POWER MATE TECHNOLOGY CO., LTD.

# PDS(H)03 SERIES

**3 WATTS DC-DC CONVERTER**


## FEATURES

- 3 WATTS MAXIMUM OUTPUT POWER
- SMD AND DIP PACKAGE, 0.74 x 0.50 x 0.33 INCH
- SMD PACKAGE QUALIFIED FOR LEADFREE REFLOW SOLDER PROCESS ACCORDING IPC J-STD-020D
- 2:1 WIDE INPUT VOLTAGE RANGE
- HIGH EFFICIENCY UP TO 83%
- 1600VDC INPUT TO OUTPUT ISOLATION AND 3000VDC FOR OPTION
- LOW RIPPLE & NOISE
- EXTERNAL ON/OFF CONTROL
- SWITCHING FREQUENCY (100kHz, MIN)
- CONTINUOUS SHORT CIRCUIT PROTECTION
- UL94-V0 PACKAGE MATERIALS
- 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

**3000VDC ISOLATION**

## DESCRIPTION

The PDS03(SMD type), PDH03(DIP type) offer 3 watts of output power from a 0.74 x 0.50 x 0.33 inch package without derating to 71ºC. The PDS(H)03 series have 2:1 wide input voltage of 4.5~9, 9~18, 18~36 and 36~75VDC and features 3000VDC of isolation, short-circuit protection.

## TECHNICAL SPECIFICATION

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

### OUTPUT SPECIFICATIONS

| | | | |
|---|---|---|---|
| Output power | | | 3 Watts, max. |
| Voltage accuracy | | | ± 1% |
| Minimum load | | | 0% |
| Line regulation | LL to HL at Full Load | | ± 0.2% |
| Load regulation | No load to Full load | Single<br>Dual | ±1.0%<br>±1.0% |
| | 10% load to 90% load | Single<br>Dual | ±0.5%<br>±0.8% |
| Cross regulation (Dual) | Asymmetrical load 25%/100% FL | | ±5% |
| Ripple and noise | 20MHz bandwidth | | See table |
| Temperature coefficient | | | ±0.02% / ºC, max. |
| Transient response recovery time | 25% load step change | | 250µs |
| Short circuit protection | | | Continuous, automatics recovery |

### GENERAL SPECIFICATIONS

| | | | |
|---|---|---|---|
| Efficiency | | | See table |
| Isolation voltage | | Standard<br>Suffix "H" | 1600VDC, min.1 minute<br>3000VDC, min.1 minute |
| Isolation resistance | 500VDC | | $10^9$ ohms, min. |
| Isolation capacitance | | Standard<br>Suffix "H" | 50pF, max.<br>50pF, max. |
| Switching frequency | | | 100kHz, min. |
| Design meets safety standard | | | IEC60950-1, UL60950-1, EN60950-1 |
| Dimensions | | | 0.74 x 0.50 x 0.33 Inch<br>(18.9 X 12.8 X 8.4 mm) |
| Weight | | | 4.5g(0.16oz) |
| MTBF(Note 1) | BELLCORE TR-NWT-000332<br>MIL-HDBK-217F | | $4.386 \times 10^6$ hrs<br>$2.401 \times 10^6$ hrs |

### EMC CHARACTERISTICS

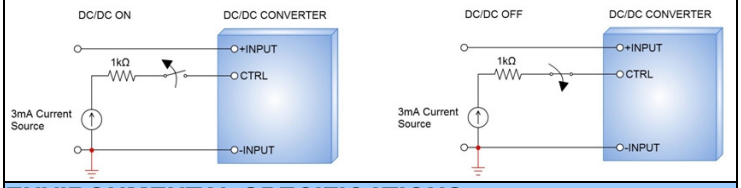
| | | | | |
|---|---|---|---|---|
| EMI (Note 6) | EN55022 | | | Class A, Class B |
| ESD | EN61000-4-2 | Air<br>Contact | ± 8kV<br>± 6kV | Perf. Criteria A |
| Radiated immunity | EN61000-4-3 | | 10 V/m | Perf. Criteria A |
| Fast transient (Note 7) | EN61000-4-4 | | ± 2kV | Perf. Criteria A |
| Surge (Note 7) | EN61000-4-5 | | ± 1kV | Perf. Criteria A |
| Conducted immunity | EN61000-4-6 | | 10 Vr.m.s | Perf. Criteria A |

