

PDL02 SERIES

DC / DC Single & Dual Output: 2 Watts



Features

- 2:1 Input voltage range
- 5V, 12V, 24V & 48V input voltage options
- Single & Dual outputs
- Fixed switching frequency 100KHz
- Industry Standard SIP package
- High efficiency up to 805%
- Regulated output & Short circuit protection
- 1000V isolation
- Low ripple & Noise
- External ON/OFF control
- Safety approvals EN60950, UL60950

| | |
|--|---|
| Input Voltage | 5VDC (4.5 ~ 9) 12VDC (9 ~ 18) 24VDC (18 ~ 36) 48VDC (36 ~ 75) |
| Input Filter | Capacitor type |
| Input Surge Voltage. (100mS) | 5V: 15VDC, 12V : 36VDC, 24V: 50VDC. 48V: 100VDC |
| Input Reflected Ripple Current | 5V input (10uF/MLCC) 400mA p-p 12V input (10uF/MLCC) 150mA p-p 24V input (2.2uF/MLCC) 380mA p-p 48V input (2.2uF/MLCC) 170mA p-p |
| Start Up time | 1mS typical constant resistive load |
| Remote ON/OFF (Positive logic) | DC-DC ON Open or high impedance DC-DC OFF Control pin applied current 4 ~ 8mA max via 1Kohm |
| Output power | 2 watts |
| Voltage Accuracy | ±1.0% |
| Minim Load | See table for minimum load requirement |
| Line Regulation | ±0.5% Low Load to 100% |
| Load Regulation | Single ±0.85% , Dual ±1% (Loa load to -100%) |
| Cross Regulation | ±5% Asymmetrical load: 25-100% load) |
| Ripple & noise | See table. 20MHZ bandwidth |
| Temp. Coefficient | ±0.1% / °C |
| Transient Response | 500uS (25% load step change) |
| Overload Protection | Typically 150% of load |
| Short Circuit protection | Continuous hiccup mode |

| | |
|---------------------------|--|
| Efficiency | Model dependant 65 ~ 80% |
| Isolation | 1600VDC |
| Isolation Cap. | 300pF |
| Switching Freq. | 100KHz |
| Safety | EN60950-1, UL60950-1 |
| Case Material | Non-conductive black plastic |
| Base Material | None |
| Potting | Epoxy UL94-V0 |
| Dimensions | 21.8 x 9.1 x 11.2mm |
| Weight | 4.8g |
| MTBF | 5.107 x 10 ⁸ Hrs |
| Operating Temp | -40°C to +85°C (with derating) |
| Thermal shock | MIL-STD-810F |
| Vibration | 10-55Hz, 10G, 30min along X, Y,Z |
| Humidity | 5-95% RH |
| EMC | EN55022 Class A Consult office for Class B design |
| ESD | EN61000-4-2 |
| Radiated Immunity | EN61000-4-3 |
| Fast Transients | EN61000-4-4 |
| Surge | EN61000-4-5 |
| Conducted Immunity | EN61000-4-6 |

