Descriptions

6W isolated, DC-DC Converter



RoHS

3 Years Warranty

CE Report EN 62368-1

UKCA Report BS EN 62368-1

Features

- Wide 2:1 input voltage range
- High efficiency up to 87%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage 1.6k VDC
- Input under-voltage protection, output short-circuit, over-current protection
- Operating ambient temperature range: -40℃ to +105℃
- Compact SIP package
- Industry standard pin-out

Applications

- Industrial control
- Electric Power
- Medical
- Instrumentation
- Communication

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency ② (%)Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DES6-B1203	12 (9-18)	20	3.3	1350/0	74/76	1800
	DES6-B1205			5	1200/0	78/80	1000
	DES6-B1209			9	667/0	80/82	470
	DES6-B1212			12	500/0	82/84	470
	DES6-B1215			15	400/0	82/84	220
	DES6-B1224			24	250/0	82/84	100
	DES6-B2403	24 (18-36)	40	3.3	1350/0	76/78	1800
	DES6-B2405			5	1200/0	80/82	1000
	DES6-B2409			9	667/0	82/84	470
	DES6-B2412			12	500/0	84/86	470
	DES6-B2415			15	400/0	84/87	220
	DES6-B2424			24	250/0	83/85	100

Note:
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.

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	--	489/12	502/18	mA
			Others	--	625/12	641/18	
		24VDC nominal input series, nominal input voltage	3.3V output	--	238/5	245/12	
			5V output	--	305/5	313/12	
			Others	--	298/10	305/16	
	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 nominal input voltage		12	15.5	--	
	Input Filter			Capacitance Filter			
	Hot Plug			Unavailable			
	Ctrl ①	Module on		Ctrl floating or connected to TTL high level (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	±2	%
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.5	±1	
	Load Regulation③	5%-100% load		--	±0.5	±1.5	
	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		--	50	100	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.		1600	--	--	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	--	+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		--	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;
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 150mV, the "parallel cable" method is used for Ripple and Noise test;
⑤Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement;
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.

Electromagnetic Compatibility (EMC)

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

Typical Characteristic Curves

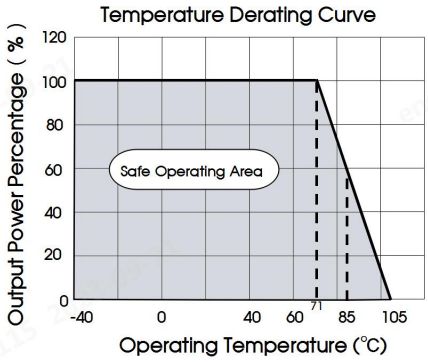
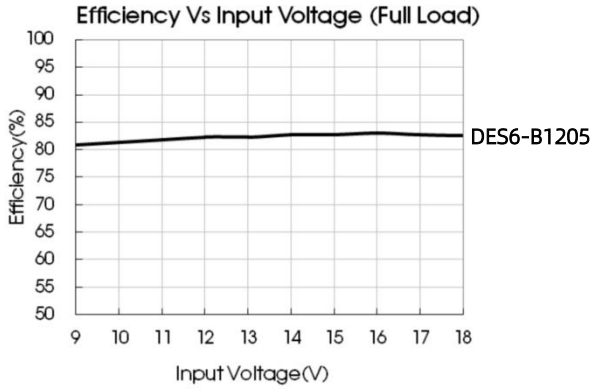
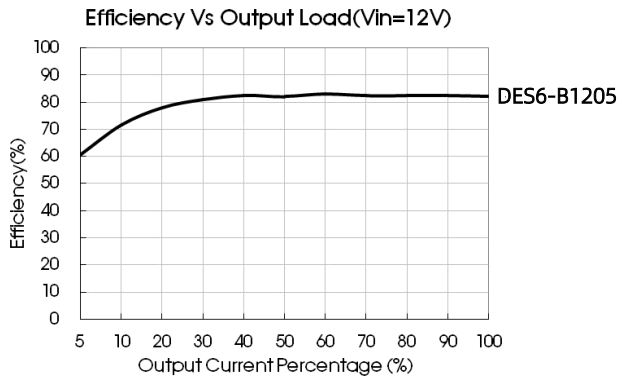
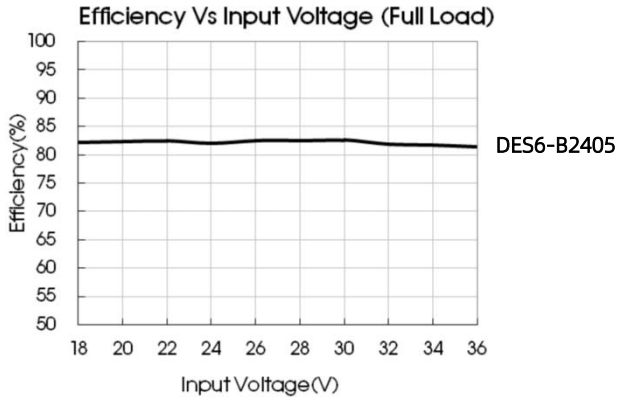
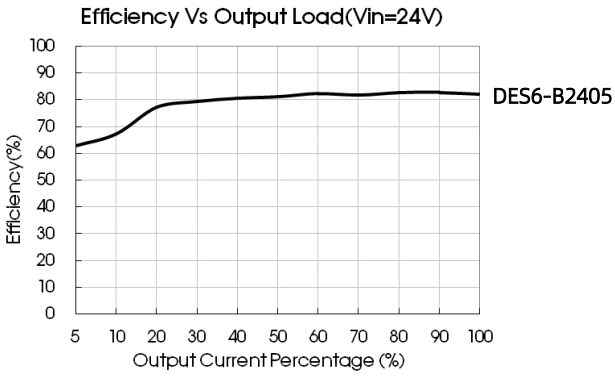


