

FEATURES

- ◆ Ultra-wide 4:1 input voltage range
- ◆ Reinforced I/O isolation test voltage 2250V_{DC}
- ◆ Operating ambient temperature range -40℃ to +70℃
- ◆ Input under-voltage protection, output short circuit, over-current, over-voltage protection
- ◆ Low output ripple & noise
- ◆ EN50121-3-2 & CISPR32/EN55032 CLASSA EMI compliant without external components
- ◆ EN50155/EN60950 Approval
- ◆ Designed to meet IEC60950/UL60950 safety standards
- ◆ 3 Years warranty

20W isolated DC-DC converter with Ultra-wide Input and Regulated Single Output



Selection Guide

Certification	Part No. ①	Input Voltage(V _{DC})		Output		Full Load Efficiency ③ (%) Min./Typ.	Max.Capacitive Load(μF)
		Nominal (Range)	Max. ②	Voltage(V _{DC})	Current(mA) Max./Min.		
	CFDA20-110S03	110 (40-160)	170	3.3	5000/0	84/86	10000
	CFDA20-110S05			5	4000/0	87/89	8000
	CFDA20-110S12			12	1667/0	87/89	2000
	CFDA20-110S15			15	1333/0	87/89	1000
	CFDA20-110S24			24	833/0	88/90	500

Note:

① Use "S" suffix for heat sink mounting, "Z" suffix for chassis mounting 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 Absolute maximum stress rating without damage (not recommended);

③ 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)	Nominal input voltage	3.3V output	--	183/10	188/20	mA
		5V output	--	214/10	219/20	
		Others	--	212/3	217/8	
Reflec ted Ripple Current	Nominal input voltage		--	25	--	
Surge Voltage(1sec.max.)			-0.7	--	180	Vdc
Start-up Voltage	100%load		--	--	40	
Shut-down Voltage			28	33	--	
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		--	2	7	mA
Note: *The CNT pin voltage is referenced to input -Vin.						

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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	0%-100%load		--	±0.5	±1	
Transient Recovery Time	25%load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation		3.3V/5V output	--	±3	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Full load		--	±0.02	±0.03	%/°C
Ripple & Noise *	20MHz bandwidth,5%-100%load		--	50	100	mVp-p
Trim			90	--	110	%Vo
Over-voltage Protection	Input voltage range		110	--	160	
Over-current Protection			120	--	210	
Short-circuit Protection			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.	2250	--	--	V _{DC}
	Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1600	--	--	
Insulation Resistance	Input-output resistance at 500V _{DC}	1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	--	2200	--	pF
Operating Temperature	See Fig.1	-40	--	+70	°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
Switching Frequency*	PWM mode	--	300	--	KHz
Vibration		IEC61373 - Category 1,Grade B			
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	Without heat sink	Horizontal package	25.4×25.4×11.7mm
		Z Din-rail mounting	76.0×31.5×25.8mm
Weight	Without heat sink	Horizontal package/Z Din-rail mounting	26.0g/68.0g(Typ.)
	With heat sink	Horizontal package/Z2 chassis mounting/Z4 Din-rail mounting	34.0g/76.0g(Typ.)
Cooling Method	Free air convection		

Electromagnetic compatibility(EMC)(EN60950)

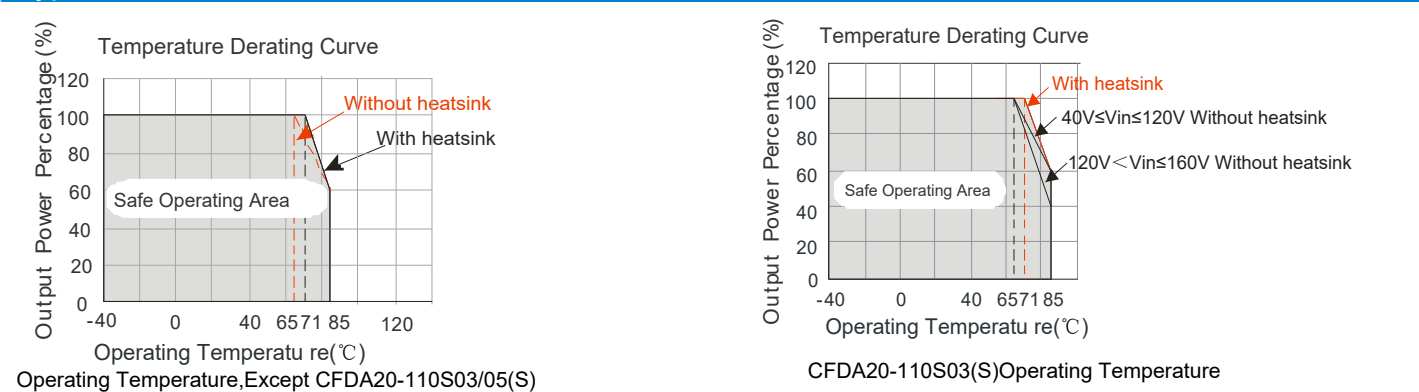
Emissions	CE	CISPR32/EN55032	CLASS A(without external components)/CLASS B(see Fig.4-② for recommended circuit)
	RE	CISPR32/EN55032	CLASS A(without external components)/CLASS B(see Fig.4-② for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV perf. Criteria B
	RS	IEC/EN61000-4-3	10V/ m perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV(see Fig.3 or Fig.4-① for recommended circuit) perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (2Ω 0.5uF see Fig.3 for recommended circuit) perf. Criteria B
			line to ground ±4KV (12Ω 0.5uF see Fig.3 for recommended circuit)
		EN50121-3-2	line to line ±1KV (42Ω 0.5uF see Fig.4-① for recommended circuit) perf. Criteria B
			line to ground ±2KV (42Ω 0.5uF see Fig.4-① for recommended circuit)
	CS	IEC/EN61000-4-6	10Vr.m.s perf. Criteria A

