

## LANC2412UW12

## DC/DC Converter 9-36 VDC Input 12 VDC Output at 1.0A





#### **Applications:**

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

#### **Features:**

- RoHS Compliant
- Single 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)
- 4:1 Ultra 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

#### **Description:**

The LANCUW12 single output series offers 12 watts of output power from a package in an IC compatible 24pin DIP and SMT configuration. LANCUW12 single output series has 4:1 wide input voltage of 9-36VDC and 18-75VDC. The LANCUW12 single 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 DATASHEET**

LANC2412UW12

Switching Frequency   Test at nominal Vin and full load   400   81	<b>Technical Specifications</b>	Model No. LANC24				
SPECIFICATION   Related condition   Test at nominal Vin and full load   SPECIFICATION   SWITCHING   Test at nominal Vin and full load   SPECIFICATION   SWITCHING   SPECIFICATION   SPECIFI	All specifications are based on 2	25 °C, Nominal Input Voltage and Maximum Output C	urrent unless oth	erwise no	ted.	
Switching Frequency   Test at nominal Vin and full load   400   81   180   1				2.7	3.5	<b>T</b> T •.
Notify   N			Min		Max	Unit
Operating Voltage Range [mipur Voltage (Criminous)   10 mipur Voltage (Variation)   10 mipur Voltage	Switching Frequency	Test at nominal Vin and full load		400		kHz
Imput Voltage (Continuous)			0	24	26	X 7 1
Imput Voltage (Transient 100ms)			9	24		Vdc
UVLO Turn-of Threshold						Vdc
UNLO Tum-off Threshold   8				0	50	Vdc
Input Standardy Current						Vdc
Imput Oltage Variation   Complies with EST300 132 part 4.4   50   70   70   70   70   70   70   70	0 0					Vdc
Imput Current   Nominal Vin and Full Load   See   Se				25	_	mA
Reflected Ripple Current         5 to 20MHz, 12µH source impedance (see the Test Setup section - pg 8)         20         method (see the Test Setup section - pg 8)         20         method (see the Test Setup section - pg 8)         20         20           CUTPUT (Vo.)           Operating Output Range         Nominal Vin and Full Load         11.856         12.144         V           Load Regulation (DIP Type)         0% to 100% Full Load         -0.5         -1.0						V/ms
Set   Set	Input Current				610	mA
PRINCIPICY	Reflected Ripple Current			20		mA <sub>pk-p</sub>
See the Test Setup section = pg 8	Reflected Ripple Current			20		III/Apk-p
OUTPUT (V.)   Operating Output Range	EFFICIENCY			86		0/_
Operating Output Range         Nominal Vin and Full Load         11.85         12.0         12.144         V.           Load Regulation (DIP Type)         0% to 100% Full Load         -0.5         4-0.5         9.5         4-0.5         V.         Load Regulation (SMT Type)         0% to 100% Full Load         -1.0         4-1.0         4-0.2         V.         -1.0         1.0         4-1.0         1.0         4-1.0         1.0         4-1.0         1.0	EFFICIENCY	(See the Test Setup section – pg 8)		80		/0
Operating Output Range         Nominal Vin and Full Load         11.85         12.0         12.144         V.           Load Regulation (DIP Type)         0% to 100% Full Load         -0.5         4-0.5         9.5         4-0.5         V.         Load Regulation (SMT Type)         0% to 100% Full Load         -1.0         4-1.0         4-0.2         1-0.2						
Load Regulation (DIP Type)         0% to 100% Full Load         −0.5         +0.5         № 1.0         № 1.0         № 1.0         +1.0         № 1.0		Nominal Vin and Full Load	11.856	12.0	12.144	Vdc
Load Regulation (SMT Type)         0% to 100% Full Load         -1.0         +1.0         %           Line Regulation         Lt to HL at Full Load         -0.2         +0.2         %           Output Ripple & Noise         5Hz to 20MHz bandwidth (See the Test Setup section - pg 8)         m         1.0         A           Output Current         2 cert diode clamp         1.5         V           Over Voltage Protection         2 cert diode clamp         1.5         V           Over Lornert Protection         Test at nominal Vin         200         1.5         V           Short Circuit Protection         Test at nominal Vin         200         m         m           Setting Time (Vout < 10% peak deviation)		0% to 100% Full Load	-0.5		+0.5	%
Line Regulation         LL to HL at Pull Load         -0.2         +0.2         %           Output Ripple & Noise         SHz to 20MHz bandwidth (See the Test Setup section - pg 8)         m         85         m           Output Current         0         1.0         A         %           Output Voltage Potection         Zener diode clamp         15         V           Over Voltage Protection         25         150         %           Short Circuit Protection         150         %         %           Short Circuit Protection         Continuous automate revenue to						%
Output Ripple & Noise         5Hz to 20MHz bandwidth (See the Test Setup section - pg 8)         moutput Current         85 m         moutput Current         0 moutput Voltage Overshoot         1.L to HL at Full Load         0 moutput Voltage Protection         2 moutput Voltage Protection         2 moutput Voltage Protection         2 moutput Voltage Protection         2 mountput Voltage Protection <th< td=""><td></td><td></td><td></td><td></td><td></td><td>%</td></th<>						%
Output Current         (See the Test Setup section - pg 8)         85         m           Output Voltage Overshoot         LL to HL at Full Load         0         1.0         A           Output Voltage Protection         Zener diode clamp         1.5         V           Over Voltage Protection         Zener diode clamp         1.5         V           Over Current Protection         Continuous, automatic recover automatic	·	5Hz to 20MHz bandwidth				
Output Voltage Overshoot         LL to HL at Full Load         0         1.0         A           Output Voltage Protection         Zener diode clamp         15         V           Over Current Protection         Test at nominal Vin         Continuous, automatic recoverable of the continuous automatic recoverable of the continuou	Output Ripple & Noise				85	$mV_{pk-p}$
