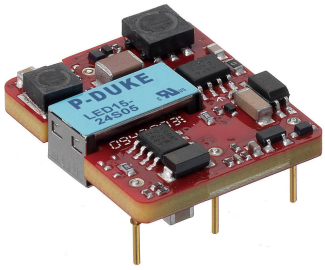
POWER MATE TECHNOLOGY CO., LTD.

# LED15 SERIES

**DC-DC CONVERTER**

**2:1 WIDE INPUT RANGE**
**UP TO 15Watts**




## FEATURES

- NO MINIMUM LOAD REQUIRED
- 2250VDC INPUT TO OUTPUT ISOLATION
- SMALL SIZE AND LOW PROFILE：1.10 x 0.94 x 0.34 INCH
- SURFACE-MOUNT OR THROUGH-HOLE
- 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

| 2250VDC ISOLATION | REMOTE CONTROL | UVP | OCP | SCP | OVP |
|---|---|---|---|---|---|

## TECHNICAL SPECIFICATION All specifications are typical at nominal input, full load and 25℃ otherwise noted

| Model Number | Input Range | Output Voltage | Output Current @Full Load | Input Current @ No Load | Efficiency | Maximum Capacitor Load (1) |
|---|---|---|---|---|---|---|
| | VDC | VDC | mA | mA | % | μF |
| LED15-24S3P3 | 18 ~ 36 | 3.3 | 3500 | 20 | 86 | 10000 |
| LED15-24S05 | 18 ~ 36 | 5 | 3000 | 20 | 87 | 6000 |
| LED15-24S12 | 18 ~ 36 | 12 | 1250 | 15 | 87 | 1000 |
| LED15-24S15 | 18 ~ 36 | 15 | 1000 | 15 | 88 | 660 |
| LED15-48S3P3 | 36 ~ 75 | 3.3 | 3500 | 15 | 85 | 10000 |
| LED15-48S05 | 36 ~ 75 | 5 | 3000 | 15 | 87 | 6000 |
| LED15-48S12 | 36 ~ 75 | 12 | 1250 | 10 | 87 | 1000 |
| LED15-48S15 | 36 ~ 75 | 15 | 1000 | 10 | 88 | 660 |

## PART NUMBER STRUCTURE

LED15 - 48 S 05 - A

**Series Name**

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

**Output Quantity**
**S:** Single

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

**Option**
**□:** Negative logic remote ON/OFF with DIP(Standard)
**A:** Negative logic remote ON/OFF with SMT
**B:** Positive logic remote ON/OFF with DIP
**C:** Positive logic remote ON/OFF with SMT
**D:** DIP type without Ctrl pin
**E:** SMT type without Ctrl pin
**F:** DIP type, negative logic remote ON/OFF without Trim pin
**G:** SMT type, negative logic remote ON/OFF without Trim pin
**H:** DIP type without Ctrl & Trim pin
**I:** SMT type without Ctrl & Trim pin
**J:** DIP type, positive logic remote ON/OFF without Trim pin
**K:** SMT type, positive logic remote ON/OFF without Trim pin

