TECHNICAL DATASHEET

Wall Industries, Inc.

LANC4805DW12

DC/DC Converter
36-75 VDC Input
±5.0 VDC Output at ±1.2A

UL
TUV
CB
CE MARK

Features:

- **RoHS Compliant**
- **Dual Output**
- **Standard 24 Pin DIP and SMT Package**
- **Five-Sided Continuous Shield**
- **No Minimum Load Required**
- **High Power Density**
- **High Efficiency up to 88%**
- **Small Size: 1.25 x 0.8 x 0.450 Inches**
- **Input to Output Isolation (1600VDC)**
- **2:1 Wide Input Voltage Range**
- **Fixed Switching Frequency**
- **Input Under-Voltage Protection**
- **Output Over-Voltage Protection**
- **Over-Current Protection**
- **Output Short Circuit Protection**
- **Remote ON/OFF**

Applications:

- **Distributed Power Architectures**
- **Communications Equipment**
- **Computer Equipment**
- **Work Stations**

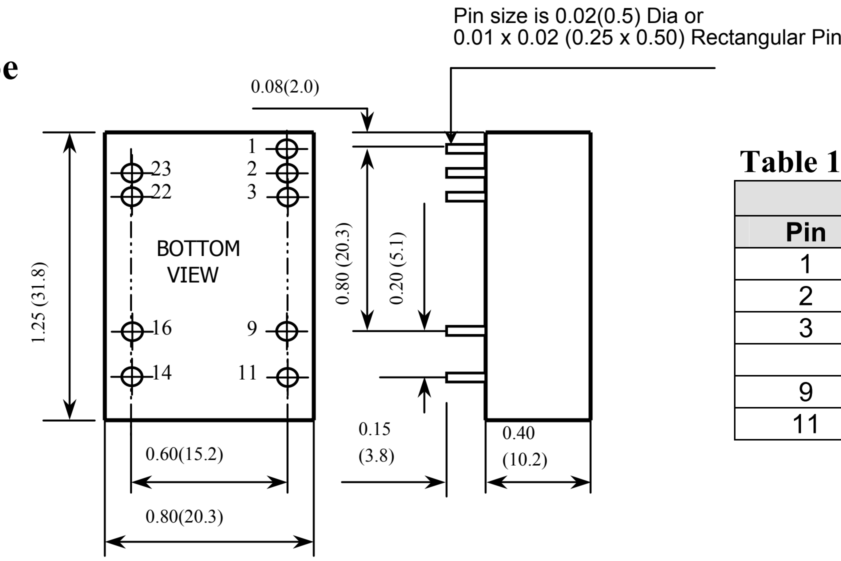
Description:

The LANCW12 dual output series offers 12 watts of output power from a package in an IC compatible 24 pin DIP and SMT configuration. LANCW12 dual output series has 2:1 wide input voltage of 9-18VDC, 18-36VDC, and 36-75VDC. The LANCW12 dual output series features 1600VDC of isolation, short circuit protection and five sided shielding. All models are particularly suited for telecommunications, industrial, mobile telecom, and test equipment applications.

Technical Specifications	Model No. LANC4805DW12				
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	**Related condition**	**Min**	**Nom**	**Max**	**Unit**
Switching Frequency	Test at nominal Vin and full load		400		kHz
INPUT (V_{in})					
Operating Voltage Range		36	48	75	Vdc
Input Voltage (Continuous)				80	Vdc
Input Voltage (Transient 100ms)				100	Vdc
UVLO Turn-on Threshold			36		Vdc
UVLO Turn-off Threshold			33		Vdc
Input Standby Current	Nominal Vin and No Load		6		mA
Input Voltage Variation	Complies with EST300 132 part 4.4			5	V/ms
Input Current	Nominal Vin and Full Load			316	mA
Reflected Ripple Current	5 to 20MHz, 12µH source impedance (See the Test Setup section - pg 8)		20		mA_{pk-pk}
EFFICIENCY	Test at nominal Vin and full load (See the Test Setup section – pg 8)		83		%
OUTPUT (V_o)					
Operating Output Range	Nominal Vin and Full Load	4.94	5.0	5.06	Vdc
Load Regulation	0% to 100% Full Load	-1.0		+1.0	%
Line Regulation	LL to HL at Full Load	-0.2		+0.2	%
Cross Regulation	Asymmetrical Load 25% / 100% of Full Load	-5.0		+5.0	%
Output Ripple & Noise	5Hz to 20MHz bandwidth (See the Test Setup section - pg 8)			85	mV_{pk-pk}
Output Current		0		±1.2	A
Output Voltage Overshoot	LL to HL at Full Load		0	3	% Vout
Over Current Protection			150		% FL
Short Circuit Protection		Continuous, automatic recovery			
DYNAMIC LOAD RESPONSE	Test at nominal Vin				
Peak Deviation	Load step change from 75 to 100% or 100 to 75 % of FL		200		mV
Setting Time (Vout < 10% peak deviation)			250		µs
REMOTE ON/OFF	The ON/OFF pin voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)				
ON/OFF pin High Voltage (Remote ON)		3.0		12	Vdc
ON/OFF pin Low Voltage (Remote OFF)		0		1.2	Vdc
ON/OFF pin Low Voltage, input current				2.5	mA
START UP TIME	Test at nominal Vin and constant resistive load				
Power Up			450		ms
Remote ON/OFF			5		ms
ISOLATION					
Isolation Voltage (Input-Output)		1600			Vdc
Isolation Voltage (Output to Case–DIP Type)		1600			Vdc
Isolation Voltage (Output to Case–SMT Type)		1000			Vdc
Isolation Voltage (Input to Case - DIP Type)		1600			Vdc
Isolation Voltage (Input to Case - SMT Type)		1000			Vdc
Isolation Resistance		1			GΩ
Isolation Capacitance				1200	pF
ENVIRONMENTAL					
Operating Ambient Temperature (w/ derating)		-40		85	°C
Operating Case Temperature				100	°C
Storage Temperature		-55		105	°C
Temperature Coefficient		-0.02		+0.02	% / °C
MTBF	See the MTBF and Reliability section (pg 13)				
Bellcore TR-NWT-000332, T_C=40°C			2,750,000		hours
MIL-STD-217F			1,080,000		hours
MECHANICAL			**See Figure 1**		
Weight			18.0		grams
Dimensions			1.25 x 0.8 x 0.450		inches

