

# Features

# Switching Regulator

- Efficiency up to 93%, no need for heatsinks
- High voltage input range, up to 50V
- Short Circuit Protection, Thermal Shutdown
- All-in-one solution, no external components required
- IEC/EN60950-1 + AM:2 Certified

## Description

The R-78HBxx/W-Series high efficiency, high input voltage switching regulators are ideally suited to replace 78xx linear regulators. The efficiency of up to 93% means that very little energy is wasted as heat so there is no need for any heat sinks with their additional space and mounting costs. A wide input voltage range allows the full stored energy utilization of standard 12, 24 and 36V batteries as well as COB LED drivers. No external components are required to make a complete regulated, short-circuit protected supply. A built-in protection diode allows high capacitive loads. Typical applications include Auxiliary fan CV power supplies powered from CC LED drivers, industrial, aerospace and battery powered applications.

## Selection Guide

Part Number	Input Voltage Range <sup>(2)</sup> [VDC]	Output Voltage [VDC]	Output Current [A]	Efficiency typ @ min Vin. [%]	Max. Capacitive Load <sup>(1)</sup> [μF]
R-78HB5.0-0.5/W	9-72	5.0	0.5	86	100/6800
R-78HB12-0.5/W	17-72	12	0.5	93	100/6800

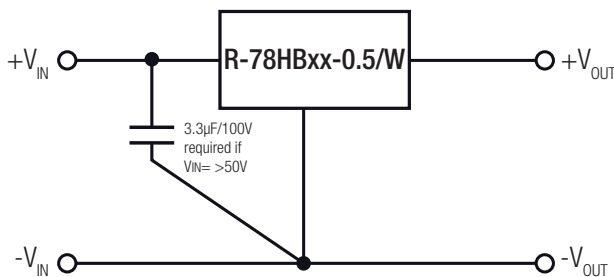
### Notes:

Note1: with normal start-up time and no external components = 100μF  
with <1S start-up time = 6800μF

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

BASIC CHARACTERISTICS					
Parameter	Condition	Min.	Typ.	Max.	
Input Voltage Range <sup>(2)</sup>	5Vout	9VDC	48VDC	72VDC	
	12Vout	17VDC	48VDC	72VDC	
Short Circuit Input Current			15mA	25mA	
Quiescent Current	Vin = 48VDC, 10% load	1mA		5mA	
Internal Power Dissipation			0.65W		
Internal Operating Frequency	full load	120kHz		800kHz	
Efficiency				see Selection Guide	
Minimum Load <sup>(3)</sup>		10mA			
Output Ripple and Noise			20mVp-p	60mVp-p	

## Typical Application Circuit



### Notes:

Note2: The converter has built in soft start circuit. Rapidly changing the input voltage from  $V_{INmin}$  to  $V_{INmax}$  can bypass this circuit and damage the converter.

Note3: Operation under no load will not damage the devices, however they may not meet all specifications. A minimum load of 10mA is recommended.

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**RECOM**  
DC/DC Converter

## R-78HB/W

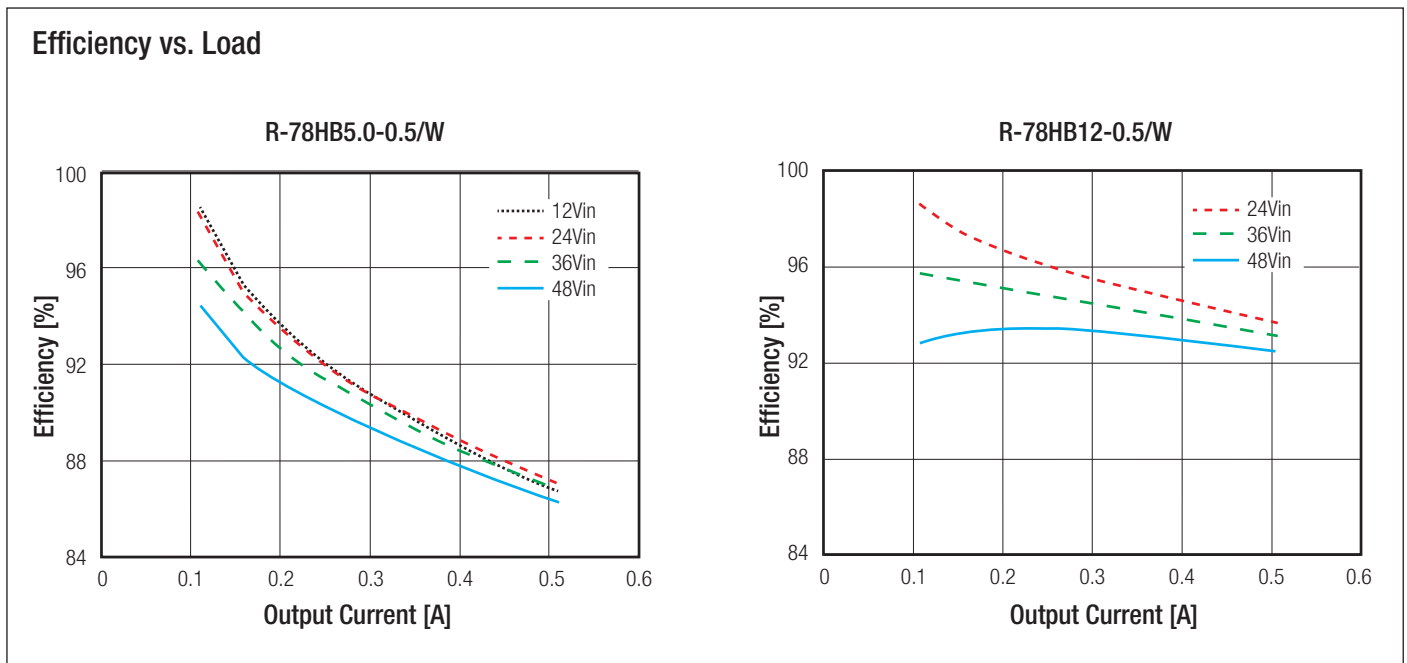
**0.5 AMP**  
**SIP3 Wired**  
**Single Output**



