



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

V78 XX W - XXX X

Base Number

Output Voltage

Output Current

blank = standard
R = Right Angle

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 1.5	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]

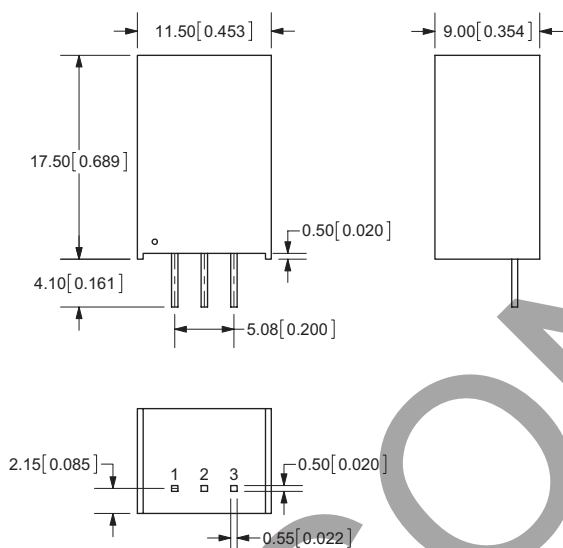
All pins on a 2.54mm pitch

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

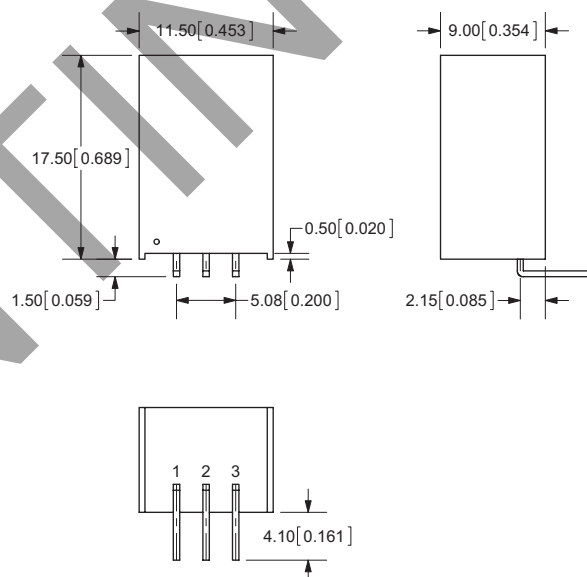
general tolerance: $\pm 0.25\text{mm} [\pm 0.010\text{in}]$

