

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 LAN 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 | I _o = 10% to 100% | ±0.2 | ±0.5 | | % |
| Line Regulation | V _{in} = 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 | mV _{rms} |
| 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 | 500 | | | VDC |
| | "H" option | 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 | | | Hours |
| 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 |

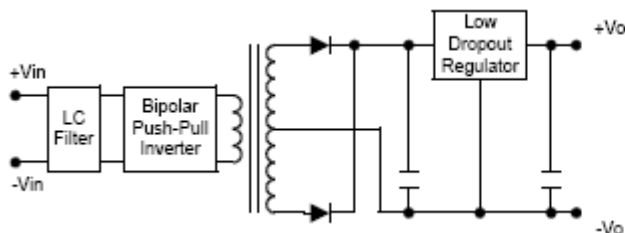
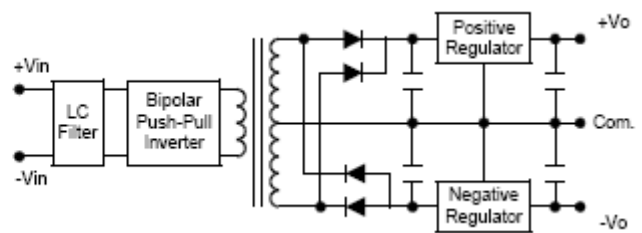
| 2 WATT MODELS | | | | | | | | | | |
|---------------|-----------------------------|----------------|----------------|--------|---------------|----------|--------------------------|--------------|------------------|-------------------------|
| Model Number | Input Voltage | Output Voltage | Output Current | | 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 |

