

**FEATURES:**

- ◆ Ultra-wide 4:1 input voltage range
- ◆ High efficiency up to 90%
- ◆ Reinforced I/O isolation test voltage 1500VDC
- ◆ Operating ambient temperature range -40°C to +85°C
- ◆ Input under-voltage protection, output short circuit, over-current, over-voltage protection
- ◆ Low output ripple/noise
- ◆ EN50121-3-2/CISPR32/EN55032 CLASS A EMI compliant without external components
- ◆ EN50155/EN60950 Approval
- ◆ Designed to meet UL 62368/IEC62368 standard
- ◆ The tail fix Z(guide rail type) product model has the function of input anti reverse connection
- ◆ Industry standard pin-out

10W isolated DC-DC converter with Ultra-wide Input and Regulated Single Output



**Selection Guide**

Certification	PartNo. <sup>①</sup>	Input Voltage(VDC)		Output		Full Load Efficiency <sup>③</sup> (%) Min./Typ.	Max. Capacitive Load(μF)
		Nominal (Range)	Max. <sup>②</sup>	Voltage(VDC)	Current(mA) Max./Min.		
CE	CFDA10-110S03	110 (40-160)	170	3.3	2400/0	82/84	5400
	CFDA10-110S05			5	2000/0	84/86	5400
	CFDA10-110S12			12	833/0	86/88	470
	CFDA10-110S15			15	667/0	86/88	330
	CFDA10-110S24			24	417/0	88/90	100

## Note:

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 Absolute maximum stress rating without damage (not recommended);

③ Efficiency is measured at nominal input voltage and rated output load; 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	--	95/3	98/8
			Others	--	110/3	117/8
Reflected Ripple Current	Nominal input voltage		--	25	--	mA
Surge Voltage(1sec.max.)			-0.7	--	180	
Start-up Voltage	100% load		--	--	40	VDC
Shut-down Voltage			28	33	--	
Start-up Time	Nominal input voltage/constant resistance load		--	10	--	ms
Input Filter	Pi filter					
Hot Plug	Unavailable					

### 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			--	300	500	μs
Transient Response Deviation	25% load step change, nominal input voltage	3.3V/5V output	--	±3	±8	%
		Others	--	±3	±5	
Temperature Coefficient	Fullload		--	±0.02	±0.03	%/°C
Ripple/Noise <sup>①</sup>	20MHz bandwidth,5%-100% load		--	50	100	mVp-p
Over-voltage Protection	Input voltage range	110	--	160	160	%Vo
Over-current Protection		120	--	210	210	%Io
Short-circuit Protection		Continuous,self-recovery				

Note:①Ripple/Noise at <5% load is 5%Vo max.The "parallel cable" method is used for Ripple and Noise test

Notes for specific information.

### General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1 mA 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	--	2200	--	pF
Operating Temperature	See Fig.1	-40	--	+85	°C
Storage Temperature		-55	--	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
Storage Humidity	Non-condensing	5	--	95	%RH
Vibration	IEC61373-Category 1,Grade B				
Switching Frequency <sup>①</sup>	PWM Mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

Note:①Switching frequency is measured at fullload.The module reduces the switching frequency for light load (below 50%) efficiency improvement.

### Mechanical Specifications

Case Material	Aluminum alloy		
Dimensions	Horizontal package(without heat sink)	25.4×25.4×12.2mm	
	ZDin-rail mounting(with heat sink)	76.0×31.5×29.9mm	
Weight	without heat sink	Horizontal package Z Din-rail	26.0g/68.0g(Typ.)
Cooling Methods	Freeair convection		

