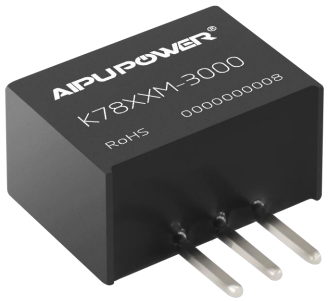
## Typical Features

- ◆ Wide input voltage range, non-isolated & regulated output
- ◆ Efficiency up to 94%
- ◆ Low standby power consumption, available for negative output
- ◆ High power density, Mini size SIP package
- ◆ With overheat protection, output short circuit protection
- ◆ Operating temperature from -40℃ to +95℃
- ◆ Plastic case, flame class UL94-V0




## Application Field

**This series of products can be widely used in the fields of instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.**

## Typical Product List

| Certificate | Part No. | Input Voltage Range | | Output Voltage/Current (Vo/Io) | | Capacitive Load | Efficiency (%) @Full load | |
|---|---|---|---|---|---|---|---|---|
| | | Nominal (VDC) | Range (VDC) | Vo (VDC) | Io (mA) | (uF) (Max) | Vin (Min) | Vin (Typ.) |
| - | K7803M-3000 | 24 | 6.5-32 | 3.3 | 3000 | 4700 | 90 | 87 |
| | | 12 | 6.5-27 | -3.3 | -2000 | 2200 | 83 | 86 |
| - | K7805M-3000 | 24 | 6.5-32 | 5 | 3000 | 4700 | 91 | 89 |
| | | 12 | 6.5-27 | -5 | -2000 | 2200 | 85 | 88 |
| - | K7809M-3000 | 24 | 12-32 | 9 | 2500 | 2200 | 92 | 92 |
| | | 12 | 8-23 | -9 | -1000 | 1000 | 87 | 89 |
| - | K7812M-3000 | 24 | 15-32 | 12 | 2500 | 2200 | 94 | 93 |
| | | 12 | 8-20 | -12 | -1000 | 1000 | 84 | 86 |
| - | K7815M-3000 | 24 | 18-32 | 15 | 2500 | 1000 | 93 | 92 |
| | | 12 | 10-17 | -15 | -1000 | 470 | 85 | 87 |

Note: It is recommended to use an electrolytic capacitor (47uF/50V) at the input to protect the unit against the peak voltage when the input voltage is more than 27VDC.

## Input Specifications

| Item | Test Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| No load input current | Full input voltage range | Positive output | -- | 0.2 | 1 | mA |
| | | Negative output | -- | 1 | 4 | |
| Full load input current | 3.3V output | | -- | 474 | 1731 | mA |
| | -3.3V output | | -- | 640 | 1254 | |
| | 5V output | | -- | 702 | 2653 | mA |
| | -5V output | | -- | 950 | 1854 | |
| | 9V output | | -- | 1019 | 2083 | mA |

| | | | | | |
|---|---|---|---|---|---|
| | -9V output | -- | 843 | 1324 | |
| | 12V output | -- | 1344 | 2174 | mA |
| | -12V output | -- | 1163 | 1829 | |
| | 15V output | -- | 1698 | 2289 | mA |
| | -15V output | -- | 1437 | 1807 | |
| Input reversed | Not allowed | | | | |
| Input filter | Capacitor Filter | | | | |
| Hot plug | Unavailable | | | | |

## Output Specifications

| Item | Test Condition | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Output voltage accuracy | Full input voltage range, 0%-100% load | | -- | ±1 | ±2 | % |
| Line regulation | Full input voltage range, 100% load | | -- | ±0.3 | ±0.5 | % |
| Load regulation | 0% - 100% load | Positive output | -- | 1 | 2 | % |
| | | Negative output | -- | 2 | 3 | |
| Transient response deviation | 25% load step change, nominal input voltage | | -- | 50 | 300 | mV |
| Transient recovery time | | | -- | 0.2 | 1 | mS |
| Temperature drift coefficient | | | -- | -- | ±0.03 | %/°C |
| Ripple & Noise | 0%-100% load, 20MHz bandwidth | 3.3 & 5V output | -- | 40 | 75 | mVp-p |
| | | Others | -- | 100 | 150 | |
| Over current protection | Full input voltage range | | -- | 200 | -- | %Io |
| Short circuit protection | Continuous, self-recovery | | | | | |
| Note: The Ripple & Noise is tested by the Twisted Pair Method, please refer to the following test instruction. | | | | | | |

