A300R Series

3W, Regulated Single & Dual Output DC/DC Converters

Key Features:

- **3W Output Power**
- **Compact DIP Package**
- **High MTBF**
- **Tightly Regulated**
- **Short Circuit Protected**
- LOW COST!

Electrical Specifications

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range	5 VDC Input	4.5	5.0	5.5	VDC
	12 VDC Input	10.8	12.0	13.2	
	24 VDC Input	21.6	24.0	26.4	
	48 VDC Input	43.2	48.0	52.8	
Input Filter	π (Pi) Filter				
Reverse Polarity Input Current				0.5	A
Short Circuit Input Power				2,500	mW

Output

Parameter	Conditions	Min.	Typ.	Max.	Units
Output Voltage Accuracy			±2.0	±4.0	%
Output Voltage Balance	Dual Output , Balanced Loads		±1.0	±3.0	%
Line Regulation	Vin = Min to Max		±0.2	±0.5	%
Load Regulation	Iout = 10% to 100%		±0.2	±0.5	%
Ripple & Noise (20 MHz) (Note 2)			40	50	mV P - P
Ripple & Noise (20 MHz)	Over Line, Load & Temp.			75	mV P - P
Ripple & Noise (20 MHz)				5	mV rms
Output Power Protection		120			%
Transient Recovery Time (Note 3)	50% Load Step Change			50	µSec
Transient Response Deviation				±6.0	%
Temperature Coefficient			±0.01	±0.02	%/°C
Output Short Circuit	Continuous				

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage	60 Seconds	500			VDC
Isolation Resistance	500 VDC	1,000			MΩ
Isolation Capacitance	100 kHz, 1V		100	150	pF
Switching Frequency		40	80		kHz

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-25		+71	°C
Operating Temperature Range	Case	-25		+90	°C
Storage Temperature Range		-40		+125	°C
Cooling	Free Air Convection				
Humidity	RH, Non-condensing			95	%

Physical

Case Size	1.25 x 0.80 x 0.40 Inches (31.8 x 20.3 x 10.2 mm)
Case Material	Non-Conductive Black Plastic
Weight	0.42 Oz (12g)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	600			kHours

Absolute Maximum Ratings

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Surge (1 Sec)	5 VDC Input	-0.7		7.5	VDC
	12 VDC Input	-0.7		15.0	
	24 VDC Input	-0.7		30.0	
	48 VDC Input	-0.7		55.0	
Lead Temperature	1.5 mm From Case For 10 Sec			260	°C
Internal Power Dissipation	All Models			3,000	mW

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Model Selection Guide - A300R Series

Model Number	Input					Output			Efficiency (%, Typ)	Fuse Rating Slow-Blow (mA)
	Voltage (VDC)		Current (mA)		Reflected Ripple Current (mA, Typ)	Voltage (VDC)	Current (mA, Max)	Current (mA, Min)		
	Nominal	Range	Full-Load	No-Load						
A301R	5	4.5 - 5.5	1,000	100	100	5.0	600	0.0	60	2,000
A302R	5	4.5 - 5.5	960	100	100	12.0	250	0.0	62	2,000
A303R	5	4.5 - 5.5	960	100	100	15.0	200	0.0	62	2,000
A304R	5	4.5 - 5.5	1,000	100	100	±12.0	±125	±0.0	60	2,000
A305R	5	4.5 - 5.5	1,000	100	100	±15.0	±100	±0.0	60	2,000
A311R	12	10.8 - 13.2	420	50	40	5.0	600	0.0	60	1,000
A312R	12	10.8 - 13.2	400	50	40	12.0	250	0.0	62	1,000
A313R	12	10.8 - 13.2	400	50	40	15.0	200	0.0	62	1,000
A314R	12	10.8 - 13.2	420	50	40	±12.0	±125	±0.0	60	1,000
A315R	12	10.8 - 13.2	420	50	40	±15.0	±100	±0.0	60	1,000
A321R	24	21.6 - 26.4	210	25	25	5.0	600	0.0	60	500
A322R	24	21.6 - 26.4	195	25	25	12.0	250	0.0	64	500
A323R	24	21.6 - 26.4	195	25	25	15.0	200	0.0	64	500
A324R	24	21.6 - 26.4	210	25	25	±12.0	±125	±0.0	60	500
A325R	24	21.6 - 26.4	210	25	25	±15.0	±100	±0.0	60	500
A331R	48	43.2 - 52.8	105	15	10	5.0	600	0.0	60	200
A332R	48	43.2 - 52.8	100	15	10	12.0	250	0.0	62	200
A333R	48	43.2 - 52.8	100	15	10	15.0	200	0.0	62	200
A334R	48	43.2 - 52.8	105	15	10	±12.0	±125	±0.0	60	200
A335R	48	43.2 - 52.8	105	15	10	±15.0	±100	±0.0	60	200

Notes:

1. Exceeding the absolute maximum ratings of the unit could cause damage. These are not continuous operating ratings.

2. When measuring output ripple, it is recommended that an external 0.33 µF ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units.

