

Features

- Efficiency up to 96%, no need for heatsinks!
- Pin-out compatible with LM78XX Linear Regs.
- Low profile (L*W*H=11.6*8.5*10.4mm)
- Wide input range (5V ~ 42V)
- Short circuit protection, thermal shutdown
- Non-standard outputs available as specials
- Low ripple and noise
- See Ininline App Notes for use as a positive-to-negative inverter (alternative to 79xx regulator)

Description

The R-78Cxx-1.0 series switching regulators are ideally suited to replace 1 Amp 78xx linear regulators and are pin compatible. Efficiencies of up to 96% means that very little energy is wasted as heat and the high input voltage is a useful feature.

Selection Guide

Part Number	Input Range (V)	Output Voltage (V)	Output Current (A)	Efficiency	
				Min. Vin (%)	Max. Vin (%)
R-78C1.8-1.0	5 – 42	1.8	1.0	80	71
R-78C3.3-1.0	7 – 42	3.3	1.0	89	79
R-78C5.0-1.0	8 – 42	5	1.0	93	85
R-78C9.0-1.0	12 – 42	9	1.0	95	90
R-78C12-1.0	15 – 42	12	1.0	96	92
R-78C15-1.0	18 – 42	15	1.0	96	94

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

Characteristics	Conditions	Min.	Typ.	Max.
Input Voltage Range	All Series	Vout+3V		42V
Output Voltage Range	All Series	1.8V		15V
Output Current	All Series	0mA*		1000mA
Short Circuit Input Current (Vin =24V)	All Series		65mA	
No Load Input Current			1mA	
Short Circuit Protection			Continuous, automatic recovery	
Output Voltage Accuracy (At 100% Load)	All Series		±2%	±3%
Line Regulation (100% Load, Vin max.)	All Series		0.2%	
Load Regulation (10 to 100% full load)	All Series		0.4%	
Dynamic Load Stability	100% <-> 50% load			±75mV
	100% <-> 10% load			±200mV
Ripple & Noise (20Mhz BW Limited)	Vin = 24V, Vout =1.8V-15V		75mVp-p	100mVp-p
With 10µF MLCC output capacitor	Full Load		30mVp-p	
Temperature Coefficient	-40°C ~ +85°C ambient			0.015%/°C
Max capacitance Load	with normal start-up time, no external components			470µF
	with <1 second start up time + diode protection circuit			6800µF
Switching Frequency		280kHz	350kHz	420kHz
Operating Temperature Range		-40°C		+85°C
Maximum Case Temperature				+100°C
Storage Temperature Range		-55°C		+125°C
Case Thermal Impedance				70°C/W
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
Package Weight			2g	
Packing Quantity			42 pcs per Tube	
Case Material			Non-Conductive Black Plastic	

continued on next page

INNOLINE DC/DC-Converter

with 3 year Warranty

RECOM

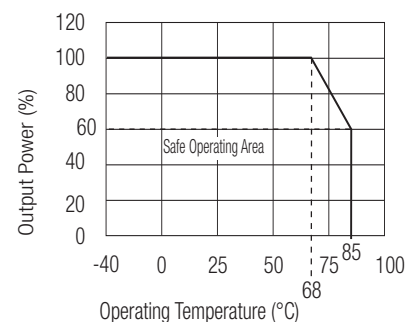
1.0 AMP SIP3 Single Output



IEC/EN-60950-1 Certified

R-78C-1.0

Derating-Graph (Ambient Temperature)



Refer to Application Notes

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

Potting Material		Epoxy (UL94V-0)
IEC/EN General Safety	Report: SPCLVD 1407030-1	IEC/ EN-60950-1, 2nd Edition
Standby Power		EN62301:2005
Fast Transient		EN61000-4-4 Class A
Conducted Immunity		EN61000-4-6 Class A
Magnetic Field Immunity		EN61000-4-8 Class A
MTBF (+25°C)	using MIL-HDBK 217F	8600 x 10 ³ hours.
(+68°C)	using MIL-HDBK 217F	3880 x 10 ³ hours.

