


**CUI INC**

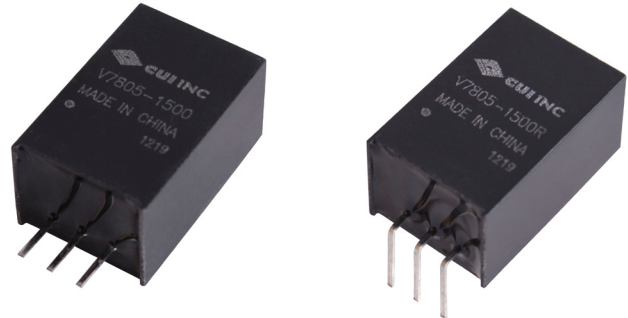
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date 09/22/2021

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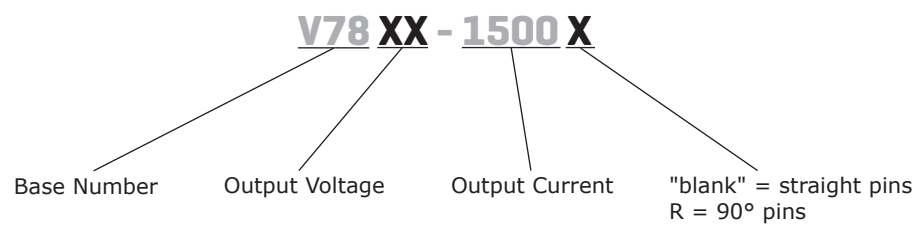
**SERIES: V78-1500 | DESCRIPTION: NON-ISOLATED SWITCHING REGULATOR**
**FEATURES**

- 1.5 A current output
- extremely high efficiency up to 95%
- no heat sink required
- pin compatible to LM78XX linear regulators
- available in straight and right angle SIP packages
- low ripple and noise
- short circuit protection, thermal shutdown
- wide temperature (-40~85°C)


**MODEL**

|            | input voltage |                | output voltage<br>(Vdc) | output current<br>max<br>(mA) | ripple and noise <sup>1</sup><br>max<br>(mVp-p) | efficiency     |                |
|------------|---------------|----------------|-------------------------|-------------------------------|-------------------------------------------------|----------------|----------------|
|            | typ<br>(Vdc)  | range<br>(Vdc) |                         |                               |                                                 | Vin min<br>(%) | Vin max<br>(%) |
| V7803-1500 | 12            | 4.75~18        | 3.3                     | 1,500                         | 45                                              | 91             | 88             |
| V7805-1500 | 12            | 6.5~18         | 5                       | 1,500                         | 45                                              | 93             | 91             |
| V7806-1500 | 12            | 8~18           | 6.5                     | 1,500                         | 45                                              | 95             | 93             |

Notes: 1. ripple and noise are measured at 20 MHz BW.

**PART NUMBER KEY**


## INPUT

| parameter               | conditions/description | min  | typ | max | units |
|-------------------------|------------------------|------|-----|-----|-------|
| operating input voltage | 3.3 V output           | 4.75 | 12  | 18  | Vdc   |
|                         | 5 V output             | 6.5  | 12  | 18  | Vdc   |
|                         | 6.5 V output           | 8    | 12  | 18  | Vdc   |

## OUTPUT

| parameter               | conditions/description              | min | typ   | max   | units |
|-------------------------|-------------------------------------|-----|-------|-------|-------|
| line regulation         | Vin = min ~ max, at full load       |     | ±0.5  | ±0.75 | %     |
| load regulation         | measured from 10% load to full load |     | ±0.5  | ±1.0  | %     |
| voltage accuracy        | 100% load                           |     | ±2    | ±3    | %     |
| switching frequency     | 100% load, input voltage range      | 300 | 340   | 380   | kHz   |
| temperature coefficient |                                     |     | ±0.02 |       | %/°C  |

## PROTECTIONS

| parameter                | conditions/description         | min | typ | max | units |
|--------------------------|--------------------------------|-----|-----|-----|-------|
| short circuit protection | continuous, automatic recovery |     |     |     |       |
| thermal shutdown         |                                |     | 150 |     | °C    |

