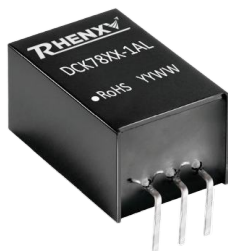


## DCK78xx-1A(L) Series



CE Report

RoHS



### Features

- Wide Operating Temperature Range : -40°C To +85°C
- Up To 95% Efficiency
- No Load Current As Low As 0.2MA
- Ripple As Low As 30mVp-P
- The Pins Are Compatible With The LM78xx Series And Can Be Packaged With Straight Or Curved Pins

### Description

Wide Voltage Input, Output 1A, Non Isolated /Stabilized / Single Output / SIP3 Packaging.

### Model Numbering

## DCK78xx-1A(L)

Series

Representing corner products

Output Current

Output Voltage

### Selection Guide

| Product model | Input Voltage<br>Standard Value(range) | Output Voltage | Output Current (A)<br>(Max./Min.) | Efficiency %<br>(Min./Typ.) | Maximum capacitive load<br>( $\mu$ F) |
|---------------|----------------------------------------|----------------|-----------------------------------|-----------------------------|---------------------------------------|
| DCK7803-1A(L) | 24(4.75-36)                            | 3.3            | 1                                 | 80/90                       | 680                                   |
| DCK7805-1A(L) | 24(6.5-36)                             | 5              | 1                                 | 85/93                       | 680                                   |
|               | 12(7-31)                               | -5             | -0.5                              | 81/85                       | 330                                   |
| DCK7809-1A(L) | 24(12-36)                              | 9              | 1                                 | 89/94                       | 680                                   |
| DCK7812-1A(L) | 24(15-36)                              | 12             | 1                                 | 92/95                       | 680                                   |
|               | 12(8-24)                               | -12            | -0.3                              | 87/88                       | 330                                   |
| DCK7815-1A(L) | 24(19-36)                              | 15             | 1                                 | 93/96                       | 680                                   |
|               | 12(8-21)                               | -15            | -0.3                              | 87/88                       | 330                                   |

## Input Characteristics

| Parameter                | Conditions           | Min. | Typ. | Max. | Units |
|--------------------------|----------------------|------|------|------|-------|
| Input Current (No-Load)  | Positive Output      | --   | 5    | 20   | mA    |
| Reflected Ripple Current |                      | 3    | 15   | 20   | mA    |
| Input Filter             | Capacitive Filtering |      |      |      |       |

Remarks: This product does not support hot plug

## Output Characteristic

| Parameter                     | Conditions                                             | Min. | Typ.    | Max.   | Units |
|-------------------------------|--------------------------------------------------------|------|---------|--------|-------|
| Output Voltage Accuracy       | Full Load, Input Voltage Range                         | --   | +/-2    | +/-4   | %     |
| Linear Adjustment Rate        | Full Load, Input Voltage Range                         | --   | +/-0.2  | +/-0.5 | %     |
| Load Regulation Rate          | Nominal Input Voltage, 10% To 100% Load                | --   | +/-0.3  | +/-0.6 | %     |
| Ripple/ Noise                 | 20MHz Bandwidth                                        | --   | 20      | 80     | %     |
| Temperature Drift Coefficient | 100% Load                                              | --   | +/-0.03 | --     | %/°C  |
| Transient Response Deviation  | Nominal Input Voltage,<br>25% Load Step Change         | --   | 50      | 245    | mV    |
| Transient Recovery Time       | 100Nominal Input Voltage,<br>25% Load Step Change Load | --   | 0.2     | 1      | ms    |
| Short Circuit Protection      | Sustainable, Self-Healing                              |      |         |        |       |

Note: The testing method for ripple and noise is the parallel line testing method.

## General Characteristic

| Parameter                                | Conditions                                                                  | Min. | Typ. | Max. | Units  |
|------------------------------------------|-----------------------------------------------------------------------------|------|------|------|--------|
| Working Temperature                      | Derated For Use At<br>Temperatures $\geq 71^{\circ}\text{C}$ (See Figure 1) | -40  | --   | 85   | °C     |
| Storage Temperature                      |                                                                             | -55  | --   | 125  | °C     |
| Storage Humidity                         | No Condensation                                                             | --   | --   | 260  | %RH    |
| Pin Resistance To<br>Welding Temperature | Welding Point Distance From<br>The Shell 1.5mm, 10 Seconds                  | 550  | --   | 850  | kHz    |
| Mean Time Between<br>Failures            | MIL-HDBK-217F@25°C                                                          | 2000 | --   | --   | kHours |