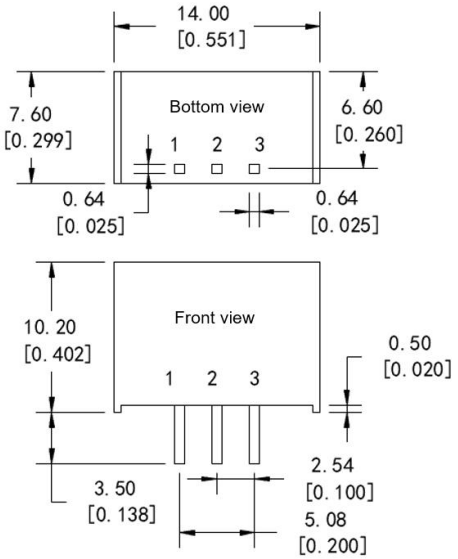
## General Specifications

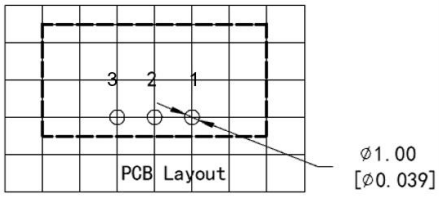
| Item | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Switching frequency | Nominal input voltage, full load | -- | 300 | -- | KHz |
| Operating temperature | Refer to the Temperature Derating Graph | -40 | -- | +95 | ℃ |
| Storage temperature | | -55 | -- | +125 | ℃ |
| Case temperature | Within the operating derating range | -- | -- | +110 | ℃ |
| Pin soldering temperature | 1.5mm from the case, soldering time 10S | -- | -- | 300 | ℃ |
| Relative humidity | No condensing | 5 | -- | 95 | %RH |
| MTBF | MIL-HDBK-217F@25℃ | 1000 | -- | -- | K hours |
| Vibration | 10-150Hz, 5G, 30 Min. along X, Y and Z | | | | |
| Case material | Plastic in Black, flame class UL94-V0 | | | | |
| Unit weight | 2.6g (Typ.) | | | | |
| Cooling method | Natural air | | | | |
| Packing | Tube size (526x9.5x17mm) | | | 35PCS/Tube | |
| | Carton size (542x110x155mm) | | | 2800PCS (total 80 tubes) | |
| Unit dimensions | L x W x H | 14.00×7.60×10.20 mm | | 0.551×0.299×0.402 inch | |

## EMC Performance

| Item | | Test Standards | Performance/Class |
|---|---|---|---|
| EMI | CE | CISPR32/EN55032 | Class B (with the Recommended EMC circuit) |
| | RE | CISPR32/EN55032 | Class B (with the Recommended EMC circuit) |
| EMS | ESD | IEC/EN61000-4-2 | Contact ±8kV perf. Criteria B |

## Mechanical Dimensions




PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

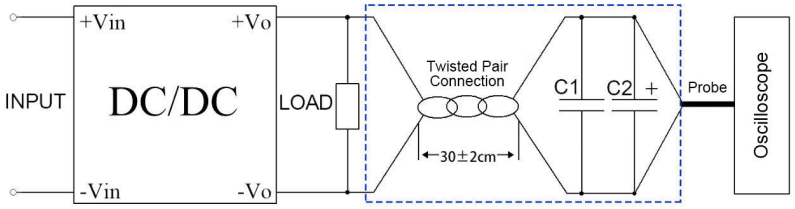
Unit: mm[inch]
Pin section tolerance ±0.10[±0.004]
General tolerance ±0.50[±0.020]

**Pin-out Function Description**

| Pin No. | 1 | 2 | 3 |
|---|---|---|---|
| Positive output | +Vin | GND(Common) | +Vo |
| Negative output | +Vin | -Vo | GND(Common) |

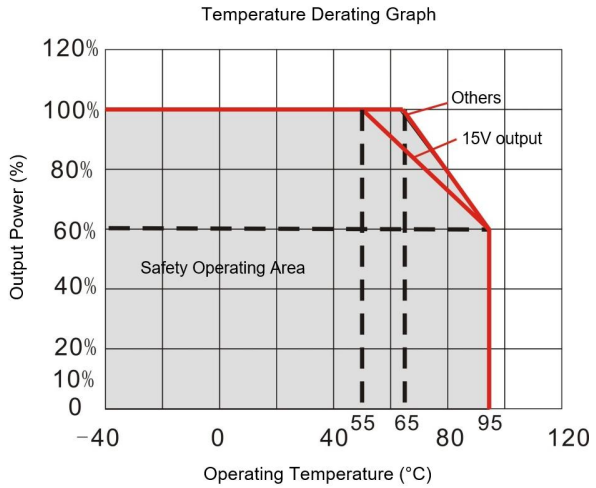
Note: Please take the pin definition on the product label as the right one if it is different than the data sheet description.

