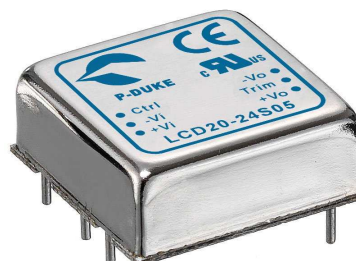


LCD20 SERIES

DC-DC CONVERTER

2:1 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
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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
LCD20-12S3P3	9 ~ 18	3.3	4500	10	89	7000
LCD20-12S05	9 ~ 18	5	4000	10	89	5000
LCD20-12S12	9 ~ 18	12	1670	10	89	850
LCD20-12S15	9 ~ 18	15	1330	10	89	700
LCD20-12D12	9 ~ 18	±12	±833	10	89	±500
LCD20-12D15	9 ~ 18	±15	±667	10	90	±350
LCD20-24S3P3	18 ~ 36	3.3	4500	10	90	7000
LCD20-24S05	18 ~ 36	5	4000	10	91	5000
LCD20-24S12	18 ~ 36	12	1670	6	90	850
LCD20-24S15	18 ~ 36	15	1330	6	91	700
LCD20-24D12	18 ~ 36	±12	±833	6	90	±500
LCD20-24D15	18 ~ 36	±15	±667	6	90	±350
LCD20-48S3P3	36 ~ 75	3.3	4500	10	90	7000
LCD20-48S05	36 ~ 75	5	4000	10	90	5000
LCD20-48S12	36 ~ 75	12	1670	4	90	850
LCD20-48S15	36 ~ 75	15	1330	4	90	700
LCD20-48D12	36 ~ 75	±12	±833	4	89	±500
LCD20-48D15	36 ~ 75	±15	±667	4	90	±350

PART NUMBER STRUCTURE

LCD20		-	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 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 HS: Heat-sink HC: Heat-sink with 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)	16				
		48Vin(nom)	33				
Start up time	Constant resistive load	Power up Remote ON/OFF	30 30			ms	
Input surge voltage	1 second, max.	12Vin(nom)	25			VDC	
		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			mA
		(Option)	DC-DC OFF	Short or 0 ~ 1.2VDC			
		Negative logic	DC-DC ON	Short or 0 ~ 1.2VDC			
		(Standard)	DC-DC OFF	Open or 3 ~ 15VDC			
		Input current of Ctrl pin	-0.5	1.0			
		Remote off input current		2.0			

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		-10		+10	%
Ripple and noise	Measured by 20MHz bandwidth With a 1μF M/C X7R and a 10μF T/C	3.3Vout, 5Vout		75		mVp-p
		12Vout, 15Vout		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 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		3.3Vout, 5Vout	248	275	303	kHz
		Others	297	330	363	
Safety approvals			UL60950-1 EN60950-1 IEC60950-1			
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		1.477 x 10 ⁶ 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	Vertical direction by 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

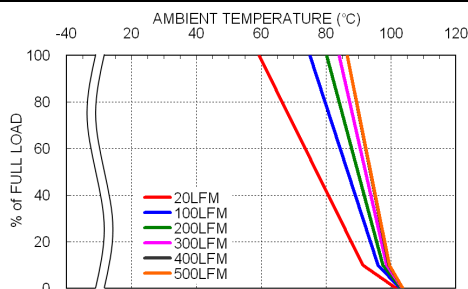
Parameter	Conditions	Level
EMI (3)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8 kV and Contact ± 6 kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4 ± 2 kV	Perf. Criteria A
Surge (4)	EN61000-4-5 ± 1 kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

Note:

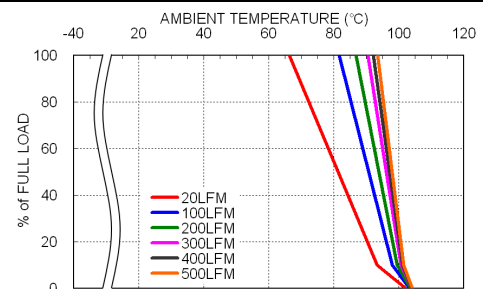
- Test by minimum input and constant resistive load.
- Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
- The standard modules meet EN55022 Class A without external components and meet Class B with external components.
For further information, please contact with P-DUKE.
- 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, 220 μ F/100V.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

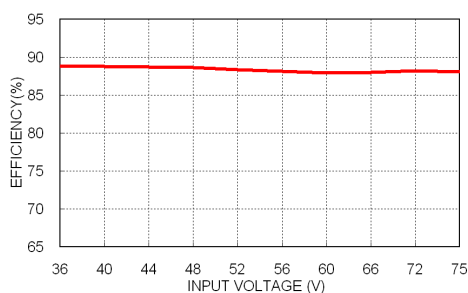
CHARACTERISTIC CURVE



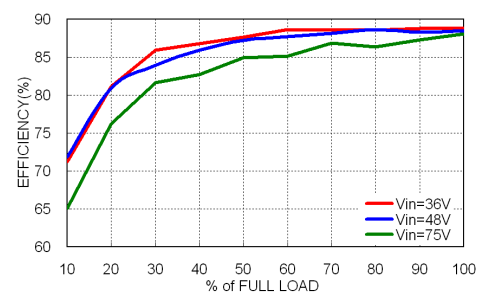
LCD20-48S05 Derating Curve



LCD20-48S05 Derating Curve With Heat-sink

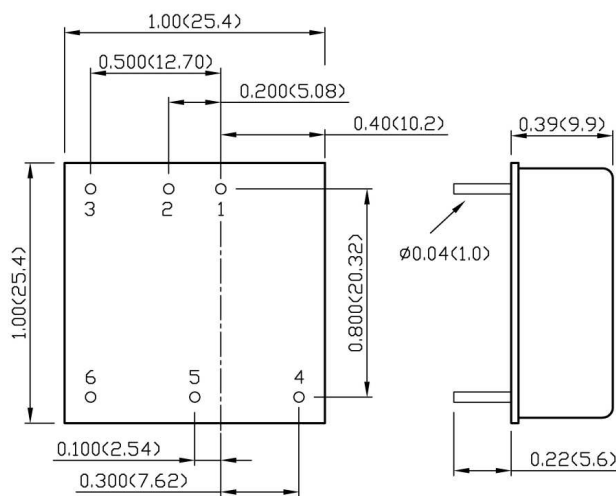


LCD20-48S05 Efficiency vs. Input Voltage



LCD20-48S05 Efficiency vs. Output Load

MECHANICAL DRAWING



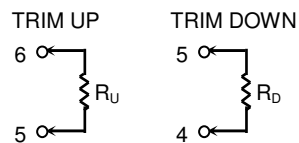
BOTTOM VIEW

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)