

# 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



## R-78E-0.5

**0.5 Amp  
SIP3  
Single Output**



### 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

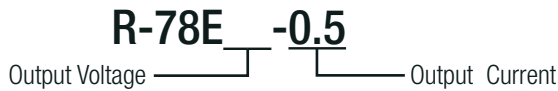
Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [A]	Efficiency <sup>(1)</sup>		Max. Capacitive Load <sup>(2)</sup> [μF]
				@ min Vin [%]	@ max. Vin [%]	
R-78E3.3-0.5	6-28	3.3	0.5	75	88	220
R-78E5.0-0.5	7-28	5	0.5	82	92	220
R-78E9.0-0.5	12-28	9	0.5	89	94	220
R-78E12-0.5	15-28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

**Notes:**

Note1: Efficiency is tested at nom. input voltage and full load  
 Note2: Max. Cap Load is tested by nominal input and full resistive load



### Model Numbering



IEC60950-1 certified  
EN60950-1 certified

### 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 <sup>(3)</sup>			2%		
Internal Operating Frequency				570kHz	
Output Ripple and Noise <sup>(4)</sup>	20MHz BW	3.3, 5, 9Vout		50mVp-p	
		12, 15Vout		70mVp-p	

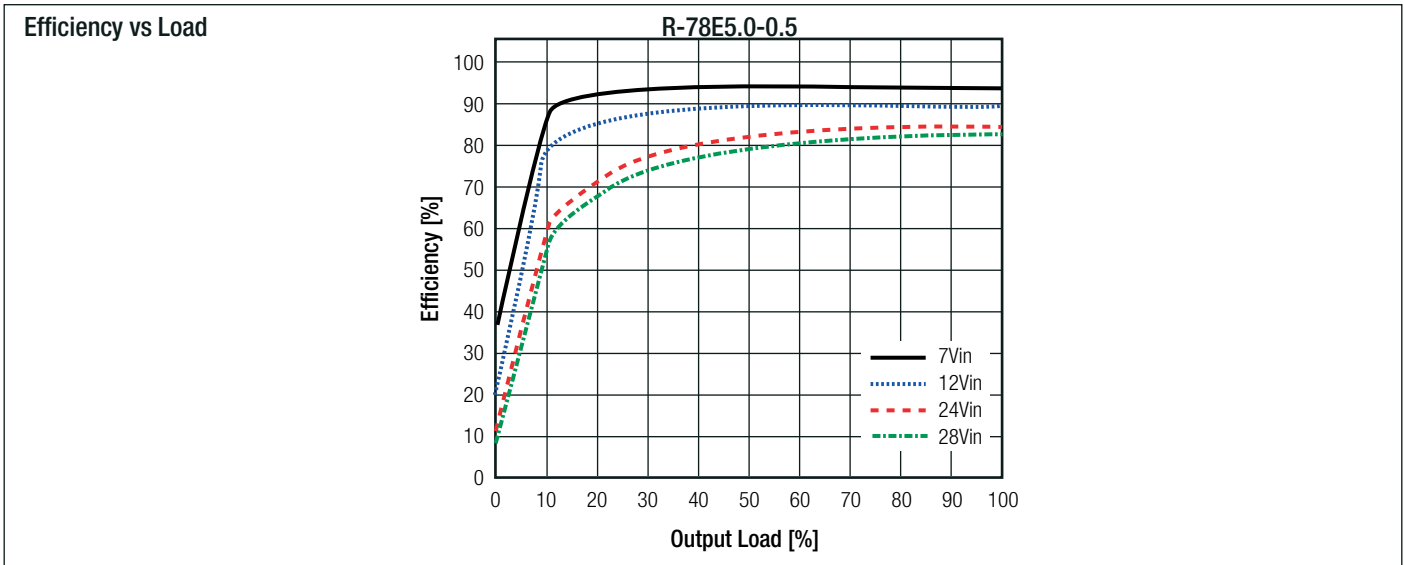
**Notes:**

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)