### INPUT SPECIFICATIONS

| | | |
|---|---|---|
| Input voltage range | 5V nominal input | 4.5 ~ 9VDC |
| | 12V nominal input | 9 ~ 18VDC |
| | 24V nominal input | 18 ~ 36VDC |
| | 48V nominal input | 36 ~ 75VDC |
| Input filter | | Capacitor type |
| Input surge voltage | 5V input | 15VDC 1sec, max. |
| | 12V input | 25VDC 1sec, max. |
| | 24V input | 50VDC 1sec, max. |
| | 48V input | 100VDC 1sec, max. |
| Input reflected ripple current(Note 6) | 5V input | 80mAp-p |
| | 12V input | 40mAp-p |
| | 24V input | 30mAp-p |
| | 48V input | 20mAp-p |

| | | | |
|---|---|---|---|
| Start up time | Nominal input and constant resistive load | Power up<br>Remote ON/OFF | 5ms<br>5ms |
| Remote ON/OFF | DC-DC ON<br>DC-DC OFF | | Open or high impedance<br>Control pin applied current 2 ~ 4mA max(via 1kΩ) |
| Remote off state input current | Nominal input | | 2.5mA, max. |

Application circuit:




### ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Operating ambient temperature | -40ºC ~ +71ºC (without derating)<br>+71ºC ~ +85ºC (with derating) |
| Storage temperature range | -55ºC ~ +125ºC |
| Thermal shock | MIL-STD-810F |
| Vibration | MIL-STD-810F |
| Relative humidity(non-condensing) | 5% to 90% RH |
| Lead-free reflow solder process | IPC J-STD-020D |
| Moisture sensitivity level(MSL) | IPC J-STD-033B<br>Level 2a |

