



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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# 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 [mA]	Efficiency typ <sup>(1)</sup> [%]	Max. Capacitive Load <sup>(2)</sup> [μF]
R-78E3.3-0.5	6-28	3.3	500	75-88	220
R-78E5.0-0.5	7-28	5	500	82-92	220
R-78E9.0-0.5	12-28	9	500	89-94	220
R-78E12-0.5	15-28	12	500	92-95	220
R-78E15-0.5	18-28	15	500	93-95	220

### Notes:

- Note1: test by maximum/minimum input, full load and @25°C.  
 Note2: test by minimum input and constant resistive load.

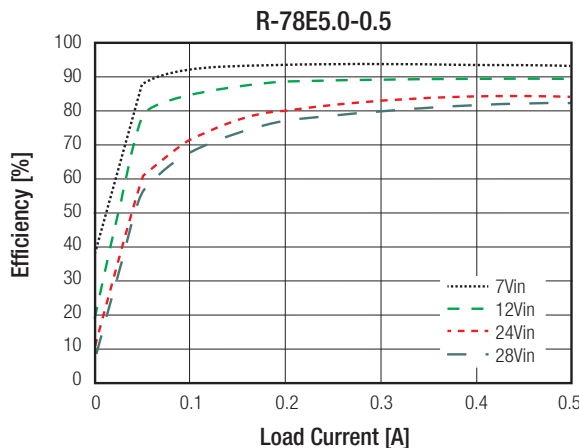
## Specifications (measured @ ta= 25°C, full load, nominal input voltage and after warm-up)

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Nominal Input Voltage				24VDC	
Input Current	@ no load			1.5mA	
Minimum Load <sup>(3)</sup>			2%		
Operating Frequency				570kHz	
Output Ripple and Noise	20MHz bandwidth	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.

### Efficiency vs Load



## R-78E-0.5

500mA  
SIP3  
Single Output



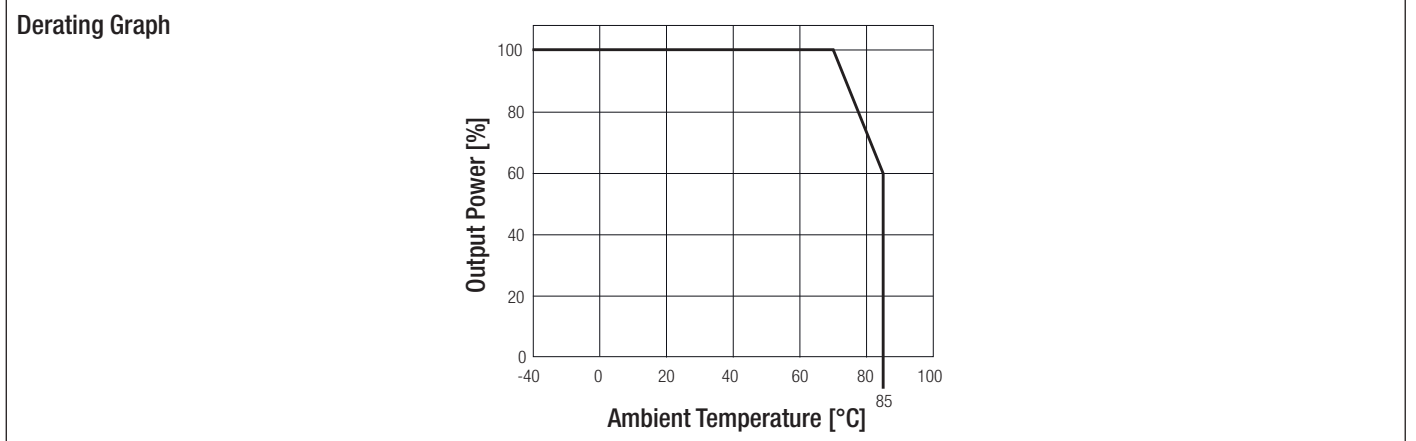
IEC60950-1 Certified  
EN60950-1 Certified

Specifications (measured @  $t_a = 25^\circ\text{C}$ , full load, nominal input voltage and after warm-up)

REGULATIONS		
Parameter	Condition	Value
Output Voltage Accuracy		$\pm 3.0\%$ typ.
Line Voltage Regulation	low line to high line, full load	$\pm 0.5\%$ typ.
Load Voltage Regulation	10% to 100% load	$\pm 1.0\%$ typ.

