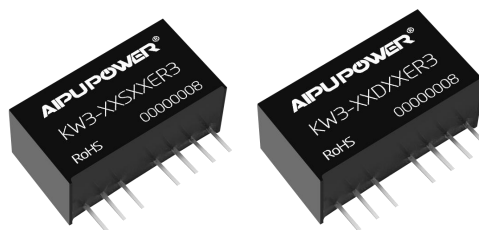


## Typical Features

- ◆ Wide input voltage range, isolated and regulated output, 3W output power.
- ◆ Efficiency up to 84%
- ◆ With remote shutdown function
- ◆ Long-term short-circuit protection with Self-recovery
- ◆ Input under-voltage protection, output short-circuit and over-current protection.
- ◆ Isolation Voltage 1500 VDC
- ◆ Operating Temperature Range: -40°C to +105°C
- ◆ Plastic Case, UL 94V-0 Rated



RoHS

## Applications

**KW3-XXXXXER3 series** power supplies are widely used in instrumentation, communications, pure digital circuits, general low-frequency analog circuits, relay drive circuits, data switching circuits, and other fields.

## Selection Guide

| Certifications | Model         | Input Voltage Range |                   | Output Voltage/Current (Vo/Io) |              | Input Current @Nominal Input Typ |              | Max. Capacitive Load | Efficiency @ Full Load (Typ) |         |
|----------------|---------------|---------------------|-------------------|--------------------------------|--------------|----------------------------------|--------------|----------------------|------------------------------|---------|
|                |               | Nominal Value (VDC) | Range Value (VDC) | Voltage (VDC)                  | Current (mA) | Full Load (mA)                   | No Load (mA) | μF                   | Min (%)                      | Typ (%) |
| CE, RoHS       | KW3-05S3V3ER3 | 5                   | 4.5 - 9           | 3.3                            | 728          | 696                              | 10           | 1000                 | 69                           | 71      |
| CE, RoHS       | KW3-05S05ER3  |                     |                   | 5                              | 600          | 811                              | 6            | 1000                 | 70                           | 74      |
| CE, RoHS       | KW3-05S09ER3  |                     |                   | 9                              | 333          | 800                              | 6            | 680                  | 73                           | 77      |
| CE, RoHS       | KW3-05S12ER3  |                     |                   | 12                             | 250          | 800                              | 6            | 330                  | 73                           | 77      |
| CE, RoHS       | KW3-05S15ER3  |                     |                   | 15                             | 200          | 800                              | 8            | 220                  | 73                           | 77      |
| CE, RoHS       | KW3-05S24ER3  |                     |                   | 24                             | 125          | 769                              | 8            | 100                  | 74                           | 78      |
| CE, RoHS       | KW3-05D3V3ER3 |                     |                   | ±3.3                           | ±364         | 696                              | 10           | 1000                 | 69                           | 71      |
| CE, RoHS       | KW3-05D05ER3  |                     |                   | ±5                             | ±300         | 811                              | 6            | 470                  | 70                           | 74      |
| CE, RoHS       | KW3-05D09ER3  |                     |                   | ±9                             | ±167         | 800                              | 6            | 330                  | 73                           | 77      |
| CE, RoHS       | KW3-05D12ER3  |                     |                   | ±12                            | ±125         | 800                              | 6            | 100                  | 73                           | 77      |
| CE, RoHS       | KW3-05D15ER3  |                     |                   | ±15                            | ±100         | 769                              | 8            | 100                  | 74                           | 78      |
| CE, RoHS       | KW3-05D24ER3  |                     |                   | ±24                            | ±62          | 769                              | 8            | 100                  | 74                           | 78      |
| CE, RoHS       | KW3-24S3V3ER3 | 24                  | 9 - 36            | 3.3                            | 728          | 134                              | 4            | 2200                 | 73                           | 75      |
| CE, RoHS       | KW3-24S05ER3  |                     |                   | 5                              | 600          | 155                              | 4            | 2200                 | 78                           | 80      |
| CE, RoHS       | KW3-24S06ER3  |                     |                   | 6                              | 500          | 155                              | 4            | 2200                 | 78                           | 80      |
| CE, RoHS       | KW3-24S09ER3  |                     |                   | 9                              | 333          | 152                              | 4            | 1000                 | 78                           | 80      |
| CE, RoHS       | KW3-24S12ER3  |                     |                   | 12                             | 250          | 145                              | 4            | 680                  | 81                           | 83      |

