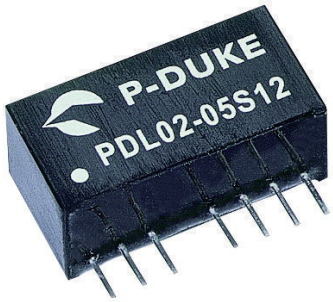
POWER MATE TECHNOLOGY CO., LTD.

PDL02 SERIES

2 WATTS DC-DC CONVERTER



FEATURES

- **2 WATTS MAXIMUM OUTPUT POWER**
- **OUTPUT CURRENT UP TO 500mA**
- **SIP PACKAGE, 0.86 x 0.36x 0.44 INCH**
- **HIGH EFFICIENCY UP TO 84%**
- **2:1 WIDE INPUT VOLTAGE RANGE**
- **SWITCHING FREQUENCY (100kHz, MIN)**
- **SINGLE AND DUAL OUTPUT**
- **NO EXTERNAL INPUT AND OUTPUT CAPACITOR NEEDED**
- **LOW RIPPLE & NOISE**
- **UL94-V0 CASE POTTING MATERIALS**
- **INPUT TO OUTPUT ISOLATION: 1600VDC**
- **CONTINUOUS SHORT CIRCUIT PROTECTION**
- **EXTERNAL ON/OFF CONTROL**
- **CE MARK MEETS 2006/95/EC, 2011/95/EC AND 2004/108/EC**
- **SAFETY MEETS UL60950-1, EN60950-1 AND IEC60950-1**
- **ISO9001 CERTIFIED MANUFACTURING FACILITIES**
- **COMPLIANT TO RoHS EU DIRECTIVE 2011/65/EU**

APPLICATIONS

Wireless Network
Telecom/Datacom
Industry Control System
Measurement Equipment
Semiconductor Equipment

DESCRIPTION

The PDL02 series offer 2 watts of output power from a 21.8 x 9.1 x 11.2 mm package without derating to 85ºC and without external input/output capacitors. The PDL02 series have 2:1 wide input voltage of 4.5~9, 9~18, 18~36 and 36~75VDC and features 1600VDC of isolation, short-circuit protection.

TECHNICAL SPECIFICATION

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

OUTPUT SPECIFICATIONS

Output power			2 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 Dual	±1.0% ±1.0%
	10% load to 90% load	Single Dual	±0.5% ±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		500µs
Short circuit protection			Continuous, automatics recovery

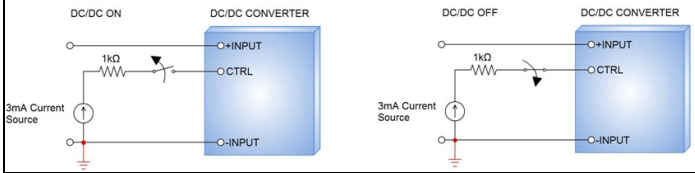
GENERAL SPECIFICATIONS

Efficiency		See table
Isolation voltage		1600VDC, min. 1minute
Isolation resistance	500VDC	10^9 ohms, min.
Isolation capacitance		200pF, max.
Switching frequency	Full load to minimum load	100kHz, min.
Design meet safety standard		IEC60950-1, UL60950-1, EN60950-1
Case material		Non-conductive black plastic
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		4.8g (0.17oz)
MTBF (Note 1)	MIL-HDBK-217F	4.903 x 10^6 hrs

INPUT SPECIFICATIONS

Input voltage range		5VDC nominal input	4.5 ~ 9VDC
		12VDC nominal input	9 ~ 18VDC
		24VDC nominal input	18 ~ 36VDC
		48VDC nominal input	36 ~ 75VDC
Input filter			Capacitor type
Input surge voltage		5VDC input	15VDC 100ms, max.
		12VDC input	36VDC 100ms, max.
		24VDC input	50VDC 100ms, max.
		48VDC input	100VDC 100ms, max.
Input reflected ripple current There is an external capacitor at input (Note 6)		5VDC input (10µF/MLCC)	400mAp-p, max.
		12VDC input (10µF/MLCC)	150mAp-p, max.
		24VDC input (2.2µF/MLCC)	380mAp-p, max.
		48VDC input (2.2µF/MLCC)	170mAp-p, max.
Start up time	Nominal input and constant resistive load	Power up	5ms
		Remote ON/OFF	5ms
Remote ON/OFF	DC-DC ON		Open or high impedance
	DC-DC OFF		Control pin applied current 2 ~ 4mA max(via 1kΩ)
Remote off state input current	Nominal input		2.5 mA, max.

