

SERIES: V78W-500 | **DESCRIPTION:** NON-ISOLATED SWITCHING REGULATOR

FEATURES

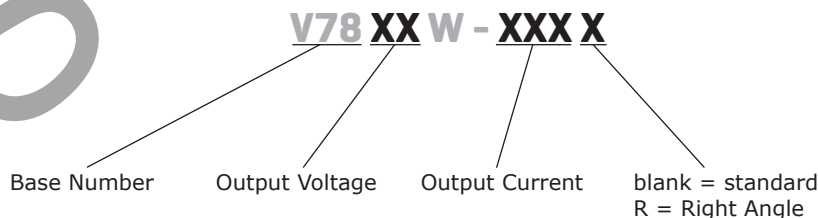
- up to 500 mA current output
- extremely high efficiency up to 95%
- no heatsink required
- pin comparable to LM78 linear regulators
- available in straight and right angle SIP packages
- up to 8:1 ultra wide input
- low ripple and noise
- short circuit protections
- wide temperature (-40°C ~ 85°C)



| MODEL | input voltage range (Vdc) | output voltage (Vdc) | output current | | output power max (W) | ripple and noise ¹ max (mVp-p) | efficiency level ² typ (%) |
|---------------------------|---------------------------|----------------------|----------------|----------|----------------------|---|---------------------------------------|
| | | | min (mA) | max (mA) | | | |
| V7803W-500 ⁵ | 9 ~ 72 | 3.3 | 10 | 500 | 1.65 | 60 | 82 |
| V7805W-500 | 9 ~ 72 | 5 | 10 | 500 | 2.5 | 60 | 87 |
| V7806W-500 ^{4,5} | 9 ~ 72 | 6.5 | 10 | 500 | 3.25 | 60 | 91 |
| V7809W-500 ^{4,5} | 14 ~ 72 | 9 | 10 | 500 | 4.5 | 60 | 92 |
| V7812W-500 ⁴ | 17 ~ 72 | 12 | 10 | 500 | 6 | 60 | 93 |
| V7815W-500 | 20 ~ 72 | 15 | 10 | 500 | 7.5 | 60 | 94 |
| V7824W-500 ^{3,4} | 36 ~ 72 | 24 | 6 | 300 | 7.2 | 60 | 95 |

- Notes:
1. 20MHz bandwidth, from 10% to 100% load
 2. Measured at Vin min and 100% load
 3. V7824W-500 output current is 300 mA (max)
 4. Standard option discontinued.
 5. Bent pin option discontinued.

PART NUMBER KEY



INPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|------------------------|-----|-----|-----|-------|
| operating input voltage | 3, 5, 6.5 V models | 9 | 48 | 72 | Vdc |
| | 9 V model | 14 | 48 | 72 | Vdc |
| | 12 V model | 17 | 48 | 72 | Vdc |
| | 15 V model | 20 | 48 | 72 | Vdc |
| | 24 V model | 36 | 48 | 72 | Vdc |

OUTPUT

| parameter | conditions/description | min | typ | max | units |
|-------------------------|-------------------------------------|-----|------|--------|----------|
| line regulation | measured from low line to high line | | ±0.4 | ±1.0 | % |
| load regulation | measured from 10% to full load | | ±0.3 | ±0.6 | % |
| voltage accuracy | at 100% load | | ±2 | ±3 | % |
| switching frequency | 100% load | 120 | | 800 | kHz |
| temperature coefficient | -40°C ~ +85°C ambient | | | ±0.015 | %/°C |
| quiescent current | Vin = nominal, min. load | | 1 | 5 | mA |
| tendencies load | at 10% to 100% load | | 1.0 | ±100 | mV ms |
| max capacitance load | | | | 100 | µF |

PROTECTIONS

| parameter | conditions/description | min | typ | max | units |
|---------------------------|--------------------------------|-----|------|------|-------|
| short circuit protection | continuous, automatic recovery | | | | |
| short circuit input power | Vin = nominal | | 0.72 | 1.2 | W |
| thermal shutdown | | | 160 | | °C |
| current limit | Vin = nominal | | 700 | 1200 | mA |