|         |               |    |               |      |      |     |   |      |    |    |
|---------|---------------|----|---------------|------|------|-----|---|------|----|----|
| CE、RoHS | KW3-24S15ER3  |    |               | 15   | 200  | 148 | 5 | 470  | 82 | 84 |
| CE、RoHS | KW3-24S18ER3  |    |               | 18   | 167  | 148 | 5 | 470  | 82 | 84 |
| CE、RoHS | KW3-24S24ER3  |    |               | 24   | 125  | 146 | 5 | 100  | 81 | 83 |
| CE、RoHS | KW3-24D3V3ER3 | 24 | 9<br>-<br>36  | ±3.3 | ±364 | 134 | 4 | 1000 | 73 | 75 |
| CE、RoHS | KW3-24D05ER3  |    |               | ±5   | ±300 | 155 | 4 | 1000 | 78 | 80 |
| CE、RoHS | KW3-24D09ER3  |    |               | ±9   | ±167 | 152 | 4 | 680  | 78 | 80 |
| CE、RoHS | KW3-24D12ER3  |    |               | ±12  | ±125 | 145 | 4 | 470  | 81 | 83 |
| CE、RoHS | KW3-24D15ER3  |    |               | ±15  | ±100 | 148 | 5 | 330  | 82 | 84 |
| CE、RoHS | KW3-24D24ER3  |    |               | ±24  | ±62  | 148 | 5 | 100  | 82 | 84 |
| CE、RoHS | KW3-48S3V3ER3 | 48 | 18<br>-<br>75 | 3.3  | 728  | 64  | 5 | 2200 | 76 | 78 |
| CE、RoHS | KW3-48S05ER3  |    |               | 5    | 600  | 78  | 5 | 2200 | 78 | 80 |
| CE、RoHS | KW3-48S09ER3  |    |               | 9    | 333  | 78  | 5 | 1000 | 78 | 80 |
| CE、RoHS | KW3-48S12ER3  |    |               | 12   | 250  | 77  | 5 | 680  | 79 | 81 |
| CE、RoHS | KW3-48S15ER3  |    |               | 15   | 200  | 76  | 5 | 470  | 80 | 82 |
| CE、RoHS | KW3-48S24ER3  |    |               | 24   | 125  | 76  | 5 | 100  | 80 | 82 |
| CE、RoHS | KW3-48D3V3ER3 |    |               | ±3.3 | ±364 | 64  | 5 | 1000 | 76 | 78 |
| CE、RoHS | KW3-48D05ER3  |    |               | ±5   | ±300 | 78  | 5 | 1000 | 78 | 80 |
| CE、RoHS | KW3-48D09ER3  |    |               | ±9   | ±167 | 78  | 5 | 680  | 78 | 80 |
| CE、RoHS | KW3-48D12ER3  |    |               | ±12  | ±125 | 77  | 5 | 470  | 79 | 81 |
| CE、RoHS | KW3-48D15ER3  |    |               | ±15  | ±100 | 76  | 5 | 330  | 80 | 82 |
| CE、RoHS | KW3-48D24ER3  |    |               | ±24  | ±62  | 76  | 5 | 100  | 80 | 82 |

Note 1: Maximum capacitive load refers to the allowable output capacitance when the power supply starts at full load; exceeding this value may cause startup failure.

Note 2: The above efficiency is measured under nominal input voltage and rated output load.

Note 3: Due to space limitations, this is only a partial product list; for unlisted models, please contact our sales department.

