



10DPW_3R series

10W - Single/Dual Output DC-DC Converter - Wide Input - Isolated & Regulated

DC-DC Converter 10 Watt

- ⊕ DIP24 package
- ⊕ 2:1 input range
- ⊕ Operating temperature range: -40°C to +85°C
- ⊕ 3000VDC isolation
- ⊕ Up to 87% efficiency
- ⊕ Input under-voltage protection
- ⊕ Short-circuit protection (SCP)
- ⊕ Over-voltage protection
- ⊕ Over-current protection

Introducing our new 10DPW_3R series – reliable Power in a compact DIP24 housing. Designed for demanding environments and precision-critical applications, the 10DPW_3R Series delivers robust performance and intelligent protection features in a compact DIP24 package. With a 2:1 input voltage range, 3000VDC isolation, and efficiency of up to 87%, this DC-DC converter ensures reliable power conversion even under tough conditions. The operating temperature range from -40°C to +85°C makes it suitable for a wide range of industrial applications. Built-in under-voltage, over-voltage, over-current, and short-circuit protection ensure safe and stable operation at all times. Ideal for use in: Industry • Power Systems • Instrumentation • Communication Equipment • Rail Transit



Common specifications	
Short circuit protection	Input voltage range, continuous, self-recovery
Switching frequency	300 kHz (full load, nominal input voltage)
Operation temperature	-40°C ~+85°C (with derating)
Storage temperature	-55°C ~+125°C
Pin welding can withstand the highest temperature	+300°C (Soldering spot is 1.5mm away from case for 10 seconds)
Storage humidity	5~95% RH (non-condensing)
MTBF: (MIL-HDBK-217F@25°C)	> 1,000,000 hours
Input filter	Capacitance filter
Hot plug	Unavailable
Case material	Black flame retardant and heat-resistant plastic (UL 94V-0 rated)
Package dimensions	32.00 × 20.30 × 12.60mm
Weight	13g (typ.)
Cooling method	Free air convection

Output specifications					
Item	Test condition	Min	Typ	Max	Units
Voltage accuracy (0%- 100% load)	Positive output		±1	±3	%
	Negative output		±2	±5	
Linear regulation (input voltage from low limit to high limit, full load)	Positive output		±0.2	±1	%
	Negative output		±0.5	±1.5	
Load regulation (10%- 100% load)	Positive output		±0.5	±1	%
	Negative output		±0.8	±2	
Ripple & noise (20MHz bandwidth 5% - 100% load)	Single 3.3/5VDC		50	100	mVp-p
	Other output		50	150	
Transient recovery time	25% load step change		0.3	0.5	ms
Transient response deviation (25% load step change)	Single 3.3/5VDC		±5	±8	%
	Other output		±3	±5	
Temperature drift coefficient	Full load			±0.03	%/°C
Overcurrent protection (input voltage range)	Single 3.3/5VDC	110	160	230	%Io
	Other Output	110	140	190	

Note: 1. Auxiliary circuit output voltage (Vo2) maximum accuracy is ± 5%;
2. Load regulation for 0% - 100% load is ± 5%.

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Input current (full load/ no load)	12VDC nominal input		1041/15	1068/30	mA
	• Single 3.3VDC Output		1004/5	1029/12	
	• Single 5VDC Output		958/9	980/15	
	• Other Output				
	24VDC nominal input		521/10	534/25	mA
	• Single 3.3VDC Output		502/5	514/12	
	• Single 5VDC Output		479/5	490/12	
	• Other Output				
	48VDC nominal input		260/8	267/20	mA
	• Single 3.3VDC Output		251/5	257/12	
	• Single 5VDC Output		239/4	245/8	
	• Other Output				
Reflected ripple current	12VDC nominal input		50		
	24VDC nominal input		40		
	48VDC nominal input		30		
Impulse voltage	12VDC nominal input	-0.7		25	VDC
	24VDC nominal input	-0.7		50	
	48VDC nominal input	-0.7		100	
Starting voltage	12VDC nominal input			9	VDC
	24VDC nominal input			18	
	48VDC nominal input			36	
Input undervoltage protection	12VDC nominal input	5.5	6.5		VDC
	24VDC nominal input	12	15.5		
	48VDC nominal input	25	30.5		
CTRL	Module shutdown	0-0.7V shutdown			
	Module enabled	Suspended or 3.5 - 12V open			

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Insulation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000			VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000			M Ω
Insulation Capacitance	Input-output, 100KHz/0.1V		1200		pF

Example:
10DPW_2405S3R
10 = 10Watt; D = DIP; P = Series; W = Wide input; 24 = 24Vin; 05 = 5Vout; S = Single Output; 3 = 3000VDC isolation; R = Regulated Output

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
- Suggested dual output module load imbalance: ≤ ± 5%. If it exceeds ± 5%, it cannot be guaranteed that the product performance meets all performance indicators in this datasheet;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at Ta = 25 °C, humidity <75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this datasheet are based on our corporate standards;
- Product specifications are subject to change without prior notice.

