FEATURES

- Low Cost
- 100% Burn-in
- RoHS Approved
- Regulated Outputs
- 40mVp-p Ripple & Noise
- Industry Standard Pinout
- Low Reflected Ripple Current
- Two levels of Isolation Available
- Over Load and Short Circuit Protection
- 3KVDC Isolation Option Available ("H" Suffix)

DESCRIPTION

Offering alternate combinations from four different input voltage ranges, eight different output voltages, two levels of isolation, and three tiers of power, the L AN C series of dc/dc converters can be tailor-made to fit most any low power conversion requirement. This LAN C series is specially designed to provide 40mA output ripple, continuous short circuit protection, and up to 3 watts output power in a low-profile 24 pin DIP package. The -25°C to +71°C operating temperature range makes these converters ideal for data communication equipment, distributed power systems, telecommunication equipment, mixed analog/digital subsystems, industrial robot systems, and automatic test instrumentation. All models are 100% burned-in.

SPECIFICATIONS: *LAN C Series*

All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS	Min	Nom	Max	Unit
INPUT (V_{in})					
Input Voltage Range	5V nominal input models	4.5	5	5.5	VDC
	12V nominal input models	10.8	12	13.2	
	24V nominal input models	21.6	24	26.4	
	48V nominal input models	43.2	48	52.8	
Input Surge Voltage (1000ms)	5V nominal input models	-0.7		7.5	VDC
	12V nominal input models	-0.7		15	
	24V nominal input models	-0.7		30	
	48V nominal input models	-0.7		55	
Input Current (no load)	No load	See Rating Chart			
Input Current (rated load)	Rated load	See Rating Chart			
Input reflected ripple current		See Rating Chart			
Reverse Polarity Input Current	All models			0.5	A
Short Circuit Input Power	All models			2500	mW
Input Filter		Pi Filter			
OUTPUT (V_o)					
Output Voltage Range		See Rating Chart			
Output Voltage Accuracy			±0.2	±4.0	%
Output Voltage Balance	Dual Output, Balanced Load		±1.0	±3.0	%
Load Regulation	Io = 10% to 100%		±0.2	±0.5	%
Line Regulation	Vin = min. to max.		±0.2	±0.5	%
Output Power		See Rating Chart			
Output Current Range		See Rating Chart			
Ripple & Noise (20MHz)			40	50	mV_{pk-pk}
Ripple & Noise (20MHz)	Over Line, Over Load, and Over Temperature			75	mV_{pk-pk}
Ripple & Noise (20MHz)				5	mVrms
Transient Recovery Time	50% load step change			50	µs
Transient Response Deviation				±6	%
PROTECTION					
Over Load Protection		120			%
Short Circuit Protection		Continuous			
Input Fuse Recommendation	5V nominal input models	2000mA slow-blow type			
	12V nominal input models	1000mA slow-blow type			
	24V nominal input models	500mA slow-blow type			
	48V nominal input models	200mA slow-blow type			
GENERAL					
Efficiency		See Rating Chart			
Switching Frequency		40	80		KHz
Isolation Voltage (input to output)	Standard, 60 seconds	500			VDC
	"H" option, 60 seconds	3000			VDC
Isolation Test Voltage	Flash Test for 1 second	550			VDC
Isolation Resistance	500VDC	1000			MΩ
Isolation Capacitance	100KHz, 1V		100	150	pF
Internal Power Dissipation				3000	mW
Max. Capacitive Load		See Rating Chart			
ENVIRONMENTAL					
Operating Temperature (Ambient)		-25		+71	°C
Operating Temperature (Case)		-25		+90	°C
Storage Temperature		-40		+125	°C
Lead Temperature	1.5mm from case for 10 seconds			260	°C
Humidity				95	%
Cooling		Free air convection			
Temperature Coefficient			±0.01	±0.02	%/°C
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	600			Khours
PHYSICAL					
Weight		14 grams			
Dimensions (L x W x H)		1.25 x 0.8 x 0.4 inches			
Case Material		Black coated metal			
Flammability		UL94V-0			