## Input Specifications

| Test Item                             | Test Conditions                                              | Mini. | Typ. | Max | Unit |
|---------------------------------------|--------------------------------------------------------------|-------|------|-----|------|
| Input Transient Voltage (1 sec. max.) | 4.5–9 V input                                                | -0.7  | -    | 16  | VDC  |
|                                       | 9–36 V input                                                 | -0.7  | -    | 50  | VDC  |
|                                       | 18–75 V input                                                | -0.7  | -    | 100 | VDC  |
| Start-up voltage                      | 4.5–9 V input                                                | -     | 3.6  | 4.5 | VDC  |
|                                       | 9–36 V input                                                 | -     | 8    | 9   | VDC  |
|                                       | 18–75 V input                                                | -     | 16   | 18  | VDC  |
| Start-up current                      | 4.5–9 V input                                                | 1.5   | -    | -   | A    |
|                                       | 9–36 V input                                                 | 0.7   | -    | -   | A    |
|                                       | 18–75 V input                                                | 0.3   | -    | -   | A    |
| Remote control (Ctrl)                 | High level or open for enable (Output ON);                   | 3.5   | -    | 50  | VDC  |
|                                       | Low level or connected to Input GND for disable (Output OFF) | 0     | -    | 1.2 | VDC  |
| Standby Power Consumption             | 0.5 W (Max.)                                                 |       |      |     |      |
| Input filter                          | Capacitor Filter                                             |       |      |     |      |
| Hot Plug                              | N/A                                                          |       |      |     |      |

## Output Specifications

| Test Item                                                                                                        | Test Conditions                                                                  |                  | Mini. | Typ. | Max   | Unit  |
|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------|-------|------|-------|-------|
| Output Power                                                                                                     |                                                                                  |                  | 0.15  | -    | 3     | W     |
| Output Voltage Accuracy                                                                                          | 10% to 100% load<br>Full Input Voltage Range                                     | Main output      | -     | -    | ±2    | %     |
|                                                                                                                  |                                                                                  | Auxiliary output | -     | -    | ±3    | %     |
| No-load Output Voltage Accuracy                                                                                  | Full Input Voltage Range                                                         | Main output      | -     | -    | ±3    | %     |
|                                                                                                                  |                                                                                  | Auxiliary output | -     | -    | ±5    | %     |
| Linear voltage regulation                                                                                        | 100% load<br>Full Input Voltage Range                                            | Main output      | -     | -    | ±0.5  | %     |
|                                                                                                                  |                                                                                  | Auxiliary output | -     | -    | ±1    | %     |
| Load regulation                                                                                                  | 10% to 100% load                                                                 | Main output      | -     | -    | ±1    | %     |
|                                                                                                                  |                                                                                  | Auxiliary output | -     | -    | ±1.5  | %     |
| Cross-adjustment rate                                                                                            | Dual-channel output, main channel at 50% load<br>Auxiliary channel 25%–100% load |                  | -     | -    | ±5    | %     |
| Transient Response Deviation                                                                                     | 25% load step change                                                             | 3.3V/5V output   | -     | ±5   | ±8    | %     |
|                                                                                                                  | Nominal Input Voltage                                                            | Other            | -     | ±3   | ±5    | %     |
| Transient Recovery Time                                                                                          | 25% load step change, Nominal Input Voltage                                      |                  | --    | 300  | 500   | μs    |
| Temperature Coefficient                                                                                          | 100% load                                                                        |                  | -     | -    | ±0.03 | %/°C  |
| Ripple & Noise                                                                                                   | 0%–100% load, 20 MHz bandwidth                                                   |                  | -     | 50   | 100   | mVp-p |
| Output Over-current Protection (OCP)                                                                             | Input Voltage Range                                                              | %lo              | 150   | -    | 300   | %     |
| Output Short-circuit Protection (SCP)                                                                            | Continuous short-circuit protection, Self-recovery                               |                  |       |      |       |       |
| Note: Ripple & noise testing uses the twisted-pair method; see the Ripple & Noise Test Instructions for details. |                                                                                  |                  |       |      |       |       |