Output Voltage Overshoot         LL to HL at Full Load         0         3         V           Over Voltage Protection         Zener diode clamp         15         V           Nover Current Protection         150         %           Short Circuit Protection         Test at nominal Vin         Continuous, automatic received           Peak Deviation         Load step change from 75 to 100% or 100 to 75 % of FL         200         m           Setting Time (Vout ≤ 10% peak deviation)         The ON/OFF pin voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)         3.0         12         V           ON/OFF pin High Voltage (Remote ON)         See the Remote ON/OFF Control section - pg 5)         3.0         12         V           ON/OFF pin Low Voltage (Remote ONF)         See the Remote ON/OFF Control section - pg 5)         0         1,2         V           ON/OFF pin Low Voltage (Remote ONF)         Test at nominal Vin and constant resistive load         450         m           Power Up         Test at nominal Vin and constant resistive load         5         m           Remote ON/OFF         5         m         N           Isolation Voltage (Input to Case-DIP Type)         1600         V           Isolation Voltage (Output to Case-SMT Type)         1600         V           Isolation Capa	Output Current	(See the 16st Setup section pg 6)	0		1.0	A
Nover Voltage Protection	Output Voltage Overshoot	LL to HL at Full Load		0	3	%
Over Current Protection         150         %           Short Circuit Protection         Test at nominal Vin           Peak Deviation         Load step change from 75 to 100% or 100 to 75 % of FL         200         m           Setting Time (Vout < 10% peak deviation)         Load step change from 75 to 100% or 100 to 75 % of FL         200         m           REMOTE ON/OFF         The ON/OFF pin voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)         3.0         12         V.           ON/OFF pin High Voltage (Remote OFF)         One of the Remote ON/OFF Control section - pg 5)         3.0         12         V.           ON/OFF pin Low Voltage, input current         Test at nominal Vin and constant resistive load         Test at nominal Vin and constant resistive load         m         M	•	7		1.5		Vout
Short Circuit Protection         Continuous, automatic recover DYNAMIC LOAD RESPONSE         Test at nominal Vin           Peak Deviation         Load step change from 75 to 100% or 100 to 75% of FL         200         mean restring response to 100% or 100 to 75% of FL         200         page 100% or page 100% or page 100 to 100% or 100 to 75% of FL         200         page 100% or page 100% or page 100 to 100 to 75% of FL         200         page 100% or page 1		Zener diode clamp				Vdc
DYNAMIC LOAD RESPONSE         Test at nominal Vin         200         m           Peak Deviation         Load step change from 75 to 100% or 100 to 75 % of FL         200         m           Setting Time (Vout < 10% peak deviation)         The ON/OFF pin Voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)         250         µs           REMOTE ON/OFF pin High Voltage (Remote ON)         3.0         12         V           ON/OFF pin Low Voltage (Remote OFF)         0         1.2         V           ON/OFF pin Low Voltage, input current         Test at nominal Vin and constant resistive load         3.0         12         V           Power Up         Test at nominal Vin and constant resistive load         450         m           Remote ON/OFF         5         m         M         M           Isolation Voltage (Input Output)         1600         V         V           Isolation Voltage (Output to Case-DIP Type)         1600         V         V           Isolation Voltage (Input to Case-SMT Type)         1600         V         V           Isolation Voltage (Input to Case - DIP Type)         1600         V         V           Isolation Voltage (Input to Case - SMT Type)         1600         V         V           Isolation Voltage (Input to Case - SMT Type)         1			Q i			% FL
Peak Deviation   Setting Time (Vout < 10% peak deviation)   Setting Time (Vout < 10% peak deviation)   The ON/OFF pin voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)   Setting Time (Vout < 10% peak deviation)   The ON/OFF pin voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)   Setting Time (Vout < 10% peak deviation)   Setting Time (Vout < 10% peak deviation)   Setting Time (Vout < 10% of 1.2 stating Time (Vout < 10% peak deviation)   Setting Time (Vout < 10% peak deviation)   S		m	Conti	nuous, aut	tomatic re	covery
Setting Time (Vout < 10% peak deviation)         250         page 1           REMOTE ON/OFF         The ON/OFF pin voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)         3.0         12         V. ON/OFF pin High Voltage (Remote ON)         3.0         12         V. ON/OFF pin Low Voltage (Remote OFF)         3.0         1.2         V. ON/OFF pin Low Voltage (Remote OFF)         4.0         1.2         V. ON/OFF pin Low Voltage, input current           START UP TIME         Test at nominal Vin and constant resistive load         450         m           Power Up         Test at nominal Vin and constant resistive load         450         m           SOLATION         Test at nominal Vin and constant resistive load         450         m           SOLATION         1600         V. ON/OFF pin Low Voltage (Input-Output)         1600         V. ON/OFF pin Low Voltage (Input to Case—SMT Type)         1600         V. ON/OFF pin Low Voltage (Input to Case—SMT Type)         1600         V. ON/OFF pin Low Voltage (Input to Case—SMT Type)         1600         V. ON/OFF pin Low Voltage (Input to Case—SMT Type)         1000         V. ON/OFF pin Low Voltage (Input to Case—SMT Type)         1000         V. ON/OFT pin Low Voltage (Input to Case—SMT Type)         1000         V. ON/OFT pin Low Voltage (Input to Case—SMT Type)         1000         V. ON/OFT pin Low Voltage (Input to Case—SMT Type)         1000         V. ON/OFT pin Low Voltage (Input to Case—SMT Ty			CER	200		* 7
