

FEATURES

- ◆ Ultra-wide 4:1 input voltage range
- ◆ High efficiency up to 91%
- ◆ I/O isolation tes tvoltage1500V_{DC}
- ◆ Input under-voltage protection, output short circuit, over-current,over-voltage protection
- ◆ Operating ambient temperature range-40℃~ +70℃
- ◆ 3 Years warranty

20W isolated DC-DC converter DIP package
Ultra-wide input and regulated single output



Selection Guide							
Certification	Part No. ^①	Input Voltage(Vdc)		Output		Full Load Efficiency ^④ (%)Min./Typ.	Max. Capacitive Load(μF)
		Nominal ^② (Range)	Max. ^③	Voltage(Vdc)	Current(mA) Max./Min.		
	CFDA20-24S03	24 (9-36)	40	3.3	5000/0	86/88	10000
	CFDA20-24S05			5	4000/0	88/90	10000
	CFDA20-24S06			6	3333/0	87/89	10000
	CFDA20-24S12			12	1667/0	88/90	1600
	CFDA20-24S15			15	1333/0	89/91	1000
	CFDA20-24S24			24	833/0	89/91	500
	CFDA20-48S03	48 (18-75)	80	3.3	5000/0	86/88	10000
	CFDA20-48S05			5	4000/0	88/90	10000
	CFDA20-48S12			12	1667/0	89/91	1600
	CFDA20-48S15			15	1333/0	89/91	1000
	CFDA20-48S24			24	833/0	89/91	500

Notes:

① Use“S”suffix for heat sink mounting,“Z” suffix for DIN-Rail mounting.We recommend to choose modules with a heat sink for enhanced heat dissipation and applications with extreme temperature requirements;

② The Z Model's start-up and minimum input voltages are increased by 1Vdc due to the input reverse polarity protection circuit;

③ Absolute maximum stress rating without damage (not recommended);

④ Efficiency is measured at nominal input voltage and rated output load;efficiencies for Z Model's is decreased by 2% due to the input reverse polarity protection circuit.

Input specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current(full load/no-load)	24V _{DC} nominal input series, nominal input voltage	3.3V _{DC} output	--	782/30	800/50	mA
		5V _{DC} output	--	926/35	947/55	
		6V _{DC} output	--	936/50	958/70	
		12V _{DC} output	--	926/6	947/15	
		15V _{DC} output	--	916/6	937/15	
		24V _{DC} output	--	916/10	937/20	
	48V _{DC} nominal input series, nominal input voltage	3.3V _{DC} output	--	391/15	400/30	mA
		5V _{DC} output	--	463/20	474/30	
		12V _{DC} output	--	458/3	469/15	
		15V _{DC} output	--	458/3	469/15	
		24V _{DC} output	--	458/4	469/15	
Reflected Ripple Current	Nominal input series,		--	30	--	
Surge Voltage(1sec.max.)	24V _{DC} nominal input series		-0.7	--	50	V _{DC}
	48V _{DC} nominal input series		-0.7	--	100	
Start-up Voltage	24V _{DC} nominal input series		--	--	9	
	48V _{DC} nominal input series		--	--	18	
Under-voltage Protection	24V _{DC} nominal input series		5.5	6.5	--	
	48V _{DC} 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(TTL 3.5-12V _{DC})			
	Module off		CNT pin pulled low to -V _{in} (0-1.2V _{DC})			
	Input current when off		--	2	7	mA

Note:*The CNT pin voltage is referenced to input -V_{in}

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	0%-100% load		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	
Load Regulation	5%-100% load		--	±0.5	±1	
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation		3.3V/5V/6V output	--	±5	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple/Noise*	20MHz bandwidth,5%-100% load		--	50	100	mVp-p
Trim	Input voltage range		90	--	110	%Vo
Over-voltage Protection			110	--	160	
Over-current Protection			110	150	190	%Io
Short-circuit Protection			Hiccup,continuous,self-recovery			
Note:						
*Ripple/Noise at<5% load is 5%Vo max.The "parallel cable" method is used for Ripple and Noise test						