## General Specifications

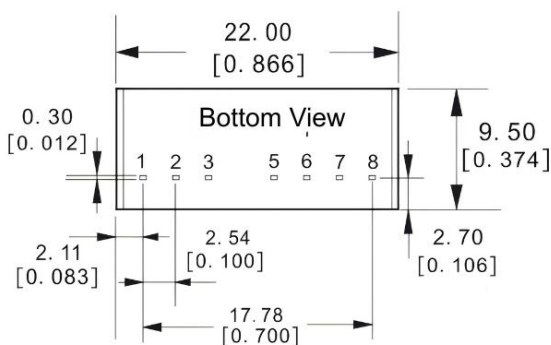
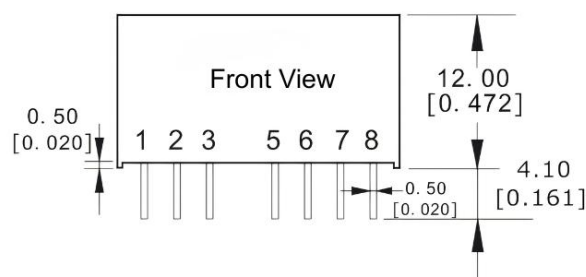
| Test Item                | Test Conditions                                        |              | Minimum                                   | Typical | Max  | Unit    |
|--------------------------|--------------------------------------------------------|--------------|-------------------------------------------|---------|------|---------|
| Switching Frequency      | Nominal Input Voltage at<br>Full Load                  | 5V Input     | -                                         | 550     | -    | kHz     |
|                          |                                                        | Other inputs | -                                         | 330     | -    | kHz     |
| Operating Temperature    | Use the reference temperature Derating Curve           |              | -40                                       | -       | +105 | °C      |
| Storage Temperature      | /                                                      |              | -55                                       | -       | +125 | °C      |
| Case Temperature Rise    | Within the operating curve range, Ta=25°C              |              | -                                         | 35      | -    | °C      |
| Pin Soldering Resistance | 10s (1.5mm from case)                                  |              | -                                         | -       | 300  | °C      |
| Relative Humidity        | Non-condensing                                         |              | 5                                         | -       | 95   | %RH     |
| Isolation Voltage        | I/P-O/P, Test 1min, leakage current <1 mA              |              | 1500                                      | -       | -    | VDC     |
| Insulation Resistance    | I/P-O/P, 500 VDC                                       |              | 1000                                      | -       | -    | MΩ      |
| Isolation Capacitance    | I/P-O/P, 100 kHz/0.1 V                                 |              | -                                         | 50      | -    | pF      |
| Vibration                |                                                        |              | 10–150 Hz, 5 G, 30 min. along X, Y, and Z |         |      |         |
| MTBF                     | MIL-HDBK-217F @ 25°C                                   |              | 1000                                      | -       | -    | K hours |
| Case Material            | Black Flame-retardant Heat-resistant Plastic (UL94-V0) |              |                                           |         |      |         |
| Weight                   | 4.5 g (Typ.)                                           |              |                                           |         |      |         |
| Cooling Method           | Natural Convection                                     |              |                                           |         |      |         |

|                  |                                  |                  |                            |
|------------------|----------------------------------|------------------|----------------------------|
| Packaging Method | Single tube (525 x 12.5 x 20 mm) |                  | 22PC                       |
|                  | Per box (542.5 x 110 x 155 mm)   |                  | 1,232 pcs (56 tubes total) |
| Dimensions       | L×W×H                            | 22 × 9.5 × 12 mm | 0.866 × 0.374 × 0.472 in   |

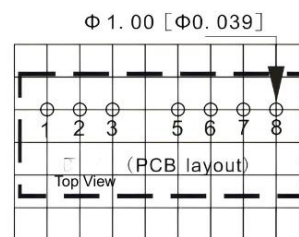
## EMC Performance

| Component | Sub-item       | Technical Standard | Performance Criteria                               |                                      |
|-----------|----------------|--------------------|----------------------------------------------------|--------------------------------------|
| EMI       | CE             | CISPR 32/EN 55032  | CLASS B                                            | (See Fig. ② for recommended circuit) |
|           | RE             | CISPR 32/EN 55032  | CLASS B                                            | (see Fig. ② for recommended circuit) |
| EMS       | ESD            | IEC/EN 61000-4-2   | Contact ±4 kV                                      | Perf. Criteria B                     |
|           | RS             | IEC/EN 61000-4-3   | 10 V/m                                             | Perf. Criteria A                     |
|           | EFT            | IEC/EN 61000-4-4   | Contact ±2 kV (see Fig. ①) for recommended circuit | Perf. Criteria B                     |
|           | Surge Immunity | IEC/EN 61000-4-5   | ±2 kV (see Fig. ①) for recommended circuit         | Perf. Criteria B                     |
|           | CS             | IEC/EN 61000-4-6   | 3 V rms                                            | Perf. Criteria A                     |

## Mechanical Dimensions



Dimensions



PCB Layout Vertical View

Grid 2.54×2.54 [0.10×0.10]  
Unit: mm[inch]  
Pin diameter tolerance ±0.10[±0.004]  
General tolerance ±0.50[±0.020]