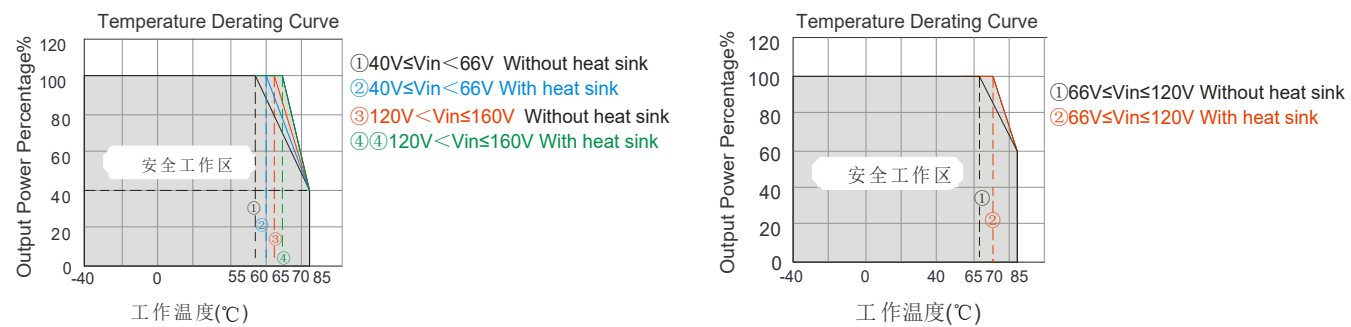
Electromagnetic Compatibility(EMC)(EN50155)

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

Note:All the tests are measured under the conditions of inputs capacitor 100uF/200V