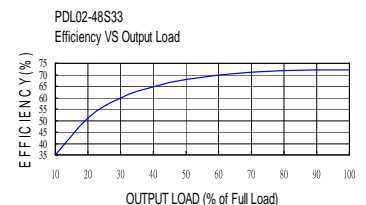
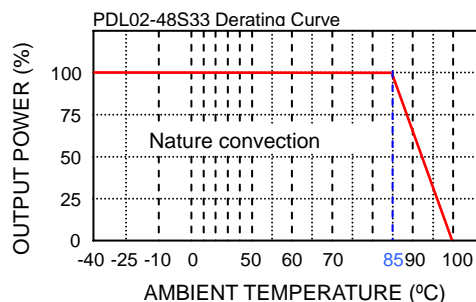
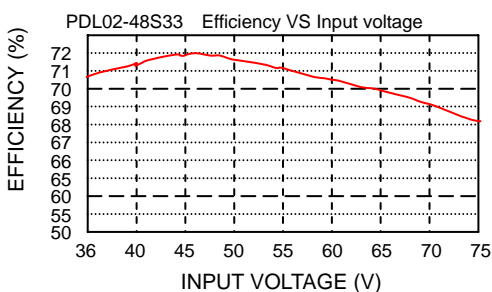
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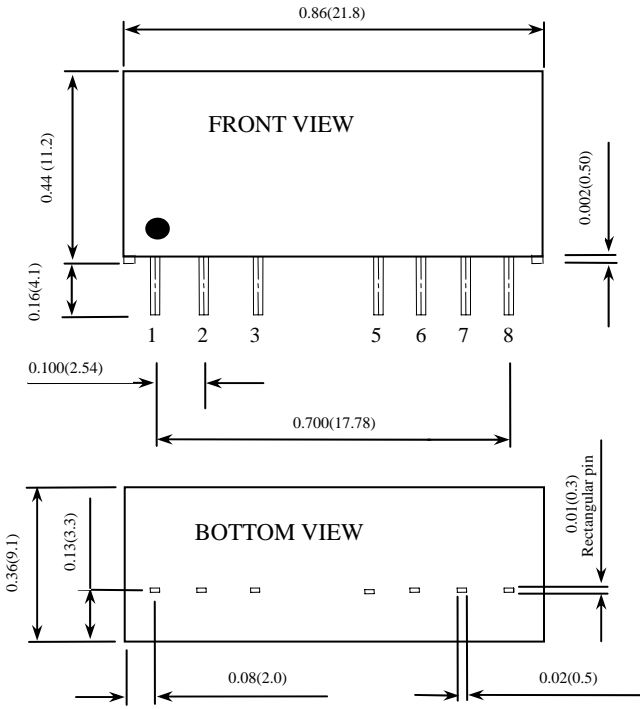
| Model | Input V | Output V | Output Current | | Output ⁽⁴⁾ Ripple & Noise | Input Current | | Eff ⁽⁴⁾ (%) | Capacitor ⁽⁵⁾ Load max |
|-------------|-----------|----------|----------------|-----------|---|------------------------|--------------------------|---------------------------|--------------------------------------|
| | | | Min Load | Full Load | | No load ⁽³⁾ | Full load ⁽²⁾ | | |
| PDL02-05S33 | 4.5 – 9 V | 3.3 V | 50mA | 500mA | 50mVp-p | 60mA | 540mA | 65 | 2200uF |
| PDL02-05S05 | 4.5 – 9 V | 5 V | 40mA | 400mA | 50mVp-p | 55mA | 615mA | 69 | 1000uF |
| PDL02-05S09 | 4.5 – 9 V | 9 V | 22mA | 222mA | 50mVp-p | 55mA | 596mA | 71 | 470uF |
| PDL02-05S12 | 4.5 – 9 V | 12 V | 17mA | 167mA | 50mVp-p | 75mA | 588mA | 72 | 170uF |
| PDL02-05S15 | 4.5 – 9 V | 15 V | 13mA | 134mA | 50mVp-p | 40mA | 582mA | 73 | 110uF |
| PDL02-05D05 | 4.5 – 9 V | ±5 V | ±20mA | ±200mA | 50mVp-p | 75mA | 645mA | 77 | ±470uF |
| PDL02-05D12 | 4.5 – 9 V | ±12 V | ±8mA | ±83mA | 50mVp-p | 75mA | 595mA | 78 | ±100uF |
| PDL02-05D15 | 4.5 – 9 V | ±15 V | ±7mA | ±67mA | 50mVp-p | 90mA | 598mA | 78 | ±47uF |
| PDL02-12S33 | 9 – 18 V | 3.3 V | 50mA | 500mA | 50mVp-p | 20mA | 202mA | 72 | 2200uF |
| PDL02-12S05 | 9 – 18 V | 5 V | 40mA | 400mA | 50mVp-p | 25mA | 234mA | 75 | 1000uF |
| PDL02-12S09 | 9 – 18 V | 9 V | 22mA | 222mA | 50mVp-p | 25mA | 222mA | 79 | 470uF |
| PDL02-12S12 | 9 – 18 V | 12 V | 17mA | 167mA | 50mVp-p | 30mA | 219mA | 80 | 170uF |
| PDL02-12S15 | 9 – 18 V | 15 V | 13mA | 134mA | 50mVp-p | 30mA | 220mA | 80 | 110uF |
| PDL02-12D05 | 9 – 18 V | ±5 V | ±20mA | ±200mA | 50mVp-p | 50mA | 242mA | 73 | ±470uF |
| PDL02-12D12 | 9 – 18 V | ±12 V | ±8mA | ±83mA | 50mVp-p | 40mA | 224mA | 78 | ±100uF |
| PDL02-12D15 | 9 – 18 V | ±15 V | ±7mA | ±67mA | 50mVp-p | 40mA | 226mA | 78 | ±47uF |
| PDL02-24S33 | 18 – 36 V | 3.3 V | 50mA | 500mA | 50mVp-p | 10mA | 102mA | 71 | 2200uF |
| PDL02-24S05 | 18 – 36 V | 5 V | 40mA | 400mA | 50mVp-p | 10mA | 115mA | 76 | 1000uF |
| PDL02-24S09 | 18 – 36 V | 9 V | 22mA | 222mA | 50mVp-p | 15mA | 109mA | 80 | 470uF |
| PDL02-24S12 | 18 – 36 V | 12 V | 17mA | 167mA | 50mVp-p | 15mA | 109mA | 80 | 170uF |
| PDL02-24S15 | 18 – 36 V | 15 V | 13mA | 134mA | 50mVp-p | 15mA | 108mA | 81 | 110uF |
| PDL02-24D05 | 18 – 36 V | ±5 V | ±20mA | ±200mA | 50mVp-p | 15mA | 117mA | 75 | ±470uF |
| PDL02-24D12 | 18 – 36 V | ±12 V | ±8mA | ±83mA | 50mVp-p | 20mA | 112mA | 78 | ±100uF |
| PDL02-24D15 | 18 – 36 V | ±15 V | ±7mA | ±67mA | 50mVp-p | 20mA | 110mA | 80 | ±47uF |
| PDL02-48S33 | 36 – 75 V | 3.3 V | 50mA | 500mA | 50mVp-p | 10mA | 52mA | 70 | 2200uF |
| PDL02-48S05 | 36 – 75 V | 5 V | 40mA | 400mA | 50mVp-p | 10mA | 60mA | 74 | 1000uF |
| PDL02-48S09 | 36 – 75 V | 9 V | 22mA | 222mA | 50mVp-p | 10mA | 56mA | 78 | 470uF |
| PDL02-48S12 | 36 – 75 V | 12 V | 17mA | 167mA | 50mVp-p | 10mA | 55mA | 80 | 170uF |
| PDL02-48S15 | 36 – 75 V | 15 V | 13mA | 134mA | 50mVp-p | 10mA | 55mA | 79 | 110uF |
| PDL02-48D05 | 36 – 75 V | ±5 V | ±20mA | ±200mA | 50mVp-p | 10mA | 62mA | 75 | ±470uF |
| PDL02-48D12 | 36 – 75 V | ±12 V | ±8mA | ±83mA | 50mVp-p | 10mA | 57mA | 77 | ±100uF |
| PDL02-48D15 | 36 – 75 V | ±15 V | ±7mA | ±67mA | 50mVp-p | 12mA | 57mA | 77 | ±47uF |

