Features

- Efficiency up to 97%,Non isolated, no need for heatsinks
- Pin-out compatible with LM78XX Linears
- Very low profile(L*W*H=11.5*7.5*10.2)
- Wide input range.(4.75V ~ 32V)
- Short circuit protection, Thermal shutdown
- Non standard outputs available as specials
- Low ripple and noise
- UL94V-0 package material
- EMC, Safety Certified
- See Innoline Application Notes for use as an inverter (alternative to LM79xx Linear)

INNOLINE
DC/DC-Converter
with 3 year Warranty

RECOM

0.5 AMP SIP3 Single Output

RoHS 2011/65/EU 6/6

EN-55022 Certified
EN-55024 Certified
EN-60950-1 Certified

Description

The R-78xx-Series high efficiency switching regulators are ideally suited to replace 78xx linear regulators and are pin compatible. The efficiency of up to 97% means that very little energy is wasted as heat so there is no need for any heat sinks with their additional space and mounting costs. Low ripple and noise figures and short circuit , overload and over-temperature protection round off the specifications of this versatile converter series.This R-78xx-0.5 is fully certified to EN 55022 (Emissions), and EN55024 (Immunity) EMC Standards and for EN-60950-1 Safety.

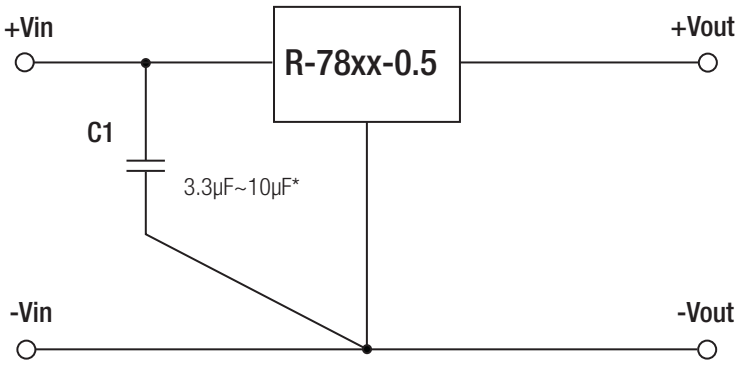
Selection Guide

Part Number SIP3	Input Range (V)	Output Voltage (V)	Output Current (A)	Efficiency Min. Vin (%)	Efficiency Max. Vin (%)
R-781.5-0.5	4.75 – 30 (1)	1.5	0.5	73	63
R-781.8-0.5	4.75 – 32	1.8	0.5	82	71
R-782.5-0.5	4.75 – 32	2.5	0.5	87	77
R-783.3-0.5	4.75 (2) – 32	3.3	0.5	91	81
R-785.0-0.5	6.5 – 32	5.0	0.5	94	86
R-786.5-0.5	8.0 – 32	6.5	0.5	95	88
R-789.0-0.5	11 – 32	9.0	0.5	96	92
R-7812-0.5	15 – 32	12	0.5	97	94
R-7815-0.5	18 – 32	15	0.5	97	95

Note 1: 1.5V Output can be unstable with Vin>30VDC
Note 2: Refer to Dynamic Load Stability

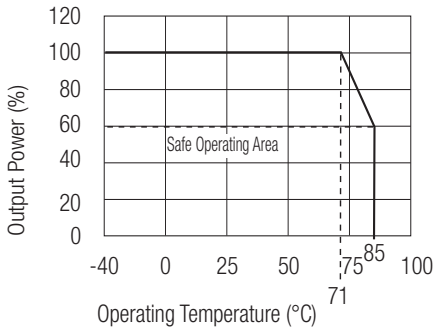
R-78-0.5

Standard Application Circuit



* Input capacitor required if Vin>26VDC (3.3µF) or if the supply is a battery or other low impedance source (4.7µF~10µF)
Capacitor should be electrolytic or MLCC with 1R resistor in series

Derating-Graph
(Ambient Temperature)



Refer to Application Notes

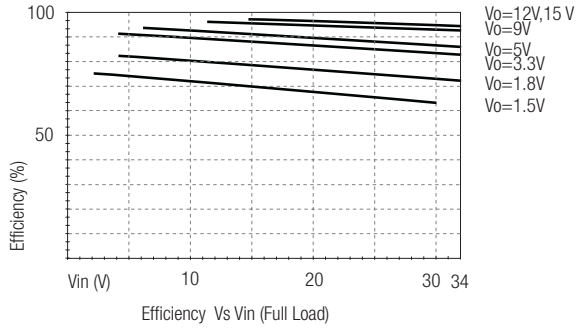
R-78xx-0.5 Series

Specifications (typical at 25°C, 10% minimum load, unless otherwise specified)