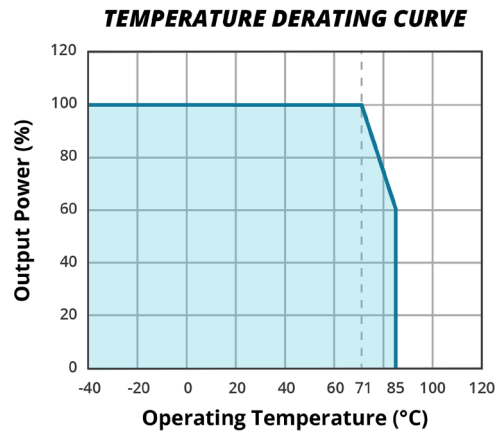
## SAFETY AND COMPLIANCE

| parameter | conditions/description                 | min       | typ | max | units |
|-----------|----------------------------------------|-----------|-----|-----|-------|
| EMI/EMC   | EN 55022 class B, EN 61000-4-2 class A |           |     |     |       |
| MTBF      |                                        | 2,000,000 |     |     | hours |
| RoHS      | 2011/65/EU                             |           |     |     |       |

## ENVIRONMENTAL

| parameter             | conditions/description          | min | typ | max | units |
|-----------------------|---------------------------------|-----|-----|-----|-------|
| operating temperature |                                 | -40 |     | 85  | °C    |
| storage temperature   |                                 | -55 |     | 125 | °C    |
| case temperature      |                                 |     |     | 100 | °C    |
| storage humidity      | non-condensing                  |     |     | 95  | %     |
| temperature rise      | at full load                    |     | 25  |     | °C    |
| lead temperature      | 1.5 mm from case for 10 seconds |     |     | 300 | °C    |

## DERATING CURVES



## MECHANICAL

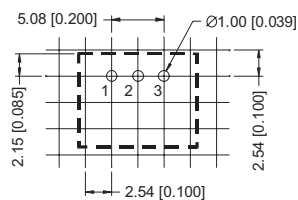
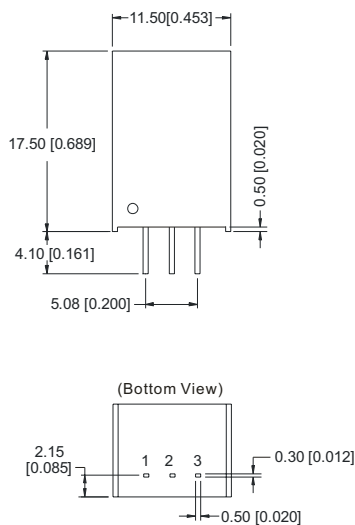
| parameter     | conditions/description                          | min | typ | max | units |
|---------------|-------------------------------------------------|-----|-----|-----|-------|
| dimensions    | 0.689 x 0.354 x 0.453 (11.50 x 9.00 x 17.50 mm) |     |     |     | inch  |
| case material | plastic (UL94-V0)                               |     |     |     |       |
| weight        |                                                 |     | 4.0 |     | g     |

## MECHANICAL DRAWING

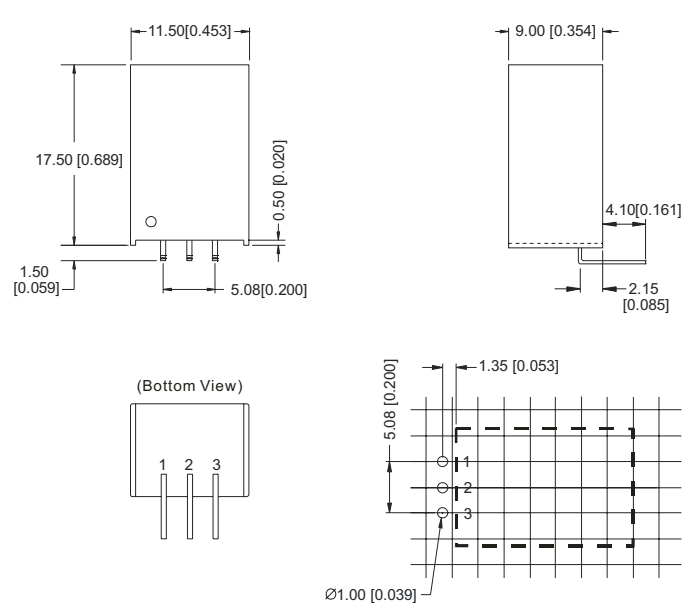
units: mm [inches]

tolerance:  $\pm 0.25$  [ $\pm 0.010$ ]pin section tolerance:  $\pm 0.10$  mm [ $\pm 0.004$ ]

V78XX-1500



V78XX-1500R



### PIN CONNECTIONS

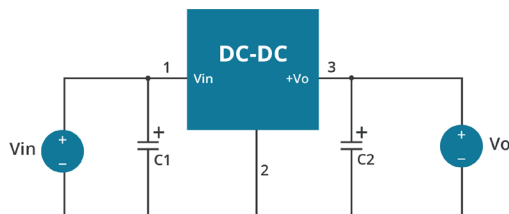
| PIN | FUNCTION |
|-----|----------|
| 1   | +Vin     |
| 2   | GND      |
| 3   | +Vo      |

