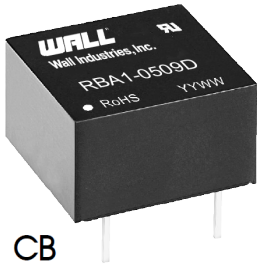
SIP Package "S" Suffix

Size: 0.5in x 0.24in x 0.40in

DIP Package "D" Suffix



Size: 0.5in x 0.40in x 0.303in

FEATURES

- Fixed Input Voltage
- High Efficiency
- RoHS Compliant
- SIP or DIP Package
- Isolated & Unregulated Single Outputs
- Continuous Short Circuit Protection
- 3 Years Warranty
- Industry Standard Pinout
- I/O Isolation Voltage of 1500VDC
- IEC60950, EN60950 & UL60950 Approval

DESCRIPTION

The RBA1 series of DC/DC converters offers up to 1 watt of output power in either a DIP or SIP package with industry standard pin-out. This series consists of isolated and unregulated single output models with a wide, fixed input range and high efficiency. Features of this series include continuous short circuit protection, isolation voltage of 1500VDC, and RoHS compliance. This series has IEC60950, EN60950 and UL60950 safety approvals. Please contact factory for order details.

MODEL SELECTION TABLE

SIP Package

Model Number	Input Voltage Range	Output Voltage	Output Current		Efficiency		UL Certification	Load Regulation	Typ. Ripple & Noise	Output Power
			Min Load	Max Load	Min.	Typ.				
RBA1-303S	3.3VDC (2.97~3.63VDC)	3.3VDC	30mA	303mA	68%	72%	UL60950	18%	60mVp-p	1W
RBA1-305S		5VDC	20mA	200mA	72%	76%	UL60950	12%		
RBA1-312S		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-0503S	5VDC (4.5~5.5VDC)	3.3VDC	30mA	303mA	68%	72%	UL60950	18%	60mVp-p	1W
RBA1-0505S		5VDC	20mA	200mA	76%	80%	UL60950	12%		
RBA1-0509S		9VDC	12mA	111mA	76%	80%	UL60950	8%		
RBA1-0512S		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-0515S		15VDC	7mA	67mA	76%	80%	UL60950	6%		
RBA1-0524S		24VDC	4mA	42mA	76%	80%	UL60950	5%		
RBA1-1203S	12VDC (10.8~13.2VDC)	3.3VDC	30mA	303mA	68%	72%	-	18%	60mVp-p	1W
RBA1-1205S		5VDC	20mA	200mA	76%	80%	UL60950	12%		
RBA1-1209S		9VDC	12mA	111mA	76%	80%	UL60950	8%		
RBA1-1212S		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-1215S		15VDC	7mA	67mA	76%	80%	UL60950	6%		
RBA1-1224S		24VDC	4mA	42mA	76%	80%	UL60950	5%		
RBA1-1505S	15VDC (13.5~16.5VDC)	5VDC	20mA	200mA	76%	80%	-	12%	60mVp-p	1W
RBA1-1512S		12VDC	9mA	84mA	76%	80%	-	7%		
RBA1-1515S		15VDC	7mA	67mA	76%	80%	-	6%		
RBA1-2403S	24VDC (21.6~26.4VDC)	3.3VDC	30mA	303mA	68%	72%	-	18%	60mVp-p	1W
RBA1-2405S		5VDC	20mA	200mA	76%	80%	UL60950	12%		
RBA1-2409S		9VDC	12mA	111mA	76%	80%	UL60950	8%		
RBA1-2412S		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-2415S		15VDC	7mA	67mA	76%	80%	UL60950	6%		
RBA1-2424S		24VDC	4mA	42mA	76%	80%	UL60950	5%		

MODEL SELECTION TABLE

DIP Package

Model Number	Input Voltage Range	Output Voltage	Output Current		Efficiency		Certification	Load Regulation	Ripple & Noise	Output Power
			Min Load	Max Load	Min.	Typ.				
RBA1-303D	3.3VDC (2.97~3.63VDC)	3.3VDC	30mA	303mA	68%	72%	-	18%	60mVp-p	1W
RBA1-305D		5VDC	20mA	200mA	72%	76%	-	12%		
RBA1-0503D	5VDC (4.5~5.5VDC)	3.3VDC	30mA	303mA	68%	72%	-	18%	60mVp-p	1W
RBA1-0505D		5VDC	20mA	200mA	76%	80%	UL60950	12%		
RBA1-0509D		9VDC	12mA	111mA	76%	80%	UL60950	8%		
RBA1-0512D		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-0515D		15VDC	7mA	67mA	76%	80%	UL60950	6%		
RBA1-0524D		24VDC	4mA	42mA	76%	80%	UL60950	5%		
RBA1-1203D	12VDC (10.8~13.2VDC)	3.3VDC	30mA	303mA	68%	72%	UL60950	18%	60mVp-p	1W
RBA1-1205D		5VDC	20mA	200mA	76%	80%	UL60950	12%		
RBA1-1209D		9VDC	12mA	111mA	76%	80%	UL60950	8%		
RBA1-1212D		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-1215D		15VDC	7mA	67mA	76%	80%	UL60950	6%		

MODEL SELECTION TABLE

DIP Package (Cont.)

