

## SEMICONDUCTOR CIRCUITS

### Low Profile, Industry Standard Regulated DC/DC Converters

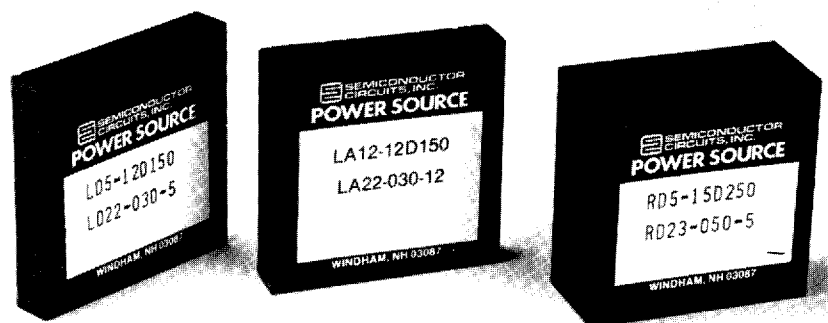
**LD,LA,  
RD,RA**

- LOW PROFILE CASES, ONLY 0.375" HIGH (LD, LA SERIES)
- HIGH PERFORMANCE INPUT FILTER
- OVERCURRENT-PROTECTED OUTPUTS

The LD, LA and RD, RA Series are economy priced, high performance DC/DC converters designed for all but the most demanding analog and digital applications. The LD and LA Series models feature low profile packaging for 0.5 inch on-center card file applications. The RD and RA Series models deliver greater output power from within a slightly higher profile case. Both families feature efficiency to 65%, a Pi input filter for minimum input reflected ripple as well as line transient protection and input spike attenuation. The series features a switching front end and series pass regulation on the outputs resulting in a high degree of efficiency and tight output regulation. All outputs are overcurrent protected.

The LD, LA and RD, RA Series have MTBF's greater than 150,000 hours. They are packaged in very low profile cases (to 0.375") for on board use in tight spaces and deliver full power to +71°C. The series offers dual output tracking necessary for providing supply voltages to op amps and are ideally suited for RAM boards and  $\mu$ P boards. Nominal input voltages are 5, 12, 24 and 48 Vdc.

Two industry standard pin configurations are available for ease of multiple sourcing.



#### Application Notes

A Pi input filter and low noise outputs make the LD, LA, RD, RA Series well suited for analog and digital communications applications. The overcurrent-protected outputs are capable of driving sensitive analog circuits while supplying the correct current for small  $\mu$ P,  $\mu$ C or memory systems. The low profile LA and LD (0.375" case height) is specifically designed for use in 0.5" card spacing.

#### General Specifications

##### Input Reflected Ripple

<1%  $E_{in}$  (max)

##### Output Voltage Tolerance

$\pm 1\%$  (Fixed)

##### Regulation (Line/Load)

5V Out Models: 0.05/0.1%  
ALL OTHER MODELS: 0.05/0.05%

##### Ripple and Noise

1mV RMS (max); 30mV p-p (typ)

##### Operating Temperature Range

-25°C to +71°C  
Above 60°C derate:  
V in 0.5%/°C \*  
P out 1%/°C \*

##### Storage Temperature Range

-40°C to +85°C

##### Efficiency

50-65% (at nominal line, full load)

##### I/O Isolation

Voltage: 300 Vdc  
Resistance: 100 Megohms

##### Oscillator Frequency Range

6-20 kHz

##### Temperature Coefficient

0.02%/°C (typical)

##### Dual Output Tracking

1mV/mV (typical)

##### Overcurrent Protection

Current Limiting

\*In order to improve reliability and maintain a nearly constant case temperature from 60°C to 70°C it is recommended that  $V_{in}$  and  $P_{out}$  be derated as indicated.



