

Descriptions

20W isolated DC-DC converter



CE Report
EN 62368-1

RoHS
UKCA Report
BS EN 62368-1



Features

- Ultra-wide 4:1 input voltage range
- High efficiency up to 90%
- No-load power consumption as low as 0.24W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Operating ambient temperature range: -40°C to +105°C
- Input reverse polarity protection available with Chassis (E2S) or 35mm DIN-Rail mounting (D4S) version
- Industry standard pin-out
- Meets EN50155 railway standard

Applications

- Industrial control
- Electric power
- Instrumentation
- Communication
- Railway

Selection Guide

Certification	Part No. ^①	Input Voltage (VDC)		Output		Full Load Efficiency ^④ (%)Min./Typ.	Capacitive Load ^⑤ (μF)Max.
		Nominal ^② (Range)	Max. ^③	Voltage(VDC)	Current (mA) Max./Min.		
EN/BS EN	DWMD20-A2405	24 (9-36)	40	±5	±2000	84/86	2000
	DWMD20-A2412			±12	±833	88/90	800
	DWMD20-A2415			±15	±667	88/90	600
	DWMD20-A2424			±24	±417	86/88	300

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 (wiring) and D4S (rail) suffixes because of the input reverse polarity function;

③Exceeding the maximum input voltage may cause permanent damage;

④Efficiency is measured 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 positive and negative output is identical.

Specifications

Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	24VDC nominal input series, nominal input voltage		--	958/10	--/20	mA
	Maximum input current	24VDC nominal input series, nominal input voltage		--	--	1100	
	Reflected Ripple Current			--	30	--	
	Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	VDC
	Start-up Voltage	24VDC nominal input series		--	--	9	
	Under-voltage Protection	24VDC nominal input series		5.5	6.5	--	
	Start-up Time	Nominal input voltage & constant resistance load		--	10	--	ms
	Input Filter			Pi filter			
	Hot Plug			Unavailable			
	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		--	2	7	mA
Output Specifications	Voltage Accuracy ^②	5%-100% load		--	±1	±3	%
	Linear Regulation	Input voltage variation from low to high at full load	Vo1	--	±0.2	±0.5	
		Vo2	--	±0.4	±1		
	Load Regulation ^③	5%-100% load		--	±0.5	±1	
	Cross Regulation	Dual output, Vo1 load at 50%, Vo2 load at range of 10%-100%		--	--	±5	μs
	Transient Recovery Time	25% load step change, nominal input voltage	All products	--	300	500	
	Transient Response Deviation		5VDC output	--	±3	±8	
			Others	--	±3	±5	%
	Temperature Coefficient	Full load		--	--	±0.03	%/℃
	Ripple & Noise ^④	20MHz bandwidth, 5%-100% load		--	100	200	mVp-p
	Over-voltage Protection	Input voltage range		110	--	160	%Vo
	Over-current Protection			110	150	200	%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
		Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.		1000	--	--	
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	2000	--	pF
	Operating Temperature	See Fig. 1		-40	--	+105	℃
	Storage Temperature			-55	--	+125	
	Storage Humidity	Non-condensing		5	--	95	

	Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	℃
	Vibration		IEC/EN61373 - Category 1, Grade B			
	Switching Frequency ⑤	PWM mode	--	270	--	kHz
	MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Mechanical Specifications	Case Material	Aluminum alloy				
	Dimensions	Horizontal package	25.40 × 25.40 × 11.70 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	15.0g/35.0g/58.0g (Typ.)			
	Cooling method	Free air convection				

Note:

①The Ctrl pin voltage is referenced to input GND.

②Output voltage accuracy for 0%-5% load is ±4% max;

③Load regulation for 0%-100% load is ±5%;

④Under 0% -5% load conditions, ripple & noise does not exceed 5%Vo. 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 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 (Bare pager)	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		

Electromagnetic Compatibility (EMC) (EN50155)

Emissions	CE	EN50121-3-2	150kHz-500kHz	99dBuV (see Fig.3-② for recommended circuit)	
		EN55016-2-1	500kHz-30MHz	93dBuV (see Fig.3-② for recommended circuit)	
	RE	EN50121-3-2	30MHz-230MHz	40dBuV/m at 10m (see Fig.3-② for recommended circuit)	
		EN55016-2-1	230MHz-1GHz	47dBuV/m at 10m (see Fig.3-② for recommended circuit)	
Immunity	ESD	EN50121-3-2	Contact ±6kV/Air ±8kV	perf. Criteria A	
	RS	EN50121-3-2	20V/m (Bare pager)	perf. Criteria A	
	EFT	EN50121-3-2	±2kV 5/50ns 5kHz (see Fig.3-① for recommended circuit)	perf. Criteria A	
	Surge	EN50121-3-2	line to line ± 1kV (42Ω, 0.5μF) (see Fig.3-① for recommended circuit)	perf. Criteria A	
	CS	EN50121-3-2	0.15MHz-80MHz 10 Vr.m.s (Bare pager)	perf. Criteria A	

