


UL 60950-1 CB Scheme RoHS Compliant

Size: 1.25in x 0.80in x 0.40in (31.8mm x 20.3mm x 10.2mm)

## OPTIONS

- Input Voltage
- Output Voltage
- Single or Dual

## FEATURES

- Low cost
- RoHS Compliant
- 15000VDC Isolation
- Efficiency up to 84%
- MTBF > 1,000,000 Hours
- Industry Standard Pin-out
- Internal SMT Construction
- UL 94V-0 Package Material
- UL60950-1 Safety Approval
- Single and Dual Regulated Outputs
- Operating Temperature: -25ºC~+71ºC
- 2:1 and 4:1 Wide Input Voltages Ranges

## APPLICATIONS

- Data Communication Equipment
- Mobile Battery Driven Systems
- Distributed Power Systems
- Telecommunication Equipment
- Mixed Analog/Digital Subsystems
- Process/Machine Control Equipment
- Computer Peripheral Systems
- Industrial Robot Systems

## DESCRIPTION

LAN K series of DC/DC converters provide 2~4 watts of continuous output power in a low profile DIP package. These converters operate over 2:1 input voltage ranges of 4.5~9VDC, 9-18VDC, 18-36VDC, and 36-75VDC and 4:1 input voltage ranges of 9-36VDC and 18-75VDC. This series also has standard single output voltages of 3.3, 5, 12, 15VDC and dual output voltages of ±5, ±12, and ±15VDC. Some features include continuous short circuit protection, 1500VDC I/O isolation, -25°C~+71°C operating temperature, and built-in filtering for input and output. The LAN K series is an excellent selection for a variety of applications some of which include data communication equipment, mobile battery driven systems, distributed power systems, telecommunication equipment, mixed analog/digital subsystems, process/machine control equipment, computer peripheral systems, and industrial robot systems.

**MODEL SELECTION TABLE**

**2:1 Input Models**

| Model Number | Input Voltage Range | Output Voltage | Output Current | Output Power |
|---|---|---|---|---|
| LANK53.3W2 | 5VDC (4.5~9VDC) | 3.3 VDC | 600mA | 2W |
| LANK505W3 | | 5 VDC | 500mA | 2.5W |
| LANK512W3 | | 12 VDC | 250mA | 3W |
| LANK515W3 | | 15 VDC | 200mA | 3W |
| LANK505DW3 | | ±5 VDC | ±250mA | 2.5W |
| LANK512DW3 | | ±12 VDC | ±125mA | 3W |
| LANK515DW3 | | ±15 VDC | ±100mA | 3W |
| LANK123.3W2 | 12VDC (9~18VDC) | 3.3 VDC | 600mA | 2W |
| LANK1205W3 | | 5 VDC | 500mA | 2.5W |
| LANK1212W3 | | 12 VDC | 250mA | 3W |
| LANK1215W3 | | 15 VDC | 200mA | 3W |
| LANK1205DW3 | | ±5 VDC | ±250mA | 2.5W |
| LANK1212DW3 | | ±12 VDC | ±125mA | 3W |
| LANK1215DW3 | | ±15 VDC | ±100mA | 3W |
| LANK243.3W2 | 24VDC (18~36VDC) | 3.3 VDC | 600mA | 2W |
| LANK2405W3 | | 5 VDC | 500mA | 2.5W |
| LANK2412W3 | | 12 VDC | 250mA | 3W |
| LANK2415W3 | | 15 VDC | 200mA | 3W |
| LANK2405DW3 | | ±5 VDC | ±250mA | 2.5W |
| LANK2412DW3 | | ±12 VDC | ±125mA | 3W |
| LANK2415DW3 | | ±15 VDC | ±100mA | 3W |
| LANK483.3W2 | 48VDC (18~75VDC) | 3.3 VDC | 600mA | 2W |
| LANK4805W3 | | 5 VDC | 500mA | 2.5W |
| LANK4812W3 | | 12 VDC | 250mA | 3W |
| LANK4815W3 | | 15 VDC | 200mA | 3W |
| LANK4805DW3 | | ±5 VDC | ±250mA | 2.5W |
| LANK4812DW3 | | ±12 VDC | ±125mA | 3W |
| LANK4815DW3 | | ±15 VDC | ±100mA | 3W |