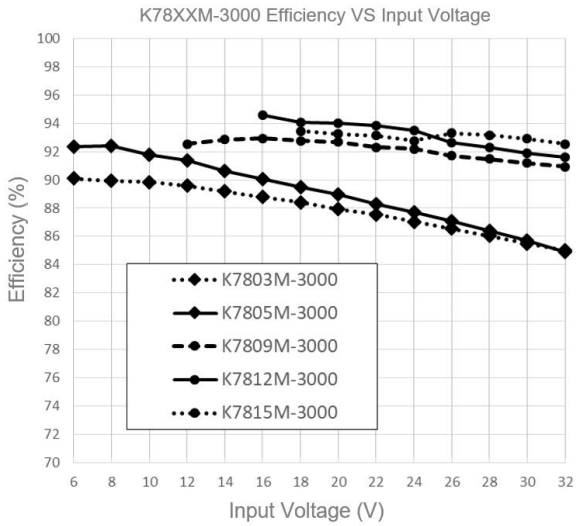
## Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)

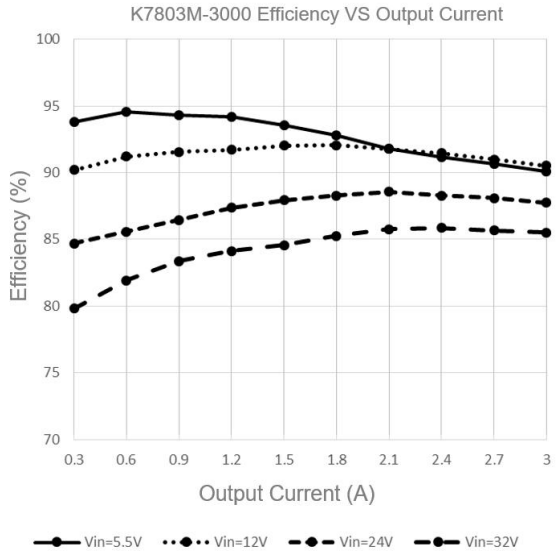


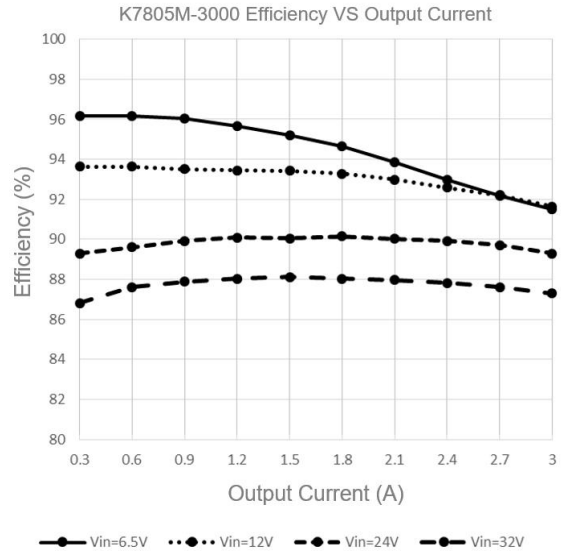

1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high frequency low impedance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load. The test can start after the input power on.
3. It is recommended to use a ≥10% load or a high frequency low impedance electrolytic capacitor (≥100uF) load at the output to avoid the output ripple increasing.

