Features

Switching Regulator

- Efficiency up to 91%, no need for heatsinks
- Pin-out compatible with LM78XX linears
- Low profile (LxWxH=11.6 x 8.5 x 10.4mm)
- Wide input range (7V - 28V)
- Short circuit protection
- IEC/EN60950-1 + AM2 certified

RECOM
DC/DC Converter

R-78E-1.0

1.0 Amp SIP3 Single Output

3 YEAR Warranty

Description

The R-78E series is a switching regulator module that has been designed to offer all the advantages of a switching regulator (high efficiency, wide input range, accurate output voltage regulation) but with a low cost for production quantities. Due to the R-78E's high efficiency of up to 91% at an output voltage of 5V/1A at the output, no heat sink is required. The compact TO- 220 compatible SIP3 package measures only 11.6 x 8.5 x 10.4 mm, so it saves precious board space. The warranty is 3 years.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [A]	Efficiency (1) @ min. Vin [%]	Efficiency (1) @ max. Vin [%]	max. Capacitive Load (2) [µF]
R-78E3.3-1.0	7-28	3.3	1.0	91	84	220
R-78E5.0-1.0	8-28	5.0	1.0	93	85	220
R-78E12-1.0/X9	15-27	12	1.0	97	93	100

Notes:

Note1: Efficiency is tested at full load at +25°C ambient

Note2: Max. Cap Load is tested by nominal input and full resistive load

IEC60950-1 certified
EN60950-1 certified

Model Numbering

R-78E__-1.0/X9

- Output Voltage
- Potting Material (3)
- Output Current

Notes:

Note3: R-78E12-1.0/X9 is available with epoxy potting only.
For more information refer to ***"Material"***

Specifications (measured at Ta= 25°C, full load, Vin= 24VDC and after warm-up)

BASIC CHARACTERISTICS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Input Current	min. Vin			1000mA
Quiescent Current			1.5mA	
Internal Operating Frequency	3.3 & 5Vout		330kHz	
	12Vout		570kHz	
Minimum Load	only R-78E12-1.0/X9		2%	
Output Ripple and Noise (4)	20MHz BW			120mVp-p

Notes:

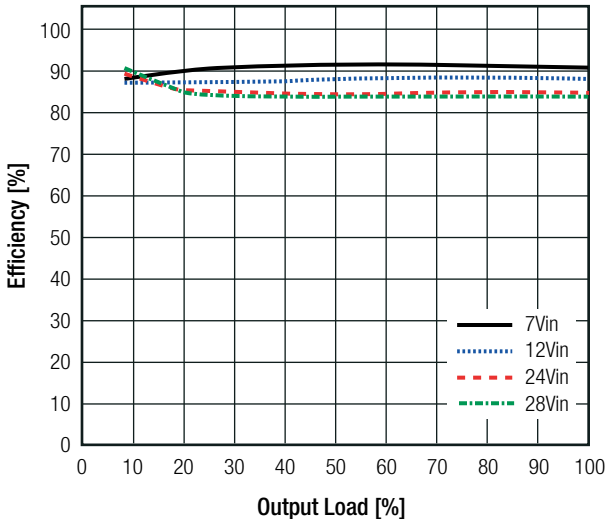
Note4: Measurements are made with a 100nF MLCC across output (low ESR)

continued on next page

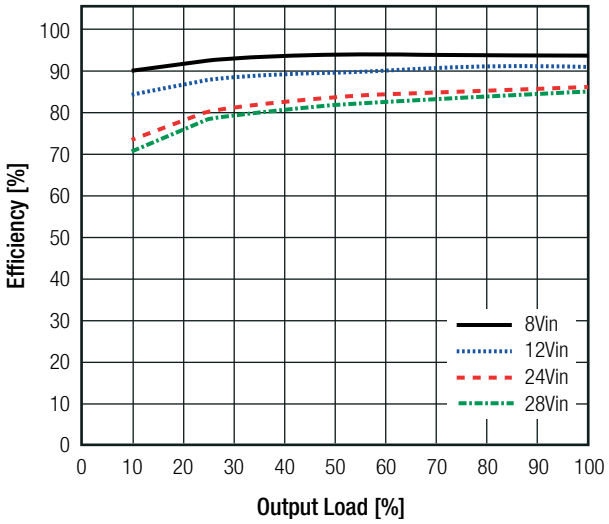
Specifications (measured at Ta= 25°C, full load, Vin= 24VDC and after warm-up)