Figure 1: Mechanical Dimensions

DIP Type



1. **All dimensions are in Inches (mm)**
   Tolerance: x.xx±0.02 (x.x±0.5)
2. Pin pitch tolerance ±0.014(0.35)

Table 1

Pin Connection			
Pin	**Define**	**Pin**	**Define**
1	CTRL		
2	-Input	23	+Input
3	-Input	22	+Input
9	Common	16	Common
11	-Output	14	+Output

SMT Type

Suffix-S

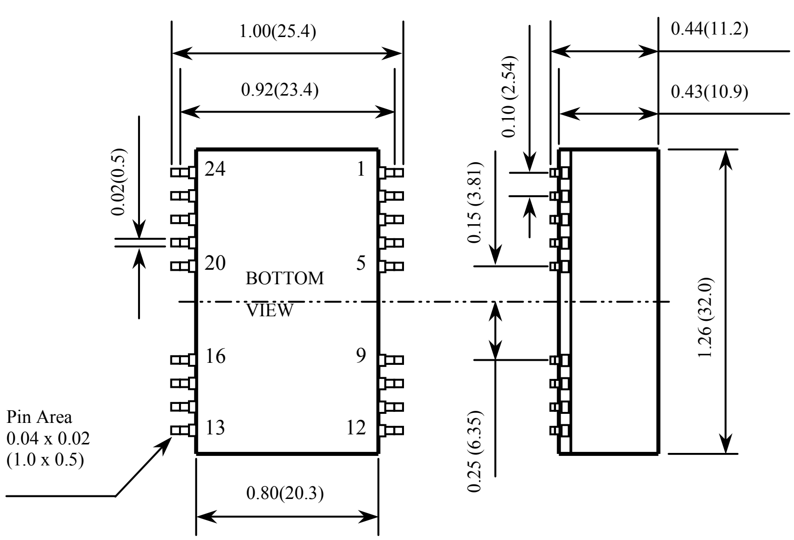


Table 2

Pin Connection			
Pin	**Define**	**Pin**	**Define**
1	CTRL		
2	-Input	23	+Input
3	-Input	22	+Input
9	Common	16	Common
11	-Output	14	+Output
Others	NC	Others	NC

1. **All dimensions in Inches (mm)**
   Tolerance: x.xx±0.02 (x.x±0.5)
2. Pin pitch tolerance ±0.014(0.35)

DESIGN CONSIDERATIONS:

Output Over Current Protection

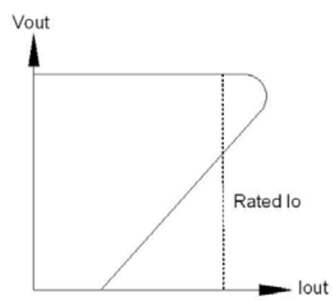
When excessive output currents occur in the system, circuit protection is required on all power supplies. Normally, overload current is maintained at approximately 150% of rated current for the LANCW12 dual output series.

Fold back-mode is a method of operation in a power supply whose purpose is to protect the power supply from being damaged during an over-current fault condition. It also enables the power supply to operate normally when the fault is removed.

One of the problems resulting from over current is that excessive heat may be generated in power devices; especially MOSFET and Schottky diodes and the temperature of those devices may exceed their specified limits. A protection mechanism has to be used to prevent those power devices from being damaged.

The operation of fold back is as follows. When the current sense circuit sees an over-current event, the output voltage of the module will be decreased for low power dissipation and decrease the heat of the module.

Figure 2



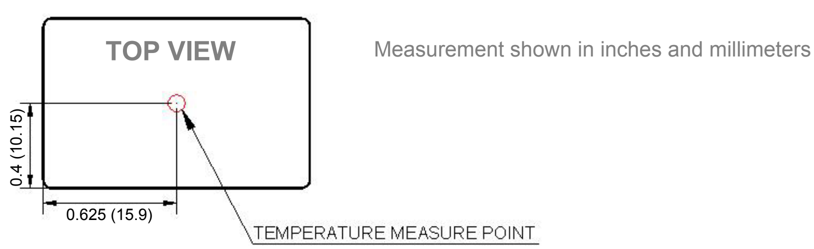
Input Source Impedance

The power module should be connected to a low impedance input source. Highly inductive source impedance can affect the stability of the power module. Input external L-C filter is recommended to minimize input reflected ripple current. The inductor is simulated source impedance of 12µH and capacitor is Nippon chemi-con KZE series 47µF/100V. The capacitor must as close as possible to the input terminals of the power module for lower impedance.

Thermal Consideration

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convention, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point as the figure below. The temperature at this location should not exceed 105°C. When operating, adequate cooling must be provided to maintain the test point temperature at or below 105°C. Although the maximum point temperature of the power modules is 105°C, you can limit this temperature to a lower value for extremely high reliability.

