

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

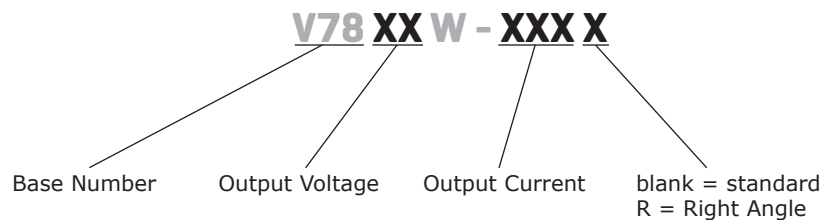
- up to 500 mA current output
- extremely high efficiency up to 95%
- no heatsink required
- pin comparable to LM78 linear regulators
- available in straight and right angle SIP packages
- up to 8:1 ultra wide input
- low ripple and noise
- short circuit protections
- wide temperature (-40°C ~ 85°C)



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

**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<br>1.5 | mV<br>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 |

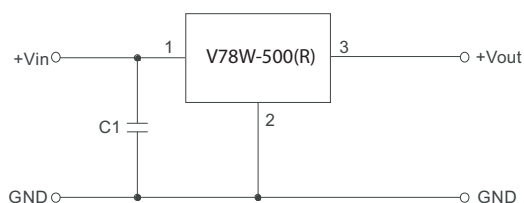
## ENVIRONMENTAL

| 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  | %     |

| 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     |

| PIN CONNECTIONS |       |
|-----------------|-------|
| 1               | +Vin  |
| 2               | GND   |
| 3               | +Vout |

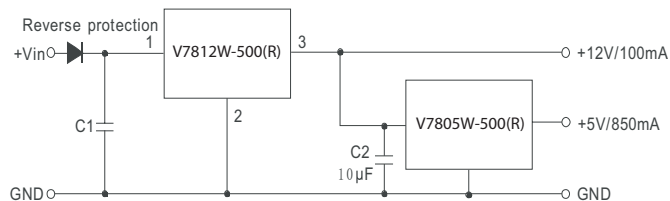
## TYPICAL APPLICATION CIRCUIT



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 C1 ( $\leq 47\mu\text{F}/100\text{V}$ ) to prevent voltage spikes caused by damage to the module.
3. No parallel connection.

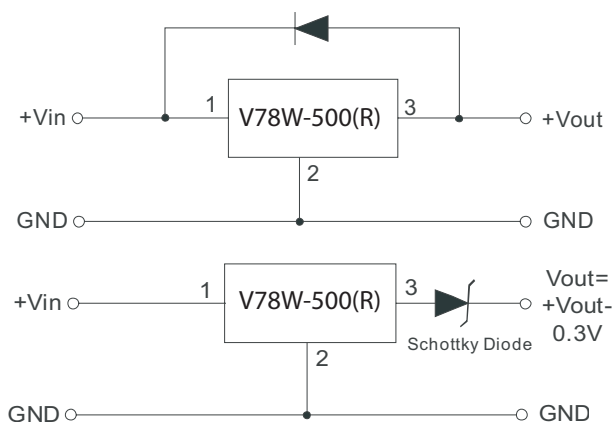
## APPLICATION EXAMPLE

High voltage input, multiple outputs, with greater load

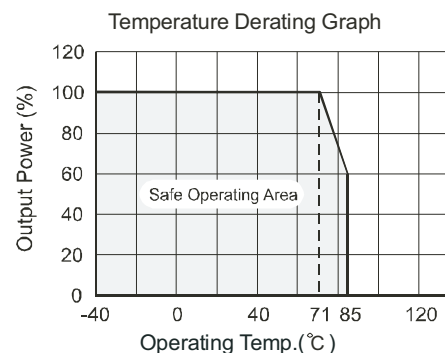


1. The input current amount of the back-grade regulator and the pre-class load should be less than or equal the max load current of the pre-class regulator.
2. If further filtering is required, please add components as per the above circuit (We recommend not to add components), if request, please make sure the capacitors C1  $\leq 47\mu\text{F}$ , C2  $\leq 10\mu\text{F}$  more close to the back-grade regulator.

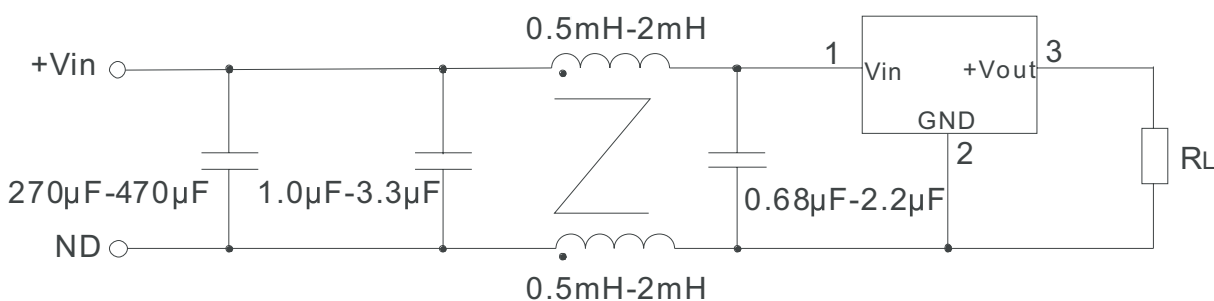
## MODULES PROTECT RECOMMENDED CIRCUIT



## 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 |

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



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