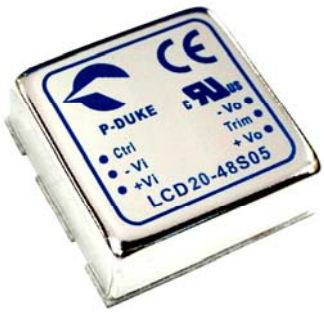
POWER MATE TECHNOLOGY CO., LTD.

LCD20 SERIES

20 WATTS DC-DC CONVERTER



FEATURES

- **20 WATTS MAXIMUM OUTPUT POWER**
- **ULTRA LOW QUIESCENT CURRENT**
- **SINGLE OUTPUT UP TO 4.5A**
- **SMALL SIZE AND LOW PROFILE：1.0 x 1.0 x 0.39 INCH**
- **HIGH EFFICIENCY UP TO 91%**
- **2:1 WIDE INPUT VOLTAGE RANGE**
- **SIX-SIDED CONTINUOUS SHIELD**
- **MEET EN55022 CLASS A WITHOUT EXTERNAL COMPONENTS**
- **FIXED SWITCHING FREQUENCY**
- **INPUT TO OUTPUT ISOLATION:1600VDC**
- **INDUSTRY STANDARD PIN-OUT LCD15 SERIES COMPATIBLE**
- **CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC**
- **SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1**
- **COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU**

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

OPTIONS

Positive logic Remote On/Off, Without trim, Without CTRL pin

DESCRIPTION

LCD20 DC/DC converters provide up to 20 watts of output power in an industry standard package and footprint. These units are specifically designed to meet the power needs of low profile. All models feature with 2:1 wide input voltage of 9~18 VDC, 18~36VDC and 36~75VDC, comprehensively protected against over-current, over-voltage and input under-voltage protection conditions, and trimmable output voltage.

TECHNICAL SPECIFICATION

All specifications are typical at nominal input, full load and 25ºC otherwise noted

OUTPUT SPECIFICATIONS

Output power			20 Watts
Voltage accuracy			±1%
Minimum load			0%
Voltage adjustability (Note 5)		Single	±10%
Line regulation	LL to HL at Full Load	Single Dual	± 0.2% ± 0.5%
Load regulation	No Load to Full Load	Single Dual	± 0.2% ± 1.0%
	10% Load to 90% Load	Single Dual	± 0.1% ± 0.8%
Cross regulation	Asymmetrical load 25% / 100% FL	Dual	± 5%
Ripple and noise	20MHz bandwidth (Measured with a 1μF M/C X7R and a 10μF T/C)		See table
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250μs
Over voltage protection	3.3VDC output 5VDC output 12VDC output 15VDC output		3.7VDC~5.4VDC 5.6VDC~7.0VDC 13.5VDC~19.6VDC 16.8VDC~-20.5VDC
Over load protection	% of FL at nominal input		150%
Short circuit protection			Continuous, automatics recovery

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output Input(Output) to Case	1600VDC, min. 1minute 1000VDC, min. 1minute
Isolation resistance	500VDC	10^9 ohms, min.
Isolation capacitance		1500pF, max.
Switching frequency	3.3 & 5Vout Others	275kHz±10% 330kHz±10%
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Nickel-coated copper
Base material		FR4 PCB
Potting material		Silicone (UL94-V0)
Dimensions		1.0 X 1.0 X 0.39 Inch (25.4 X 25.4 X 9.9mm)
Weight		15g(0.53oz)
MTBF (Note 1)	MIL-HDBK-217F	1.477x10^6hrs

INPUT SPECIFICATIONS

Input voltage range	12VDC nominal input 24VDC nominal input 48VDC nominal input	9 ~ 18VDC 18 ~ 36VDC 36 ~ 75VDC
Input filter		Pi type
Input surge voltage	12VDC input 24VDC input 48VDC input	25VDC 1sec, max. 50VDC 1sec, max. 100VDC 1sec, max.
Input reflected ripple current	Nominal input and full load	30mAp-p
Start up time	Nominal input and constant resistive load	Power up 30ms, max. Remote ON/OFF 30ms, max.
Start-up voltage	12VDC input 24VDC input 48VDC input	9VDC, max. 18VDC, max. 36VDC, max.
Shutdown voltage	12VDC input 24VDC input 48VDC input	8VDC 16VDC 33VDC
Remote ON/OFF (Note 6)		
Positive logic(Option)	DC-DC ON DC-DC OFF	Open or 3 V < Vr < 15V Short or 0V < Vr < 1.2V
Negative logic(Standard)	DC-DC ON DC-DC OFF	Short or 0V < Vr < 1.2V Open or 3V < Vr < 15V
Input current of Remote control pin	Nominal input	-0.5mA~1.0mA
Remote off state input current	Nominal input	2.0mA

ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature(Note 7)		-40ºC ~ +60ºC (without derating) +60ºC ~ +101ºC (with derating)
Maximum case temperature		105ºC
Storage temperature range		-55ºC ~ +125ºC
Thermal impedance (Note 8)	Natural convection Natural convection with Heat-sink	17.6ºC/Watt 14.8ºC/Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS

EMI (Note 9)	EN55022		Class A, Class B
ESD	EN61000-4-2	Air ± 8kV Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient (Note 10)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (Note 10)	EN61000-4-5	± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

LCD20 SERIES

20 WATTS DC-DC CONVERTER

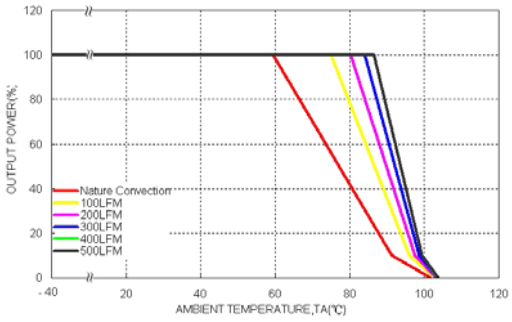
Model Number	Input Range	Output Voltage	Output Current		Output [3] Ripple & Noise	No Load[2] Input Current	Eff [3] (%)	Capacitor [4] Load max
			Min. Load	Full Load				
LCD20-12S3P3	9 ~ 18 VDC	3.3 VDC	0mA	4500mA	75mVp-p	10mA	87	7000μF
LCD20-12S05	9 ~ 18 VDC	5 VDC	0mA	4000mA	75mVp-p	10mA	89	5000μF
LCD20-12S12	9 ~ 18 VDC	12 VDC	0mA	1670mA	100mVp-p	10mA	89	850μF
LCD20-12S15	9 ~ 18 VDC	15 VDC	0mA	1330mA	100mVp-p	10mA	89	700μF
LCD20-12D12	9 ~ 18 VDC	± 12 VDC	0mA	± 833mA	100mVp-p	10mA	89	± 500μF
LCD20-12D15	9 ~ 18 VDC	± 15 VDC	0mA	± 667mA	100mVp-p	10mA	90	± 350μF
LCD20-24S3P3	18 ~ 36 VDC	3.3 VDC	0mA	4500mA	75mVp-p	6mA	87	7000μF
LCD20-24S05	18 ~ 36 VDC	5 VDC	0mA	4000mA	75mVp-p	6mA	90	5000μF
LCD20-24S12	18 ~ 36 VDC	12 VDC	0mA	1670mA	100mVp-p	6mA	90	850μF
LCD20-24S15	18 ~ 36 VDC	15 VDC	0mA	1330mA	100mVp-p	6mA	91	700μF
LCD20-24D12	18 ~ 36 VDC	± 12 VDC	0mA	± 833mA	100mVp-p	6mA	90	± 500μF
LCD20-24D15	18 ~ 36 VDC	± 15 VDC	0mA	± 667mA	100mVp-p	6mA	90	± 350μF
LCD20-48S3P3	36 ~ 75 VDC	3.3 VDC	0mA	4500mA	75mVp-p	4mA	87	7000μF
LCD20-48S05	36 ~ 75 VDC	5 VDC	0mA	4000mA	75mVp-p	4mA	89	5000μF
LCD20-48S12	36 ~ 75 VDC	12 VDC	0mA	1670mA	100mVp-p	4mA	90	850μF
LCD20-48S15	36 ~ 75 VDC	15 VDC	0mA	1330mA	100mVp-p	4mA	90	700μF
LCD20-48D12	36 ~ 75 VDC	± 12 VDC	0mA	± 833mA	100mVp-p	4mA	89	± 500μF
LCD20-48D15	36 ~ 75 VDC	± 15 VDC	0mA	± 667mA	100mVp-p	4mA	90	± 350μF

