Features

Switching Regulator

- Designed for 12V - 60V battery-powered apps
- Wide input range (6.5V - 72V)
- 100V surge withstand
- -40°C to +105°C operation at 48V input, full load
- Short circuit protected
- Efficiency up to 83%, no need for heatsinks

RECOM
DC/DC Converter

R-78HE-0.3

0.3 Amp SIP3 Single Output

Description

The R-78HE-5.0-0.3 is a low cost switching regulator module in a compact SIP3 package that has been specially designed for battery-powered use, but will find many other high input voltage applications. The exceptionally wide input voltage and operating temperature range, high MTBF (15 mio. hrs), tight regulation and low quiescent current consumption makes this converter ideal for 36V/48V lithium-ion and 12V/24V/48V lead-acid battery-powered applications. The 100V surge withstand capability means that external voltage clamping circuits can be eliminated and only a simple LC filter is needed for Class A and B EMC conformity.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency (1) @ min. Vin [%]	Efficiency (1) @ max. Vin [%]	Max. Capacitive Load (2) [µF]
R-78HE5.0-0.3	6.5 - 72	5	300	83	72	470

Notes:

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

Note2: Max. Cap Load is tested at nominal input and constant resistive load

Model Numbering

R-78HE5.0-0.3

Output Voltage — Output Current

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

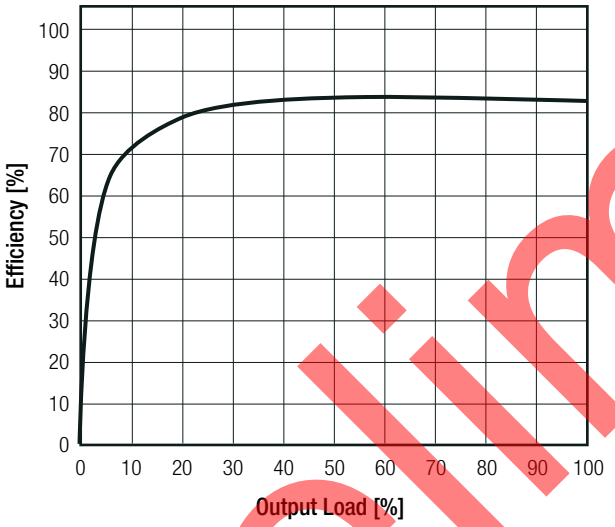
BASIC CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.
Internal Input Filter				capacitor
Input Voltage Range	nom. Vin= 24VDC	6.5VDC		72VDC
Input Surge Voltage	100ms max.			100VDC
Quiescent Current			1.5mA	3mA
Under Voltage Lockout	DC-DC ON DC-DC OFF		5.3VDC 5.1VDC	
Minimum Load		0%		
Internal Operating Frequency	nom. Vin= 24VDC		135kHz	
Output Ripple and Noise [3]	20MHz BW			150mVp-p

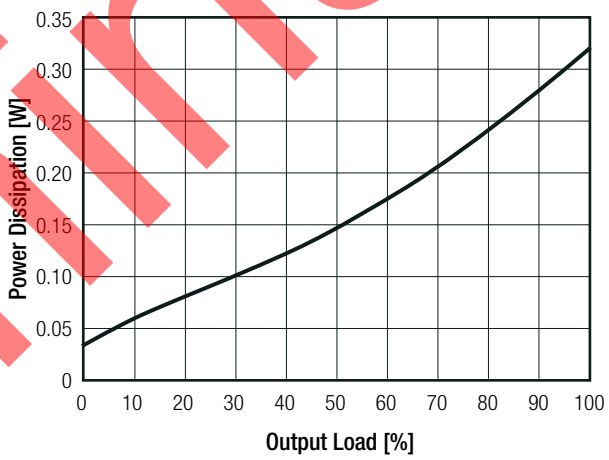
Notes:

Note3: Measurements are made with a 10µF MLCC across output (low ESR)

Efficiency vs. Load



Power Dissipation vs. Load



REGULATIONS

Parameter	Condition		Value
Output Accuracy	full load		±1.0% typ. / ±2.5% max.
Line Regulation	low line to high line, full load	8-72Vin 6.5-72Vin	±1.0% typ. ±1.5% max.
Load Regulation	0% to 100% load		1.0% typ.