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EMC specifications							
EMC	EMI	CE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (recommended circuit diagram 3-2)			
EMC	EMI	RE	CISPR32/EN55032	CLASS A (without extra components)/ CLASS B (recommended circuit diagram 3-2)			
EMC	EMS	ESD	IEC/EN61000-4-2	Contact± 4kV	Perf. Criteria	B	
EMC	EMS	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria	A	
EMC	EMS	EFT	IEC/EN61000-4-4	± 2kV (Recommended circuit diagram 3-①)	Perf. Criteria	B	
EMC	EMS	Surge	IEC/EN61000-4-5	± 2kV (Recommended circuit diagram 3-①)	Perf. Criteria	B	
EMC	EMS	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria	A	
EMC	EMS	Voltage sag, drop, and short-term interruption immunity	IEC/EN61000-4-29	0 - 70%	Perf.Criteria	B	

Product Selection Guide

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency% (typ.)	Capacitive Load max. (µF)
	10DPW_1203S3R	12 (9-18)	20	3.3	2400/0	80	1200
	10DPW_1205S3R	12 (9-18)	20	5	2000/0	83	1000
	10DPW_1212S3R	12 (9-18)	20	12	833/0	87	470
	10DPW_1215S3R	12 (9-18)	20	15	667/0	87	330
	10DPW_1224S3R	12 (9-18)	20	24	416/0	87	100
	10DPW_2403S3R	24 (18-36)	40	3.3	2400/0	81	1200
	10DPW_2405S3R	24 (18-36)	40	5	2000/0	83	1000
	10DPW_2412S3R	24 (18-36)	40	12	833/0	87	470
	10DPW_2415S3R	24 (18-36)	40	15	667/0	87	330
	10DPW_2424S3R	24 (18-36)	40	24	416/0	87	100
	10DPW_4803S3R	48 (36-75)	80	3.3	2400/0	80	1200
	10DPW_4805S3R	48 (36-75)	80	5	2000/0	83	1000
	10DPW_4812S3R	48 (36-75)	80	12	833/0	87	470
	10DPW_4815S3R	48 (36-75)	80	15	667/0	87	330
	10DPW_4824S3R	48 (36-75)	80	24	416/0	87	100

Approval	Part number	Input Voltage Nominal Range (VDC)	Input Voltage Max. (VDC)	Output Voltage (VDC)	Output Current (mA) max.	Full Load Efficiency% (typ.)	Capacitive Load max. (µF)
	10DPW_1205S3R	12 (9-18)	20	±5	±1000/0	83	1000
	10DPW_1212S3R	12 (9-18)	20	±12	±416/0	87	470
	10DPW_1215S3R	12 (9-18)	20	±15	±333/0	87	330
	10DPW_2405S3R	24 (18-36)	40	±5	±1000/0	83	1000
	10DPW_2412S3R	24 (18-36)	40	±12	±416/0	87	470
	10DPW_2415S3R	24 (18-36)	40	±15	±333/0	87	330
	10DPW_4805S3R	48 (36-75)	80	±5	±1000/0	83	1000
	10DPW_4812S3R	48 (36-75)	80	±12	±416/0	87	470
	10DPW_4815S3R	48 (36-75)	80	±15	±333/0	87	330