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

V78W-500

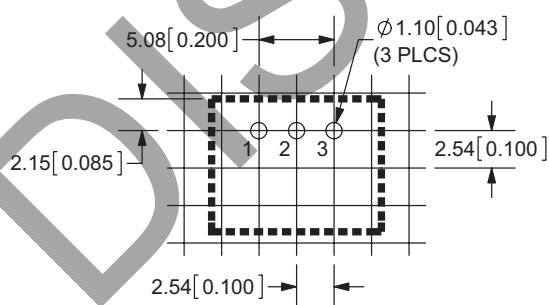


V78W-500R

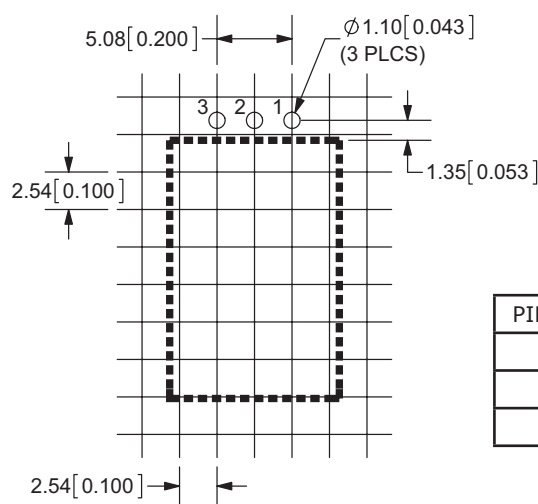


RECOMMENDED FOOTPRINT

V78W-500

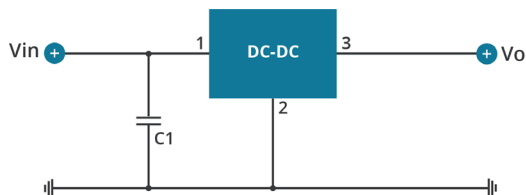


V78W-500R



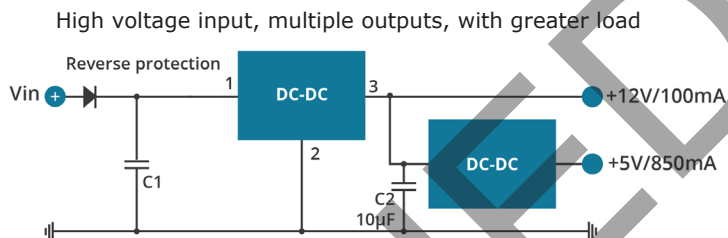
PIN CONNECTIONS	
1	+Vin
2	GND
3	+Vout

TYPICAL APPLICATION CIRCUIT



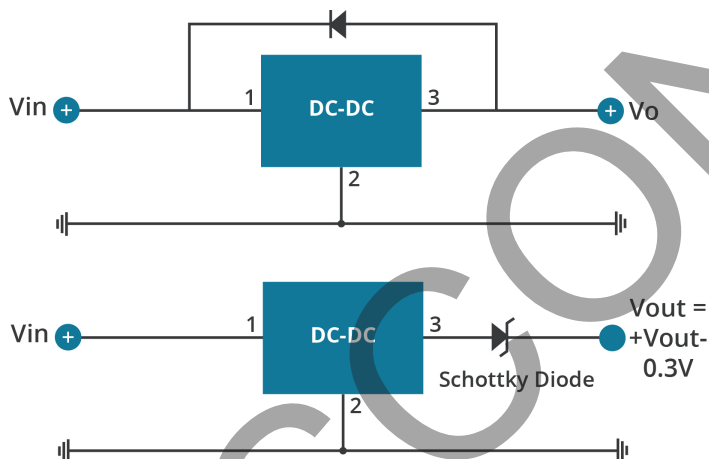
1. The regulator proposed to establish the input voltage by soft-start, no plug and play, if the input voltage changes from low voltage to high voltage abruptly, the regulator might be damaged.
2. If the applications is high-voltage input, the regulator must add an external capacitor $C1$ ($\leq 47\mu F/100V$) to prevent voltage spikes caused by damage to the module.
3. No parallel connection.

APPLICATION EXAMPLE



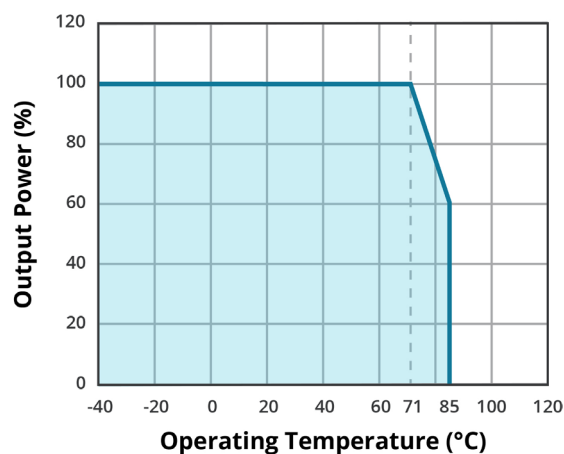
1. The input current amount of the back-grade regulator and the pre-class load should be less than or equal the max load current of the pre-class regulator.
2. If further filtering is required, please add components as per the above circuit (We recommend not to add components), if request, please make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

MODULES PROTECT RECOMMENDED CIRCUIT

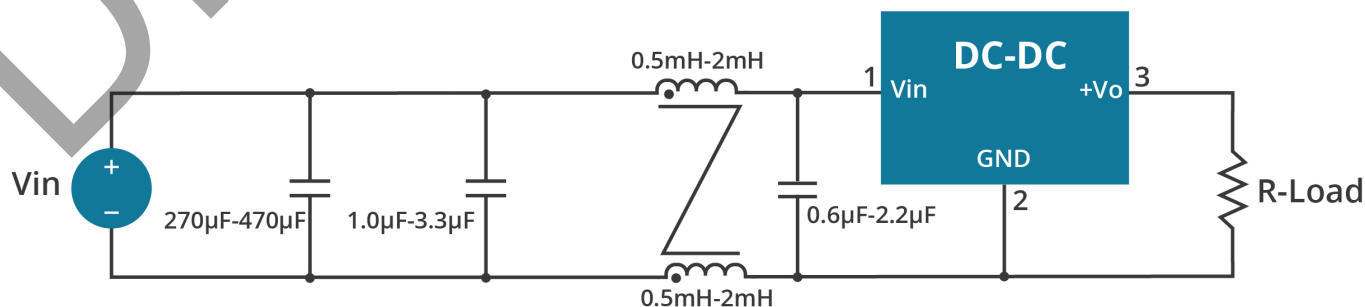


DERATING CURVE

TEMPERATURE 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.



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