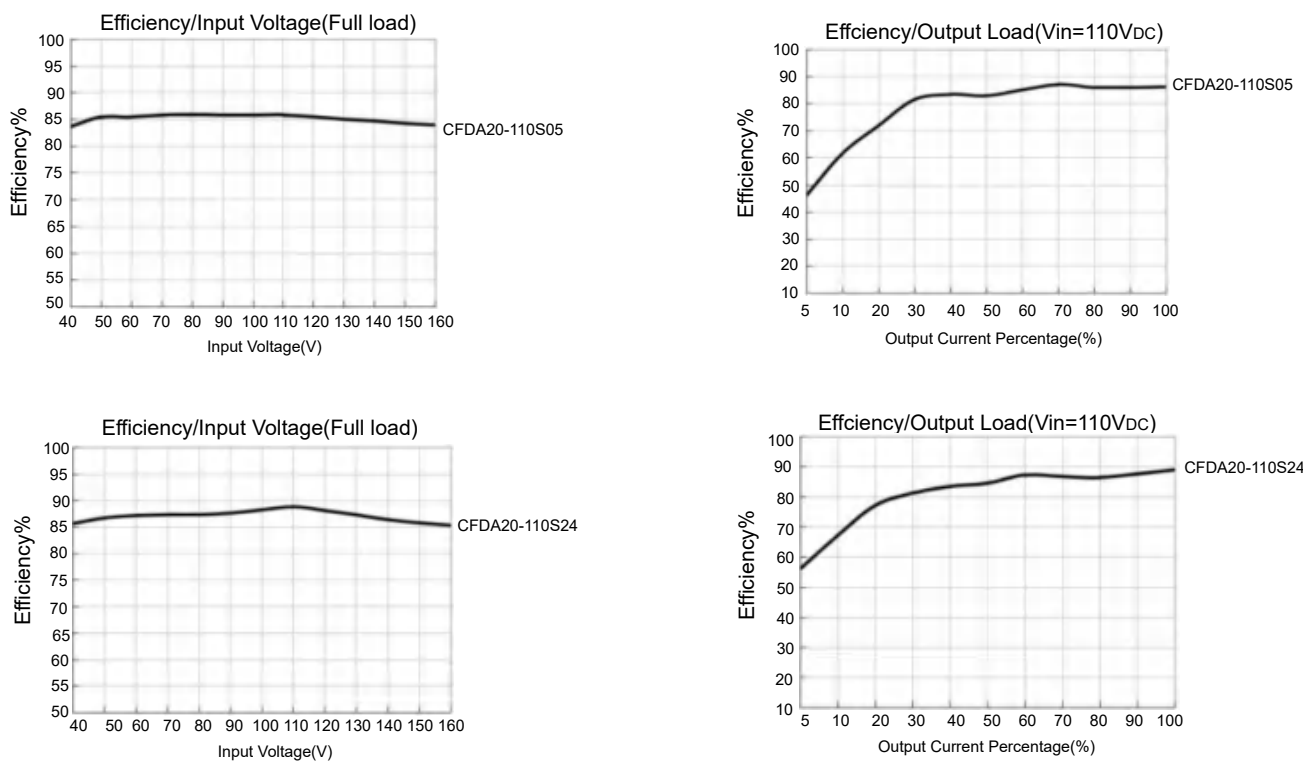
Typical Characteristic Curves





CFDA20-110S05 Operating Temperature °C

图 1

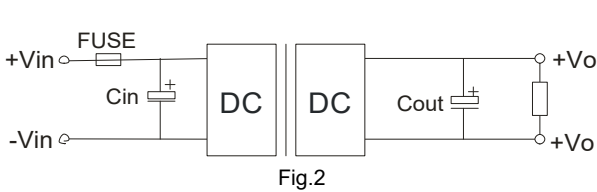


Design Reference

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 Cin and Cout 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.



Vout(Vdc)	Fuse	Cin	Cout
3.3/5	2A,slow blow	10μF-47μF	470μF
12/15			220μF
24			100μF

2. EMC compliance circuit

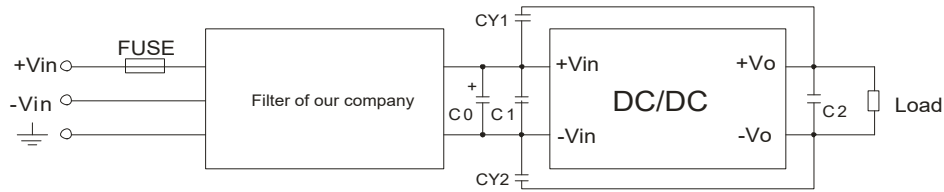


Fig.3

Fig.3 List of components:

Output voltage	3.3V	5V	12V	15V	24V
Fuse	Choose according to actual input current				
Filter of our company	is the EMC auxiliary component of our company. Input voltage range:40V-160V				
C0	100μF/200V				
C1	47μF/200V				
C2	470μF/16V		220μF/25V		100μF/35V
CY1,CY2	1000pF/400VAC				

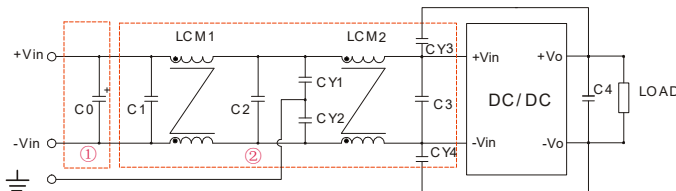


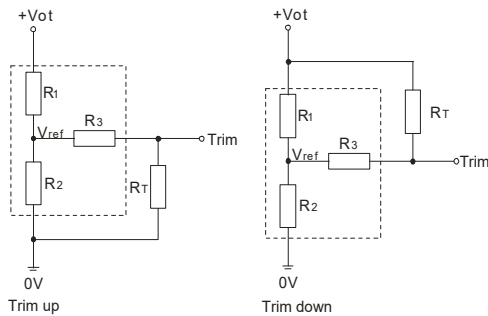
Fig. 4

Notes: Part ① in the Fig.4 is used for EMS test and part ② for EMI test

Fig.4 List of components:

Output voltage	3.3V	5V	12V	15V	24V
C0	100μF/200V				
C1,C2	0.22μF/250V				
C3	47μF/200V				
LCM1,LCM2	15mH				
CY1,CY2, CY3,CY4	1000pF/400VAC				
C4	470μF/16V		220μF/25V		100μF/35V

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



Calculating Trim resistor values:

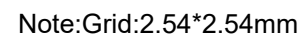
$$\begin{aligned} \text{up: } R_T &= \frac{aR_2}{R_2 - a} - R_3 & a &= \frac{V_{ref}}{V_o' - V_{ref}} \cdot R_1 \\ \text{down: } R_T &= \frac{aR_1}{R_1 - a} - R_3 & a &= \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

TRIM resistor connection(dashed line shows internal resistor network)

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	4.801	2.87	10	1.24
5	2.883	2.87	10	2.5
12	11.00	2.87	15	2.5
15	14.384	2.87	15	2.5
24	24.872	2.87	17.8	2.5

Dimensions and Recommended Layout



Note:
Unit:mm[inch]
Mounting rail:TS35
Winr range:24-12AWG
Tightening torque:Max 0.4N•m
General tolerances:±1.0[±0.039]