The ON/OFF pin Voltage is referenced to -Vin (See the Remote ON/OFF Control section - pg 5)   See the Remote ON/OFF Control section - pg 5)   See the Remote ON/OFF pin Low Voltage (Remote OFF)   On 1.2   Vin ON/OFF pin Low Voltage (Remote OFF)   On 1.2   Vin ON/OFF pin Low Voltage, input current   START UP TIME   Test at nominal Vin and constant resistive load   Power Up		Load step change from 75 to 100% or 100 to 75 % o	of FL			mV
No No F P pin High Voltage (Remote ON)   3.0   12   V ON OF P pin Low Voltage (Remote OFF)   0   1.2   V ON OFF P pin Low Voltage (Remote OFF)   0   1.2   V ON OFF P pin Low Voltage, input current   2.5   m ON OFF P pin Low Voltage, input current   2.5   m ON OFF P pin Low Voltage, input current   2.5   m ON OFF P pin Low Voltage, input current   2.5   m ON OFF P pin Low Voltage, input current   2.5   m ON OFF P pin Low Voltage, input current   2.5   m ON ON OFF P pin Low Voltage, input current   2.5   m ON ON OFF   2.5   m ON ON OFF   2.5   m ON	Setting Time (Vout < 10% peak deviation)			250		μs
ON/OFF pin Low Voltage (Remote OFF)         0         1.2         Voltage (No/OFF pin Low Voltage, input current)         2.5         m           START UP TIME         Test at nominal Vin and constant resistive load           Power Up         450         m           Remote ON/OFF         5         m           ISOLATION           Isolation Voltage (Input-Output)         1600         Voltage (Input Output to Case—DIP Type)         1600         Voltage (Input Output to Case—SMT Type)         1600         Voltage (Input Output to Case—SMT Type)         Voltage (Input to Case—SMT Type)         1600         Voltage (Input Output to Case—SMT Type)         Voltage (Input to Case—SMT Type)         1600         Voltage (Input Output to Case—SMT Type)         Voltage (Input to Case—SMT Type)         1600         Voltage (Input Output to Case—SMT Type)         Voltage (Input to Case—SMT Type)         1600         Voltage (Input Output to Case—SMT Type)         Voltage (Input to Case—SMT Type) <td>REMOTE ON/OFF</td> <td></td> <td></td> <td></td> <td></td> <td></td>	REMOTE ON/OFF					
ON/OFF pin Low Voltage, input current         Test at nominal Vin and constant resistive load         2.5         m           Power Up         450         m           Remote ON/OFF         5         m           ISOLATION         1600         Voltage (Input-Output)           Isolation Voltage (Output to Case–DIP Type)         1600         Voltage (Input-Output)           Isolation Voltage (Input to Case–SMT Type)         1000         Voltage (Input to Case - DIP Type)           Isolation Voltage (Input to Case - SMT Type)         1000         Voltage (Input to Case - SMT Type)           Isolation Voltage (Input to Case - SMT Type)         1000         Voltage (Input to Case - SMT Type)           Isolation Voltage (Input to Case - SMT Type)         1000         Voltage (Input to Case - SMT Type)	ON/OFF pin High Voltage (Remote ON)	•	3.0		12	Vdc
ON/OFF pin Low Voltage, input current         Test at nominal Vin and constant resistive load         2.5         m           Power Up         450         m           Remote ON/OFF         5         m           ISOLATION         1600         Voltage (Input-Output)           Isolation Voltage (Output to Case–DIP Type)         1600         Voltage (Input-Output)           Isolation Voltage (Input to Case–SMT Type)         1000         Voltage (Input to Case - DIP Type)           Isolation Voltage (Input to Case - SMT Type)         1000         Voltage (Input to Case - SMT Type)           Isolation Voltage (Input to Case - SMT Type)         1000         Voltage (Input to Case - SMT Type)           Isolation Voltage (Input to Case - SMT Type)         1000         Voltage (Input to Case - SMT Type)			0		1.2	Vdc
START UP TIME	ON/OFF pin Low Voltage, input current					mA
Power Up		Test at nominal Vin and constant resistive load				
Remote ON/OFF         5         m           ISOLATION         ISOlation Voltage (Input-Output)         1600         V.           Isolation Voltage (Output to Case–DIP Type)         1600         V.           Isolation Voltage (Input to Case–SMT Type)         1600         V.           Isolation Voltage (Input to Case - DIP Type)         1600         V.           Isolation Voltage (Input to Case - SMT Type)         1000         V.           Isolation Resistance         1         G.           Isolation Capacitance         1500         pt           ENVIRONMENTAL         -40         85         C.           Operating Ambient Temperature (w/ derating)         -40         85         C.           Operating Case Temperature         -55         125         C.           Storage Temperature         -55         125         C.           MTBF         See the MTBF and Reliability section (pg 13)         b.           Bellcore TR-NWT-000332, T <sub>C</sub> =40°C         2,350,000         b.           MIL-STD-217F         875,000         b.           MECHANICAL         See Figure 1		1 cot we from the transfer to form to form		450		ms
SOLATION						ms
Isolation Voltage (Input-Output)   1600   Voltage (Output to Case–DIP Type)   1600   Voltage (Output to Case–SMT Type)   1600   Voltage (Output to Case–SMT Type)   1000   Voltage (Input to Case - DIP Type)   1600   Voltage (Input to Case - DIP Type)   1600   Voltage (Input to Case - SMT Type)   1600   Voltage (Input to Case - SMT Type)   1000   Voltage (Input to Case - DIP Type)   1000   Voltage (Input to Case - SMT Type)   1000   10						1115
Isolation Voltage (Output to Case–DIP Type)       1600       Voltage (Solution Voltage (Output to Case–SMT Type)       1000       Voltage (Solution Voltage (Input to Case - DIP Type)       1600       Voltage (Input to Case - DIP Type)       1600       Voltage (Input to Case - DIP Type)       1600       Voltage (Input to Case - SMT Type)       Voltage (Input to Case - SMT Type)       1000       Voltage (Input to Case - SMT Type)       Voltage (Input to Case - SMT Type)       Input SMT			1600			Vdc