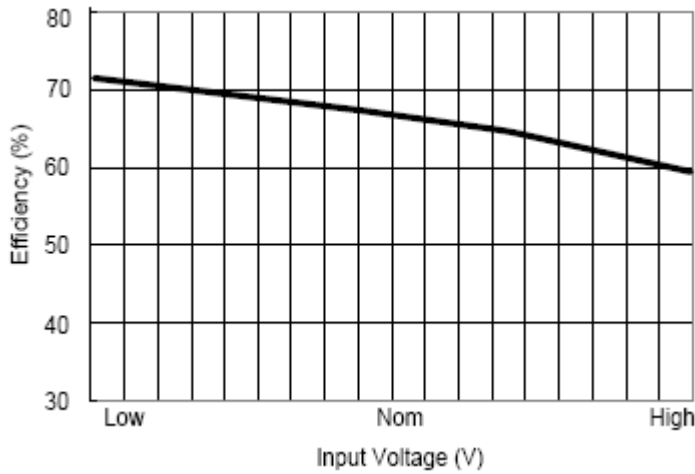
NOTES

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

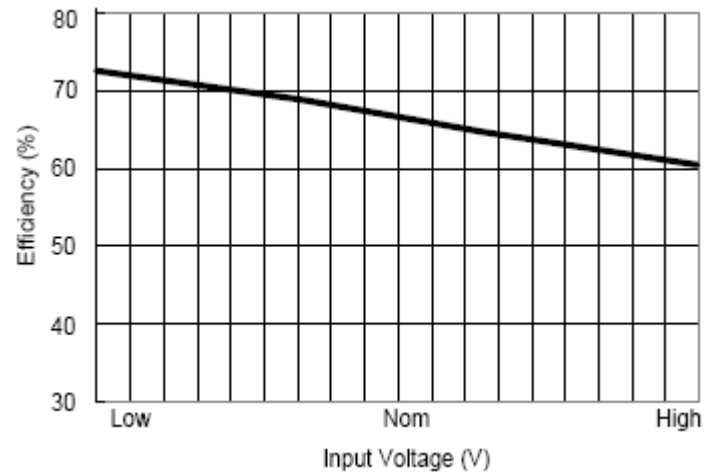
BLOCK DIAGRAMS
Single Output

Dual Output


DERATING CURVES & EFFICIENCY GRAPHS

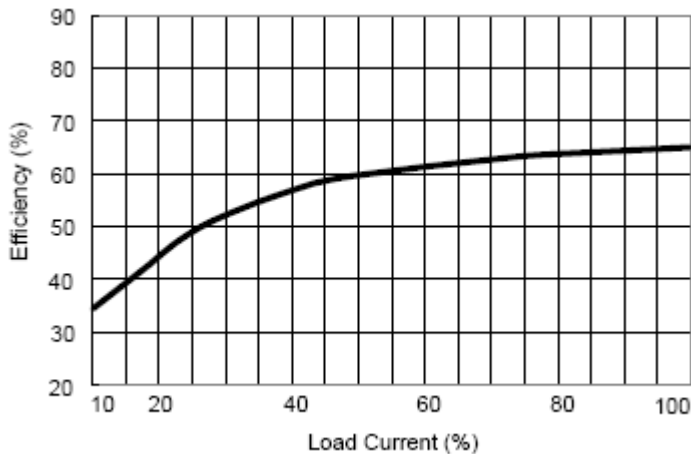
Efficiency vs Input Voltage (Single Output)



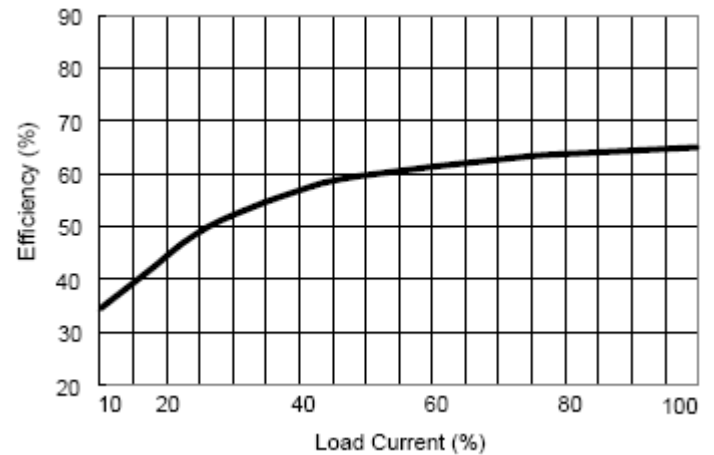
Efficiency vs Input Voltage (Dual Output)



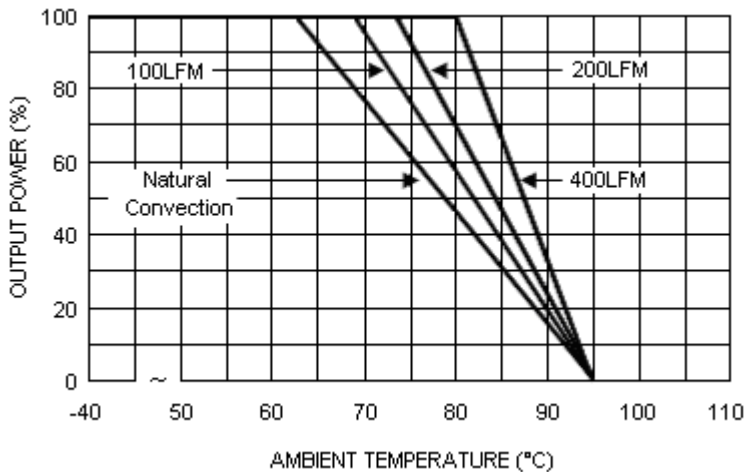
Efficiency vs Output Load (Single Output)



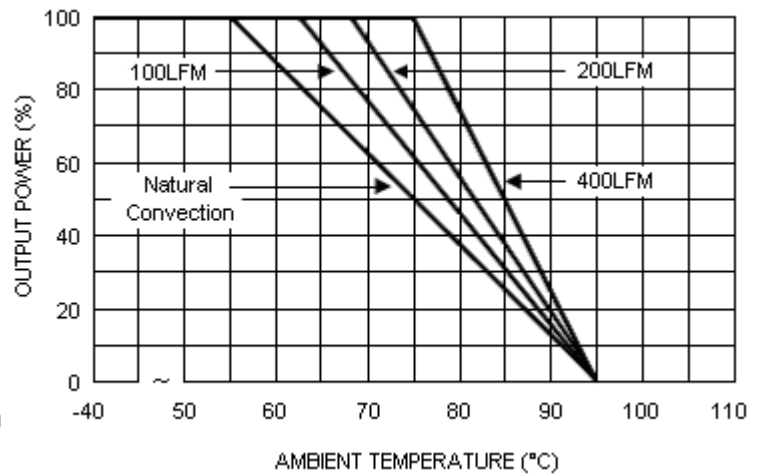
Efficiency vs Output Load (Dual Output)