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General Specifications

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
	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	3.3V/5V/6V output	-40	--	+70	℃
		Others	-40	--	+105	
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	℃
Vibration			10-150Hz, 5G, 0.75mm.along X,Y and Z			
Switching Frequency*	PWM mode	3.3V/5V/6V output	--	300	--	KHz
		Others	--	270	--	
MTBF	MIL-HDBK-217F@25℃		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(withoutheatsink)		25.4×25.4×11.7mm
	Horizontal package(withheatsink)		25.4×25.4×16.2mm
	ZDin-rail package(withoutheatsink)		76.0×31.5×25.8mm
Weight	without heat sink	Horizontal package/Z Din-rail package	15.0g/58.0g(Typ.)
	with heat sink	Horizontal package/ZDin-rail package	20.0g/60.0g(Typ.)
Cooling method	Free air convection		

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 ±6KV, Air ±8KV		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 A
	Surge	IEC/EN61000-4-5	line to line ±2KV(see Fig.3-① for recommended circuit)		perf.Criteria B
	CS	IEC/EN61000-4-6	3Vr.m.s		perf.Criteria A

Typical Characteristic Curves

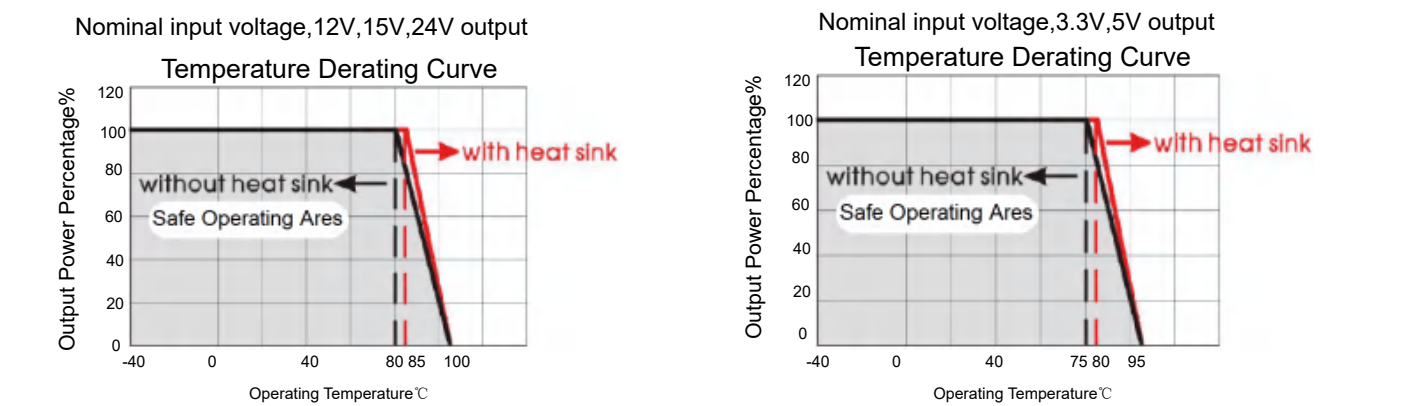
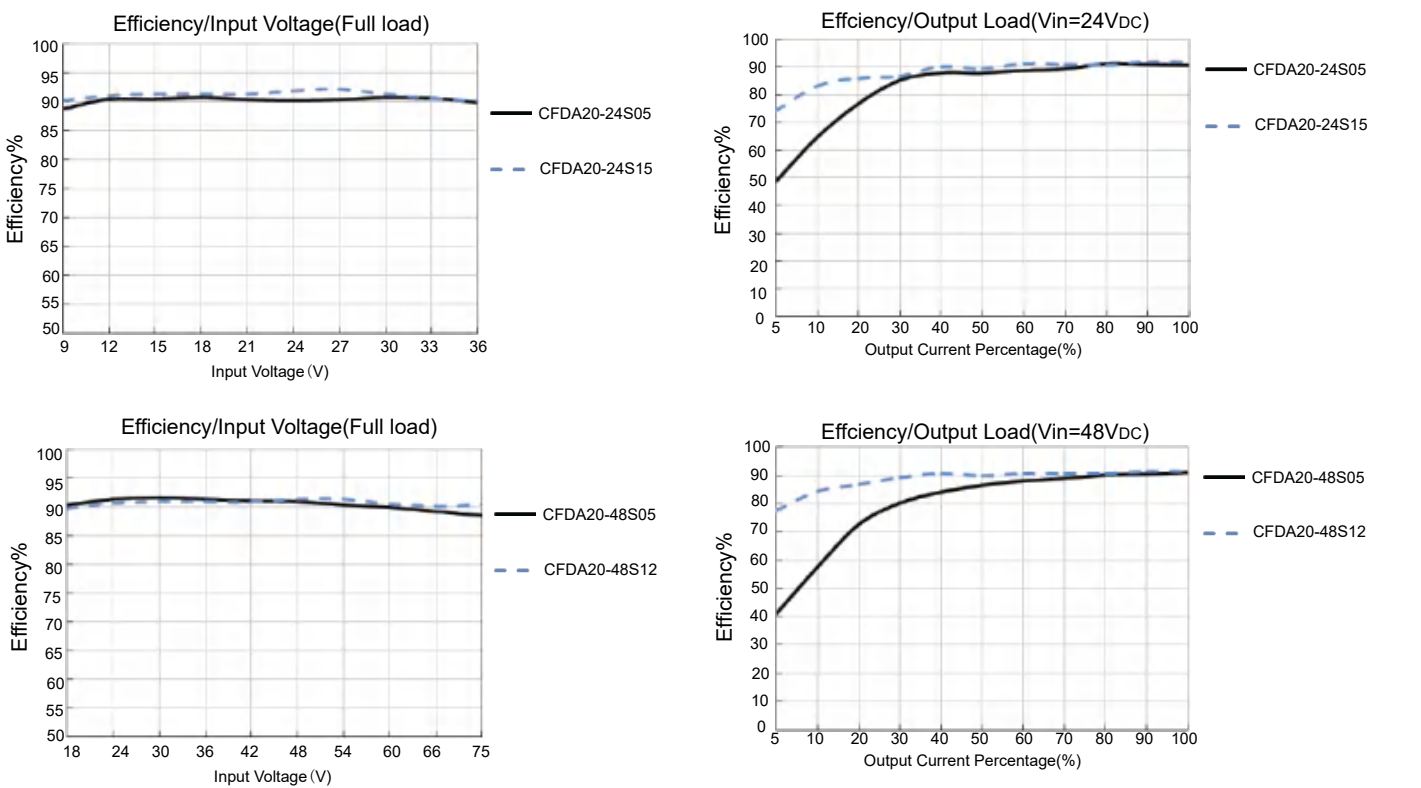


