

## FEATURES

- ◆ Ultra-wide 4:1 input voltage range
- ◆ High efficiency up to 90%
- ◆ No-load power consumption as low as 0.24W
- ◆ I/O isolation test voltage 1500V<sub>DC</sub>
- ◆ Input under-voltage protection,output short circuit, over-current,over-voltage protection
- ◆ Operating ambient temperature range:-40℃to+71℃
- ◆ Input reverse polarity protection available with
- ◆ Chassis(Z2)or 35mm DIN-Rail mounting(Z4)version
- ◆ Industry standard pin-out
- ◆ Three year warranty

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



## Selection Guide

| Certification | Part No. <sup>①</sup> | Input Voltage(V <sub>DC</sub> ) |                   | Output                        |                          | Full Load Efficiency <sup>④</sup> (%)<br>Min./Typ. | Max.Capacitive Load <sup>⑤</sup> (μF) |
|---------------|-----------------------|---------------------------------|-------------------|-------------------------------|--------------------------|----------------------------------------------------|---------------------------------------|
|               |                       | Nominal <sup>②</sup><br>(Range) | Max. <sup>③</sup> | Voltage<br>(V <sub>DC</sub> ) | Current(mA)<br>Max./Min. |                                                    |                                       |
|               | CFDA20-24D05          | 24<br>(9-36)                    | 40                | ±5                            | ±2000                    | 85/87                                              | 2000                                  |
|               | CFDA20-24D12          |                                 |                   | ±12                           | ±833                     | 88/90                                              | 800                                   |
|               | CFDA20-24D15          |                                 |                   | ±15                           | ±667                     | 88/90                                              | 600                                   |
|               | CFDA20-24D24          |                                 |                   | ±24                           | ±417                     | 87/89                                              | 300                                   |
|               | CFDA20-48D05          | 48<br>(18-75)                   | 80                | ±5                            | ±2000                    | 84/86                                              | 2000                                  |
|               | CFDA20-48D12          |                                 |                   | ±12                           | ±833                     | 88/90                                              | 800                                   |
|               | CFDA20-48D15          |                                 |                   | ±15                           | ±667                     | 88/90                                              | 600                                   |
|               | CFDA20-48D24          |                                 |                   | ±24                           | ±417                     | 88/90                                              | 300                                   |

Notes:

① "Z"suffix for DIN-Rail mounting;

② Minimum input voltage and start-up voltage are increased by 1V<sub>DC</sub> for all models with Z (rail) suffixes because of the input reverse polarity function;

③ Exceeding the maximum input voltage may cause permanent damage;

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;

⑤ The specified maximum capacitive load value for positive and negative output is identical.

## Input Specifications

| Item                                 | Operating Conditions                                         | Min. | Typ.   | Max.  | Unit            |
|--------------------------------------|--------------------------------------------------------------|------|--------|-------|-----------------|
| Input Current<br>(full load/no-load) | 24V <sub>DC</sub> nominal input series,nominal input voltage | --   | 958/10 | --/20 | mA              |
|                                      | 48V <sub>DC</sub> nominal input series,nominal input voltage | --   | 969/5  | --/11 |                 |
| Reflected Ripple Current             |                                                              | --   | 30     | --    |                 |
| Surge Voltage(1sec.max.)             | 24V <sub>DC</sub> nominal input series                       | -0.7 | --     | 50    | V <sub>DC</sub> |
|                                      | 48V <sub>DC</sub> nominal input series                       | -0.7 | --     | 100   |                 |

|                          |                                                  |                                        |      |    |     |
|--------------------------|--------------------------------------------------|----------------------------------------|------|----|-----|
| Start-up Voltage         | 24Vdc nominal input series                       | --                                     | --   | 9  | Vdc |
|                          | 48Vdc nominal input series                       | --                                     | --   | 18 |     |
| Under-voltage Protection | 24Vdc nominal input series                       | 5.5                                    | 6.5  | -- |     |
|                          | 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                           | --                                     | 2    | 7  | mA  |

Note:\*The CNT pin voltage is referenced to input -Vin.