Derating Curve without Heatsink

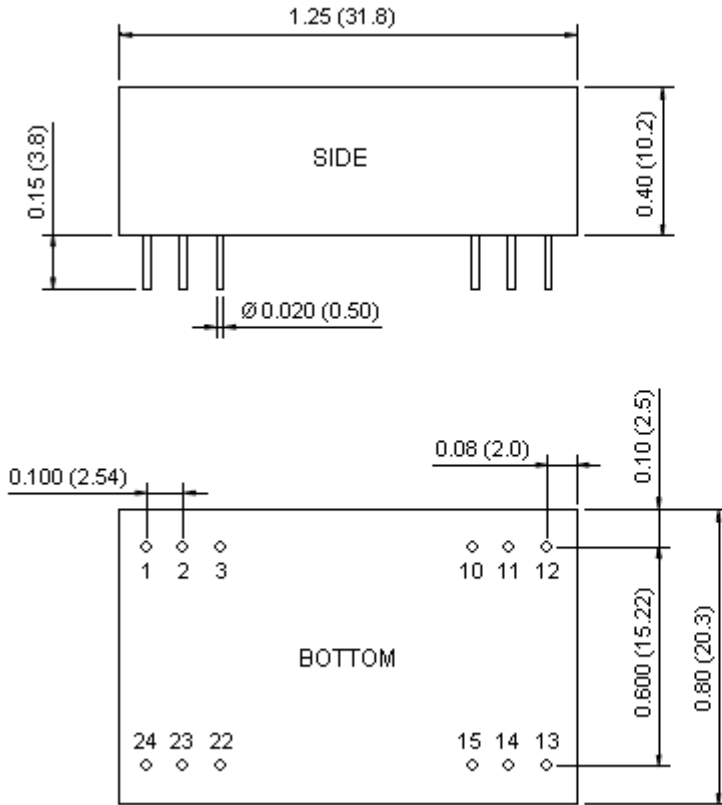


Derating Curve with Heatsink



MECHANICAL DRAWINGS

Unit: inches (mm)

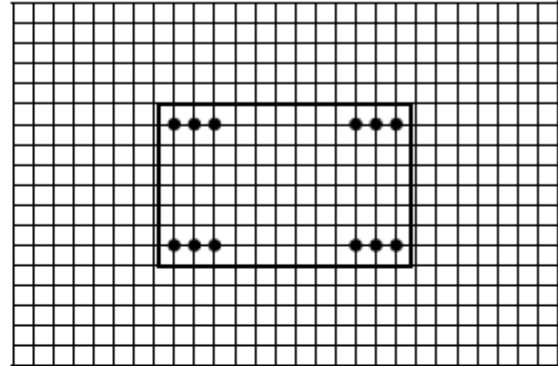


- Tolerance: X.X±0.25 [X.XX±0.01]
X.XX±0.25 [X.XXX±0.01]
- Pin: ±0.05 [±0.002]

