Descriptions

3W isolated DC-DC converter



RoHS

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Ultra-wide 4:1 input voltage range
- No-load power consumption as low as 0.2W
- I/O isolation test voltage: 3k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40℃ to +85℃

Applications

- Data transmission device
- Communication
- Distributed power supply system
- Hybrid modular/digital system
- Remote control system

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output(Vo1/Vo2)			Full Load Efficiency② (%) Min./Typ.	Capacitive Load (μF)Max. (Vo1/Vo2)
		Nominal (Range)	Max. ①	Voltage(VDC)	Current (mA) Max.	Current (mA) Min.		
EN/BS EN	DWS3-D480505	48 (18-75)	80	5/5	300/300	0/0	76/78	680/680
	DWS3-D480512			5/12	300/125	0/0	76/78	680/330
	DWS3-D480524			5/24	300/63	0/0	76/78	680/220

Note:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured In nominal input voltage and rated output load;
③Product 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)	Nominal input voltage		--	81/5	83/12	mA
	Reflected Ripple Current			--	30	--	
	Surge Voltage (1sec. max.)			-0.7	--	100	VDC
	Start-up Voltage			--	--	18	
	Shut-down Voltage			12	15	--	
	Start-up Time	Nominal input& constant resistance load		--	10	--	ms
	Input Filter			Capacitance Filter			
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy	10% -100% load	Vo1	--	±1	±3	%
			Vo2	--	±3	±5	
		5% -10% load	Vo1	--	±2	±4	
			Vo2	--	±4	±6	
	Linear Regulation①	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
			Vo2	--	±0.5	±1	
	Load Regulation	10% -100% load	Vo1	--	±0.5	±1	
			Vo2	--	±1	±2	
	Cross Regulation	Vo1 load at 50%, Vo2 load at range of 25%-100%		--	--	±8	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation②			--	±5	±8	%
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise③	20MHz bandwidth, nominal input, full load	Vo1	--	70	150	mV p-p
			Vo2	--	100	150	
	Over-current Protection④	Input voltage range		110	--	250	%Io
	Short-circuit Protection⑤			Hiccup, continuous, self-recovery			
General Specifications	Isolation	Input-output Electric Strength test for 1 minute with a leakage current of 1mA max.		3000	--	--	VDC
		Output-output Electric Strength test for 1 minute with a leakage current of 1mA max.		1500	--	--	
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	1000	--	pF
	Operating Temperature	See Fig. 1		-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Pin Soldering Resistance Temperature⑥	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 Frequency⑦	PWM mode		--	300	--	kHz
	MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours

Mechanical Specifications	Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
	Dimensions	27.40 × 9.50 × 12.00 mm
	Weight	5.4g (Typ.)
	Cooling method	Free air convection

Note:
①Load regulation for 0%-100% load is ±5%;
②Dynamic load only refer to Vo1;
③The ＂parallel cable＂ method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information;
④Dual output with balanced-load;
⑤Both Vo1/Vo2 go into hiccup protection when one of them short circuit; Vo2 is allowed to be short circuit only under condition of Vo1 with load range from 10%-100%; Vo1 could be short circuit if Vo2 with load range from 0%-100%.
⑥The 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;
⑦Switching 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.3-① for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.3-① 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 (see Fig.3-② for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2kV (see Fig.3-② for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A

Typical Characteristic Curves

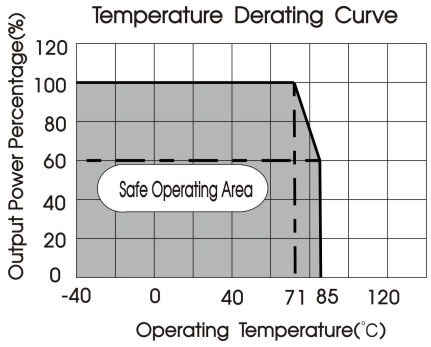
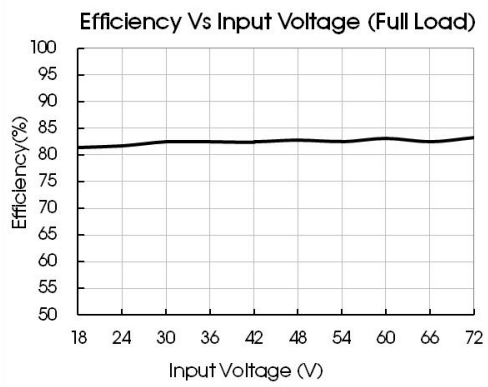
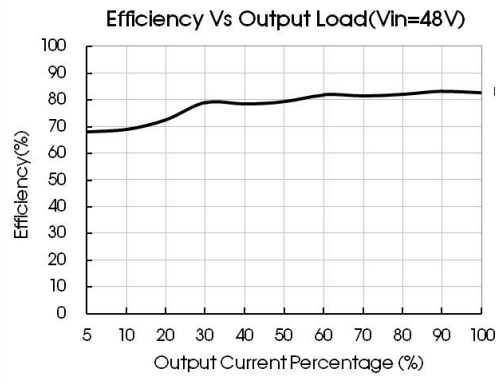