Model Number	Input Voltage Range	Output Voltage	Output Current		Efficiency		Certification	Load Regulation	Ripple & Noise	Output Power
			Min Load	Max Load	Min.	Typ.				
RBA1-1505D	15VDC (13.5~16.5VDC)	5VDC	20mA	200mA	76%	80%	-	12%	60mVp-p	1W
RBA1-1509D		9VDC	12mA	111mA	76%	80%	-	8%		
RBA1-1515D		15VDC	7mA	67mA	76%	80%	-	6%		
RBA1-2403D	24VDC (21.6~26.4VDC)	3.3VDC	30mA	303mA	68%	72%	-	18%	60mVp-p	1W
RBA1-2405D		5VDC	20mA	200mA	76%	80%	UL60950	12%		
RBA1-2409D		9VDC	12mA	111mA	76%	80%	UL60950	8%		
RBA1-2412D		12VDC	9mA	84mA	76%	80%	UL60950	7%		
RBA1-2415D		15VDC	7mA	67mA	76%	80%	UL60950	6%		
RBA1-2424D		24VDC	4mA	42mA	76%	80%	UL60950	5%		

SPECIFICATIONS

All specifications are based on 25°C, Humidity <75%, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	3.3VDC Nominal Input		2.97	3.3	3.63	VDC
	5VDC Nominal Input		4.5	5	5.5	
	12VDC Nominal Input		10.8	12	13.2	
	15VDC Nominal Input		13.5	15	16.5	
	24VDC Nominal Input		21.6	24	26.4	
Input Current	Full Load	3.3VDC Nominal Input		404		mA
		5VDC Nominal Input		277		
		12VDC Nominal Input		115		
		15VDC Nominal Input		83		
		24VDC Nominal Input		57		
	No Load	3.3VDC Nominal Input		30	70	mA
		5VDC Nominal Input		20	60	
		12VDC Nominal Input		15	50	
		15VDC Nominal Input		10	35	
		24VDC Nominal Input		17	30	
Surge Voltage (1 sec. max.)	3.3VDC Nominal Input		-0.7		5	VDC
	5VDC Nominal Input		-0.7		9	
	12VDC Nominal Input		-0.7		18	
	15VDC Nominal Input		-0.7		21	
	24VDC Nominal Input		-0.7		30	
Reflected Ripple Current				15		mA
Input Filter			Filter Capacitor			
Hot Plug			Unavailable			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Output Accuracy			See Output Regulation Curves			
Linear Regulation	Input Voltage Change: ±1%	3.3VDC			±1.5	-
		Other Models			±1.2	
Load Regulation	10-100% Load		See Table			
Output Power			See Table			
Output Current			See Table			
Maximum Capacitive Load	Tested under full load condition and over the input voltage range				220	µF
Ripple & Noise [1]	20MHz Bandwidth			60	150	mVp-p
Temperature Coefficient	Full Load				±0.03	%/ºC
PROTECTION						
Short Circuit Protection	3.3VDC Nominal Inputs, 24VDC Nominal Inputs, RBA1-0524S & RBA1-0524D [2]				1	s
	Other Models		Continuous, Self-Recovery			
ENVIRONMENTAL SPECIFICATIONS						
Operating Temperature	Derating when operating temperature up to 85ºC		-40		105	ºC
Storage Temperature			-55		125	ºC
Case Temperature Rise	Ta=25ºC, Nominal Input, Full Load Output			25		ºC
Storage Humidity	Non-Condensing				95	%RH
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds				300	ºC
MTBF	MIL-HDFK-217F@25ºC		3500			K Hours

SPECIFICATIONS

All specifications are based on 25°C, Humidity <75%, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