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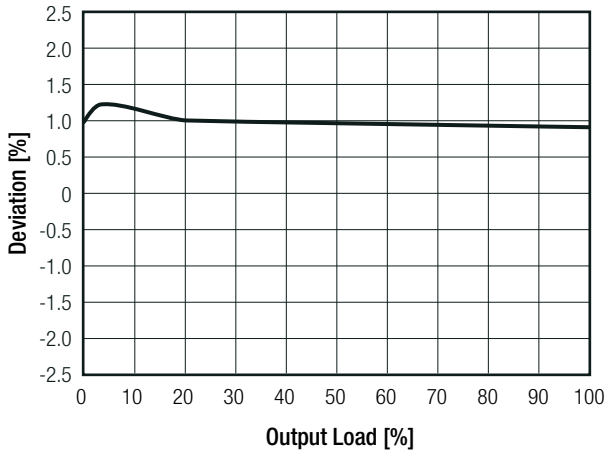
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Deviation vs. Load



PROTECTIONS

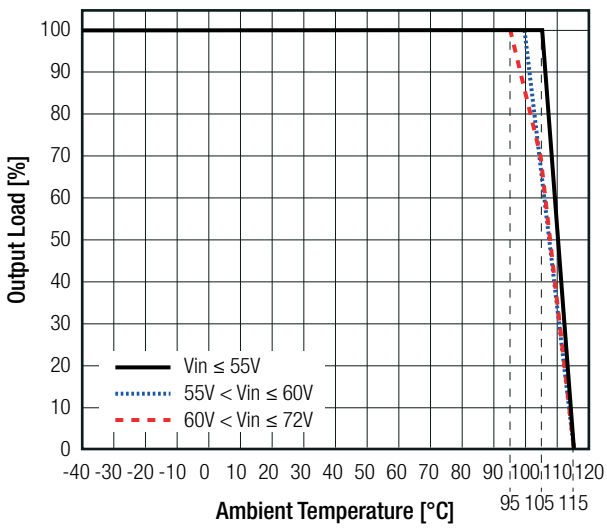
Parameter	Condition	Value
Short Circuit Protection (SCP)	below 100mΩ	continuous, automatic recovery
Over Current Protection (OCP)		hiccup mode, 160% typ.

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load, 48Vin refer to derating graph	-40°C to +105°C -40°C to +115°C
Maximum Case Temperature			120°C
Temperature Coefficient			0.02%/K
Thermal Impedance	0.1m/s, horizontal		37K/W
Operating Altitude			2000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Shock			according to MIL-STD 202G standard
Vibration			according to MIL-STD 202G standard
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +95°C	15000 x 10^3 hours 1000 x 10^3 hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)



R-78HE-0.3 Series

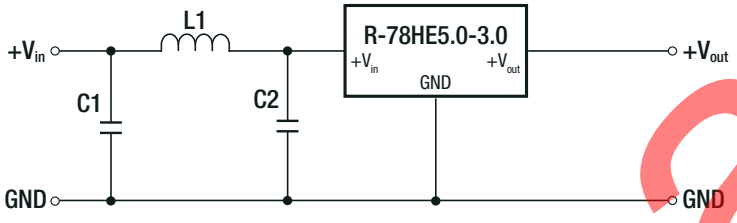
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
RoHS2		RoHS 2011/65/EU + AM2015/863

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

EMC Filter suggestion according to EN55032 Class A and B



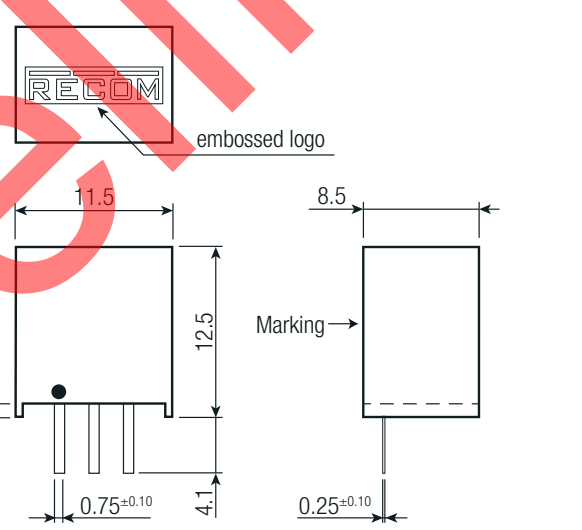
Component List

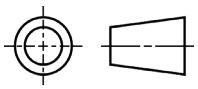
Level	C1	C2	L1
Class A	2.2µF	-	12µH choke RLS-126
Class B	2.2µF	2.2µF	68µH choke RLS-686

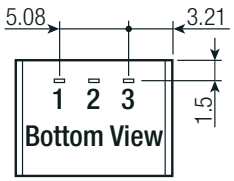
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	non-conductive black plastic, (UL94 V-0)
	potting	epoxy, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		11.5 x 8.5 x 12.5mm
Weight		2.6g typ.

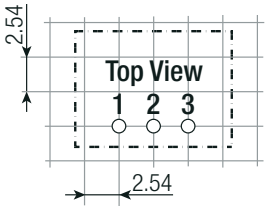
Dimension Drawing (mm)







Recommended Footprint Details



Pin Connections

Pin #	Function
1	+Vin
2	GND
3	+Vout

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

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	tube	530.0 x 10.7 x 23.2mm
Packaging Quantity	tube	42pcs
Storage Temperature Range		-55°C to +125°C
Storage Humidity	non-condensing	95% RH max.