Fig. 1

DWS3-D480512



DWS3-D480512



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 max. capacitive load value of the product.



Fig. 2

Vout (VDC)	Cout	Cin
5	47μF/16V	100μF/100V
12	22μF/25V	
24	22μF/50V	

Note:

①CS Pin: By connecting a low ESR capacitor between this terminal and the pin-7, the output ripple and noise may be further improved. Generally, the capacitance is no greater than 47uF.

2. EMC compliance circuit

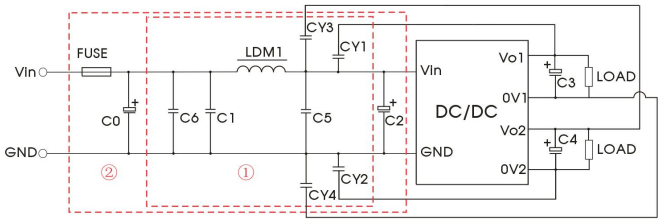


Fig. 3

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

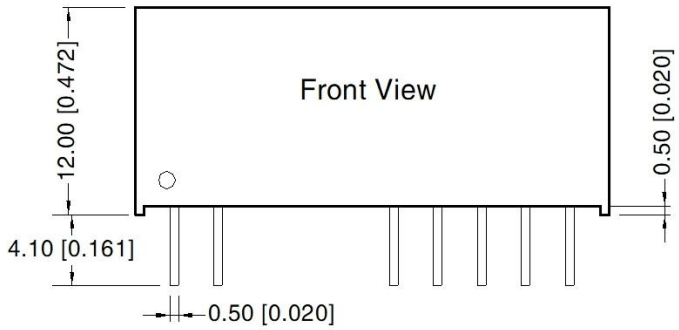
Parameter description

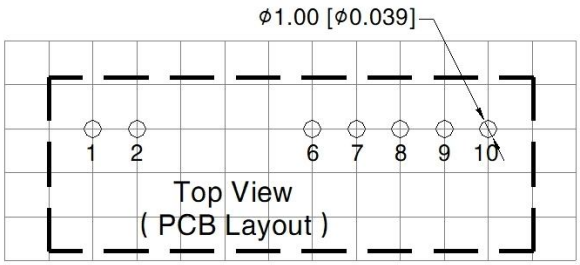
Model	Vin: 48V
FUSE	Choose according to actual input current
C0	680μF/100V
C1/C5/C6	4.7μF/100V
C2	330μF/100V
C3/C4	Refer to the Cout in Fig.2
LDM1	22μH/0.6A
CY1/CY2/CY4	1nF/3kV
CY3	2.2nF/3kV

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

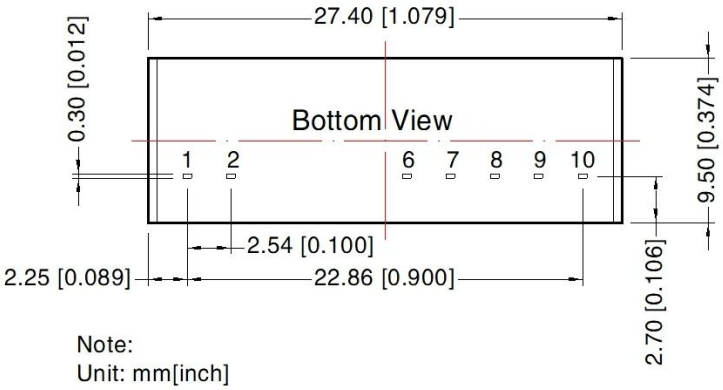
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm



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

Pin-Out	
Pin	Mark
1	GND
2	Vin
6	+Vo1
7	0V1
8	CS
9	0V2
10	+Vo2

Note:

1. The maximum capacitor 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.