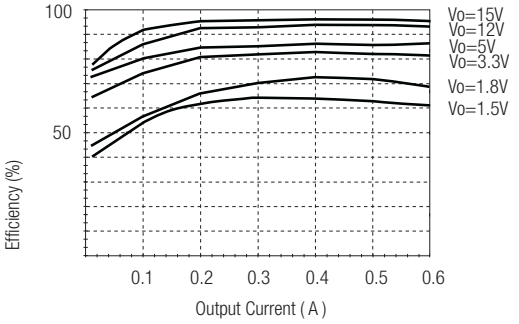
Characteristics	Conditions	Min.	Typ.	Max.
Input Voltage Range	1.5V	4.75	30V	34V abs. max.
	1.8V to 15.5V	4.75	32V	34V abs. max.
Output Voltage Range (for customized parts)	All Series	1.25		15.5V
Output Current (see note)	All Series	0*		500mA
Short Circuit Input Current (Vin = 24V)	All Series			60mA
Internal Power Dissipation				0.4W
Short Circuit Protection				Continuous, automatic recovery
Output Voltage Accuracy (At 100% Load)	All Series		±2	±3%
Line Voltage Regulation (Vin = min. to max. at full load)	1.5V to 6.5V		0.2	0.4%
	9V to 15.5V		0.1	0.2%
Load Regulation (10 to 100% full load)	1.5V to 6.5V		0.4	0.6%
	9V to 15.5V		0.25	0.4%
Note: Operation under no load will not damage these devices, however they may not meet all specifications. A minimum load of 6mA is recommended				
Dynamic Load Stability	100% <-> 50% load		±75mV	
	100% <-> 10% load			±100mV
Note: The R-783.3-0.5 requires Vin>5.5V to meet the Dynamic Load Stability Specification.				
Ripple & Noise (without Output Capacitor)	1.5V to 6.5V		20mVp-p	30mVp-p
	9V to 15.5V		30mVp-p	40mVp-p
Ripple & Noise (with Output Capacitor=100µF)	1.5V to 6.5V		15mVp-p	20mVp-p
	9V to 15.5V		25mVp-p	35mVp-p
Temperature Coefficient	-40°C ~ +85°C ambient			0.015%/°C
Max capacitance Load	with normal start-up time, no external components			220µF
	with <1 second start up time + diode protection circuit			6800µF
Switching Frequency		280	330	380kHz
Quiescent Current	Vin = min. to max. at 0% load		5	7mA
Operating Temperature Range		-40°C		+85°C
Operating Case Temperature				+100°C
Storage Temperature Range		-55°C		+125°C
Case Thermal Impedance				70°C / W
Case Material				Non-Conductive Black Plastic
Potting Material				Epoxy (UL94V-0)
Conducted Emissions (with filter)	EN55022			Class B
Radiated Emissions (with filter)	EN55022			Class B
ESD	EN61000-4-2			Class A
Radiated Immunity	EN61000-4-3			Class A
Fast Transient	EN61000-4-4			Class A
Conducted Immunity	EN61000-4-6			Class A
Magnetic Field Immunity	EN61000-4-8			Class A
Package Weight				1.9g
Packing Quantity				42pcs per Tube
MTBF (+25°C)	using MIL-HDBK 217F			21098 x 10^3 hours
(+71°C) *Detailed Information see*	using MIL-HDBK 217F			4212 x 10^3 hours
Certifications *Application Notes chapter "MTBF"*				
EN General Safety	Report: SPCLVD 1301026-1			EN 60950-1:2006 + A12:2011
EMC	Report: 5A111502E			EN55022, EN61000, EN55024

Characteristics

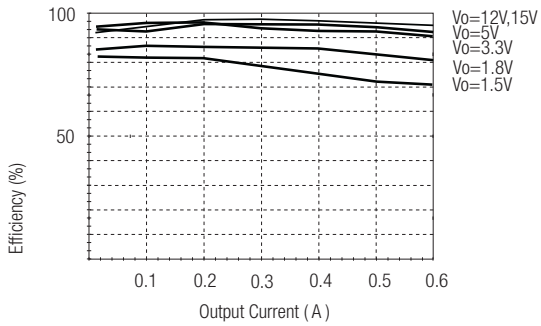
Efficiency



Efficiency Vs Vin (Full Load)

