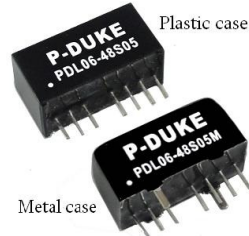


# PDL06 SERIES

DC-DC CONVERTER

2:1 WIDE INPUT RANGE  
UP TO 6 WATTS



## FEATURES

- SIP PACKAGE, 0.86 x 0.36x 0.44 INCH
- 1600VDC INPUT TO OUTPUT ISOLATION AND 3000VDC FOR OPTION
- CONTINUOUS SHORT CIRCUIT PROTECTION
- SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1
- CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC
- COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU

## APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- MEASUREMENT EQUIPMENT
- SEMICONDUCTOR EQUIPMENT

## TECHNICAL SPECIFICATION

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

Model Number	Input Range	Output Voltage	Output Current @ Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load
	VDC	VDC	mA	mA		
PDL06-05S3P3	4.5 ~ 9	3.3	1300	65mA	77	6600
PDL06-05S05	4.5 ~ 9	5	1200	105mA	81	3300
PDL06-05S09	4.5 ~ 9	9	666	105mA	83	2000
PDL06-05S12	4.5 ~ 9	12	500	105mA	84	1600
PDL06-05S15	4.5 ~ 9	15	400	105mA	84	1400
PDL06-05S24	4.5 ~ 9	24	250	105mA	84	680
PDL06-05D05	4.5 ~ 9	±5	±600	105mA	81	±2000
PDL06-05D12	4.5 ~ 9	±12	±250	105mA	84	±900
PDL06-05D15	4.5 ~ 9	±15	±200	105mA	84	±660
PDL06-12S3P3	9 ~ 18	3.3	1300	40mA	78	6600
PDL06-12S05	9 ~ 18	5	1200	55mA	83	3300
PDL06-12S09	9 ~ 18	9	666	55mA	85	2000
PDL06-12S12	9 ~ 18	12	500	55mA	85	1600
PDL06-12S15	9 ~ 18	15	400	55mA	85	1400
PDL06-12S24	9 ~ 18	24	250	55mA	84	680
PDL06-12D05	9 ~ 18	±5	±600	55mA	82	±2000
PDL06-12D12	9 ~ 18	±12	±250	55mA	84	±900
PDL06-12D15	9 ~ 18	±15	±200	55mA	85	±660
PDL06-24S3P3	18 ~ 36	3.3	1300	20mA	78	6600
PDL06-24S05	18 ~ 36	5	1200	28mA	83	3300
PDL06-24S09	18 ~ 36	9	666	28mA	85	2000
PDL06-24S12	18 ~ 36	12	500	28mA	86	1600
PDL06-24S15	18 ~ 36	15	400	28mA	86	1400
PDL06-24S24	18 ~ 36	24	250	28mA	85	680
PDL06-24D05	18 ~ 36	±5	±600	28mA	82	±2000
PDL06-24D12	18 ~ 36	±12	±250	28mA	85	±900
PDL06-24D15	18 ~ 36	±15	±200	28mA	85	±660
PDL06-48S3P3	36 ~ 75	3.3	1300	14mA	78	6600
PDL06-48S05	36 ~ 75	5	1200	14mA	82	3300
PDL06-48S09	36 ~ 75	9	666	14mA	84	2000
PDL06-48S12	36 ~ 75	12	500	14mA	85	1600
PDL06-48S15	36 ~ 75	15	400	14mA	86	1400
PDL06-48S24	36 ~ 75	24	250	14mA	84	680
PDL06-48D05	36 ~ 75	±5	±600	14mA	82	±2000
PDL06-48D12	36 ~ 75	±12	±250	14mA	84	±900
PDL06-48D15	36 ~ 75	±15	±200	14mA	85	±660

## PART NUMBER STRUCTURE

<b>PDL06</b>	<b>- 48</b>	<b>S</b>	<b>05</b>	<b>H</b>
Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Assembly Option
	05:4.5~9 12:9~18 24:18~36 48:36~75	S:Single    D: Dual	3P3:3.3 05:5 09:9 12:12 15:15 24:24 05:±5 12:±12 15:±15	□:Standard H:Plastic case with 3000VDC isolation M: Metal case with 1600VDC isolation