## MODEL SELECTION TABLE

### 4:1 Input Models

| Model Number | Input Voltage Range | Output Voltage | Output Current | Output Power |
|---|---|---|---|---|
| LANK243.3UW3 | 24VDC (9~36VDC) | 3.3 VDC | 900mA | 3W |
| LANK2405UW3 | | 5 VDC | 660mA | 3W |
| LANK2412UW4 | | 12 VDC | 333mA | 4W |
| LANK2415UW4 | | 15 VDC | 267mA | 4W |
| LANK2405DUW3 | | ±5 VDC | ±300mA | 3W |
| LANK2412DUW4 | | ±12 VDC | ±167mA | 4W |
| LANK2415DUW4 | | ±15 VDC | ±133mA | 4W |
| LANK483.3UW3 | 48VDC (18~75VDC) | 3.3 VDC | 900mA | 3W |
| LANK4805UW3 | | 5 VDC | 660mA | 3W |
| LANK4812UW4 | | 12 VDC | 333mA | 4W |
| LANK4815UW4 | | 15 VDC | 267mA | 4W |
| LANK4805DUW3 | | ±5 VDC | ±300mA | 3W |
| LANK4812DUW4 | | ±12 VDC | ±167mA | 4W |
| LANK4815DUW4 | | ±15 VDC | ±133mA | 4W |

## SPECIFICATIONS

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 | Typ | Max | Unit |
|---|---|---|---|---|---|
| **INPUT SPECIFICATIONS** | | | | | |
| Input Voltage Range (2:1 Input Models) | 5V input models | 4.5 | 5 | 9 | VDC |
| | 12V input models | 9 | 12 | 18 | |
| | 24V input models | 18 | 24 | 36 | |
| | 48V input models | 36 | 48 | 75 | |
| Input Voltage Range (4:1 Input Models) | 24V input models | 9 | 24 | 36 | VDC |
| | 48V input models | 18 | 48 | 75 | |
| Input Filter | | Pi Filter | | | |
| **OUTPUT SPECIFICATIONS** | | | | | |
| Output Voltage | | See Table | | | |
| Output Voltage Balance | | | ±0.5 | ±2.0 | % |
| Output Voltage Accuracy | Dual Output, Balanced Loads | | ±0.5 | ±1.0 | % |
| Line Regulation | Vin=Min. to Max. | | ±0.2 | ±0.5 | % |
| Load Regulation | Io=10% to 100% | | ±0.2 | ±0.5 | % |
| Output Power | | See Table | | | |
| Output Current | | See Table | | | |
| Ripple & Noise (20MHz bandwidth) | | | 1% | | $mV_{pk-pk}$ |
| Transient Recover Time | 50% load step change | | 300 | 500 | µS |
| Transient Response Deviation | 5% load step change | | ±3 | ±5 | % |
| Temperature Coefficient | | | ±0.01 | ±0.02 | %/ºC |
| **PROTECTION** | | | | | |
| Over Power Protection | | 120 | | | % |
| Short Circuit Protection | | Continuous | | | |
| **ENVIRONMENTAL SPECIFICATIONS** | | | | | |
| Operating Ambient Temperature | | -25 | | +85 | ºC |
| Operating Case Temperature | | -25 | | +90 | ºC |
| Storage Temperature | | -40 | | 120 | ºC |
| Lead Temperature | 1.5mm from case for 10 seconds | | | 260 | ºC |
| Humidity | Non-Condensing | | | 95 | % RH |
| Cooling | | Free air convection | | | |
| MTBF | MIL-HDBK-217F @25ºC, Ground Benign | 1,000,000 | | | hours |

## SPECIFICATIONS

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.