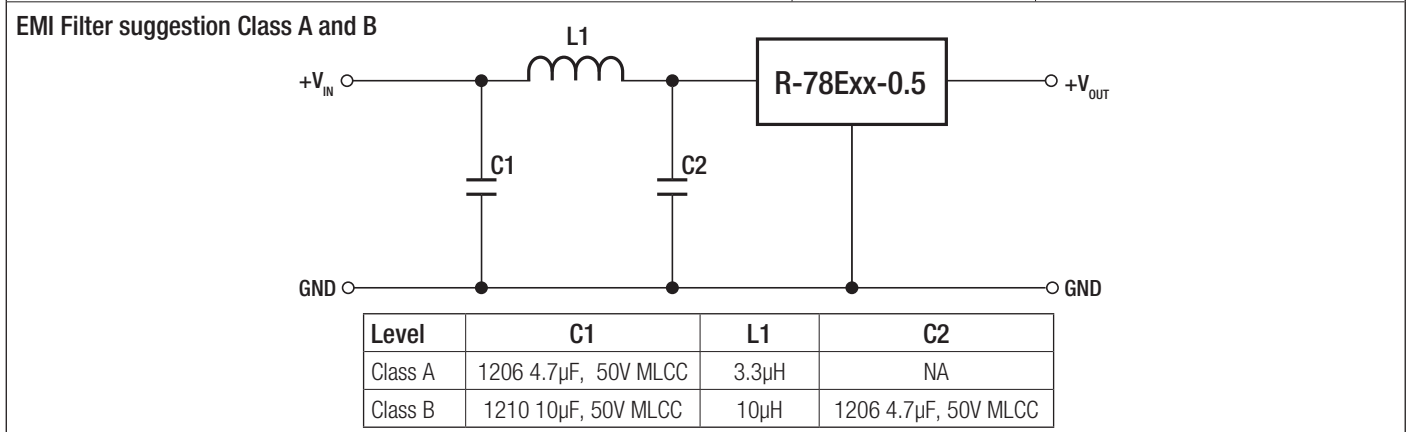
PROTECTIONS		
Parameter	Condition	Value
Short Circuit Protection (SCP)		continuous, automatic recovery

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	natural convection and with derating	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Maximum Case Temperature		$100^\circ\text{C}$
Vibration		10-55Hz, 2G, 30min along X,Y,Z
MTBF	MIL-HDBK 217F, $+25^\circ\text{C}$ MIL-HDBK 217F, $+70^\circ\text{C}$	$4185 \times 10^3$ hours $2182 \times 10^3$ hours



SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety (LVD)	LVD1603123	IEC/EN60950-1, 2nd Edition, Am2:2013

EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external filter	EN55022, Class A or B



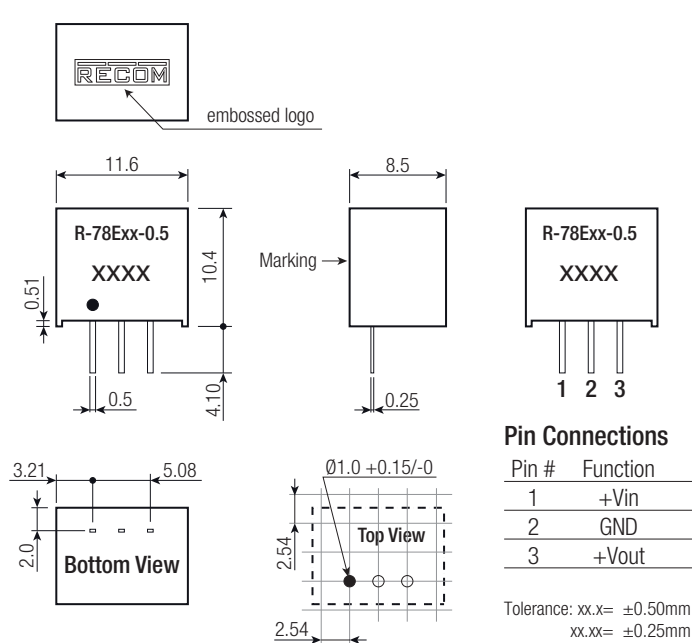


**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , full load, nominal input voltage and after warm-up)

**DIMENSIONS and PHYSICAL CHARACTERISTICS**

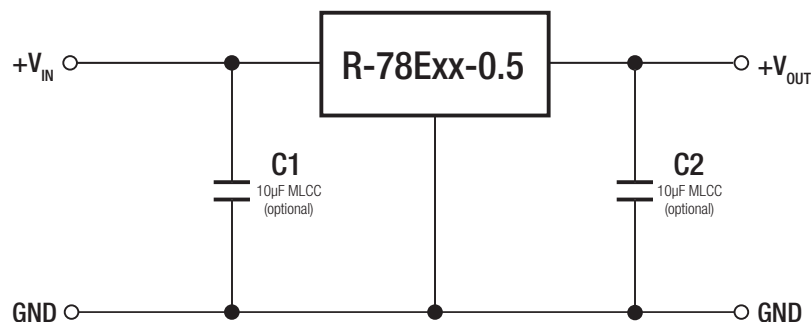
Parameter	Condition	Value
Material	Case Potting	UL94V-0, non-conductive black plastic UL94V-0, Silicone
Package Dimension (LxWxH)		11.6 x 8.5 x 10.4mm
Package Weight		2g typ.

**Dimension Drawing (mm)**



**INSTALLATION AND APPLICATION**

**Standard Application:**



**Notes:**

Note4: The R-78Exx-0.5 can't be used as positive to negativ 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