Characteristic Curve

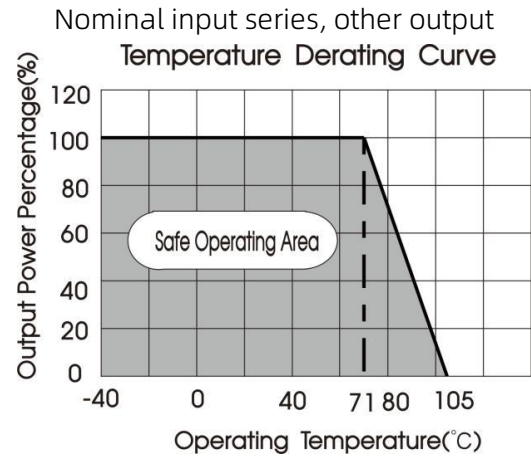
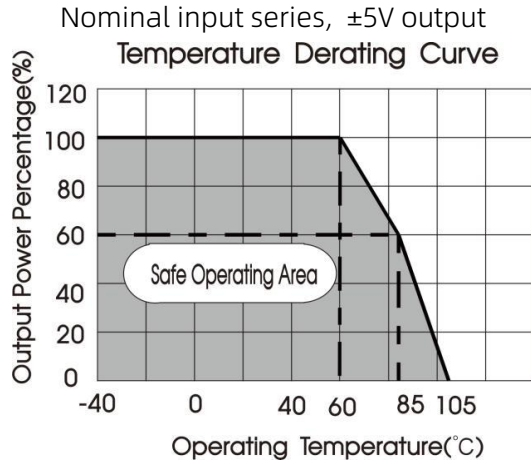
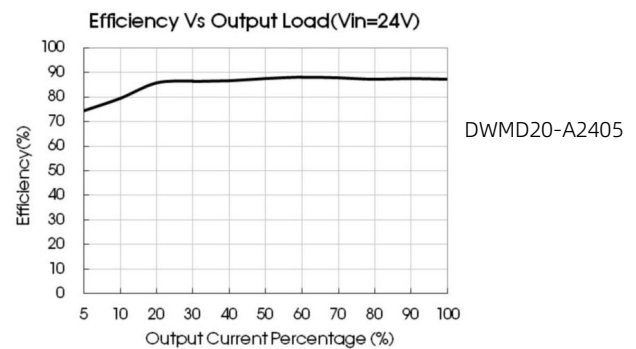
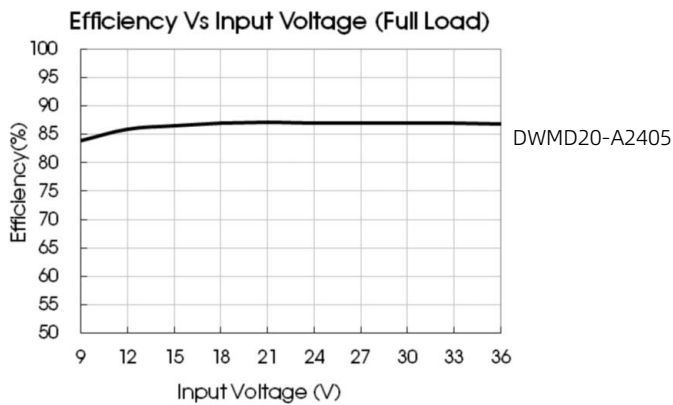


Fig. 1



Design Reference

1. Typical application

All the 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 sure that the capacitance is not exceeding the max. capacitive load value of the product.



Fig. 2

Vin (VDC)	Vout (VDC)	Cin	Cout
24	± 5	100 μ F/50V	10 μ F/16V
	$\pm 12/\pm 15$		10 μ F/25V
	± 24		10 μ F/50V

