Descriptions

6W 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 85%
- No-load power consumption as low as 0.24W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40℃ to +85℃
- Industry standard pin-out

Applications

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

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/BS EN	DWS6-A2405	24 (9-36)	40	±5	±600/0	78/80	470
	DWS6-A2409			±9	±333/0	81/83	220
	DWS6-A2412			±12	±250/0	81/83	120
	DWS6-A2415			±15	±200/0	81/83	100
	DWS6-A2424			±24	±125/0	80/82	68
--	DWS6-A4815	48 (18-75)	80	±15	±200/0	83/85	68

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 nominal input series,nominal input voltage	±5V output	--	313/12	320/16	mA
			±9V/±12V/±15V output	--	301/12	309/16	
			±24V output	--	305/12	313/16	
		48VDC nominal input series,nominal input voltage	±15V output	--	147/5	151/16	
	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	14.5	--	
	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	Vo1	--	±1.5	±2	%
			Vo2		±2	±3	
	Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.5	±1	
			Vo2	--	±1.0	±1.5	
	Load Regulation③	5%-100% load	Vo1	--	±0.8	±1.5	
			Vo2	--	±1.2	±2	
	Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 25%-100%		--	--	±5	
	Transient Recovery Time	25% load step change, nominal input voltage		--	450	500	μs
	Transient Response Deviation	25% load step change, nominal input voltage	±5V output	--	±5	±8	%
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise④	20MHz bandwidth, 5%-100% load		--	120	150	mV p-p
	Over-current Protection	Input voltage range		110	160	230	%Io
	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.		1500	--	--	VDC
	Insulation Resistance	Input-output insulation at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
	Operating	See Fig. 1		-40	--	+85	℃

	Temperature					
	Storage Humidity	Without condensation	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	--	500	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)				
	Dimensions	22.00 × 9.50 × 12.00 mm				
	Weight	4.6g (Typ.)				
	Cooling method	Free air convection				

Note:
①The Ctrl pin voltage is referenced to input GND;
②At 0%~5% load, the Vo1 Max. output voltage accuracy is ±3%, the Vo2 Max. output voltage accuracy is ±5%;
③At 0%~100% load, the Vo1 regulation for 0%-100% load is ±4%, the Vo2 regulation for 0%-100% load is ±4.5%;
④Under 0% -5% load conditions, ripple & noise does not exceed 180mV. The "parallel cable" method is used for Ripple and Noise test;
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.

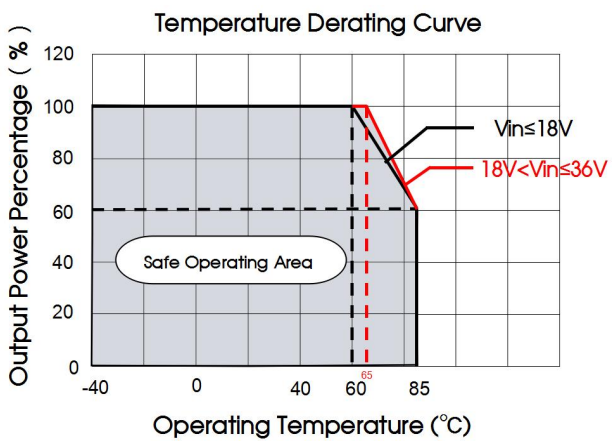
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (24VDC nominal input series: see Fig.3-② for recommended circuit) (48VDC nominal input series: see Fig.4-① for recommended circuit)	
	RE	CISPR32/EN55032 CLASS B (24VDC nominal input series: see Fig.3-② for recommended circuit) (48VDC nominal input series: see Fig.4-① 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(24VDC nominal input series: see Fig.3-① for recommended circuit) (48VDC nominal input series: see Fig.4-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2kV (24VDC nominal input series: see Fig.3-① for recommended circuit) (48VDC nominal input series: see Fig.4-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A