## Output Specifications

| Item                                                                                                                                                                                                          | Operating Conditions                                  |              | Min.                     | Typ. | Max.  | Unit  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|--------------|--------------------------|------|-------|-------|
| Voltage Accuracy①                                                                                                                                                                                             | 5%-100% load                                          |              | --                       | ±1   | ±3    | %     |
| Linear Regulation                                                                                                                                                                                             | Input voltage variation from low to high at full load | Vo1          | --                       | ±0.2 | ±0.5  |       |
|                                                                                                                                                                                                               |                                                       | Vo2          | --                       | ±0.4 | ±1    |       |
| Load Regulation②                                                                                                                                                                                              | 5%-100% load                                          |              | --                       | ±0.5 | ±1    |       |
| Cross Regulation                                                                                                                                                                                              | Vo1 load at 50%,Vo2 load at range of 10%-100%         |              | --                       | --   | ±5    |       |
| Transient Recovery Time                                                                                                                                                                                       | 25% load step change, nominal input voltage           | All products | --                       | 300  | 500   | μs    |
| Transient Response Deviation                                                                                                                                                                                  |                                                       | 5VDC output  | --                       | ±3   | ±8    | %     |
|                                                                                                                                                                                                               |                                                       | Others       | --                       | ±3   | ±5    |       |
| Temperature Coefficient                                                                                                                                                                                       | Full load                                             |              | --                       | --   | ±0.03 | %/℃   |
| Ripple/Noise®                                                                                                                                                                                                 | 20MHz bandwidth,5%-100% load                          |              | --                       | 100  | 200   | mvp-p |
| Over-voltage Protection                                                                                                                                                                                       | Input voltage range                                   |              | 110                      | --   | 160   | %Vo   |
| Over-current Protection                                                                                                                                                                                       |                                                       |              | 110                      | 150  | 200   | %Io   |
| Short-circuit Protection                                                                                                                                                                                      |                                                       |              | Continuous,self-recovery |      |       |       |
| Note:①Output voltage accuracy for 0%-5% load is ±4% max;<br>②Load regulation for 0%-100% load is ±5%;<br>③Ripple & Noise at≤5% load is 5%Vo max.The “parallel cable” method is used for Ripple and Noise test |                                                       |              |                          |      |       |       |

## 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                                                                                | -40                                       | --   | +71  | ℃       |
| 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,0.75mm,5G,90Min.along X, Y and Z |      |      |         |
| Switching Frequency*                 | PWM mode                                                                                 | --                                        | 270  | --   | KHz     |
| 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                     | 25.4×25.4×11.7mm |
|                | Z DIN-rail mounting                    | 76.0×31.5×25.8mm |
| Weight         | Horizontal package/Z DIN-rail mounting | 15.0g/58.0g(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 ±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 | 3Vr.m.s                                                | perf.Criteria A |