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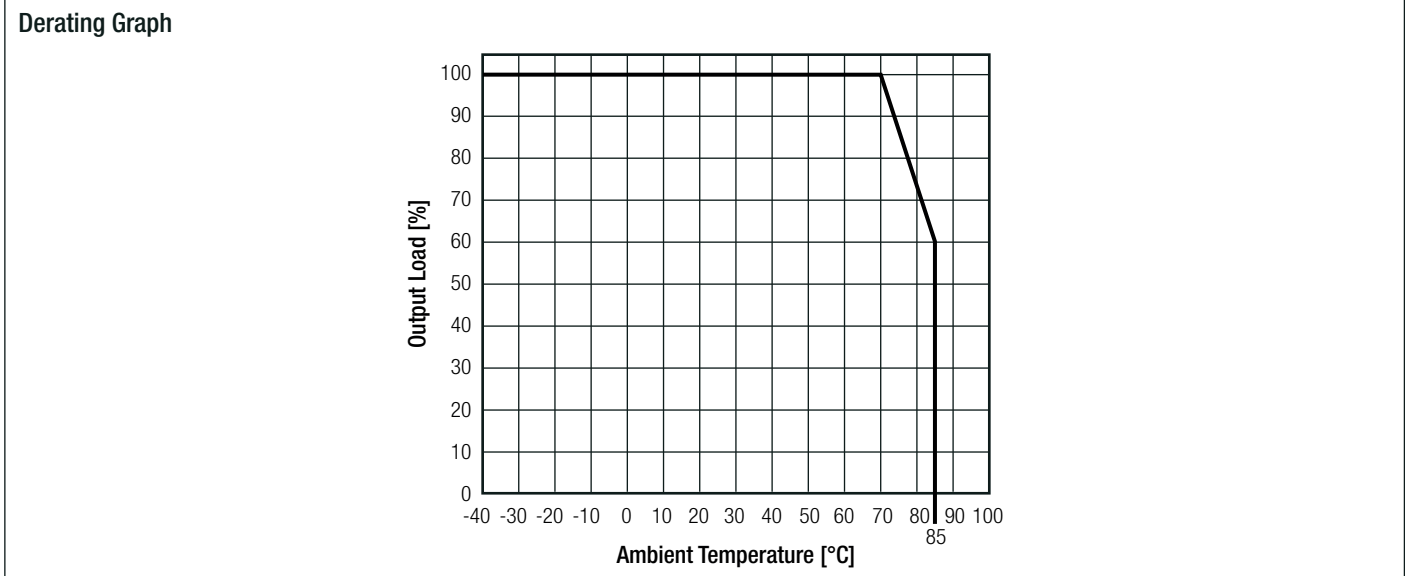
Specifications (measured @ Ta= 25°C, full load, nominal input voltage and after warm-up)



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 <sup>3</sup> hours +70°C: 2182 x 10 <sup>3</sup> hours



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

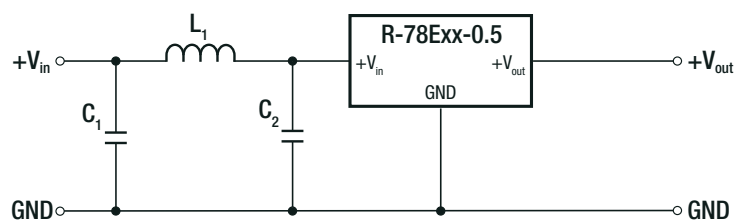
### SAFETY AND CERTIFICATIONS

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

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	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

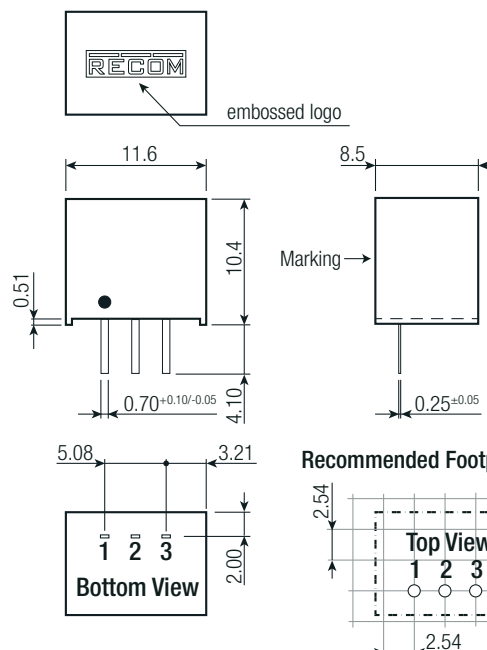
#### Notes:

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)

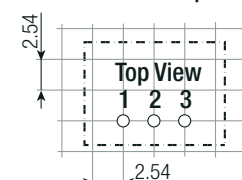


#### Pin Connections

Pin #	Function
1	+Vin
2	GND
3	+Vout

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

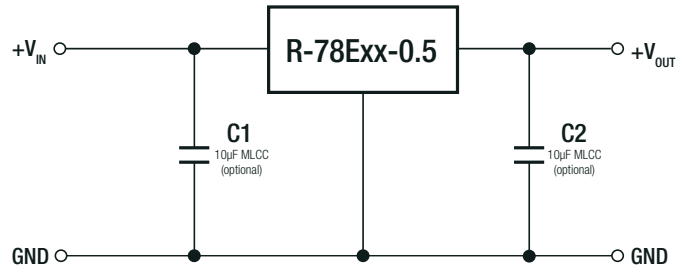
#### Recommended Footprint Details



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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