IEC60950-1 Certified  
EN60950-1 Certified  
EN55022 Certified

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

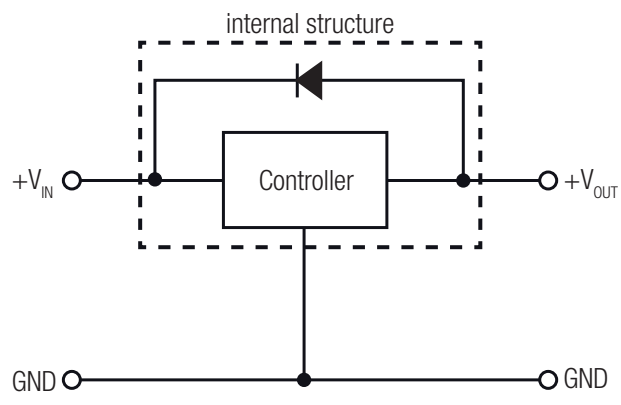
### Efficiency vs. Load



REGULATIONS		
Parameter	Condition	Value
Output Voltage Accuracy	100% load	$\pm 2\%$ typ. / $\pm 3\%$ max.
Line Voltage Regulation	$V_{in} = \text{min. to max.}$ , full load	0.4% typ. / 1% max.
Load Voltage Regulation	10% to 100% load	0.3% typ. / 0.6% max.
Dynamic Load Stability	with 100 $\mu\text{F}$ output Capacitor, 100% $\leftrightarrow$ 50% load	$\pm 75\text{mV}$ typ. / $\pm 100\text{mV}$ max.

PROTECTIONS		
Parameter	Condition	Value
Internal Input Filter		1 $\mu\text{F}$ Capacitor
Short Circuit Protection (SCP)		continuous, automatic recovery

### Optional Protection Circuit

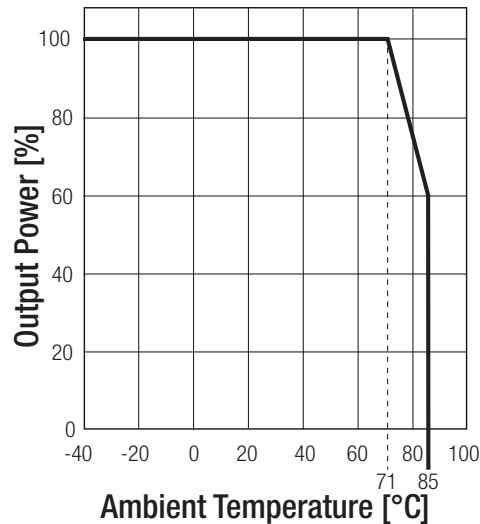


**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , full load, nominal input voltage and after warm-up)

**ENVIRONMENTAL**

Parameter	Condition	Value
Operating Temperature Range	with derating (see graph)	-40°C to +85°C
Maximum Case Temperature		+100°C
Case Thermal Impedance		55°C/W
MTBF	MIL-HDBK 217F, +25°C	7395 x 10 <sup>3</sup> hours
	MIL-HDBK 217F, +71°C	1242 x 10 <sup>3</sup> hours

