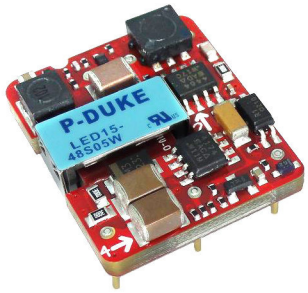
**POWER MATE TECHNOLOGY CO., LTD.**

# LED15W SERIES

**15 WATTS DC-DC CONVERTER**




## FEATURES

- 15 WATTS MAXIMUM OUTPU POWER
- SINGLE OUTPUT UP TO 4A
- SMALL SIZE AND LOW PROFILE：1.10 x 0.94 x 0.34 INCH
- HIGH EFFICIENCY UP TO 87%
- 4:1 ULTRA WIDE INPUT VOLTAGE RANGE
- FIXED SWITCHING FREQUENCY
- INPUT TO OUTPUT ISOLATION: 2250VDC
- INDUSTRY STANDARD PIN-OUT FEC15 SERIES COMPATIBLE
- SURFACE-MOUNT OR THROUGH-HOLE
- SMD PACKAGE QUALIFIED FOR LEADFREE REFLOW SOLDER PROCESS ACCORDING IPC J-STD-020D
- COST EFFICIENT OPEN FRAME DESIGN
- 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

## APPLICATIONS

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

## OPTIONS

Positive logic Remote On/Off, SMD type, Without TRIM pin, Without CTRL pin

## DESCRIPTION

LED15W single output 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 4:1 ultra wide input voltage of 9~36 VDC and 18~75 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 | | 15 Watts |
| Voltage accuracy | | ± 1% |
| Minimum load | | 0% |
| Voltage adjustability (Note 6) | | ±10% |
| Line regulation | LL to HL at Full Load | ± 0.2% |
| Load regulation | No Load to Full Load | ± 0.2% |
| Ripple and noise | 20MHz bandwidth (Measured with a 1μF M/C 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 (Voltage clamped) | 3.3VDC output<br>5VDC output<br>12VDC output<br>15VDC output | 3.7VDC~5.4VDC<br>5.6VDC~7.0VDC<br>13.8VDC~17.5VDC<br>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 | 2250 VDC, min. 1minute |
| Isolation resistance | 500VDC | $10^9$ ohms , min. |
| Isolation capacitance | | 1500pF, max. |
| Switching frequency | 3.3VDC,5VDC<br>12VDC,15VDC | 350kHz±10%<br>400kHz±10% |
| Design meets safety standard | IEC60950-1, UL60950-1, EN60950-1 | |
| Dimensions | | 1.10 X 0.94 X 0.34 Inch (27.9 X 23.9 X 8.5 mm) |
| Weight | | 10.5g(0.36oz) |
| MTBF (Note 1) | BELLCORE TR-NWT-000332<br>MIL-HDBK-217F | $1.322x10^6$hrs<br>$5.147x10^5$hrs |

### INPUT SPECIFICATIONS

| | | | |
|---|---|---|---|
| Input voltage range | 24VDC nominal input<br>48VDC nominal input | | 9 ~ 36VDC<br>18 ~ 75VDC |
| Input surge voltage | 24VDC input<br>48VDC input | | 50VDC 100ms ,max.<br>100VDC 100ms ,max. |
| Input reflected ripple current | | | 30mAp-p |
| Start up time | Nominal input and constant resistive load | Power up<br>Remote ON/OFF | 30ms, max.<br>30ms, max. |
| Start-up voltage | 24VDC input<br>48VDC input | | 9VDC, max.<br>18VDC, max. |
| Shutdown voltage | 24VDC input<br>48VDC input | | 8VDC<br>16VDC |
| Remote ON/OFF (Note 7) | | | |
| Positive logic(Option) | DC-DC ON<br>DC-DC OFF | | Open or 3 V < Vr < 15V<br>Short or 0V < Vr < 1.2V |
| Negative logic(Standard) | DC-DC ON<br>DC-DC OFF | | Short or 0V < Vr < 1.2V<br>Open or 3V < Vr < 15V |
| Input current of remote control pin | | Nominal input | -0.5mA~1.0mA |
| Remote off state input current | | Nominal input | 2.5 mA |

### ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Operating ambient temperature | -40ºC ~ +85ºC (with derating) |
| Storage temperature range | -55ºC ~ +125ºC |
| Thermal shock | MIL-STD-810F |
| Vibration | MIL-STD-810F |
| Relative humidity | 5% to 95% RH |
| Lead-free reflow solder process | IPC J-STD-020D |
| Moisture sensitivity level(MSL) | IPC J-STD-033B level 2a |

### EMC CHARACTERISTICS

| | | | |
|---|---|---|---|
| EMI (Note 8) | EN55022 | | Class A, Class B |
| Radiated immunity | EN61000-4-3 | 10 V/m | Perf. Criteria A |
| Fast transient (Note 9) | EN61000-4-4 | ± 2kV | Perf. Criteria A |
| Surge (Note 9) | EN61000-4-5 | ± 1kV | Perf. Criteria A |
| Conducted immunity | EN61000-4-6 | 3 Vr.m.s | Perf. Criteria A |

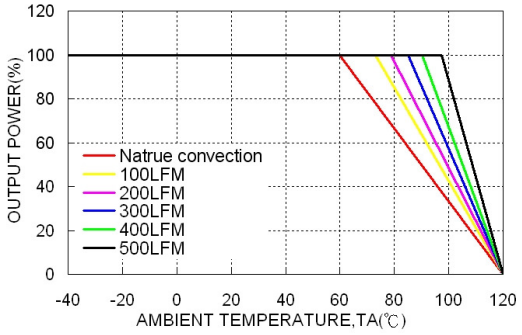
| Model Number | Input Range | Output Voltage | Output Current | | Output [2] Ripple & Noise | No Load [3] Input Current | Eff [4] (%) | Capacitor [5] Load max |
|---|---|---|---|---|---|---|---|---|
| | | | Min. Load | Full Load | | | | |
| LED15-24S3P3W | 9 ~ 36 VDC | 3.3 VDC | 0mA | 4000mA | 100mVp-p | 60mA | 85 | 12000μF |
| LED15-24S05W | 9 ~ 36 VDC | 5 VDC | 0mA | 3000mA | 100mVp-p | 70mA | 87 | 6000μF |
| LED15-24S12W | 9 ~ 36 VDC | 12 VDC | 0mA | 1300mA | 100mVp-p | 10mA | 86 | 1000μF |
| LED15-24S15W | 9 ~ 36 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 10mA | 86 | 660μF |
| LED15-48S3P3W | 18 ~ 75 VDC | 3.3 VDC | 0mA | 4000mA | 100mVp-p | 40mA | 85 | 12000μF |
| LED15-48S05W | 18 ~ 75 VDC | 5 VDC | 0mA | 3000mA | 100mVp-p | 40mA | 87 | 6000μF |
| LED15-48S12W | 18 ~ 75 VDC | 12 VDC | 0mA | 1300mA | 100mVp-p | 10mA | 86 | 1000μF |
| LED15-48S15W | 18 ~ 75 VDC | 15 VDC | 0mA | 1000mA | 100mVp-p | 10mA | 86 | 660μF |

Note

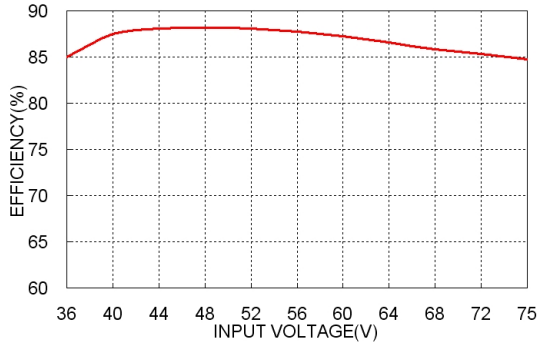
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment)
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full 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. The LED15W series standard module meets EN55022 Class A and Class B with external components. For more detail information, please contact with P-DUKE.
9. 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.

