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 Innoline 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 SIP3	Input Range (V)	Output Voltage (V)	Output Current (A)	Efficiency Min. Vin (%)	Efficiency 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

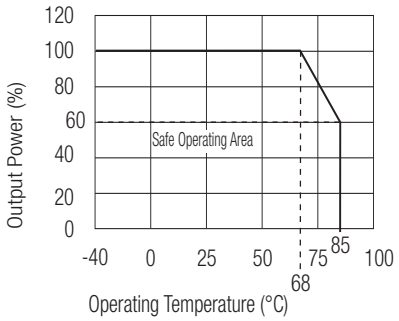
1.0 AMP SIP3 Single Output

RoHS 2011/65/EU 6/6

IEC/EN-60950-1 Certified

R-78C-1.0

Derating-Graph
(Ambient Temperature)



Refer to Application Notes

R-78Cxx-1.0 Series

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

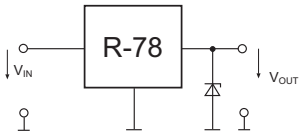
Potting Material			Epoxy (UL94V-0)
IEC/EN General Safety	Report: SPCLVD 1407030-1		IEC/ EN-60950-1, 2nd Edition
Standby Power			EN62301:2005
Fast Transient		EN61000-4-4	Class A
Conducted Immunity		EN61000-4-6	Class A
Magnetic Field Immunity		EN61000-4-8	Class A
MTBF (+25°C)	using MIL-HDBK 217F		8600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

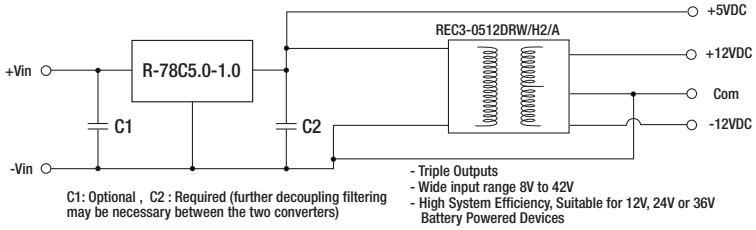
Minimum Zener Breakdown Voltage ($V_{Z_{min}}$) ≥ $V_{out_{nom}}$ + 3% Accuracy



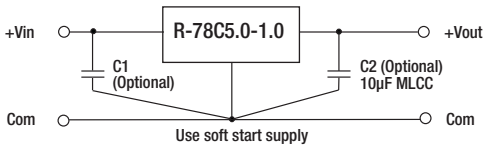
R-78C V_{out}	Zener Voltage, Vz (Vz_{min})	Recomended Zener Diode
1.8V (1.85V max.)	**2.0V** (1.90V)	MMSZ679T1G
3.3V (3.4V max.)	**3.6V** (3.42V)	MMSZ4685T1G
5V (5.15V max.)	**5.6V** (5.32V)	MMSZ4690T1G
9V (9.27V max.)	**10V** (9.50V)	MMSZ4697T1G
12V (12.36V max.)	**13V** (12.35V) / **14V** (13.30V)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

Application Examples

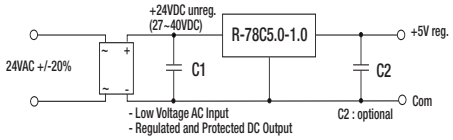
High efficiency regulated outputs



Standard Application Circuit

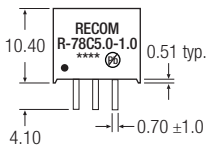


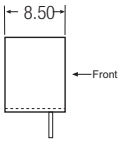
Low Voltage AC input, regulated DC output

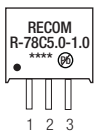


Package Style and Pinning (mm)

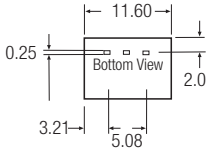
SIP3 PIN Package

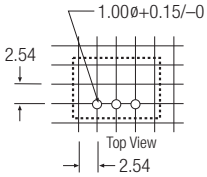






Recommended Footprint Details





Pin Connections

Pin #	
1	+Vin
2	GND
3	+Vout

xx.x ±0.5mm
xx.xx ±0.25mm