## EXTERNAL CAPACITOR TABLE

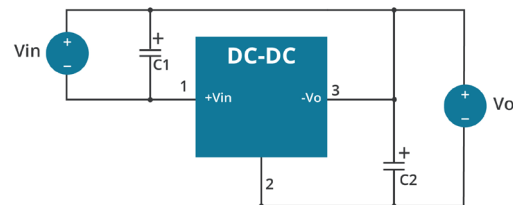
| Part Number | C1 (Ceramic capacitor) | C2 (Ceramic capacitor) |
|-------------|------------------------|------------------------|
| V7803-1500  | 10 $\mu$ F/25V         | 22 $\mu$ F/6.3V        |
| V7805-1500  | 10 $\mu$ F/25V         | 22 $\mu$ F/16V         |
| V7806-1500  | 10 $\mu$ F/25V         | 22 $\mu$ F/16V         |

## TYPICAL APPLICATION CIRCUIT

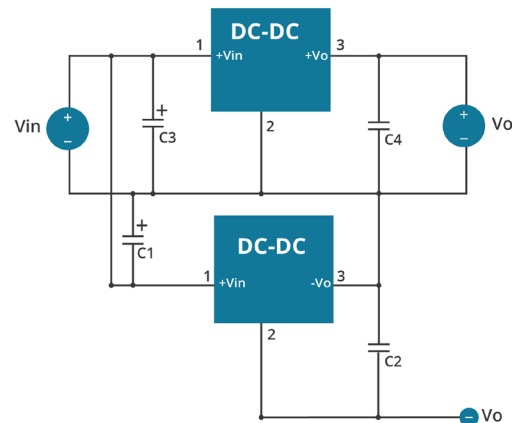
### Positive Output



### Negative Output



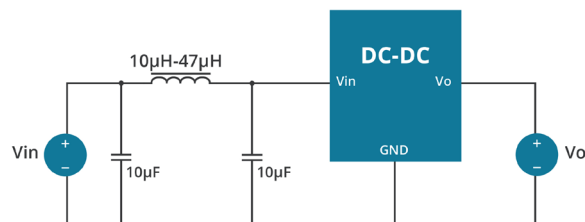
## APPLICATION EXAMPLE



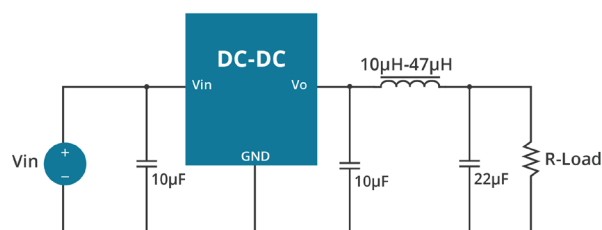
Note:

1. C1 and C2 are required and should be fitted close to the converter pins.
2. The capacitance of C1 and 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.