SAFETY AND COMPLIANCE

| parameter | conditions/description | min | typ | max | units |
|--------------------|--|-----------|-----|-----|-------|
| thermal resistance | | | | 60 | °C/W |
| EMI/EMC | EN55022, class B (refer to page 4), IEC/EN 61000-4-2 level 4 | | | | |
| RoHS compliant | yes | | | | |
| MTBF | 25°C (MIL-HDBK-217K) | 3,500,000 | | | hours |
| | 71°C (MIL-HDBK-217K) | 1,500,000 | | | hours |

ENVIRONMENTAL

| parameter | conditions/description | min | typ | max | units |
|----------------------------|---------------------------|-----|-----|-----|-------|
| case operating temperature | | | 65 | 100 | °C |
| operating temperature | power derating above 71°C | -40 | | 85 | °C |
| storage temperature | | -55 | | 125 | °C |
| storage humidity | non-condensing | | | 95 | % |

MECHANICAL

| parameter | conditions/description | min | typ | max | units |
|---------------|--|-----|-----|-----|-------|
| dimensions | 11.5 x 9.0 x 17.5 mm (0.45 x 0.35 x 0.69 inch) | | | | |
| case material | Plastic (UL94-V0) | | | | |
| weight | | | 4 | | g |

MECHANICAL DRAWING

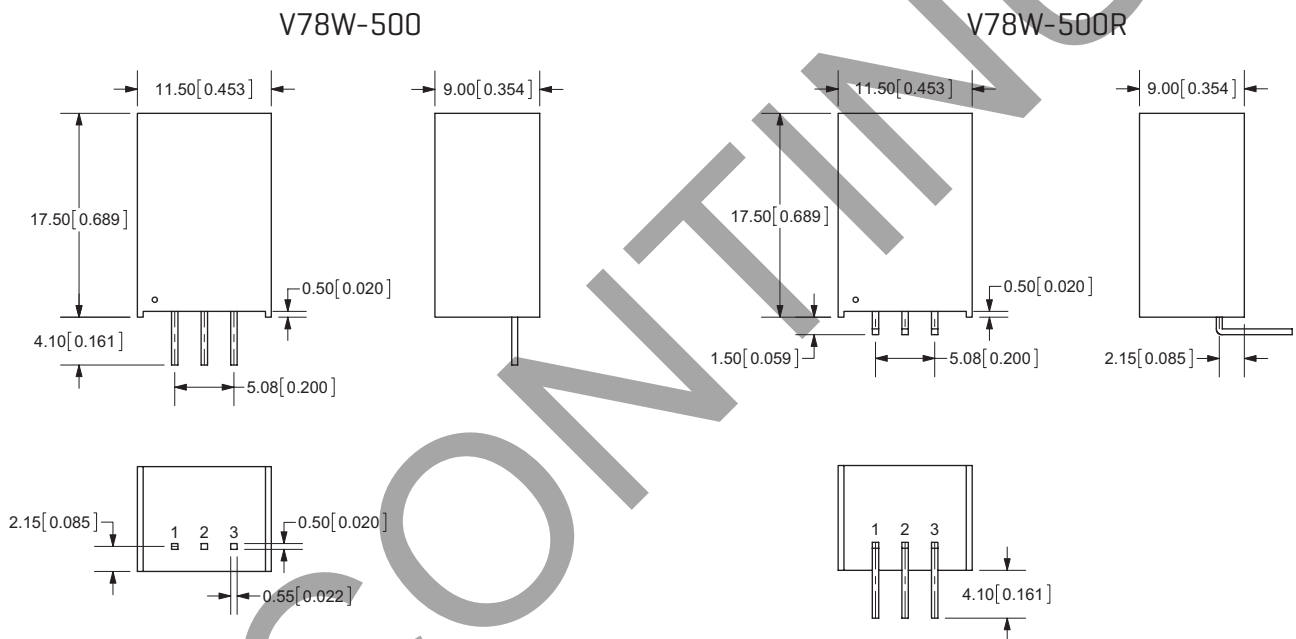
Units: mm [in]