Application circuit



ENVIRONMENTAL SPECIFICATIONS

Operating ambient temperature	-40ºC ~ +85ºC (non–derating)
Storage temperature range	-55ºC ~ +125ºC
Thermal shock	MIL-STD-810F
Vibration	MIL-STD-810F
Relative humidity	5% to 95% RH

EMC CHARACTERISTICS

EMI (Note 7)	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 (Note 8)	EN61000-4-4	± 2kV	Perf. Criteria A
Surge (Note 8)	EN61000-4-5	± 1kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A

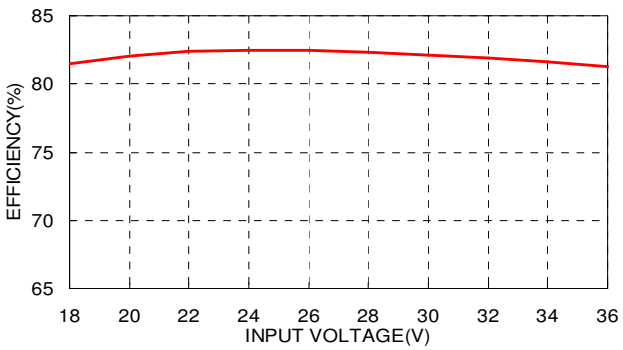
Model Number	Input Range	Output Voltage	Output Current		Output [2] Ripple & Noise	No load[3] Input Current	Eff [4] (%)	Capacitor[5] Load max
			Min Load	Full Load				
PDL02-05S33	4.5 ~ 9 VDC	3.3 VDC	0mA	500mA	50mVp-p	35mA	76	2200μF
PDL02-05S05	4.5 ~ 9 VDC	5 VDC	0mA	400mA	50mVp-p	35mA	80	1000μF
PDL02-05S09	4.5 ~ 9 VDC	9 VDC	0mA	222mA	50mVp-p	40mA	82	470μF
PDL02-05S12	4.5 ~ 9 VDC	12 VDC	0mA	167mA	50mVp-p	40mA	81	170μF
PDL02-05S15	4.5 ~ 9 VDC	15 VDC	0mA	134mA	50mVp-p	40mA	83	110μF
PDL02-05D05	4.5 ~ 9 VDC	±5 VDC	0mA	±200mA	50mVp-p	40mA	79	±470μF
PDL02-05D12	4.5 ~ 9 VDC	±12 VDC	0mA	±83mA	50mVp-p	40mA	82	±100μF
PDL02-05D15	4.5 ~ 9 VDC	±15 VDC	0mA	±67mA	50mVp-p	40mA	81	±47μF
PDL02-12S33	9 ~ 18 VDC	3.3 VDC	0mA	500mA	50mVp-p	20mA	77	2200μF
PDL02-12S05	9 ~ 18 VDC	5 VDC	0mA	400mA	50mVp-p	20mA	81	1000μF
PDL02-12S09	9 ~ 18 VDC	9 VDC	0mA	222mA	50mVp-p	20mA	82	470μF
PDL02-12S12	9 ~ 18 VDC	12 VDC	0mA	167mA	50mVp-p	20mA	83	170μF
PDL02-12S15	9 ~ 18 VDC	15 VDC	0mA	134mA	50mVp-p	20mA	84	110μF
PDL02-12D05	9 ~ 18 VDC	±5 VDC	0mA	±200mA	50mVp-p	30mA	81	±470μF
PDL02-12D12	9 ~ 18 VDC	±12 VDC	0mA	±83mA	50mVp-p	30mA	83	±100μF
PDL02-12D15	9 ~ 18 VDC	±15 VDC	0mA	±67mA	50mVp-p	30mA	84	±47μF
PDL02-24S33	18 ~ 36 VDC	3.3 VDC	0mA	500mA	50mVp-p	15mA	78	2200μF
PDL02-24S05	18 ~ 36 VDC	5 VDC	0mA	400mA	50mVp-p	15mA	81	1000μF
PDL02-24S09	18 ~ 36 VDC	9 VDC	0mA	222mA	50mVp-p	15mA	82	470μF
PDL02-24S12	18 ~ 36 VDC	12 VDC	0mA	167mA	50mVp-p	15mA	83	170μF
PDL02-24S15	18 ~ 36 VDC	15 VDC	0mA	134mA	50mVp-p	15mA	84	110μF
PDL02-24D05	18 ~ 36 VDC	±5 VDC	0mA	±200mA	50mVp-p	15mA	80	±470μF
PDL02-24D12	18 ~ 36 VDC	±12 VDC	0mA	±83mA	50mVp-p	15mA	83	±100μF
PDL02-24D15	18 ~ 36 VDC	±15 VDC	0mA	±67mA	50mVp-p	15mA	82	±47μF
PDL02-48S33	36 ~ 75 VDC	3.3 VDC	0mA	500mA	50mVp-p	8mA	76	2200μF
PDL02-48S05	36 ~ 75 VDC	5 VDC	0mA	400mA	50mVp-p	8mA	78	1000μF
PDL02-48S09	36 ~ 75 VDC	9 VDC	0mA	222mA	50mVp-p	8mA	84	470μF
PDL02-48S12	36 ~ 75 VDC	12 VDC	0mA	167mA	50mVp-p	8mA	83	170μF
PDL02-48S15	36 ~ 75 VDC	15 VDC	0mA	134mA	50mVp-p	8mA	83	110μF
PDL02-48D05	36 ~ 75 VDC	±5 VDC	0mA	±200mA	50mVp-p	8mA	80	±470μF
PDL02-48D12	36 ~ 75 VDC	±12 VDC	0mA	±83mA	50mVp-p	8mA	81	±100μF
PDL02-48D15	36 ~ 75 VDC	±15 VDC	0mA	±67mA	50mVp-p	8mA	81	±47μF

