

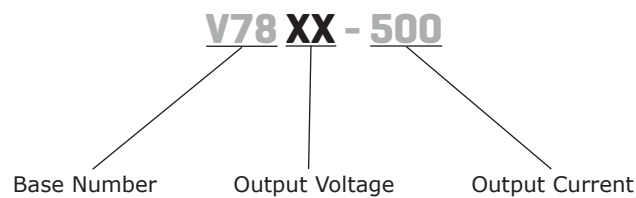
SERIES: V78-500 | DESCRIPTION: NON-ISOLATED SWITCHING REGULATOR
FEATURES

- 0.5 A current output
- extremely high efficiency up to 97%
- 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 (Vdc)	output current max (mA)	output power max (W)	ripple and noise ¹ max (mVp-p)	efficiency	
	typ (Vdc)	range (Vdc)					Vin min (%)	Vin max (%)
V7801-500	12	4.75~26	1.5	500	0.75	35	76	66
V78X2-500	12	4.75~28	1.8	500	0.9	35	79	67
V7802-500	12	4.75~28	2.5	500	1.25	35	85	73
V7803-500	24	4.75~28	3.3	500	1.65	35	90	80
V7805-500	24	6.5~32	5.0	500	2.5	35	93	84
V78X6-500	24	8~32	6.5	500	3.25	35	94	87
V7809-500	24	11~32	9.0	500	4.5	35	95	91
V7812-500	24	15~32	12	500	6	35	95	92
V7815-500	24	18~32	15	500	7.5	35	96	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	1.5 V output	4.75	12	26	Vdc
	1.8 V output	4.75	12	28	Vdc
	2.5 V output	4.75	12	28	Vdc
	3.3 V output	4.75	24	28	Vdc
	5 V output	6.5	24	32	Vdc
	6 V output	8	24	32	Vdc
	9 V output	11	24	32	Vdc
	12 V output	15	24	32	Vdc
	15 V output	18	24	32	Vdc

OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	Vin = min ~ max,		±0.5	±1.0	%
	at full load	1.5~2.5 V models 3.3~15 V models	±0.2	±0.4	%
load regulation	measured from		±0.4	±0.75	%
	10% load to full load	1.5~2.5 V models 3.3~15 V models	±0.4	±0.6	%
voltage accuracy	100% load		±2	±3	%
switching frequency	100% load, input voltage range	280	330	450	kHz
temperature coefficient				±0.02	%/°C

PROTECTIONS

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

SAFETY AND COMPLIANCE

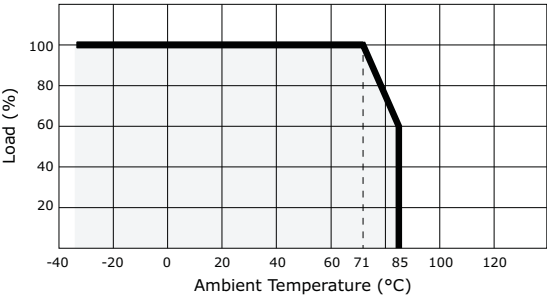
parameter	conditions/description	min	typ	max	units
MTBF		2,000,000			hours
RoHS compliant	yes				