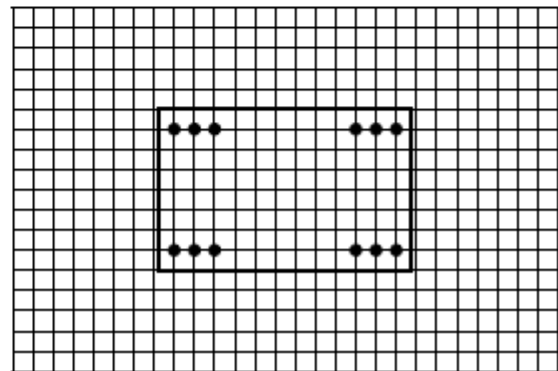
Connecting Pin Patterns

(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

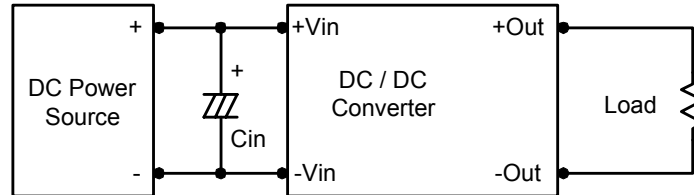
| PIN CONNECTIONS (3000VDC I/O Isolation) | | |
|---|---------------|-------------|
| PIN | SINGLE OUTPUT | DUAL OUTPUT |
| 1 | +Vin | +Vin |
| 2 | +Vin | +Vin |
| 3 | No Pin | No Pins |
| 10 | NC | Common |
| 11 | NC | Common |
| 12 | -Vout | NC |
| 13 | +Vout | -Vout |
| 14 | NC | NC |
| 15 | NC |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

NC: No Connection

DESIGN & FEATURE CONSIDERATIONS

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.



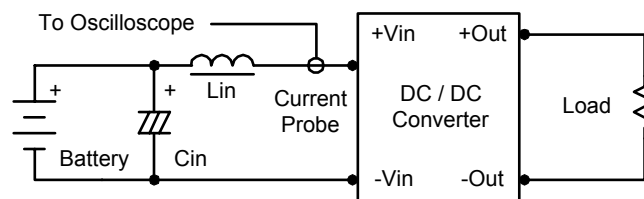
Maximum Capacitive Load

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.



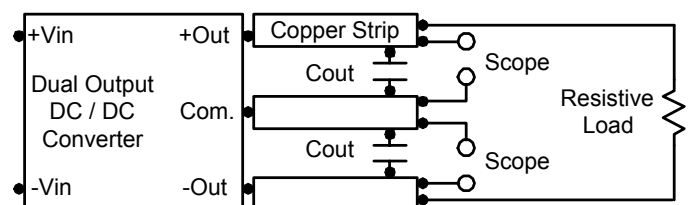
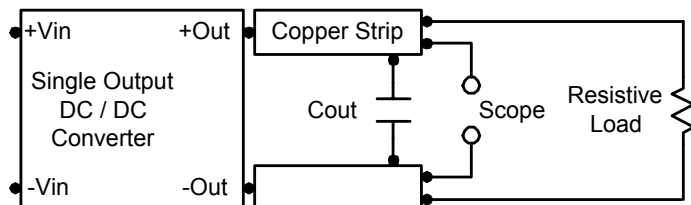
Capacitor Cin offsets possible battery impedance.

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

Peak-to-Peak Output Noise Measurement Test

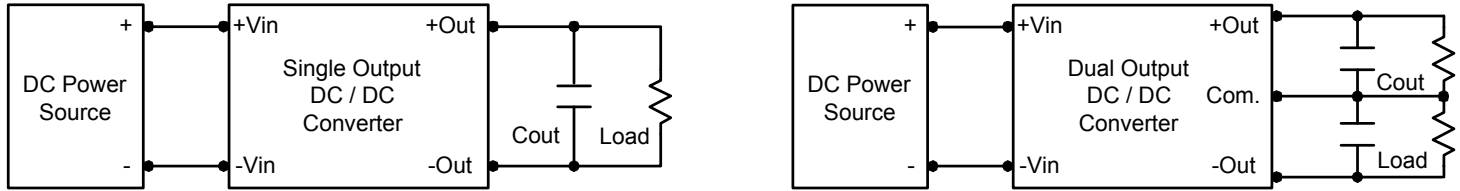
Use a Cout 0.33μF ceramic capacitor.

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.



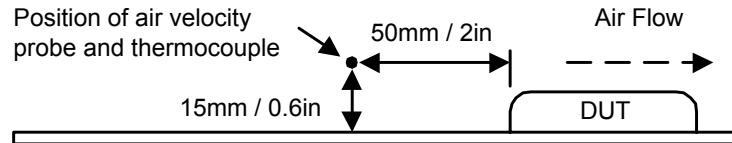
Output Ripple Reduction

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 1.5 μ F 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.

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