Isolation Voltage (Output to Case–SMT Type)       1000       Voltage (Input to Case - DIP Type)         Isolation Voltage (Input to Case - DIP Type)       1600       Voltage (Input to Case - SMT Type)         Isolation Resistance       1       Great Isolation Capacitance         Isolation Capacitance       1500       pH         ENVIRONMENTAL       -40       85       °C         Operating Ambient Temperature (w/ derating)       -40       85       °C         Operating Case Temperature       -55       125       °C         Storage Temperature       -55       125       °C         Temperature Coefficient       -0.02       +0.02       %         MTBF       See the MTBF and Reliability section (pg 13)       See       2,350,000       hc         MIL-STD-217F       875,000       hc       MECHANICAL       See Figure 1						Vdc
Isolation Voltage (Input to Case - DIP Type)       1600       Voltage (Input to Case - SMT Type)         Isolation Voltage (Input to Case - SMT Type)       1000       Voltage (Input to Case - SMT Type)         Isolation Resistance       1       Get (Input to Case - SMT Type)         Isolation Resistance       1       Get (Input to Case - SMT Type)         Isolation Resistance       1       Get (Input to Case - SMT Type)         Isolation Resistance       1       Get (Input to Case - SMT Type)         Isolation Resistance       1       Get (Input to Case - SMT Type)         ENVIRONMENTAL       -40       85       °C         Operating Ambient Temperature (w/ derating)       -40       85       °C         Operating Case Temperature       -55       125       °C         Storage Temperature       -55       125       °C         Temperature Coefficient       -0.02       +0.02       %         MTBF       See the MTBF and Reliability section (pg 13)       between the proper of the proper						Vdc
Isolation Voltage (Input to Case - SMT Type)       1000       Voltage (Input to Case - SMT Type)         Isolation Resistance       1       Get (Input to Case - SMT Type)       Get (Input to Case - SMT Type)       Input to Case - SMT Type)       Jet (Input to Case - SMT						
Isolation Resistance         1         Gr           Isolation Capacitance         1500 pF           ENVIRONMENTAL         -40         85 °C           Operating Ambient Temperature (w/ derating)         -40         85 °C           Operating Case Temperature         -55         125 °C           Storage Temperature Coefficient         -0.02         +0.02 %           MTBF         See the MTBF and Reliability section (pg 13)         See           Bellcore TR-NWT-000332, T <sub>C</sub> =40°C         2,350,000         hc           MIL-STD-217F         875,000         hc           MECHANICAL         See Figure 1						Vdc
Isolation Capacitance       1500 pF         ENVIRONMENTAL       -40 85 °C         Operating Ambient Temperature (w/ derating)       -40 85 °C         Operating Case Temperature       105 °C         Storage Temperature       -55 125 °C         Temperature Coefficient       -0.02 +0.02 %         MTBF       See the MTBF and Reliability section (pg 13)         Bellcore TR-NWT-000332, T <sub>C</sub> =40°C       2,350,000 hc         MIL-STD-217F       875,000 hc         MECHANICAL       See Figure 1			1000			Vdc
ENVIRONMENTAL           Operating Ambient Temperature (w/ derating)         -40         85         °C           Operating Case Temperature         105         °C           Storage Temperature         -55         125         °C           Temperature Coefficient         -0.02         +0.02         %           MTBF         See the MTBF and Reliability section (pg 13)         See         2,350,000         hc           MIL-STD-217F         875,000         hc         MECHANICAL         See Figure 1			1		1.500	GΩ
Operating Ambient Temperature (w/ derating)         -40         85         °C           Operating Case Temperature         105         °C           Storage Temperature         -55         125         °C           Temperature Coefficient         -0.02         +0.02         %           MTBF         See the MTBF and Reliability section (pg 13)         See         2,350,000         hc           MIL-STD-217F         875,000         hc         MECHANICAL         See Figure 1					1500	pF
Operating Case Temperature         105         °C           Storage Temperature         -55         125         °C           Temperature Coefficient         -0.02         +0.02         %           MTBF         See the MTBF and Reliability section (pg 13)         See         2,350,000         hc           MIL-STD-217F         875,000         hc         MECHANICAL         See Figure 1						
Storage Temperature         -55         125         °C           Temperature Coefficient         -0.02         +0.02         %           MTBF         See the MTBF and Reliability section (pg 13)         See			-40			°C
Temperature Coefficient         -0.02         +0.02         %           MTBF         See the MTBF and Reliability section (pg 13)         See Transport (pg 13)         See Transport (pg 13)         Fee Transport (pg 13						°C
MTBF         See the MTBF and Reliability section (pg 13)           Bellcore TR-NWT-000332, T <sub>C</sub> =40°C         2,350,000         hc           MIL-STD-217F         875,000         hc           MECHANICAL         See Figure 1						°C
MTBF         See the MTBF and Reliability section (pg 13)           Bellcore TR-NWT-000332, T <sub>C</sub> =40°C         2,350,000         hc           MIL-STD-217F         875,000         hc           MECHANICAL         See Figure 1			-0.02		+0.02	% / °C
Bellcore TR-NWT-000332, Tc=40°C       2,350,000       hc         MIL-STD-217F       875,000       hc         MECHANICAL       See Figure 1		See the MTBF and Reliability section (pg 13)				
MIL-STD-217F         875,000         hc           MECHANICAL         See Figure 1				2,350,000		hours
MECHANICAL See Figure 1						hours
					igure 1	
Weight 18 () or	Weight			18.0	5	grams
			1 25		450	inches



