

RECOM

DC/DC Converter

R-78E-0.5

0.5 Amp
SIP3
Single Output



IEC60950-1 certified
 EN60950-1 certified

Features

Switching Regulator

- Low cost switching regulator
- High start-up current capability
- Efficiency up to 95%
- Short circuit protection
- Pin compatible with 78 series regulators
- Non isolated DC-DC converter
- IEC/EN60950-1+ AM2 certified

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 95% no heat-sink is required. The compact TO-220 compatible SIP3 package measures only 11.6 x 8.5 x 10.4mm, so it saves precious board space.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [A]	Efficiency ⁽¹⁾		max. Capacitive Load ⁽²⁾ [μF]
				@ min. Vin [%]	@ max. Vin [%]	
R-78E3.3-0.5	6-28	3.3	0.5	88	75	220
R-78E5.0-0.5	7-28	5	0.5	92	82	220
R-78E9.0-0.5	12-28	9	0.5	94	89	220
R-78E12-0.5	15-28	12	0.5	95	92	220
R-78E15-0.5	18-28	15	0.5	95	93	220

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

Model Numbering

R-78E **-0.5**
 Output Voltage Output Current

Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

BASIC CHARACTERISTICS				
Parameter	Condition		Min.	Typ. Max.
Input Voltage Range	nom. Vin = 24VDC		6VDC	24VDC 28VDC
Quiescent Current				1.5mA
Minimum Load ⁽³⁾			2%	
Internal Operating Frequency				570kHz
Output Ripple and Noise ⁽⁴⁾	20MHz BW	3.3, 5, 9Vout 12, 15Vout		50mVp-p 70mVp-p

Notes:

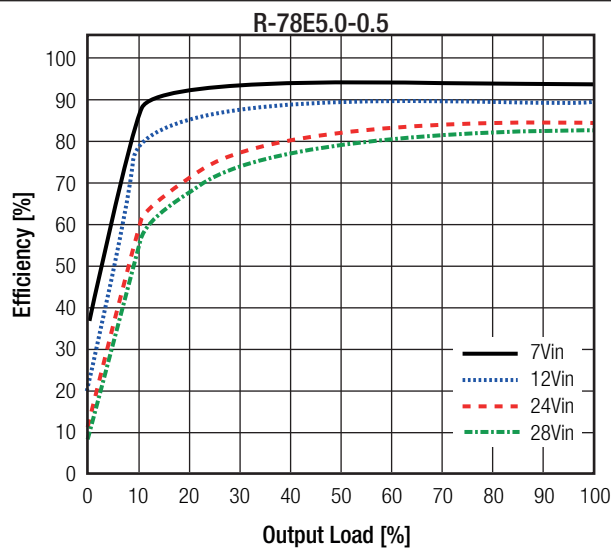
Note3: recommend to use with more than 2% load, if not, the ripple of the product may exceeds the specification, but doesn't affect the reliability of the product

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

continued on next page

Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

Efficiency vs Load



REGULATIONS

Parameter	Condition	Value
Output Accuracy		±3.0% typ.
Line Regulation	low line to high line, full load	±0.5% typ.
Load Regulation	10% to 100% load	±1.0% typ.