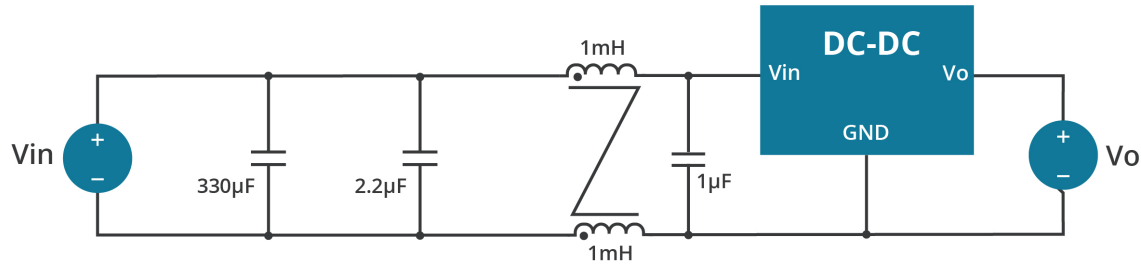
## INPUT FILTER CIRCUIT



## OUTPUT FILTER CIRCUIT

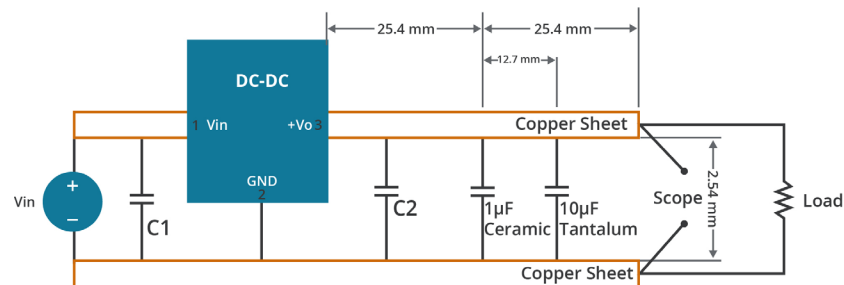


## EMC RECOMMENDED CIRCUIT

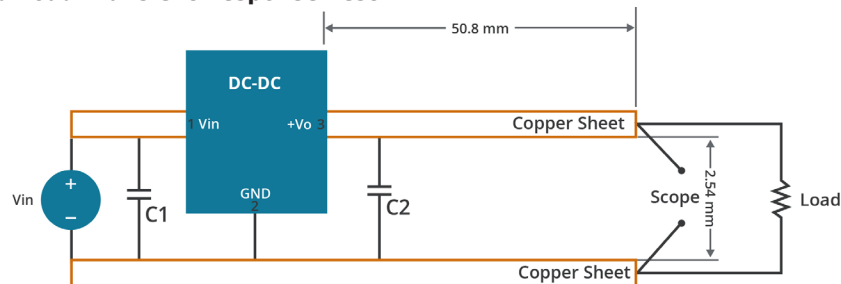


## TEST CONFIGURATION

### Efficiency and Output Voltage Ripple Test

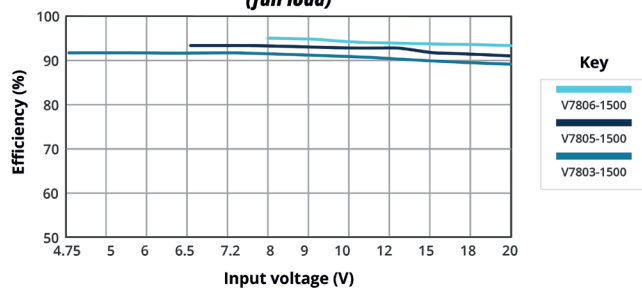


### Start-up and Load Transient Response Test

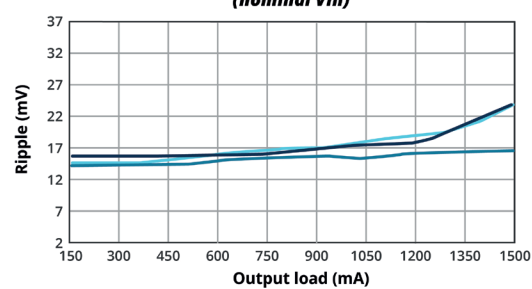


## EFFICIENCY AND RIPPLE CURVES

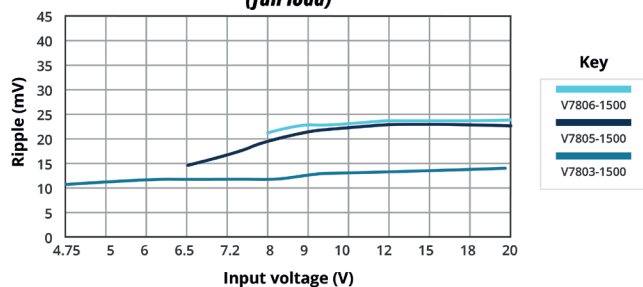
**EFFICIENCY VS INPUT VOLTAGE (full load)**



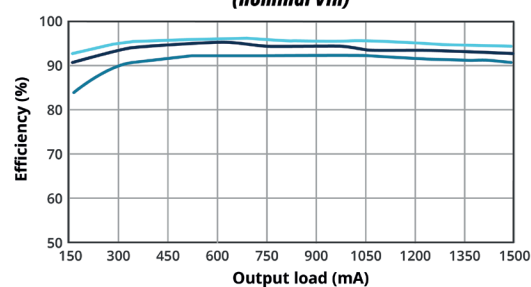
**RIPPLE VS OUTPUT LOAD (nominal  $V_{in}$ )**



**EFFICIENCY VS INPUT VOLTAGE (full load)**



**RIPPLE VS OUTPUT LOAD (nominal  $V_{in}$ )**



## REVISION HISTORY

| rev. | description                                                   | date       |
|------|---------------------------------------------------------------|------------|
| 1.0  | initial release                                               | 07/16/2010 |
| 1.01 | V-Infinity branding removed                                   | 09/04/2012 |
| 1.02 | updated typical application circuits                          | 09/25/2012 |
| 1.03 | discontinued model V7802-1500                                 | 03/21/2014 |
| 1.04 | updated datasheet                                             | 06/06/2016 |
| 1.05 | company logo updated                                          | 04/14/2021 |
| 1.06 | derating curve, efficiency curves and circuit figures updated | 09/22/2021 |

The revision history provided is for informational purposes only and is believed to be accurate.



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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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CUI products are not authorized or warranted for use as critical components in equipment that requires an extremely high level of reliability. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.