Descriptions

10W isolated, DC/DC Converter



CE Report EN 62368-1 UKCA Report BS EN 62368-1 RoHS 3 Years Warranty

Features

- Wide 2:1 input voltage range
- High efficiency up to 88%
- 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℃
- Compact SIP package
- Industry standard pin-out

Applications

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

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	DES10-B1203	12 (9-18)	20	3.3	2400/0	80/82	2200
	DES10-B1205			5	2000/0	83/85	2200
	DES10-B1209			9	1111/0	84/86	680
	DES10-B1212			12	833/0	84/86	470
	DES10-B1215			15	667/0	84/86	330
	DES10-B1224			24	417/0	84/86	220
	DES10-B2403	24 (18-36)	40	3.3	2400/0	82/84	2200
	DES10-B2405			5	2000/0	85/87	2200
	DES10-B2409			9	1111/0	86/88	680
	DES10-B2412			12	833/0	86/88	470
	DES10-B2415			15	667/0	86/88	330
	DES10-B2424			24	417/0	85/87	220

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②Efficiency is measured at nominal input voltage and rated output load.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	12VDC nominal input series, nominal input voltage	3.3V output	--	795/35	815/50	mA
			5V output	--	969/35	992/50	
			Others	--	969/9	992/18	
		24VDC nominal input series, nominal input voltage	3.3V output	--	389/25	398/45	
			5V output	--	474/25	485/45	
			Others	--	474/9	485/18	
	Reflected Ripple Current			--	50	--	
	Surge Voltage (1sec. max.)	12VDC nominal input voltage		-0.7	--	25	VDC
		24VDC nominal input voltage		-0.7	--	50	
	Start-up Voltage	12VDC nominal input voltage		--	--	9	
		24VDC nominal input voltage		--	--	18	
	Input Under-voltage Protection	12VDC nominal input voltage		5.5	6.5	--	
		24VDC nominai input voltage		12	15.5	--	
	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		--	±1.5	±2	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.25	±0.5	
	Load Regulation③	5%-100% load		--	±0.5	±1	
	Transient Recovery Time	25% load step change		--	300	500	μs
	Transient Response Deviation		3.3V/5V output	--	±5	±8	%
			Others	--	±3	±5	
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise④	20MHz bandwidth, 5%-100% load		--	75	150	mV p-p
	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
	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 Humidity	Non-condensing		5	--	95	%RH
	Storage Temperature			-55	--	+125	℃
	Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	+300	
	Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			

	Switching Frequency⑤	PWM mode	--	500	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Black plastic, flame-retardant and heat-resistant (UL94 V-0)				
	Dimension	22.00 x 9.50 x 12.00 mm				
	Weight	5.5g (Typ.)				
	Cooling Method	Free air convection (20LFM)				

Note:

①The Ctrl pin voltage is referenced to input GND;

②Under 0%-5% load conditions, the 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;

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	CISPR32/EN55032	CLASS B (see Fig.4-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig.4-② 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.4-① 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	3 Vr.m.s	perf. Criteria A

Characteristic Curve

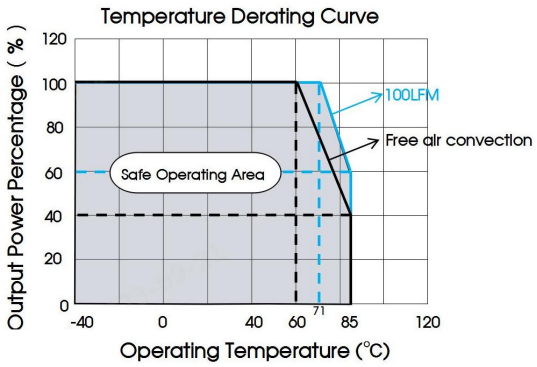
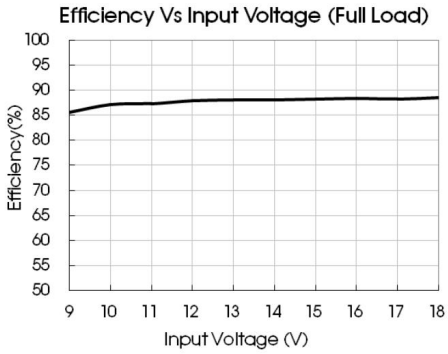
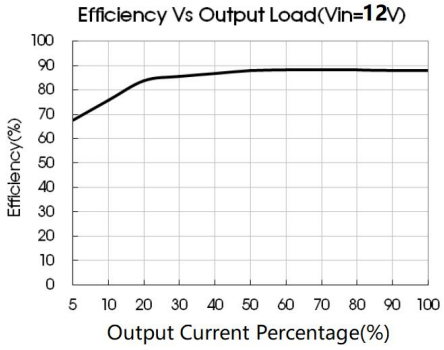


