

PDL06 SERIES

DC-DC CONVERTER

2:1 ULTRA WIDE INPUT RANGE
UP TO 6Watts



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, 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	%	µF
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

PDL06	- 48	S	05	H
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	30		ms
Input surge voltage	1 second, max.	5Vin(nom)		15	VDC
		12Vin(nom)		25	
		24Vin(nom)		50	
		48Vin(nom)		100	
Input reflected ripple current ⁽¹⁾	5Vin(nom)	5Vin(nom)	30		mA _{p-p}
		12Vin(nom)	30		
		24Vin(nom)	30		
		48Vin(nom)	30		
Input filter					Capacitor type
Remote ON/OFF	Referenced to -INPUT pin and CTRL pin applied current	DC-DC ON	Open or high impedance		
		DC-DC OFF	2	3	4
		Remote off input current		2.5	mA

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	%
		Dual	-1.0	+1.0	
Cross regulation	Asymmetrical load 25%/100% FL	-5.0		+5.0	%
Ripple and noise	Measured by 20MHz bandwidth		50	75	mV _{p-p}
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	1600			VDC
	1 minute	3000			
	Input (Output) to Case	1600			
Isolation resistance		1000			GΩ
Isolation capacitance	500VDC	1			pF
				50	
				50	
Switching frequency		100			kHz
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1			
Case material	Standard Type				Non-conductive black plastic Non-conductive black plastic Copper
	Suffix "H"				
	Suffix "M"				
Base material					None
Potting material					Silicon (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) 4.8g (0.17oz) 5.9g (0.21oz)
	Suffix "H"				
	Suffix "M"				
MTBF	BELLCORE TR-NWT-000332 Case 1: 50% Stress, Ta= 40°C .				2.097 x 10 ⁵ hrs
	MIL-HDBK-217F Ta=25°C, Full load				7.705 x 10 ⁵ hrs
	(G/B, controlled environment)				7.705 x 10 ⁵ hrs
					9.987 x 10 ⁵ 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

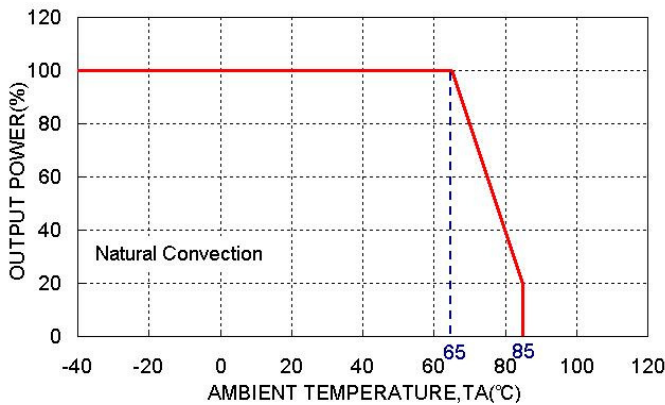
Parameter	Conditions	Level
EMI (1)	EN55022	Class A, ClassB
ESD	EN61000-4-2 Air ± 8kV Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient (2)	EN61000-4-4 ± 2kV	Perf. Criteria A
Surge (2)	EN61000-4-5 ± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6 10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

Note:

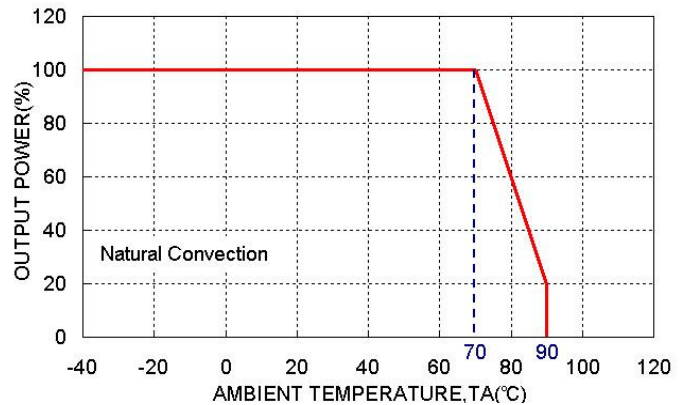
- The PDL06 series standard module meets EMI Class A or Class B and input reflected ripple current only with external components. For more detail information, please contact with P-DUKE.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. The filter capacitor 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.

