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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.

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Features

Switching Regulator

- Efficiency Up To 96%, No Heatsinks Required
- 2A Continuous Output Current
- Vin Up To 32V
- Vout: 1.2V - 15V
- Wide Operating Temperature -40°C to +70°C at Full Load
- Continuous Short Circuit Protection
- Pin Compatible With TO220 Linear Regulators
- Positive To Negative

Description

The R-78Bxx-2.0 series high efficiency switching regulators are ideally suited to replace 78xx linear regulators and are pin compatible. The efficiency of up to 96% means that very little energy is wasted as heat. Full power is available over a temperature range of -40°C up to 70°C without the need for heatsinks with their additional space and mounting costs. A high input voltage of up to 32VDC and output voltages from 1.2V up to 15V, low ripple and noise figures and a short circuit input current of typically only 50mA round off the specifications of this versatile converter series.

Selection Guide

Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency @ full load @ min Vin [%]	Efficiency @ full load @ max. Vin [%]	Max. Capacitive Load (1) [μF]
R-78B1.2-2.0	4.75 - 32	1.2	2000	72	87	3300
R-78B1.5-2.0	4.75 - 32	1.5	2000	79	90	3300
R-78B1.8-2.0	4.75 - 32	1.8	2000	80	91	3300
R-78B2.5-2.0	4.75 - 32	2.5	2000	84	92	2300
R-78B3.3-2.0	4.75 - 32	3.3	2000	86	92	1800
R-78B5.0-2.0	6.5 - 32	5	2000	90	94	820
R-78B9.0-2.0	11 - 32	9	2000	93	95	620
R-78B12-2.0	15 - 32	12	2000	94	96	470
R-78B15-2.0	18 - 32	15	2000	95	96	470

Notes:

Note1: Max. cap load is tested by nominal input and full resistive load

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

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range	nom. Vin= 24VDC	1.2Vout - 3.3Vout	4.75VDC	24VDC	32VDC
		5Vout	6.5VDC		
		9Vout	11VDC		
		12Vout	15VDC		
		15Vout	18VDC		
Maximum Reverse Voltage					0V
Inrush Current				2A	
Quiescent Current	nom. Vin= 24VDC			2mA	
Internal Power Dissipation	Vout= 1.5VDC			0.35W	0.8W
Start-up time				10ms	
Rise Time				50μs	
Internal Operating Frequency	nom. Vin= 24VDC			460kHz	
Minimum Load				0%	
Output Ripple and Noise	20MHz BW	Vout ≤3.3VDC Vout ≥5VDC		50mVp-p 75mVp-p	

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RECOM
DC/DC Converter

R-78B-2.0

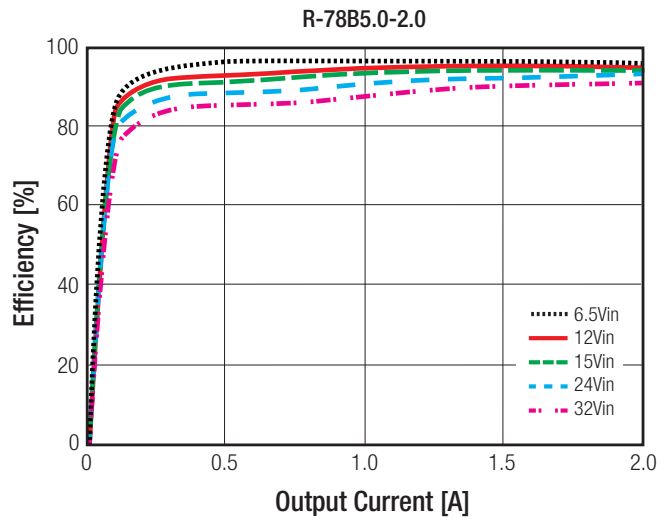
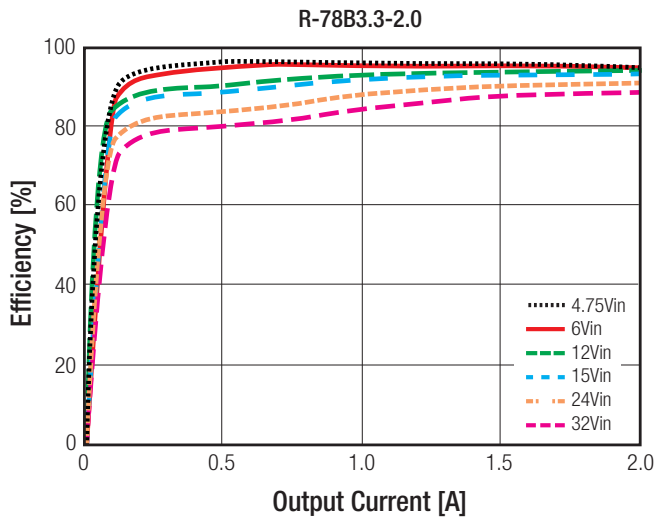
2.0 Amp
SIP3
Single Output