### Typical Characteristic Curves

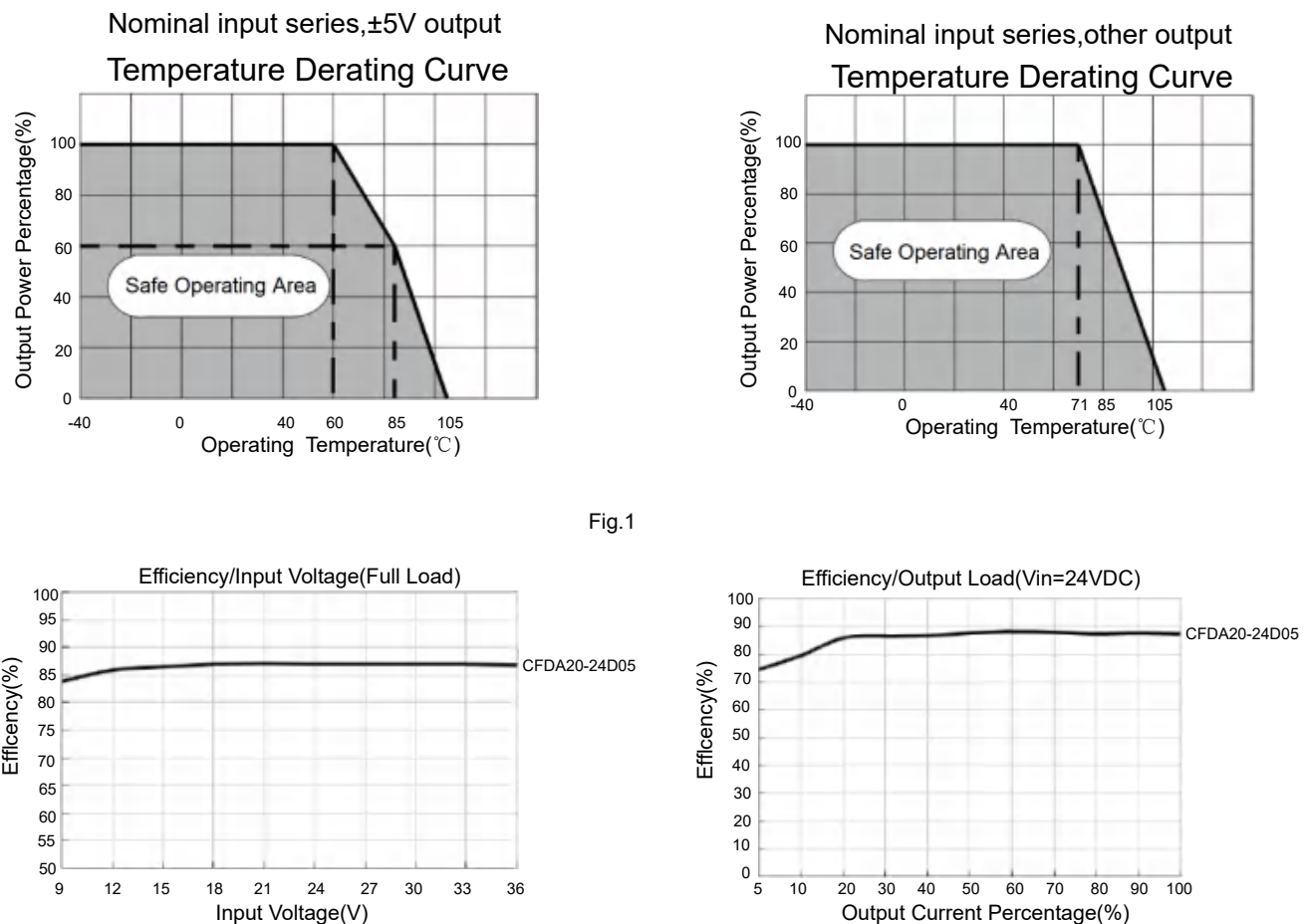
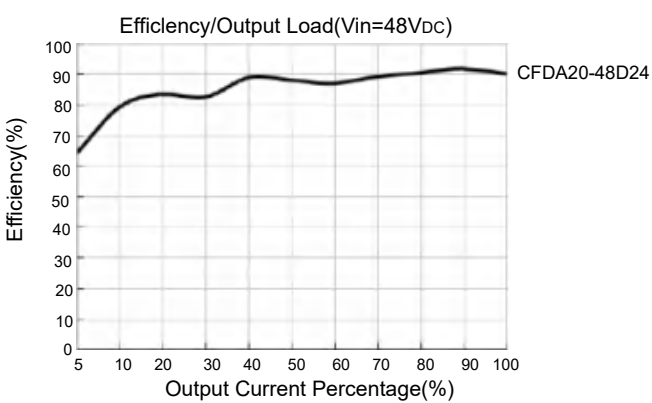
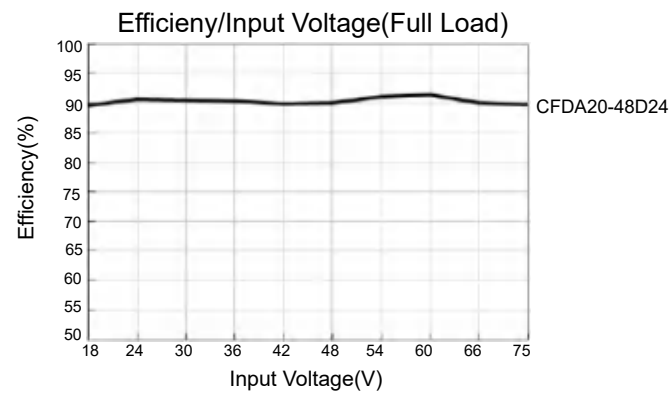


Fig.1



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 max. capacitive load value of the product.

