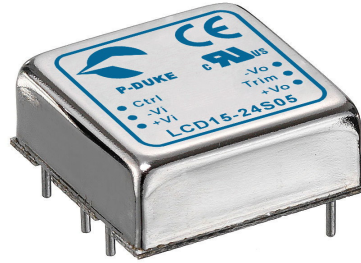


# LCD15 SERIES

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
LCD15-12D05	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
LCD15-24S3P3	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
LCD15-24D05	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
LCD15-48S3P3	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
LCD15-48D05	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

## 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 05: ±5 12: ±12 15: ±15		□: 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 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 (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	2.5				

## 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		+0.2	%
		Dual	-0.5		+0.5	%
Load regulation	No Load to Full Load	Single	-0.2		+0.2	%
		Dual	-1.0		+1.0	%
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0		+5.0	%
Voltage adjustability (2)	Single output		-10		+10	%
Ripple and noise	Measured by 20MHz bandwidth; With a 1µF M/C X7R and a 10µF T/C		Single	3.3Vout, 5Vout	75	mVp-p
			Dual	Others	100	
				All	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		5.4	VDC
	5Vout		5.6		7.0	
	12Vout		13.5		19.6	
	15Vout		16.8		20.5	
Over load protection	% of lout rated; Hiccup mode		150			%
Short circuit protection						Continuous, automatic recovery

## GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600			
		Input(Output) to Case	1000			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance			1000			pF
Switching frequency			360	400	440	kHz
Safety approvals						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 <sup>6</sup> hrs

**ENVIRONMENTAL SPECIFICATIONS**

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

**EMC SPECIFICATIONS**

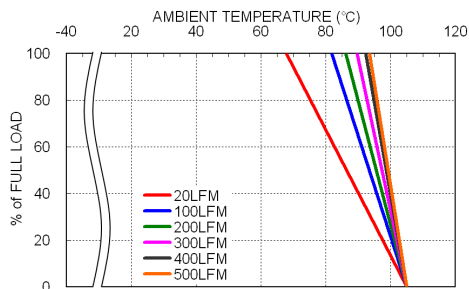
Parameter	Conditions	Level
EMI <sup>(3)</sup>	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient <sup>(4)</sup>	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge <sup>(4)</sup>	EN61000-4-5 ± 1kV	Perf. Criteria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

**Note:**

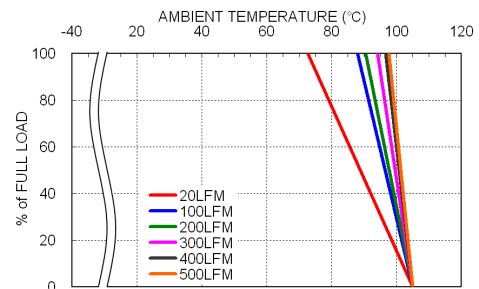
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class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

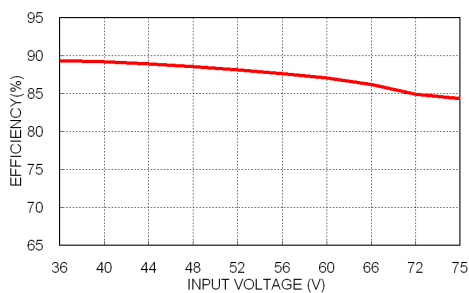
**CHARACTERISTIC CURVE**



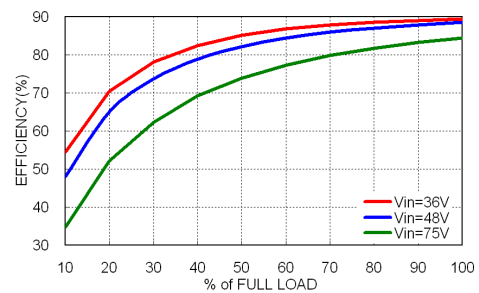
LCD15-48S05 Derating Curve



LCD15-48S05 Derating Curve With Heat-sink

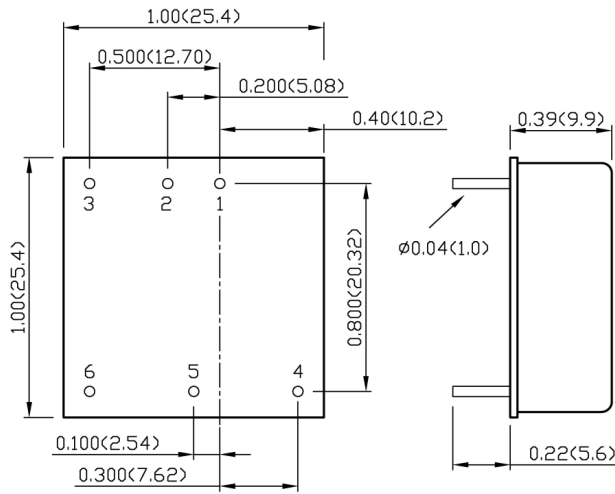


LCD15-48S05 Efficiency vs. Input Voltage



LCD15-48S05 Efficiency vs. Output Load

**MECHANICAL DRAWING**



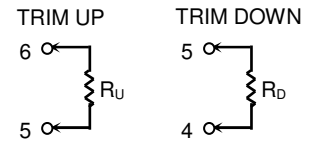
BOTTOM VIEW

**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)