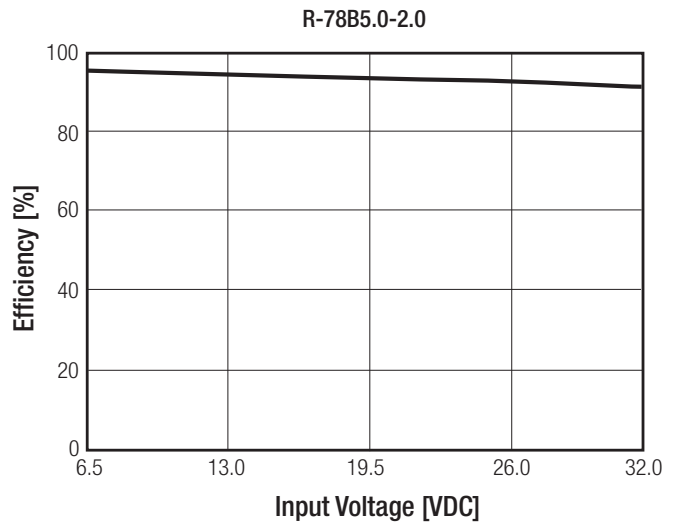
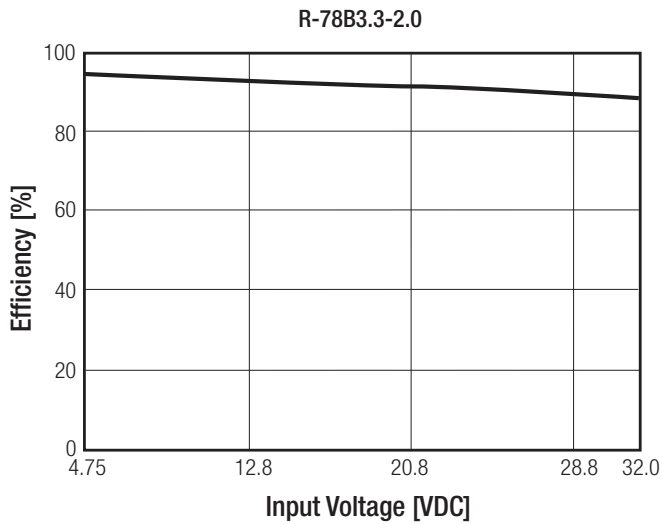
IEC/EN62368-1 certified
CB Report
EN55022 Compliant

Specifications (measured @ $t_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm up unless otherwise specified)

Efficiency vs. Load



Efficiency vs. Input Voltage



REGULATIONS

Parameter	Condition	Value
Output Accuracy		$\pm 2.0\%$ typ.
Line Regulation	low line to high line, full load	$\pm 0.5\%$ typ.
Load Regulation	0% to 100% load	$\pm 1.0\%$ typ.