Note

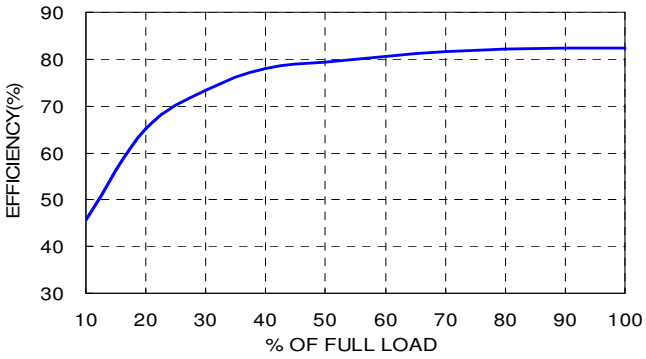
1. MIL-HDBK-217F @Ta=25 ºC, Full load.
2. Typical value at nominal input and full load. (20MHz BW.)
3. Typical value at nominal input and no load.
4. Typical value at nominal input and full load.
5. Test by minimum input and constant resistive load.
6. It will not damage the device without inserting external input capacitors. There is a smaller reflected ripple current when put a capacitor at input.
7. The PDL02 series standard module meets EN55022 Class A and Class B with external components.
   For more detail information, please contact with P-DUKE.
8. 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.

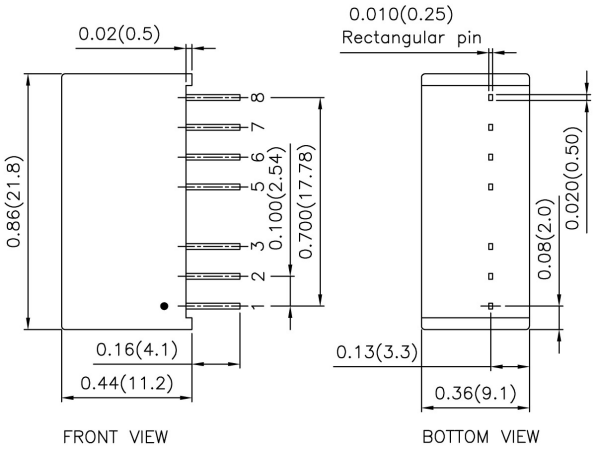
PDL02-24S05 Efficiency VS Input voltage



PDL02-24S05 Efficiency VS Output Load



MECHANICAL DRAWING :



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	+INPUT	+INPUT
3	CTRL	CTRL
5	NC	NC
6	+OUTPUT	+OUTPUT
7	-OUTPUT	COMMON
8	NC	-OUTPUT