Descriptions

10W 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 87%
- No-load power consumption as low as 0.12W
- I/O isolation test voltage: 3k VDC
- Input under-voltage protection, output short- circuit, over-voltage, over-current protection
- Operating ambient temperatDWLP10-E range: -40℃ to +85℃
- Meets CISPR32/EN55032 CLASS A, without extra components
- Input reverse polarity protection available with Chassis (E2S) or 35mm Din-Rail mounting (D4S) version
- Meets EN62368 standard
- Industry standard pin-out

Applications

- Industrial Control
- Electrical Power
- Instrumentation
- Communication

Selection Guide

Certification	Part No. ①	Input Voltage (VDC)		Output		Full Load Efficiency④ (%) Min./Typ.	Capacitive Load (μF)⑤Max.
		Nominal② (Range)	Max.③	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DWLP10-E2405	24 (9-36)	40	±5	±1000/0	79/81	1000
	DWLP10-E2412			±12	±416/0	83/85	330
	DWLP10-E2415			±15	±333/0	85/87	220
	DWLP10-F2403			3.3	2400/0	76/78	5400
	DWLP10-F2405			5	2000/0	80/82	5400
	DWLP10-F2409			9	1111/0	82/84	680
	DWLP10-F2412			12	833/0	82/84	470
	DWLP10-F2415			15	667/0	85/87	330
	DWLP10-F2424			24	416/0	84/86	100
--	DWLP10-E4805	48 (18-75)	80	±5	±1000/0	80/82	1000
	DWLP10-E4812			±12	±416/0	84/86	330
EN/BS EN	DWLP10-E4815			±15	±333/0	85/87	220
	DWLP10-F4803			3.3	2400/0	77/79	5400

	DWLP10-F4805	48 (18-75)	80	5	2000/0	80/82	5400
	DWLP10-F4812			12	833/0	84/86	470
	DWLP10-F4815			15	667/0	85/87	330
	DWLP10-F4824			24	416/0	85/87	100

Note:
①Use "E2S" suffix for chassis mounting and "D4S" suffix for Din-Rail mounting;
②Minimum input voltage and start-up voltage are increased by 1VDC for all models with E2S and D4S suffixes because of the input reverse polarity function;
③Exceeding the maximum input voltage may cause permanent damage;
④Efficiency is meas DWLP10-Exxxx at nominal input voltage and rated output load; efficiencies for E2S and D4S Model's is decreased by 2% due to the input reverse polarity protection circuit;
⑤The specified maximum capacitive load value for Vo1 and Vo2 output is identical;
⑥Product 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	3.3VDC output	--	423/5	434/12	mA
			Others	--	514/5	527/12	
		48VDC nominal input series, nominal input voltage	3.3VDC output	--	208/5	214/12	
			Others	--	254/5	260/12	
	Reflected Ripple Current	24VDC nominal input series, nominal input voltage		--	40	--	
		48VDC nominal input series, nominal input voltage		--	30	--	
	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		12	15.5	--	
	Start-up Time	Nominal input voltage & constant resistance load		--	10	--	ms
	Input Filter			Pi 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		--	5	10	mA
Output Specifications	Voltage Accuracy②	0% - 100% load		--	±1	±3	%
	Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
			Vo2	--	±0.5	±1.0	
	Load Regulation③	5% - 100% load	Vo1	--	±0.5	±1	
			Vo2	--	±0.5	±1.5	
	Cross Regulation	Dual outputs, Vo1 load at 50%, Vo2 load at range of 10% - 100%		--	--	±5	
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
	Transient Response Deviation			--	±3	±5	%
	Temperat Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise④	20MHz bandwidth, 5% - 100% load		--	60	120	mV p-p
	Over-voltage Protection	Input voltage range		110	130	160	%Vo
	Over-current Protection			110	140	190	%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.	3000	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	500	--	pF
	Operating Temperat	See Fig. 1	-40	--	+85	℃
	Storage Temperat		-55	--	+125	
	Storage Humidity	Non-condensing	5	--	95	%RH
	Pin Soldering Resistance Temperat⑤	Soldering spot is 1.5mm away from the case, 10 seconds max.	--	--	+300	℃
		Wave soldering, maximum 10 seconds	255	260	265	
	Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
	Switching Frequency⑥	PWM mode	--	350	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)				
	Dimensions	Horizontal package	51.50 × 26.50 × 12.00 mm			
		E2S chassis mounting	76.00 × 31.50 × 21.20 mm			
		D4S Din-rail mounting	76.00 × 31.50 × 25.80 mm			
	Weight	Horizontal package/E2S chassis mounting/D4S Din-rail mounting	21.2g/46.0g/66.0g (Typ.)			
	Cooling method	Free air convection				

