

# LCD20W SERIES

DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE  
UP TO 20Watts



## 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
- MEET EN55022 CLASS A WITHOUT EXTERNAL COMPONENTS
- 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

## 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
LCD20-24S3P3W	9 ~ 36	3.3	4500	10	89	7000
LCD20-24S05W	9 ~ 36	5	4000	10	89	5000
LCD20-24S12W	9 ~ 36	12	1670	6	89	850
LCD20-24S15W	9 ~ 36	15	1330	6	89	700
LCD20-24S24W	9 ~ 36	24	833	10	91	220
LCD20-24D12W	9 ~ 36	±12	±833	6	89	±500
LCD20-24D15W	9 ~ 36	±15	±667	6	90	±350
LCD20-24D24W	9 ~ 36	±24	±417	12	91	±100
LCD20-48S3P3W	18 ~ 75	3.3	4500	10	90	7000
LCD20-48S05W	18 ~ 75	5	4000	10	90	5000
LCD20-48S12W	18 ~ 75	12	1670	4	89	850
LCD20-48S15W	18 ~ 75	15	1330	4	90	700
LCD20-48S24W	18 ~ 75	24	833	8	91	220
LCD20-48D12W	18 ~ 75	±12	±833	4	89	±500
LCD20-48D15W	18 ~ 75	±15	±667	4	90	±350
LCD20-48D24W	18 ~ 75	±24	±417	10	91	±100

## PART NUMBER STRUCTURE

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Option	Assembly Option
LCD20 - 48 S 05 W - A HS	24: 9~36 48: 18~75	S: Single  D: Dual	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	□: None HS: Heat-sink HC: Heat-sink with Clamp

**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	
	48Vin(nom)						18
Shutdown voltage	24Vin(nom)					8	
	48Vin(nom)						16
Start up time	Constant resistive load	Power up				30	
		Remote ON/OFF					30
Input surge voltage	1 second, max.	24Vin(nom)				50	
		48Vin(nom)					100
Input filter	Pi type						
Remote ON/OFF	Referred to -Vin pin	Positive logic	DC-DC ON				Open or 3 ~ 15VDC
		(Option)	DC-DC OFF				
		Negative logic	DC-DC ON				
		(Standard)	DC-DC OFF				
		Short or 0 ~ 1.2VDC					
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	24Vout	-10		+20	%				
		Others	-10		+10					
Ripple and noise	Measured by 20MHz bandwidth									
	With a 1µF M/C X7R and a 10µF T/C	Single					75			
		3.3Vout, 5Vout, 12Vout, 15Vout, 24Vout								
	With 2 pcs of 6.8µF/50V X7R MLCC	Single					75			
		24Vout								
With a 1µF M/C X7R and a 10µF T/C for each output	Dual	100								
	12Vout, 15Vout, 24Vout									
With a 4.7µF/50V X7R MLCC for each output	Dual	100								
24Vout										
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					
	24Vout		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 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
	Pending: LCD20-□□S24W, LCD20-□□D24W					
Case material						Nickel-coated copper
Base material						FR4 PCB
Potting material						Silicone (UL94 V-0)
Weight						15g (0.53oz)
MTBF	MIL-HDBK-217F, Full load					1.469 x 10 <sup>6</sup> hrs

## ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature		Without derating With derating	-40 +60		+60 +101	°C
Maximum case temperature					105	°C
Storage temperature range			-55		+125	°C
Thermal impedance	Natural convection (20LFM)	Without heat-sink With heat-sink		17.6 14.8		°C/W
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

## EMC SPECIFICATIONS

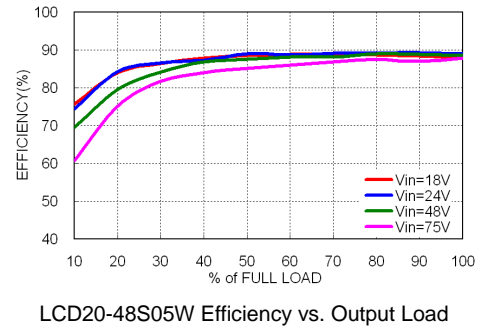
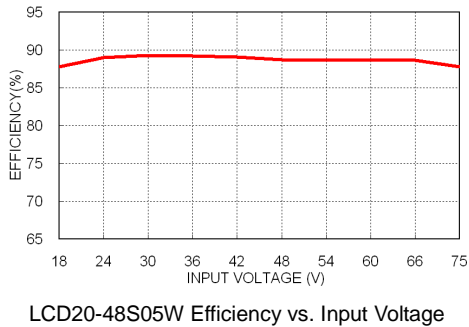
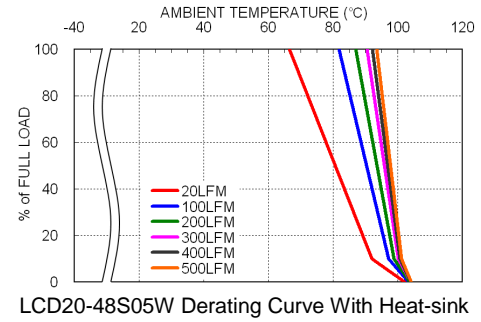
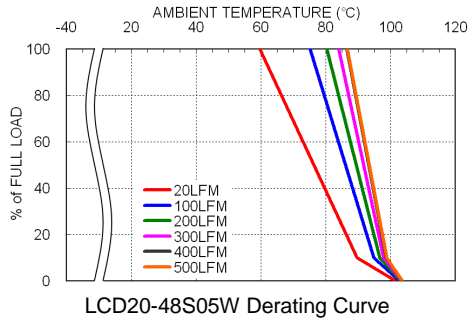
Parameter	Conditions		Level
EMI <sup>(3)</sup>	EN55022		Class A, Class B
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient <sup>(4)</sup>	EN61000-4-4	± 2kV	Perf. Criteria A
Surge <sup>(4)</sup>	EN61000-4-5	± 2kV	Perf. Criteria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

### Note:

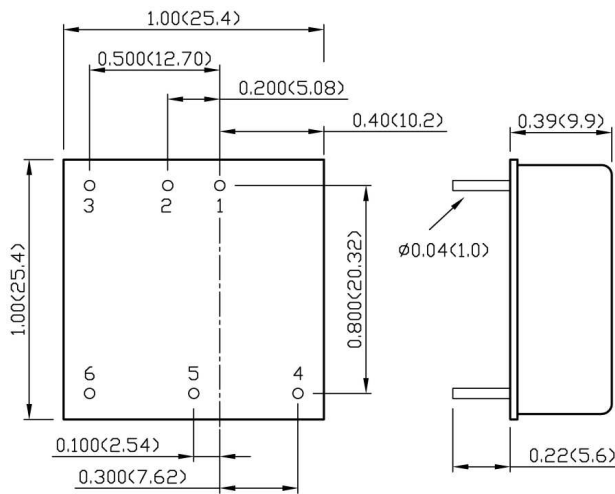
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard module meets EN55022 Class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



## MECHANICAL DRAWING



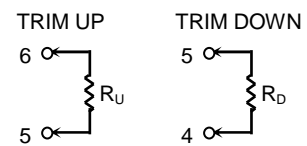
BOTTOM VIEW

### 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)