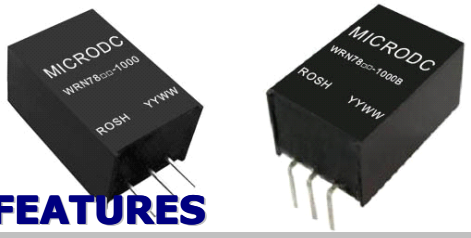
MICRODC
Professional Power Module

# WRN78XX-1000(B) Series

**WIDE INPUT NON-ISOLATED & REGULATED SINGLE OUTPUT**




## FEATURES

- ◆Efficiency up to 97%
- ◆Operating temperature: -40°C ~ +85°C
- ◆Short circuit protection, thermal shutdown
- ◆Low ripple and noise
- ◆Micro miniature SIP package
- ◆ No heatsink required
- ◆ Industry standard pinout
- ◆MTBF>2,000,000 hours

## MODEL SELECTION

**WRN78①05②-1000③(B)④**

①Product Series ②Output Voltage
③Output Current ④Bend 90° pins

## APPLICATIONS

The WRN78xx-1000(B) series high efficiency switching regulators are ideally suited to replace WRN78xx linear regulators and are pin compatible. The efficiency of up to 97% means that very little energy is wasted as heat so there is no need for any heatsinks with their additional space and mounting costs.

## Product Program

| Part Number | Input Voltage(VDC) | | Output | | Efficiency(%,Typ) | |
|---|---|---|---|---|---|---|
| | Nominal | Range | Voltage (VDC) | Current (MA) | Vin (min.) | Vin (max.) |
| WRN781.5-1000(B) | 12 | 4.75-26 | 1.5 | 1000 | 80 | 71 |
| WRN781.8-1000(B) | 12 | 4.75-26 | 1.8 | 1000 | 83 | 74 |
| WRN782.5-1000(B) | 12 | 4.75-28 | 2.5 | 1000 | 88 | 80 |
| WRN7803-1000(B) | 24 | 4.75~28 | 3.3 | 1000 | 90 | 83 |
| WRN7805-1000(B) | 24 | 6.5~32 | 5.0 | 1000 | 93 | 88 |
| WRN786.5-1000(B) | 24 | 9.0~32 | 6.5 | 1000 | 94 | 90 |
| WRN7809-1000(B) | 24 | 12~32 | 9.0 | 1000 | 95 | 92 |
| WRN7812-1000(B) | 24 | 16~32 | 12 | 1000 | 96 | 94 |
| WRN7815-1000(B) | 24 | 20~32 | 15 | 1000 | 97 | 94 |

Add suffix "B" for 90° bend pins, for example: WRN7805-1000B.

## OUTPUT SPECIFICATIONS

| Item | Test conditions | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Output voltage accuracy | 100% full load | | | ±2 | ±3 | % |
| Line regulation | Vin=min. to max. at full load | | | ±0.2 | ±0.4 | |
| Load regulation* | 10% to 100% load | | | ±0.4 | ±0.6 | |
| Ripple & Noise | 20MHz bandwidth (refer to figure 3) | | | 25 | 35 | mVp-p |
| Short circuit input power** | | | | 0.5 | 1.8 | W |
| Short circuit protection | | | Continuous, automatic recovery | | | |
| Thermal shutdown | Internal IC junction | | | 150 | | ℃ |
| Switching frequency | 100% full load | | 280 | 330 | 450 | KHz |
| Output current limit | Vin= min. to max. (at full load) | Vout:1.5V~3.3V | | | 3000 | mA |
| | | Vout:5V~15V | | | 2000 | |
| Quiescent current | | | | 5 | 8 | mA |
| Temperature coefficient | -40℃ ~ +85℃ ambient | | | | ±0.02 | %/℃ |
| Max capacitance load | | | | | 1000 | μF |

* WRN781.8-1000 is ±0.75%(Max), ** WRN781.5-1000 is 4W(Max).

## COMMON SPECIFICATIONS

| Item | Test conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Storage humidity | | | | 95 | % |
| Operating temperature | Power derating (above 71℃) | -40 | | 85 | ℃ |
| Operating case temp. | | | | 100 | |
| Storage temperature | | -55 | | 125 | |
| Lead temperature | 1.5mm from case for 10 seconds | | | 300 | |
| Cooling | | Free air convection | | | |
| Case material | | Plastic (UL94-V0) | | | |
| MTBF | 25℃（MIL-HDBK-217F） | 2000 | | | k hours |
| Weight | | | 3.7 | | g |

Note:

1. All specifications measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. Only typical models listed. If you need other model, please confirm the power, input voltage and output voltage, then phone us.