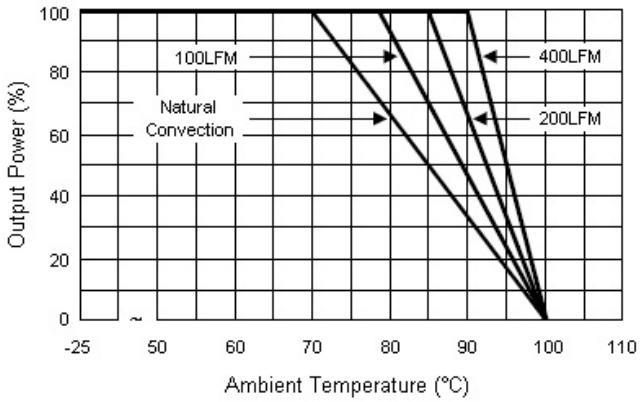
| SPECIFICATION | TEST CONDITIONS | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| GENERAL SPECIFICATIONS | | | | | |
| Efficiency | | | 80 | | % |
| Switching Frequency | | | 300 | | KHz |
| Isolation Voltage Rated | 60 seconds | 1500 | | | VDC |
| Isolation Voltage Test | Flash Tested for 1 second | 1650 | | | VDC |
| Isolation Resistance | 500VDC | 1000 | | | MΩ |
| Isolation Capacitance | 100KHz, 1V | | 65 | 100 | pF |
| Internal Power Dissipation | | | | 2500 | mW |
| PHYSICAL SPECIFICATIONS | | | | | |
| Weight | | 0.44oz (12.4g) | | | |
| Dimensions (L x W x H) | | 1.25in x 0.80in x 0.40in (31.8mm x 20.3mm x 10.2mm) | | | |
| Case Material | 2:1 Input Voltage Models | Non-Conductive Black Plastic | | | |
| | 4:1 Input Voltage Models | Metal with Non-Conductive Base | | | |
| Flammability | | UL94V-0 | | | |
| SAFETY & EMC CHARACTERISTICS | | | | | |
| Conducted Immunity | UL60950-1 | | | | |

## NOTES

(1) Transient recovery time is measured to within 1% error for a step change in output load of 50% to 100%.
(2) The LAN K series requires a 10% minimum load on the output to maintain specified regulation. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
(3) All DC/DC converters should be externally fused at the front end for protection.
(4) Due to advances in technology, specifications are subject to change without notice.