## TECHNICAL DATASHEET

LANC2412UW12

**Figure 1: Mechanical Dimensions** 

**DIP Type** 

Pin size is 0.02(0.5) Dia or 0.01 x 0.02 (0.25 x 0.50) Rectangular Pin

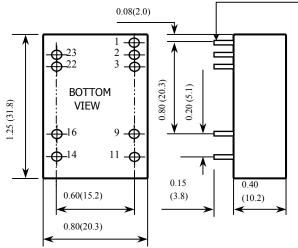


Table 1

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

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



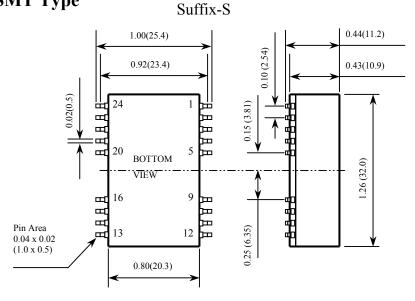


Table 2

Pin Connection				
Pin	Define Pin Define			
1	CTRL			
2	-Input	23	+Input	
3	-Input	22	+Input	
6	NC	16	-Output	
11	NC	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:**

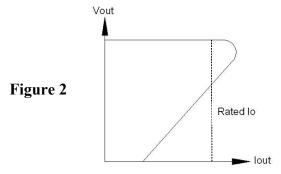
#### **Output Over Current Protection**

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 LANCUW12 single 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.