Fig.1

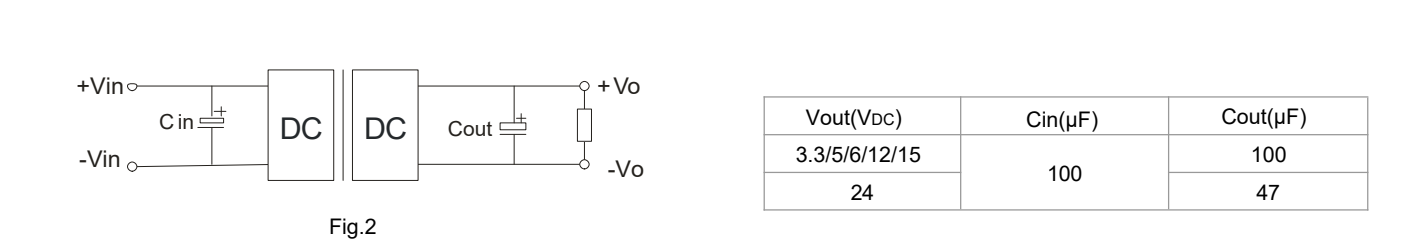


Design Reference

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



2. EMC compliance circuit

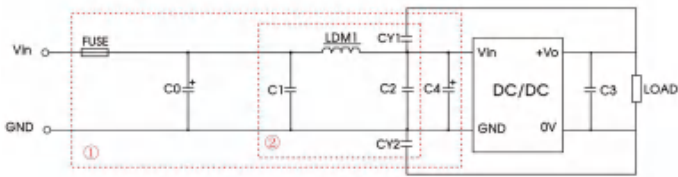


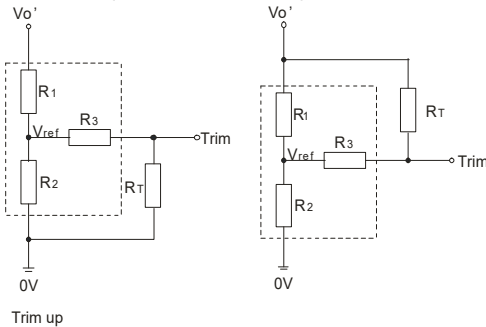
Fig. 3

Notes: We use Part ① in Fig. 3 for Immunity tests and Part ② for Emissions test.

