



APPLICATIONS

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

FEATURES

- 15 WATTS MAXIMUM OUTPUT POWER
- SINGLE OUTPUT UP TO 4A
- SMALL SIZE AND LOW PROFILE : 1.0 x 1.0 x 0.39 Inch
- HIGH EFFICIENCY UP TO 89%
- 2:1 WIDE INPUT VOLTAGE RANGE
- SIX-SIDED CONTINUOUS SHIELD
- FIXED SWITCHING FREQUENCY
- INPUT TO OUTPUT ISOLATION:1600VDC
- INDUSTRY STANDARD PIN-OUT FEC15 SERIES COMPATIBLE
- CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC
- SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1
- ISO9001 CERTIFIED MANUFACTURING FACILITIES
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

OPTIONS

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

DESCRIPTION

LCD15 DC/DC converters provide up to 15 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 36~75VDC, 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 25°C otherwise noted

| OUTPUT SPECIFICATIONS | | | |
|----------------------------------|---|----------------------------|------------------|
| Output power | 15 Watts | | |
| Voltage accuracy | ±1% | | |
| Minimum load | 0% | | |
| Voltage adjustability (Note 6) | ±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% |
| Cross regulation (Dual) | Asymmetrical load 25% / 100% FL ± 5% | | |
| Ripple and noise | 20MHz bandwidth (Measured with a 1µF M/C and a 10µF T/C) | See table | |
| Temperature coefficient | ±0.02% / °C, 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 | 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 | 1600VDC, min. 1minute | |
| | Input(Output) to Case | 1000VDC, min. 1minute | |
| Isolation resistance | 500VDC | 10 ⁹ ohms, min. | |
| Isolation capacitance | 1000pF, max. | | |
| Switching frequency | 400kHz±10% | | |
| Design meet safety standard | IEC60950-1, UL60950-1, EN60950-1 | | |
| Case material | Nickel-coated copper | | |
| Base material | FR4 PCB | | |
| Potting material | Epoxy (UL94-V0) | | |
| Dimensions | 1.0 X 1.0 X 0.39 Inch (25.4 X 25.4 X 9.9 mm) | | |
| Weight | 15g(0.53oz) | | |
| MTBF (Note 1) | MIL-HDBK-217F | 1.600x10 ⁶ hrs | |

| 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 | 36VDC 100ms, max. | |
| | 24VDC input | 50VDC 100ms, max. | |
| | 48VDC input | 100VDC 100ms, max. | |
| Input reflected ripple current | 30mA _{p-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 | 14.5VDC | |
| | 48VDC input | 30.5VDC | |
| Remote ON/OFF (Note 7) | | | |
| Positive logic(Optional) | DC-DC ON | Open or 3V < 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 | 2.5mA | |
| ENVIRONMENTAL SPECIFICATIONS | | | |
| Operating ambient temperature | -40°C ~ +85°C (with derating) | | |
| Maximum case temperature | +105°C | | |
| Storage temperature range | -55°C ~ +125°C | | |
| Thermal impedance (Note 8) | Natural convection | 18.2°C/Watt | |
| | Natural convection with heat-sink | 15.8°C/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 |
| 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 | ± 1kV | Perf. Criteria A |
| Conducted immunity | EN61000-4-6 | 3 Vr.m.s | Perf. Criteria A |

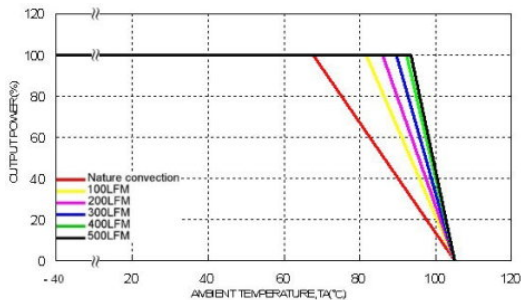
| Model Number | Input Range | Output Voltage | Output Current | | Output ⁽²⁾ Ripple & Noise | No Load ⁽³⁾ Input Current | Eff ⁽⁴⁾ (%) | Capacitor ⁽⁵⁾ Load max |
|--------------|-------------|----------------|----------------|-----------|---|---|---------------------------|--------------------------------------|
| | | | Min. Load | Full Load | | | | |
| LCD15-12S3P3 | 9 ~ 18 VDC | 3.3 VDC | 0mA | 4000mA | 75mVp-p | 120mA | 84 | 12000μF |
| LCD15-12S05 | 9 ~ 18 VDC | 5 VDC | 0mA | 3000mA | 75mVp-p | 90mA | 88 | 6000μF |
| LCD15-12S12 | 9 ~ 18 VDC | 12 VDC | 0mA | 1300mA | 100mVp-p | 30mA | 86 | 1000μF |
| LCD15-12S15 | 9 ~ 18 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 30mA | 88 | 660μF |
| LCD15-12D05 | 9 ~ 18 VDC | ± 5 VDC | 0mA | ± 1500mA | 100mVp-p | 30mA | 85 | ± 3000μF |
| LCD15-12D12 | 9 ~ 18 VDC | ± 12 VDC | 0mA | ± 625mA | 100mVp-p | 30mA | 87 | ± 520μF |
| LCD15-12D15 | 9 ~ 18 VDC | ± 15 VDC | 0mA | ± 500mA | 100mVp-p | 30mA | 88 | ± 330μF |
| LCD15-24S3P3 | 18 ~ 36 VDC | 3.3 VDC | 0mA | 4000mA | 75mVp-p | 50mA | 86 | 12000μF |
| LCD15-24S05 | 18 ~ 36 VDC | 5 VDC | 0mA | 3000mA | 75mVp-p | 65mA | 88 | 6000μF |
| LCD15-24S12 | 18 ~ 36 VDC | 12 VDC | 0mA | 1300mA | 100mVp-p | 20mA | 87 | 1000μF |
| LCD15-24S15 | 18 ~ 36 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 20mA | 88 | 660μF |
| LCD15-24D05 | 18 ~ 36 VDC | ± 5 VDC | 0mA | ± 1500mA | 100mVp-p | 15mA | 85 | ± 3000μF |
| LCD15-24D12 | 18 ~ 36 VDC | ± 12 VDC | 0mA | ± 625mA | 100mVp-p | 15mA | 88 | ± 520μF |
| LCD15-24D15 | 18 ~ 36 VDC | ± 15 VDC | 0mA | ± 500mA | 100mVp-p | 25mA | 88 | ± 330μF |
| LCD15-48S3P3 | 36 ~ 75 VDC | 3.3 VDC | 0mA | 4000mA | 75mVp-p | 25mA | 86 | 12000μF |
| LCD15-48S05 | 36 ~ 75 VDC | 5 VDC | 0mA | 3000mA | 75mVp-p | 35mA | 88 | 6000μF |
| LCD15-48S12 | 36 ~ 75 VDC | 12 VDC | 0mA | 1300mA | 100mVp-p | 12mA | 88 | 1000μF |
| LCD15-48S15 | 36 ~ 75 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 12mA | 88 | 660μF |
| LCD15-48D05 | 36 ~ 75 VDC | ± 5 VDC | 0mA | ± 1500mA | 100mVp-p | 12mA | 85 | ± 3000μF |
| LCD15-48D12 | 36 ~ 75 VDC | ± 12 VDC | 0mA | ± 625mA | 100mVp-p | 15mA | 89 | ± 520μF |
| LCD15-48D15 | 36 ~ 75 VDC | ± 15 VDC | 0mA | ± 500mA | 100mVp-p | 20mA | 88 | ± 330μF |