All pins on a 2.54mm pitch

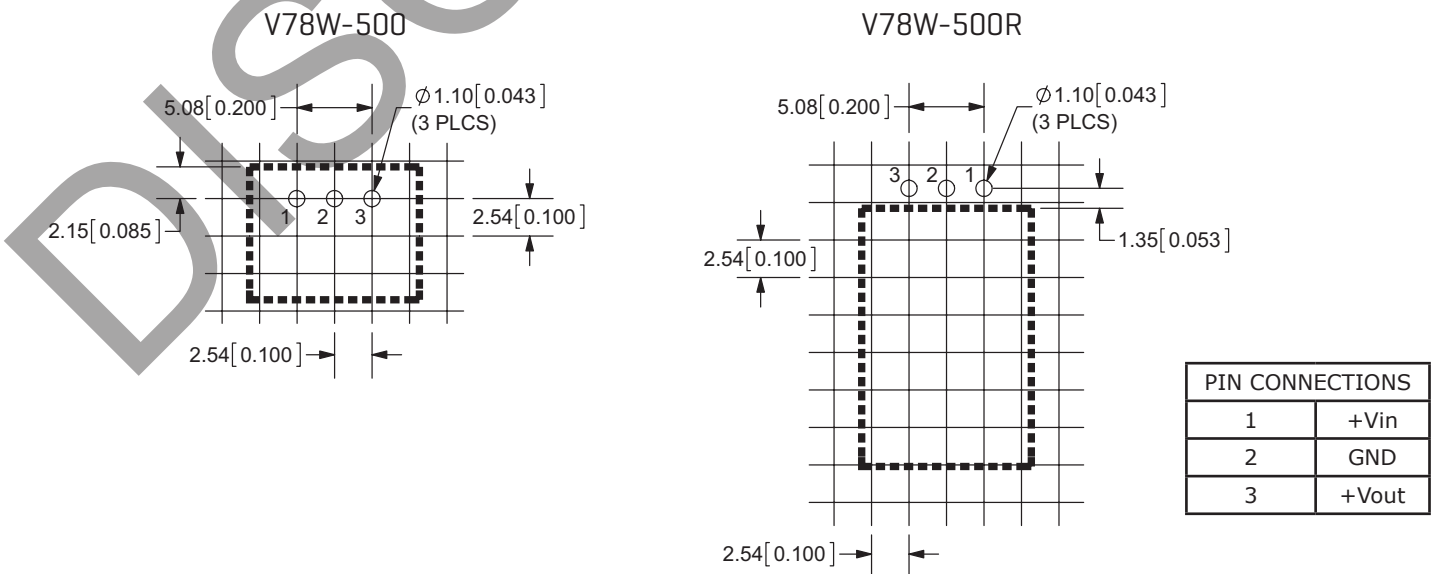
pin tolerance: $\pm 0.10\text{mm}[\pm 0.004\text{in}]$

general tolerance: $\pm 0.25\text{mm}[\pm 0.010\text{in}]$

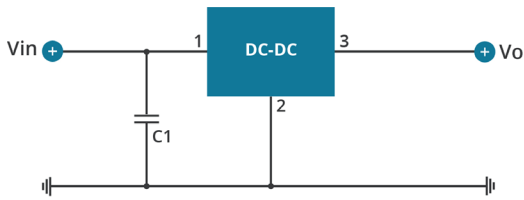
general tolerance (right angle): $\pm 0.50\text{mm}[\pm 0.020\text{in}]$