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

1. output power vs. ambient temperature

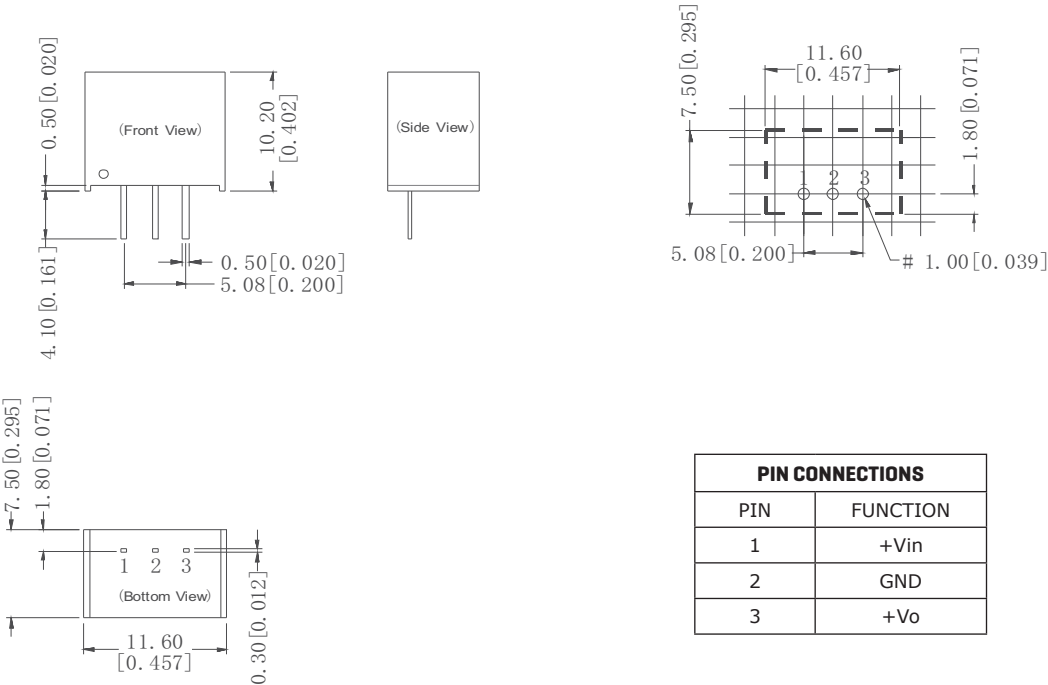


MECHANICAL

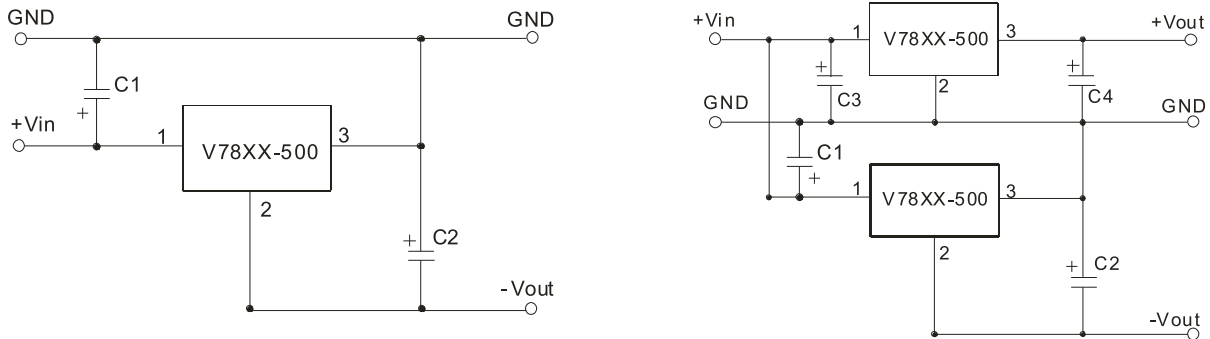
parameter	conditions/description	min	typ	max	units
dimensions	0.689 x 0.354 x 0.453 (11.50 x 9.00 x 17.50 mm)				inch
case material	plastic (UL94-V0)				
weight			2.0		g

MECHANICAL DRAWING

units: mm [inches]
tolerance: ± 0.25 [± 0.010]
pin section tolerance: ± 0.10 mm [± 0.004]