- Notes:
1. BELLCORE TR-NWT-000332. Case: 50% Stress. Temperature at 40°C. (Ground fixed and controlled environment).
 2. Maximum value at nominal input voltage and full load.
 3. Typical value at nominal input voltage and no load.
 4. Typical value at nominal input voltage and full load.
 5. Test by minimum Vin and constant resistive load.
 6. The output requires a minimum loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices, however they may not meet all listed specification.
 7. It will not damage the device without inserting external input capacitors. There is a smaller reflected ripple current when put a capacitor at input.
 8. The PDL02 series meet EN55022 Class A with external L-C filter before the input pins to the converter. (Connect networks following Class B figure.)
 Recommend: 05 Vin : C1=10µF/25V 1812 MLCC. L1=2.2uH 0504 SMD Inductor P/N:PMT-059
 12 Vin : C1=10µF/25V 1812 MLCC. L1=2.2uH 0504 SMD Inductor P/N:PMT-059
 24 Vin : C1=6.8µF/50V 1812 MLCC. L1=3.3uH 0504 SMD Inductor P/N:PMT-044.
 48 Vin : C1=2.2µF/100V 1812 MLCC. L1=10uH 0504 SMD Inductor P/N:PMT-047.
 9. An external filter capacitor is required if the module has to meet EN61000-4-5.
 The filter capacitor Power Mate suggest: Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.