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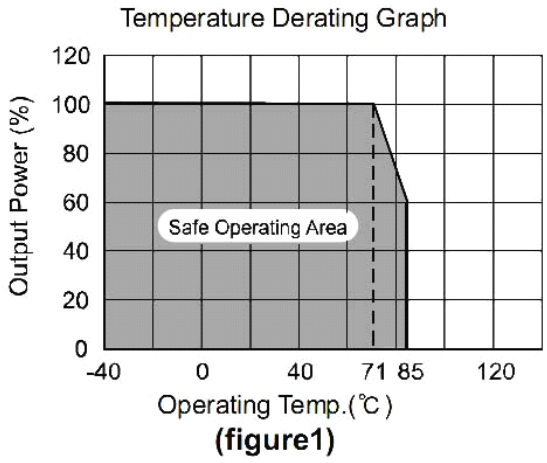
## TYPICAL CHARECTERISTICS

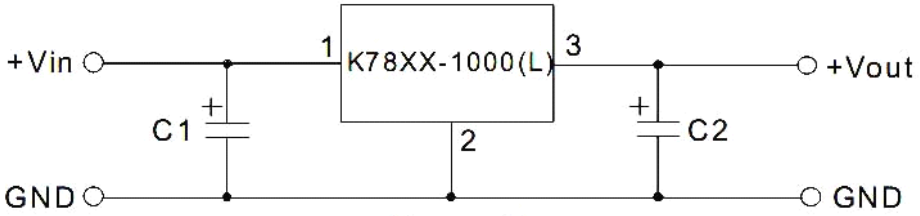



(figure1)

## EXTERNAL CAPACITOR TABL

| Part Number | C1 (Ceramic capacitor) | C2 (Ceramic capacitor) |
|---|---|---|
| WRN7801-1000(B) | 10μF/50V | 22μF/6.3V |
| WRN781.8-1000(B) | 10μF/50V | 22μF/6.3V |
| WRN782.5-1000(B) | 10μF/50V | 22μF/6.3V |
| WRN7803-1000(B) | 10μF/50V | 22μF/6.3V |
| WRN7805-1000(B) | 10μF/50V | 22μF/16V |
| WRN786.5-1000(B) | 10μF/50V | 10μF/16V |
| WRN7809-1000(B) | 10μF/50V | 10μF/16V |
| WRN7812-1000(B) | 10μF/50V | 10μF/25V |
| WRN7815-1000(B) | 10μF/50V | 10μF/25V |

## TYPICAL APPLICATION CIRCUIT

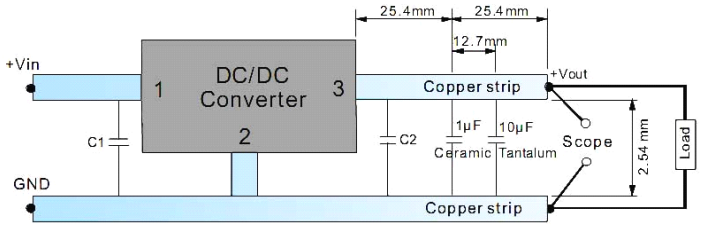



(figure 2)

1. C1 and C2 are required and should be fitted close to the converter pins.
2. The capacitance of C1, C2 sees external capacitor table, it can be increased properly if required, and tantalum or low ESR electrolytic capacitors may also suffice.
3. No parallel connection or plug and play.

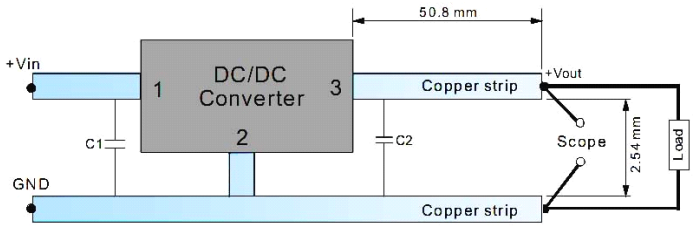
## TEST CONFIGURATIONS (TA=25℃)

1 Efficiency and Output Voltage Ripple Test



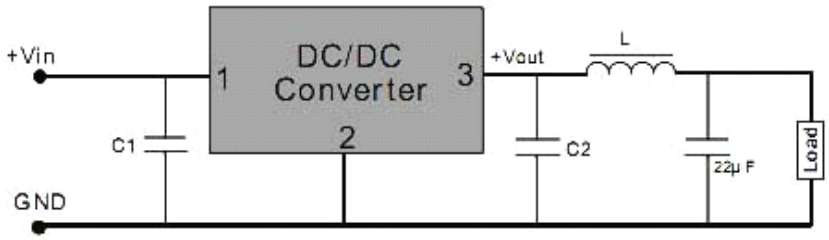

(figure 3)

