POWER MATE TECHNOLOGY CO., LTD.

LCD30 SERIES

30 WATTS DC-DC CONVERTER

FEATURES

- **30 WATTS MAXIMUM OUTPUT POWER**
- **ULTRA LOW QUIESCENT CURRENT**
- **SINGLE OUTPUT UP TO 7A**
- **SMALL SIZE AND LOW PROFILE：1.0 x 1.0 x 0.39 INCH**
- **HIGH EFFICIENCY UP TO 93%**
- **2:1 WIDE INPUT VOLTAGE RANGE**
- **SIX-SIDED CONTINUOUS SHIELD**
- **FIXED SWITCHING FREQUENCY**
- **INPUT TO OUTPUT ISOLATION:1600VDC**
- **OVER TEMPERATURE PROTECTION**
- **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

LCD30 DC/DC converters provide up to 30 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, 18~36 VDC and 36~75 VDC, 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			30Watts, max.
Voltage accuracy			±1%
Minimum load			0%
Voltage adjustability (Note 6)	Single	15 & 24Vout	+20%, -10%
		others	+10%, -10%
Line regulation	LL to HL at Full Load	Single	± 0.2%
		Dual	± 0.5%
Load regulation	No Load to Full Load	Single	± 0.2%
		Dual	± 1.0%
	10% Load to 90% Load	Single	± 0.1%
		Dual	± 0.8%
Cross regulation	Asymmetrical load 25% / 100% FL	Dual	± 5%
Ripple and noise	20MHz bandwidth		See table
Temperature coefficient			±0.02% / ºC, max.
Transient response recovery time	25% load step change		250µs
Over voltage protection	3.3VDC output		3.7VDC~5.4VDC
	5VDC output		5.6VDC~7.0VDC
	12VDC output		13.5VDC~19.6VDC
	15VDC output		18.3VDC~22.0VDC
	24VDC output		29.1VDC~32.5VDC
Over load protection	% of FL at nominal input		140%
Short circuit protection			Continuous, automatics recovery

GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage	Input to Output	1600VDC, min. 1minute
	Input(Output) to Case	1000VDC, min. 1minute
Isolation resistance	500VDC	10^9ohms, min.
Isolation capacitance		1500pF, max.
Switching frequency	3.3 & 5Vout	275kHz±10%
	Others	330kHz±10%
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1
Case material		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		16.5g(0.58oz)
MTBF (Note 1)	MIL-HDBK-217F	1.303x10^6hrs

INPUT SPECIFICATIONS

Input voltage range	12VDC nominal input	9 ~ 18VDC
	24VDC nominal input	18 ~ 36VDC
	48VDC nominal input	36 ~ 75VDC
Input filter		Pi type
Input surge voltage	12VDC input	25VDC 1sec, max.
	24VDC input	50VDC 1sec, max.
	48VDC input	100VDC 1sec, max.
Input reflected ripple current		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	9VDC, max.
	24VDC input	18VDC, max.
	48VDC input	36VDC, max.
Shutdown voltage	12VDC input	8VDC
	24VDC input	16VDC
	48VDC input	33VDC
Remote ON/OFF (Note 7)		
Positive logic(Option)	DC-DC ON	Open or 3 V < Vr < 15V
	DC-DC OFF	Short or 0V < Vr < 1.2V
Negative logic(Standard)	DC-DC ON	Short or 0V < Vr < 1.2V
	DC-DC OFF	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 8)		-40ºC ~ +50ºC (without derating) +50ºC ~ +100ºC (with derating)
Maximum case temperature		105ºC
Storage temperature range		-55ºC ~ +125ºC
Over temperature protection		115ºC
Thermal impedance (Note 9)	Natural convection	15.0ºC /Watt
	Natural convection with Heat-sink	13.8ºC /Watt
Thermal shock		MIL-STD-810F
Vibration		MIL-STD-810F
Relative humidity		5% to 95% RH

EMC CHARACTERISTICS

EMI (Note 10)	EN55022			Class A, Class B
ESD	EN61000-4-2	Air	± 8kV	Perf. Criteria A
		Contact	± 6kV	
Radiated immunity	EN61000-4-3		10V/m	Perf. Criteria A
Fast transient (Note 11)	EN61000-4-4		± 2kV	Perf. Criteria A
Surge (Note 11)	EN61000-4-5		± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6		10Vr.m.s	Perf. Criteria A