**Derating Graph**



**SAFETY AND CERTIFICATIONS**

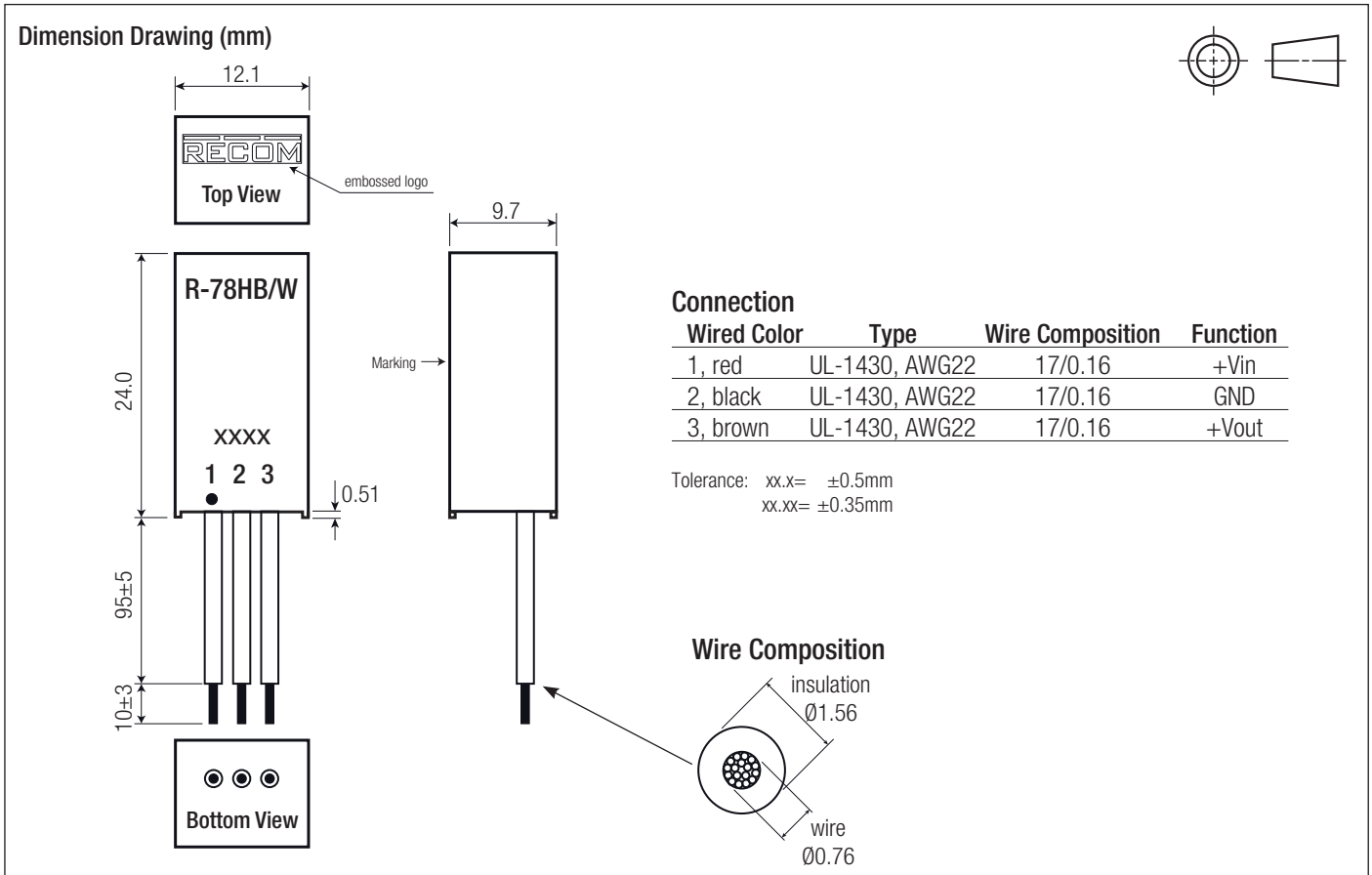
Certificate Type	Report / File Number	Standard
IEC/EN General Safety	LVD 1603123	IEC/EN-60950-1, 2nd Edition + AM:2
EMI Compliance	Condition	Standard / Criterion
EMC Conducted and Radiated		EN55022, Class B
ESD		EN61000-4-2, Criteria A

**DIMENSION and PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Case Material		non-conductive black plastic (UL94V-0)
Potting Material		epoxy (UL94V-0)
Package Dimension (LxWxH)		12.1 x 9.7 x 24.0mm
Package Weight		4.5g

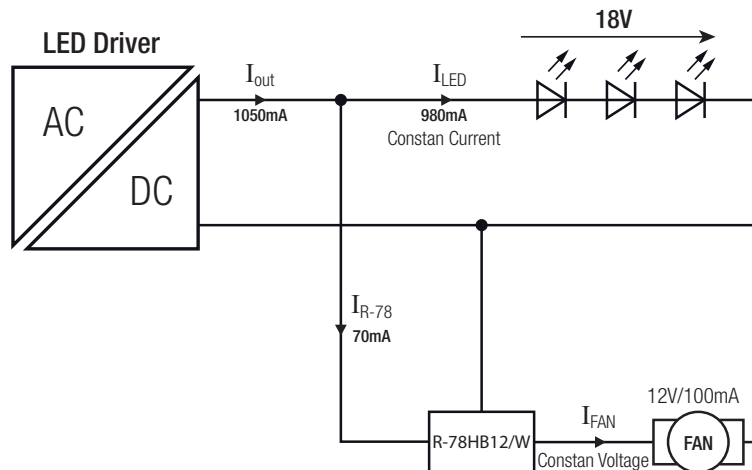
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , full load, nominal input voltage and after warm-up)



### APPLICATION

#### Standard Application



### PACKAGING INFORMATION

Packaging Dimension (LxWxH)	cardboard box	140.0 x 130.0 x 65.0mm
Packaging Quantity		25pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95%, RH max.

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