Figure 3

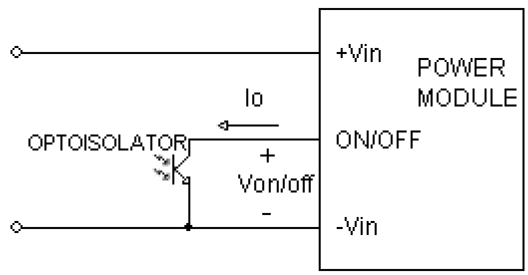


Remote ON/OFF Control
The positive logic remote ON/OFF control circuit is included.

Turns the module ON during a logic High on the On/Off pin and turns OFF during a logic Low. The On/Off pin is an open collector/drain logic input signal (Von/off) that's referenced to GND. If not using the Remote On/Off feature, please open circuit between on/off pin and –input pin to turn the module on.

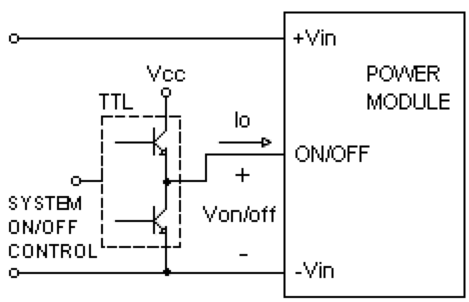
Remote ON/OFF Implementation

Figure 4



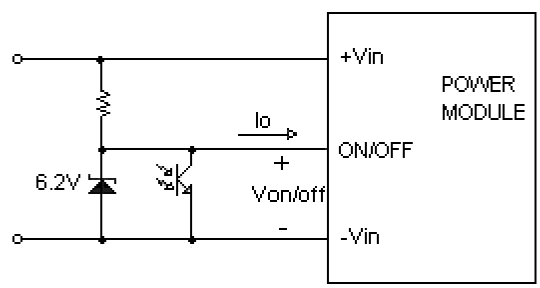
Isolated-Closure Remote ON/OFF

Figure 5



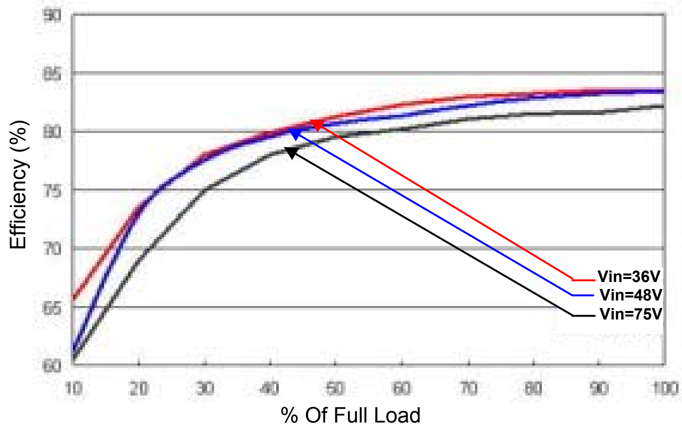
Level Control using TTL Output

Figure 6

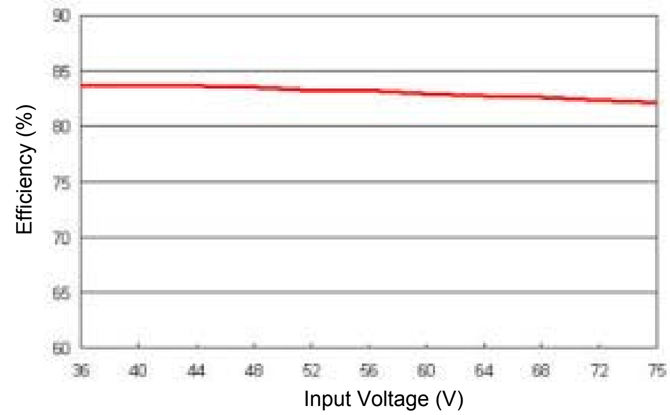


Level Control using Line Voltage

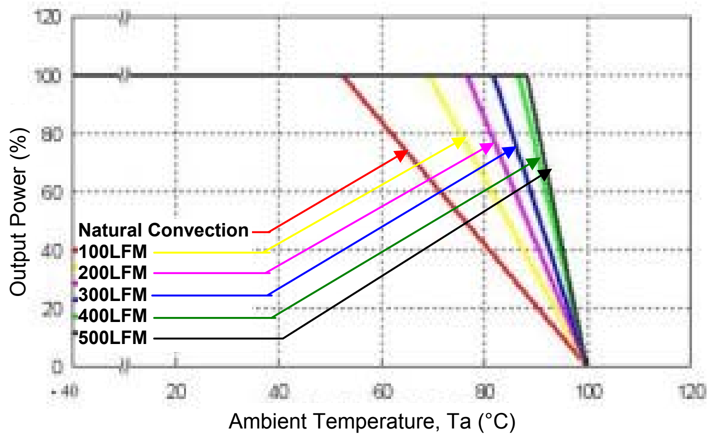
Graph 1: Efficiency vs. Output Current



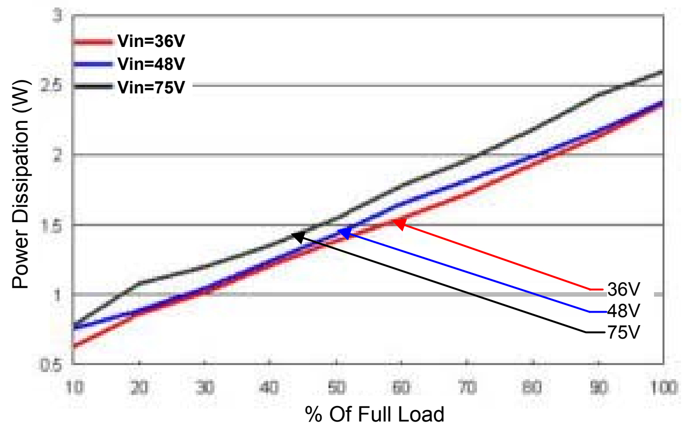
Graph 2: Efficiency vs. Input Voltage (Full Load)



