POWER MATE TECHNOLOGY CO., LTD.

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℃ otherwise noted

Model Number	Input Range VDC	Output Voltage VDC	Output Current @Full Load mA	Input Current @ No Load mA	Efficiency %	Maximum Capacitor Load (1) 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
LCD20-24D12W	9 ~ 36	±12	±833	6	89	±500
LCD20-24D15W	9 ~ 36	±15	±667	6	90	±350
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
LCD20-48D12W	18 ~ 75	±12	±833	4	89	±500
LCD20-48D15W	18 ~ 75	±15	±667	4	90	±350

PART NUMBER STRUCTURE

LCD20 - 48 S 05 W - A HS

Series Name

Input Voltage (VDC)
- **24:** 9~36
- **48:** 18~75

Output Quantity
- **S:** Single
- **D:** Dual

Output Voltage (VDC)
- **3P3:** 3.3
- **05:** 5
- **12:** 12
- **15:** 15
- **12:** ±12
- **15:** ±15

Input Range
- 4:1

Option
- □: 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

Assembly Option
- □: No assembly
- **HS:** Heat-sink
- **HC:** Heat-sink with Clamp

INPUT SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range		24Vin(nom) 48Vin(nom)	9 18	24 48	36 75	VDC
Input reflected ripple current	Nominal input and Full load			30		mAp-p
Start-up voltage		24Vin(nom) 48Vin(nom)			9 18	VDC
Shutdown voltage		24Vin(nom) 48Vin(nom)		8 16		VDC
Start up time	Constant resistive load	Power up Remote ON/OFF			30 30	ms
Input surge voltage	1 second, max.	24Vin(nom) 48Vin(nom)			50 100	VDC
Input filter				Pi type		
Remote ON/OFF	Referred to –Vin pin	Positive logic (Option) DC-DC ON DC-DC OFF Negative logic (Standard) DC-DC ON DC-DC OFF Input current of Ctrl pin Remote off input current	-0.5	Open or 3 ~ 15VDC Short or 0 ~ 1.2VDC Short or 0 ~ 1.2VDC Open or 3 ~ 15VDC 2.0	1.0	mA 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 Dual	-0.2 -0.5		+0.2 +0.5	%
Load regulation	No Load to Full Load 10% Load to 90% Load	Single Dual Single Dual	-0.2 -1.0 -0.1 -0.8		+0.2 +1.0 +0.1 +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 12Vout, 15Vout		75 100		mVp-p
Temperature coefficient			-0.02		+0.02	%/℃
Transient response recovery time	25% load step change			250		μs
Over voltage protection		3.3Vout 5Vout 12Vout 15Vout	3.7 5.6 13.5 16.8		5.4 7.0 19.6 20.5	VDC
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 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
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 10^6 hrs

ENVIRONMENTAL SPECIFICATIONS

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

EMC SPECIFICATIONS

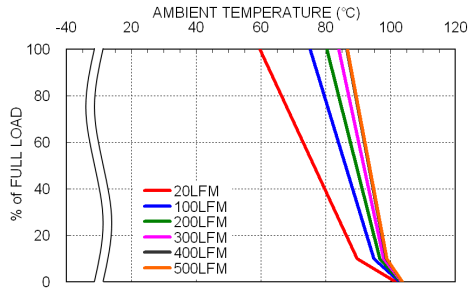
Parameter	Conditions		Level
EMI (3)	EN55022		Class A, Class B
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (4)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (4)	EN61000-4-5	± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

Note:

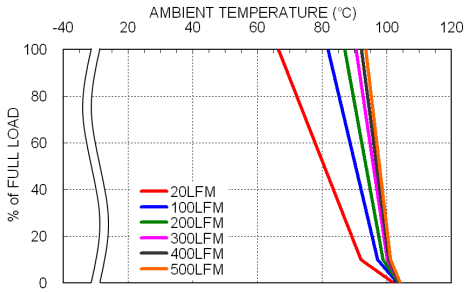
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The standard modules meet EN55022 Class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

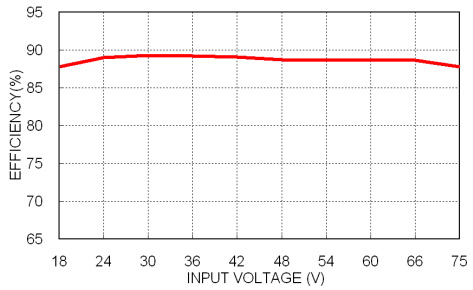
CHARACTERISTIC CURVE



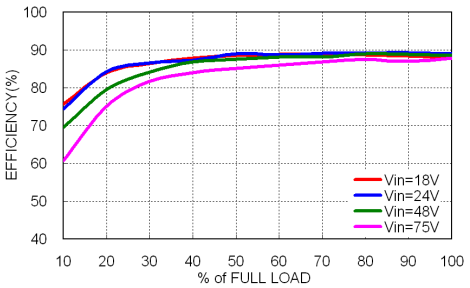
LCD20-48S05W Derating Curve



LCD20-48S05W Derating Curve With Heat-sink

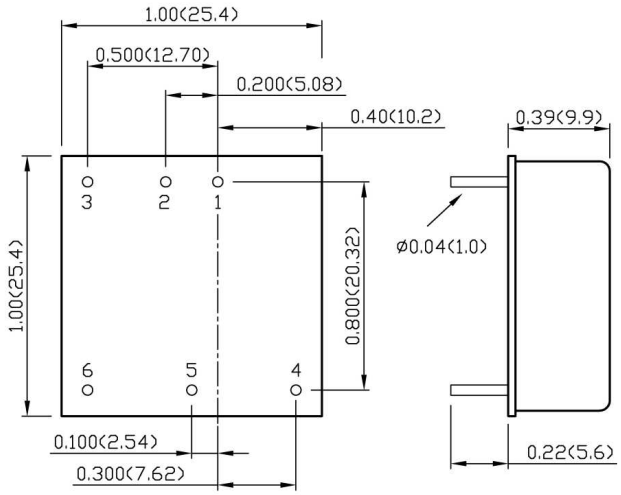


LCD20-48S05W Efficiency vs. Input Voltage



LCD20-48S05W Efficiency vs. Output Load

MECHANICAL DRAWING



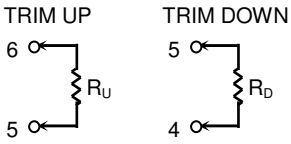
BOTTOM VIEW

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)