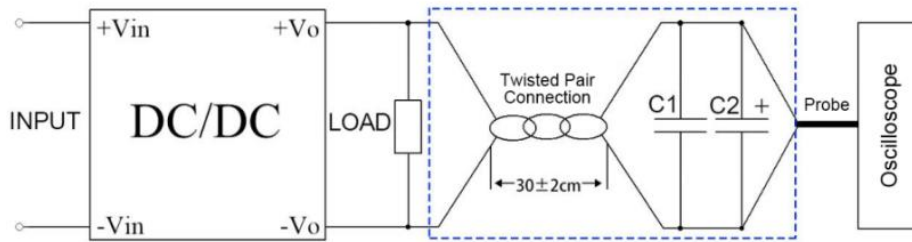
Recommended PCB Layout

## Pin Definitions

| Pin No.    | 1         | 2              | 3           | 4      | 5             | 6               | 7               | 8                  |
|------------|-----------|----------------|-------------|--------|---------------|-----------------|-----------------|--------------------|
| Single (S) | GND       | +Vin           | Ctrl        | NP     | NC            | +Vo             | -Vo             | CS                 |
|            | Input GND | Positive Input | Control Pin | No Pin | No Connection | Positive Output | Negative Output | External Capacitor |
| Dual (D)   | GND       | +Vin           | Ctrl        | NP     | NC            | +Vo             | 0V              | -Vo                |
|            | Input GND | Positive Input | Control Pin | No Pin | No Connection | Positive Output | Output COM      | Output GND         |

Note: If the pin definitions of the power module do not match the selection manual, the markings on the actual product label shall prevail.

## Ripple & Noise Test Instructions (Twisted-pair Method, 20 MHz Bandwidth)



### Test Method:

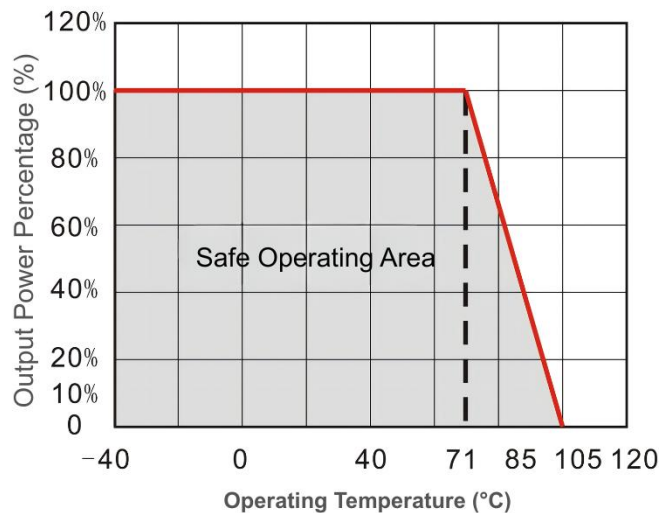
1. Ripple and Noise: Use the twisted-pair method (#12 twisted-pair). Set the oscilloscope bandwidth to 20 MHz. For probes with 100 MHz bandwidth, remove the probe cap and ground clip. Connect C1 (0.1μF polypropylene capacitor) and C2 (10μF high-frequency low-ESR electrolytic capacitor) in parallel at the probe tip. Use "Sample" acquisition mode.
2. Setup: Connect the input to the power source and the output to an electronic load via a test fixture. Use a 30 cm ( $\pm 2$ cm) sampling lead directly from the output port. Ensure power cable gauges are selected based on the output current.

### Application Notes:

1. Max. Capacitive Load: Measured under pure resistive full-load conditions.
2. Minimum Load: A minimum load of 5% or an external high-frequency low-ESR electrolytic capacitor ( $\geq 100 \mu\text{F}$ ) is recommended; otherwise, output ripple and noise may increase.
3. Custom Services: AIPUPOWER provides integrated power solutions and customized design services. Due to space limitations, please contact our technical sales team for further inquiries.

## Product Characteristic Curves

**Temperature Derating Curve**



## Recommended Circuits for Application

### ➤ CS Pin

This terminal provides a connection point to the internal main filter capacitor at the DC/DC converter's output (connected to the capacitor's positive terminal). Connecting a low-ESR capacitor between this pin and pin 7 (connected to the capacitor's negative terminal) can further improve output ripple and noise (typically  $CS \leq 47\mu\text{F}$ ).