OUTPUT VOLTAGE / CURRENT RATING CHARTS

3 WATT MODELS										
Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency (Typ)	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
LANC505R3	5 VDC (4.5 ~ 5.5 VDC)	5 VDC	0mA	600mA	100mA	1000mA	100mA	3W	60%	470µF
LANC509R3		9 VDC		300mA		-		2.7W	-	-
LANC512R3		12 VDC		250mA		960mA		3W	62%	470µF
LANC515R3		15 VDC		200mA		960mA		3W	62%	470µF
LANC505RD3		±5 VDC		±300mA		-		3W	-	-
LANC509RD3		±9 VDC		±165mA		-		3W	-	-
LANC512RD3		±12 VDC		±125mA		1000mA		3W	60%	220µF
LANC515RD3		±15 VDC		±100mA		1000mA		3W	60%	220µF
LANC1205R3	12 VDC (10.8 ~ 13.2 VDC)	5 VDC	0mA	600mA	50mA	420mA	40mA	3W	60%	470µF
LANC1209R3		9 VDC		300mA		-		2.7W	-	-
LANC1212R3		12 VDC		250mA		400mA		3W	62%	470µF
LANC1215R3		15 VDC		200mA		400mA		3W	62%	470µF
LANC1205RD3		±5 VDC		±300mA		-		3W	-	-
LANC1209RD3		±9 VDC		±165mA		-		3W	-	-
LANC1212RD3		±12 VDC		±125mA		420mA		3W	60%	220µF
LANC1215RD3		±15 VDC		±100mA		420mA		3W	60%	220µF
LANC2405R3	24 VDC (21.6 ~ 26.4 VDC)	5 VDC	0mA	600mA	25mA	210mA	25mA	3W	60%	470µF
LANC2409R3		9 VDC		300mA		-		2.7W	-	-
LANC2412R3		12 VDC		250mA		195mA		3W	64%	470µF
LANC2415R3		15 VDC		200mA		195mA		3W	64%	470µF
LANC2405RD3		±5 VDC		±300mA		-		3W	-	-
LANC2409RD3		±9 VDC		±165mA		-		3W	-	-
LANC2412RD3		±12 VDC		±125mA		210mA		3W	60%	220µF
LANC2415RD3		±15 VDC		±100mA		210mA		3W	60%	220µF
LANC4805R3	48 VDC (43.2 ~ 52.8 VDC)	5 VDC	0mA	600mA	15mA	105mA	10mA	3W	60%	470µF
LANC4809R3		9 VDC		300mA		-		2.7W	-	-
LANC4812R3		12 VDC		250mA		100mA		3W	62%	470µF
LANC4815R3		15 VDC		200mA		100mA		3W	62%	470µF
LANC4805RD3		±5 VDC		±300mA		-		3W	-	-
LANC4809RD3		±9 VDC		±165mA		-		3W	-	-
LANC4812RD3		±12 VDC		±125mA		105mA		3W	60%	220µF
LANC4815RD3		±15 VDC		±100mA		105mA		3W	60%	220µF

2 WATT MODELS										
Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Output Power	Efficiency (Typ)	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
LANC505R2	5 VDC (4.5 ~ 5.5 VDC)	5 VDC	0mA	400mA	80mA	800mA	80mA	2W	50%	470µF
LANC509R2		9 VDC		250mA		-		2.25W	-	-
LANC512R2		12 VDC		165mA		730mA		2W	54%	470µF
LANC515R2		15 VDC		133mA		690mA		2W	57%	470µF
LANC505RD2		±5 VDC		±200mA		-		2W	-	-
LANC509RD2		±9 VDC		±110mA		-		2W	-	-
LANC512RD2		±12 VDC		±83mA		740mA		2W	53%	220µF
LANC515RD2		±15 VDC		±66mA		770mA		2W	51%	220µF
LANC1205R2	12 VDC (10.8 ~ 13.2 VDC)	5 VDC	0mA	400mA	40mA	330mA	30mA	2W	50%	470µF
LANC1209R2		9 VDC		250mA		-		2.25W	-	-
LANC1212R2		12 VDC		165mA		295mA		2W	56%	470µF
LANC1215R2		15 VDC		133mA		265mA		2W	62%	470µF
LANC1205RD2		±5 VDC		±200mA		-		2W	-	-
LANC1209RD2		±9 VDC		±110mA		-		2W	-	-
LANC1212RD2		±12 VDC		±83mA		280mA		2W	59%	220µF
LANC1215RD2		±15 VDC		±66mA		280mA		2W	59%	220µF
LANC2405R2	24 VDC (21.6 ~ 26.4 VDC)	5 VDC	0mA	400mA	20mA	163mA	15mA	2W	51%	470µF
LANC2409R2		9 VDC		250mA		-		2.25W	-	-
LANC2412R2		12 VDC		165mA		135mA		2W	61%	470µF
LANC2415R2		15 VDC		133mA		135mA		2W	61%	470µF
LANC2405RD2		±5 VDC		±200mA		-		2W	-	-
LANC2409RD2		±9 VDC		±110mA		-		2W	-	-
LANC2412RD2		±12 VDC		±83mA		135mA		2W	61%	220µF
LANC2415RD2		±15 VDC		±66mA		135mA		2W	61%	220µF
LANC4805R2	48 VDC (43.2 ~ 52.8 VDC)	5 VDC	0mA	400mA	-	-	-	2W	-	-
LANC4809R2		9 VDC		250mA	-	-	-	2.25W	-	-
LANC4812R2		12 VDC		165mA	-	-	-	2W	-	-
LANC4815R2		15 VDC		133mA	-	-	-	2W	-	-
LANC4805RD2		±5 VDC		±200mA	-	-	-	2W	-	-
LANC4809RD2		±9 VDC		±110mA	-	-	-	2W	-	-
LANC4812RD2		±12 VDC		±83mA	-	-	-	2W	-	-
LANC4815RD2		±15 VDC		±66mA	-	-	-	2W	-	-