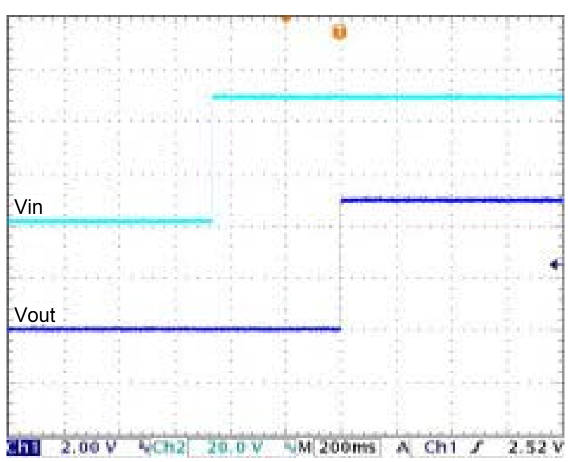
Graph 3: Output Power vs. Ambient Temperature & Airflow (Nominal Vin)



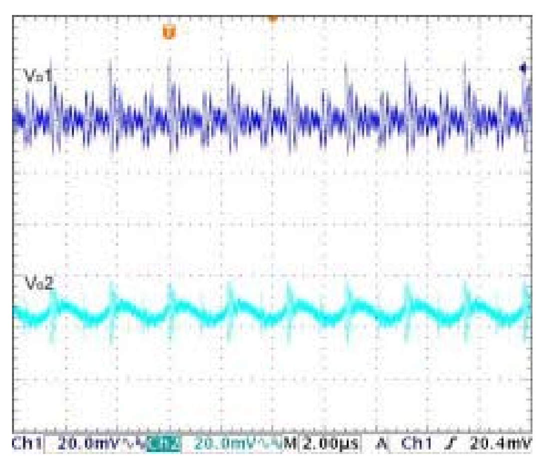
Graph 4: Power Dissipation Vs. Output Current



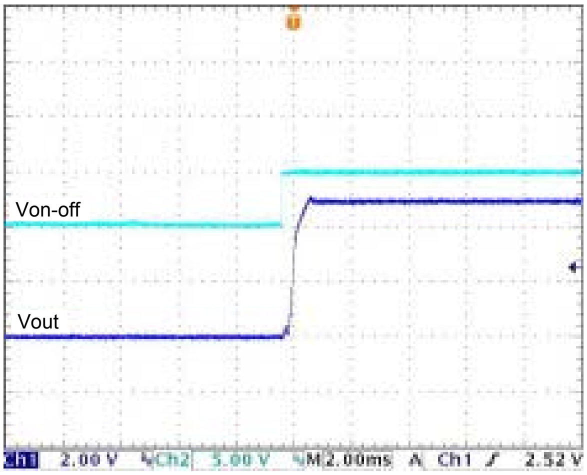
Graph 5: Typical Input Start-Up and Output Rise Characteristic (Nominal Vin and Full Load)



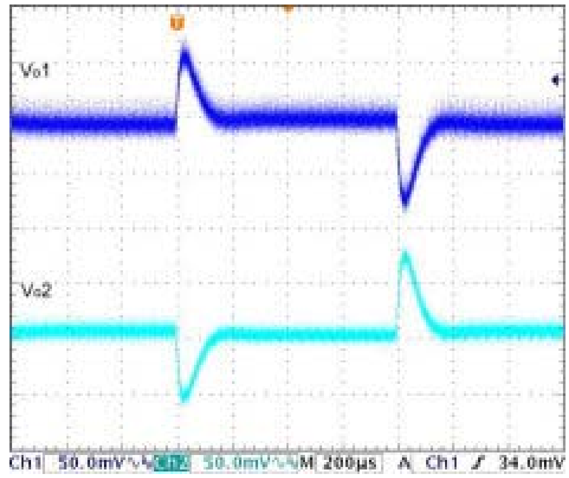
Graph 6: Typical Output Ripple and Noise (Nominal Vin and Full Load)



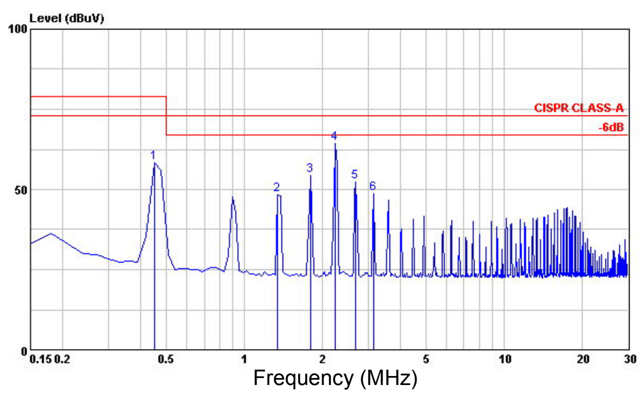
Graph 7: Using ON/OFF Voltage Start-Up and Vo Rise Characteristic (Nominal Vin and Full Load)



