Descriptions

1W isolated，DC-DC Converter





RoHS

3 Years Warranty

CE Report EN62368-1

UKCA Report BS EN62368-1

Features

- Ultra compact SIP package
- Wide input voltage range (2:1)
- Operating temperature range: -40℃ to +85℃
- I/O Isolation test voltage: 1.5k VDC
- Low ripple & noise
- Short-circuit protection (self-recovery)
- Remote On/Off

Applications

- Communication
- Instrumentation
- Industrial control

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Ripple & Noise (mVp-p) Typ./Max.	Full Load Efficiency (%)Min./Typ.	Capacitive Load② (μF)Max.
		Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max./Min.			
--	DES1-A0505	5 (4.5-9)	11	±5	±100/±5	70/100	71/73	1000
	DES1-A0512			±12	±42/±2		74/76	470
	DES1-A0515			±15	±33/±2		73/75	330
EN/BS EN	DES1-B0503			3.3	303/15		69/71	1800
	DES1-B0505			5	200/10		70/72	2200
	DES1-B0512			12	83/4		74/76	1000
	DES1-B0515			15	67/3		73/75	680
	DES1-B0524			24	42/2		71/73	470
--	DES1-A1205	12 (9-18)	20	±5	±100/±5	100/150	75/77	1000
	DES1-A1212			±12	±42/±2		79/81	470
	DES1-A1215			±15	±33/±2		76/78	330
EN/BS EN	DES1-B1203			3.3	303/15		73/75	2700
	DES1-B1205			5	200/10		75/77	2200
	DES1-B1209			9	111/6		77/79	1800
	DES1-B1212			12	83/4		76/78	1000
	DES1-B1215			15	67/3		78/80	680

	DES1-B1224			24	42/2		74/76	470
--	DES1-A2405	24 (18-36)	40	±5	±100/±5	70/100	77/79	1000
	DES1-A2409			±9	±56/±3		77/79	680
	DES1-A2412			±12	±42/±2		76/78	470
	DES1-A2415			±15	±33/±2		76/78	330
EN/BS EN	DES1-B2403			3.3	303/15		73/75	2700
	DES1-B2405			5	200/10		75/77	2200
	DES1-B2412			12	83/4		76/78	1000
	DES1-B2415			15	67/3		76/78	680
	DES1-B2424			24	42/2		75/77	470
--	DES1-A4805	48 (36-75)	80	±5	±100/±5	100/150	74/76	1000
EN/BS EN	DES1-A4812			±12	±42/±2		76/78	470
--	DES1-A4815			±15	±33/±2		78/80	330
EN/BS EN	DES1-B4803			3.3	303/15		73/75	2700
	DES1-B4805			5	200/10		74/76	2200
EN/BS EN	DES1-B4812			12	83/4		78/80	1000
	DES1-B4815			15	67/3		77/79	680

Notes:
①Exceeding the maximum input voltage may cause permanent damage;
②The specified maximum capacitive load value for positive and negative output is identical;
③The DEXS1 series products do not have 3 or 5 pins;
④Product images are for reference only; the actual product shall prevail.

Specifications

Specifications	Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load/no-load)	5VDC Input	--	281/40	290/60	mA
		12VDC Input	--	111/15	114/30	
		24VDC Input	--	55/6	57/10	
		48VDC Input	--	27/4	28/6	
	Reflected Ripple Current	5VDC Input	--	30	--	
		12VDC Input	--	40	--	
		24VDC Input	--	55	--	
		48VDC Input	--	45	--	
	Surge Voltage (1sec. max.)	5VDC Input	-0.7	--	12	VDC
		12VDC Input	-0.7	--	25	
		24VDC Input	-0.7	--	50	
		48VDC Input	-0.7	--	100	
	Starting Voltage	5VDC Input	--	--	4.5	
		12VDC Input	--	--	9	
		24VDC Input	--	--	18	
		48VDC Input	--	--	36	
	Input Filter		Capacitance filter			
	Hot Plug		Unavailable			
	Ctrl①	Module on	Ctrl pin open (high resistance)			
		Module off	Ctrl pin pulled high (current 5-10mA typ. into Ctrl.)			