# PDS(H)03 SERIES

**3 WATTS DC-DC CONVERTER**

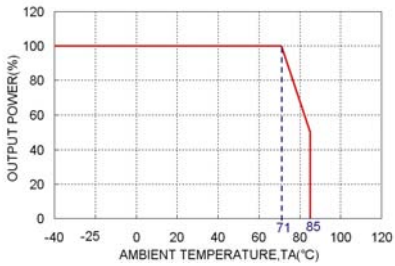
| Model Number | Input Range | Output Voltage | Output Current | | Output [2] Ripple & Noise | No load[3] Input Current | Eff [4] (%) | Capacitor [5] Load max. |
|---|---|---|---|---|---|---|---|---|
| | | | Min. load | Full load | | | | |
| PDS(H)03-05S3P3 | 4.5 ~ 9 VDC | 3.3 VDC | 0mA | 700mA | 30 mVp-p | 40mA | 75 | 3300μF |
| PDS(H)03-05S05 | 4.5 ~ 9 VDC | 5 VDC | 0mA | 600mA | 30 mVp-p | 40mA | 79 | 1680μF |
| PDS(H)03-05S09 | 4.5 ~ 9 VDC | 9 VDC | 0mA | 333mA | 30 mVp-p | 40mA | 79 | 1000μF |
| PDS(H)03-05S12 | 4.5 ~ 9 VDC | 12 VDC | 0mA | 250mA | 30 mVp-p | 40mA | 80 | 820μF |
| PDS(H)03-05S15 | 4.5 ~ 9 VDC | 15 VDC | 0mA | 200mA | 30 mVp-p | 50mA | 81 | 680μF |
| PDS(H)03-05D05 | 4.5 ~ 9 VDC | ±5 VDC | 0mA | ±300mA | 30 mVp-p | 50mA | 80 | ±1000μF |
| PDS(H)03-05D12 | 4.5 ~ 9 VDC | ±12 VDC | 0mA | ±125mA | 30 mVp-p | 50mA | 80 | ±470μF |
| PDS(H)03-05D15 | 4.5 ~ 9 VDC | ±15 VDC | 0mA | ±100mA | 30 mVp-p | 55mA | 81 | ±330μF |
| PDS(H)03-12S3P3 | 9 ~ 18 VDC | 3.3 VDC | 0mA | 700mA | 30 mVp-p | 30mA | 76 | 3300μF |
| PDS(H)03-12S05 | 9 ~ 18 VDC | 5 VDC | 0mA | 600mA | 30 mVp-p | 30mA | 81 | 1680μF |
| PDS(H)03-12S09 | 9 ~ 18 VDC | 9 VDC | 0mA | 333mA | 30 mVp-p | 30mA | 80 | 1000μF |
| PDS(H)03-12S12 | 9 ~ 18 VDC | 12 VDC | 0mA | 250mA | 30 mVp-p | 30mA | 82 | 820μF |
| PDS(H)03-12S15 | 9 ~ 18 VDC | 15 VDC | 0mA | 200mA | 30 mVp-p | 30mA | 82 | 680μF |
| PDS(H)03-12D05 | 9 ~ 18 VDC | ±5 VDC | 0mA | ±300mA | 30 mVp-p | 30mA | 80 | ±1000μF |
| PDS(H)03-12D12 | 9 ~ 18 VDC | ±12 VDC | 0mA | ±125mA | 30 mVp-p | 30mA | 82 | ±470μF |
| PDS(H)03-12D15 | 9 ~ 18 VDC | ±15 VDC | 0mA | ±100mA | 30 mVp-p | 30mA | 83 | ±330μF |
| PDS(H)03-24S3P3 | 18 ~ 36 VDC | 3.3 VDC | 0mA | 700mA | 30 mVp-p | 13mA | 76 | 3300μF |
| PDS(H)03-24S05 | 18 ~ 36 VDC | 5 VDC | 0mA | 600mA | 30 mVp-p | 13mA | 81 | 1680μF |
| PDS(H)03-24S09 | 18 ~ 36 VDC | 9 VDC | 0mA | 333mA | 30 mVp-p | 13mA | 82 | 1000μF |
| PDS(H)03-24S12 | 18 ~ 36 VDC | 12 VDC | 0mA | 250mA | 30 mVp-p | 13mA | 82 | 820μF |
| PDS(H)03-24S15 | 18 ~ 36 VDC | 15 VDC | 0mA | 200mA | 30 mVp-p | 13mA | 83 | 680μF |
| PDS(H)03-24D05 | 18 ~ 36 VDC | ±5 VDC | 0mA | ±300mA | 30 mVp-p | 13mA | 80 | ±1000μF |
| PDS(H)03-24D12 | 18 ~ 36 VDC | ±12 VDC | 0mA | ±125mA | 30 mVp-p | 13mA | 83 | ±470μF |
| PDS(H)03-24D15 | 18 ~ 36 VDC | ±15 VDC | 0mA | ±100mA | 30 mVp-p | 13mA | 83 | ±330μF |
| PDS(H)03-48S3P3 | 36 ~ 75 VDC | 3.3 VDC | 0mA | 700mA | 30 mVp-p | 10mA | 76 | 3300μF |
| PDS(H)03-48S05 | 36 ~ 75 VDC | 5 VDC | 0mA | 600mA | 30 mVp-p | 10mA | 81 | 1680μF |
| PDS(H)03-48S09 | 36 ~ 75 VDC | 9 VDC | 0mA | 333mA | 30 mVp-p | 10mA | 80 | 1000μF |
| PDS(H)03-48S12 | 36 ~ 75 VDC | 12 VDC | 0mA | 250mA | 30 mVp-p | 10mA | 82 | 820μF |
| PDS(H)03-48S15 | 36 ~ 75 VDC | 15 VDC | 0mA | 200mA | 30 mVp-p | 10mA | 82 | 680μF |
| PDS(H)03-48D05 | 36 ~ 75 VDC | ±5 VDC | 0mA | ±300mA | 30 mVp-p | 10mA | 81 | ±1000μF |
| PDS(H)03-48D12 | 36 ~ 75 VDC | ±12 VDC | 0mA | ±125mA | 30 mVp-p | 10mA | 83 | ±470μF |
| PDS(H)03-48D15 | 36 ~ 75 VDC | ±15 VDC | 0mA | ±100mA | 30 mVp-p | 10mA | 83 | ±330μF |

