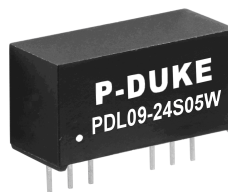


PDL09W SERIES

DC-DC CONVERTER

4:1 ULTRA WIDE INPUT RANGE
UP TO 9 Watts



FEATURES

- NO MINIMUM LOAD REQUIRED
- 1600VDC INPUT TO OUTPUT INSULATION
- SMALL SIZE AND LOW PROFILE : 0.86 X 0.36 X 0.44 INCH
- UL60950-1, EN60950-1, & IEC60950-1
UL62368-1, EN62368-1, & IEC62368-1 SAFETY APPROVALS
- CE MARKED
- COMPLIANT TO RoHS II & REACH

APPLICATIONS

- WIRELESS NETWORK
- TELECOM/DATACOM
- INDUSTRY CONTROL SYSTEM
- DISTRIBUTED POWER ARCHITECTURES
- SEMICONDUCTOR EQUIPMENT

1600VDC ISOLATION	REMOTE CONTROL	OCP	SCP	LOW STANDBY POWER
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TECHNICAL SPECIFICATION

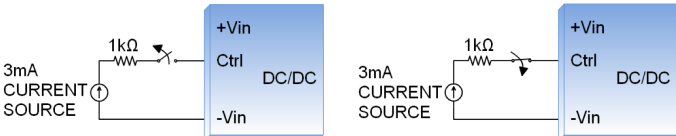
All specifications are typical at nominal input, full load and 25°C otherwise noted

Model Number	Input Range	Output Voltage	Output Current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load
	VDC	VDC	mA	mA	%	μF
PDL09-24S3P3W	9 ~ 36	3.3	2000	5	82	2600
PDL09-24S05W	9 ~ 36	5	1600	5	85	1300
PDL09-24S09W	9 ~ 36	9	1000	5	88	800
PDL09-24S12W	9 ~ 36	12	750	5	88	560
PDL09-24S15W	9 ~ 36	15	600	5	89	560
PDL09-24S24W	9 ~ 36	24	375	9	89	200
PDL09-24D05W	9 ~ 36	±5	±800	9	86	±800
PDL09-24D12W	9 ~ 36	±12	±375	9	88	±390
PDL09-24D15W	9 ~ 36	±15	±300	9	88	±200
PDL09-48S3P3W	18 ~ 75	3.3	2000	3	82	2600
PDL09-48S05W	18 ~ 75	5	1600	3	85	1300
PDL09-48S09W	18 ~ 75	9	1000	3	89	800
PDL09-48S12W	18 ~ 75	12	750	3	89	560
PDL09-48S15W	18 ~ 75	15	600	3	89	560
PDL09-48S24W	18 ~ 75	24	375	3	89	200
PDL09-48D05W	18 ~ 75	±5	±800	3	85	±800
PDL09-48D12W	18 ~ 75	±12	±375	3	88	±390
PDL09-48D15W	18 ~ 75	±15	±300	4	87	±200

PART NUMBER STRUCTURE

PDL09	-	48	S	05	W	M
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Case Option
		24: 9~36 48: 18~75	S: Single	3P3: 3.3 05: 5 09: 9 12: 12 15: 15 24: 24	4 : 1	□: Standard type Plastic case M: Metal case
			D: Dual	05: ± 5 12: ±12 15: ±15		

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	24Vin(nom) 48Vin(nom)	9 18	24 48	36 75	VDC
Start up time	Constant resistive load Power up Remote ON/OFF		50 50		ms
Input surge voltage	1 second, max. 24Vin(nom) 48Vin(nom)			50 100	VDC
Input filter				Capacitor type	
Remote ON/OFF	Ctrl pin applied current via 1kΩ DC-DC ON DC-DC OFF Remote off input current PDL09-24□□□W PDL09-48□□□W Application circuit DC-DC ON DC-DC OFF	2	3	4	mA
				3 2.5	mA
					

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 Single Dual	-1.0 -1.0		+1.0 +1.0	%
Cross regulation	Asymmetrical load 25%/100% FL Dual	-5.0		+5.0	%
Ripple and noise	20MHz bandwidth With a 1μF/50V X7R MLCC 3.3Vout, 5Vout, 9Vout 12Vout, 15Vout, 24Vout		50 75		mVp-p
Temperature coefficient		-0.02		+0.02	%/°C
Transient response recovery time	25% load step change		250		μs
Over load protection	% of Iout rated; Hiccup mode		180		%
Short circuit protection					Continuous, automatic recovery