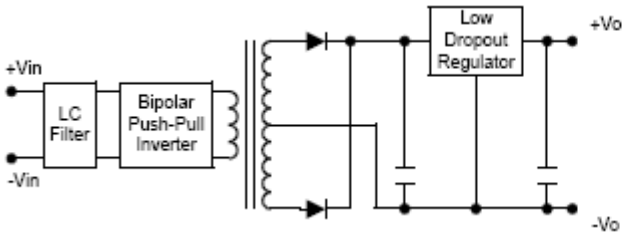
1.5 WATT MODELS				
Model Number	**Input Voltage**	**Output Voltage**	**Output Current**	**Output Power**
LANC505R	5 VDC (4.5 ~ 5.5 VDC)	5 VDC	300mA	1.5W
LANC509R		9 VDC	170mA	1.5W
LANC512R		12 VDC	125mA	1.5W
LANC515R		15 VDC	100mA	1.5W
LANC505RD		±5 VDC	±150mA	1.5W
LANC509RD		±9 VDC	±90mA	1.62W
LANC512RD		±12 VDC	±60mA	1.44W
LANC515RD		±15 VDC	±50mA	1.5W
LANC1205R	12 VDC (10.8 ~ 13.2 VDC)	5 VDC	300mA	1.5W
LANC1209R		9 VDC	170mA	1.5W
LANC1212R		12 VDC	125mA	1.5W
LANC1215R		15 VDC	100mA	1.5W
LANC1205RD		±5 VDC	±150mA	1.5W
LANC1209RD		±9 VDC	±90mA	1.62W
LANC1212RD		±12 VDC	±60mA	1.44W
LANC1215RD		±15 VDC	±50mA	1.5W
LANC2405R	24 VDC (21.6 ~ 26.4 VDC)	5 VDC	300mA	1.5W
LANC2409R		9 VDC	170mA	1.5W
LANC2412R		12 VDC	125mA	1.5W
LANC2415R		15 VDC	100mA	1.5W
LANC2405RD		±5 VDC	±150mA	1.5W
LANC2409RD		±9 VDC	±90mA	1.62W
LANC2412RD		±12 VDC	±60mA	1.44W
LANC2415RD		±15 VDC	±50mA	1.5W
LANC4805R	48 VDC (43.2 ~ 52.8 VDC)	5 VDC	300mA	1.5W
LANC4809R		9 VDC	170mA	1.5W
LANC4812R		12 VDC	125mA	1.5W
LANC4815R		15 VDC	100mA	1.5W
LANC4805RD		±5 VDC	±150mA	1.5W
LANC4809RD		±9 VDC	±90mA	1.62W
LANC4812RD		±12 VDC	±60mA	1.44W
LANC4815RD		±15 VDC	±50mA	1.5W

NOTES

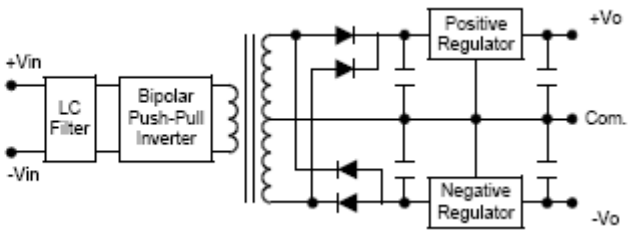
1. For 3000VDC I/O isolation add the suffix “H” to the part number.
2. Transient recovery time is measured to within 1% error band for a step change in output load of 50% to 100%.
3. All DC/DC converters should be externally fused at the front end for protection.
4. Other input and output voltages may be available, please contact factory.

