

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

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Option	Assembly Option
LCD10 - 48 S 05 W - A HS	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	□: None 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 (Option)	DC-DC ON	Open or 3 ~ 15VDC Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 15VDC	
			DC-DC OFF		
		Negative logic (Standard)	DC-DC ON		
			DC-DC OFF		
		Input current of Ctrl pin	-0.5		
	Remote off input current		2.5	mA	

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		3.3Vout	3.7	5.4	VDC
		5Vout	6.3	7.4	
		12Vout	13.5	19.6	
		15Vout	18.3	22.0	
		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	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 ⁶ 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

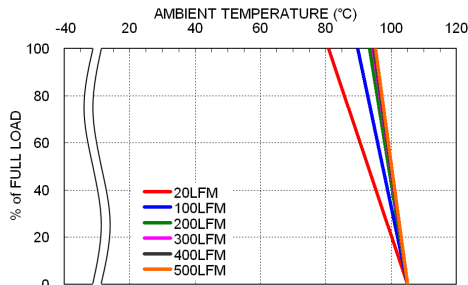
Parameter	Conditions	Level
EMI ⁽³⁾	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient ⁽⁴⁾	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge ⁽⁴⁾	EN61000-4-5 ± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

Note:

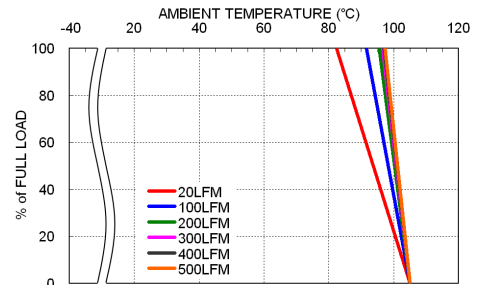
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either the +Vout pin or the -Vout pin.
3. The standard module meets EN55022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

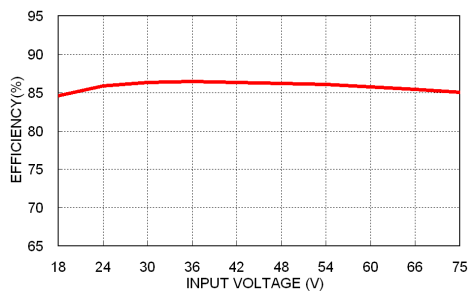
CHARACTERISTIC CURVE



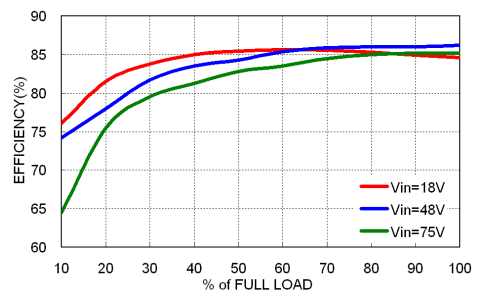
LCD10-48S05W Derating Curve



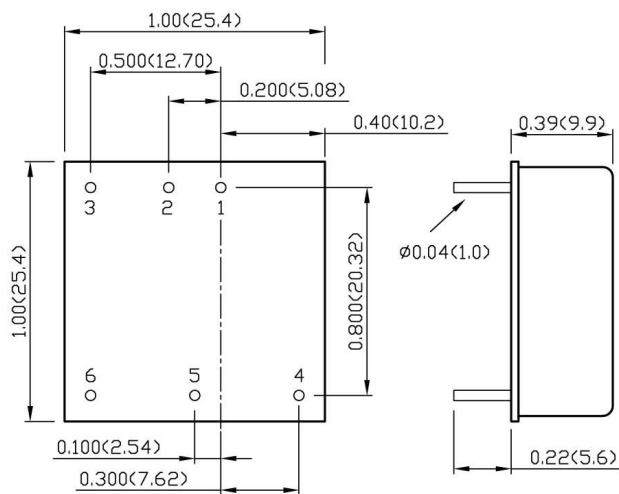
LCD10-48S05W Derating Curve With Heat-sink



LCD10-48S05W Efficiency vs. Input Voltage



LCD10-48S05W Efficiency vs. Output Load

MECHANICAL DRAWING


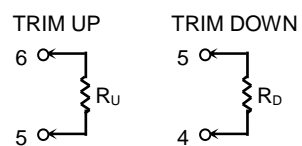
BOTTOM VIEW

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)