2 Start-up and Load Transient Response Test




(figure 4)

## OUTPUT RIPPLE REDUCTION



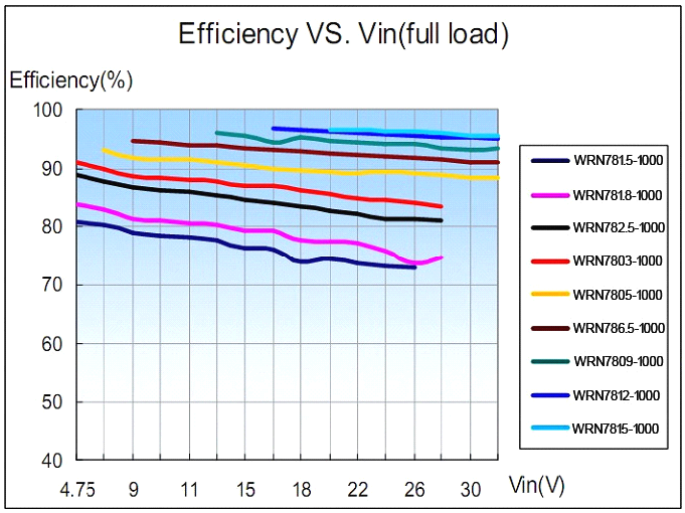

To reduce output ripple, it is recommended to add a LC filter in output port.

L: Recommended parameter 10μF~ 47μF.

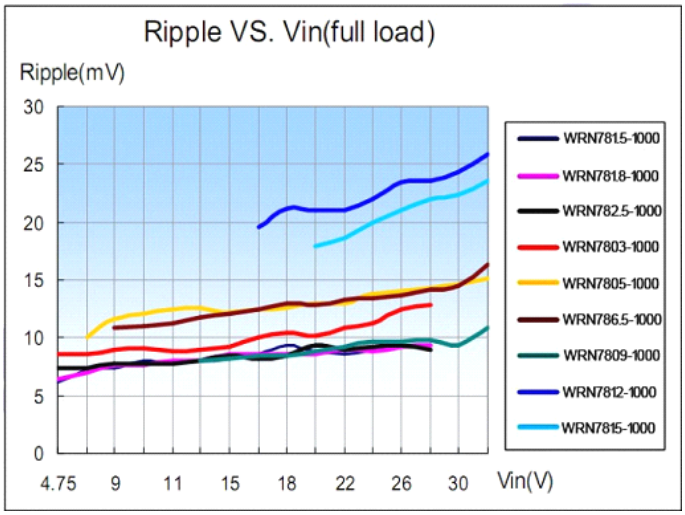
(figure 5)