BLOCK DIAGRAMS

Single Output

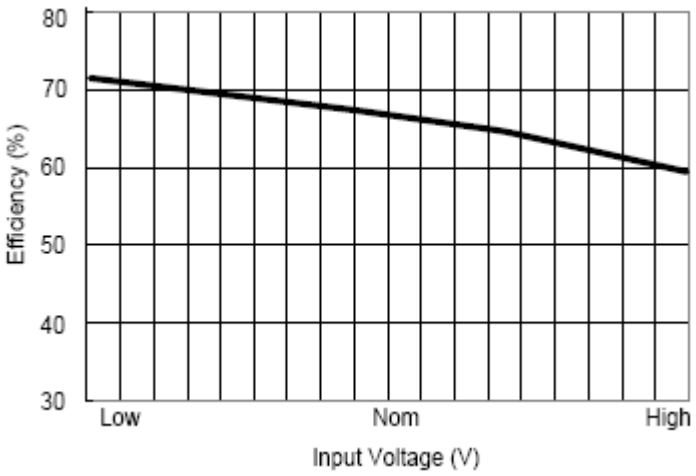


Dual Output

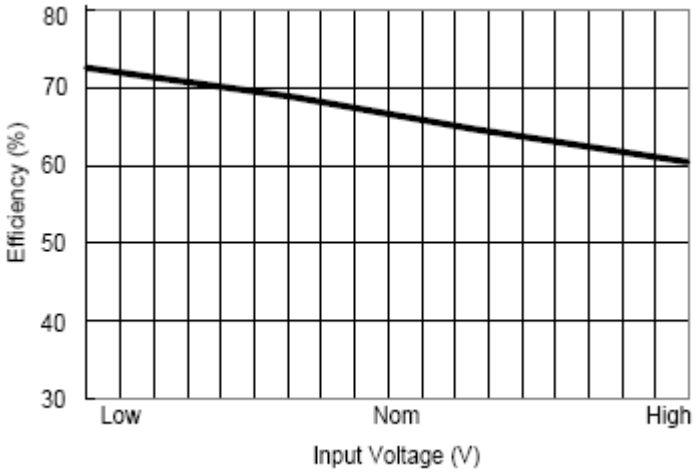


DERATING CURVES & EFFICIENCY GRAPHS

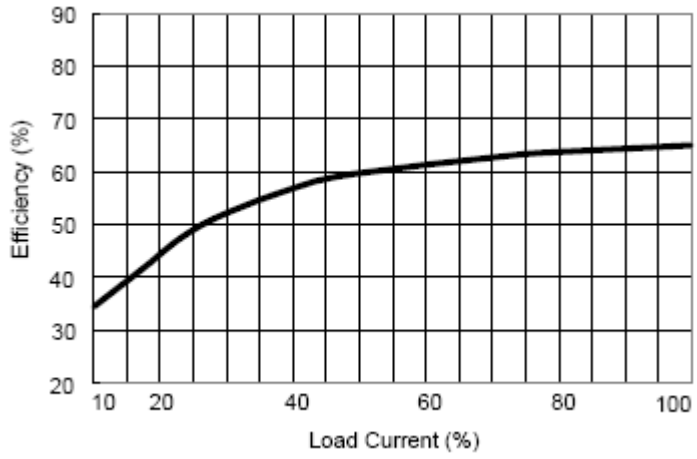
Efficiency vs Input Voltage (Single Output)