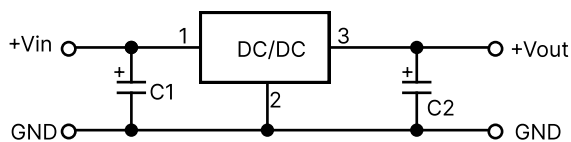
## Physical Characteristics

| Parameter          | Contents                                                   |
|--------------------|------------------------------------------------------------|
| Housing Material   | Black Flame Retardant And Heat-Resistant Plastic (UL94V-0) |
| Overall Dimensions | 11.50 X 9.00 X 17.50 Mm                                    |
| Weight             | 3.8 G(Typ.)                                                |
| Cooling Mode       | Natural Air Cooling                                        |

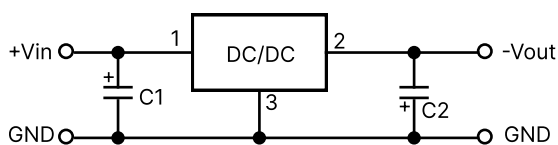
## EMC Characteristics

| Parameter | Category                       | Content                                                                |
|-----------|--------------------------------|------------------------------------------------------------------------|
| EMI       | Conductive disturbance         | CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 2) |
|           | Radiation disturbance          | CISPR32/EN55032 CLASS B (The recommended circuit is shown in Figure 2) |
| EMS       | Electrostatic discharge        | IEC/EN61000-4-2 Contact $\pm 4\text{KV}$ perf. Criteria B              |
|           | Radiated immunity              | IEC/EN 61000-4-3 10V/m perf. Criteria A                                |
|           | Pulse group immunity           | IEC/EN 61000-4-4 $\pm 1\text{KV}$ perf. Criteria B                     |
|           | Surge immunity                 | IEC/EN 61000-4-5 line to line $\pm 1\text{KV}$ perf. Criteria B        |
|           | Conducted disturbance immunity | IEC/EN 61000-4-6 3Vr.m.s perf. Criteria A                              |

## Circuit Design and Application



Positive Output



Negative Output

Table 1:  
Recommended Capacitive Load Values

| Product model  | C1/C3                 | C2/C4                 |
|----------------|-----------------------|-----------------------|
| DCK7803 -1A(L) | 10 $\mu\text{F}$ /50V | 22 $\mu\text{F}$ /10V |
| DCK7805 -1A(L) |                       | 22 $\mu\text{F}$ /10V |
| DCK7809 -1A(L) |                       | 22 $\mu\text{F}$ /16V |
| DCK7812 -1A(L) |                       | 22 $\mu\text{F}$ /25V |
| DCK7815 -1A(L) |                       | 22 $\mu\text{F}$ /25V |

Figure 1: Application circuit

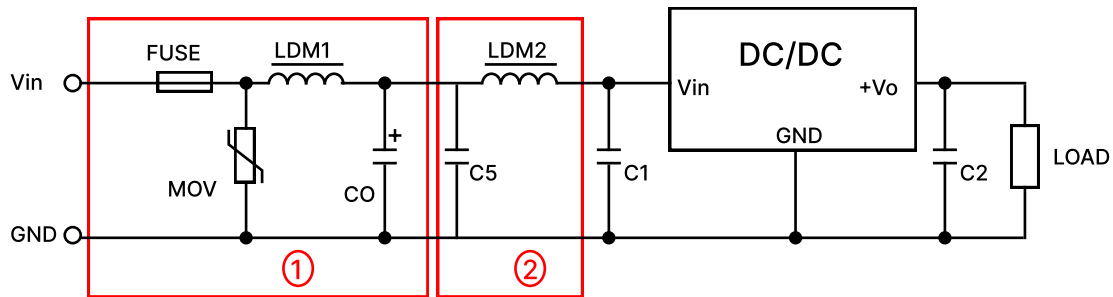


Figure 2: EMC Typical Recommended Circuits

Table 2:  
Recommended Circuit Parameter Values

| Category | Component | Value                     |
|----------|-----------|---------------------------|
| EMI      | FUSE      | Based on actual selection |
|          | MOV       | 20D470K                   |
|          | LDM1      | 82μH                      |
|          | C0        | 270pF/2kV                 |
|          | C1        | Reference Table 2         |
|          | C2        |                           |
|          | C5        | 4.7μF /50V                |
|          | LDM2      | 12μH                      |

1. Typical application: If further reduction of input and output ripple is required, a capacitor filter network can be connected at the input and output ends. The application circuit is shown in Figure 1. However, suitable filter capacitors should be selected. If the capacitance is too large, it may cause overcurrent or poor startup of the power supply. For each output, while ensuring safe and reliable operation, the recommended capacitance load values are shown in Table 1.

