

LCD30W SERIES

DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE
UP TO 30Watts



FEATURES

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT ISOLATION
- SMALL SIZE AND LOW PROFILE : 1.0 x 1.0 x 0.39 INCH
- SIX-SIDED CONTINUOUS SHIELD
- UL60950-1, EN60950-1, & IEC60950-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

1600VDC ISOLATION	REMOTE CONTROL	UVP	OCP	SCP	OVP	OTP	LOW STANDBY POWER
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TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25°C otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load (1)
	VDC	VDC	mA	mA	%	µF
LCD30-24S3P3W	9 ~ 36	3.3	7000	10	88	10000
LCD30-24S05W	9 ~ 36	5	6000	10	89	7200
LCD30-24S12W	9 ~ 36	12	2500	10	89	1200
LCD30-24S15W	9 ~ 36	15	2000	10	89	1000
LCD30-24S24W	9 ~ 36	24	1250	10	90	375
LCD30-24D12W	9 ~ 36	±12	±1250	10	89	±750
LCD30-24D15W	9 ~ 36	±15	±1000	10	91	±500
LCD30-24D24W	9 ~ 36	±24	±625	12	91	±180
LCD30-48S3P3W	18 ~ 75	3.3	7000	10	88	10000
LCD30-48S05W	18 ~ 75	5	6000	10	90	7200
LCD30-48S12W	18 ~ 75	12	2500	8	90	1200
LCD30-48S15W	18 ~ 75	15	2000	8	91	1000
LCD30-48S24W	18 ~ 75	24	1250	8	92	375
LCD30-48D12W	18 ~ 75	±12	±1250	8	91	±750
LCD30-48D15W	18 ~ 75	±15	±1000	8	92	±500
LCD30-48D24W	18 ~ 75	±24	±625	10	92	±180

PART NUMBER STRUCTURE

LCD30	-	48	S	05	W	-	A	HS
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range		Option	Assembly Option
		24: 9~36 48: 18~75	S: Single D: Dual	3P3: 3.3 05: 5 12: 12 15: 15 15: 24 12: ±12 15: ±15 24: ±24	4:1		□: Negative logic remote ON/OFF(Standard) A: Positive logic remote ON/OFF B: Without Ctrl pin C: Negative logic remote ON/OFF without Trim pin D: Without Ctrl & Trim pin E: Positive logic remote ON/OFF without Trim pin	□: No assembly HS: Heat-sink HC: Heat-sink with Clamp

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit	
Operating input voltage range	24Vin(nom)		9	24	36	VDC	
	48Vin(nom)		18	48	75		
Input reflected ripple current	Nominal input and Full load		30			mAp-p	
Start-up voltage	24Vin(nom)					9	
	48Vin(nom)						18
Shutdown voltage	24Vin(nom)		8			VDC	
	48Vin(nom)						16
Start up time	Constant resistive load	Power up	30			ms	
		Remote ON/OFF					30
Input surge voltage	1 second, max.	24Vin(nom)	50			VDC	
		48Vin(nom)					100
Input filter			Pi type				
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON	Open or 3 ~ 15VDC Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 15VDC			mA
		(Option)	DC-DC OFF				
		Negative logic	DC-DC ON				
		(Standard)	DC-DC OFF				
		Input current of Ctrl pin					
		Remote off input current		2.0	mA		

OUTPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit		
Voltage accuracy			-1.0		+1.0	%		
Line regulation	Low Line to High Line at Full Load	Single	-0.2		+0.2	%		
		Dual	-0.5		+0.5			
Load regulation	No Load to Full Load	Single	-0.2		+0.2	%		
		Dual	-1.0		+1.0			
		Single	-0.1		+0.1			
		Dual	-0.8		+0.8			
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0		+5.0	%		
Voltage adjustability ⁽²⁾	Single output	15Vout, 24Vout	-10		+20	%		
		Others	-10		+10			
Ripple and noise	Measured by 20MHz bandwidth	Single				mVp-p		
		With a 22μF/25V X7R MLCC					3.3Vout, 5Vout	75
		With 2 pcs of 22μF/25V X7R MLCC					12Vout, 15Vout	75
		With 2 pcs of 6.8μF/50V X7R MLCC					24Vout	75
		Dual					12Vout, ±15Vout	60
		With a 4.7μF/50V X7R MLCC for each output					24Vout	75
Temperature coefficient			-0.02		+0.02	%/°C		
Transient response recovery time	25% load step change		250			μs		
Over voltage protection	3.3Vout		3.7		5.4	VDC		
	5Vout		5.6		7.0			
	12Vout		13.5		19.6			
	15Vout		18.3		22.0			
	24Vout		29.1		32.5			
Over load protection	% of Iout rated; Hiccup mode		170			%		
Short circuit protection			Continuous, automatic recovery					

GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600	VDC		
		Input(Output) to Case	1000			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance			1500			pF
Switching frequency	3.3Vout, 5Vout		248	275	303	kHz
	Others		297	330	363	
Safety approvals			UL60950-1 EN60950-1 IEC60950-1			
Case material			Copper			
Base material			FR4 PCB			
Potting material			Silicone (UL94 V-0)			
Weight			16.5g (0.58oz)			
MTBF	MIL-HDBK-217F, Full load		1.259 x 10 ⁶ hrs			

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-40		+50	°C
	With derating	+50		+100	
Maximum case temperature				105	°C
Over temperature protection			115		°C
Storage temperature range		-55		+125	°C
Thermal impedance	Vertical direction by natural convection (20LFM)	Without heat-sink	15.0		°C/W
		With heat-sink	13.8		
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

EMC SPECIFICATIONS

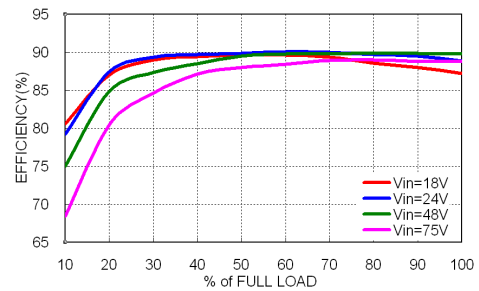
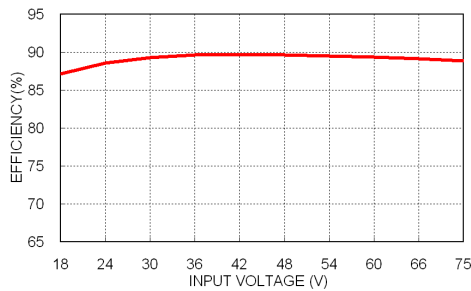
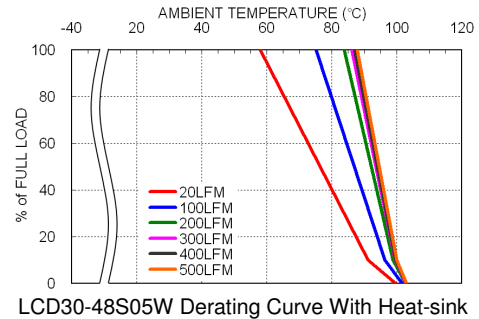
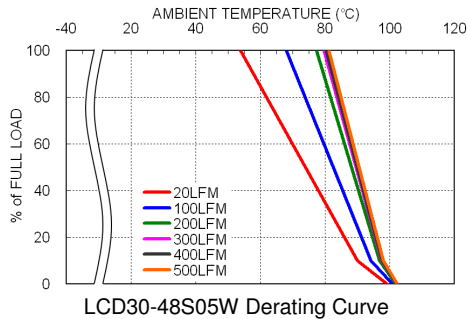
Parameter	Conditions	Level
EMI (3)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge (4)	EN61000-4-5 ± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10 Vr.m.s	Perf. Criteria A

Note:

1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
4. The external input components are required if the module has to meet EN61000-4-4, EN61000-4-5.
The LCD30-24XXXW recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.
The LCD30-48XXXW recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V).

CAUTION: This power module is not internally fused. An input line fuse must always be used.

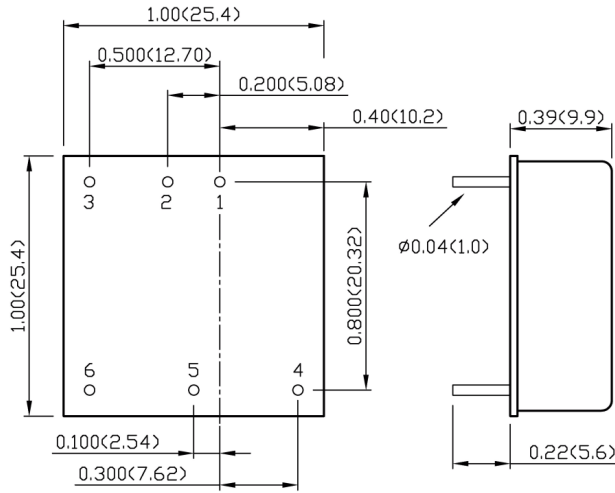
CHARACTERISTIC CURVE



LCD30-48S05W Efficiency vs. Input Voltage

LCD30-48S05W Efficiency vs. Output Load

MECHANICAL DRAWING



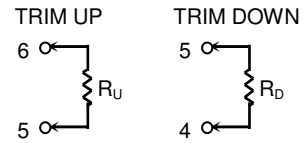
BOTTOM VIEW

PIN CONNECTION

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Ctrl	Ctrl
4	+Vout	+Vout
5	Trim	Common
6	-Vout	-Vout

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.



1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)