

FEATURES

10W isolated DC-DC converter in DIP package
Ultra-wide input and regulated dual/single output

- ◆ Ultra-wide 4:1 input voltage range
- ◆ High efficiency up to 88%
- ◆ No-load power consumption as low as 0.12W
- ◆ I/O isolation test voltage 1500Vdc
- ◆ Input under-voltage protection, output short circuit, over-current, over-voltage protection
- ◆ Operating ambient temperature range: -40°C to +85°C
- ◆ Meets CISPR32/EN55032 CLASS A, without extra components
- ◆ IEC60950, UL60950, EN62368 approved
- ◆ Industry standard pin-out



RoHS

Selection Guide

Certification	Part No. ①	Input Voltage(VDC)		Output		Full Load Efficiency ④ (%) Min./Typ.	Max. Capacitive Load ⑤ (μF)
		Nominal ② (Range)	Max. ③	Voltage (VDC)	Current(mA) Max./Min.		
CE	*CFDA10-24D05	24 (9-36)	40	±5	±1000/0	81/83	1000
	CFDA10-24D09			±9	±555/0	84/86	680
	*CFDA10-24D12			±12	±416/0	85/87	470
	CFDA10-24D15			±15	±333/0	85/87	330
	*CFDA10-24D24			±24	±208/0	85/87	100
	CFDA10-24S03			3.3	2400/0	76/78	2200
	CFDA10-24S05			5	2000/0	81/83	2200
	CFDA10-24S09			9	1111/0	83/85	680
	CFDA10-24S12			12	833/0	84/86	470
	CFDA10-24S15			15	667/0	84/86	330
	CFDA10-24S24			24	416/0	86/88	100
	*CFDA10-48D05	48 (18-75)	80	±5	±1000/0	81/83	1000
	*CFDA10-48D12			±12	±416/0	85/87	470
	*CFDA10-48D15			±15	±333/0	85/87	330
	*CFDA10-48D24			±24	±208/0	85/87	100
	*CFDA10-48S03			3.3	2400/0	77/79	2200
	*CFDA10-48S05			5	2000/0	81/83	2200
	*CFDA10-48S12			12	833/0	85/87	470
	*CFDA10-48S15			15	667/0	85/87	330
	*CFDA10-48S24			24	416/0	86/88	100

Notes:

- ① Use "Z2" suffix for chassis mounting and "Z4" suffix for DIN-Rail mounting;
- ② The Z2 and Z4 Model's start-up and minimum input voltages are increased by 1VDC due to the input reverse polarity protection circuit;
- ③ Exceeding the maximum input voltage may cause permanent damage;
- ④ Efficiency is measured at nominal input voltage and rated output load; efficiencies for Z2 and Z4 Model's is decreased by 2% due to the input reverse polarity protection circuit;
- ⑤ The specified maximum capacitive load value for positive and negative output is identical;
- ⑥ Products marked with "*" need an input capacitor in order to meet conducted specifications of CISPR32/EN55032 CLASS A.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load/no-load)	24VDC nominal input series, nominal input voltage	3.3VDC output	--	423/5	434/12	mA
		Others	--	502/5	514/12	
	48VDC nominal input series, nominal input voltage	3.3VDC output	--	190/4	215/8	
		Others	--	251/4	258/8	
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	--	VDC
	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			
Cnt*	Module on		Cnt pin open or pulled high(3.5-12VDC)			
	Module off		Cnt pin pulled low to -Vin(0-1.2VDC)			
	Input current when off		--	6	10	mA

Note: *The Cnt pin voltage is referenced to input -Vin

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy ^①	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	
Load Regulation ^②	5%-100%load	Vo1	--	±0.5	±1	
		Vo2	--	±0.5	±1.5	
Cross Regulation	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	%
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple/Noise ^③	20MHz bandwidth, 5%-100%load		--	40	80	mV p-p
Over-voltage Protection	Input voltage range		110	--	160	%Vo
Over-current Protection			110	140	190	%Io
Short-circuit Protection			Continuous, self-recovery			

Note: ① Output voltage accuracy of ±5VDC/±9VDC output converter for 0%-5%load is ±5%max;

② Load regulation for 0%-100%load is ±5%;

③ Ripple/Noise at ≤5%load is 5%Vo Max. The "parallel cable" method is used for Ripple and Noise test

General Specification

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig.1	-40	--	+85	°C
Storage Temperature		-55	--	+125	

Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	°C
Vibration		10-150Hz, 5G, 90min. along X, Y and Z			
Switching Frequency *	PWM mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