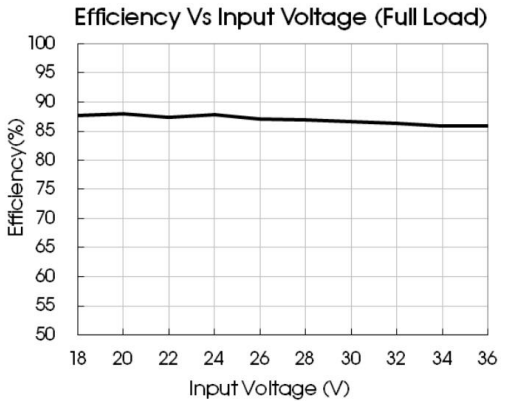
Fig. 1



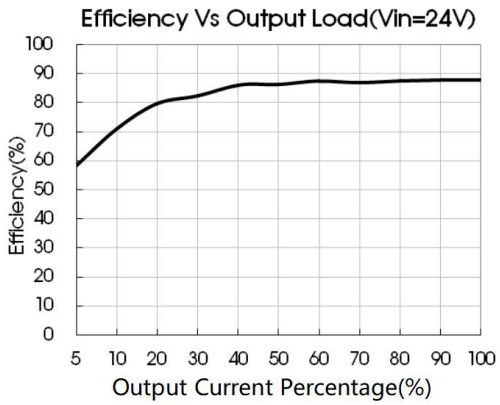
DES10-B1205



DES10-B1205



DES10-B2405



DES10-B2405

Design Reference

1. Ripple & Noise

All the DC/DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Please keep the wire of probe to copper as short as possible.

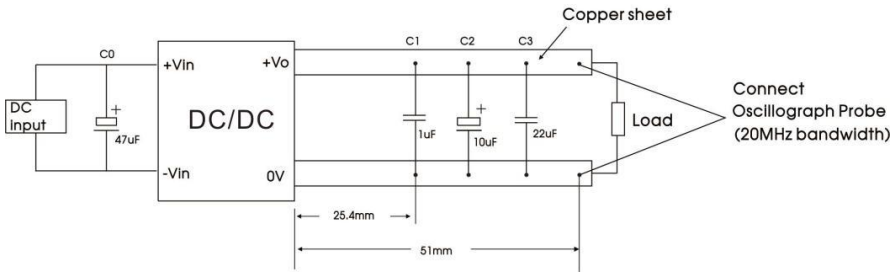


Fig. 2

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 specified max. capacitive load value of the product.



Fig. 3

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

3. EMC solution-recommended circuit

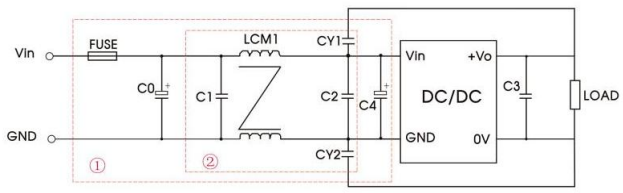


Fig. 4

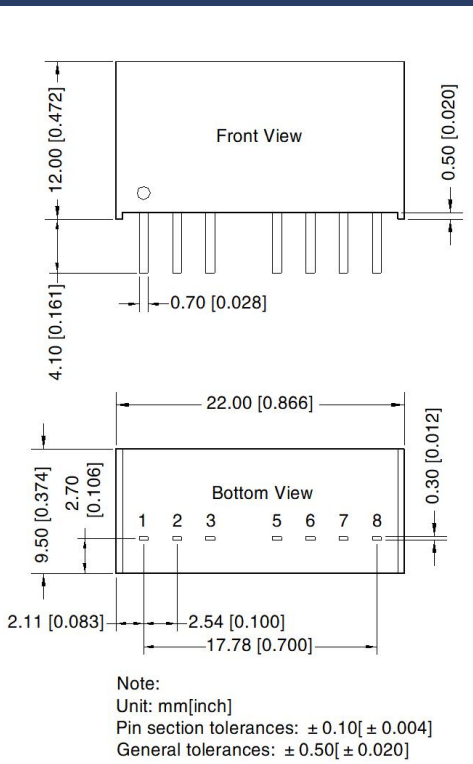
Notes: We use Part ① in Fig. 3 for Immunity test and part ② for Emissions test. Selecting based on needs.

Parameter description:

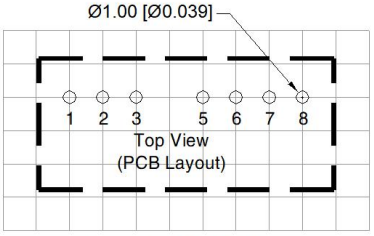
Model	Vin: 12VDC	Vin: 24VDC
FUSE	Choose according to actual input current	
C0/C4	330μF/35V	330μF/50V
C1/C2	10μF/50V	
C3	Refer to the Cout in Fig2	
LCM1	470μH, recommended to use	
CY1/CY2	1nF/2000VDC	

4. 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	NC

NC: Pin to be isolated from circuitry

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 our 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.