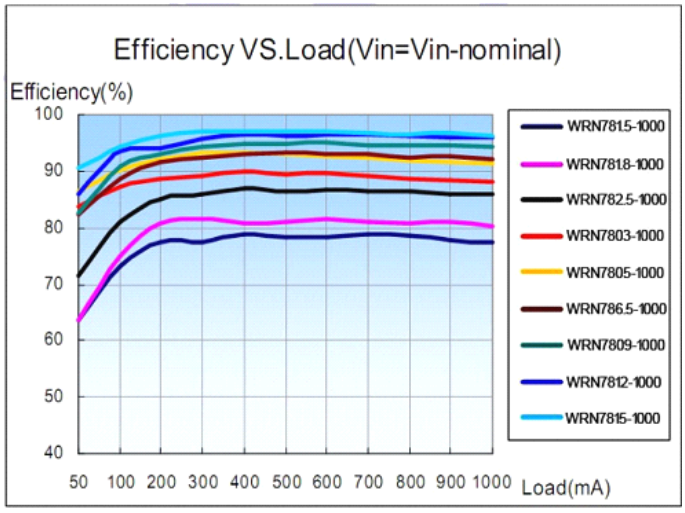
## OUTPUT RIPPLE REDUCTION

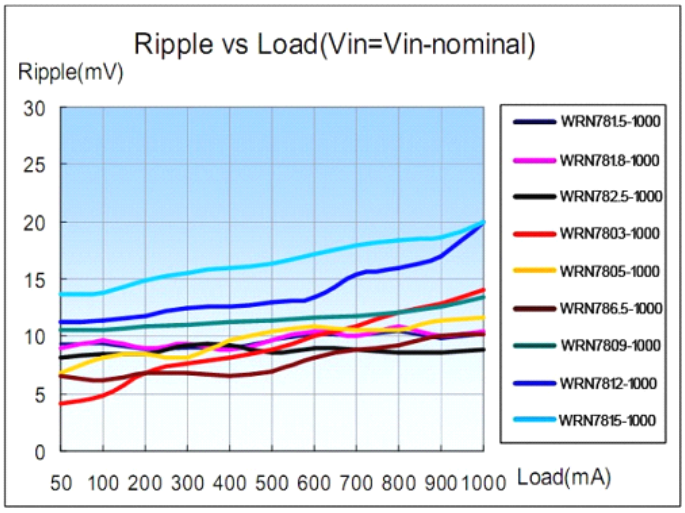
Efficiency




Ripple



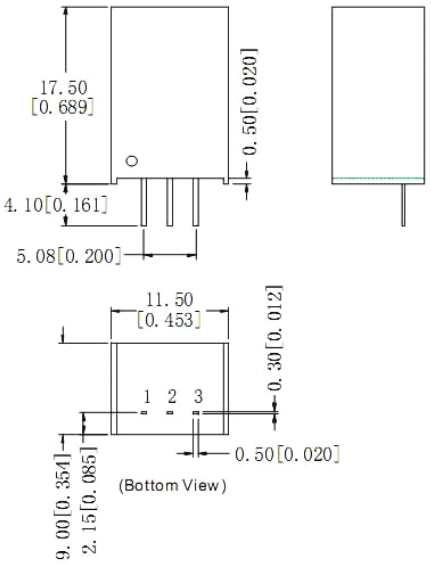



## OUTLINE DIMENSIONS & FOOTPRINT DETAILS

### MECHANICAL DIMENSIONS

**WRN78XX-1000**



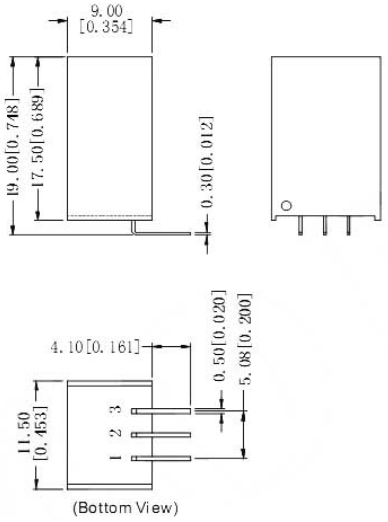

Note:

Unit:mm[inch]

Pin section tolerances: ±0.10mm[±0.004inch]

General tolerances: ±0.25mm[±0.010inch]

**WRN78XX-1000B**




Note:

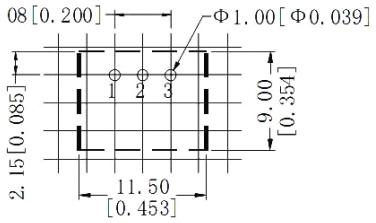
Unit:mm[inch]

Pin section tolerances: ±0.10mm[±0.004inch]

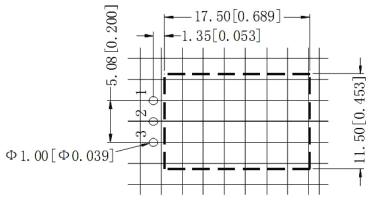
General tolerances: ±0.25mm[±0.010inch]

### RECOMMENDED FOOTPRINT

WRN78XX-1000



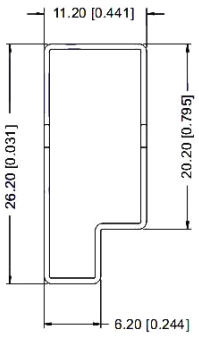

WRN78XX-1000B



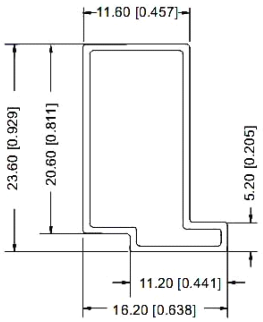

| FOOTPRINT DETAILS | |
|---|---|
| Pin | Function |
| 1 | +Vin |
| 2 | GND |
| 3 | +Vout |

### TUBE OUTLINE DIMENSIONS

**WRN78XX-1000**




**WRN78XX-1000B**




Note:

Unit :mm[inch]

General tolerances:±0.50mm[±0.020inch]

L=530mm[20.866inch] Devices per tube quantity: 44pcs

L=220mm[8.661inch] Devices per tube quantity: 17pcs

Short tube inner packaging dimensions: L*W*H=255*170*80mm

Short tube outer packaging dimensions(with six inner packaging boxes): L*W*H=375*280*270mm

Long tube inner packaging dimensions: L*W*H=580*200*100mm

Long tube outer packaging dimensions(with two inner packaging boxes): L*W*H=600*215*220mm

Long tube outer packaging dimensions(with three inner packaging boxes): L*W*H=600*215*325mm