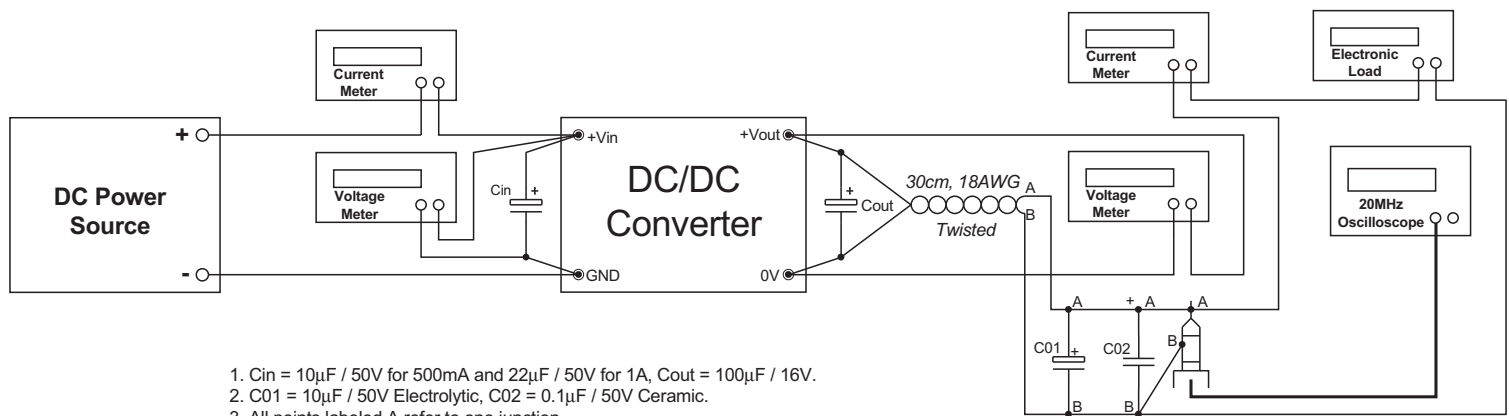


TYPICAL APPLICATION CIRCUIT



1. $C1$ and $C2$ are required and should be fitted close to the converter pins
2. For the capacitance of $C1$ and $C2$, see the external capacitor table. Low ESR types should be chosen
3. $C3$: a low ESR capacitor is required to keep the noise at the converter to a minimum. Ceramic capacitors are preferred, but tantalum or low ESR electrolytic capacitors may also suffice; General use $10\mu\text{F}/50\text{V}$ ceramic capacitor. $C4$ Optional, General use $100\mu\text{F}/25\text{V}$ electrolytic capacitor.
4. No parallel connection or plug and play