3. Transient recovery is measured to within a 1% error band for a load step change of 50% to 100%.

4. Operation at no-load will not damage these units. However, they may not meet all specifications.

5. Dual output units may be connected to provide a 24 VDC or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.

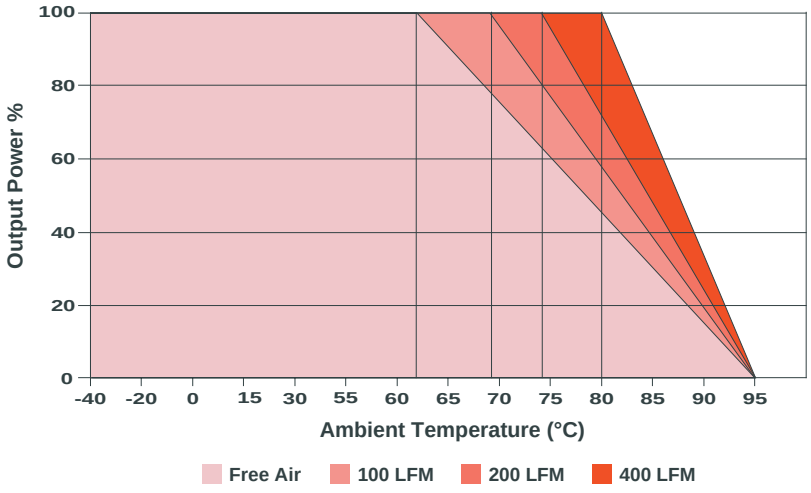
6. The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter.

   In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up.

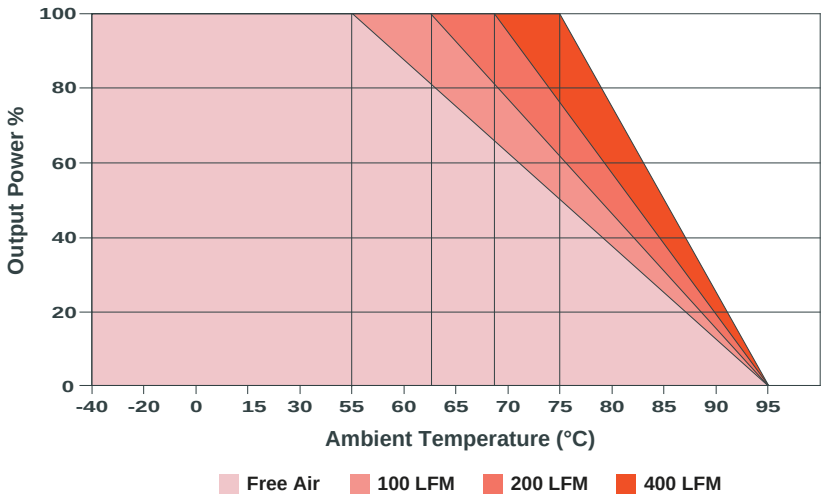
   In this case, it is recommended that a low Equivalent Series Resistance (ESR <1.0Ω at 100 kHz) capacitor be mounted close to the converter. For 5VDC input units, a 2.2 µF capacitor should be used; for 12 VDC input units a 1.0 µF; and for 24 and 48 VDC input units a 0.47 µF.