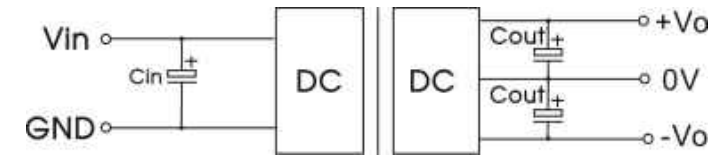


Fig.2

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

2. EMC compliance circuit

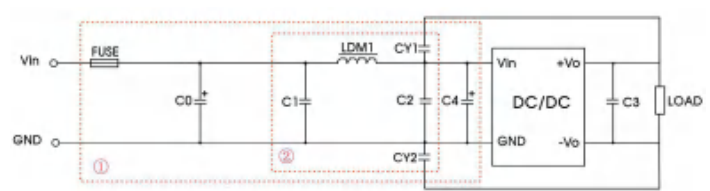


Fig.3

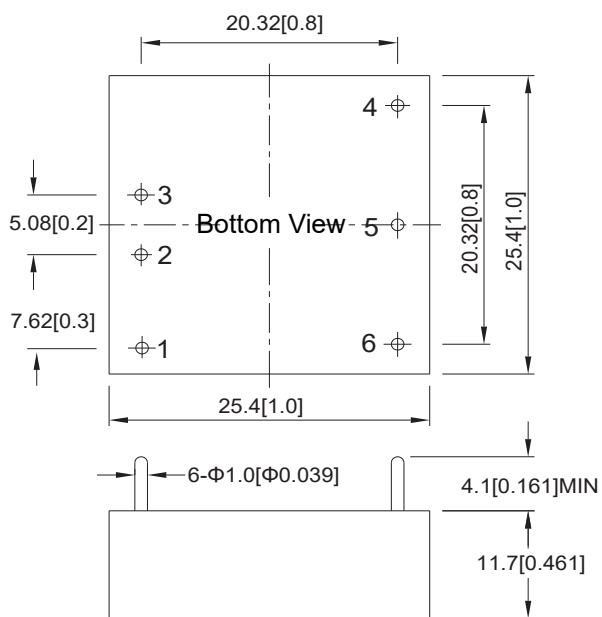
Notes:For EMC tests we use Part ① in Fig.3 for immunity and part ② for emissions test.Selecting based on needs.

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

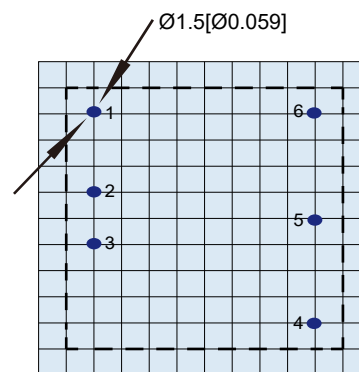
List of components:

| Model   | Vin:24V                                  | Vin:48V    |
|---------|------------------------------------------|------------|
| FUSE    | Choose 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    | 4.7μH                                    |            |
| CY1,CY2 | 1nF/2KV                                  |            |