## Elec tromagnetic compatibility (EMC) (EN60950)

Emissions	CE	CISPR32/EN55032 CLASS A (without external components)/CLASSB(see Fig.3 or Fig.4 for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (without external components)/CLASS B(see Fig.3 or Fig.4 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2 Contact ±6KV/Air ±8KV	perf.Criteria B
	RS	IEC/EN61000-4-3 20V/m	perf.Criteria A
	EFT	IEC/EN61000-4-4 ±4KV(see Fig.3 or Fig.4 for re commended circuit)	perf.Criteria B
	Surge	line to line ±2KV(2Ω18uF see Fig.3 for recommended circuit) line to ground ±4KV(12Ω9uF see Fig.3 for recommended circuit)	perf.Criteria B
	CS	IEC/EN61000-4-6 10Vr.m.s	perf.Criteria A

## Elec tromagnetic Compatibility (EMC) (EN50155)

Emissions	CE	EN50121-3-2 150kHz-500kHz 99d BuV EN55016-2-1 500kHz-30MHz93d BuV	
	RE	EN50121-3-2 30MHz-230MHz 40dBuV/m at 10m EN55016-2-1 230MHz-1GHz 47dBuV/m at 10m	
Immunity	ESD	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) line to ground±2KV(42Ω,0.5μF)	perf.Criteria B
	CS	EN50121-3-2 0.15MHz-80MHz 10Vr.m.s	perf.Criteria A

Note:All the tests are measured under the conditions of input scapacitor 100uF/200V

## Typical Charac teristic Curves

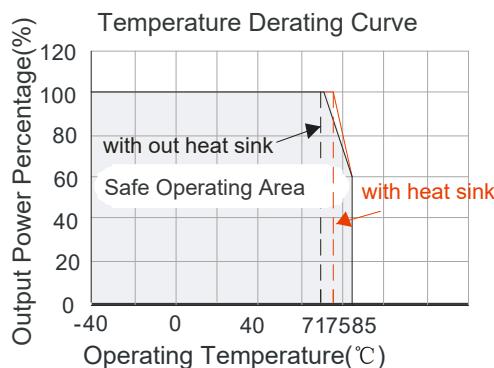
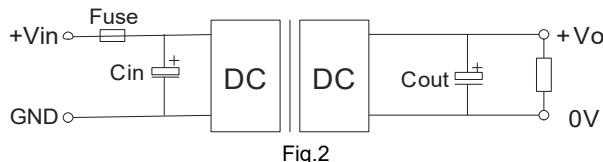


Fig.1

## 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 max. capacitive load value of the product.



Vout(VDC)	Fuse	Cin	Cout
3.3/5	2A, slow blow	10μF-47μF	100μF
12/15			47μF
24			22μF

### 2.EMC compliance circuit

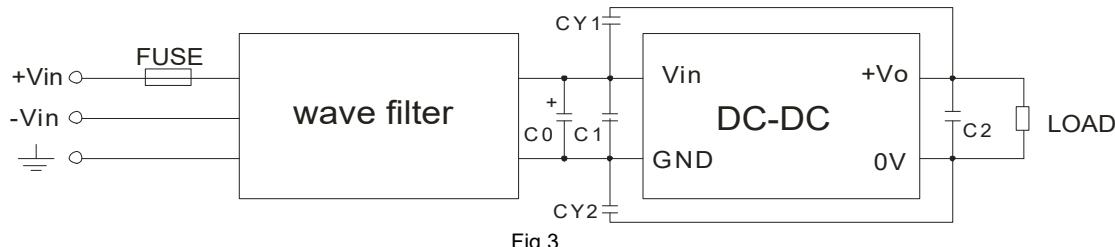


Fig.3 List of components:

FUSE	Choose according to actual input current
wave filter	Input voltage range:40V-160V
C0	100μF/200V
C1	Refer to the $C_{in}$ in Fig.2
C2	Refer to the $C_{out}$ in Fig.2
CY1, CY2	1000pF/400VAC