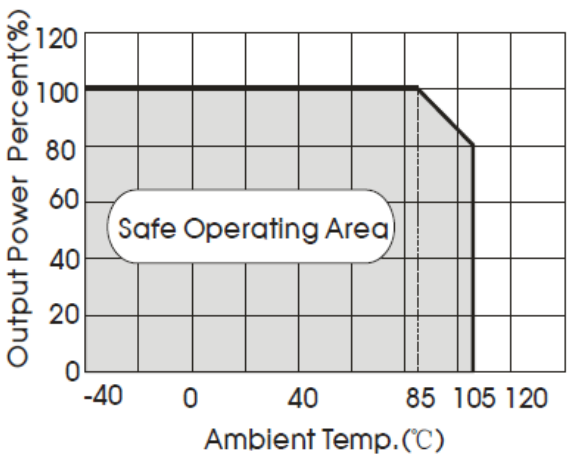
SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
GENERAL SPECIFICATIONS					
Efficiency	@Full Load		See Table		
Switching Frequency	Full Load, Nominal Input Voltage		100		KHz
Isolation	Input-Output, Electric Strength test for 1 minute with leakage current of 1mA max.	1500			VDC
Insulation Resistance	Input-Output Resistance 500VDC	1000			MΩ
Isolation Capacitance	Input-Output Capacitance at 100KHz/0.1V		20		pF
PHYSICAL SPECIFICATIONS					
Weight	SIP Package		0.046oz (1.3g)		
	DIP Package		0.063oz (1.8g)		
Dimensions (L x W x H)	SIP Package		0.46in x 0.24in x 0.4in (11.60mm x 6mm x 10.16mm)		
	DIP Package		0.5in x 0.4in x 0.32in (12.70mm x 10.16mm x 8.20mm)		
Case Material			Black Plastic, Flame-Retardant and Heat-resistant (UL94-V0)		
Cooling			Free Air Convection		
SAFETY CHARACTERISTICS					
Safety Approvals	IEC60950, EN60950, UL60950				
Emissions	CE — CISPR32/EN55032				Class B(3)
	RE — CISPR32/EN55032				Class B(3)
Immunity	ESD — IEC/EN61000-4-2 — Contact ±8kV				Perf. Criteria B

NOTES

1. Ripple & noise are measured by “parallel cable” method.
2. Supply voltage must be discontinued at the end of short circuit duration for all these models.
3. See Design Reference for recommended circuit.
4. In order to guarantee product performance and datasheet compliance, product must be operated within specification and load range requirements.
5. Products should be handled according to ISO14001 and related environmental laws and regulations by qualified personnel only.
6. Product customization available

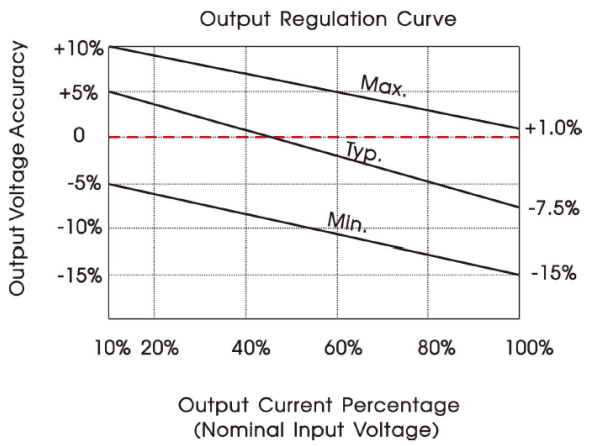
**Due to advances in technology, specifications subject to change without notice.*