PROTECTIONS

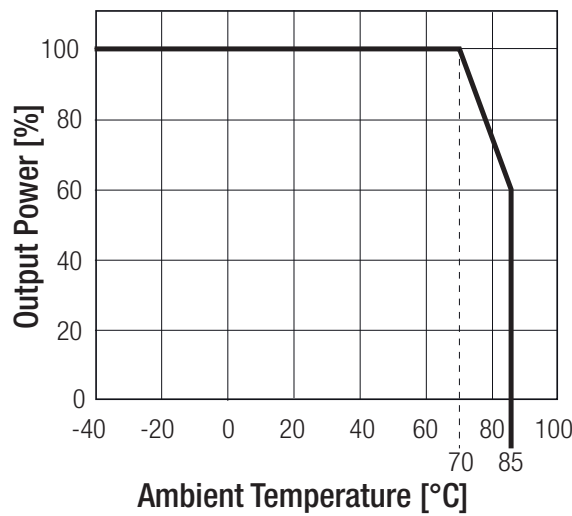
Parameter	Condition	Value
Short Circuit Protection (SCP)	below $100\text{m}\Omega$	continuous, automatic recovery
Short Circuit Input Current	nom. $V_{in} = 24\text{VDC}$	$< 5\text{V}_{out}$ $\geq 5\text{V}_{out}$
		50mA typ. 75mA typ.

Specifications (measured @ $t_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm up unless otherwise specified)

ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	without derating (see graph)	-40°C to $+70^\circ\text{C}$
Maximum Case Temperature		$+105^\circ\text{C}$
Temperature Coefficient		$0.02\%/^\circ\text{C}$ typ.
Operating Altitude		5000m
Operating Humidity	non-condensing	95% RH max.
Pollution Degree		PD2
MTBF	according to MIL-HDBK-217F, G.B. $+25^\circ\text{C}$	6349×10^3 hours
Vibration		10-55Hz, 2G, 30min along X, Y and Z axis

Derating Graph

(@ Chamber and natural convection 0.1m/s)

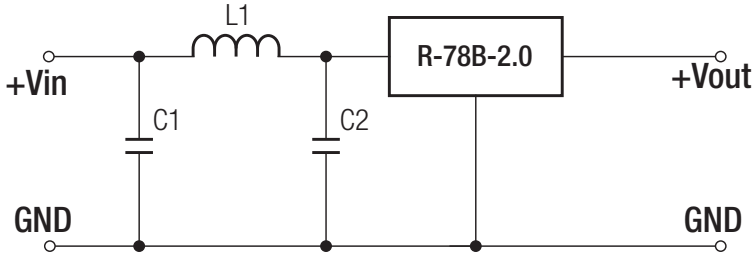


SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Audio/video, information and communication technology equipment Safety requirements (CB Scheme)	L0339m38-B1-L	IEC62368-1, 2nd Edition, 2014 EN62368-1, 2014
RoHs2+		RoHS 2011/65/EU + AM2015/863
EMC Compliance	Condition	Standard / Criterion
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	with external components (see filter suggestion below)	EN55022, Class A EN55022, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024, 2010
Electromagnetic compatibility of multimedia equipment - Emission requirements		EN55032, Class B, 2013
ESD Electrostatic discharge immunity test	Air $\pm 8\text{kV}$ and Contact $\pm 4\text{kV}$	IEC61000-4-2, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3 V/m	IEC61000-4-3, Criteria A
Fast Transient and Burst Immunity	$\pm 0.5\text{kV}$	IEC61000-4-4, Criteria A
Surge Immunity	$\pm 0.5\text{kV}$	IEC61000-4-5, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	3V	IEC61000-4-6, Criteria A
Power Magnetic Field Immunity	50Hz/ 1A/m	IEC61000-4-8, Criteria A

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Specifications (measured @ $t_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm up unless otherwise specified)

EMC Filtering Suggestion according to EN55022

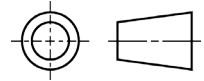
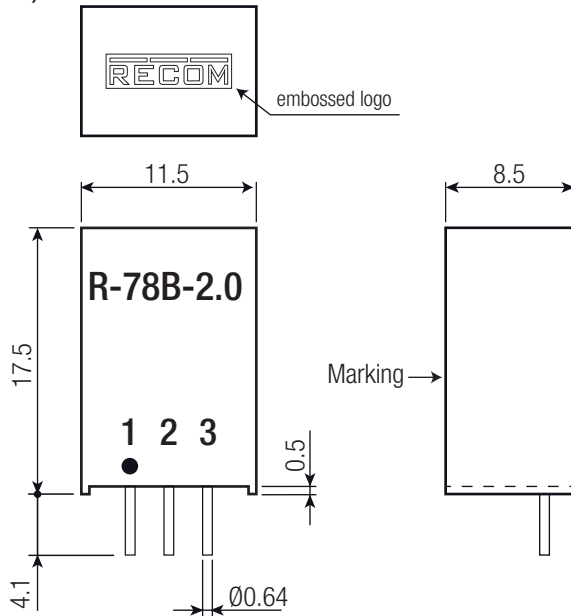