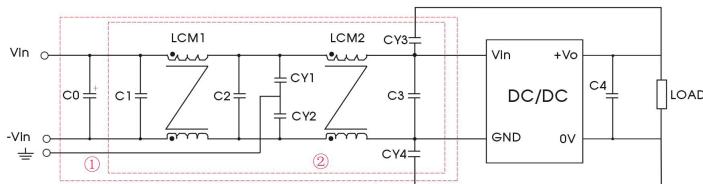


Fig.4

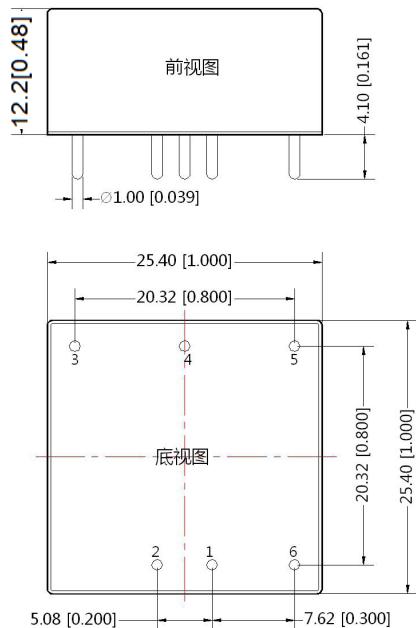
Notes: Part ① in the Fig.4 is used for EMC test and part② for EMI test

Fig.4 List of components:

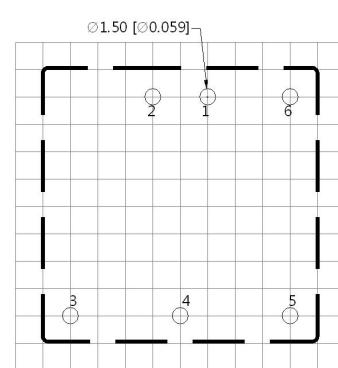
C0	100μF/200V
C1, C2	0.22μF/250V
C3	Refer to the Cin in Fig.2
LCM1	2.2mH
LCM2	1.1mH
CY1, CY2, CY3, CY4	1000pF/400VAC
C4	Refer to the Cout in Fig.2

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

#### Horizontal Package (without heat sink) Dimensions and Recommended Layout



第三角投影



注：栅格距离为2.54\*2.54mm

引脚方式		
1	单路	双路
2	Vin	Vin
3	+Vo	+Vo
4	No Pin	0V
5	0V	-Vo
6	Ctrl	Ctrl

注：

尺寸单位:mm[inch]

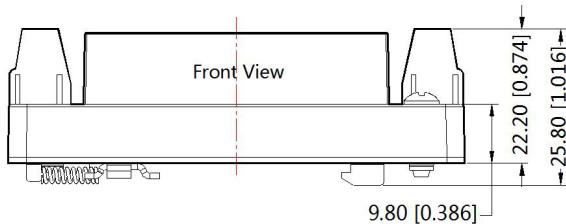
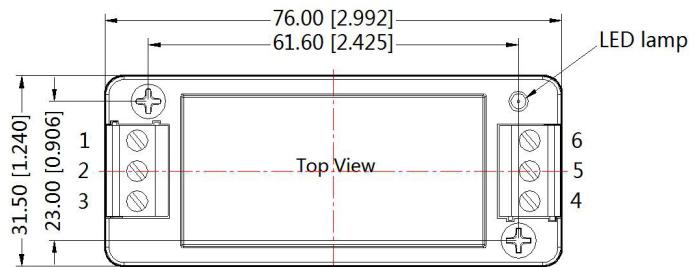
端子直径公差: $\pm 0.10$ [ $\pm 0.004$ ]

未标注公差: $\pm 0.50$ [ $\pm 0.020$ ]



Tailing Z (rail type) size:

THIRD ANGLE PROJECTION



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's corporate standards;
4. Other product application information,please see DC-DC (railway power supply) Converter Application Notes for specific operation methods;
5. We can provide product customization service,please contact our technicians directly for specific information;
6. Products are related to laws and regulations:see"Features" and "EMC";
7. 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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