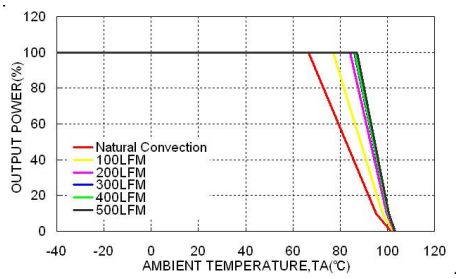
Model Number	Input Range	Output Voltage	Output Current		Output [3][4] Ripple & Noise	No Load[2] Input Current	Eff [3] (%)	Capacitor [5] Load max.
			Min. Load	Full Load				
LCD30-12S3P3	9 ~ 18 VDC	3.3 VDC	0mA	7000mA	75mVp-p	12mA	86	10000μF
LCD30-12S05	9 ~ 18 VDC	5 VDC	0mA	6000mA	75mVp-p	12mA	89	7200μF
LCD30-12S12	9 ~ 18 VDC	12 VDC	0mA	2500mA	75mVp-p	12mA	89	1200μF
LCD30-12S15	9 ~ 18 VDC	15 VDC	0mA	2000mA	75mVp-p	12mA	89	1000μF
LCD30-12S24	9 ~ 18 VDC	24 VDC	0mA	1250mA	75mVp-p	12mA	90	375μF
LCD30-12D12	9 ~ 18 VDC	± 12 VDC	0mA	± 1250mA	60mVp-p	12mA	89	± 750μF
LCD30-12D15	9 ~ 18 VDC	± 15 VDC	0mA	± 1000mA	60mVp-p	12mA	90	± 500μF
LCD30-12D24	9 ~ 18 VDC	± 24 VDC	0mA	± 625mA	75mVp-p	14mA	90	±180μF
LCD30-24S3P3	18 ~ 36 VDC	3.3 VDC	0mA	7000mA	75mVp-p	10mA	87	10000μF
LCD30-24S05	18 ~ 36 VDC	5 VDC	0mA	6000mA	75mVp-p	10mA	90	7200μF
LCD30-24S12	18 ~ 36 VDC	12 VDC	0mA	2500mA	75mVp-p	10mA	91	1200μF
LCD30-24S15	18 ~ 36 VDC	15 VDC	0mA	2000mA	75mVp-p	10mA	91	1000μF
LCD30-24S24	18 ~ 36 VDC	24 VDC	0mA	1250mA	75mVp-p	10mA	93	375μF
LCD30-24D12	18 ~ 36 VDC	± 12 VDC	0mA	± 1250mA	60mVp-p	10mA	91	± 750μF
LCD30-24D15	18 ~ 36 VDC	± 15 VDC	0mA	± 1000mA	60mVp-p	10mA	91	± 500μF
LCD30-24D24	18 ~ 36 VDC	± 24 VDC	0mA	± 625mA	75mVp-p	12mA	92	±180μF
LCD30-48S3P3	36 ~ 75 VDC	3.3 VDC	0mA	7000mA	75mVp-p	8mA	88	10000μF
LCD30-48S05	36 ~ 75 VDC	5 VDC	0mA	6000mA	75mVp-p	8mA	90	7200μF
LCD30-48S12	36 ~ 75 VDC	12 VDC	0mA	2500mA	75mVp-p	8mA	90	1200μF
LCD30-48S15	36 ~ 75 VDC	15 VDC	0mA	2000mA	75mVp-p	8mA	91	1000μF
LCD30-48S24	36 ~ 75 VDC	24 VDC	0mA	1250mA	75mVp-p	8mA	92	375μF
LCD30-48D12	36 ~ 75 VDC	± 12 VDC	0mA	± 1250mA	60mVp-p	8mA	91	± 750μF
LCD30-48D15	36 ~ 75 VDC	± 15 VDC	0mA	± 1000mA	60mVp-p	8mA	92	± 500μF
LCD30-48D24	36 ~ 75 VDC	± 24 VDC	0mA	± 625mA	75mVp-p	10mA	92	±180μF