Note:
①The Ctrl pin voltage is referenced to input GND;
②Output voltage accuracy of ±5VDC output for 0% - 5% load is ±5% max;
③Load regulation for 0% - 100% load increases to ±5%;
④Ripple & Noise at ≤ 5% load is 5%Vo max. 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 measDWLP10-Ed at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (without extra components)/ 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
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0%, 70%	perf. Criteria B

Characteristic Curve

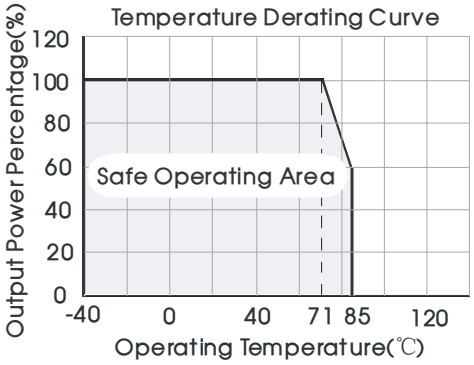


Fig. 1

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 sDWLP10-E that the capacitance is not exceeding the max. capacitive load value of the product.

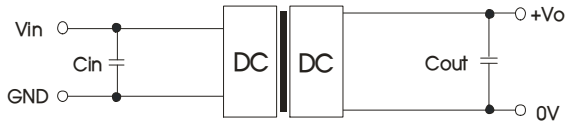


Fig. 2

Cin	Cout
10μF - 47μF/100V	10μF/63V

2. EMC compliance circuit

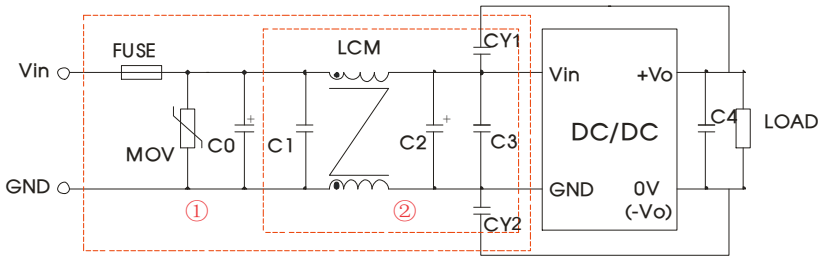


Fig. 3

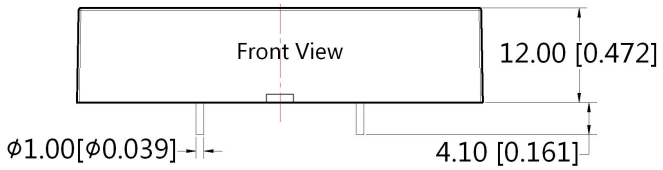
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