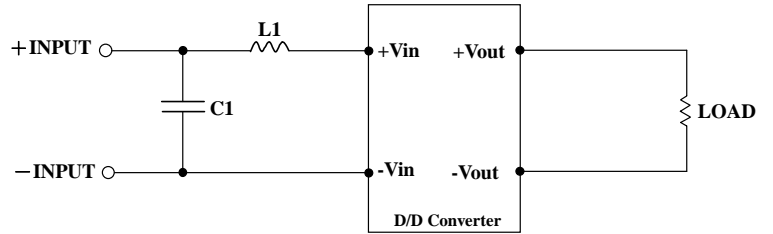


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1. All dimensions in Inches (mm)
Tolerance: X.XX±0.02 (X.X±0.5)
X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

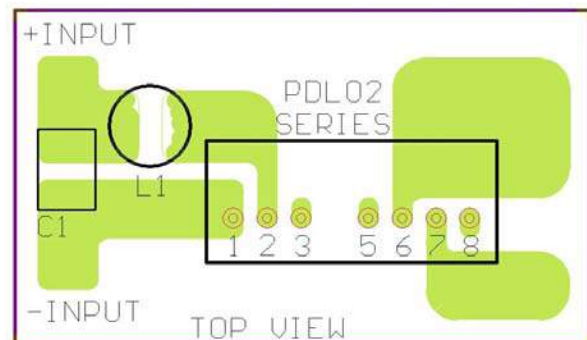


Recommended Filter for EN55022 Class B Compliance

The components used in the above figure, together with the manufacturers' part numbers for these components, are as follows:

| | C1 | L1 |
|-------------|-------------------------|--|
| PDL02-05XXX | 22uF/25V 1812 MLCC | 3.3uH 2.0A 0.06Ω 0504 SMDInductor,P/N:PMT-044 |
| PDL02-12xxx | 22uF/25V 1812 MLCC | 3.3uH 2.0A 0.06Ω 0504 SMDInductor,P/N:PMT-044 |
| PDL02-24xxx | 4.7uF/50V 1812 MLCC | 12uH 1.4A 0.12Ω 0504 SMDInductor,P/N:PMT-062 |
| PDL02-48xxx | 2.2uF/100V 1812 MLCC | 27uH 0.9A 0.2Ω 0504 SMDInductor,P/N:PMT-063 |

| Pin Assignment | | |
|----------------|----------|----------|
| PIN | SINGLE | DUAL |
| 1 | - Input | - Input |
| 2 | + Input | + Input |
| 3 | CTRL | CTRL |
| 5 | NC | NC |
| 6 | + Output | + Output |
| 7 | - Output | COM |
| 8 | NC | - Output |



Recommended EN55022 Class B Filter Circuit Layout