## Dimensions and Recommended Layout



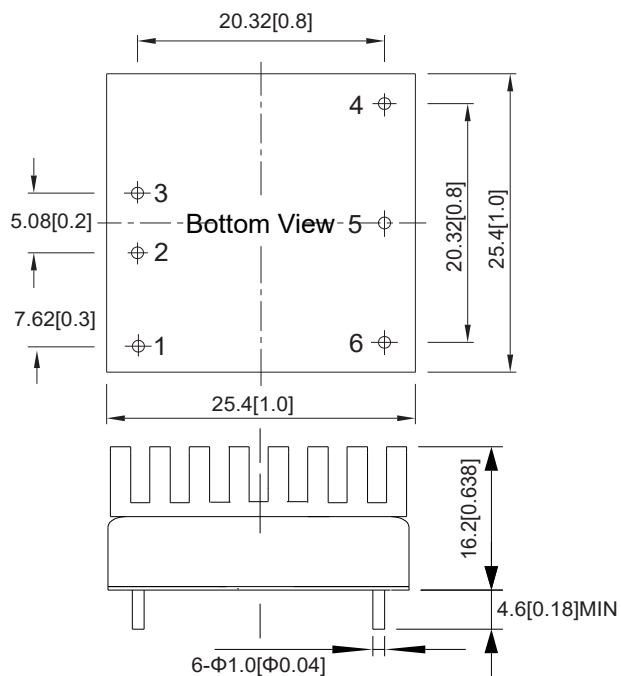
THIRD ANGLE PROJECTION



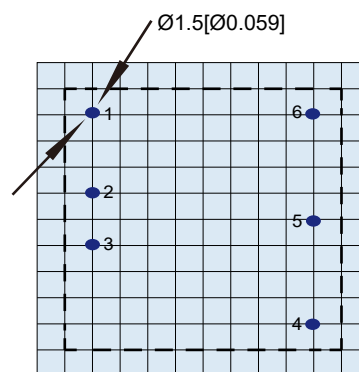
Note: Grid: 2.54\*2.54mm

| Pin     | 1   | 2    | 3    | 4    | 5   | 6    |
|---------|-----|------|------|------|-----|------|
| Two-way | CNT | -Vin | +Vin | +Vo1 | COM | -Vo2 |

## Horizontal Package(with heat sink) Dimensions

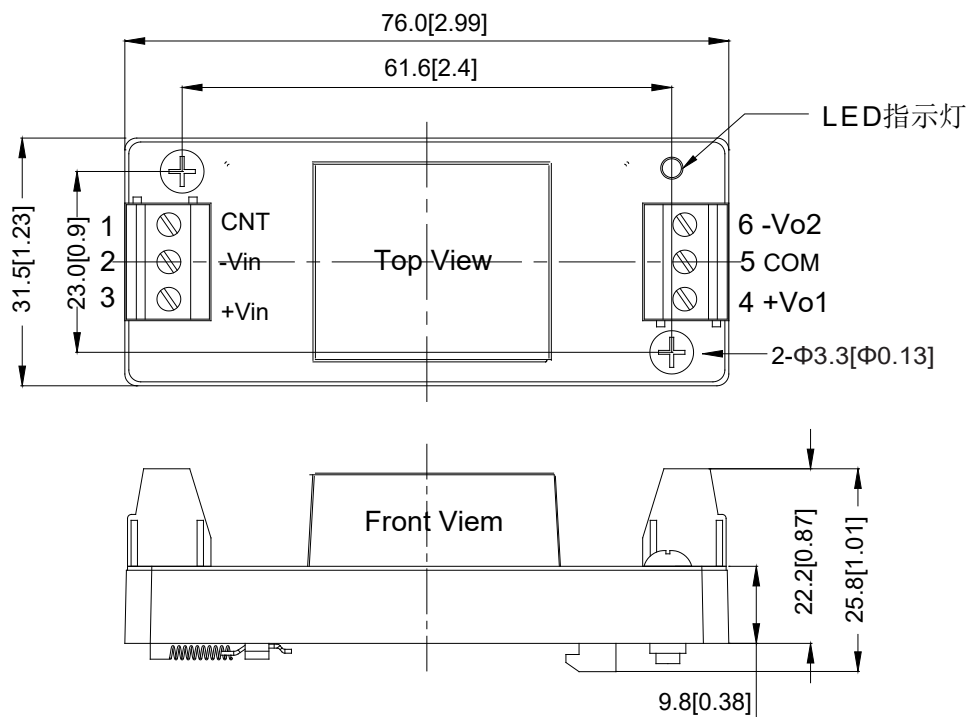


THIRD ANGLE PROJECTION



Note: Grid: 2.54\*2.54mm

## CFDA20-24D05Z 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;
- 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.



## Beijing Huayang Changfeng Technology Co.,Ltd.

Address: No.25, Torch South Street, Zhuozhou Development Zone, Hebei Province, People's Republic of China

Tel: 86-10-68817997    Mobile phone: 15600309099    E-mail: sales@chawens.net    WWW.CHAWENS.COM