RECOMMENDED FOOTPRINT

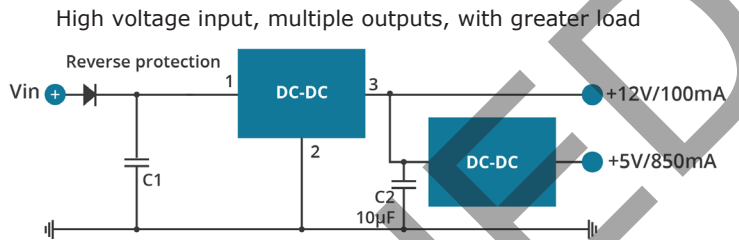


TYPICAL APPLICATION CIRCUIT



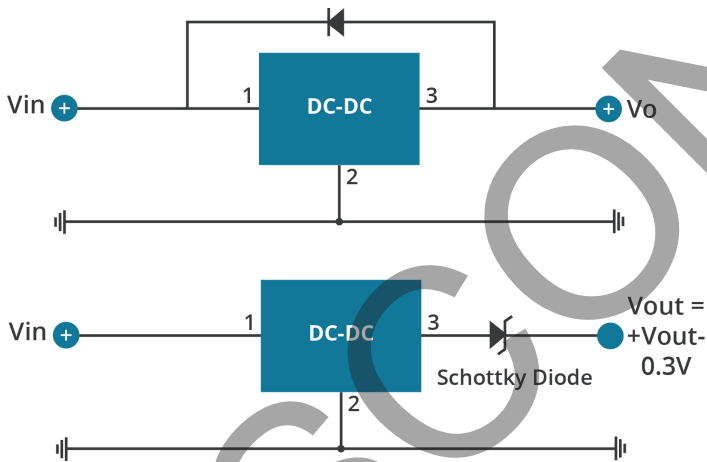
1. The regulator proposed to establish the input voltage by soft-start, no plug and play, if the input voltage changes from low voltage to high voltage abruptly, the regulator might be damaged.
2. If the applications is high-voltage input, the regulator must add an external capacitor $C_1 (\leq 47\mu F/100V)$ to prevent voltage spikes caused by damage to the module.
3. No parallel connection.

APPLICATION EXAMPLE

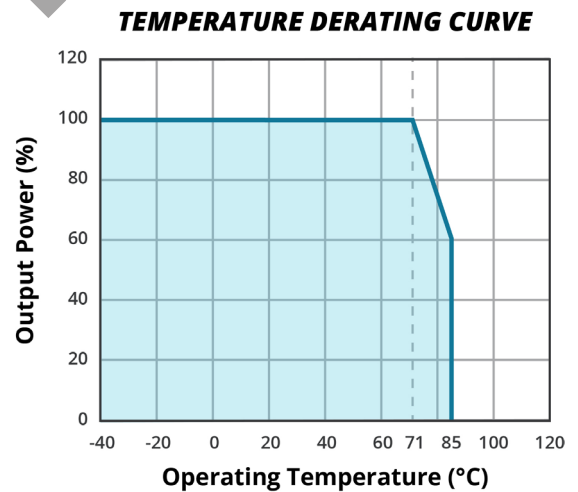


1. The input current amount of the back-grade regulator and the pre-class load should be less than or equal the max load current of the pre-class regulator.
2. If further filtering is required, please add components as per the above circuit (We recommend not to add components), if request, please make sure the capacitors $C_1 \leq 47\mu F$, $C_2 \leq 10\mu F$ more close to the back-grade regulator.

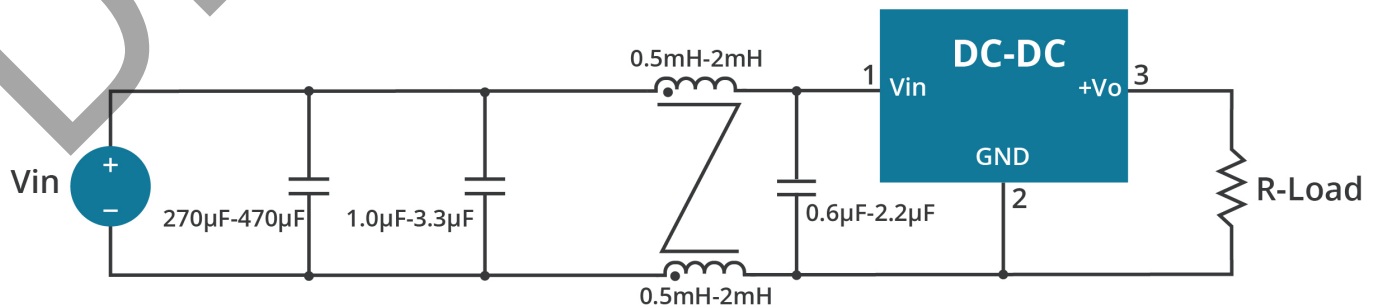
MODULES PROTECT RECOMMENDED CIRCUIT



DERATING CURVE



EMC RECOMMENDED CIRCUIT



REVISION HISTORY

| rev. | description | date |
|------|---|------------|
| 1.0 | initial release | 09/28/2011 |
| 1.01 | V-Infinity branding removed | 09/06/2012 |
| 1.02 | updated datasheet | 04/21/2015 |
| 1.03 | company logo updated | 04/14/2021 |
| 1.04 | derating curve and circuit figures updated | 09/21/2021 |
| 1.05 | discontinued model V7803W-500R, V7806W-500, V7806W-500R, V7809W-500, V7809W-500R, V7812W-500 & V7824W-500 | 01/15/2024 |

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



CUI INC

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Headquarters
20050 SW 112th Ave.
Tualatin, OR 97062
800.275.4899

Fax 503.612.2383
cui.com
techsupport@cui.com

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