EN55022	C1	C2	L1
Class A	4.7 μF 50V MLCC 1206	N/A	3.3 μH Choke
Class B	10 μF 50V MLCC 1210	4.7 μF 50V MLCC 1206	10 μH Choke

DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case Potting PCB	plastic, (UL94 V-0) silicone, (UL94 V-0) FR4, (UL94 V-0)
Package Dimension (LxWxH)		11.5 x 8.5 x 17.5mm
Package Weight		4.0g typ.

Dimension Drawing (mm)

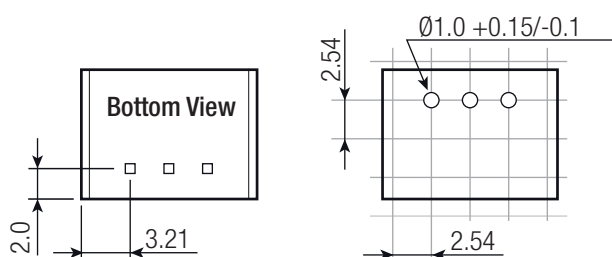


Pin Connections

Pin #	Single
1	+Vin
2	GND
3	+Vout

Tolerance: xx.x= $\pm 0.5\text{mm}$
 xx.xx= $\pm 0.25\text{mm}$
 Pin width: $\pm 0.1\text{mm}$

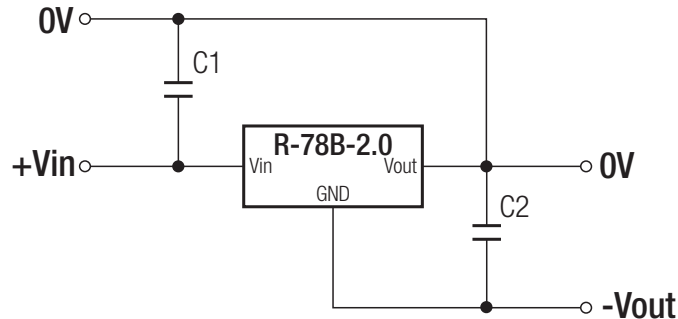
Recommended Footprint Details



Specifications (measured @ $t_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm up unless otherwise specified)

INSTALLATION and APPLICATION

Positive to Negative



Part Number	Input Voltage Range [VDC]	Output Voltage [VDC]	Output Current [mA]	Efficiency @ full load @ min V_{in} [%]	Efficiency @ full load @ max. V_{in} [%]	External Capacitor [C1 / C2]
R-78B1.2-2.0	4.75 - 32	-1.2	-1000	86	86	10 μF / 10 μF
R-78B1.5-2.0	4.75 - 32	-1.5	-1000	74	87	10 μF / 10 μF
R-78B1.8-2.0	4.75 - 32	-1.8	-1000	76	88	10 μF / 10 μF
R-78B2.5-2.0	4.75 - 32	-2.5	-1000	79	89	10 μF / 10 μF
R-78B3.3-2.0	4.75 - 32	-3.3	-1000	83	89	10 μF / 10 μF
R-78B5.0-2.0	6.5 - 32	-5	-1000	86	90	10 μF / 10 μF
R-78B9.0-2.0	11 - 32	-9	-1000	90	91	10 μF / 10 μF
R-78B12-2.0	15 - 32	-12	-1000	91	92	10 μF / 10 μF
R-78B15-2.0	18 - 32	-15	-1000	92	93	10 μF / 10 μF

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 25.1 x 10.6mm
Packaging Quantity		42pcs
Storage Temperature Range		-55 $^\circ\text{C}$ to +125 $^\circ\text{C}$
Storage Humidity	non-condensing	95% RH max.

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