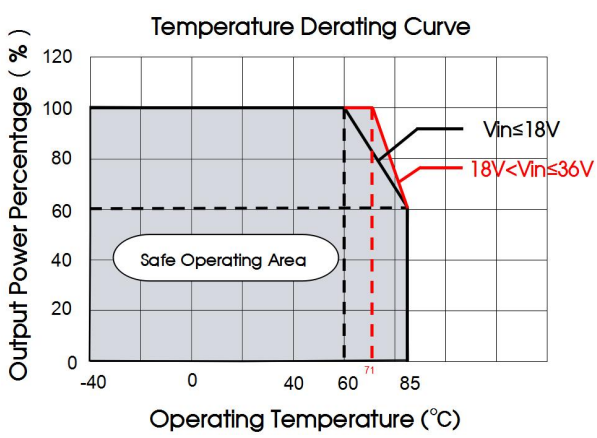
Characteristic Curve

DWS6-A24xx Series

±5V output



Others output



DWS6-A48xx Series

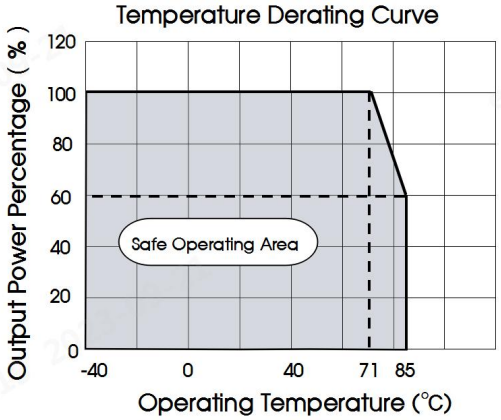
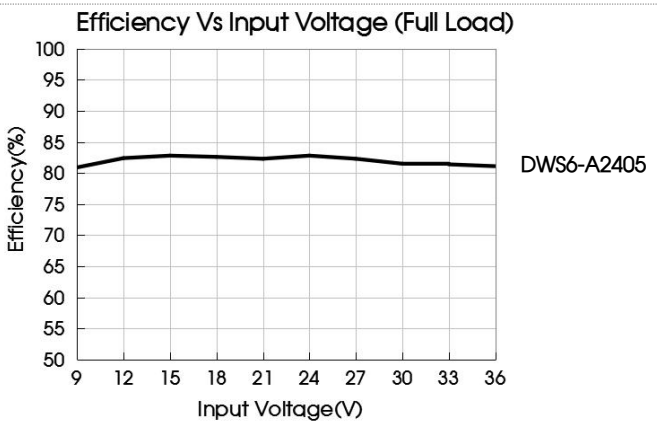
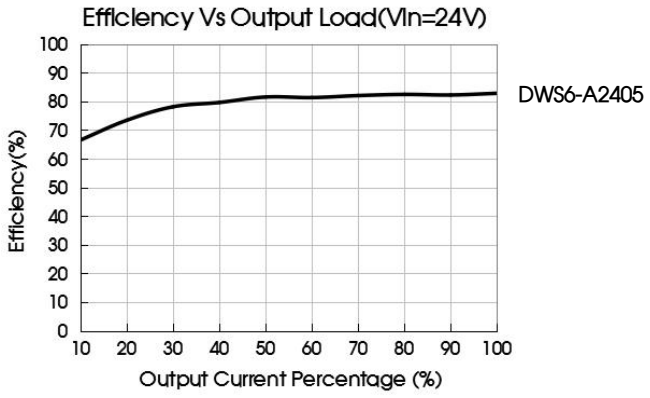
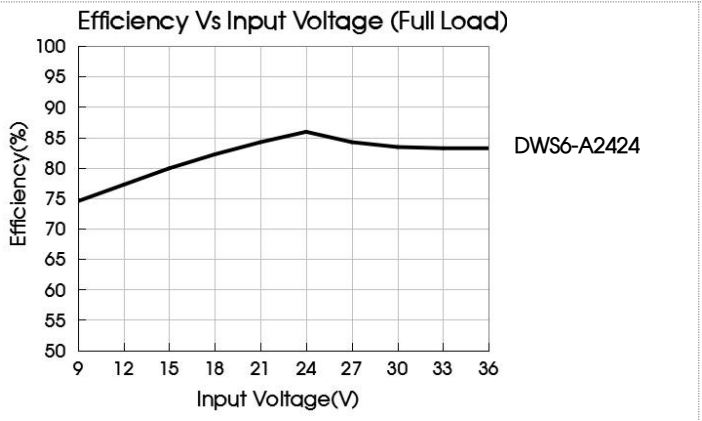
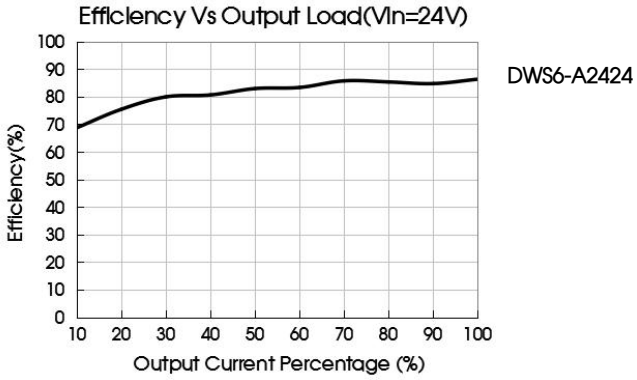


Fig. 1









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.