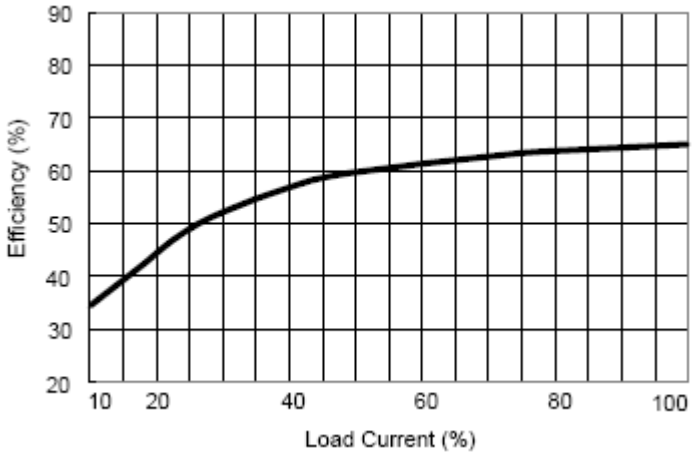
Efficiency vs Input Voltage (Dual Output)



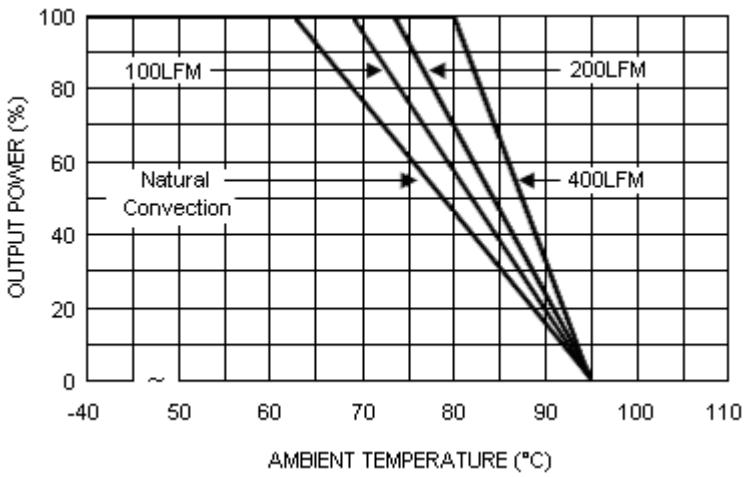
Efficiency vs Output Load (Single Output)



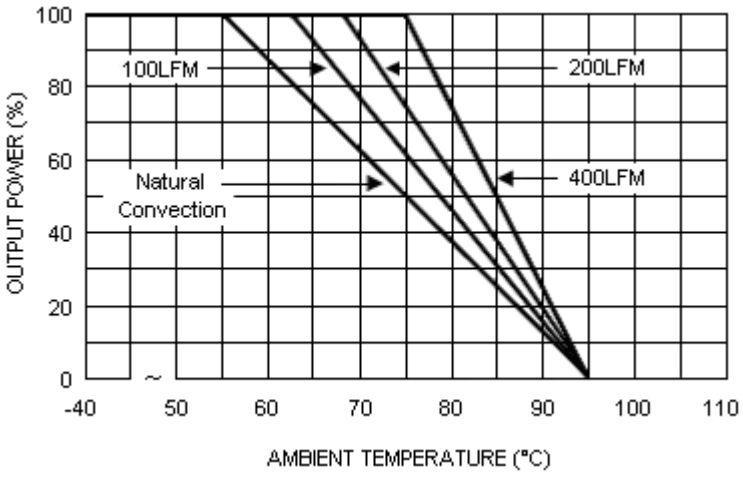
Efficiency vs Output Load (Dual Output)