**SEMICONDUCTOR  
CIRCUITS, INC.**

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**LD,LA  
RD,RA**

**Ordering Information**

Input Voltage Range (Vdc)	Output Voltage (Vdc)	Output Current (Vdc)	Pkg. (Fig.)	New Model Number	Old Model Number		
4.5- 5.5	5V	1000	1-C	<b>RD11-100-5</b>	RD5-5S1000		
			2-C	<b>RA11-100-5</b>	RA5-5S1000		
10.8-13.2			1-C	<b>RD11-100-12</b>	RD12-5S1000		
			2-C	<b>RA11-100-12</b>	RA12-5S1000		
21.6-26.4	5V	1000	1-C	<b>RD11-100-24</b>	RD24-5S1000		
			2-C	<b>RA11-100-24</b>	RA24-5S1000		
42.0-56.0			1-C	<b>RD11-100-48</b>	RD48-5S1000		
			2-C	<b>RA11-100-48</b>	RA48-5S1000		
4.5- 5.5 10.8-13.2 21.6-26.4	12V	300	1-B	<b>LD12-030-5</b>	LD5-12S300		
			1-B	<b>LD12-030-12</b>	LD12-12S300		
			1-B	<b>LD12-030-24</b>	LD24-12S300		
4.5- 5.5 10.8-13.2 21.6-26.4 42.0-56.0	12V	500	1-C	<b>RD12-050-5</b>	RD5-12S500		
			1-C	<b>RD12-050-12</b>	RD12-12S500		
			1-C	<b>RD12-050-24</b>	RD24-12S500		
			1-C	<b>RD12-050-48</b>	RD48-12S500		
4.5- 5.5	±12V	±150	1-B	<b>LD22-030-5</b>	LD5-12D150		
			2-B	<b>LA22-030-5</b>	LA5-12D150		
10.8-13.2			1-B	<b>LD22-030-12</b>	LD12-12D150		
			2-B	<b>LA22-030-12</b>	LA12-12D150		
21.6-26.4			1-B	<b>LD22-030-24</b>	LD24-12D150		
			2-B	<b>LA22-030-24</b>	LA24-12D150		
4.5- 5.5		±12V	±250	1-C	<b>RD22-050-5</b>	RD5-12D250	
				2-C	<b>RA22-050-5</b>	RA5-12D250	
10.8-13.2				1-C	<b>RD22-050-12</b>	RD12-12D250	
				2-C	<b>RA22-050-12</b>	RA12-12D250	
21.6-26.4				1-C	<b>RD22-050-24</b>	RD24-12D250	
				2-C	<b>RA22-050-24</b>	RA24-12D250	
42.0-56.0	±12V	±250	1-C	<b>RD22-050-48</b>	RD48-12D250		
			2-C	<b>RA22-050-48</b>	RA48-12D250		
4.5- 5.5			±15V	±150	1-B	<b>LD23-030-5</b>	LD5-15D150
					2-B	<b>LA23-030-5</b>	LA5-15D150
10.8-13.2					1-B	<b>LD23-030-12</b>	LD12-15D150
				2-B	<b>LA23-030-12</b>	LA12-15D150	
21.6-26.4	±15V	±150		1-B	<b>LD23-030-24</b>	LD24-15D150	
				2-B	<b>LA23-030-24</b>	LA24-15D150	
4.5- 5.5	±15V	±250	1-C	<b>RD23-050-5</b>	RD5-15D250		
			2-C	<b>RA23-050-5</b>	RA5-15D250		
10.8-13.2			1-C	<b>RD23-050-12</b>	RD12-15D250		
			2-C	<b>RA23-050-12</b>	RA12-15D250		
21.6-26.4			1-C	<b>RD23-050-24</b>	RD24-15D250		
			2-C	<b>RA23-050-24</b>	RA24-15D250		
42.0-56.0	±15V	±250	1-C	<b>RD23-050-48</b>	RD48-15D250		
			2-C	<b>RA23-050-48</b>	RA48-15D250		

\*Other versions available, please consult factory.  
Socket Information: Fig 1, RD, LD use socket P/N #100038  
For socket dimensional information refer to page 23

**Dimensions and Connections**

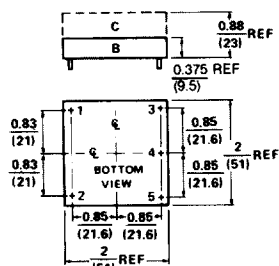


Fig. 1

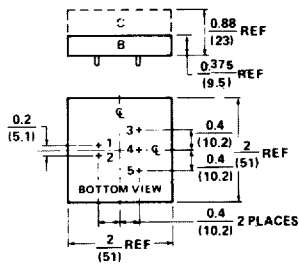


Fig. 2

**Connections**

**Single Outputs**

- PIN 1 +Vdc in
- 2 -Vdc in
- 3 +Vdc out
- 4 Do Not Connect
- 5 -Vdc out

**Dual Outputs**

- PIN 1 +Vdc in
- 2 -Vdc in
- 3 +Vdc out
- 4 Common out
- 5 -Vdc out

**Notes:**

- 1. Five Pins 0.040 (1.0) Dia x 0.2 (5.1) Lg Min
- 2. All Dimensions are in Inches and (mm)

Specifications Subject to Change Without Notice.