#### **Output Over Voltage Protection**

The output over-voltage protection consists of an output Zener diode that monitors the voltage on the output terminals. If the voltage on the output terminals exceeds the over-voltage protection threshold, then the Zener diode clamps the output voltage.

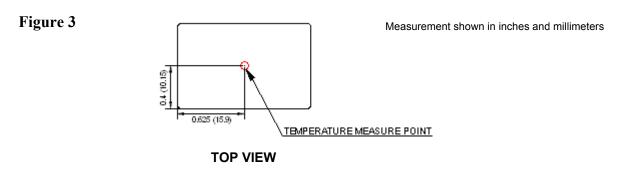
#### **Input Source Impedance**

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  $12\mu H$  and capacitor is Nippon chemi-con KZE series  $47\mu F/100V$ . 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.

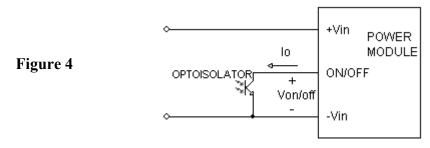


#### Remote ON/OFF Control

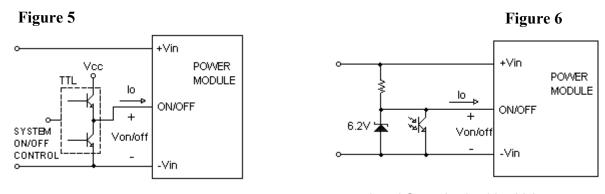
The positive logic remote ON/OFF control circuit is included.

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



Isolated-Closure Remote ON/OFF



Level Control using TTL Output

Level Control using Line Voltage

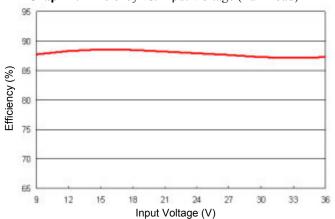


## **TECHNICAL DATASHEET**

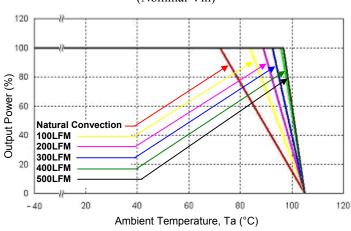
#### LANC2412UW12

Graph 1: Efficiency vs. Output Current 95 90 Efficiency (%) Vin=24V 70 65 10 20 30 60 60 100 % Of Full Load

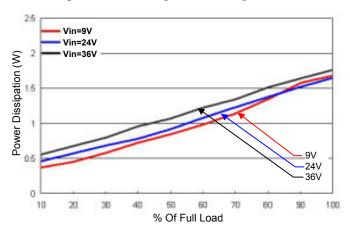
Graph 2: Efficiency vs. Input Voltage (Full Load)



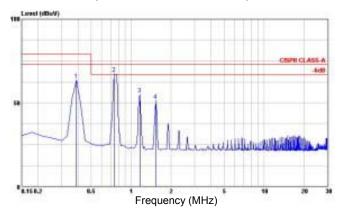
Graph 3: Output Power vs. Ambient Temperature & Airflow (Nominal Vin)



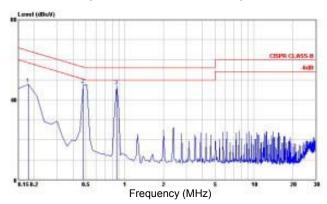
Graph 4: Power Dissipation Vs. Output Current



Graph 5: Conducted Emission of EN55022 Class A (Nominal Vin and Full Load)

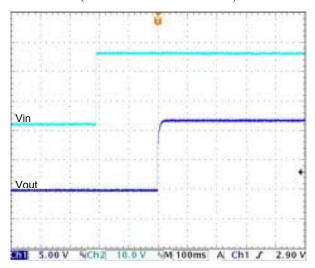


Graph 6: Conducted Emission of EN55022 Class B (Nominal Vin and Full Load)

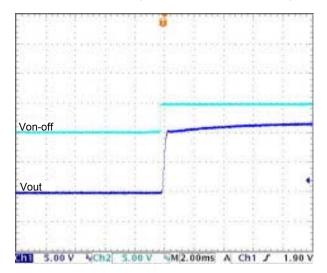




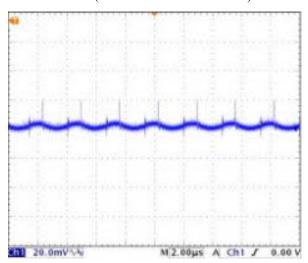
**Graph 7:** Typical Input Start-Up and Output Rise Characteristic (Nominal Vin and Full Load)