Derating Curve without Heatsink

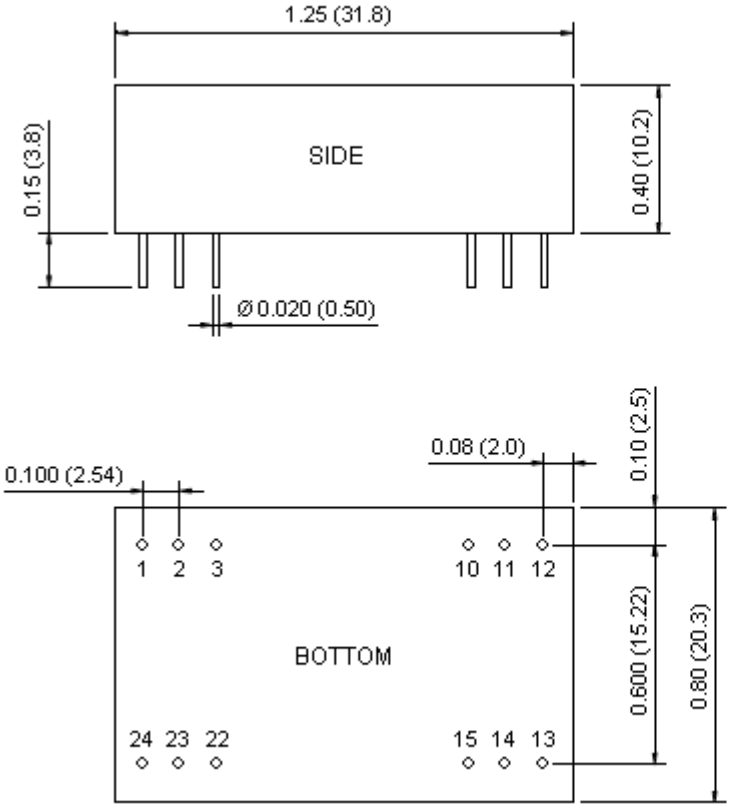


Derating Curve with Heatsink



MECHANICAL DRAWINGS

Unit: inches (mm)

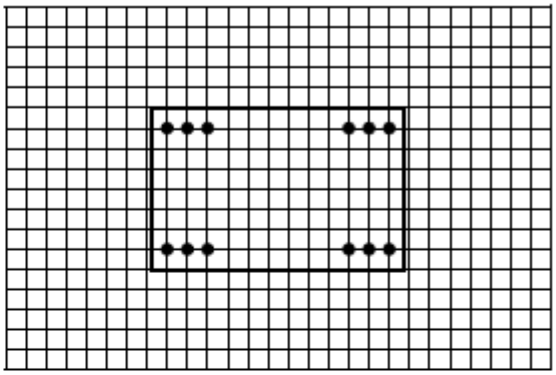


1. Tolerance: X.X±0.25 [X.XX±0.01]
   X.XX±0.25 [X.XXX±0.01]
2. Pin: ±0.05 [±0.002]

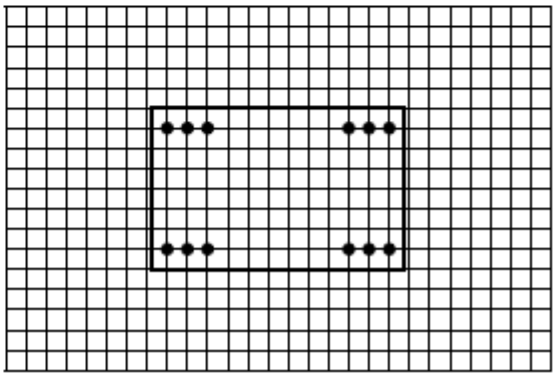
Connecting Pin Patterns

(Top View (2.54mm / 0.1 inch grids)

Single Output



Dual Output



PIN CONNECTIONS (500VDC I/O Isolation)		
PIN	**SINGLE OUTPUT**	**DUAL OUTPUT**
1	+Vin	+Vin
2	NC	-Vout
3	NC	Common
10	-Vout	Common
11	+Vout	+Vout
12	-Vin	-Vin
13	-Vin	-Vin
14	+Vout	+Vout
15	-Vout	Common
22	NC	Common
23	NC	-Vout
24	+Vin	+Vin

NC: No Connection

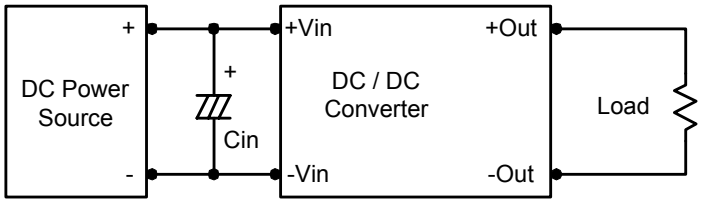
PIN CONNECTIONS (3000VDC I/O Isolation)		
PIN	**SINGLE OUTPUT**	**DUAL OUTPUT**
1	+Vin	+Vin
2	+Vin	+Vin
3	No Pin	No Pins
10	NC	Common
11	NC	Common
12	-Vout	NC
13	+Vout	-Vout
14	NC	NC
15	NC	+Vout
22	No Pin	No Pins
23	-Vin	-Vin
24	-Vin	-Vin

NC: No Connection

DESIGN & FEATURE CONSIDERATONS

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. A capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100KHz) capacitor of a 2.2μF for the 5V input models, a 1.0μF for the 12V input models, and a 0.47μF for the 24V and 48V input models.