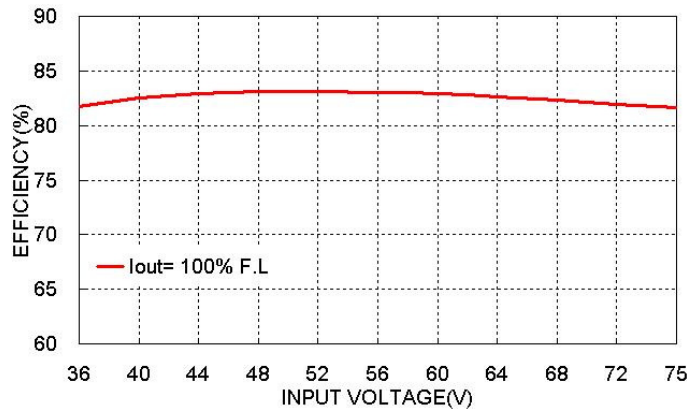
CHARACTERISTIC CURVE



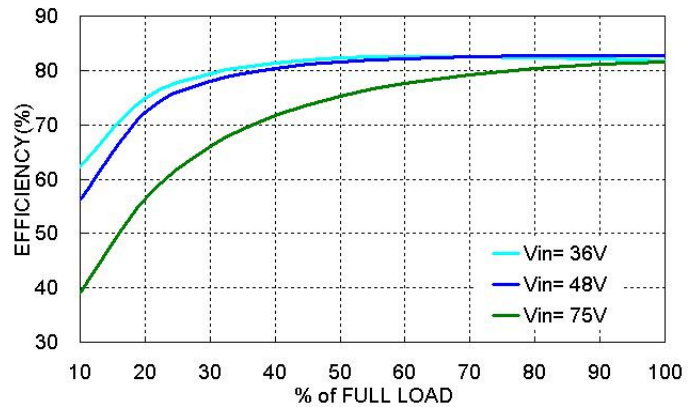
PDL06-48S05 Derating Curve



PDL06-48S05-M Derating Curve



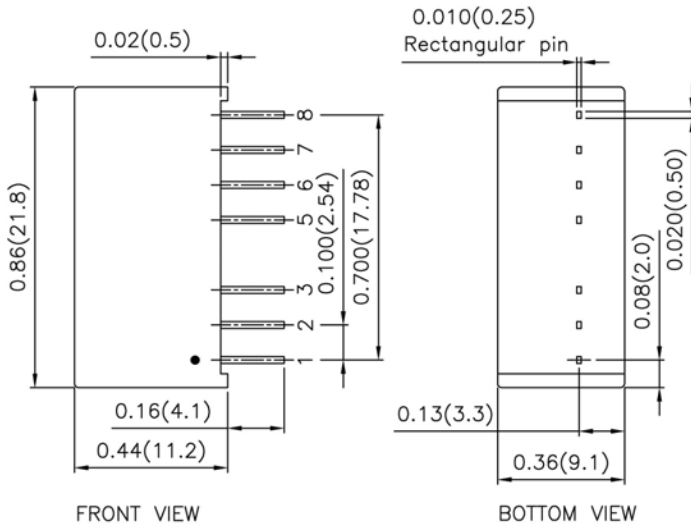
PDL06-48S05 Efficiency VS Input Voltage



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)

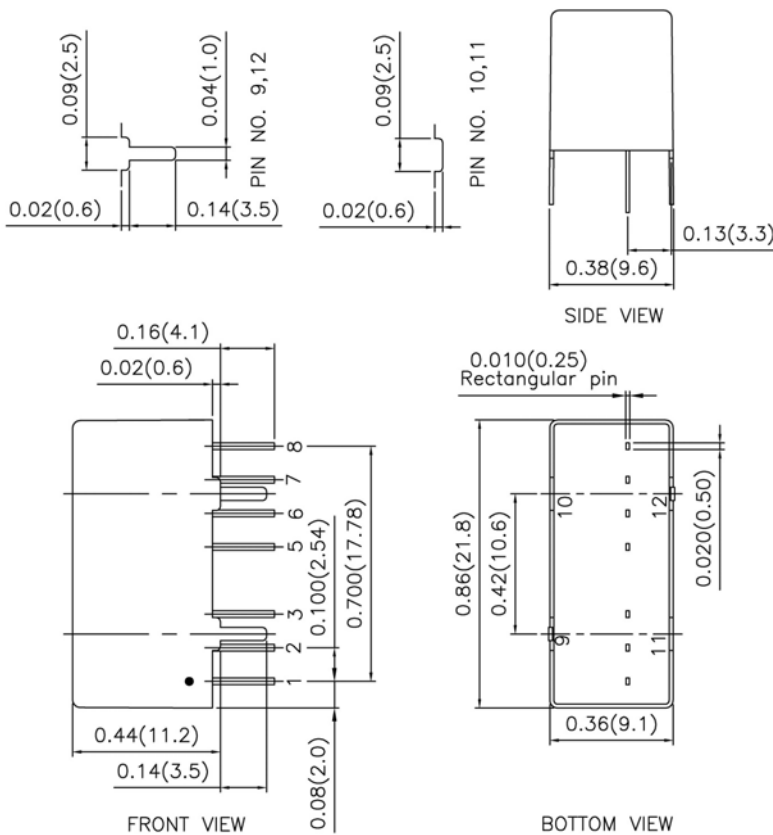
Tolerance: X.XX±0.02 (X.X±0.5)

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)