

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
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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
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	91	±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	□: 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	□: None 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			mA
		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	-10		%	
		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		
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

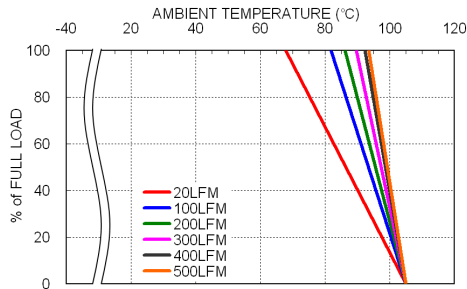
Parameter	Conditions	Level
EMI ⁽³⁾	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge ⁽⁴⁾	EN61000-4-5 ± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 3 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8 100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

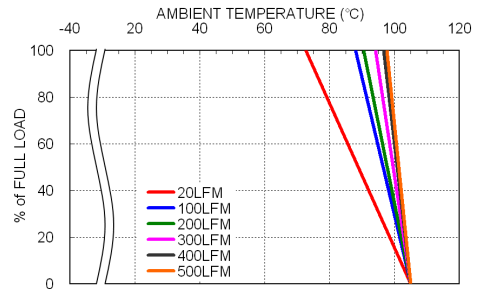
- Test by minimum input and constant resistive load.
- Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
- The standard modules meet EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
- 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.

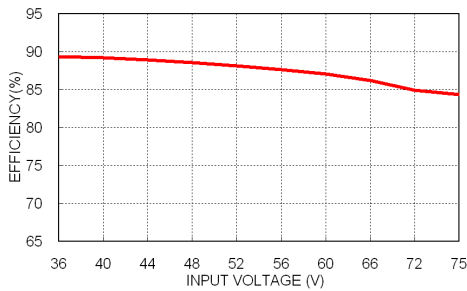
CHARACTERISTIC CURVE



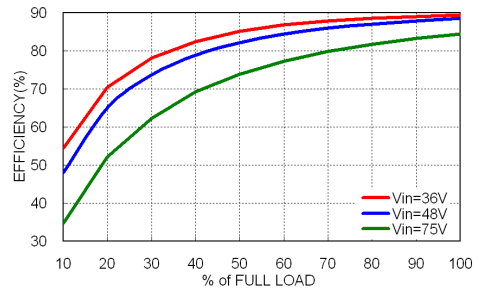
LCD15-48S05 Derating Curve



LCD15-48S05 Derating Curve With Heat-sink

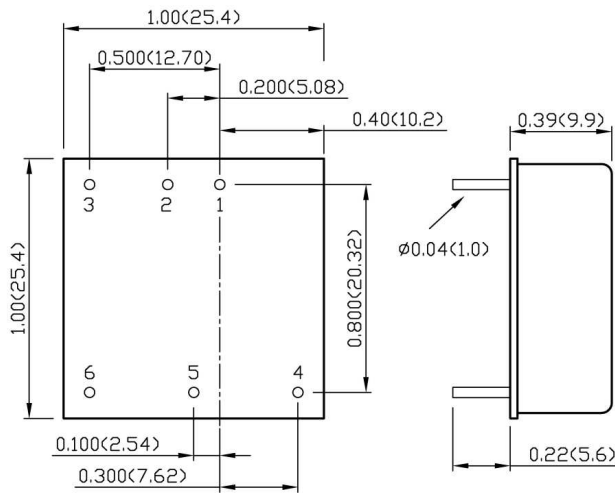


LCD15-48S05 Efficiency vs. Input Voltage



LCD15-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



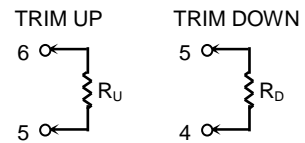
BOTTOM VIEW

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.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)