7. It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

Derating Curves - Single Output Models



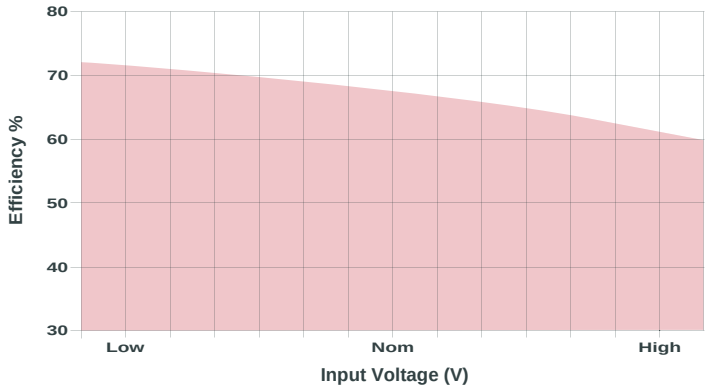
Derating Curves - Dual Output Models



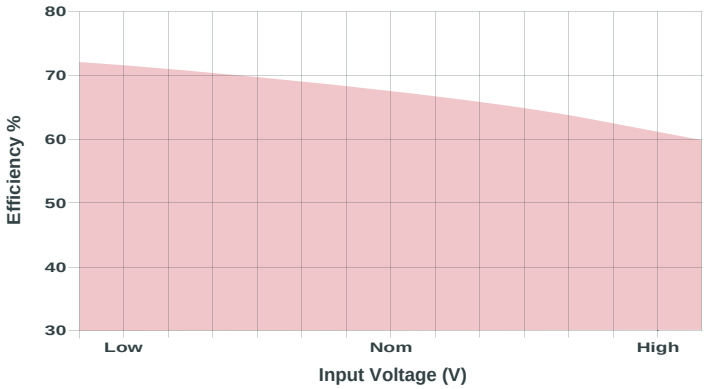
A300R Series

3W, Low Cost, Miniature DC/DC Converters

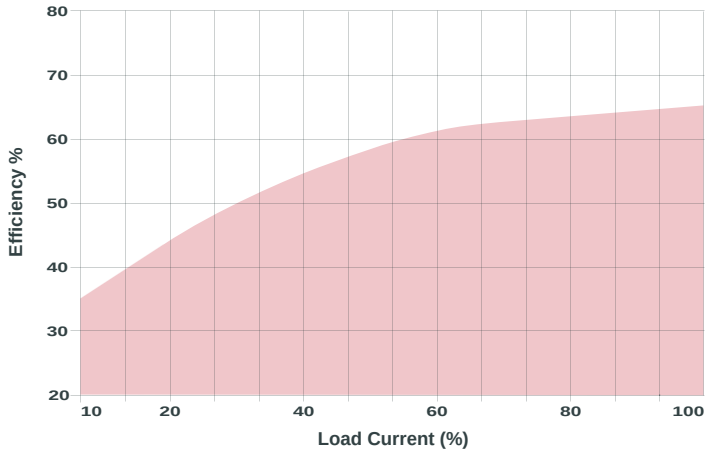
Efficiency vs Input Voltage (Single Output Models)



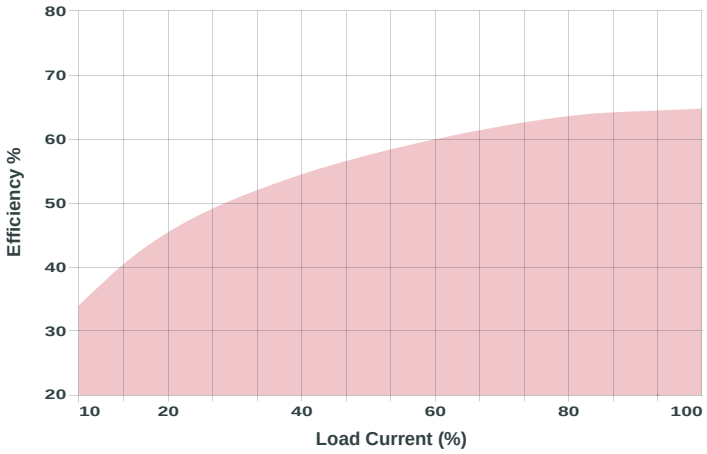
Efficiency vs Input Voltage (Dual Output Models)



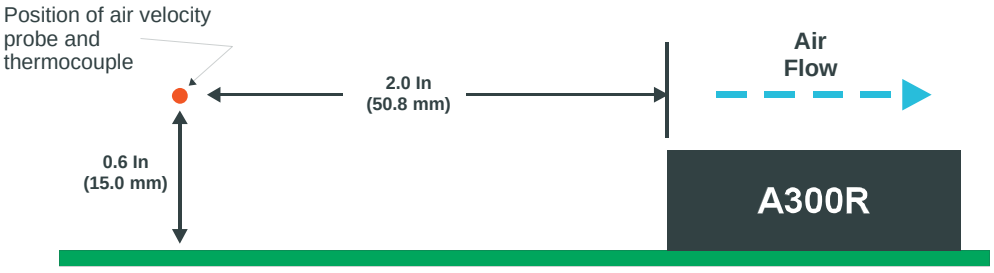
Efficiency vs Output Load (Single Output Models)



