

LCD15 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE
UP TO 15Watts



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

TECHNICAL SPECIFICATION

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

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load mA	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load (1) µF
LCD15-12S3P3	9 ~ 18	3.3	4000	120	84	12000
LCD15-12S05	9 ~ 18	5	3000	90	88	6000
LCD15-12S12	9 ~ 18	12	1300	30	86	1000
LCD15-12S15	9 ~ 18	15	1000	30	88	660
LCD15-12S24	9 ~ 18	24	625	12	90	200
LCD15-12D05	9 ~ 18	±5	±1500	30	85	±3000
LCD15-12D12	9 ~ 18	±12	±625	30	87	±520
LCD15-12D15	9 ~ 18	±15	±500	30	88	±330
LCD15-12D24	9 ~ 18	±24	±315	17	90	±100
LCD15-24S3P3	18 ~ 36	3.3	4000	50	86	12000
LCD15-24S05	18 ~ 36	5	3000	65	88	6000
LCD15-24S12	18 ~ 36	12	1300	20	87	1000
LCD15-24S15	18 ~ 36	15	1000	20	88	660
LCD15-24S24	18 ~ 36	24	625	10	90	200
LCD15-24D05	18 ~ 36	±5	±1500	15	85	±3000
LCD15-24D12	18 ~ 36	±12	±625	15	88	±520
LCD15-24D15	18 ~ 36	±15	±500	25	88	±330
LCD15-24D24	18 ~ 36	±24	±315	12	90	±100
LCD15-48S3P3	36 ~ 75	3.3	4000	25	86	12000
LCD15-48S05	36 ~ 75	5	3000	35	88	6000
LCD15-48S12	36 ~ 75	12	1300	12	88	1000
LCD15-48S15	36 ~ 75	15	1000	12	88	660
LCD15-48S24	36 ~ 75	24	625	10	91	200
LCD15-48D05	36 ~ 75	±5	±1500	12	85	±3000
LCD15-48D12	36 ~ 75	±12	±625	15	89	±520
LCD15-48D15	36 ~ 75	±15	±500	20	88	±330
LCD15-48D24	36 ~ 75	±24	±315	10	90	±100

PART NUMBER STRUCTURE

LCD15 - 48 S 05 - A HS

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Option	Assembly Option
	12: 9~18 24: 18~36 48: 36~75	S: Single D: Dual	3P3: 3.3 05: 5 12: 12 15: 15 24: 24 05: ±5 12: ±12 15: ±15 24: ±24	<input type="checkbox"/> : 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	<input type="checkbox"/> : No Assembly Option HS : Heat-sink HC : Heat-sink & 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)	14.5				
	48Vin(nom)	30.5				
Start up time	Constant resistive load	Power up	30		ms	
		Remote ON/OFF	30			
Input surge voltage	100ms, max.	12Vin(nom)	36			VDC
		24Vin(nom)	50			
		48Vin(nom)	100			
Input filter		Pi type				
Remote ON/OFF	Referred to -Vin pin	Positive logic DC-DC ON (Option)	Open or 3 ~ 15VDC			mA
		Negative logic DC-DC ON (Standard)	Short or 0 ~ 1.2VDC			
		DC-DC OFF	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	2.5			

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		%	
		Dual	+0.5			
Load regulation	No Load to Full Load	Single	+0.2		%	
		Dual	+1.0			
Cross regulation	Asymmetrical load 25%/100% FL	-5.0	+5.0		%	
Voltage adjustability (2)	Single output	24Vout	+20		%	
		Others	+10			
Ripple and noise	Measured by 20MHz bandwidth	Single	3.3Vout, 5Vout	75		mVp-p
			12Vout, 15Vout	100		
			24Vout	100		
		Dual	24Vout	100		
			others	100		
			others	100		
Temperature coefficient		-0.02	+0.02		%/°C	
Transient response recovery time	25% load step change	250			µs	
Over voltage protection		3.3Vout	3.7		VDC	
		5Vout	5.6			
		12Vout	13.5			
		15Vout	16.8			
		24Vout	29.1			
Over load protection	% of lout rated; Hiccup mode	150			%	
Short circuit protection		Continuous, automatics 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				1000	pF
Switching frequency		360	400	440	kHz
Safety approvals	Pending: LCD15-□□S24, LCD15-□□D24				UL60950-1 EN60950-1 IEC60950-1
Case material					Nickel-coated copper
Base material					FR4 PCB
Potting material					Epoxy (UL94 V-0)
Weight					15g (0.53oz)
MTBF	MIL-HDBK-217F, Full load				1.600 x 10 ⁶ hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating With derating	-40 +60		+60 +105	°C
Maximum case temperature				105	°C
Storage temperature range		-55		+125	°C
Thermal impedance	Natural convection (20LFM) Without heat-sink With heat-sink		18.2 15.8		°C/W
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