Efficiency vs. Load

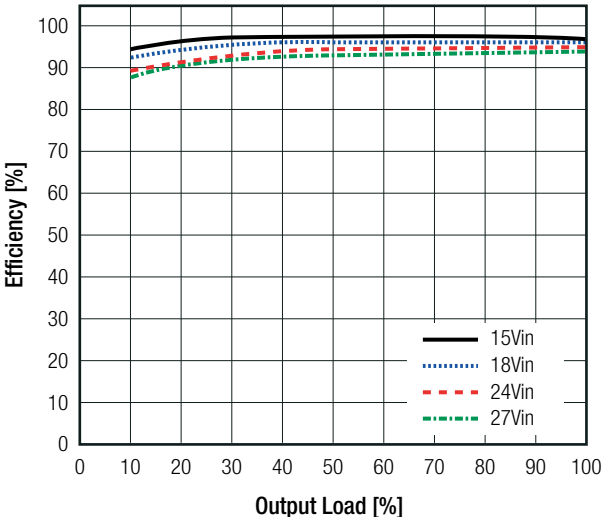
R-78E3.3-1.0



R-78E5.0-1.0



R-78E12-1.0/X9



REGULATIONS		
Parameter	**Condition**	**Value**
Output Accuracy		±3.0% typ. / ±5.0% max.
Line Regulation	low line to high line, full load	±1.0% max.
Load Regulation	typ Vin. and 10% to 100% load	±1.5% max.

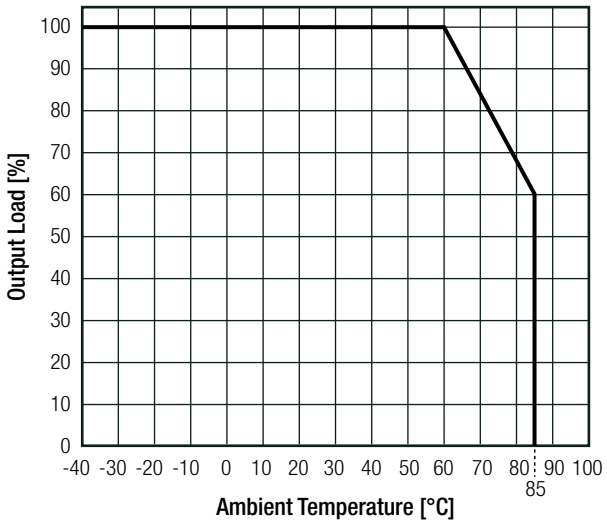
PROTECTIONS		
Parameter	**Condition**	**Value**
Short Circuit Protection (SCP)		Continuous, automatic recovery

Specifications (measured at Ta= 25°C, full load, Vin= 24VDC and after warm-up)

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	natural convection and with derating (see graph)		-40°C to +85°C
Humidity	non-condensing		95%, RH max.
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	3875 x 10^3 hours
		+60°C	2088 x 10^3 hours

Derating Graph

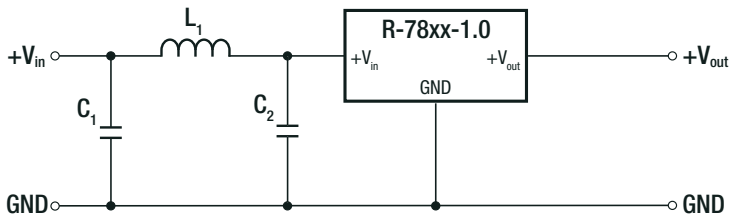


SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	1603123	IEC60950-1:2005, 2nd Edition + AM 2:2013 EN60950-1:2006 + AM2:2013
EAC	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS 2011/65/EU + AM2015/863