## INPUT SPECIFICATIONS

| Parameter | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Operating input voltage range | | 24Vin(nom)<br>48Vin(nom) | 18<br>36 | 24<br>48 | 36<br>75 | VDC |
| Input reflected ripple current | Nominal input and Full load | | | 30 | | mAp-p |
| Start-up voltage | | 24Vin(nom)<br>48Vin(nom) | | | 18<br>36 | VDC |
| Shutdown voltage | | 24Vin(nom)<br>48Vin(nom) | | 14.5<br>30.5 | | VDC |
| Start up time | Constant resistive load | Power up<br>Remote ON/OFF | | | 30<br>30 | ms |
| Input surge voltage | 100ms, max. | 24Vin(nom)<br>48Vin(nom) | | | 50<br>100 | VDC |
| Remote ON/OFF | Referred to –Vin pin | Positive logic (Option) DC-DC ON<br>DC-DC OFF<br>Negative logic (Standard) DC-DC ON<br>DC-DC OFF<br>Input current of Ctrl pin<br>Remote off input current | -0.5 | Open or 3 ~ 15VDC<br>Short or 0 ~ 1.2VDC<br>Short or 0 ~ 1.2VDC<br>Open or 3 ~ 15VDC | 1.0<br>20 | mA<br>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 | | -0.2 | | +0.2 | % |
| Load regulation | No Load to Full Load | | -0.2 | | +0.2 | % |
| Voltage adjustability (2) | | | -10 | | +10 | % |
| Ripple and noise | Measured by 20MHz bandwidth<br>With a 1μF M/C X7R and a 10μF T/C | 3.3Vout, 5Vout<br>12Vout, 15Vout | | 75<br>100 | | mVp-p |
| Temperature coefficient | | | -0.02 | | +0.02 | %/℃ |
| Transient response recovery time | 25% load step change, △Io/△t=0.1A/us | | | 300 | | μs |
| Over voltage protection | | 3.3Vout<br>5Vout<br>12Vout<br>15Vout | 3.7<br>5.6<br>13.5<br>16.8 | | 5.4<br>7.0<br>19.6<br>20.5 | VDC |
| Over load protection | % of Iout rated; Hiccup mode | | | | 150 | % |
| Output voltage overshoot | | | | 3 | | % |
| Short circuit protection | | | Continuous, automatics recovery | | | |

## GENERAL SPECIFICATIONS

| Parameter | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Isolation voltage | 1 minute | Input to Output | 2250 | | | VDC |
| Isolation resistance | 500VDC | | 10 | | | MΩ |
| Isolation capacitance | | | | 1000 | | pF |
| Switching frequency | | 3.3Vout, 5Vout<br>12Vout, 15Vout | 243<br>423 | 270<br>470 | 297<br>517 | kHz |
| Safety approvals | | | | | | UL60950-1<br>EN60950-1<br>IEC60950-1 |
| Weight | | | | | | 10.5g (0.36oz) |
| MTBF | MIL-HDBK-217F, Full load | | | | | 3.438 x $10^6$ hrs |

## ENVIRONMENTAL SPECIFICATIONS

| Parameter | Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Operating ambient temperature (3) | | With derating | -40 | | +105 | ℃ |
| Storage temperature range | | | -55 | | +125 | ℃ |
| 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 SPECIFICATIONS

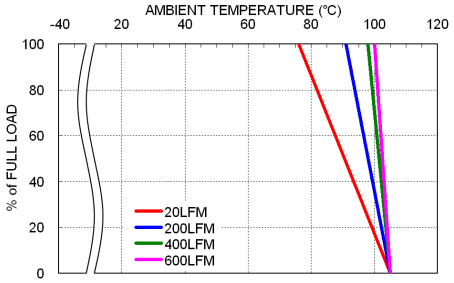
| Parameter | Conditions | | Level |
|---|---|---|---|
| EMI (4) | EN55022 | | Class A, Class B |
| Radiated immunity | EN61000-4-3 | 10 V/m | Perf. Criteria A |
| Fast transient (5) | EN61000-4-4 | ± 2kV | Perf. Criteria B |
| Surge (5) | EN61000-4-5 | ± 1kV | Perf. Criteria A |
| Conducted immunity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

## Note:

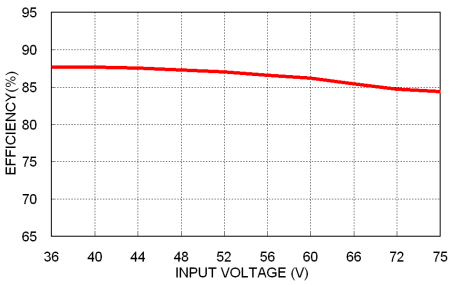
1. Test by minimum input and constant resistive load.
2. Trimming allows the user to increase or decrease the output voltage set point of the module. This is accomplished by connecting an external resistor between the Trim pin and either +Vout pin or -Vout pin.
3. The power module operates in a variety of thermal environments; however, sufficient cooling should be provided to help ensure reliable operation.
4. The standard modules meet EN55022 Class A and Class B with external components. For further information, please contact with P-DUKE.
5. 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.