DERATING CURVE

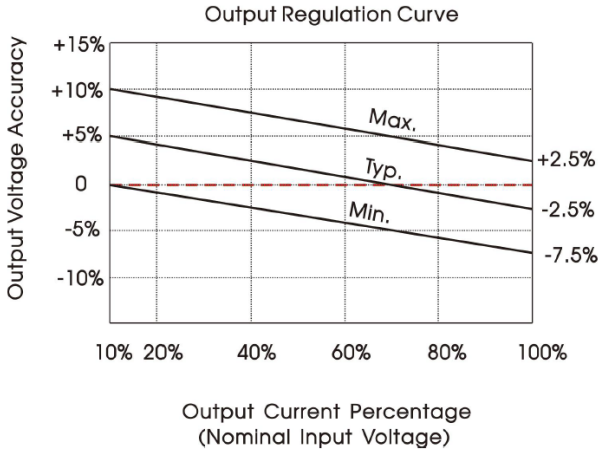


TYPICAL PERFORMANCE CURVES

3.3VDC Output

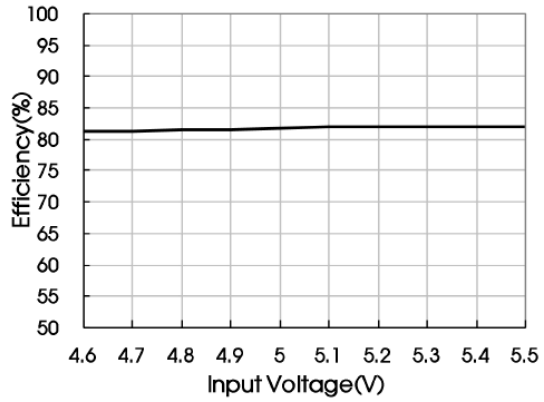


Other Outputs

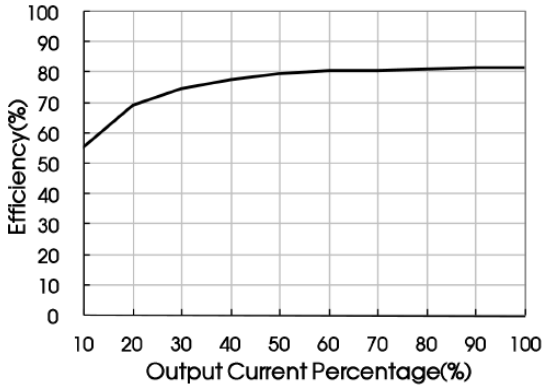


EFFICIENCY CURVES

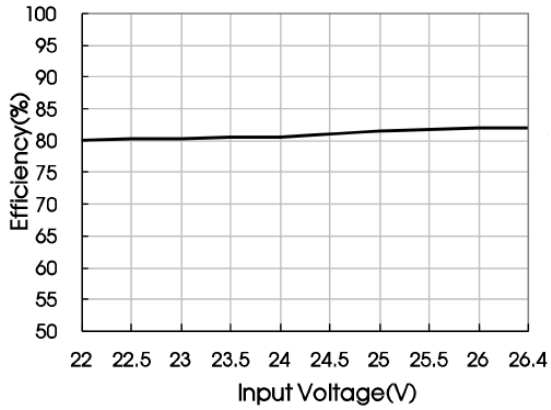
Efficiency vs. Input Voltage (Full Load) RBA1-505S



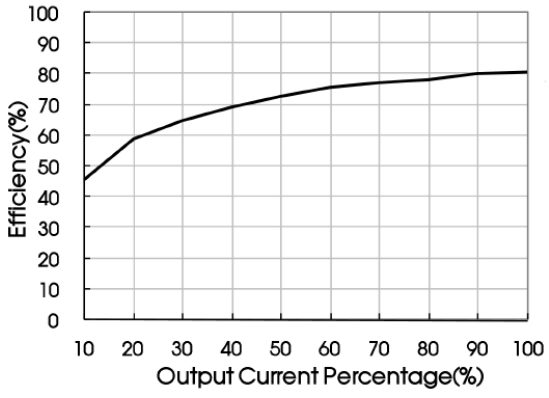
Efficiency vs. Output Load (Vin=5V) RBA1-505S



Efficiency vs. Input Voltage (Full Load) RBA1-2415S

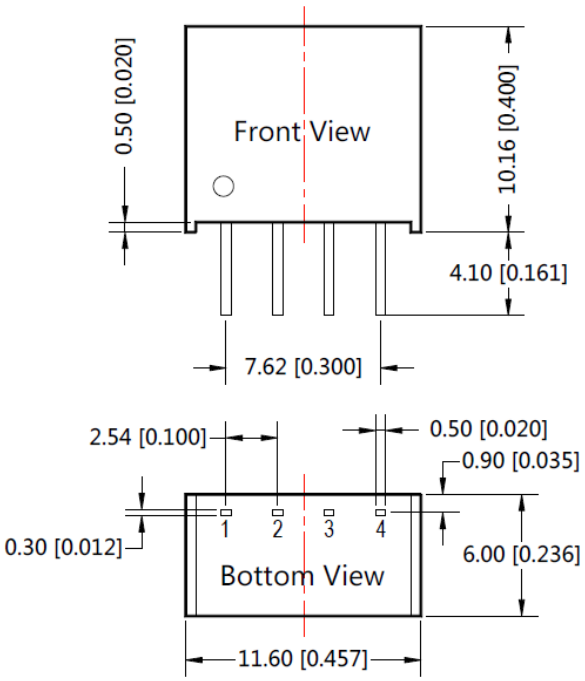


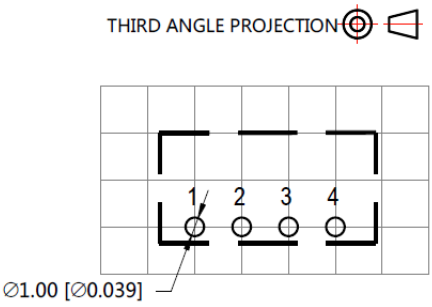
Efficiency vs. Output Load (Vin=24V) RBA1-2415S