Parameter description:

Model	Vin:24V	Vin:48V
FUSE	Select fuse value according to actual input current	
C0,C4	330μF/50V	330μF/100V
C1,C2	4.7μF/50V	4.7μF/100V
C3	Refer to the Cout in Fig.2	
LDM1	2.2μH/4A	2.2μH/2A
CY1,CY2	1nF/2KV	

3. Trim Function for Output Voltage Adjustment (open if unused)



TRIM resistor connection(dashed line shows internal resistor network)

Calculating Trim resistor values:

$$\text{up: } R_T = \frac{aR_2}{R_2 - a} - R_3$$
$$\text{down: } R_T = \frac{aR_1}{R_1 - a} - R_3$$

$$a = \frac{V_{ref}}{V_{o'} - V_{ref}} \cdot R_1$$
$$a = \frac{V_{o'} - V_{ref}}{V_{ref}} \cdot R_2$$

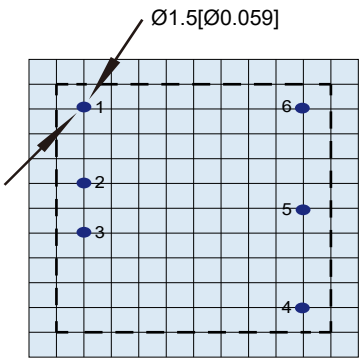
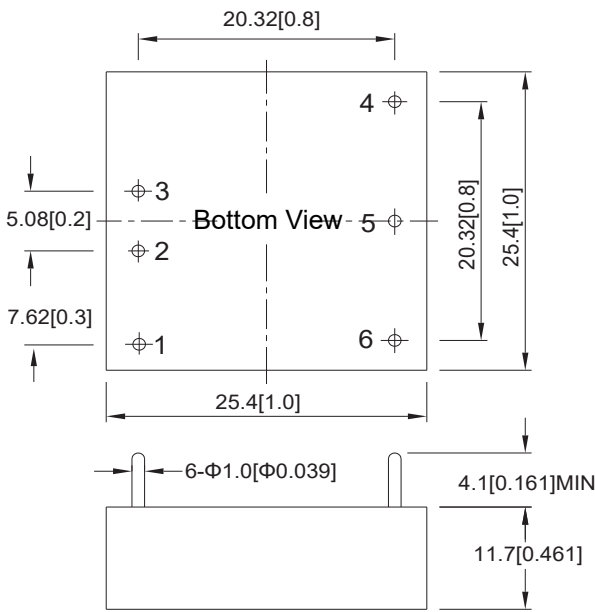
R_T = Trim Resistor value;
 a = self-defined parameter;
 $V_{o'}$ = desired output voltage

Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	4.829	2.87	15	1.24
5	2.894	2.87	10	2.5
6	4.064	2.87	10	2.5
12	11.000	2.87	17.4	2.5
15	14.494	2.87	17.4	2.5
24	24.872	2.87	20	2.5

