

LCD30 SERIES

DC-DC CONVERTER

2:1 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
LCD30-12S3P3	9 ~ 18	3.3	7000	10	87	10000
LCD30-12S05	9 ~ 18	5	6000	10	89	7200
LCD30-12S12	9 ~ 18	12	2500	12	89	1200
LCD30-12S15	9 ~ 18	15	2000	12	89	1000
LCD30-12S24	9 ~ 18	24	1250	12	90	375
LCD30-12D12	9 ~ 18	±12	±1250	12	89	±750
LCD30-12D15	9 ~ 18	±15	±1000	12	90	±500
LCD30-12D24	9 ~ 18	±24	±625	14	90	±180
LCD30-24S3P3	18 ~ 36	3.3	7000	10	87	10000
LCD30-24S05	18 ~ 36	5	6000	10	90	7200
LCD30-24S12	18 ~ 36	12	2500	10	91	1200
LCD30-24S15	18 ~ 36	15	2000	10	91	1000
LCD30-24S24	18 ~ 36	24	1250	10	93	375
LCD30-24D12	18 ~ 36	±12	±1250	10	91	±750
LCD30-24D15	18 ~ 36	±15	±1000	10	91	±500
LCD30-24D24	18 ~ 36	±24	±625	12	92	±180
LCD30-48S3P3	36 ~ 75	3.3	7000	10	88	10000
LCD30-48S05	36 ~ 75	5	6000	10	90	7200
LCD30-48S12	36 ~ 75	12	2500	8	90	1200
LCD30-48S15	36 ~ 75	15	2000	8	91	1000
LCD30-48S24	36 ~ 75	24	1250	8	92	375
LCD30-48D12	36 ~ 75	±12	±1250	8	91	±750
LCD30-48D15	36 ~ 75	±15	±1000	8	92	±500
LCD30-48D24	36 ~ 75	±24	±625	10	92	±180

PART NUMBER STRUCTURE

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Option	Assembly Option
LCD30 - 48 S 05 - A HS	12: 9~18 24: 18~36 48: 36~75	S: Single D: Dual	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 12: ±12 15: ±15 24: ±24	□: 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		12Vin(nom)	9	12	18	VDC
		24Vin(nom)	18	24	36	
		48Vin(nom)	36	48	75	
Input reflected ripple current	Nominal input and Full load		30			mAp-p
Start-up voltage		12Vin(nom)	9			VDC
		24Vin(nom)	18			
		48Vin(nom)	36			
Shutdown voltage		12Vin(nom)	8			VDC
		24Vin(nom)	16			
		48Vin(nom)	33			
Start up time	Constant resistive load	Power up Remote ON/OFF	30 30			ms
Input surge voltage	1 second, max.	12Vin(nom)	25			VDC
		24Vin(nom)	50			
		48Vin(nom)	100			
Input filter			Pi type			
Remote ON/OFF	Referred to –Vin pin	Positive logic (Option)	DC-DC ON	Open or 3 ~ 15VDC		mA
			DC-DC OFF	Short or 0 ~ 1.2VDC		
		Negative logic (Standard)	DC-DC ON	Short or 0 ~ 1.2VDC		
			DC-DC OFF	Open or 3 ~ 15VDC		
		Input current of Ctrl pin	-0.5		1.0	
		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	
	10% Load to 90%Load	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					mVp-p
	With a 22μF/25V X7R MLCC	Single				
		3.3Vout, 5Vout		75		
		12Vout, 15Vout		75		
	With 2 pcs of 22μF/25V X7R MLCC	24Vout		75		
		Dual				
		12Vout, 15Vout		60		
		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			140		%
Short circuit protection			Continuous, automatic recovery			

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute Input to Output Input(Output) to Case	1600 1000			VDC
Isolation resistance	500VDC	1			GΩ
Isolation capacitance				1500	pF
Switching frequency	3.3Vout, 5Vout Others	248 297	275 330	303 363	kHz
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				1.303 x 10 ⁶ hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating With derating	-40 +50		+50 +100	°C
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 With heat-sink		15.0 13.8		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