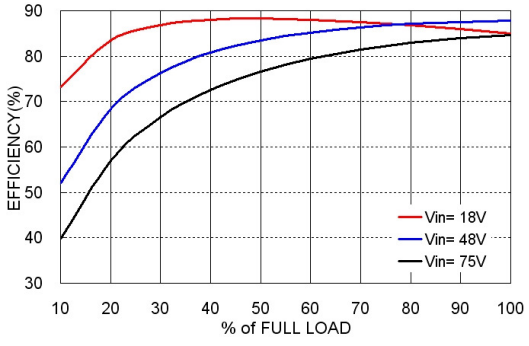
LED15-48S05W Derating Curve




LED15-48S05W Efficiency VS Input Voltage

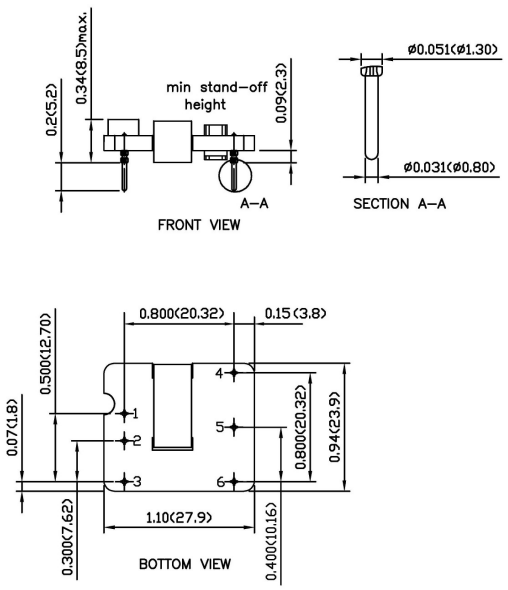



LED15-48S05W Efficiency VS Output Current

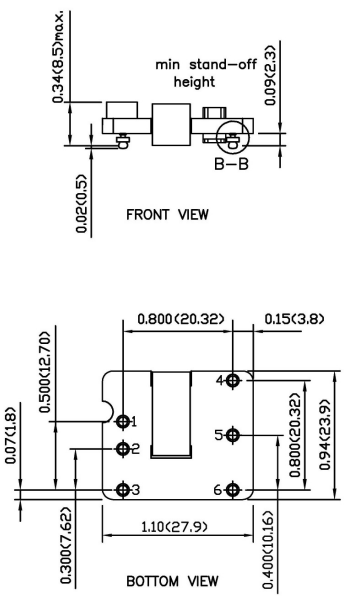


## MECHANICAL DRAWING

DIP TYPE




SMD TYPE

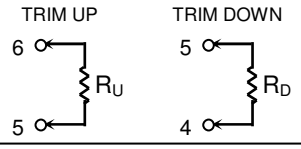



1. All dimensions in Inch (mm)
   Tolerance: X.XX±0.02 (X.X±0.5)
   X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

| PIN CONNECTION | |
|---|---|
| PIN | LED15W SERIES |
| 1 | + INPUT |
| 2 | - INPUT |
| 3 | CTRL |
| 4 | +OUTPUT |
| 5 | TRIM |
| 6 | -OUTPUT |

**EXTERNAL OUTPUT TRIMMING**

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




| PRODUCT STANDARD TABLE | |
|---|---|
| Option | Suffix |
| Negative remote ON/OFF with DIP(Standard) | |
| Negative remote ON/OFF with SMT | -A |
| Positive remote ON/OFF with DIP | -B |
| Positive remote ON/OFF with SMT | -C |
| DIP type without CTRL pin | -D |
| SMT type without CTRL pin | -E |
| DIP type, negative remote ON/OFF without TRIM pin | -F |
| SMT type, negative remote ON/OFF without TRIM pin | -G |
| DIP type without CTRL&TRIM pin | -H |
| SMT type without CTRL&TRIM pin | -I |
| DIP type, positive remote ON/OFF without TRIM pin | -J |
| SMT type, positive remote ON/OFF without TRIM pin | -K |