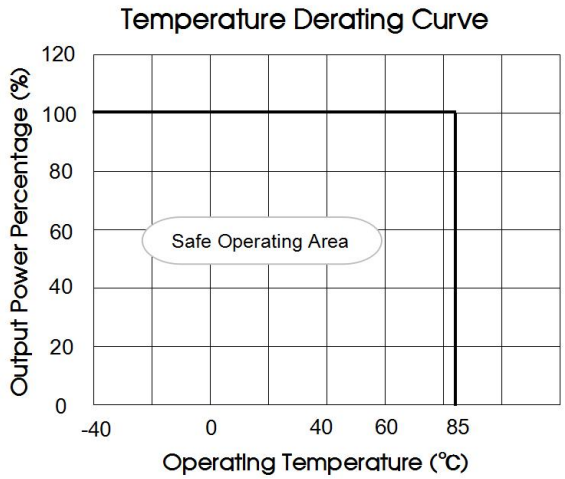
Output Specifications	Output Voltage Accuracy	5%-100% load, Input voltage range	3.3V/5V output	--	±2	±5	%
			others	--	±1	±3	
	Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
	Load Regulation	5%-100% load		--	±0.4	±0.75	
	Transient Recovery Time	25% load step change		--	0.5	2	ms
	Transient Response Deviation			--	±2.5	±5	%
	Temperature Coefficient	Full load		--	±0.02	±0.03	%/℃
	Short Circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output, with the test time of 1 minute and the leak current lower than 1mA		1500	--	--	VDC
	Insulation Resistance	Input-output, isolation voltage 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output, 100kHz/0.1V		--	120	--	pF
	Operating Temperature	see Fig. 1		-40	--	+85	℃
	Storage Temperature			-55	--	+125	
	Pin Soldering Resistance Temperature②	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	
		Wave soldering, maximum 10 seconds		255	260	265	
	Storage Humidity	Non-condensing		--	--	95	%RH
	Switching Frequency (PFM Mode)	Full load, nominal input voltage		--	200	--	kHz
	MTBF	MIL-HDBK-217F@25℃		1000	--	--	k hours
Mechanical Specifications	Case Material	Black flame-retardant and heat-resistant plastic					
	Dimension	22.00 x 9.50 x 12.00 mm					
	Weight	4.5g(Typ.)					
	Cooling Method	Free air convection					

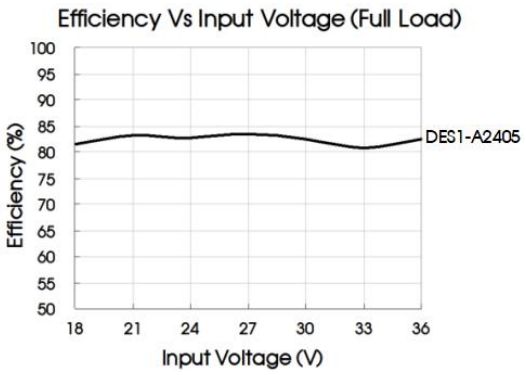
Note:
①For use of Ctrl, please refer to the "design reference" in this manual;
②The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection.

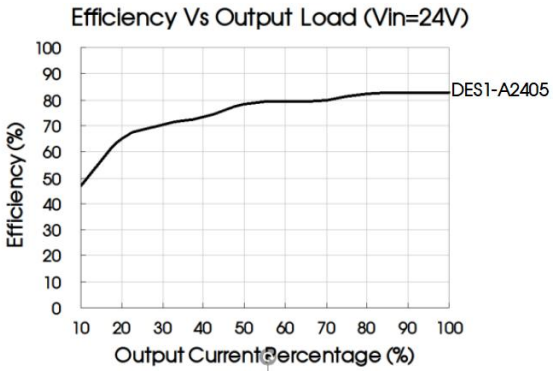
Electromagnetic Compatibility (EMC)

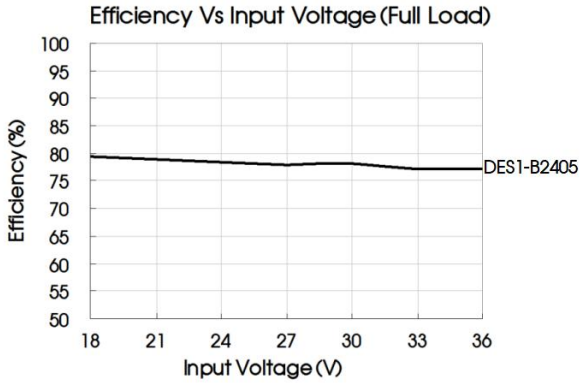
Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032 CLASS B (see Fig. 3-② for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±4kV	perf. Criteria B
	RS	IEC/EN61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4 ±2kV (see Fig. 3-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN61000-4-5 line to line ±2kV (see Fig. 3-① for recommended	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29 0%, 70%	perf. Criteria B