**INPUT SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit	
Operating input voltage range	5Vin(nom)	4.5	5	9	VDC	
	12Vin(nom)	9	12	18		
	24Vin(nom)	18	24	36		
	48Vin(nom)	36	48	75		
Start up voltage	5Vin(nom)			4.5	VDC	
	12Vin(nom)			9		
	24Vin(nom)			18		
	48Vin(nom)			36		
Shutdown voltage	5Vin(nom)		3.5		VDC	
	12Vin(nom)		7			
	24Vin(nom)		15			
	48Vin(nom)		33			
Start up time	Constant resistive load Power up Remote ON/OFF		5	10	ms	
Input surge voltage	1 second, max.	5Vin(nom)		15	VDC	
		12Vin(nom)		25		
		24Vin(nom)		50		
		48Vin(nom)		100		
Input reflected ripple current <sup>(1)</sup>	5Vin(nom) 12Vin(nom) 24Vin(nom) 48Vin(nom)		30		mA <sub>p-p</sub>	
Input filter			Capacitor type			
Remote ON/OFF	Referenced to -INPUT pin and CTRL pin applied current	DC-DC ON	Open	2	2	mA
		DC-DC OFF Remote off input current	High impedance	3	4	2.5

DC/DC ON

DC/DC OFF

**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	-1.0		+1.0	%
		-1.0		+1.0	
Cross regulation	Asymmetrical load 25%/100% FL	-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth		50		mV <sub>p-p</sub>
Temperature coefficient		-0.02		+0.02	%/°C
Transient response recovery time	25% load step change		500		μs
Short circuit protection		Continuous, automatic recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	Input to Output 1 minute	Standard Type	1600		VDC
		Suffix "H"	3000		
		Suffix "M"	1600		
	Input (Output) to Case	1000			
Isolation resistance	500VDC	1			GΩ
Isolation capacitance		Standard Type		50	pF
		Suffix "H"		50	
		Suffix "M"		50	
Switching frequency		100			kHz
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1			
Case material		Standard Type	Non-conductive black plastic		
		Suffix "H"	Non-conductive black plastic		
		Suffix "M"	Copper		
Base material		None			
Potting material		Silicone (UL94-V0)			
Dimensions		0.86 X 0.36 X 0.44 Inch (21.8 X 9.1 X 11.2 mm)			
Weight		Standard Type	4.8g (0.17oz)		
		Suffix "H"	4.8g (0.17oz)		
		Suffix "M"	5.9g (0.21oz)		
MTBF	MIL-HDBK-217F Ta=25°C, Full load	Standard Type	2.135 x 10 <sup>6</sup> hrs		
		Suffix "H"	2.135 x 10 <sup>6</sup> hrs		
		Suffix "M"	2.360 x 10 <sup>6</sup> hrs		

**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Standard Type	-40		+65	°C
	Without derating	-40		+65	°C
	Suffix "H"	-40		+70	°C
Storage temperature range	Standard Type	-55		+125	°C
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH

**EMC SPECIFICATIONS**

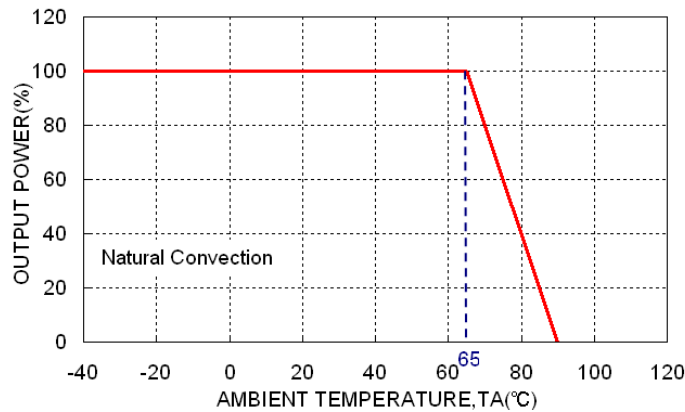
Parameter	Conditions	Level
EMI (1)	EN55022	Class A, Class B
ESD	EN61000-4-2 Air ± 8kV Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (2)	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge (2)	EN61000-4-5 ± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6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