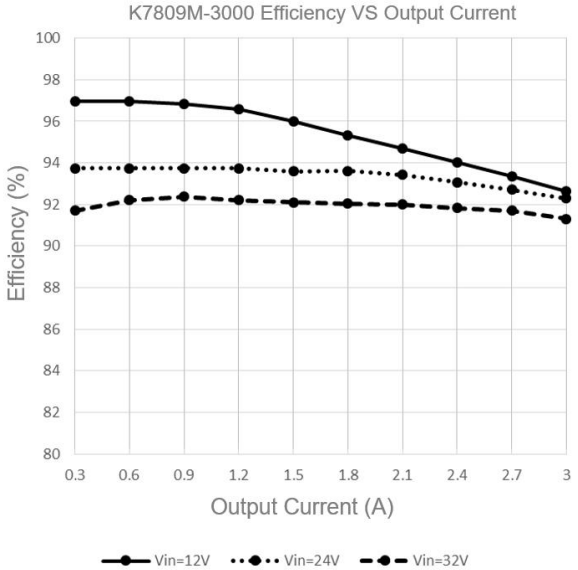
## Product Characteristics Graphs

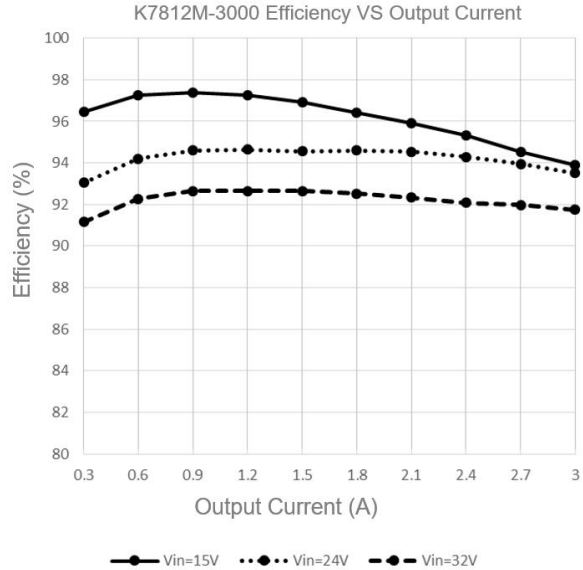


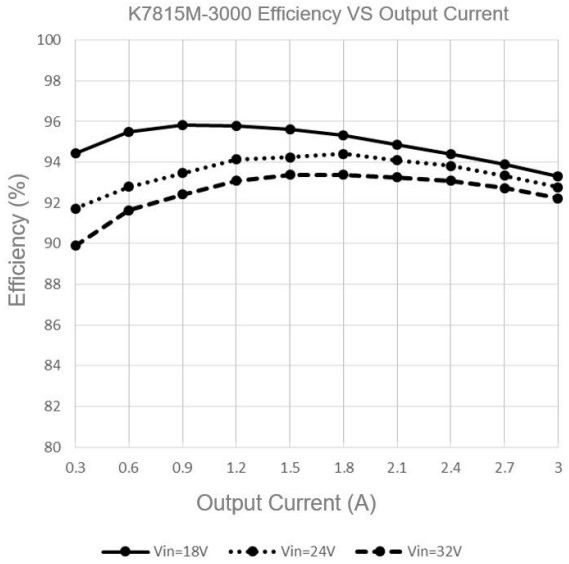






## Recommended Circuits for Application

**1. Requirement for the output load**

The maximum capacitive load is tested at the full load. The converter may not start or be damaged at the capacitive over-load.

**2. Typical application circuits**

To effectively decrease the input and output ripple and noise, a capacitor filter net can be used at the input and output as below circuit diagrams (Figure 1 for the Positive output application, Figure 2 for the Negative output application and Figure 3 for Positive & Negative outputs connected in parallel application, 10uH is recommended for LDM). Suitable filtering capacitors should be chosen as the recommended capacitive load values in Table 1. The converter could not start if the capacitance is too big. (The capacitances of C1 C2 can be increased according to the actual situation, low ESR Tantalum capacitors or Electrolytic capacitors can be used.)