Fig. 2

Parameter description:

Vin	Cin	Cout
24VDC	100μF/100V	22μF/50V
48VDC	100μF/100V	22μF/50V

2. EMC compliance circuit

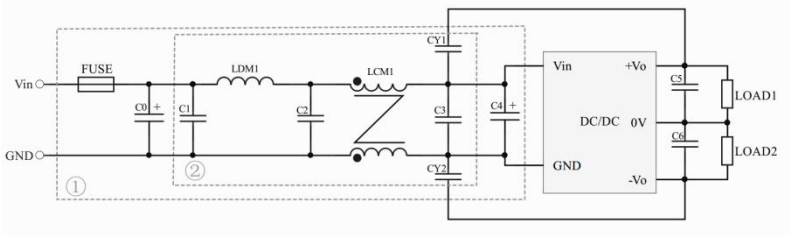


Fig. 3

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:

Components	Vin: 24VDC
FUSE	Choose according to actual
C0/C4	330μF/100V
C1/C2/C3	10μF/50V
LDM1	10uH
LCM1	1.4-1.7mH
CY1/CY2	1nF/2kV

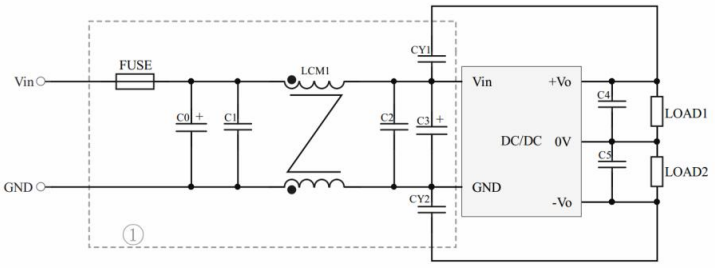


Fig. 4

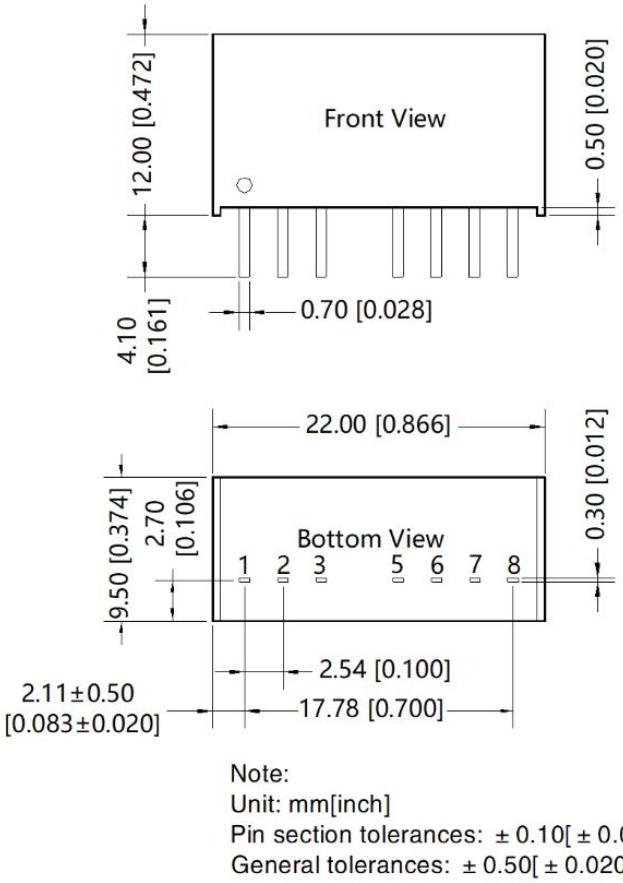
Notes: For EMC tests we use Part ① in Fig. 4 for immunity and emissions test.

Parameter description:

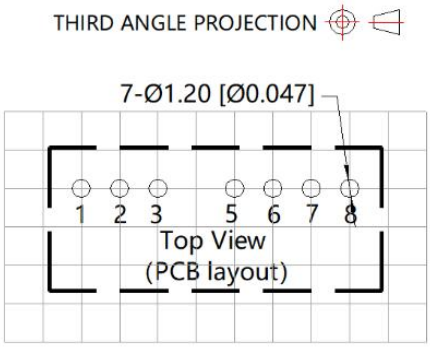
Components	Vin: 48VDC
FUSE	Choose according to actual
C0	200μF/100V
C1/C2	10μF/100V
LCM1	470μH
C3	330μF/100V
CY1/CY2	1nF/400VAC
C4/C5	22μF/50V

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

Dimensions and Recommended Layout



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



Note: Grid 2.54*2.54mm

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

NC: No connection

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.