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Typical characteristics

Temperature derating graph

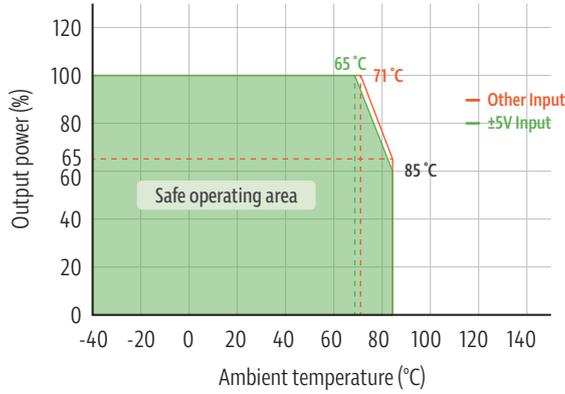
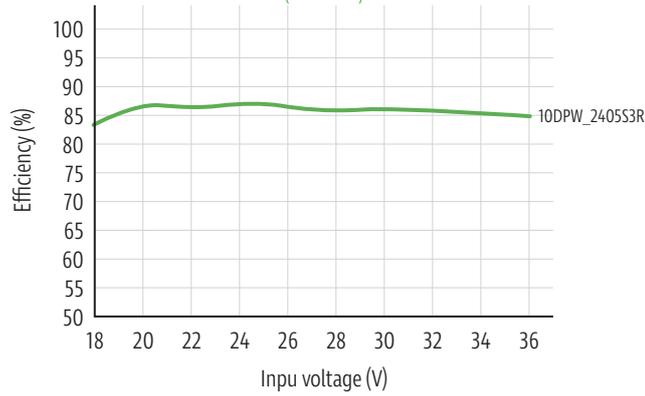


Figure1

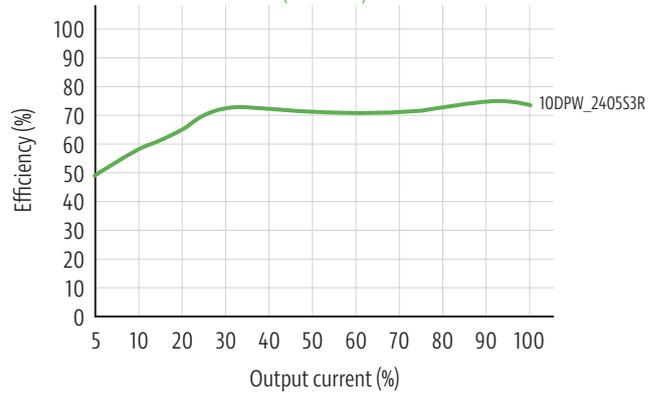
Efficiency vs input voltage

(Full load)



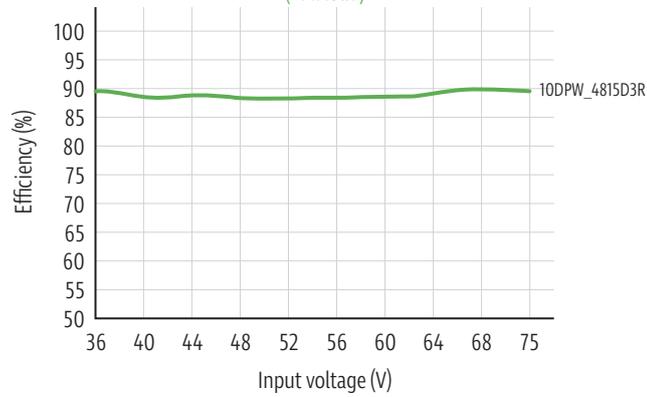
Efficiency vs output load

(Vin = 24V)



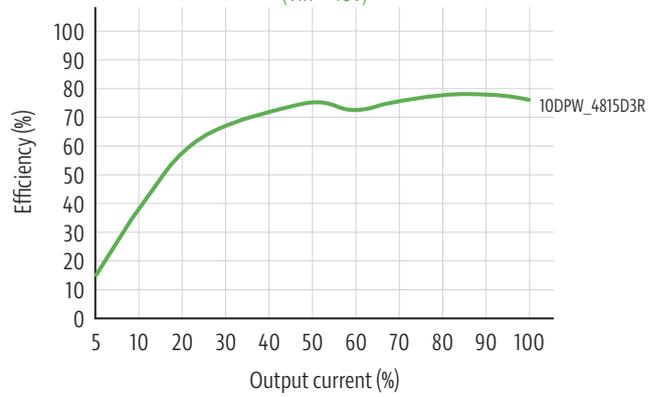
Efficiency vs input voltage

(Full load)



Efficiency vs output load

(Vin = 48V)



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Typical circuit design and application