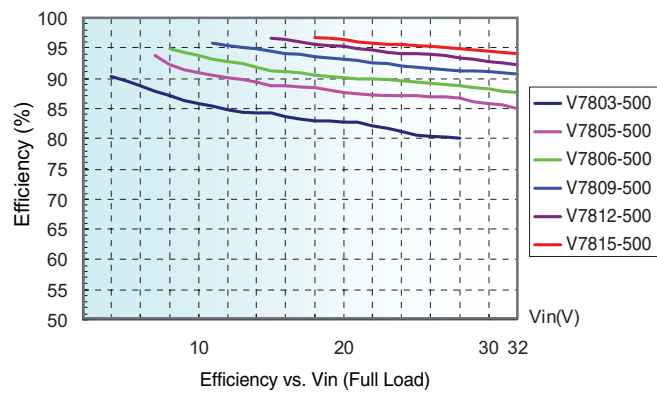
TEST CIRCUIT



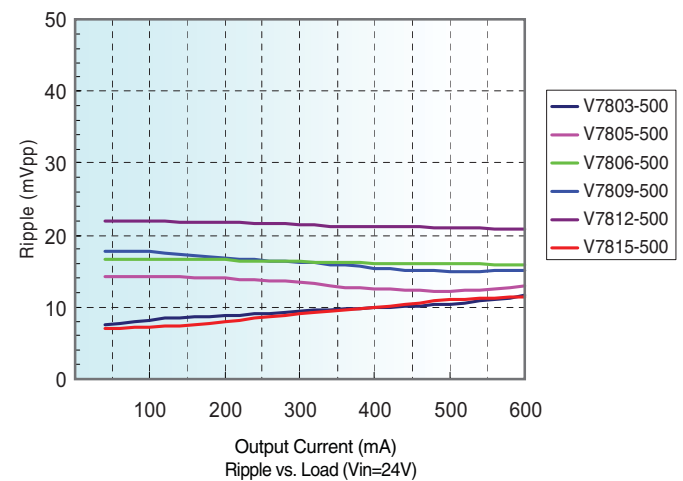
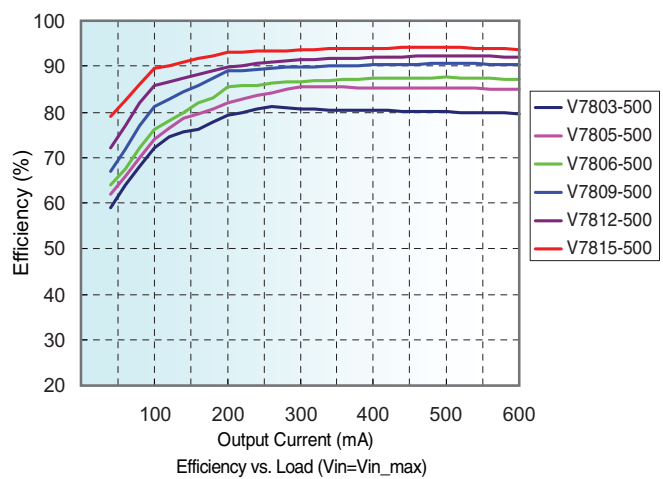
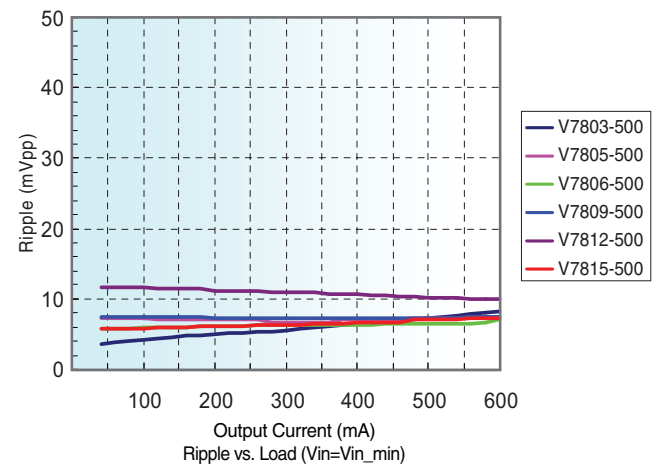
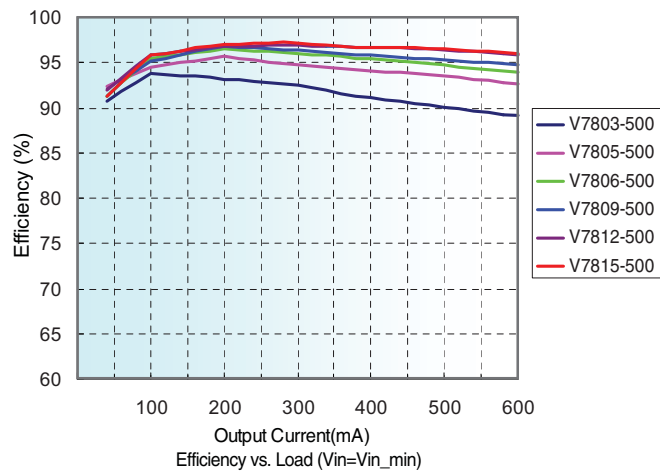
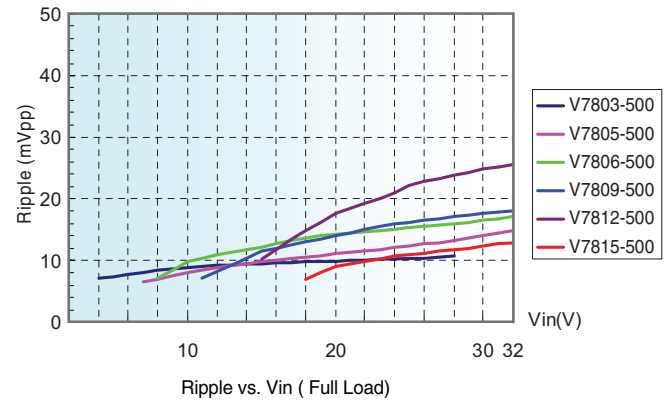
1. $C_{in} = 10\mu\text{F} / 50\text{V}$ for 500mA and $22\mu\text{F} / 50\text{V}$ for 1A, $C_{out} = 100\mu\text{F} / 16\text{V}$.
2. $C01 = 10\mu\text{F} / 50\text{V}$ Electrolytic, $C02 = 0.1\mu\text{F} / 50\text{V}$ Ceramic.
3. All points labeled A refer to one junction.
4. All points labeled B refer to one junction.
5. Use a short ground loop for probing. Do not use a wired ground clip.

EFFICIENCY AND RIPPLE

Efficiency



Output Ripple



EXTERNAL CAPACITOR TABLE

Part Number	C1,C3 (Ceramic Capacitor)	C2,C4 (Ceramic Capacitor)
V7801-500	10 μ F/50V	22 μ F/6.3V
V78X2-500	10 μ F/50V	22 μ F/6.3V
V7802-500	10 μ F/50V	22 μ F/6.3V
V7803-500	10 μ F/50V	22 μ F/6.3V
V7805-500	10 μ F/50V	22 μ F/10V
V78X6-500	10 μ F/50V	10 μ F/10V
V7809-500	10 μ F/50V	10 μ F/16V
V7812-500	10 μ F/50V	10 μ F/25V
V7815-500	10 μ F/50V	10 μ F/25V

REVISION HISTORY

rev.	description	date
1.0	initial release	07/13/2010
1.01	new template applied	04/18/2012
1.02	V-Infinity branding removed	09/04/2012
1.03	updated typical application circuits	09/25/2012
1.04	updated external capacitor values	11/08/2012

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



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