Mechanical Specifications

Case Material	Aluminum alloy	
Dimensions	Horizontal package	25.4×25.4×12.2mm
	Z2 chassismounting	76.0×31.5×21.2mm
	Z4 DIN-rail mounting	76.0×31.5×25.8mm
Weight	Horizontal pac kage/Z2 chassismounting/Z4 Din-rail mounting	12.5g/36.0g/56.0g(Typ.)
Cooling method	Free air convection	

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 V.r.m.s	perf.Criteria A	
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0%, 70%	perf.Criteria B	

Typical Characteristic Curves

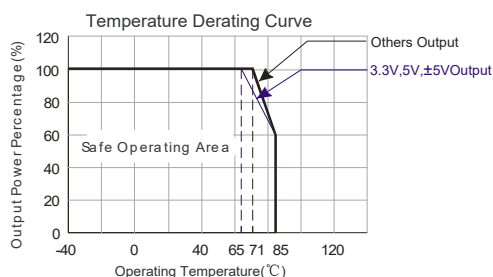
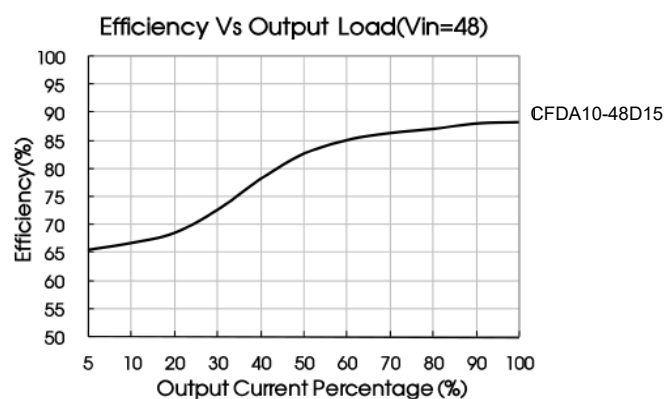
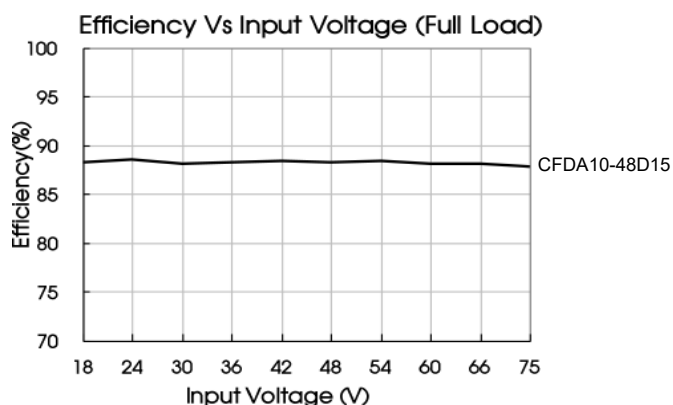
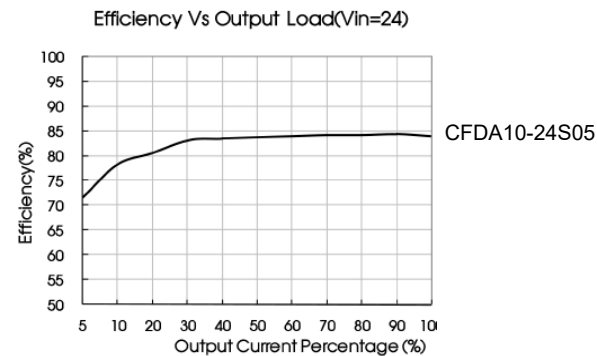
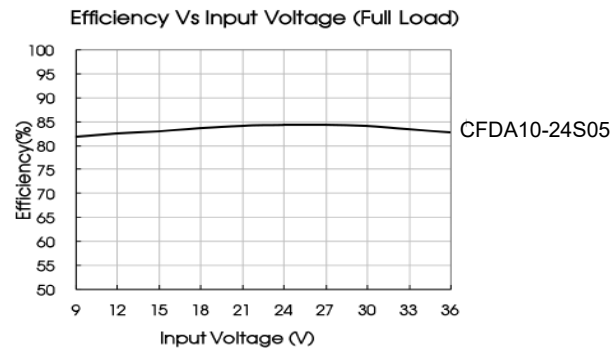


Fig. 1





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 specified max. capacitive load value of the product.