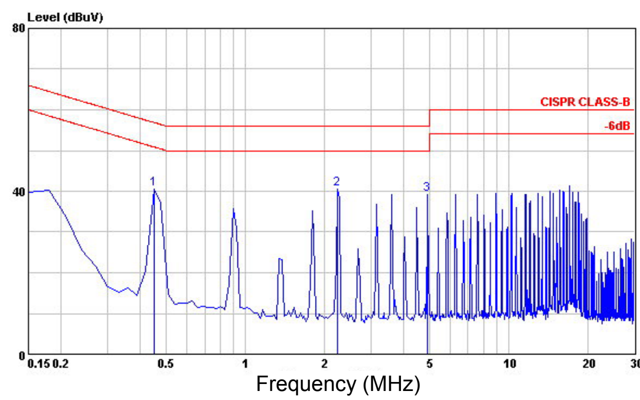
Graph 8: Transient Response to Dynamic Load Change from 100% to 75% to 100% of Full Load at Nominal Vin



Graph 9: Conduction Emission of EN55022 Class A Nominal Vin and Full Load



Graph 10: Conduction Emission of EN55022 Class B Nominal Vin and Full Load

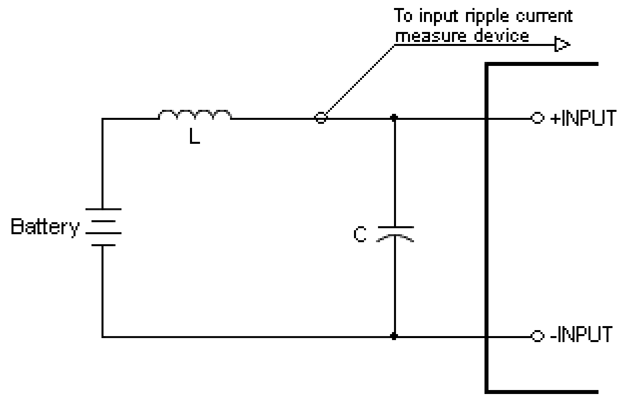


TEST SETUP:

The LANC4805DW12 specifications are tested with the following configurations:

Input Reflected-Ripple Current Measurement Test Setup

Figure 7



Component	Value	Voltage	Reference
L	12µH	----	----
C	47µF	100V	Aluminum Electrolytic Capacitor

Peak-to-Peak Output Ripple & Noise Measurement Setup

Figure 8

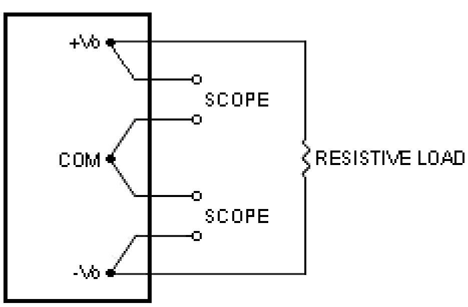
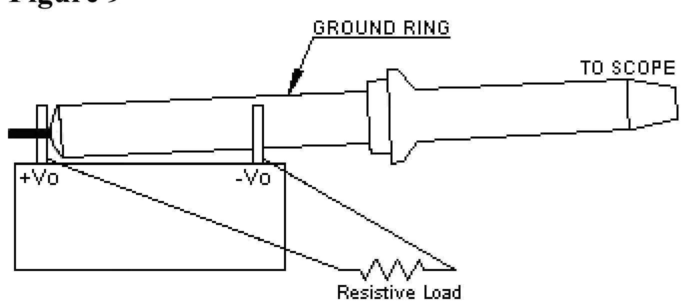
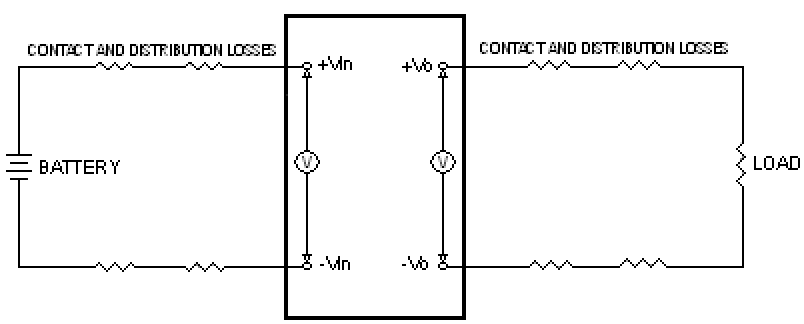


Figure 9



Output Voltage and Efficiency Measurement Setup

Figure 10



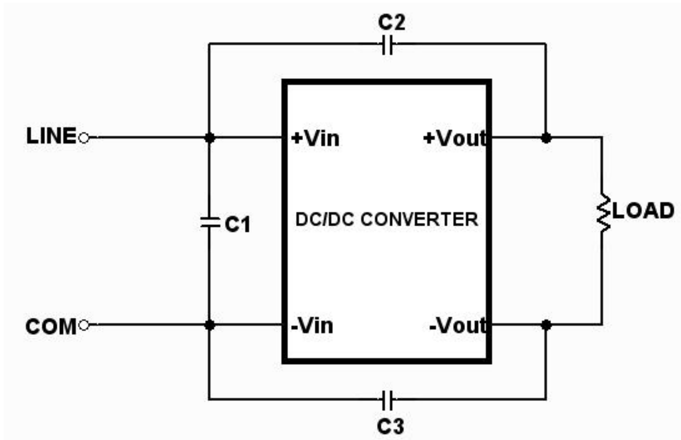
$$Efficiency = \left(\frac{Vout \times Iout}{Vin \times Iin} \right) \times 100\%$$

