

Descriptions

10W isolated, DC/DC Converter



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 temperature range: -40°C to +85°C
- 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 Efficiency ^④ (%) Min./Typ.	Capacitive Load (μF) ^⑤ Max.
		Nominal ^② (Range)	Max. ^③	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DWLP10-E2405	24 (9-36)	40	±5	±1000/0	79/81	1000
EN/BS EN	DWLP10-E2412			±12	±416/0	83/85	330
EN/BS EN	DWLP10-E2415			±15	±333/0	85/87	220
EN/BS EN	DWLP10-F2403			3.3	2400/0	76/78	5400
EN/BS EN	DWLP10-F2405			5	2000/0	80/82	5400
EN/BS EN	DWLP10-F2409			9	1111/0	82/84	680
EN/BS EN	DWLP10-F2412			12	833/0	82/84	470
EN/BS EN	DWLP10-F2415			15	667/0	85/87	330
EN/BS EN	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
--	DWLP10-E4815			±15	±333/0	85/87	220

EN/BS EN	DWLP10-F4803	48 (18-75)	80	3.3	2400/0	77/79	5400
EN/BS EN	DWLP10-F4805			5	2000/0	80/82	5400
EN/BS EN	DWLP10-F4812			12	833/0	84/86	470
EN/BS EN	DWLP10-F4815			15	667/0	85/87	330
EN/BS EN	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.

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	--	VDC
		48VDC nominal input series, nominal input voltage		--	30	--	
	Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	
		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			
Output Specifications	Ctrl ^①	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
	Voltage Accuracy ^②	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 Regulation ^③	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	μs
	Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	
	Transient Response Deviation			--	±3	±5	
	TemperatDWLP10-E Coefficient	Full load		--	--	±0.03	%/°C
	Ripple & Noise ^④	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 TemperatDWLP10-E	See Fig. 1	-40	--	+85	°C
	Storage TemperatDWLP10-E		-55	--	+125	
	Storage Humidity	Non-condensing	5	--	95	%RH
	Pin Soldering Resistance TemperatDWLP10-E	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	°C
	Vibration		10-55Hz, 2G, 30 Min. along X, Y and Z			
	Switching Frequency [®]	PWM mode	--	350	--	kHz
	MTBF	MIL-HDBK-217F@25°C	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;

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 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

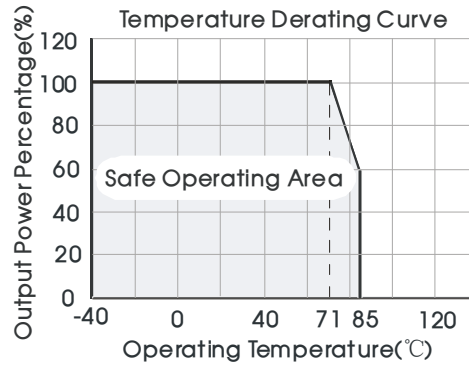


Fig. 1

Design Reference

1. Typical application

All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values C_{in} and C_{out} 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.