2. EMC requirements: For situations with high EMC requirements, a typical EMC recommended circuit is shown in Figure 2.

3. Input requirements: Ensure that the fluctuation range of the input voltage does not exceed the upper and lower limits of the input voltage specified in this data sheet, and the input power must be greater than the output power specified in this data sheet. For situations with a 24V input voltage, it is recommended to connect a TVS tube between the positive and negative input pins for protection (recommended parameters for TVS tubes: 30V, bidirectional, SOD-123 packaging).

4. Output load requirements: Try to avoid using it without load as much as possible; When the actual power of the load is less than 10% of the rated output power in this data sheet, or when it needs to be used in no-load situations, it is recommended to connect a load resistor externally at the output end. The load resistor can be calculated according to 5-10% of the rated power in this data sheet. The calculation formula for the load resistor value is  $R_L = V_{out}^2 / (P_{out} * 10\%)$ .

5. Overload protection: Under normal working conditions, the output circuit of this product has no protection function for overload situations. The simplest method is to connect a self recovery fuse in series at the input end, or add a circuit breaker outside the circuit; Or during design and selection, the actual power of the circuit should be around 60-80% of the rated power in this data sheet.

## Product Characteristic Curve

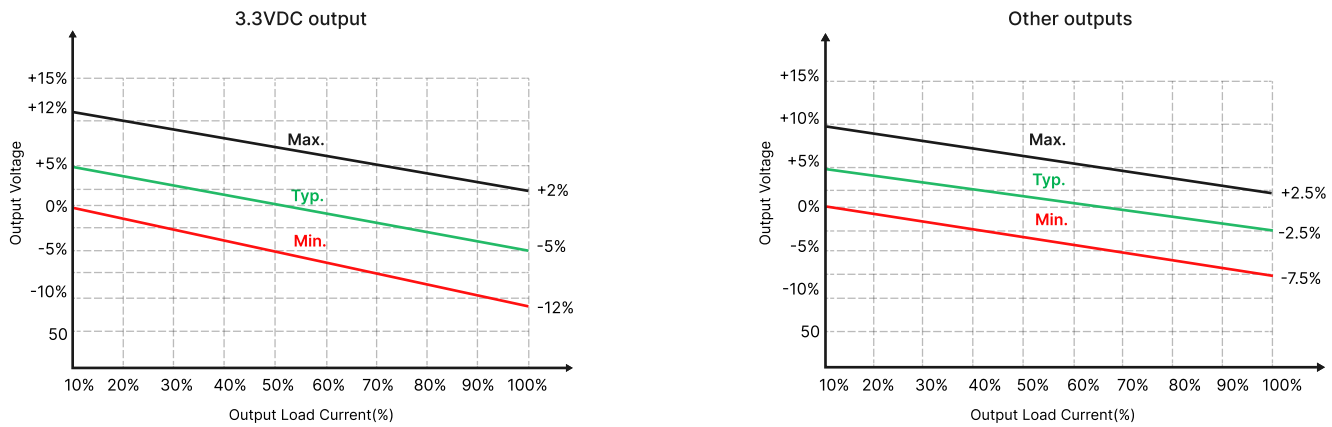


Figure 3: Voltage tolerance envelope

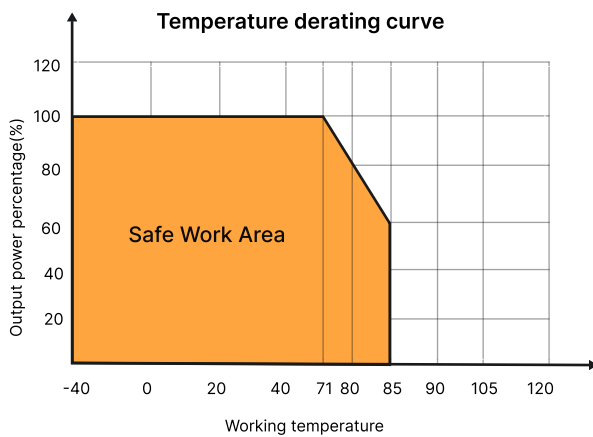


Figure 4: Temperature Derating Curve

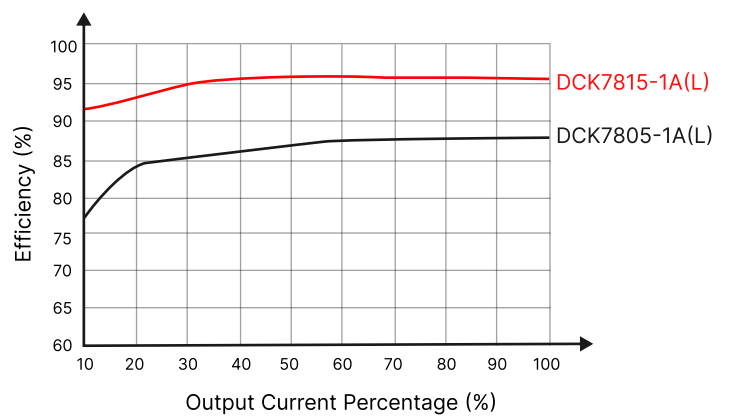


Figure 5: Efficiency Vs Output Load

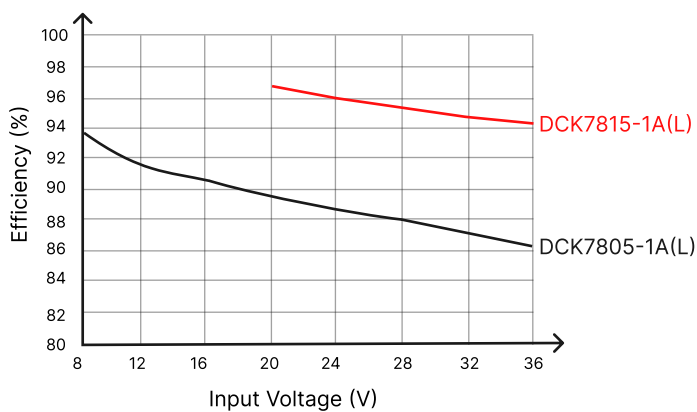


Figure 6: Efficiency Vs Input Voltage

### Overall Dimensions and Pin Functions

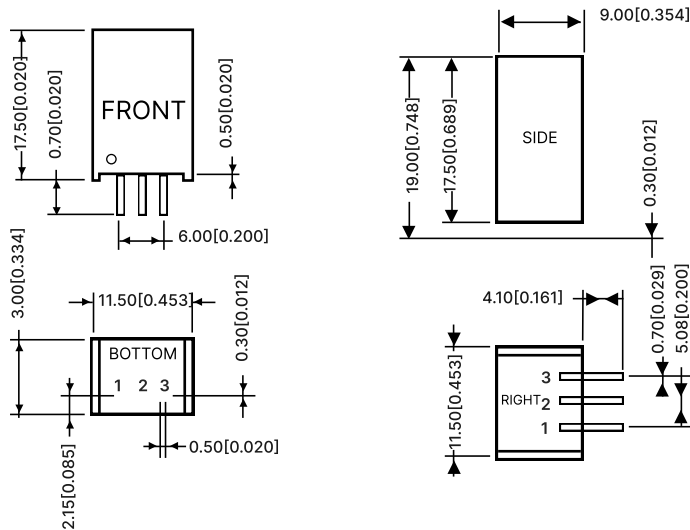


Figure 7: Overall dimensions

Table 3: Pin Function Table

| Pin | Positive output | Negative output |
|-----|-----------------|-----------------|
| 1   | Vin             | Vin             |
| 2   | GND             | -Vo             |
| 3   | +0V             | GND             |

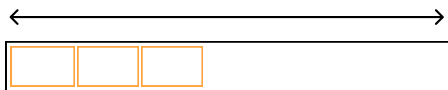
Note:

Dimensions in mm

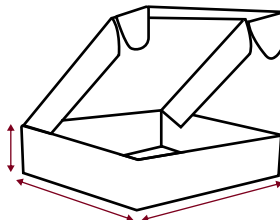
Terminal diameter tolerance:  $\pm 0.10$

Undeclared tolerance:  $\pm 0.50$

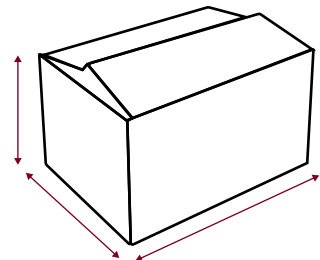
### Packaging Method



30 Pieces/Tube



540 Pieces/Inner box



2700 Pieces/Outer box

### Notes & Instructions

- 1.The input voltage shall not exceed the specified range value, otherwise permanent and unrecoverable damage maybe caused.
2. Unless otherwise specified, the parameters in this manual are measured at 25 °C,40%~75% humidity, input nominal voltage and output pure resistance mode under full load.
- 3.All index test methods are based on the company's enterprise standards.
- 4.The copyright and the final interpretation right of the product belong to HENXY.