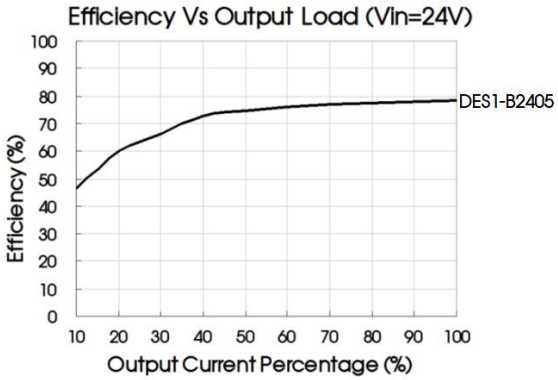
Characteristic Curve











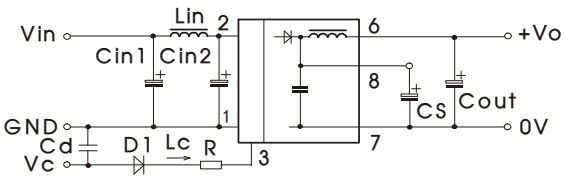
Design Reference

1. Typical application

①All 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.

Single



Dual

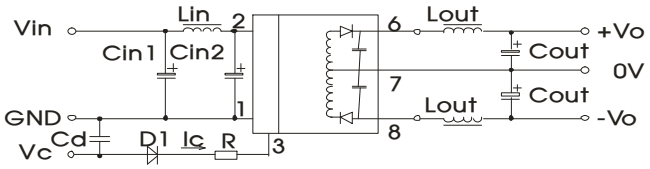


Fig. 2

Vin	5VDC&12VDC	24VDC&48VDC
Cin1	100μF/25V	10μF/100V
Cin2	47μF/25V	1μF/100V
Lin	4.7μH-12μH	
Cs	10μF-22μF/50V	
Cout	Vo(3/±3/5/±5/9/±9V):100μF/16V	
	Vo(12/±12/15/±15V):100μF/25V	
	Vo(24/±24V):100μF/50V	
Lout	2.2μH-10μH	
Cd	47nF/100V	

2. EMC compliance recommended circuit

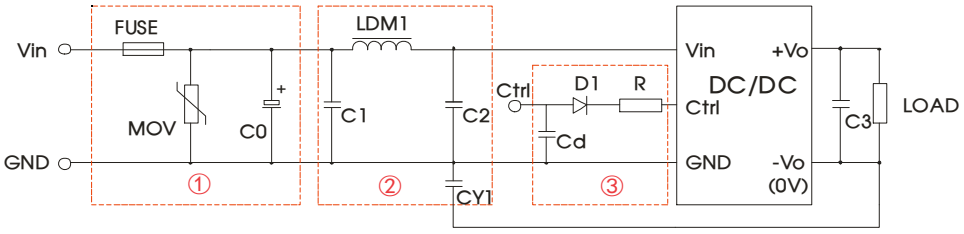


Fig 3

Model	Vin: 5VDC	Vin: 12VDC	Vin: 24VDC	Vin: 48VDC
FUSE	Slow-blow, selecting based on needs			
MOV	--	S14K25	S14K35	S14K60
C0	1000μF/16V	1000μF/25V	330μF/50V	330μF/100V
C1	4.7μF/50V			4.7μF/100V
LDM1	12μH			
C2	4.7μF/50V			4.7μF/100V
C3	Refer to the Cout in Fig.2			
CY1	1nF/2kV			
D1	60V/1A			
R	In accordance with the formula: $R = \frac{V_C - V_D - 1.0}{I_C} - 300$			
Cd	47nF/100V			

Notes:

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

② VC is the voltage of the Ctrl end relative to the GND of the input grounding; VD is the positive-going conduction pressure drop of D1; IC is the current flows into the Ctrl end and its value is generally 5-10mA, see Fig. 3-③ for the peripheral circuit of Ctrl end;

③ If there is no recommended parameters, no external component is required;

3. Ctrl end

The modules are of normal output when the Ctrl end is suspended or of high resistance; the modules turn off when connecting with high level (relative to the input grounding); notice that the current flows into the pin shall be 5 - 10mA, the modules will be permanently damaged if the current exceeds its max. value (20mA in general).