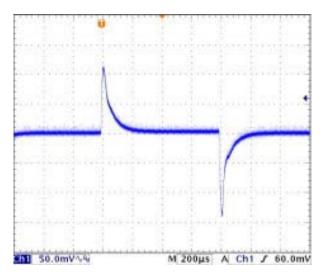
**Graph 9:** Using ON/OFF Voltage Start-Up and Vo Rise Characteristic (Nominal Vin and Full Load)



**Graph 8:** Typical Output Ripple and Noise (Nominal Vin and Full Load)



**Graph 10:** Transient Response to Dynamic Load Change from 100% to 75% to 100% of Full Load at Nominal Vin

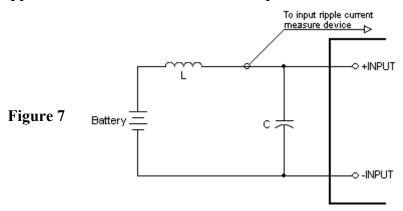


Resistive Load

#### **TEST SETUP:**

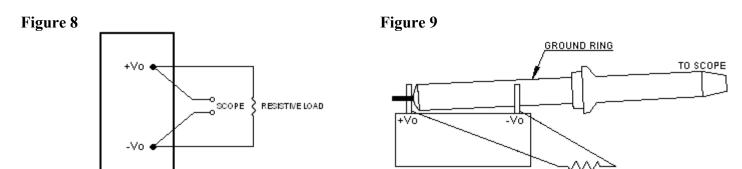
The LANC2412UW12 specifications are tested with the following configurations:

#### **Input Reflected-Ripple Current Measurement Test Setup**



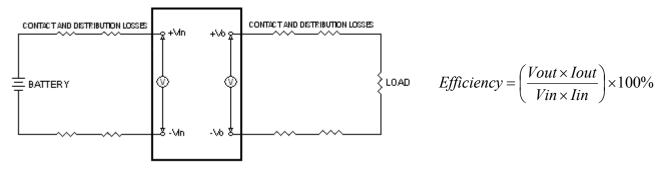
Component	Value	Voltage	Reference
L	12µH		
С	47µF	100V	Aluminum Electrolytic Capacitor

#### Peak-to-Peak Output Ripple & Noise Measurement Setup



#### **Output Voltage and Efficiency Measurement Setup**

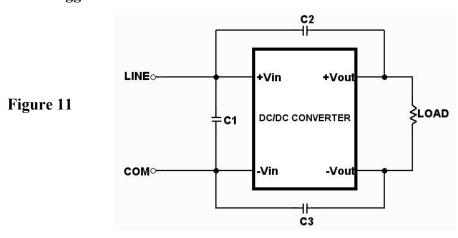
#### Figure 10



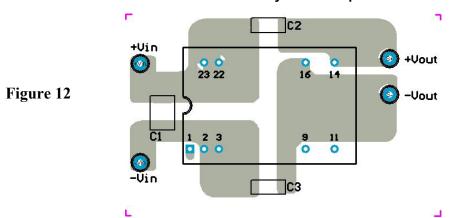
NOTE: All measurements are taken at the module terminals

#### **EMC Considerations**

#### Suggested Schematic for EN55022 Conducted Emission Class A Limits



#### **Recommended Layout with Input Filter**



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

#### LANC24xxUW12

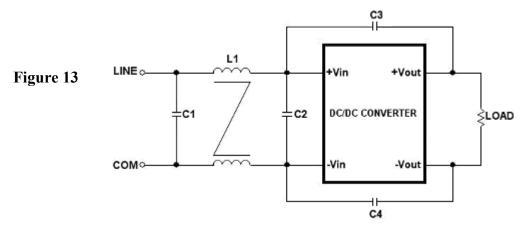
Component	Value	Voltage	Reference
C1	1uF	50V	1210 MLCC
C2, C3	1000pF	2KV	1206 MLCC

#### LANC48xxUW12

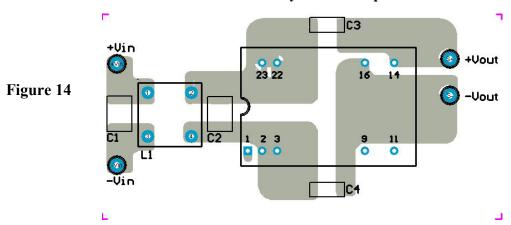
Component	Value	Voltage	Reference
C1	0.47uF	100V	1812 MLCC
C2, C3	1000pF	2KV	1206 MLCC