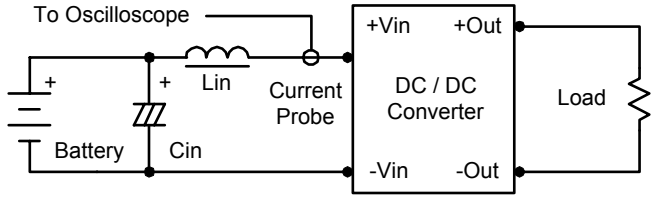
Maximum Capacitive Load

The LAN C Series has a limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. For optimum performance we recommend 220μF maximum capacitive load for dual output models and 470μF capacitive load for single output models. The maximum capacitance can be found in the Output Voltage / Current Rating Chart.

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin (4.7μH) and Cin (220μF, ESR < 1.0Ω at 100KHz) to simulate source impedance.



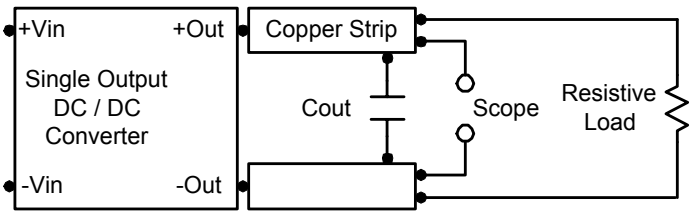
Capacitor Cin offsets possible battery impedance.

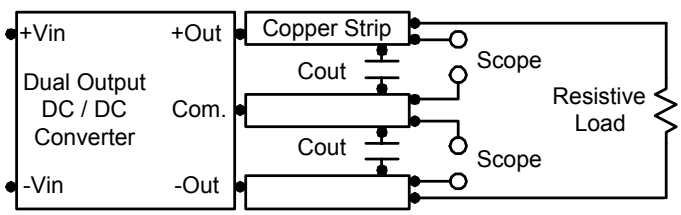
Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0 ~ 500KHz.

Peak-to-Peak Output Noise Measurement Test

Use a Cout 0.33μF ceramic capacitor.

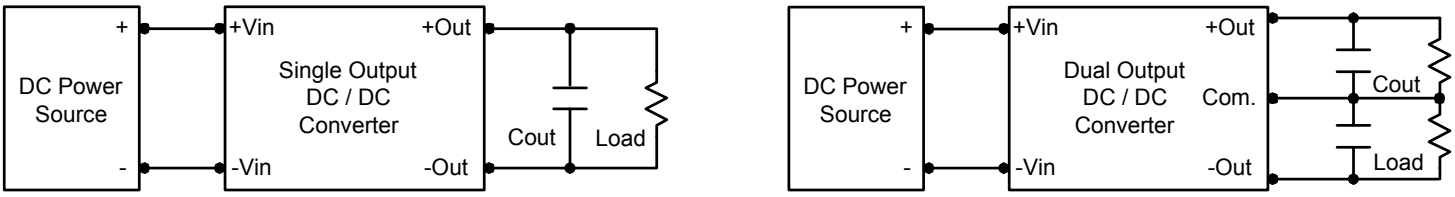
Scope measurement should be made by using a BNC socket; measurement bandwidth is 0 ~ 20MHz. Position the load between 50mm and 75mm from the DC/DC Converter.





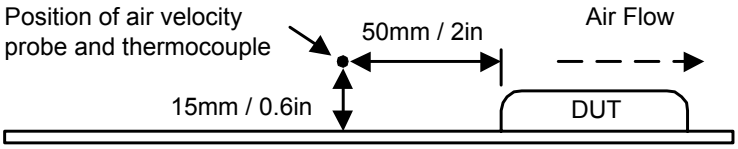
Output Ripple Reduction

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 1.5µF capacitors at the output.



Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 85°C. The derating curves are determined from measurements obtained in an experimental apparatus.



COMPANY INFORMATION:

Wall Industries, Inc. has created custom and modified units for over 40 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on time and on budget. Our ISO9001-2000 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.

Contact **Wall Industries** for further information:

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