Note

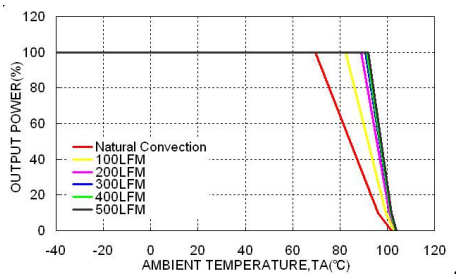
1. MIL-HDBK-217F @Tc=70 ºC, Full load.
2. Typical value at nominal input and no load.
3. Typical value at nominal input and full load.
4. The ripple and noise of output voltage 3.3VDC/ 5VDC is measured with a 22μF/25V X7R MLCC;
   12VDC/ 15VDC is measured with 2 pcs of 22μF/25V X7R MLCC;
   24VDC is measured with 2 pcs of 6.8μF/50V X7R MLCC;
   ±12VDC/ ±15VDC is measured with a 10μF/25V X7R MLCC for each output ;
   ±24VDC is measured with a 4.7μF/50V X7R MLCC for each output.
5. Test by minimum input and constant resistive load.
6. 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.
7. The CTRL pin voltage is reference to -INPUT.
   The order number please see product standard table.
8. Test condition with vertical direction by natural convection (20LFM).
9. Heat-sink is optional and P/N:7G-0047C-F
10. The LCD30 series standard module meets EN55022 Class A and Class B with external components.
    For more detail information, please contact with P-DUKE.
11. The external input components are required if the module has to meet EN61000-4-4, EN61000-4-5.
    The LCD30-12XXX recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ58A, 58V, 3000Watt peak pulse power) to connect in parallel.
    The LCD30-24XXX and LCD30-48XXX recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V).

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

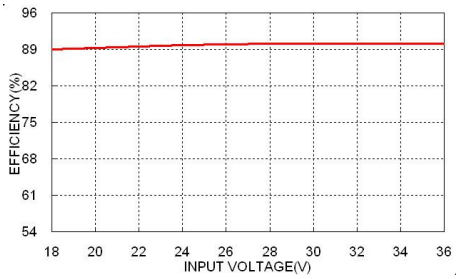
LCD30-24S05 Derating Curve



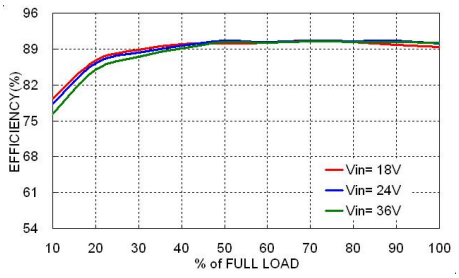
LCD30-24S05 Derating Curve With Heat-sink



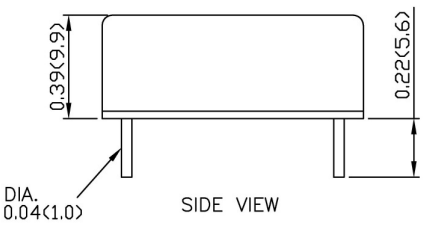
LCD30-24S05 Efficiency VS Input Voltage

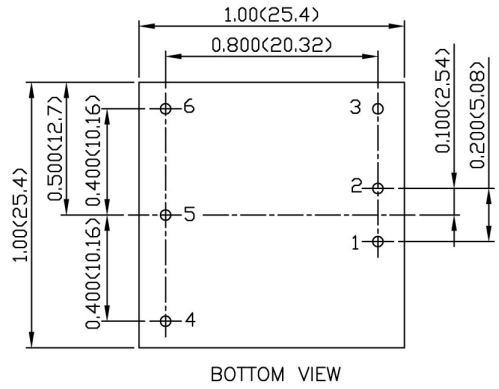


LCD30-24S05 Efficiency VS Output Current



MECHANICAL DRAWING :



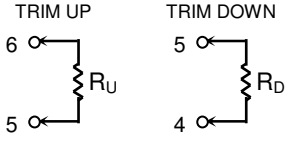


1. All dimensions in Inch (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01 (0.25)
3. Pin dimension tolerance ±0.004 (0.1)

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