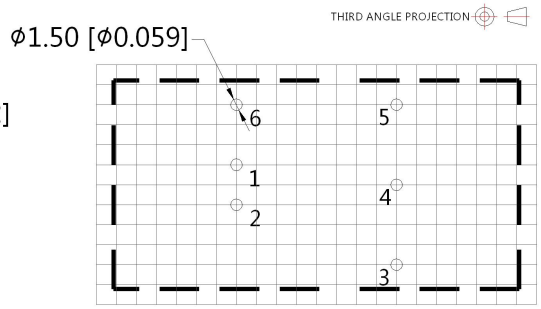
List of components:

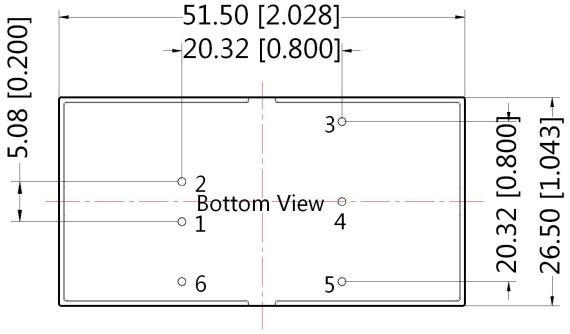
Model	DWLP10-E_		DWLP10-F_	
	Vin:24V	Vin:48V	Vin:24V	Vin:48V
FUSE	Choose according to actual input current			
MOV	S20K30	S14K60	S20K30	S14K60
C0	680μF/50V	680μF/100V	680μF/50V	680μF/100V
C1	1μF/50V	1μF/100V	1μF/50V	1μF/100V
C2	330μF/50V	330μF/100V	330μF/50V	330μF/100V
C3	4.7μF/50V	4.7μF/100V	4.7μF/50V	4.7μF/100V
LCM	4.7mH			6.8mH
C4	Refer to the Cout in Fig.2			
CY1/CY2	1nF/3KV			

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

Dimensions and Recommended Layout





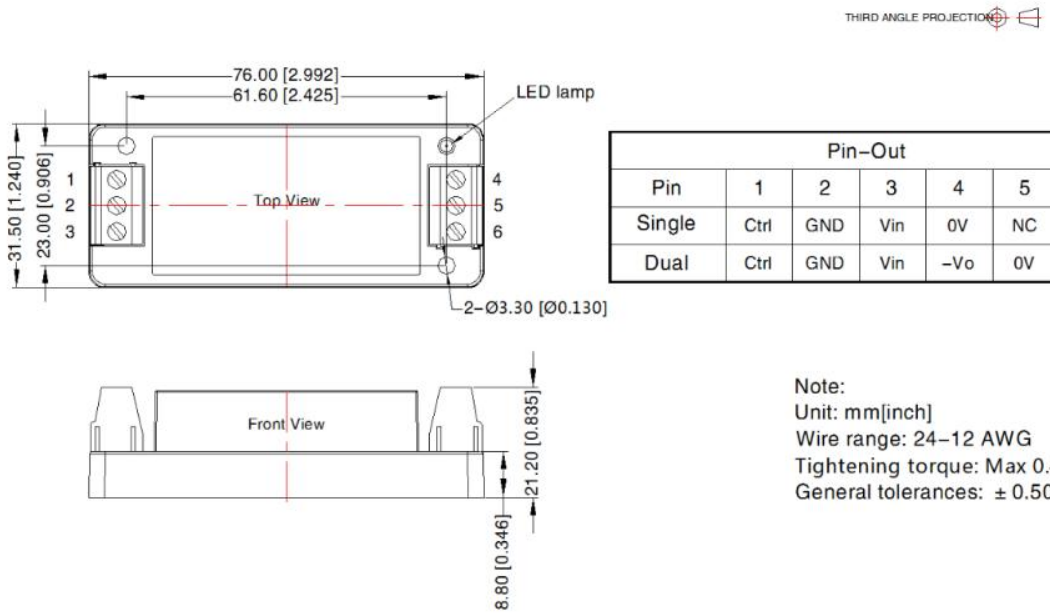


Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.50[±0.020]