2. EMC compliance circuit

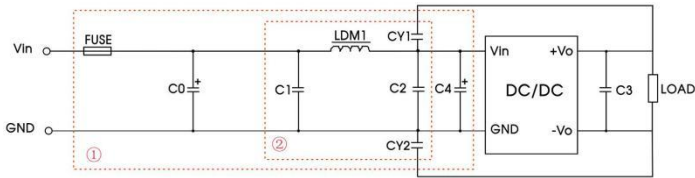


Fig. 3

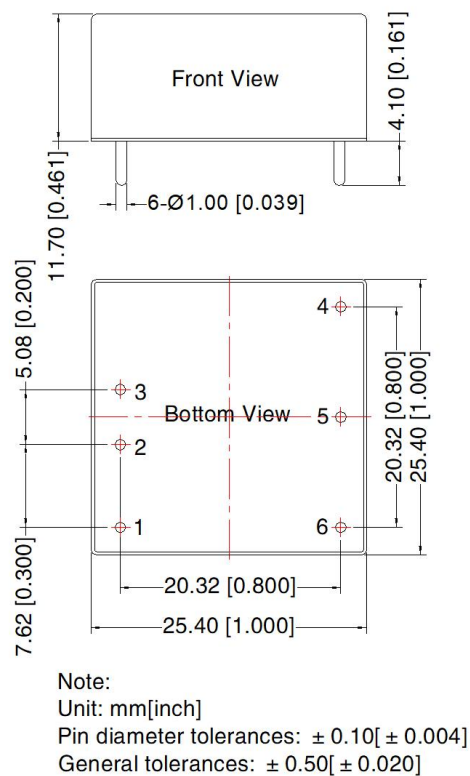
Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

List of components:

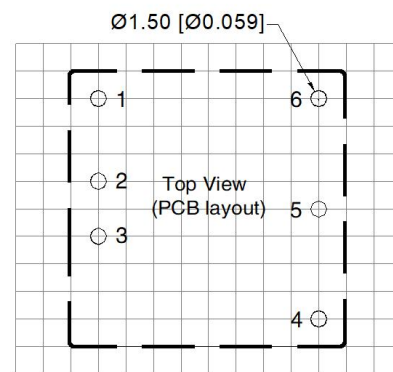
Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0, C4	330μF/50V
C1, C2	4.7μF/50V
C3	Refer to the Cout in Fig.2
LDM1	4.7μH
CY1, CY2	1nF/2kV

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

Dimensions and Recommended Layout



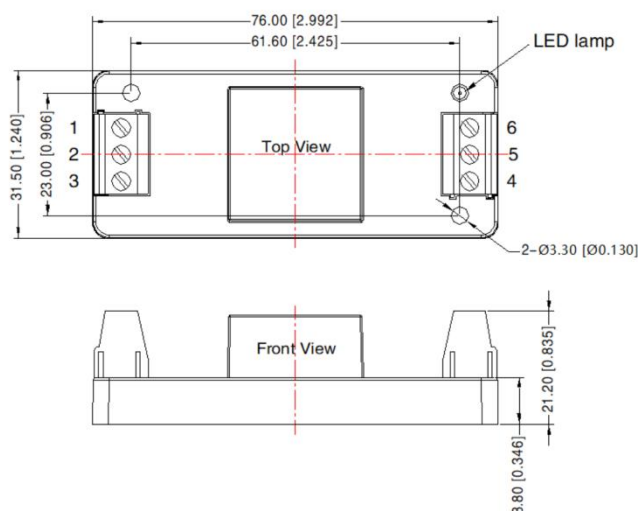
THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

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

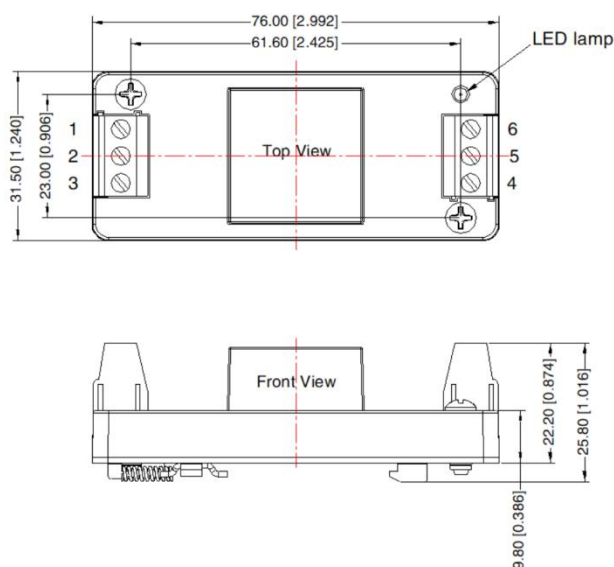
DWMD20-A24xxE2S Dimensions

THIRD ANGLE PROJECTION 

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

Note:
 Unit: mm[inch]
 Wire range: 24-12 AWG
 Tightening torque: Max 0.4 N · m
 General tolerances: $\pm 1.00 [\pm 0.039]$

DWMD20-A24xxD4S Dimensions

THIRD ANGLE PROJECTION 

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

Note:
 Unit: mm[inch]
 Mounting rail: TS35
 Wire range: 24-12 AWG
 Tightening torque: Max 0.4 N · m
 General tolerances: $\pm 1.00 [\pm 0.039]$

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 $T_a=25^{\circ}\text{C}$, 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.