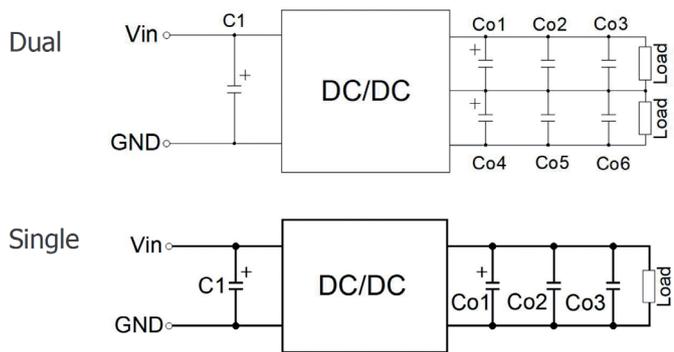


Figure2

Recommended capacitive load value table

Vout (VDC)	C1 (uF)	Co1, Co4 (uF)	Co2, Co5 (uF)	Co3, Co6 (uF)
3.3/5VDC	100µF/100V	100uF/16V	0.1uF/50V	10uF/50V
12/15VDC	100µF/100V	47µF/25V	0.1uF/50V	10µF/50V
24VDC	100µF/100V	47µF/50V	0.1uF/50V	10µF/50V

Application circuit description:

All DC-DC converters in this series are tested according to the recommended testing circuit (Figure 2) before leaving the factory. If further reduction of input and output ripple is required, the input and output external capacitors C1 and Co1, Co2, Co3, Co4, Co5, Co6 can be increased or a capacitor with a small series equivalent impedance value can be selected, but the capacitance value cannot exceed the maximum capacitive load of the product.

EMI recommended component parameters

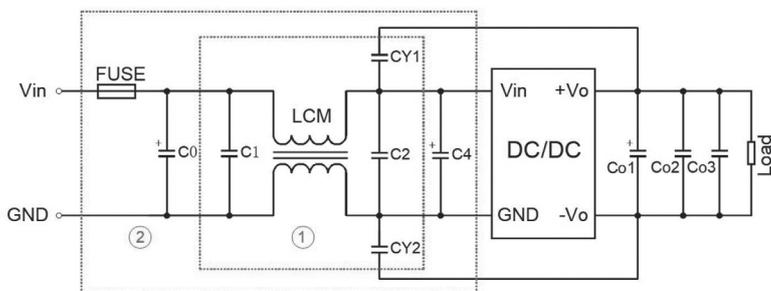


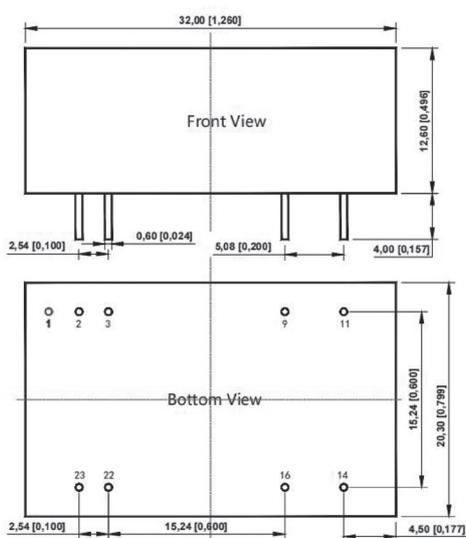
Fig 3

EMI recommended component parameters

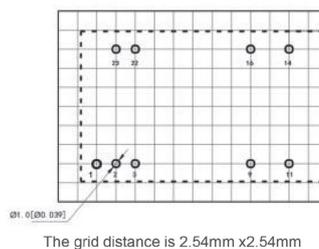
Model	Vin: 12V	Vin: 24V	Vin: 48V
FUSE	Select based on the actual input current of the customer		
C0, C4	470µF/35V	330µF/50V	330µF/100V
C1, C2	10µF/50V	10µF/50V	10µF/100V
Co1/Co2/Co3/Co4/Co5/Co6	Figure 2. Capacitive load value table		
LCM	1.4-1.7mH		
CY1, CY2	1nF/2KV		

Note: Part ① of Figure 3 is used for EMC testing; Part 2 is used for EMI filtering and can be selected according to requirements.

Mechanical dimensions



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



Pin definition table		
Pin	Single	Double
1	CTRL	CTRL
2	GND	GND
3	GND	GND
9	NO PIN	COM
11	NC	-Vo
14	+Vo	+Vo
16	-Vo	COM
22	Vin	Vin
23	Vin	Vin

NC: Pin to be isolated from circuitry