#### **EMC Considerations (Continued)**

#### Suggested Schematic for EN55022 Conducted Emission Class B limits



#### **Recommended Layout with Input Filter**



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

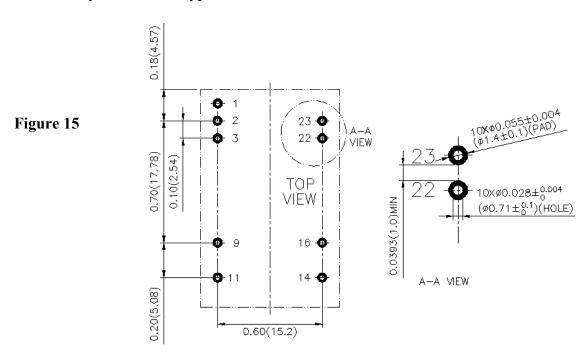
#### LANC24xxUW12

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

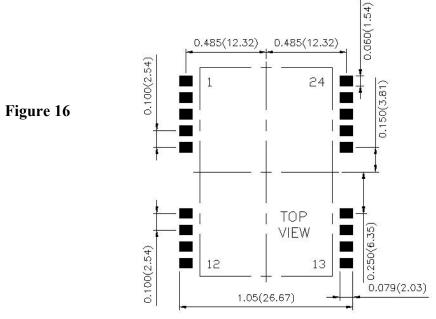
#### LANC48xxUW12

Component	Value	Voltage	Reference
C1	1.5µF	100V	1812 MLCC
C3, C4	1000pF	2KV	1206 MLCC
L1	325µH		Common Choke, P/N: PMT-050

#### **Recommended Pad Layout for DIP Type**



#### **Recommended Pad Layout for SMT Type**



- 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)

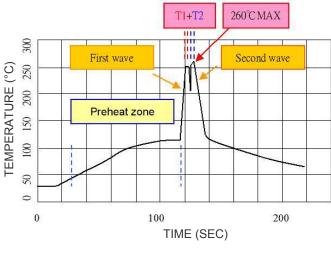


Figure 17

## **TECHNICAL DATASHEET LANC2412UW12**

#### **Soldering and Reflow Considerations:**

#### Lead Free Wave Solder Profile for DIP Type



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

Hand Welding:

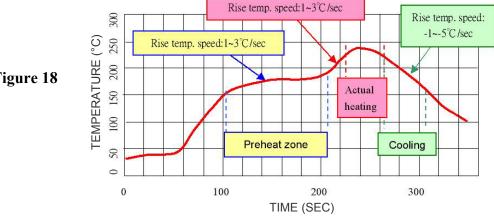
Soldering Iron: Power 90W Welding Time: 2~4 sec Temp: 380~400°C

	( /
Zone	Reference Parameter
Preheat	Rise temp. speed: 3°C/sec max.
Zone.	Preheat temp: 100~130°C

Peak temp: 250~260°C

Peak time (T1+T2 time): 4~6 sec

#### Lead free reflow profile for SMT type



Actual Heating

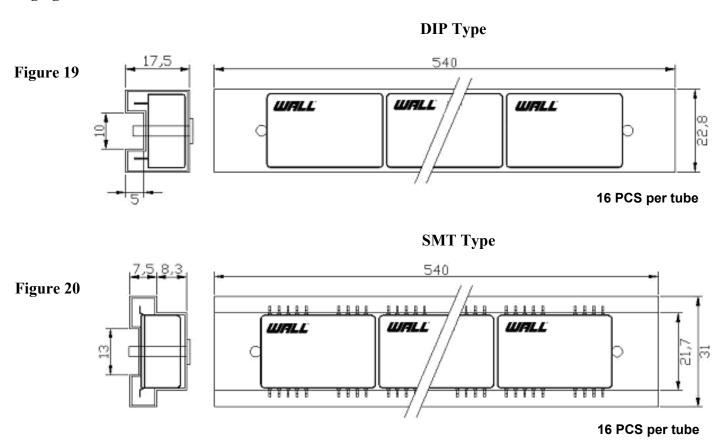
Figure 18

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

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



#### **Packaging Information:**



#### **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

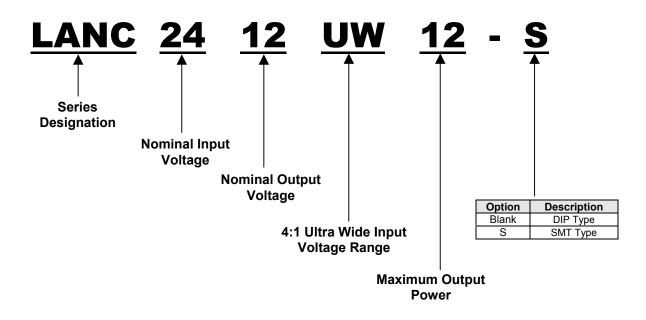
The MTBF of the LANCUW12 single output series of DC/DC converters has been calculated using Bellcore TR-NWT-000332 Case I: 50% stress, Operating Temperature at 40°C (Ground fixed and controlled environment). The resulting figure for MTBF is  $2.35 \times 10^6$  hours.

MIL-HDBK 217F NOTICE2 FULL LOAD, Operating Temperature at 25°C. The resulting figure for MTBF is  $8.745 \times 10^6$  hours.



#### **Ordering Information:**

Part Number Example:



#### **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:

E-mail: sales@wallindustries.com
Web: www.wallindustries.com
Address: 5 Watson Brook Rd.

Exeter, NH 03833