Fig. 1









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:

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

2. EMC compliance circuit

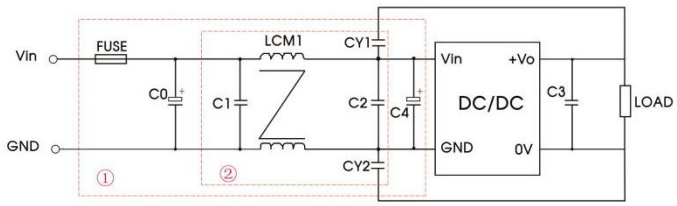


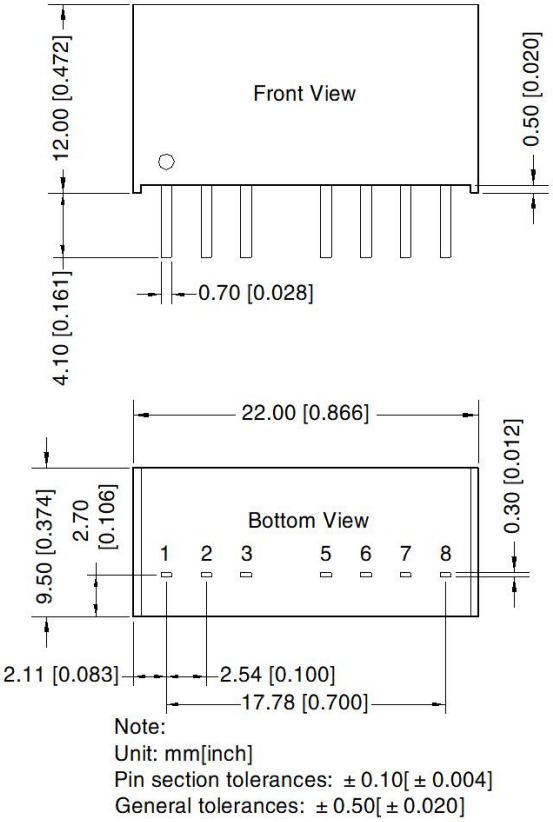
Fig. 3

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

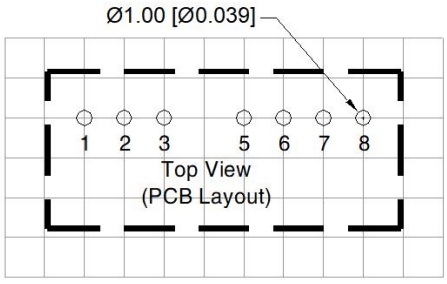
Parameter description:

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	
CY1/CY2	1nF/400VAC	

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 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.