## DERATING CURVES

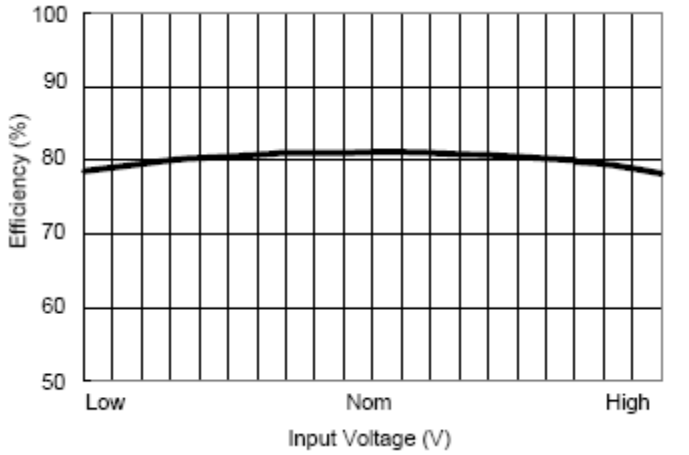
2:1 Input Voltage Range Derating Curve



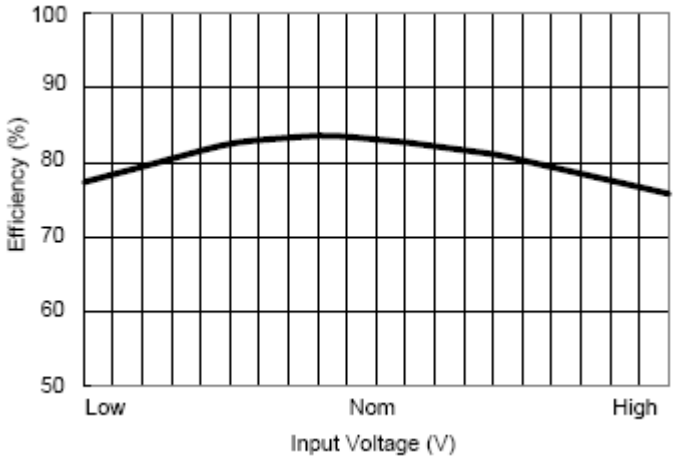
## EFFICIENCY GRAPHS

2:1 Input Voltage Range Efficiency Graphs

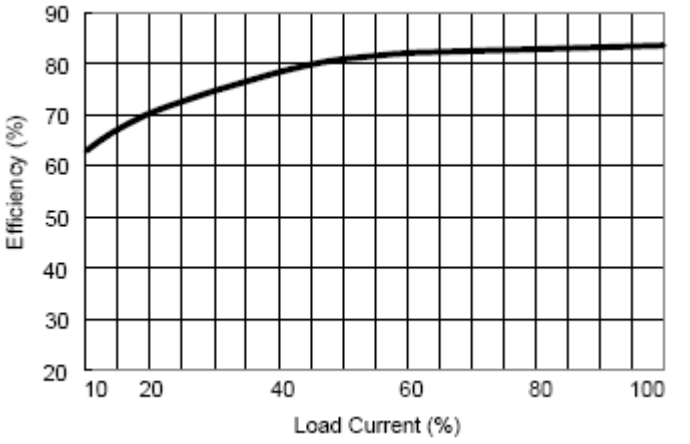
Efficiency vs Input Voltage (Single Output)



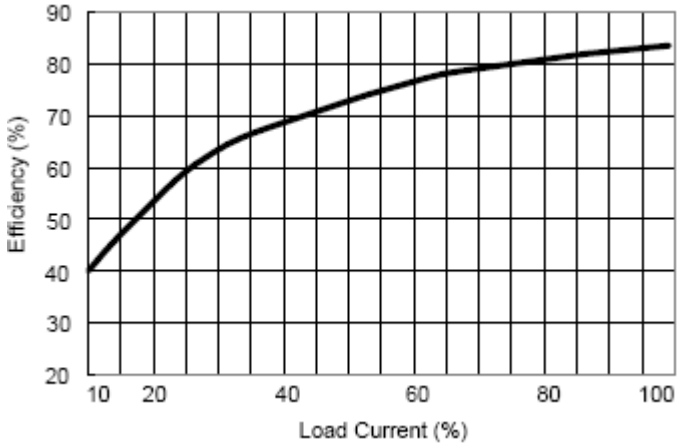

Efficiency vs Input Voltage (Dual Output)



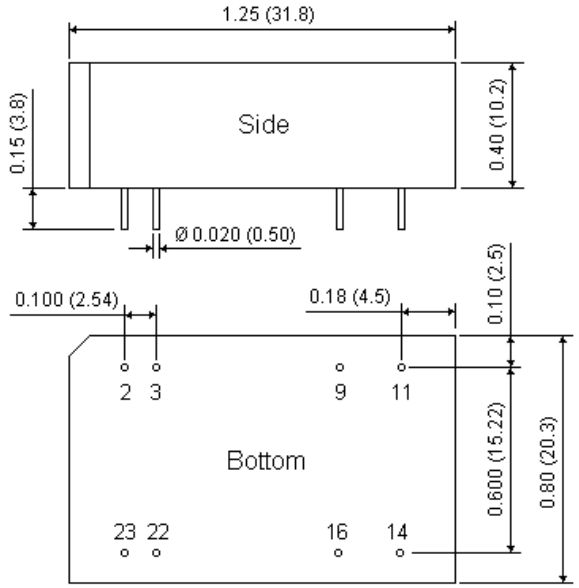

Efficiency vs Output Load (Single Output)




Efficiency vs Output Load (Dual Output)



## MECHANICAL DRAWINGS




| Pin | Single Output | Dual Output |
|---|---|---|
| 2 | -Vin | -Vin |
| 3 | -Vin | -Vin |
| 9 | No Pin | Common |
| 11 | NC | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Common |
| 22 | +Vin | +Vin |
| 23 | +Vin | +Vin |