The value of R can be derived as follows:

$$R = \frac{V_C - V_D - 1.0}{I_C} - 300$$

For Detailed parameter, please refer to EMC solution-recommended circuit in this manual.

4. Input current

When the electricity is provided by the unstable power supply, please make sure that the range of the output voltage fluctuation and the ripple voltage of the power supply do not exceed the indicators of the modules. Input current of power supply should afford the flash startup current of this kind of DC/DC module(see Fig. 5).

Generally: Vin= 5V series Iave =445mA

Vin=12V series Iave =205mA

Vin=24V series Iave =104mA

Vin=48V series Iave =53mA

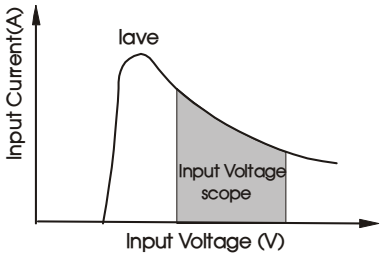
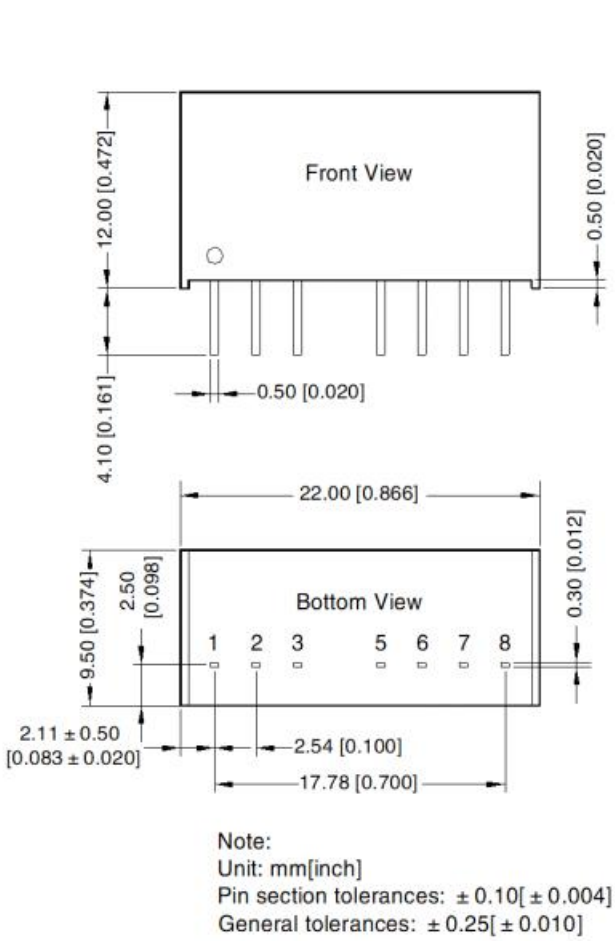


Fig. 5

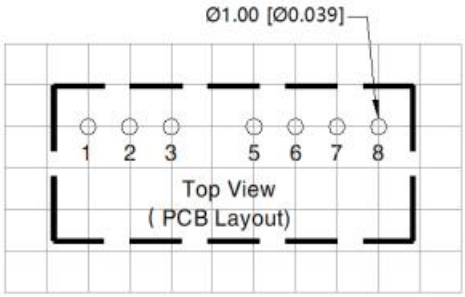
5. Output load requirements

When using, the minimum load of the module output should not be less than 5% of the nominal load. In order to meet the performance parameters of this datasheet, please connect a 5% dummy load in parallel at the output end, the dummy load is generally a resistor, please note that the resistor needs to be used in derating.

Dimensions and Recommended



Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.25[± 0.010]



Note: Grid 2.54*2.54mm

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

DEXS1 Series without Pin 3 and Pin 5

NC: Not available for electrical connection

Notes:

1. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product
2. The recommended unbalance degree of the dual output module load is ≤±5%; if the degree exceeds ±5%, then the product performance cannot be guaranteed to comply with all parameters in the datasheet
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on company corporate standards;
6. Specifications are subject to change without prior notice;
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.