

# LCD10W SERIES

DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE  
UP TO 10Watts



## 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
- BUILT-IN EN55022 CLASS B FILTER
- 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	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
LCD10-24S3P3W	9 ~ 36	3.3	3000	6	85	3500
LCD10-24S05W	9 ~ 36	5	2000	6	87	2500
LCD10-24S12W	9 ~ 36	12	830	6	90	430
LCD10-24S15W	9 ~ 36	15	670	6	91	350
LCD10-24S24W	9 ~ 36	24	416	6	90	125
LCD10-24D05W	9 ~ 36	±5	±1000	6	87	±1440
LCD10-24D12W	9 ~ 36	±12	±416	6	89	±250
LCD10-24D15W	9 ~ 36	±15	±333	6	89	±180
LCD10-48S3P3W	18 ~ 75	3.3	3000	4	85	3500
LCD10-48S05W	18 ~ 75	5	2000	4	87	2500
LCD10-48S12W	18 ~ 75	12	830	4	90	430
LCD10-48S15W	18 ~ 75	15	670	4	90	350
LCD10-48S24W	18 ~ 75	24	416	4	90	125
LCD10-48D05W	18 ~ 75	±5	±1000	4	87	±1440
LCD10-48D12W	18 ~ 75	±12	±416	4	89	±250
LCD10-48D15W	18 ~ 75	±15	±333	4	89	±180

## PART NUMBER STRUCTURE

LCD10	-	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	3P3: 3.3 05: 5 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 Option HS: Heat-sink HC: Heat-sink & Clamp
			D: Dual	05: ±5 12: ±12 15: ±15				

## 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			VDC
	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			
Remote ON/OFF	Referred to -Vin pin	Positive logic	Open or 3 ~ 15VDC			mA
		DC-DC ON (Option)	Short or 0 ~ 1.2VDC			
		DC-DC OFF	Short or 0 ~ 1.2VDC			
		Negative logic (Standard)	Open or 3 ~ 15VDC			
		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
Output power	Output voltage trimmed up 10%		11			W
	Output voltage trimmed up 20%		12			
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	3.3Vout, 12Vout	-10	+10		%
		Others	-10	+20		
Ripple and noise	Measured by 20MHz bandwidth With a 10µF/25V X7R 1206 MLCC	3.3Vout, 5Vout	40			mVp-p
		12Vout, 15Vout	60			
	With a 1µF/50V X7R 1206 MLCC	24Vout	60			
Temperature coefficient			-0.02	+0.02		%/°C
Transient response recovery time	25% load step change		250			µs
Over voltage protection			3.7	5.4		VDC
			6.3	7.4		
			13.5	19.6		
			18.3	22.0		
			29.1	32.5		
Over load protection	% of Iout 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			VDC
		Input(Output) to Case	1000			
Isolation resistance	500VDC		1			GΩ
Isolation capacitance			1500			pF
Switching frequency			297	330	363	kHz
Safety approvals			UL60950-1 EN60950-1 IEC60950-1			
Case material			Copper			
Base material			FR4 PCB			
Potting material			Epoxy (UL94 V-0)			
Weight			16.5g (0.58oz)			
MTBF	MIL-HDBK-217F, Full load		3.376 x 10 <sup>6</sup> hrs			

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-40		+81	°C
	With derating	+81		+105	
Maximum case temperature				105	°C
Storage temperature range		-55		+125	°C
Thermal impedance	Vertical direction by natural convection (20LFM)		16.18		°C/W
	With heat-sink		15.13		
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

**EMC SPECIFICATIONS**

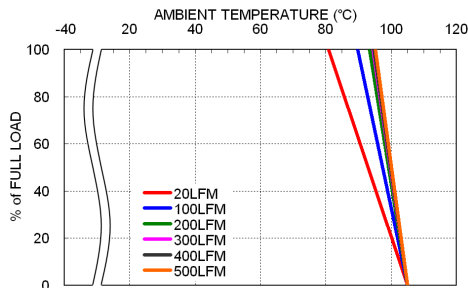
Parameter	Conditions	Level
EMI (3)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge (4)	EN61000-4-5 ± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

**Note:**

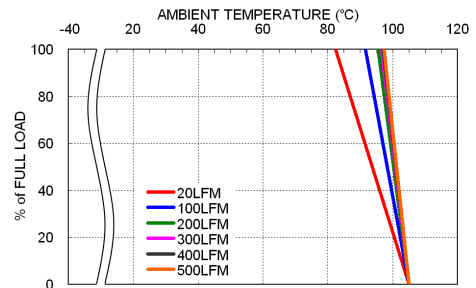
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
3. The standard modules meet EN55022 Class A without external components and meet 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.

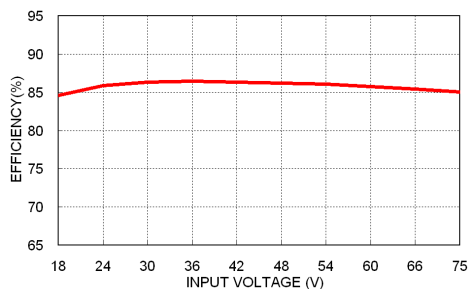
**CHARACTERISTIC CURVE**



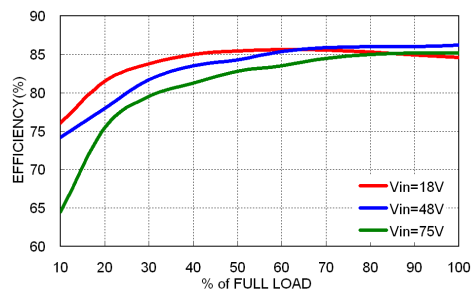
LCD10-48S05W Derating Curve



LCD10-48S05W Derating Curve With Heat-sink

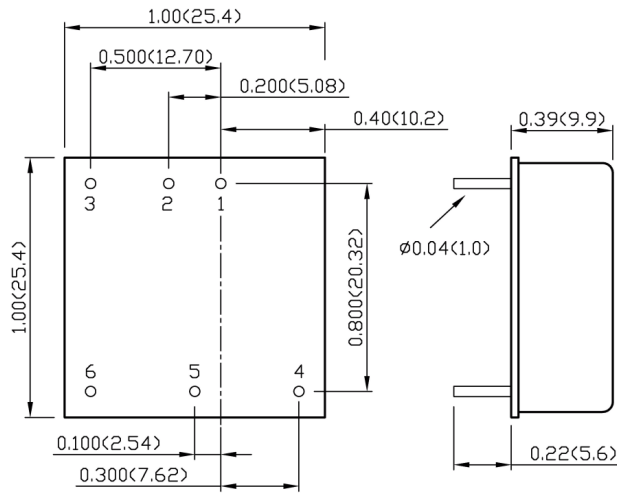


LCD10-48S05W Efficiency vs. Input Voltage



LCD10-48S05W Efficiency vs. Output Load

**MECHANICAL DRAWING**



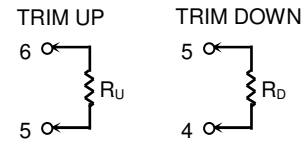
BOTTOM VIEW

**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)