Note

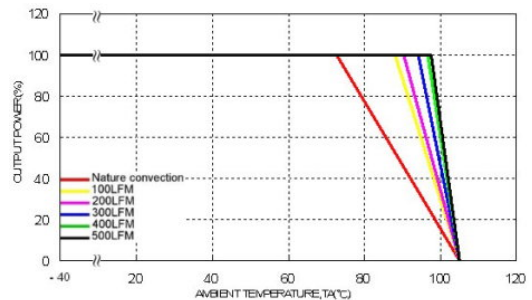
1. MIL-HDBK-217F @Ta=25 °C, Full load.
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. Trimming allows the user to increase or decrease 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. Heat-sink is optional and P/N:7G-0047C-F
9. The LCD15 series standard module meets EN55022 Class A and 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, 220μF /100V.

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

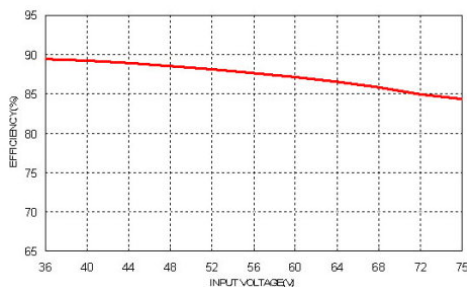
LCD15-48S05 Derating Curve



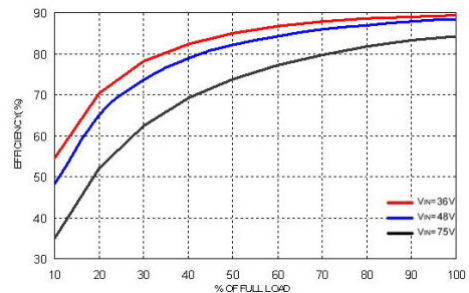
LCD15-48S05 Derating Curve With Heat-sink



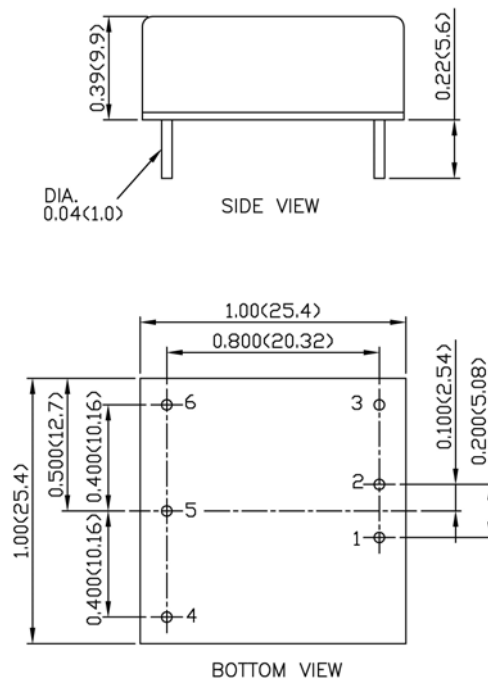
LCD15-48S05 Efficiency VS Input Voltage



LCD15-48S05 Efficiency VS Output Current

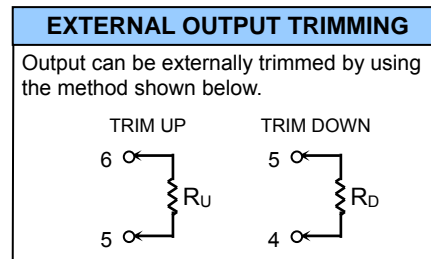


MECHANICAL DRAWING :



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 |



| 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 |