### ➤ Output Load Requirements

a. To ensure the power module operates efficiently and reliably, the minimum load must not be less than 5% of the rated resistive load. If your actual required power is lower, please connect a resistor equivalent to 5% of the rated load in parallel at the output. For dual-output (positive and negative) products, the loads on both outputs should be as balanced as possible to maintain the specified

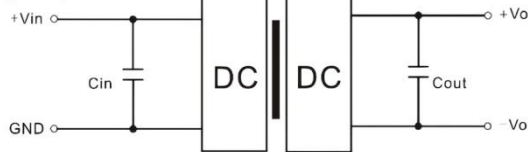
output voltage accuracy.

b. The maximum capacitive load of the product is measured under nominal full-load test conditions and must not be exceeded during use; otherwise, startup difficulties may occur, potentially damaging the product. If the module must operate under no-load conditions, the capacitive load at the output must be minimized as much as possible, or a resistor equivalent to 5% of the rated load must be connected in parallel; otherwise, output voltage instability may occur, or the voltage may exceed the specified accuracy range.

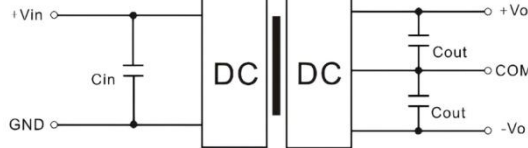
#### ➤ Recommended Circuit

To effectively reduce input and output ripple and noise, a capacitor filter network can be connected at the input and output terminals, as shown in the application circuit below. However, appropriate filter capacitors must be selected; excessive capacitance may affect product startup. To ensure each output operates under safe and reliable conditions, the recommended capacitive load values are detailed in Table 1 below.

Single Output



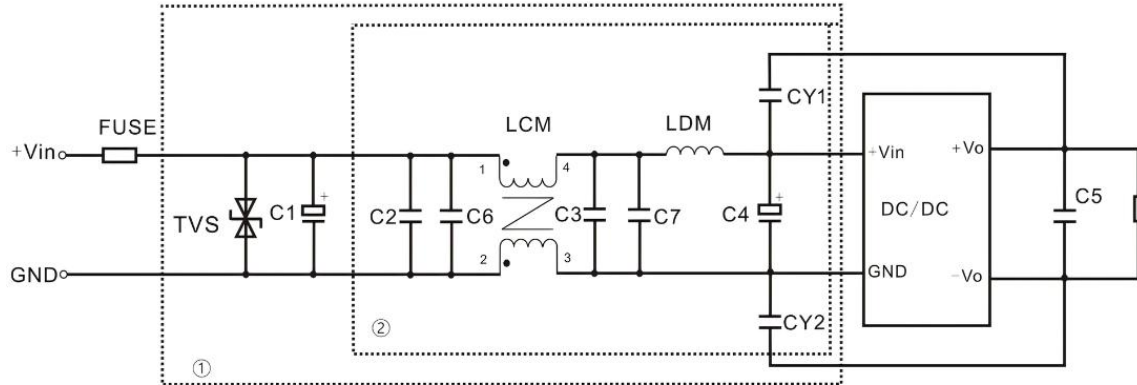
Dual Output



Recommended Capacitive Load Values (Table 1)

| Vin<br>(Vdc) | Cin             | Single-Channel<br>Vout<br>(Vdc) | Cout             | Dual-chann<br>el Vout<br>(Vdc) | Cout             |
|--------------|-----------------|---------------------------------|------------------|--------------------------------|------------------|
| 5            | 10 $\mu$ F/16V  | 3.3                             | 10 $\mu$ F/16V   | $\pm$ 3.3                      | 4.7 $\mu$ F/16V  |
| 24           | 4.7 $\mu$ F/50V | 5, 6                            | 10 $\mu$ F/16 V  | $\pm$ 5                        | 4.7 $\mu$ F/16V  |
| 48           | 1 $\mu$ F/100 V | 9                               | 2.2 $\mu$ F/25 V | $\pm$ 9                        | 2.2 $\mu$ F/25 V |
| -            | -               | 12                              | 2.2 $\mu$ F/25V  | $\pm$ 12                       | 1 $\mu$ F/25V    |
| -            | -               | 15                              | 2.2 $\mu$ F/25V  | $\pm$ 15                       | 1 $\mu$ F/25V    |
| -            | -               | 18, 24                          | 1 $\mu$ F/50 V   | $\pm$ 24                       | 0.47 $\mu$ F/50V |