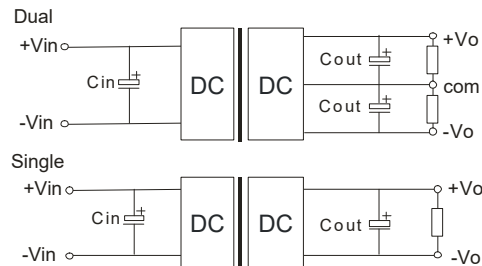


Fig.2

Vin	24V	48V
Cin	100μF	10μF-47μF
Cout	10μF	

2. EMS compliance circuit

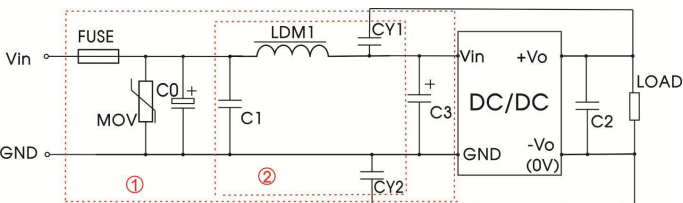


Fig. 3

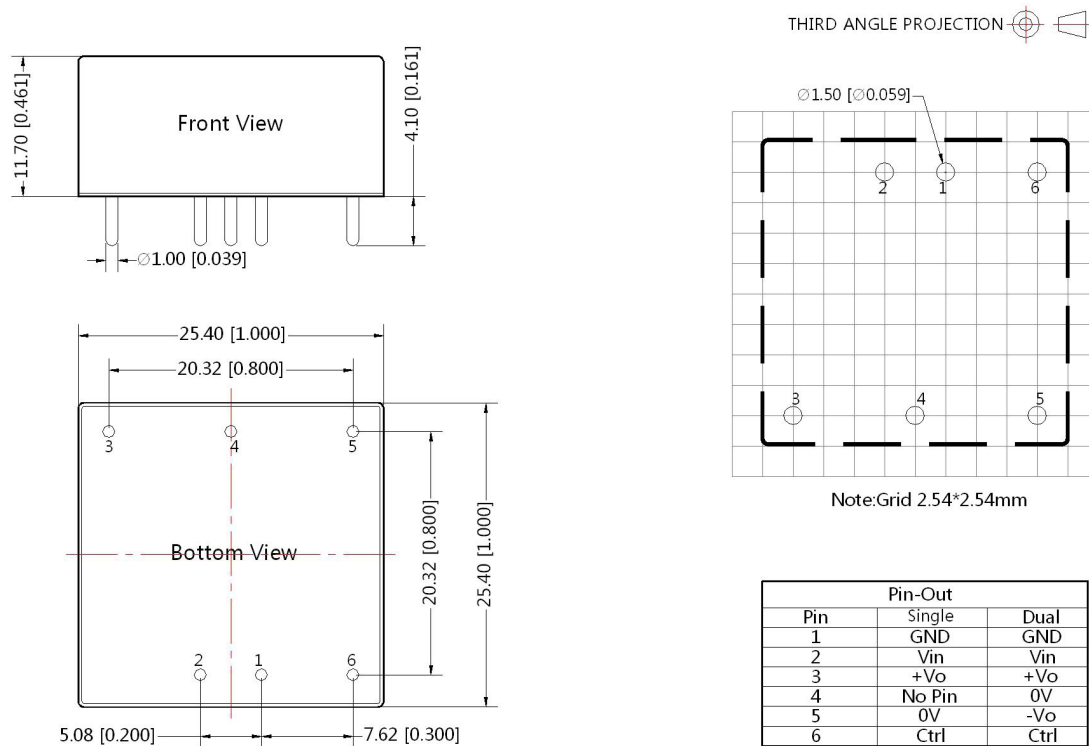
Notes: For EMC tests we use Part ① in Fig.3 for immunity and part ② for emissions test. Selecting based on needs.

Parameter description:

Model	Vin:24V	Vin:48V
FUSE	Choose according to actual input current	
MOV	S20K30	S14K60
C0/C3	330μF/50V	330μF/100V
C1	1μF/50V	1μF/100V
C2	Refer to the Cout in Fig.2	
LDM1	4.7μH	
CY1/CY2	1nF/2KV	