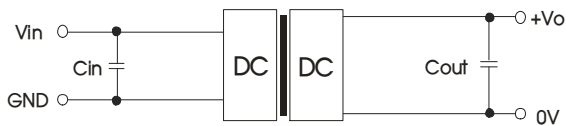


Fig. 2

C_{in}	C_{out}
10 μ F - 47 μ F/100V	10 μ F/63V

2. EMC compliance circuit

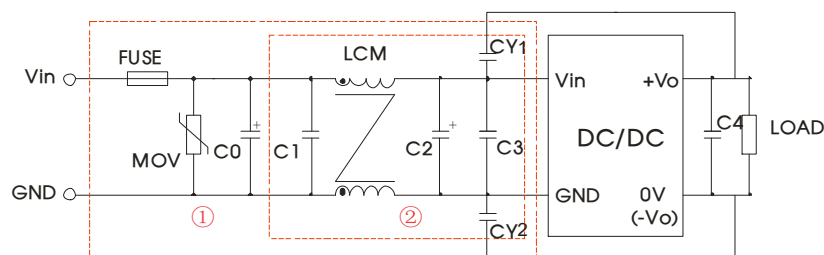


Fig. 3

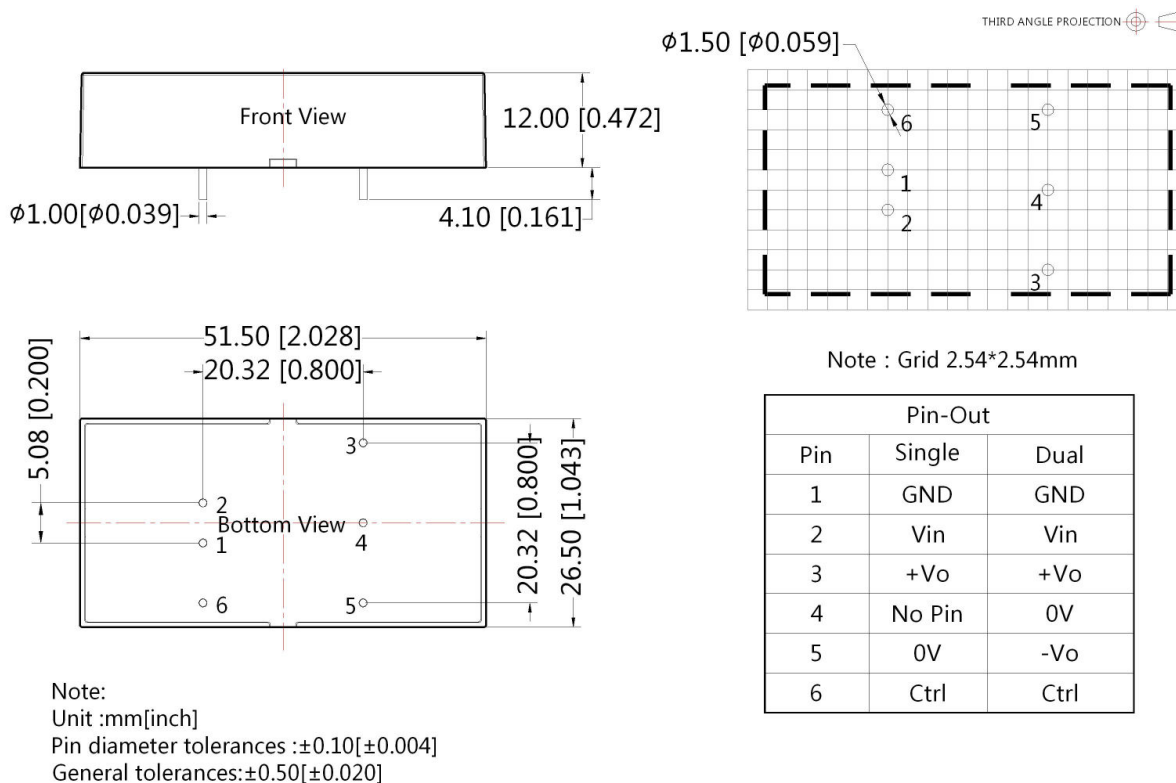
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

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			

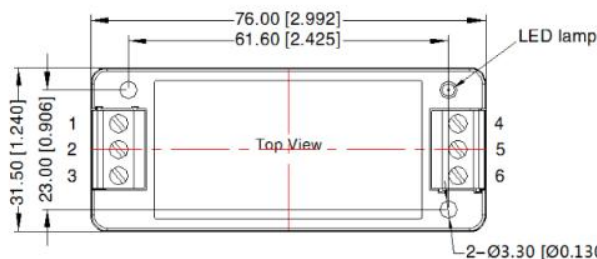
3. The products do not support parallel connection of their output

Dimensions and Recommended Layout



DWLP10-ExxxxE2S & DWLP10-FxxxxE2S Dimensions

THIRD ANGLE PROJECTION

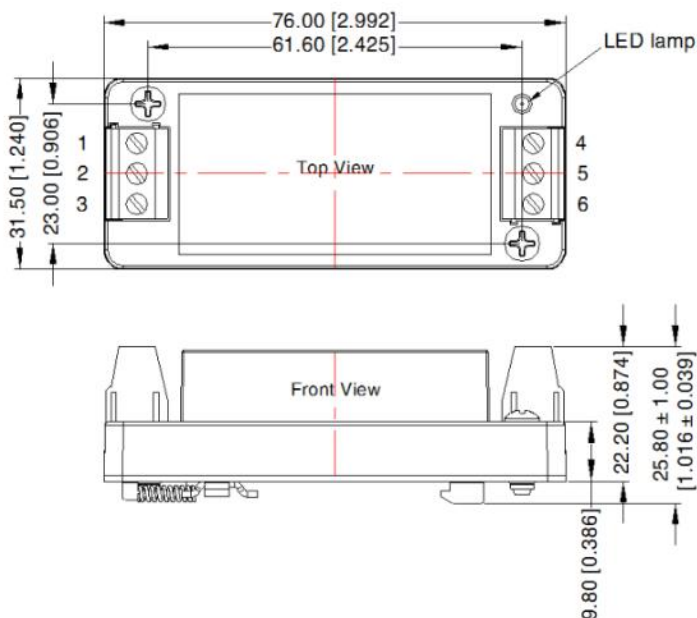


Pin-Out						
Pin	1	2	3	4	5	6
Single	Ctrl	GND	Vin	0V	NC	+Vo
Dual	Ctrl	GND	Vin	-Vo	0V	+Vo

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

THIRD ANGLE PROJECTION



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 $\leq \pm 5\%$. If it exceeds $\pm 5\%$, 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 $T_a=25^{\circ}\text{C}$, humidity $<75\%\text{RH}$ 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.