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



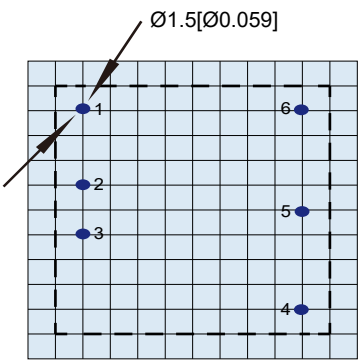
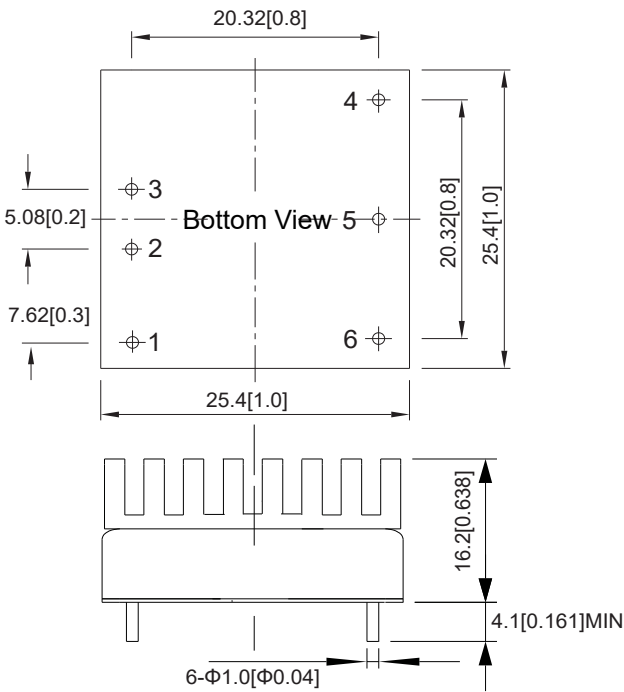
Note:Grid:2.54*2.54mm

Unit:mm[inch]
General tolerances:±1.0[±0.039]

Pin	1	2	3	4	5	6
Two-way	CNT	-Vin	+Vin	+Vo	Trim	-Vo

Horizontal Package(with heat sink) Dimensions

THIRD ANGLE PROJECTION

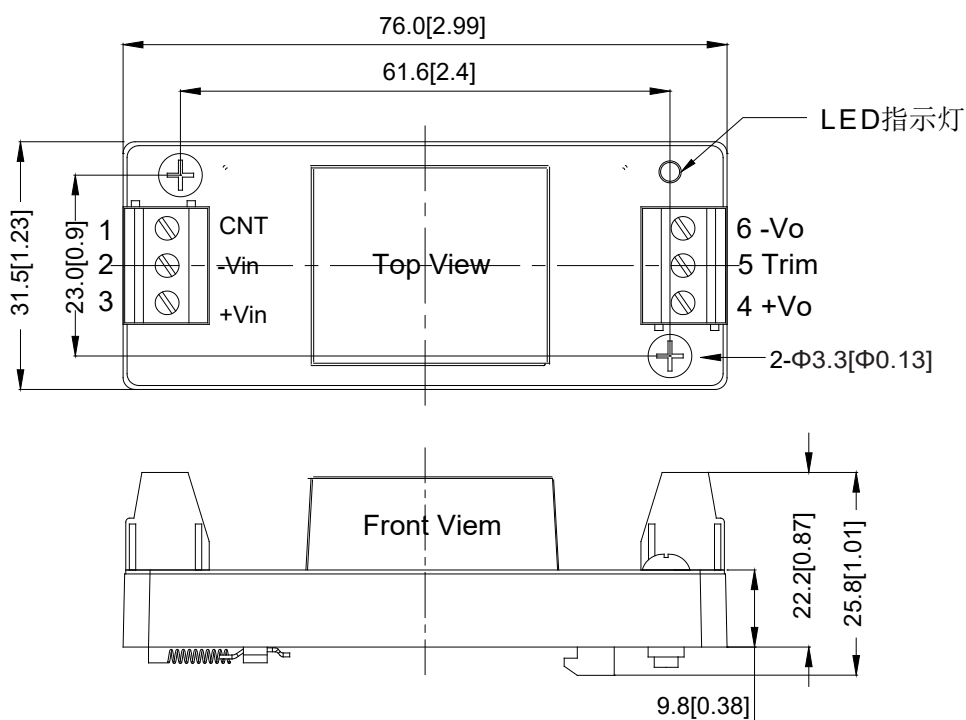


Note:Grid:2.54*2.54mm

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General tolerances:±1.0[±0.039]

Pin	1	2	3	4	5	6
Two-way	CNT	-Vin	+Vin	+Vo	Trim	-Vo

CFDA20-24S05Z Dimensions



Note:

Unit:mm[inch]

Mounting rail:TS35

Wire range:24-12AWG

Tightening torque:Max 0.4N•m

General tolerances:±1.0[±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.



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