EMC SPECIFICATIONS

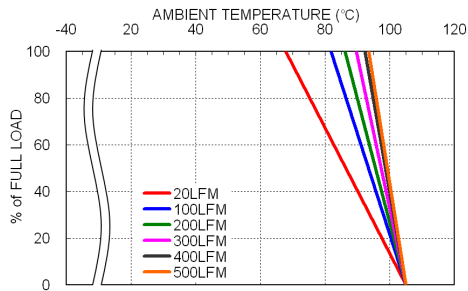
Parameter	Conditions	Level
EMI ⁽³⁾	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge ⁽⁴⁾	EN61000-4-5 ± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 3 Vr.m.s	Perf. Criteria A

Note:

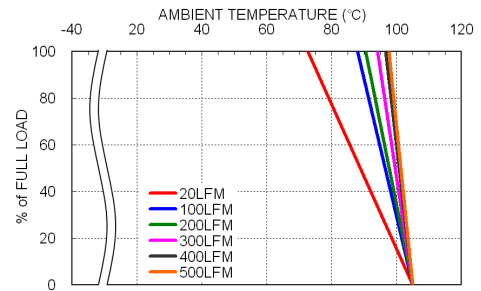
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
4. An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220μF/100V.

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

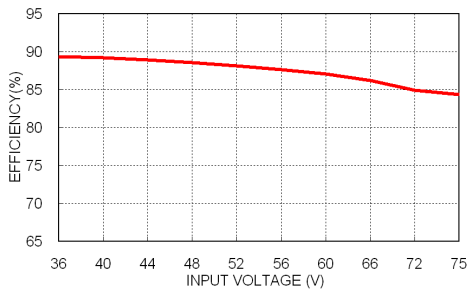
CHARACTERISTIC CURVE



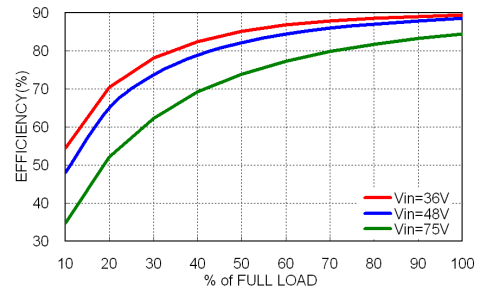
LCD15-48S05 Derating Curve



LCD15-48S05 Derating Curve With Heat-sink

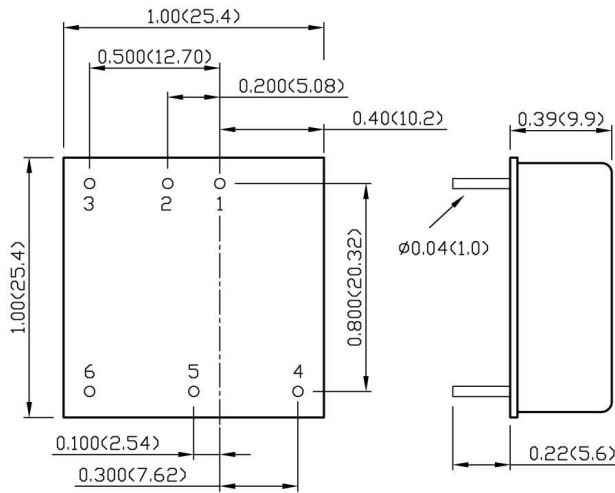


LCD15-48S05 Efficiency vs. Input Voltage



LCD15-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



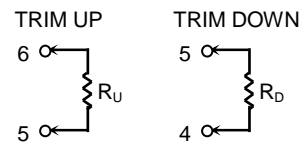
BOTTOM VIEW

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.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)