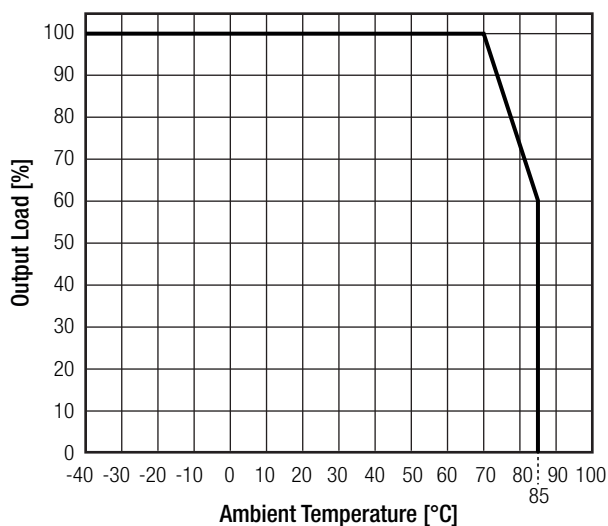
PROTECTIONS

Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery

ENVIRONMENTAL

Parameter	Condition	Value
Operating Temperature Range	natural convection and with derating (see graph)	-40°C to +85°C
Maximum Case Temperature		100°C
Vibration		10-55Hz, 2G, 30min along X,Y,Z
MTBF	according to MIL-HDBK-217F, G.B.	+25°C: 7976 x 10 ³ hours +70°C: 2182 x 10 ³ hours

Derating Graph



Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

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
RoHS 2+		RoHS 2011/65/EU + AM2015/863

EMC Compliance

Electromagnetic compatibility of multimedia equipment -
Emission requirements

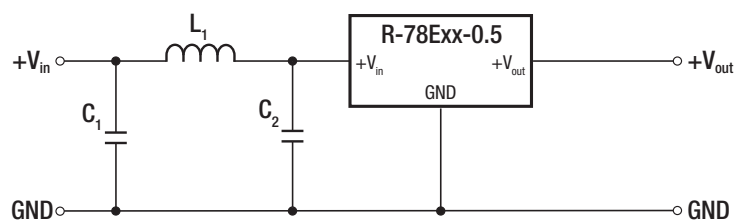
Condition

with external filter
(see filter suggestion below)

Standard / Criterion

EN55032, Class A and B

EMC Filter Suggestion according to EN55032



Component List Class A

MODEL	C1	L1
R-78E3.3-0.5	4.7µF	3.9µH choke
R-78E15-0.5	50V MLCC	RLS-397

Component List Class B

MODEL	C1	C2	L1
R-78E3.3-0.5	10µF	4.7µF	12µH choke
R-78E15-0.5	100V MLCC	50V MLCC	RLS-126

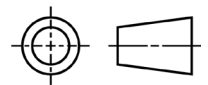
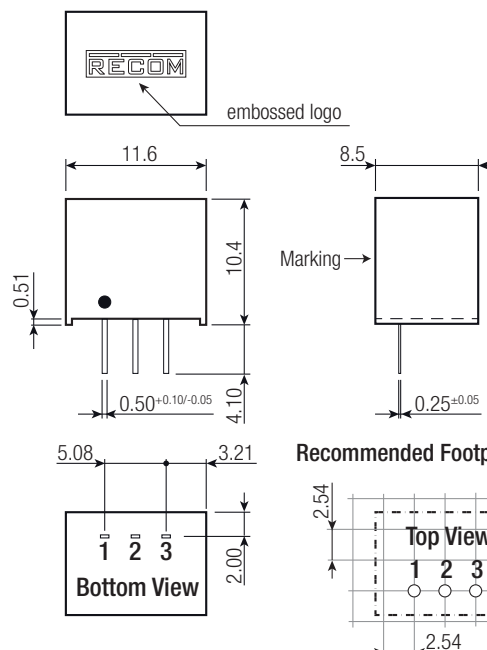
Notes:

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

DIMENSION and PHYSICAL CHARACTERISTICS

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

Dimension Drawing (mm)



Pin Connections

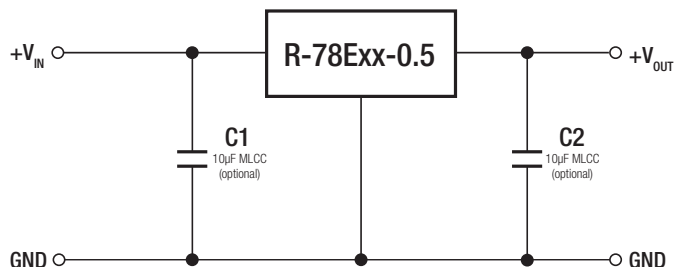
Pin #	Function
1	+Vin
2	GND
3	+Vout

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

Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)

INSTALLATION AND APPLICATION

Standard Application



Notes:

Note6: The R-78Exx-0.5 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

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