Efficiency vs Output Load (Dual Output Models)



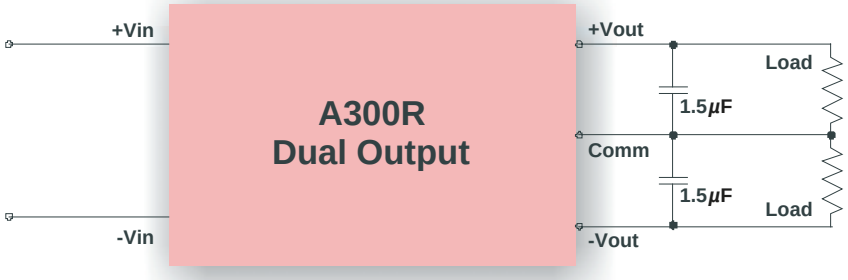
Thermal Measurement



A number of factors affect the thermal performance of the converter, including mounting orientation, component spacing, airflow over the unit, etc. To avoid exceeding the maximum rated temperature of internal components, the case temperature of the converter must be kept below 90°C.

The derating curves given in this datasheet have been derived using a converter operating at full load and nominal input. Temperature measurements have been made as shown above.

Output Noise



When using this series in a noise sensitive application, it is recommended that an external capacitor be connected as shown in the drawing at left.

For the **A300R**, a low ESR 1.5 μF capacitor connected as close as possible to the load is recommended.

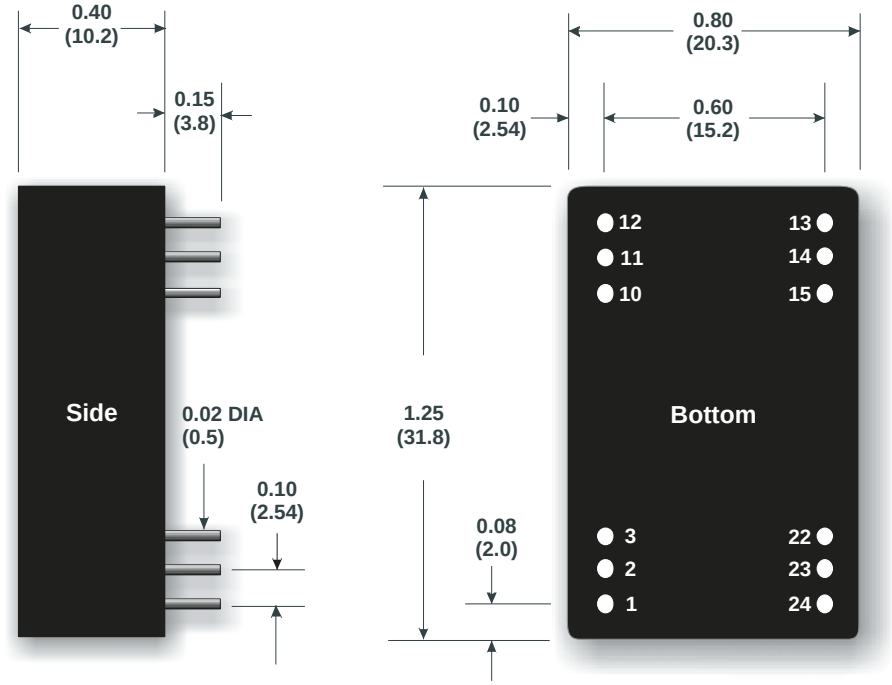
Capacitive Load

Models (Vout)	5V	12V	15V	±12V	±15V	Units
Max. Capacitive Load	470	470	470	±220	±220	μF

Having excessive capacitive load in a power supply application may cause start up problems. If the specified capacitive load is exceeded, the converter may go into current limit on start-up.

Notes:
1. For dual output units, capacitive load is specified for each output.

Mechanical Dimensions



Pin Connections

Pin	Single	Dual
1, 24	+Vin	+Vin
2, 23	NC	-Vout
3, 22	NC	Common
10, 15	-Vout	Common
11, 14	+Vout	+Vout
12, 13	-Vin	-Vin

Notes:
- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.01 (±0.25)
- Pin 1 is marked by a “dot” or indentation on the top of the unit
- NC = No Connection
- Leads are tin plated for improved solderability.

Flammability

The **A300R** converter is encapsulated in a low thermal resistance molding compound that has excellent resistance/electrical characteristics over a wide temperature range or in high humidity environments.

The encapsulant and unit case are both rated to UL 94V-0 flammability specifications.