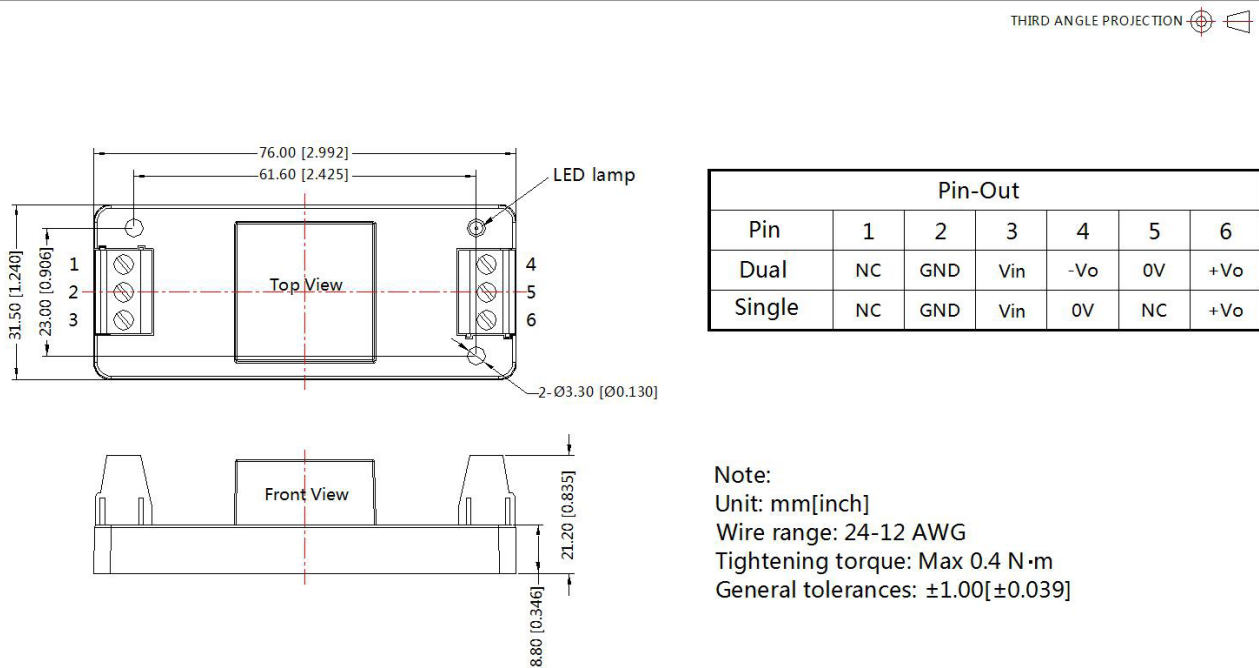
3. The products do not support parallel connection of their output

Dimensions Recommended Layout



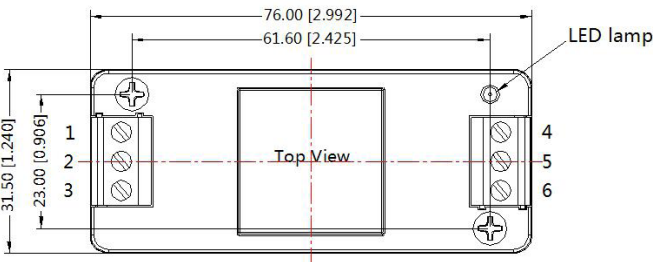
Note:
Unit :mm[inch]
Pin diameter tolerances : $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

Z2 Dimensions

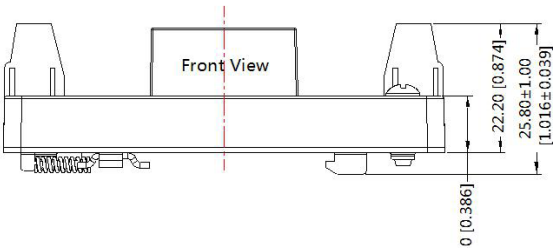


Z4 Dimensions

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: ±1.00[±0.039]

- 1.The recommended unbalance degree of the dual output module load is $\leq \pm 5\%$; if the degree exceeds $\pm 5\%$, than the product performance cannot be guaranteed to comply with all parameters in the datasheet. Please contact our technicians directly for specific information;
- 2. The maximum capacitive load offered were tested at nominal input voltage and full load;
- 3. Unless otherwise specified,parameters in this datasheet were measured under the conditions of $T_a=25^{\circ}\text{C}$,humidity<75% with nominal input voltage and rated output load;
The maximum capacitive load offered were tested at nominal input voltage and full load;
- 4.All index testing methods in this datasheet are based on our Company's corporate standards;
- 5.The performance parameters of the product models listed in this manual are as above, but some parameters of non-standard model products may exceed the requirements mentioned above.Please contact our technicians directly for specific information;
- 6.Specifications are subject to change without prior notice.



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