NOTE: All measurements are taken at the module terminals

EMC Considerations

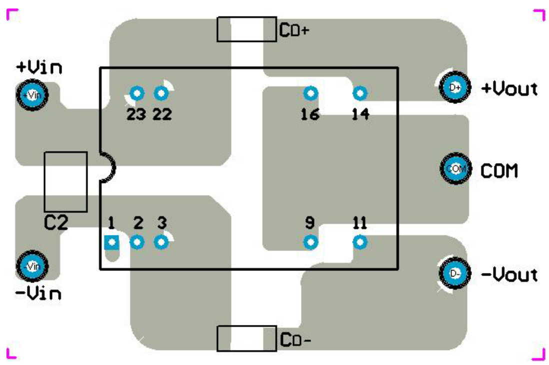
Suggested Schematic for EN55022 Conducted Emission Class A Limits

Figure 11



Recommended Layout with Input Filter

Figure 12



To meet Conducted Emissions EN55022 CLASS A needed the following components:

LANC12xxDW12

Component	Value	Voltage	Reference
C1	6.8uF	50V	1210 MLCC
C2, C3	1000pF	2KV	1206 MLCC

LANC24xxDW12

Component	Value	Voltage	Reference
C1	4.7uF	50V	1210 MLCC
C2, C3	1000pF	2KV	1206 MLCC

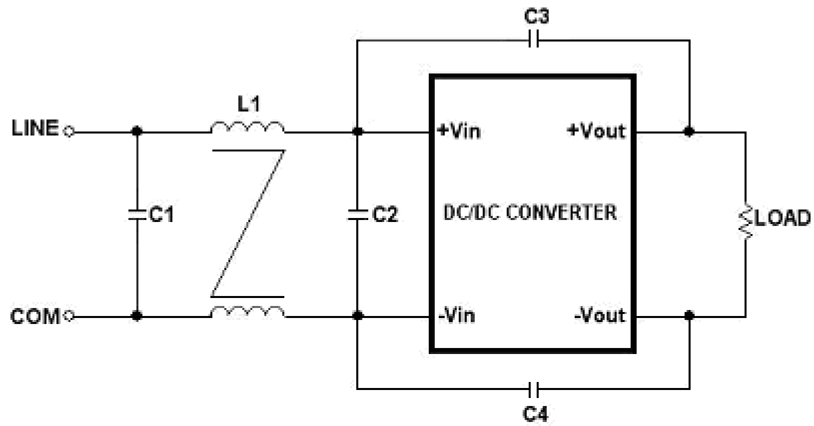
LANC48xxDW12

Component	Value	Voltage	Reference
C1	2.2uF	100V	1812 MLCC
C2, C3	1000pF	2KV	1206 MLCC

EMC Considerations (Continued)

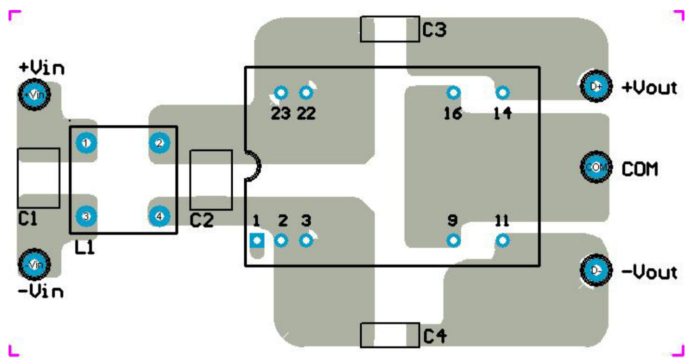
Suggested Schematic for EN55022 Conducted Emission Class B limits

Figure 13



Recommended Layout with Input Filter

Figure 14



To meet Conducted Emissions EN55022 CLASS B needed the following components:

LANC12xxDW12

Component	Value	Voltage	Reference
C1	3.3µF	50V	1812 MLCC
C3, C4	1000pF	2KV	1206 MLCC
L1	325µH	----	Common Choke, P/N: PMT-050

LANC24xxDW12

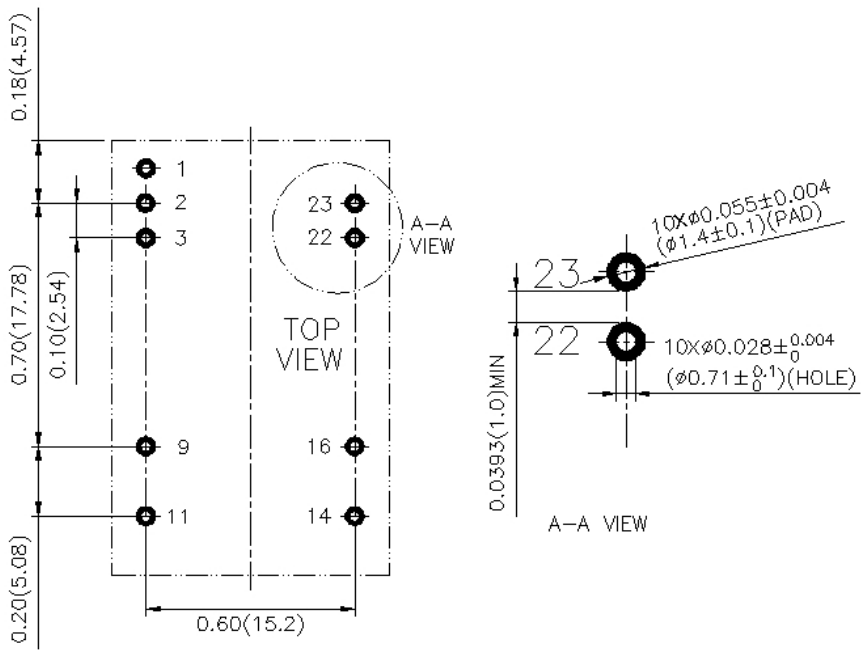
Component	Value	Voltage	Reference
C1	4.7µF	50V	1812 MLCC
C3, C4	1000pF	2KV	1206 MLCC
L1	325µH	----	Common Choke, P/N: PMT-050