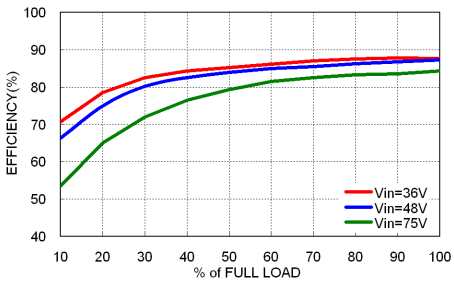
## CHARACTERISTIC CURVE




LED15-48S05 Derating Curve



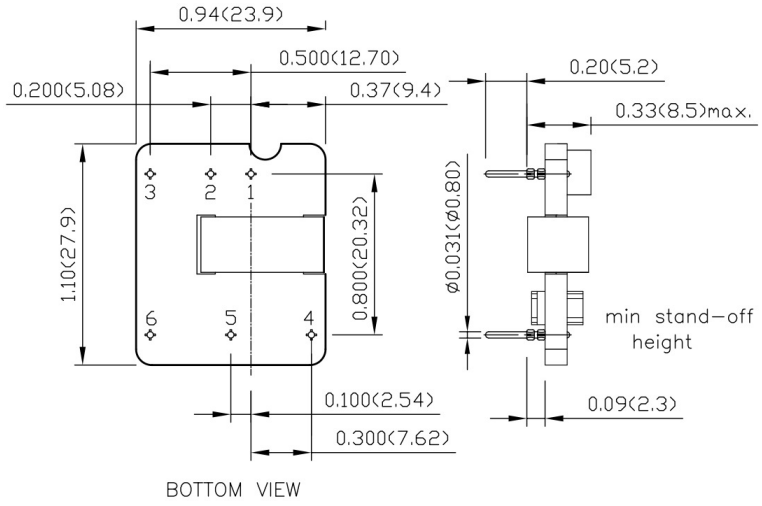

LED15-48S05 Efficiency vs. Input Voltage




LED15-48S05 Efficiency vs. Output Load

## MECHANICAL DRAWING

### DIP TYPE

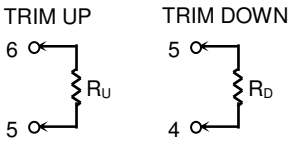



**PIN CONNECTION**

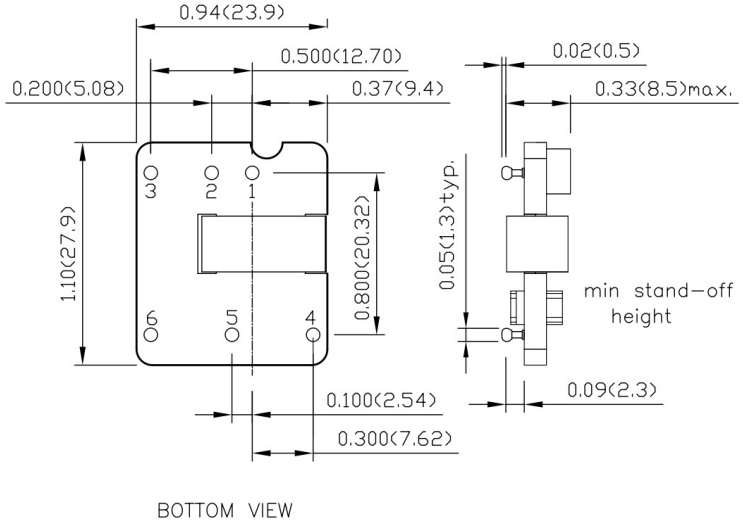
| PIN | DEFINE |
|---|---|
| 1 | +Vin |
| 2 | -Vin |
| 3 | Ctrl |
| 4 | +Vout |
| 5 | Trim |
| 6 | -Vout |

**EXTERNAL OUTPUT TRIMMING**

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




### SMT TYPE




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)