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	with external filter (see filter suggestion below)	EN55032, Class A and B

EMC Filter Suggestion according to EN55032



Component List Class A

MODEL	C1	C2	L1
R-78E3.3-1.0	10µF 100V MLCC	10µF 100V MLCC	12µH choke RLS-126
R-78E5.0-1.0			
R-78E12-1.0/X9	10µF 50V MLCC	10µF 50V MLCC	5.6µH choke RLS-567

Component List Class B

MODEL	C1	C2	L1
R-78E3.3-1.0	10µF 100V MLCC	2.2µF 100V MLCC	68µH choke RLS-686
R-78E5.0-1.0			
R-78E12-1.0	10µF 50V MLCC	10µF 50V MLCC	100µH choke RLS-105

Notes:

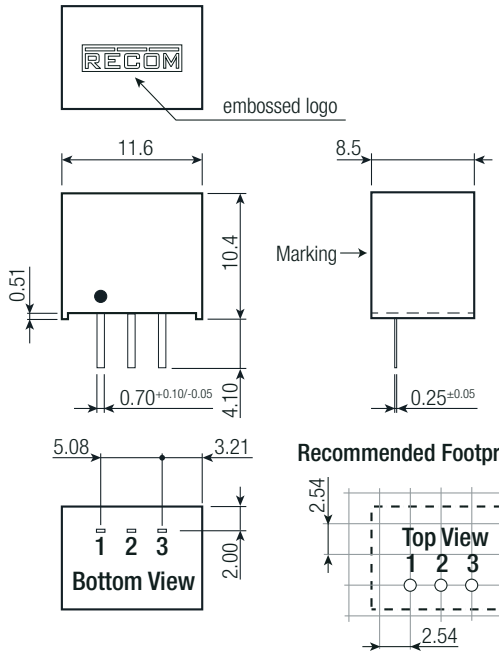
Note5: Filter suggestions are valid for indicated part numbers only. For other part numbers, please contact RECOM tech support for advice

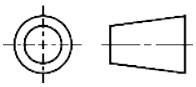
Specifications (measured at Ta= 25°C, full load, Vin= 24VDC and after warm-up)

DIMENSION and PHYSICAL CHARACTERISTICS

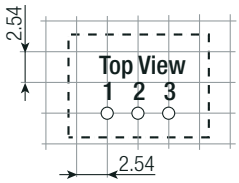
Parameter	Condition		Value
Material	case		non-conductive black plastic, (UL94 V-0)
	potting	3.3, 5Vout	silicone, (UL94 V-0)
		12Vout	epoxy, (UL94 V-0)
Package Dimension (LxWxH)			11.6 x 8.5 x 10.4mm
Package Weight			2g typ.

Dimension Drawing (mm)





Recommended Footprint Details



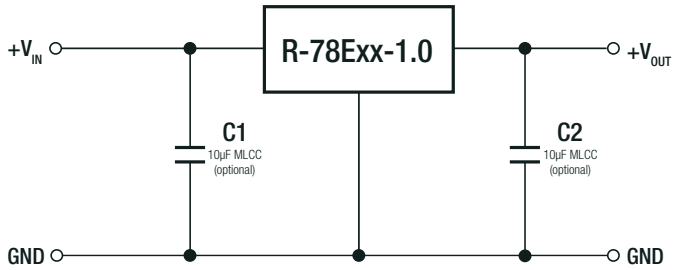
Pin Connections

Pin #	Function
1	+Vin
2	GND
3	+Vout

Tolerance: xx.x= ±0.50mm
xx.xx= ±0.25mm

INSTALLATION AND APPLICATION

Standard Application



To protect the converter during power-up, use soft start power supply.

Notes:

Note6: The R-78Exx-1.0 can not be used as positive to negative converter

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 11.2 x 18.2mm
Packaging Quantity		42pcs
Storage Temperature Range		-55°C to +125°C