**Note:**

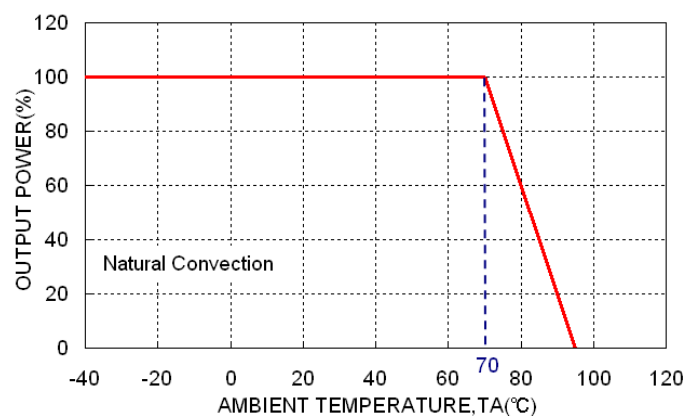
- The PDL06 series standard module meets EMI Class A or Class B and input reflected ripple current only with external components. For more detail information, please contact with P-DUKE.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor Power Mate suggest: 5 VDC input : Nippon chemi-con KY series, 330µF/50V. Others : Nippon chemi-con KY series, 220µF/100V.

**CAUTION:** This power module is not internally fused. An input line fuse must always be used.

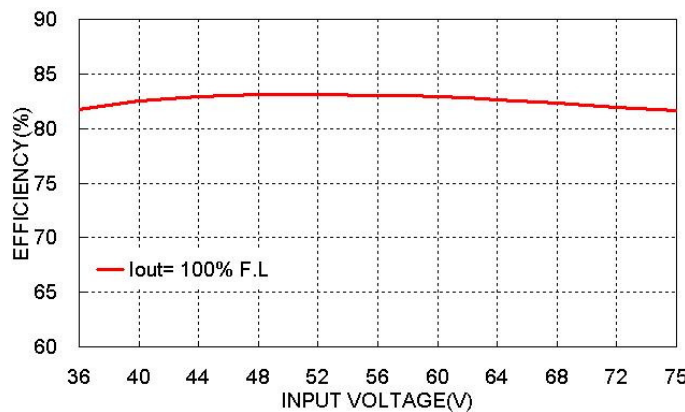
**CHARACTERISTIC CURVE**



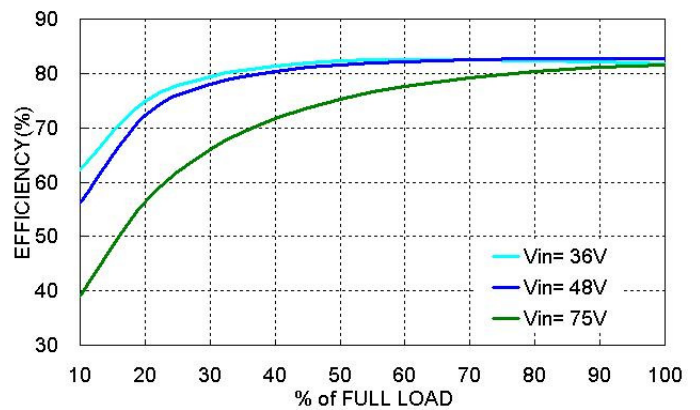
PDL06-48S05 Derating Curve



PDL06-48S05-M Derating Curve



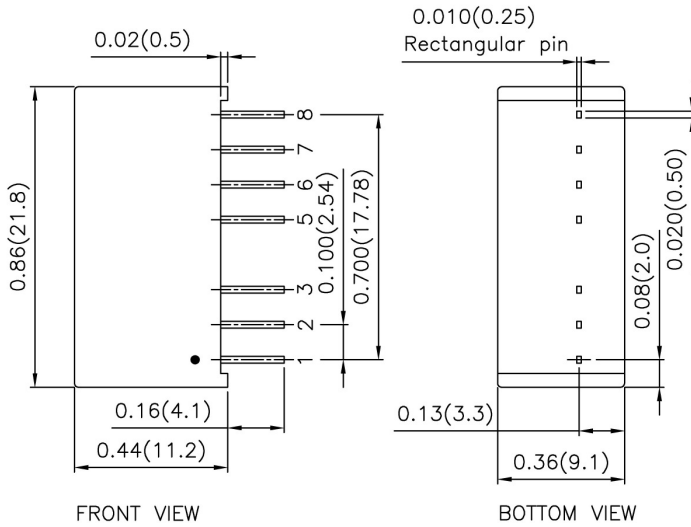
PDL06-48S05 Efficiency VS Input Voltage



PDL06-48S05 Efficiency VS Output Load