LANC48xxDW12

Component	Value	Voltage	Reference
C1	2.2µF	100V	1812 MLCC
C3, C4	1000pF	2KV	1206 MLCC
L1	325µH	----	Common Choke, P/N: PMT-050

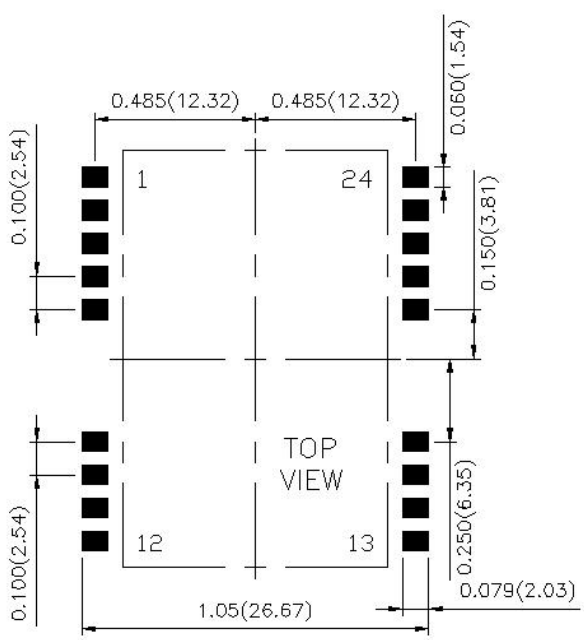
Recommended Pad Layout for DIP Type

Figure 15



Recommended Pad Layout for SMT Type

Figure 16

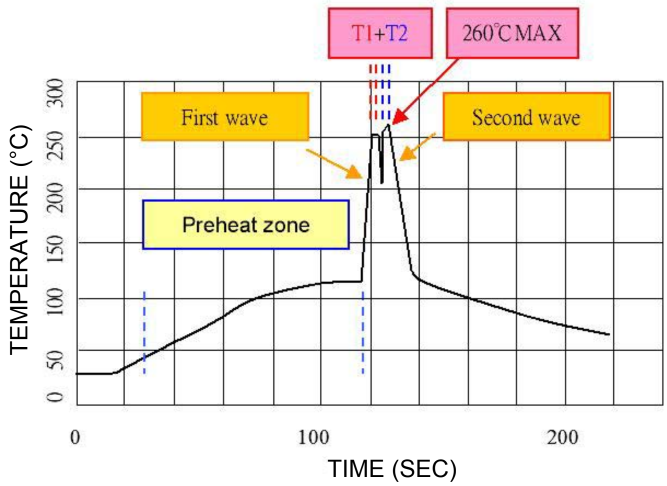


1. **All dimensions in Inches (mm)**
2. Pin pitch tolerance ±0.35mm
3. Tolerance: x.xx±0.02 (x.x±0.5)
   x.xxx±0.01 (x.xx±0.25)

Soldering and Reflow Considerations:

Lead Free Wave Solder Profile for DIP Type

Figure 17



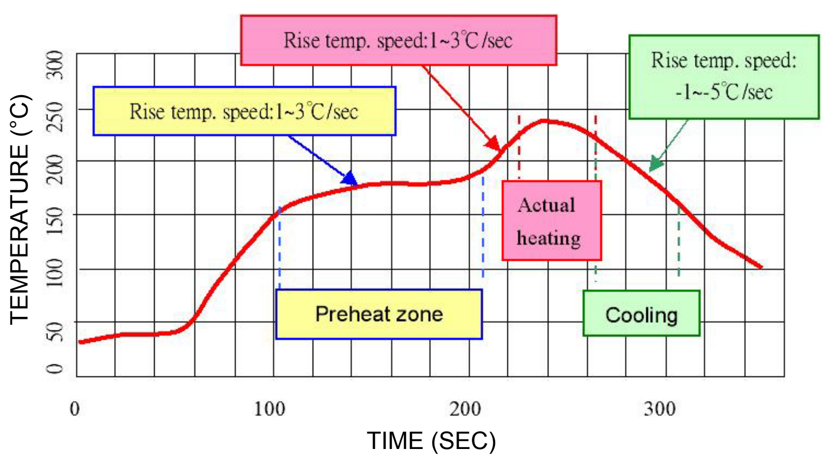
Reference Solder: Sn-Ag-Cu; Sn-Cu

Hand Welding:
- Soldering Iron: Power 90W
- Welding Time: 2~4 sec
- Temp: 380~400°C

Zone	Reference Parameter
Preheat Zone	Rise temp. speed: 3℃/sec max. Preheat temp: 100~130℃
Actual Heating	Peak temp: 250~260℃ Peak time (T1+T2 time): 4~6 sec

