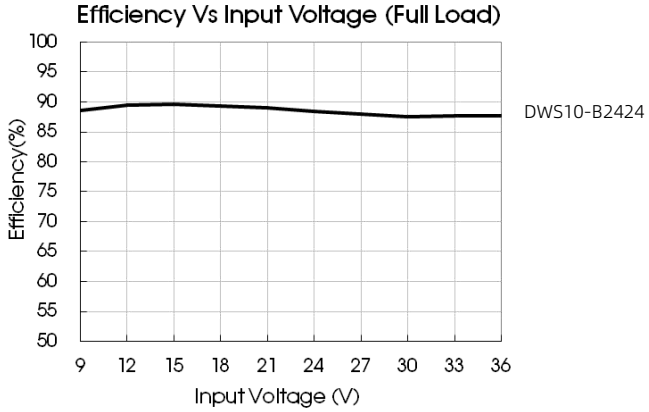


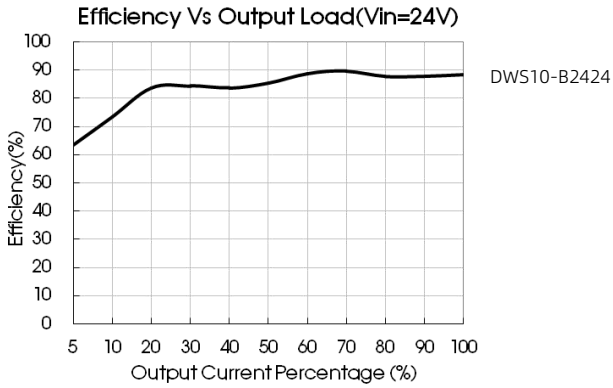
48VDC nominal input series

Fig. 1









Design Reference

1. Ripple & Noise

All DC/DC converters in this series are tested according to the recommended test circuit in Figure 2 before leaving the factory, with the wiring from the probe to the copper foil kept as short as possible.

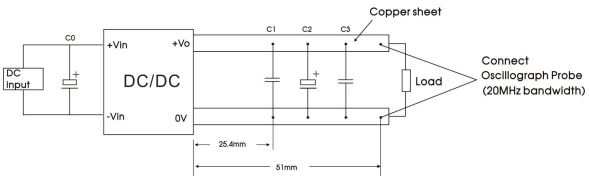


Fig. 2

Vin	C0	Vout	C1	C2	C3
24VDC	47μF /100V	3.3/5/9VDC	1μF/16V	10μF/16V	22μF/16V
		12/15VDC	1μF/25V	10μF/25V	22μF/25V
		24VDC	1μF/50V	10μF/50V	22μF/50V
48VDC	100μF /100V	3.3/5VDC	1μF/16V	10μF/16V	22μF/16V
		12VDC	1μF/25V	10μF/25V	22μF/25V
		24/28VDC	1μF/50V	10μF/50V	22μF/50V

2. Typical application

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 max. capacitive load value of the product.



Fig. 3

Vin	Cin	Vout	Cout
24VDC	47μF/100V	3.3/5/9VDC	22μF/16V
		12/15VDC	22μF/25V
		24VDC	22μF/50V
48VDC	100μF/100V	3.3/5VDC	22μF/16V
		12VDC	22μF/25V
		24/28VDC	22μF/50V

3. EMC compliance circuit

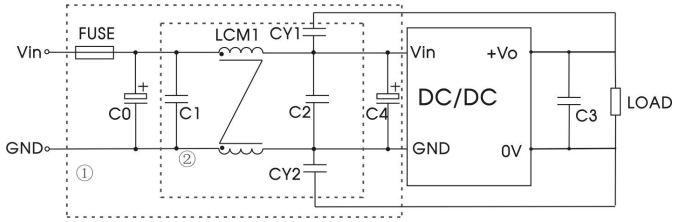


Fig. 4

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
FUSE	Choose according to actual input current
C0/C4	330μF/50V
C1/C2	10μF/50V
C3	Refer to the Cout in Fig.2
LCM1	470μH
CY1/CY2	1nF/2000VDC

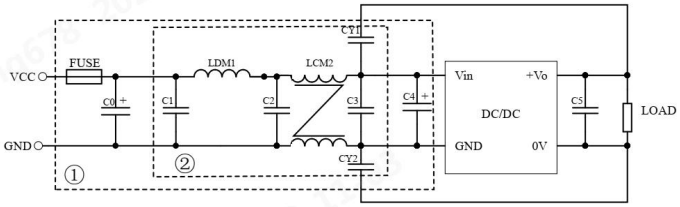


Fig. 5

Notes: For EMC tests we use Part ① in Fig. 5 for immunity and part ② for emissions test. Selecting based on needs.

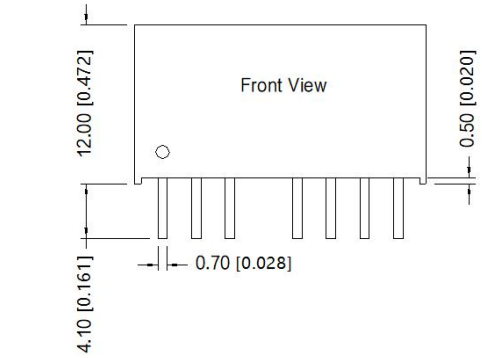
Parameter description:

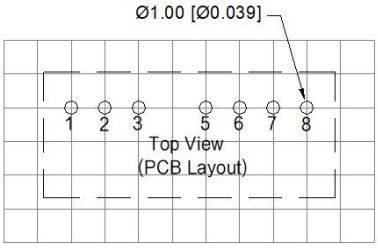
Model	Vin: 48VDC
FUSE	Choose according to actual input current
C0、C4	560μF/100V
C1	10μF/100V
C2	10μF/100V
C3	27μF/100V
C5	Refer to the Cout in Fig.2
LDM1	4.7μH
LCM2	1mH
CY1、CY2	1nF/400VAC

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

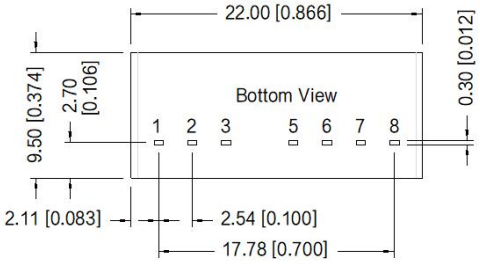
Dimensions and Recommended

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm



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

Pin-Out	
Pin	Mark
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	NC

NC: Cannot be connected to any external circuit

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. All index testing methods in this datasheet are based on company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
7. 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.