1. Tolerance: X.XX±0.01 (X.X±0.25)
   X.XXX±0.005 (X.XX±0.13)
2. Pin Tolerance: ±0.002 (±0.05)

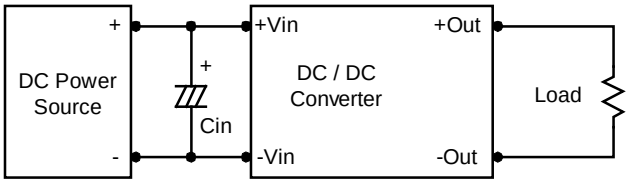
## DESIGN & FEATURE CONSIDERATIONS

### 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.

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 100 KHz) capacitor of 8.2µF for the 5V input devices, a 3.3µF for the 12V input devices, and a 1.5µF for the 24V and 48V devices.




### Maximum Capacitive Load

The LAN K 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 1000µF maximum capacitive load for dual outputs and 4000µF capacitive load for single outputs.

### Over Current Protection

To provide protection in a fault (output over load) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specific range.

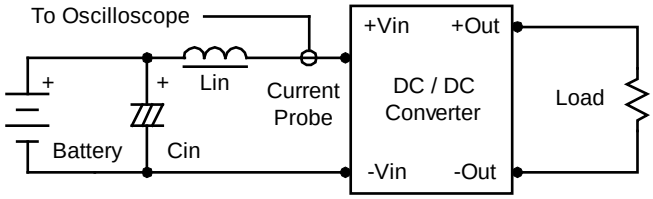
## TEST CONFIGURATIONS

### 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.

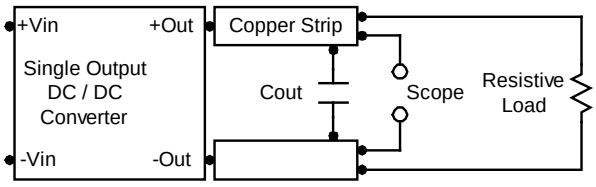
Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0-500 KHz.

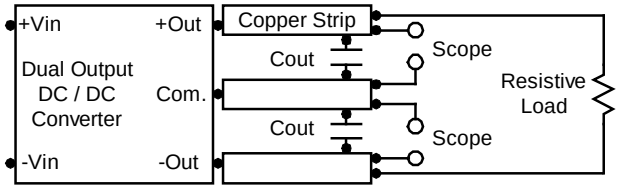



### Peak-to-Peak Output Noise Measurement Test

Use Cout 0.47µF ceramic capacitor.

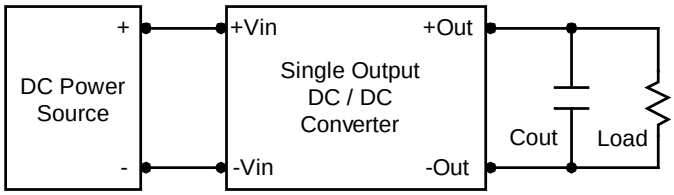
Scope measurement should be made by using BNC socket, measurement bandwidth is 0-20MHZ. Position the load between 50mm and 75mm from the Dc/DC Converter.

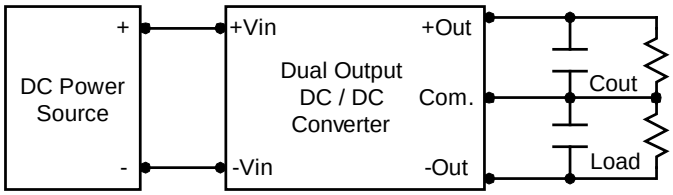



### Output Ripple Reduction

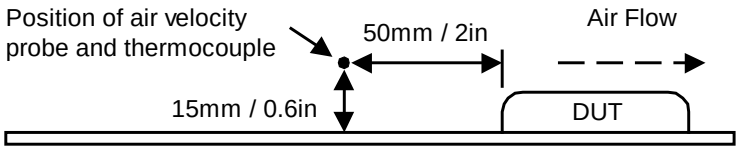
A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 3.3µF capacitors at the output.




### 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 90ºC. 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 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001-2008 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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