Note : Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo
6	Ctrl	Ctrl

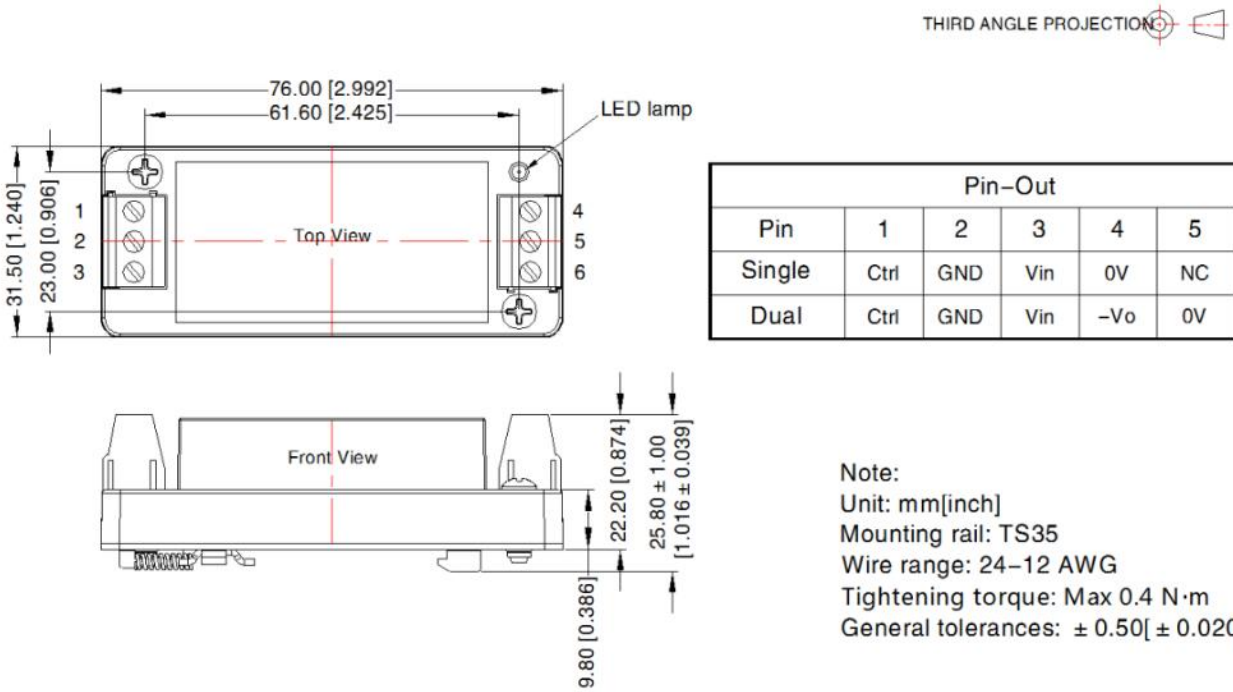
DWLP10-ExxxxE2S & DWLP10-FxxxxE2S Dimensions



Pin-Out						
Pin	1	2	3	4	5	6
Single	Ctrl	GND	Vin	0V	NC	+Vo
Dual	Ctrl	GND	Vin	-Vo	0V	+Vo

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 0.50[± 0.020]

DWLP10-ExxxxD4S & DWLP10-FxxxxD4S Dimensions



Pin-Out						
Pin	1	2	3	4	5	6
Single	Ctrl	GND	Vin	0V	NC	+Vo
Dual	Ctrl	GND	Vin	-Vo	0V	+Vo

Note:
Unit: mm[inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ± 0.50[± 0.020]

Note:

1. It is recommended that the load imbalance of the dual output is ≤±5%. If it exceeds ±5%, the performance of the product cannot be guaranteed to meet as datasheet marked. For details, please contact our technical staff;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measDWLP10-Ed under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. Products are related to laws and regulations: see "FeatDWLP10-Es" 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.