#### ➤ Typical Recommended EMC Circuit

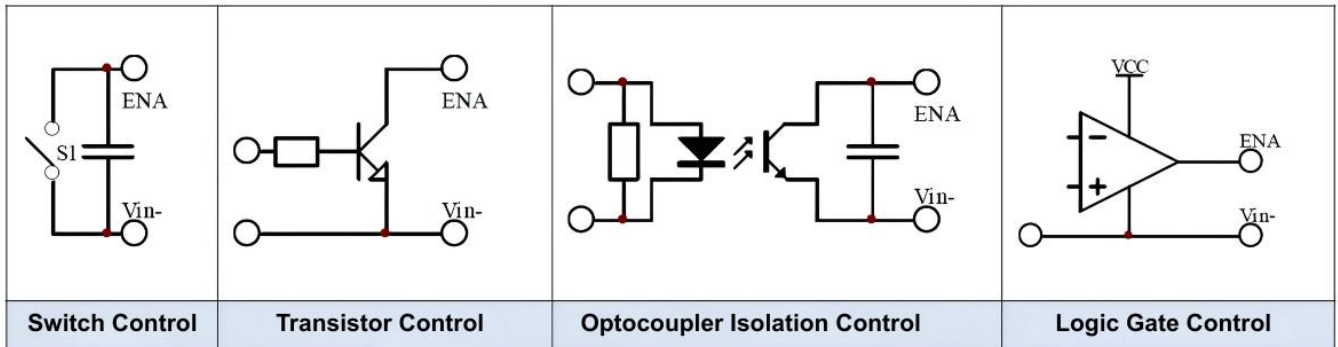


**Note:** Part ① corresponds to Fig.① for EMC testing; Part ② corresponds to Fig.② for EMI filtering and can be selected as required.

|         | 5V Input                                | 24V Input         | 48V Input         |
|---------|-----------------------------------------|-------------------|-------------------|
| FUSE    | Select based on actual customer current |                   |                   |
| TVS     | SMCJ12CA                                | SMCJ40CA          | SMCJ80CA          |
| C1      | 1000 $\mu$ F/50 V                       | 1000 $\mu$ F/50 V | 680 $\mu$ F/100 V |
| C2/C3   | 10 $\mu$ F/50 V                         | 4.7 $\mu$ F/50 V  | 4.7 $\mu$ F/100 V |
| C6/C7   | 470 nF/50 V                             | 470 nF/50 V       | 470 nF/100 V      |
| C4      | 330 $\mu$ F/25V                         | 100 $\mu$ F/50 V  | 100 $\mu$ F/100 V |
| C5      | 22 $\mu$ F/50V                          | 22 $\mu$ F/50V    | 22 $\mu$ F/50V    |
| LCM     | 1.5 mH                                  | 2.2 mH            | 2.2 mH            |
| LDM     | 2.2 $\mu$ H                             | 4.7 $\mu$ H       | 6.8 $\mu$ H       |
| CY1/CY2 | 1nF/2 kV                                | 1nF/2 kV          | 1nF/2 kV          |

### ➤ CTRL Pin(Active High Enable)

The module operates normally when the control pin is connected to a high level or left open, and shuts down when connected to GND or a low level.



### Application Notes:

1. No parallel connection or hot-plugging;
2. Use within specified ranges to avoid permanent damage;
3. Performance is not guaranteed if the load is below the minimum requirement;
4. Performance is not guaranteed if operated beyond the load range;
5. Unless specified, all data are measured at  $T_a=25^{\circ}\text{C}$ , humidity <75%, nominal input, and rated resistive load;
6. Testing methods follow our corporate standards;
7. These specifications apply to standard models; performance of custom models may vary—please contact our technical team;
8. Customized products and power solutions are available upon request.

### Guangzhou Aipu Electron Technology Co., Ltd

Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China

Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821

E-mail: [sales@aipu-elec.com](mailto:sales@aipu-elec.com) Website: <https://www.aipupower.com>