**MECHANICAL DRAWING**

Standard plastic case



PIN CONNECTION		
PIN	SINGLE	DUAL
1	-INPUT	-INPUT
2	+INPUT	+INPUT
3	CTRL	CTRL
5	NC*/NO PIN**	NC*/NO PIN**
6	+OUTPUT	+OUTPUT
7	-OUTPUT	COMMON
8	NC	-OUTPUT

\*NC pin for standard.

\*\*NO pin for 3KV isolation. (P/N suffix "H")

1. All dimensions in Inch (mm)

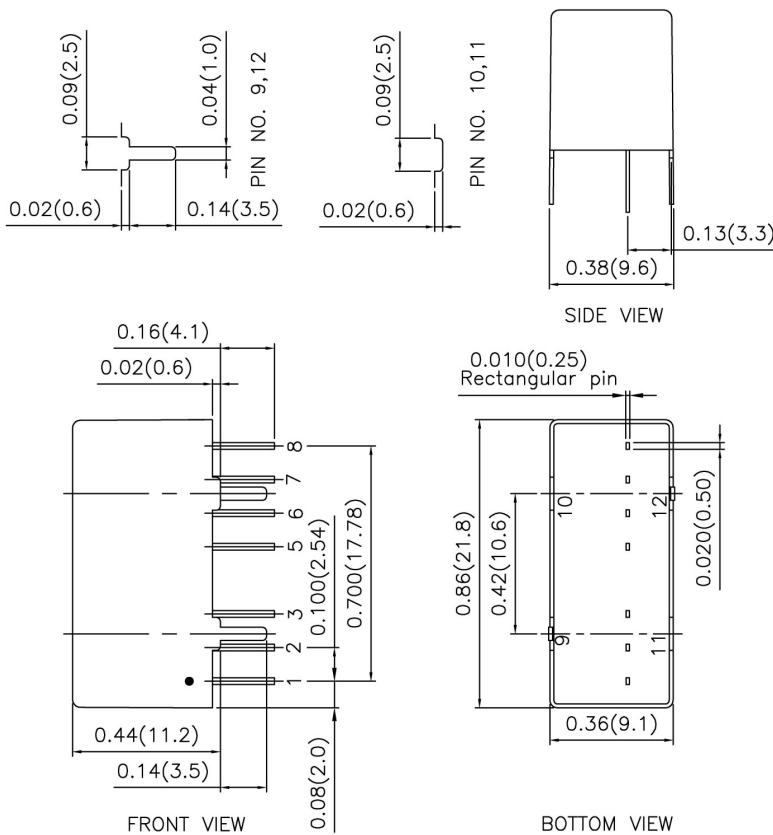
Tolerance: X.XX±0.02 (X.X±0.5)

X.XXX±0.01 (X.XX±0.25)

2. Pin pitch tolerance ±0.01(0.25)

3. Pin dimension tolerance ±0.004 (0.1)

Option suffix "M" metal case



PIN CONNECTION		
PIN	SINGLE	DUAL
1	-INPUT	-INPUT
2	+INPUT	+INPUT
3	CTRL	CTRL
5	NC	NC
6	+OUTPUT	+OUTPUT
7	-OUTPUT	COMMON
8	NC	-OUTPUT
9	CASE	CASE
10	STAND OFF	STAND OFF
11	STAND OFF	STAND OFF
12	CASE	CASE

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)