Lead free reflow profile for SMT type

Figure 18



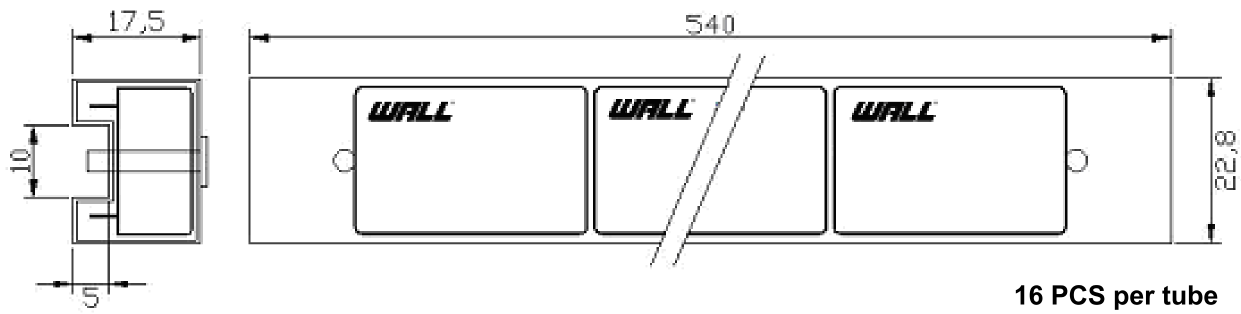
Zone	Reference Parameter
Preheat Zone	Rise temp. speed: 1~3℃/sec Preheat time: 60~120sec Preheat temp.155~185℃
Actual Heating	Rise temp. speed: 1~3℃/sec Melting time: 30~60 sec Melting temp: 217°C Peak temp: 230~240℃ Peak time: 10~20 sec
Cooling	Rise temp. speed: -1~ -5℃/sec

Reference Solder: Sn-Ag-Cu; Sn-Cu

Packaging Information:

DIP Type

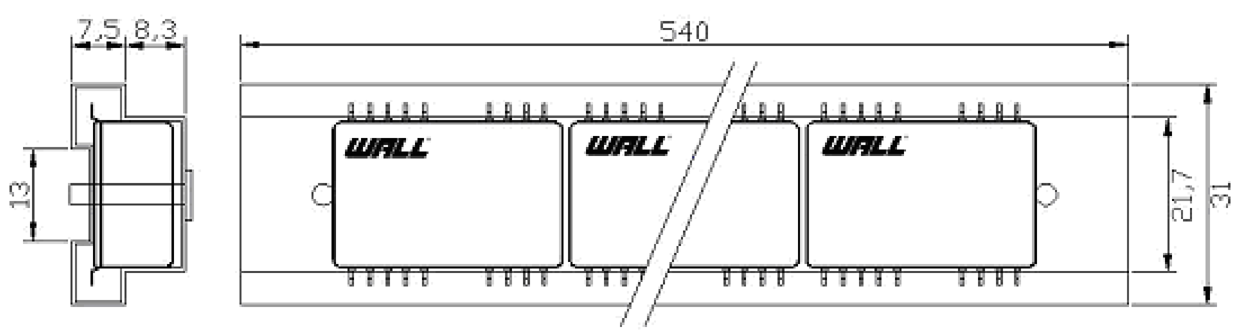
Figure 19



16 PCS per tube

SMT Type

Figure 20



16 PCS per tube

Safety and Installation Instruction:

Fusing Consideration

Caution: This power module is not internally fused. An input line fuse must always be used.
This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture. To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The safety agencies require a normal-blow fuse with maximum rating of 3A. Based on the information provided in this data sheet on inrush energy and maximum DC input current; the same type of fuse with lower rating can be used. Refer to the fuse manufacturer's data for further information.

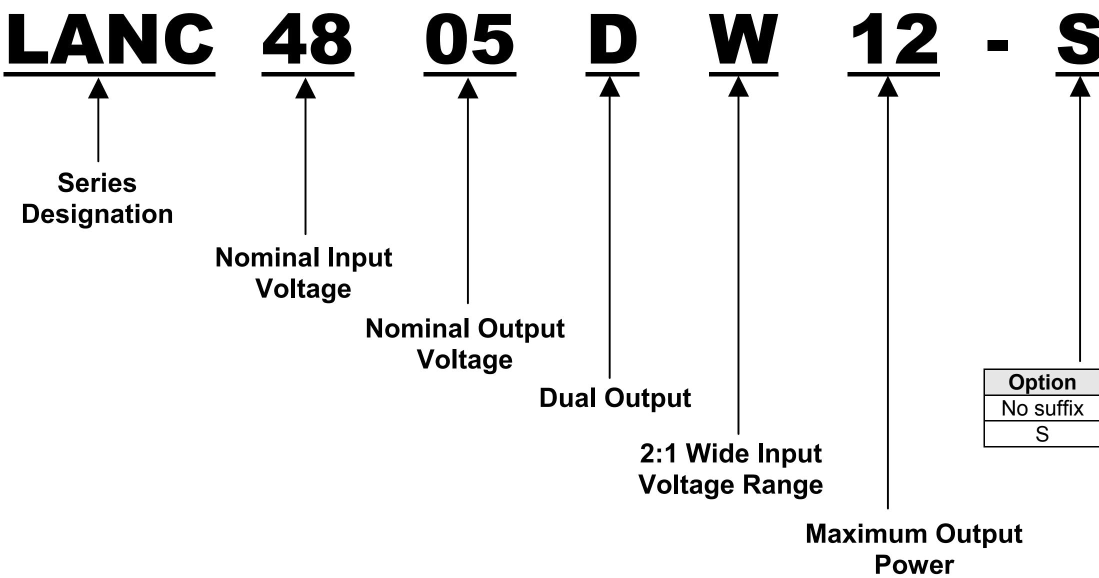
MTBF and Reliability

The MTBF of the LANCW12 dual output series of DC/DC converters has been calculated using Bellcore TR-NWT-000332 Case I: 50% stress, Operating Temperature at 40°C (Ground fixed and controlled environment). The resulting figure for MTBF is 2.75×10^6 hours.

MIL-HDBK 217F NOTICE2 FULL LOAD, Operating Temperature at 25°C. The resulting figure for MTBF is 1.078×10^6 hours.

Ordering Information:

Part Number Example:



Option	Description
No suffix	DIP Type
S	SMT Type

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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