MECHANICAL DRAWINGS

SIP Package "S" Suffix





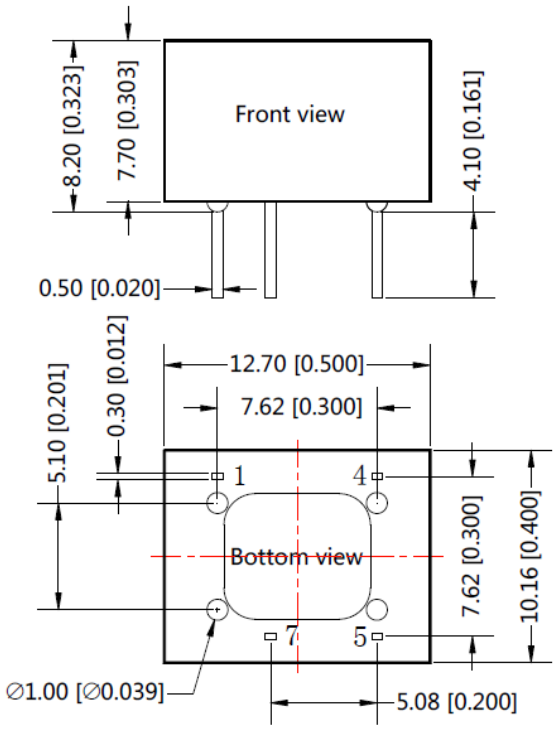
Note: Grid 2.54*2.54mm

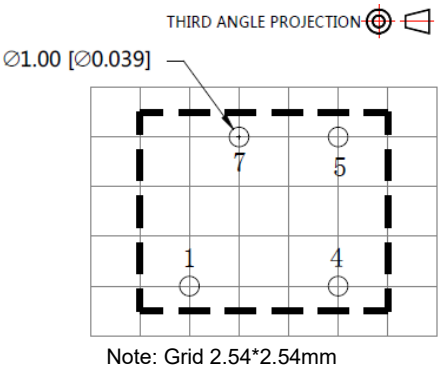
Pin-Out

Pin	Function
1	GND
2	Vin
3	0V
4	+Vo

Notes:
Unit: mm [inch]
Pin section tolerances: ±0.10 [±0.004]
General tolerances: ±0.25 [±0.010]

DIP Package "D" Suffix





Note: Grid 2.54*2.54mm

Pin-Out

Pin	Function
1	GND
4	Vin
5	+Vo
7	0V

Notes:
Unit: mm[inch]
Pin section tolerances: ±0.10 [±0.004]
General Tolerances: ±0.25 [±0.010]

DESIGN REFERENCE

1. Typical Application Circuit

Input and/or output ripple can be further reduced by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 1.
Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. Refer to table below for recommended input and output capacitor values.

Fig 1

Recommended Capacitive Load Value Table

Vin (VDC)	Cin (μF)	Vo (VDC)	Cout (μF)
3.3/5	4.7	3.3/5	10
12	2.2	9	4.7
15	2.2	12	2.2
24	1	15	1
-	-	24	0.47

2. EMC (Class B) Compliance Circuit

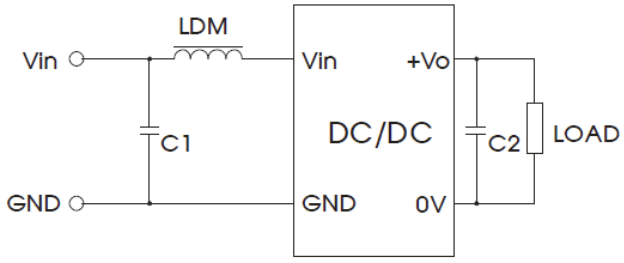


Fig 2

Input Voltage (VDC)		3.3/5/12/15/24
EMI	C1	4.7μF/50V
	C2	Refer to the Cout in Fig 1
	LDM	6.8μH

3.Minimum Output Load Requirements

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

MODEL NUMBER SETUP

RBA	1	-	05	05	S
Series Name	Output Power		Input Voltage	Ouptut Voltage	Package Type
			03: 3.3VDC **05:** 5VDC **12:** 12VDC **15:** 15VDC **24:** 24VDC	**03:** 3.3VDC **05:** 5VDC **09:** 9VDC **12:** 12VDC **15:** 15VDC **24:** 24VDC	**S:** SIP Package **D:** DIP Package

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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