Note

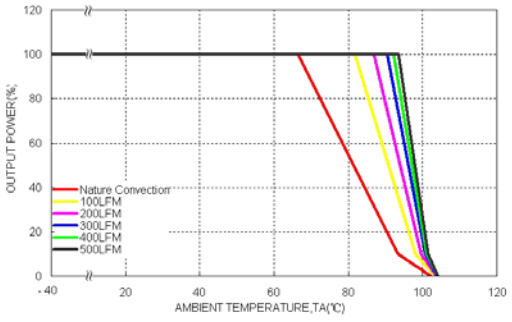
1. MIL-HDBK-217F @Ta=25 ºC, Full load.
2. Typical value at nominal input and no load.
3. Typical value at nominal input and full load.
4. Test by minimum input and constant resistive load.
5. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the TRIM pin and either the +OUTPUT pin or the -OUTPUT pin.
6. The CTRL pin voltage is reference to -INPUT.
   The order number please see product standard table.
7. Test condition with vertical direction by natural convection (20LFM).
8. Heat-sink is optional and P/N:7G-0047C-F
9. The LCD20 series standard module meet EN55022 Class A without external components and meet Class B with external components.
   For more detail information, please contact with P-DUKE.
10. 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 μF/100V.

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

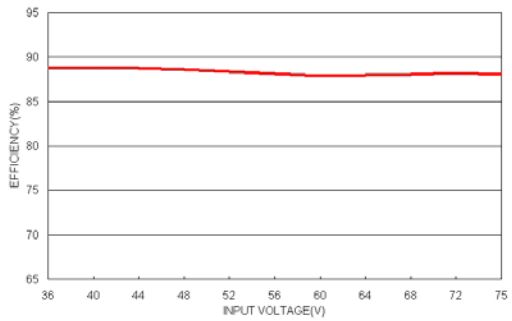
LCD20-48S05 Derating Curve



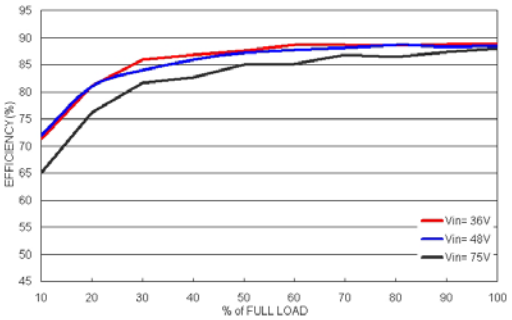
LCD20-48S05 Derating Curve With Heat-sink



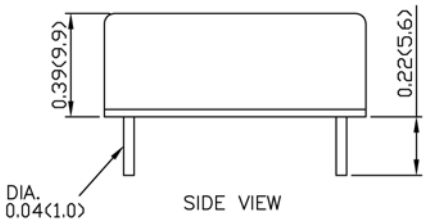
LCD20-48S05 Efficiency VS Input Voltage

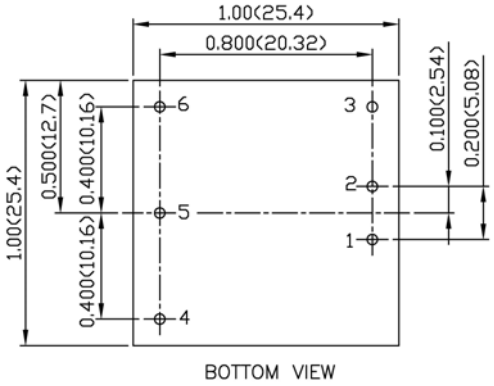


LCD20-48S05 Efficiency VS Output Current



MECHANICAL DRAWING：





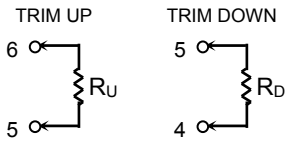
1. All dimensions in Inch (mm)

   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01 (0.25)
3. Pin dimension tolerance ±0.004 (0.1)

PIN CONNECTION		
PIN	SINGLE	DUAL
1	+ INPUT	+ INPUT
2	- INPUT	- INPUT
3	CTRL	CTRL
4	+OUTPUT	+OUTPUT
5	TRIM	COMMON
6	-OUTPUT	-OUTPUT

EXTERNAL OUTPUT TRIMMING

Output can be externally trimmed by using the method shown below.



PRODUCT STANDARD TABLE	
Option	Suffix
Negative logic remote ON/OFF(Standard)	
Positive logic remote ON/OFF	-A
Without CTRL pin	-B
Negative logic remote ON/OFF without TRIM pin	-C
Without CTRL &TRIM pin	-D
Positive logic remote ON/OFF without TRIM pin	-E