EMC SPECIFICATIONS

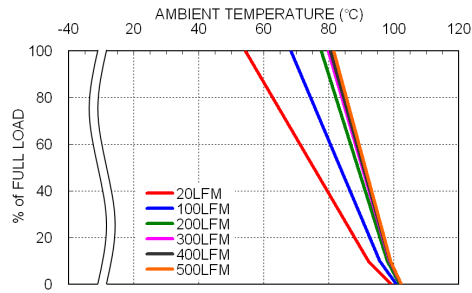
Parameter	Conditions	Level
EMI ⁽³⁾	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge ⁽⁴⁾	EN61000-4-5 ± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

Note:

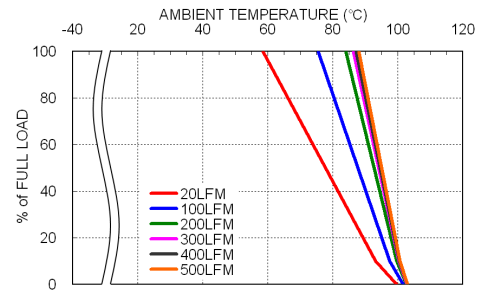
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class 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 LCD30-12XXX 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 LCD30-24XXX and LCD30-48XXX 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.

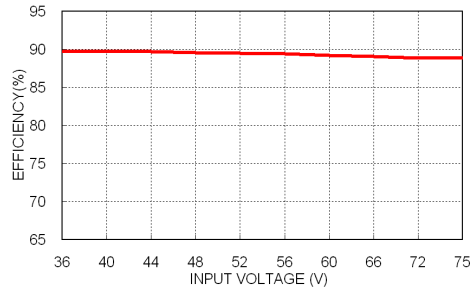
CHARACTERISTIC CURVE



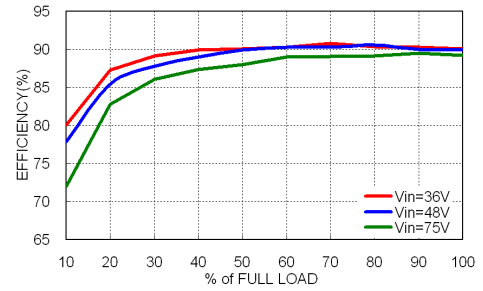
LCD30-48S05 Derating Curve



LCD30-48S05 Derating Curve With Heat-sink

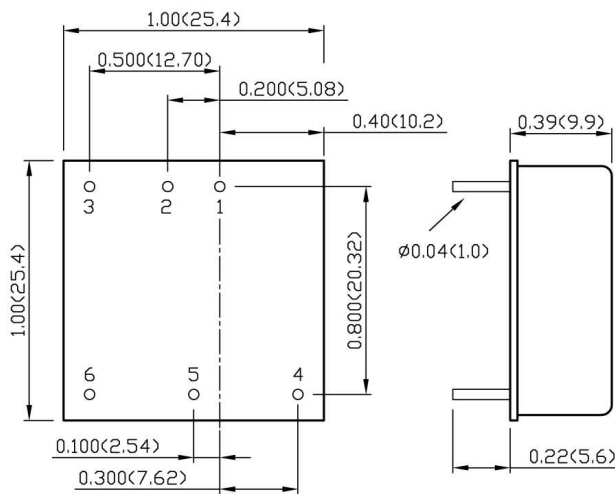


LCD30-48S05 Efficiency vs. Input Voltage



LCD30-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



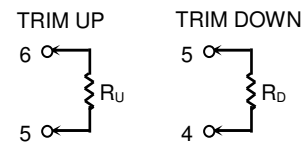
BOTTOM VIEW

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.xx±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)