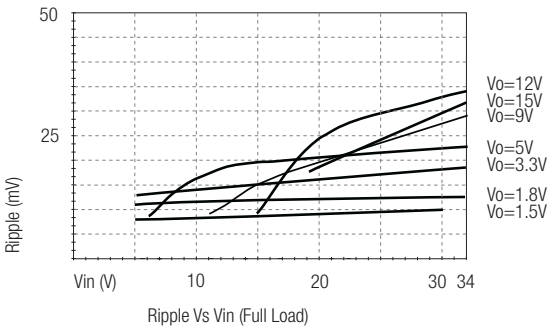


Efficiency Vs Load (Vin=Max)

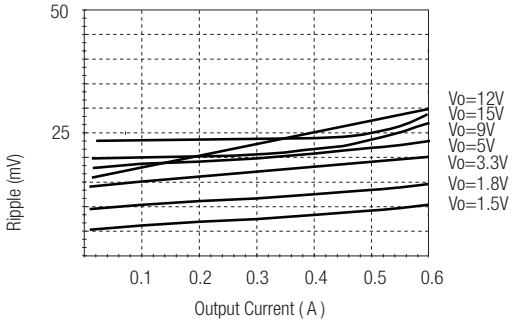


Efficiency Vs Load (Vin=Min)

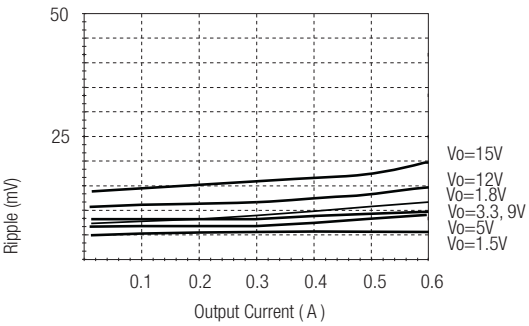
Ripple



Ripple Vs Vin (Full Load)



Ripple Vs Load (Vin=24V)



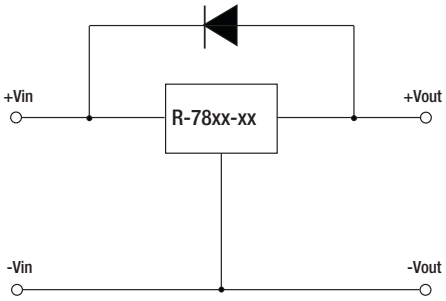
Ripple Vs Load (Vin=Min)

Optional Diode Protection Circuit

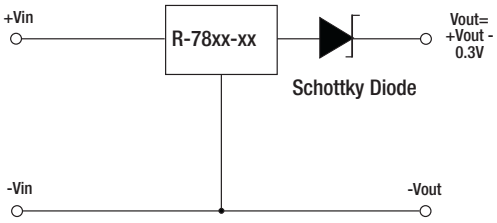
Add a blocking diode to Vout if current can flow backwards into the output, as this can damage the converter when it is powered down.

The diode can either be fitted across the device if the source is low impedance or fitted in series with the output (recommended).

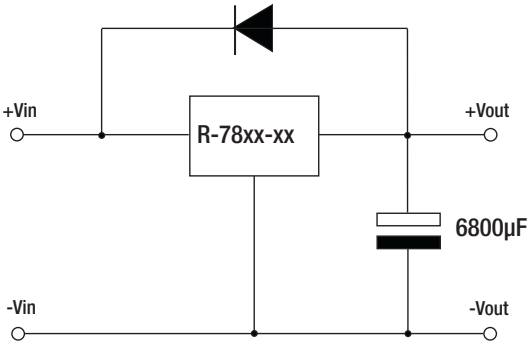
Optional Protection 1:



Optional Protection 2:

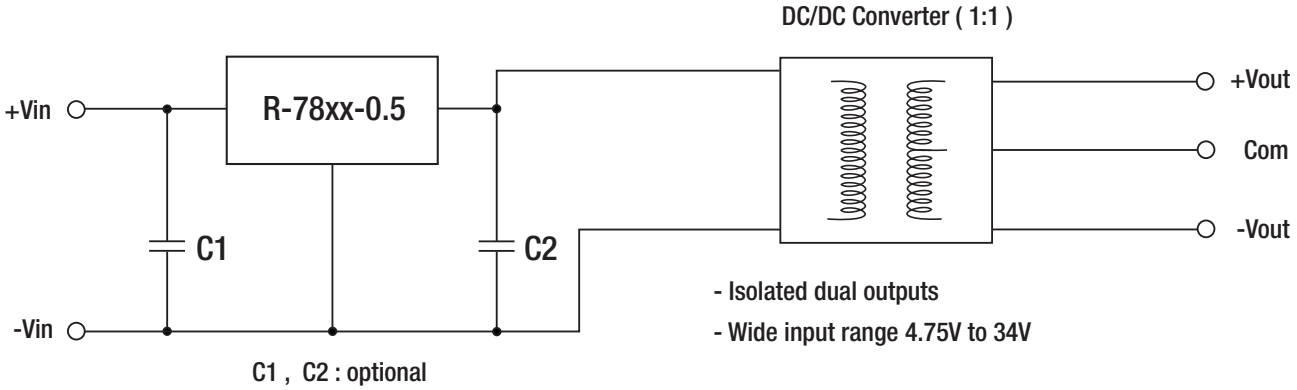


Application example:
Driving a high capacitive load



Application Examples

High efficiency, isolated, dual unregulated outputs

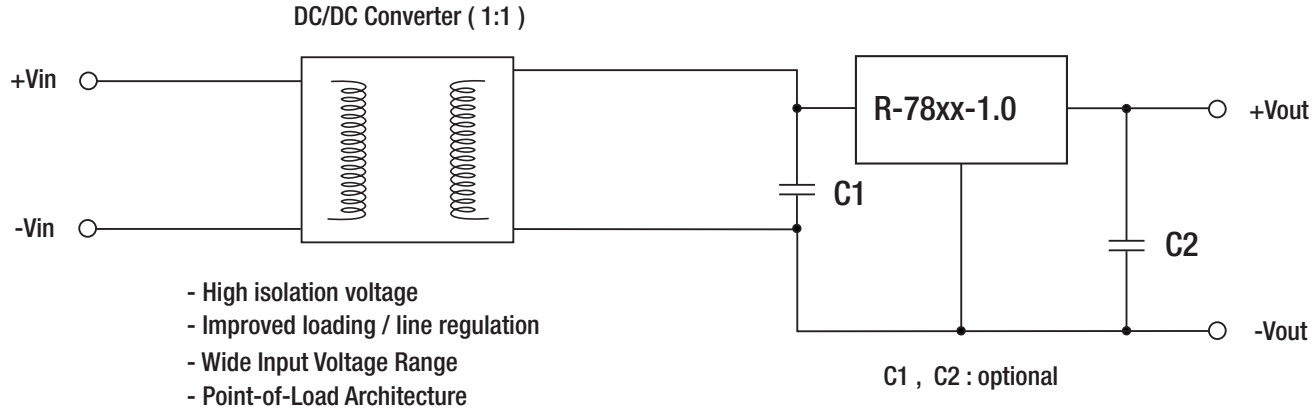


- Isolated dual outputs
- Wide input range 4.75V to 34V

C1 , C2 : optional

Application Examples

Isolated (up to 6KV), wide Input range regulated output

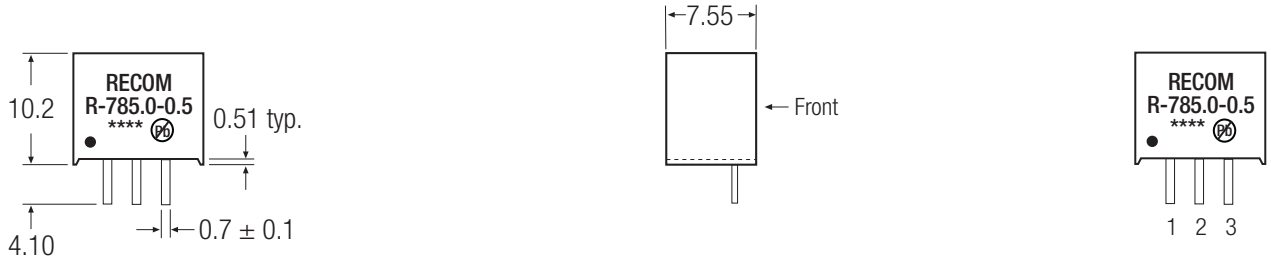


- High isolation voltage
- Improved loading / line regulation
- Wide Input Voltage Range
- Point-of-Load Architecture

C1 , C2 : optional

Package Style and Pinning (mm)

SIP3 PIN Package



Recommended Footprint Details

Pin Connections	
Pin #	
1	+Vin
2	GND
3	+Vout

xx.x ±0.5mm
xx.xx ±0.25mm