Note

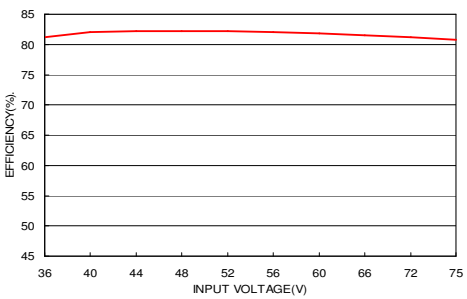
1. BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40ºC.
   MIL-HDBK-217F Notice2 @Ta=25 ºC, Full load(Ground, Benign, controlled environment)
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. The PDS(H)03 series standard module meets EN55022 Class A and Class B with external components.
   For more detail information, please contact with P-DUKE.
7. 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.

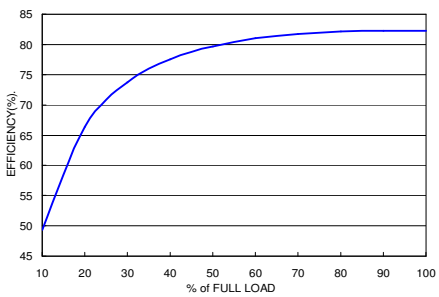
PDS03-48S05 Derating Curve




PDS03-48S05 Efficiency VS Input Voltage

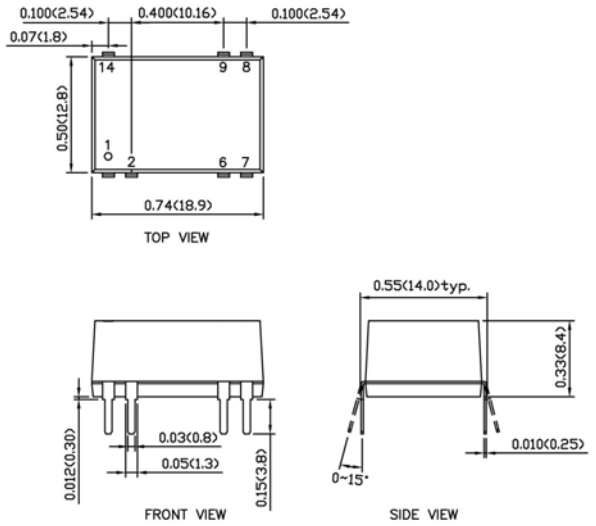



PDS03-48S05 Efficiency VS Output Load

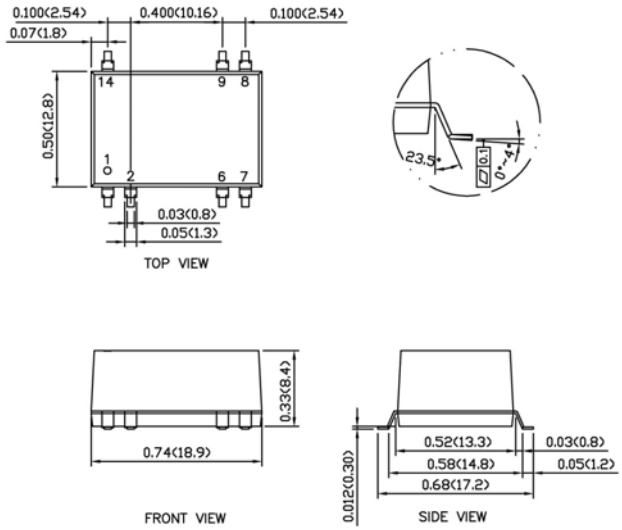


## MECHANICAL DRAWING :

### 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 | SINGLE | DUAL |
| 1 | -INPUT | -INPUT |
| 2 | CTRL | CTRL |
| 6 | NC | COMMON |
| 7 | NC | -OUTPUT |
| 8 | +OUTPUT | +OUTPUT |
| 9 | -OUTPUT | COMMON |
| 14 | +INPUT | +INPUT |