LCD10 SERIES

DC-DC CONVERTER

2:1 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

TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ 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
LCD10-12S3P3	9 ~ 18	3.3	3000	10	83	3500
LCD10-12S05	9 ~ 18	5	2000	10	86	2500
LCD10-12S12	9 ~ 18	12	830	10	89	430
LCD10-12S15	9 ~ 18	15	670	10	90	350
LCD10-12S24	9 ~ 18	24	416	10	91	125
LCD10-12D05	9 ~ 18	±5	±1000	10	86	±1440
LCD10-12D12	9 ~ 18	±12	±416	10	89	±250
LCD10-12D15	9 ~ 18	±15	±333	10	90	±180
LCD10-24S3P3	18 ~ 36	3.3	3000	6	85	3500
LCD10-24S05	18 ~ 36	5	2000	6	86	2500
LCD10-24S12	18 ~ 36	12	830	6	91	430
LCD10-24S15	18 ~ 36	15	670	6	90	350
LCD10-24S24	18 ~ 36	24	416	6	91	125
LCD10-24D05	18 ~ 36	±5	±1000	6	86	±1440
LCD10-24D12	18 ~ 36	±12	±416	6	90	±250
LCD10-24D15	18 ~ 36	±15	±333	6	90	±180
LCD10-48S3P3	36 ~ 75	3.3	3000	4	85	3500
LCD10-48S05	36 ~ 75	5	2000	4	87	2500
LCD10-48S12	36 ~ 75	12	830	4	90	430
LCD10-48S15	36 ~ 75	15	670	4	90	350
LCD10-48S24	36 ~ 75	24	416	4	91	125
LCD10-48D05	36 ~ 75	±5	±1000	4	87	±1440
LCD10-48D12	36 ~ 75	±12	±416	4	91	±250
LCD10-48D15	36 ~ 75	±15	±333	4	90	±180

PART NUMBER STRUCTURE

LCD10 - 48 S 05 - A HS

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Option	Assembly Option
	12: 9~18	**S:** Single	**3P3:** 3.3	□: Negative logic remote ON/OFF(Standard)	□: None
	24: 18~36		**05:** 5	**A:** Positive logic remote ON/OFF	**HS:** Heat-sink
	48: 36~75		**12:** 12	**B:** Without Ctrl pin	**HC:** Heat-sink & Clamp
			15: 15	**C:** Negative logic remote ON/OFF without Trim pin	
			24: 24	**D:** Without Ctrl & Trim pin	
		D: Dual	**05:** ±5	**E:** Positive logic remote ON/OFF without Trim pin	
			12: ±12		
			15: ±15		

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)		16		
		48Vin(nom)		33		
Start up time	Constant resistive load	Power up			30	ms
		Remote ON/OFF			30	
Input surge voltage	1 second, max.	12Vin(nom)			25	VDC
		24Vin(nom)			50	
		48Vin(nom)			100	
Remote ON/OFF	Referred to –Vin pin	Positive logic (Option) DC-DC ON		Open or 3 ~ 15VDC		
		Positive logic (Option) DC-DC OFF		Short or 0 ~ 1.2VDC		
		Negative logic (Standard) DC-DC ON		Short or 0 ~ 1.2VDC		
		Negative logic (Standard) DC-DC OFF		Open or 3 ~ 15VDC		
		Input current of Ctrl pin	-0.5		1.0	mA
		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	%/□
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, automatics 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					3.308 x 10^6 hrs

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature		Without derating With derating	-40 +78		+78 +105	℃
Maximum case temperature					105	℃
Storage temperature range			-55		+125	℃
Thermal impedance	Vertical direction by natural convection (20LFM)	Without heat-sink With heat-sink		16.18 15.13		℃/W
Thermal shock					MIL-STD-810F	
Vibration					MIL-STD-810F	
Relative humidity					5% to 95% RH	

EMC SPECIFICATIONS

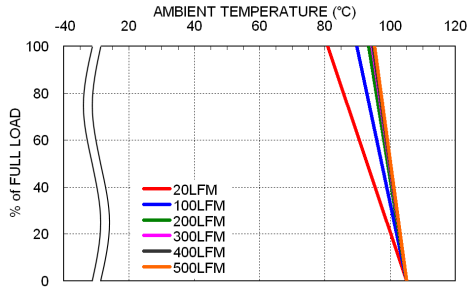
Parameter	Conditions		Level
EMI (3)	EN55022		Class A, Class B
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (4)	EN61000-4-5	± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

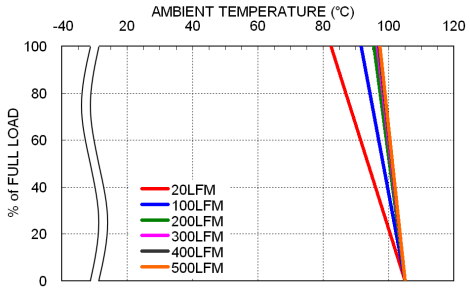
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class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

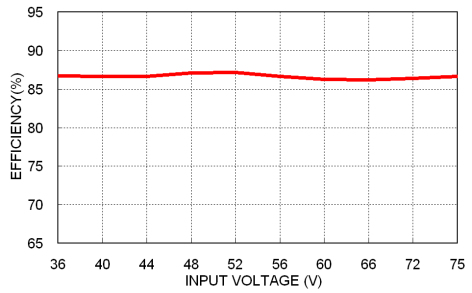
CHARACTERISTIC CURVE



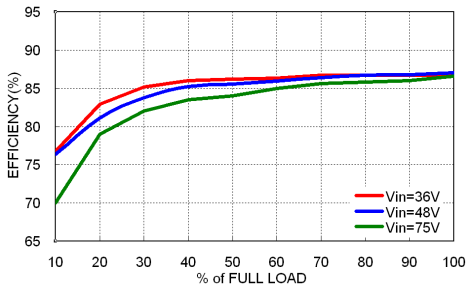
LCD10-48S05 Derating Curve



LCD10-48S05 Derating Curve With Heat-sink

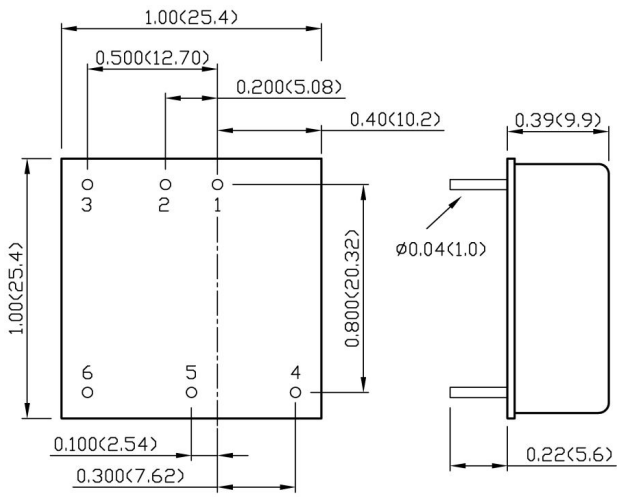


LCD10-48S05 Efficiency vs. Input Voltage



LCD10-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



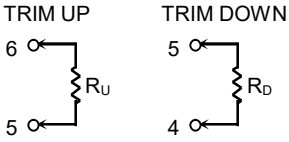
BOTTOM VIEW

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)