

# 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

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

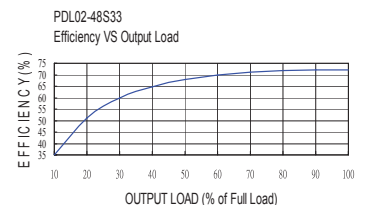
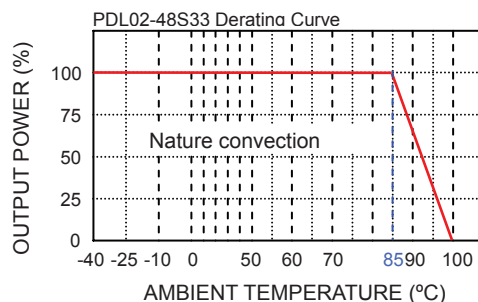
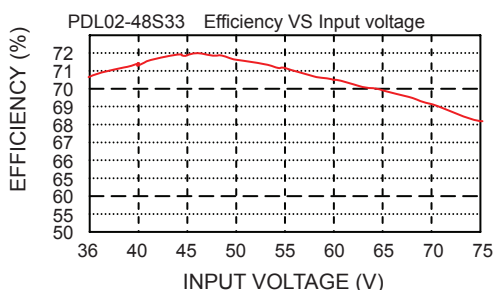
<b>Efficiency</b>	Model dependant 65 ~ 80%
<b>Isolation</b>	1600VDC
<b>Isolation Cap.</b>	300pF
<b>Switching Freq.</b>	100KHz
<b>Safety</b>	EN60950-1, UL60950-1
<b>Case Material</b>	Non-conductive black plastic
<b>Base Material</b>	None
<b>Potting</b>	Epoxy UL94-V0
<b>Dimensions</b>	21.8 x 9.1 x 11.2mm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

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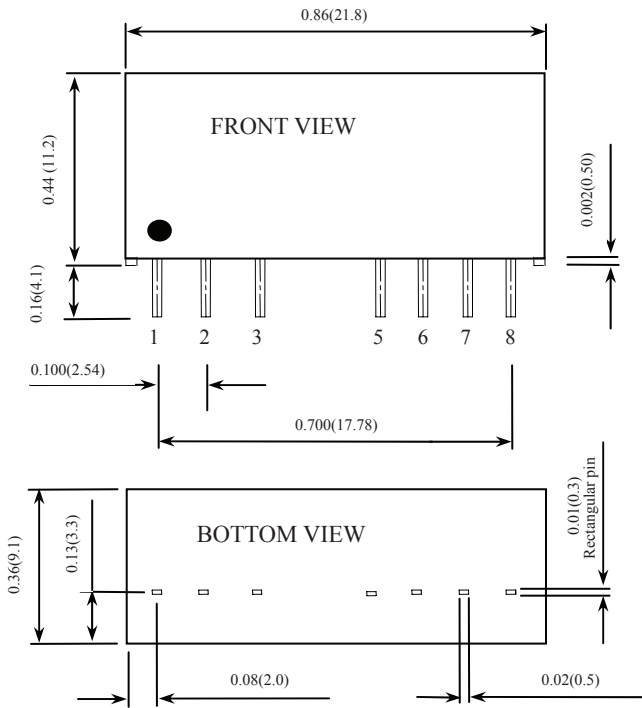
Model	Input V	Output V	Output Current		Output <sup>(4)</sup> Ripple & Noise	Input Current		Eff <sup>(4)</sup> (%)	Capacitor <sup>(5)</sup> Load max
			Min Load	Full Load		No load <sup>(3)</sup>	Full load <sup>(2)</sup>		
PDL02-05S33	4.5 – 9 V	3.3 V	50mA	500mA	50mVp-p	60mA	540mA	65	2200uF
PDL02-05S05	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.

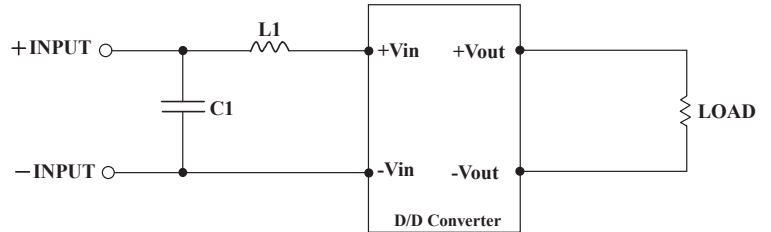


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1. All dimensions in Inches (mm)  
Tolerance: X.XX±0.02 (X.X±0.5)  
X.XXX±0.01 (X.XX±0.25)
2. Pin pitch tolerance ±0.01(0.25)
3. Pin dimension tolerance ±0.004 (0.1)

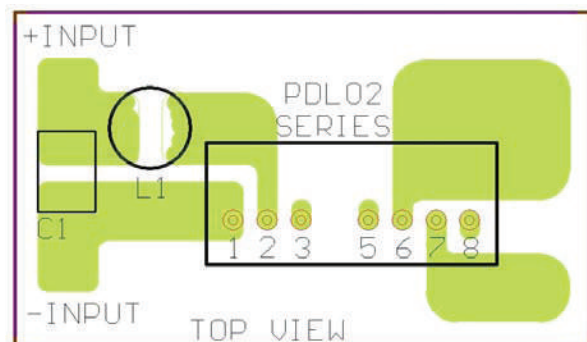


### Recommended Filter for EN55022 Class B Compliance

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