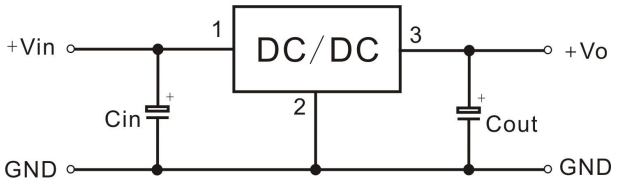



**Figure 1 (Positive output circuit diagram)**

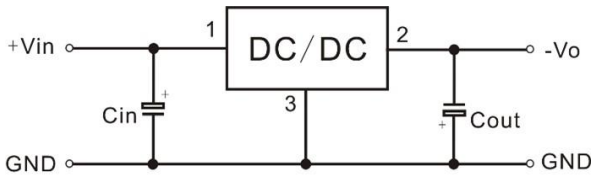



**Figure 2 (Negative output circuit diagram)**

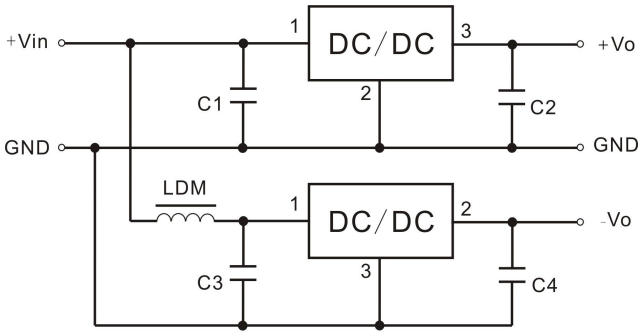
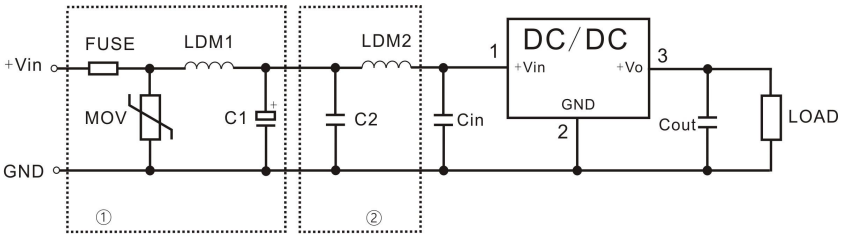



**Figure 3 (Positive & negative outputs parallel application circuit diagram)**

| Part No. | Recommended Capacitive Load Values (Table 1) | | | |
|---|---|---|---|---|
| | Cin (Electrolytic capacitor) | C1/C3 (Ceramic capacitor) | Cout (Electrolytic capacitor) | C2/C4 (Ceramic capacitor) |
| K7803M-3000 | 47uF/50V | 22uF/50V | 100uF/16V | 47uF/10V |
| K7805M-3000 | 47uF/50V | 22uF/50V | 100uF/16V | 47uF/10V |
| K7809M-3000 | 100uF/50V | 47uF/50V | 220uF/16V | 47uF/16V |
| K7812M-3000 | 100uF/50V | 47uF/50V | 220uF/25V | 47uF/25V |
| K7815M-3000 | 100uF/50V | 47uF/50V | 220uF/25V | 47uF/25V |

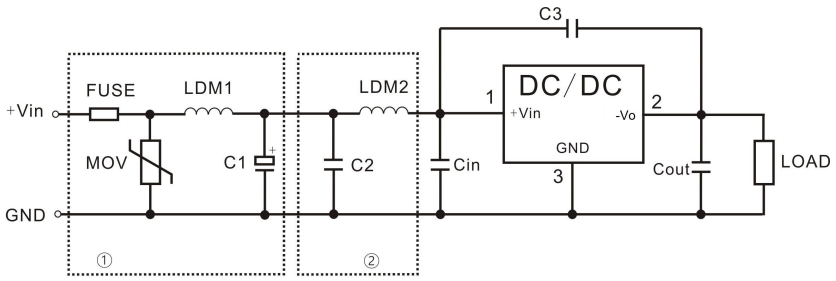
### 3. Recommended EMC circuit diagrams

Positive output circuit diagram




| | |
|---|---|
| FUSE | TBD by the input current |
| MOV | 20D330K |
| C1 | 680uF/50V |
| C2 | 4.7uF/50V |
| Cin/Cout | Refer to Table 1 |
| LDM1 | 82uH |
| LDM2 | 6.8uH |

Negative output circuit diagram




| | |
|---|---|
| FUSE | TBD by the input current |
| MOV | 20D330K |
| C1 | 680uF/50V |
| C2/C3 | 4.7uF/50V |
| Cin/Cout | Refer to Table 1 |
| LDM1 | 82uH |
| LDM2 | 6.8uH |

Note: Part ① circuit is for EMS test, part ② for EMI filtering, both can be adjusted according to the actual situation.

**Application Notice**

1. The product is not available to be used in parallel, and not available for hot-plug.
2. The product should be used according to the specifications, otherwise it could be permanently damaged.
3. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performance cannot be guaranteed if it works under over-load condition.
5. Unless otherwise specified, all values or indicators on this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).
6. All values or indicators on this datasheet have been tested based on Aipupower test specifications.
7. The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
8. Aipupower can provide customization service.

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