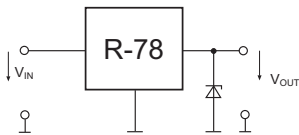
Note:

No load operation will not damage these devices, however they may not meet all specifications. A minimum load of 10mA is recommended.

Zener Diode Calculation

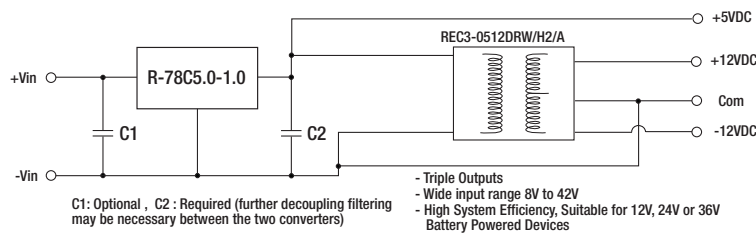
Minimum Zener Breakdown Voltage (V_{Zmin}) $\geq V_{outnom} + 3\%$ Accuracy

R-78C V_{out}	Zener Voltage, V_z (V_{Zmin})	Recommended Zener Diode
1.8V (1.85V max.)	2.0V (1.90V)	MMSZ679T1G
3.3V (3.4V max.)	3.6V (3.42V)	MMSZ4685T1G
5V (5.15V max.)	5.6V (5.32V)	MMSZ4690T1G
9V (9.27V max.)	10V (9.50V)	MMSZ4697T1G
12V (12.36V max.)	13V (12.35V) / 14V (13.30V)	MMSZ4700T1G / MMSZ4701T1G
15V (15.45V max.)	17V (16.15V)	MMSZ4704T1G

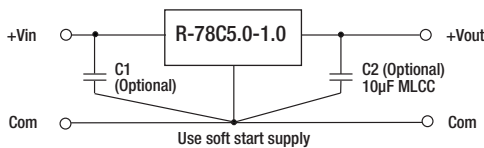


Application Examples

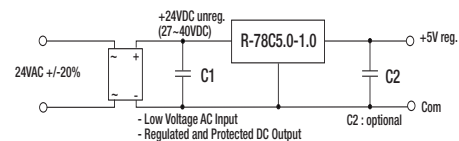
High efficiency regulated outputs



Standard Application Circuit

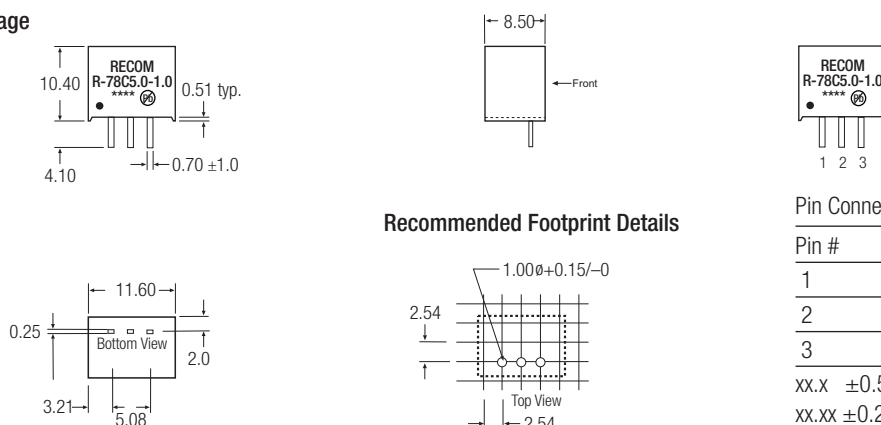


Low Voltage AC input, regulated DC output

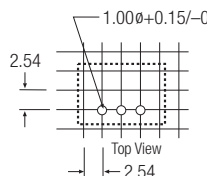


Package Style and Pinning (mm)

SIP3 PIN Package



Recommended Footprint Details



Pin Connections

Pin #	Connection
1	+Vin
2	GND
3	+Vout

xx.x ±0.5mm
xx.xx ±0.25mm

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.