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute Input to Output Standard Type Suffix "M" Input (Output) to Case Suffix "M"	1600 1600 1000			VDC
Isolation resistance	500VDC	1			GΩ
Isolation capacitance	Standard Type Suffix "M"			50 50	pF
Switching frequency	Single Dual		400 500		kHz
Safety approvals				EN60950-1 UL60950-1 IEC60950-1 EN62368-1 UL62368-1 IEC62368-1	
Case material	Standard Type Suffix "M"			Non-conductive black plastic Copper	
Base material				None	
Potting material				Silicone (UL94 V-0)	
Weight	Standard Type Suffix "M"			4.8g (0.17oz) 5.9g (0.21oz)	
MTBF	MIL-HDBK-217F, Full load Standard Type Suffix "M"			2.696E+06 hrs 2.939E+06 hrs	

ENVIRONMENTAL SPECIFICATIONS

Parameter	Conditions			Min.	Typ.	Max.	Unit
Operating ambient temperature	3.3Vout	Standard type	Without derating	-40		+45	°C
			With derating	+45		+100	
		Suffix “M”	Without derating	-40		+50	
			With derating	+50		+100	
	Others	Standard type	Without derating	-40		+55	
			With derating	+55		+100	
		Suffix “M”	Without derating	-40		+60	
			With derating	+60		+100	
Storage temperature range				-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 and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient ⁽²⁾	EN61000-4-4	± 2kV	Perf. Criteria A
Surge ⁽²⁾	EN61000-4-5	± 2kV	Perf. Criteria A
Conducted immunity	EN61000-4-6	10 Vr.m.s	Perf. Criteria A
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second	Perf. Criteria A

Note:

- The standard modules meet either EMI Class A or Class B with external components. For further 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.

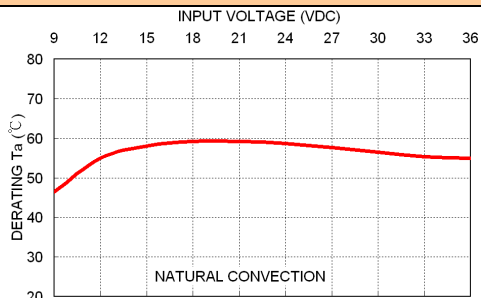
The filter Power Mate suggested:

The PDL09-24□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ70A, 70V, 3000Watt peak pulse power) to connect in parallel.

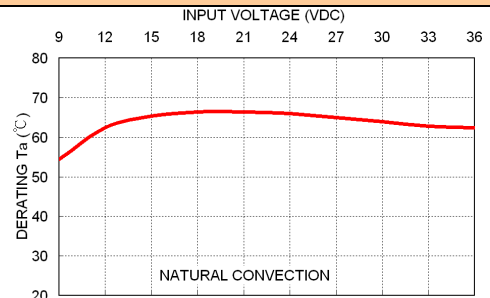
The PDL09-48□□□W recommended an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220μF/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) to connect in parallel.

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

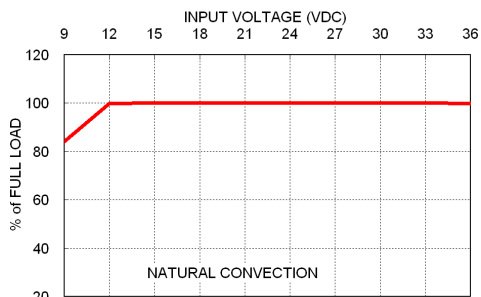
CHARACTERISTIC CURVE



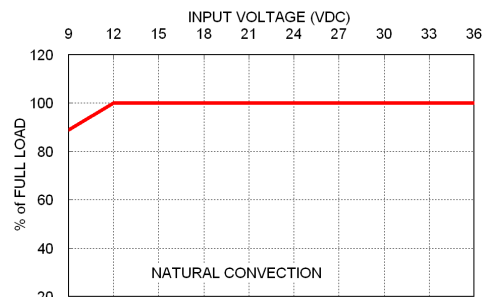
PDL09-24D12W Derating Ta v.s. Input Voltage (at Full Load)



PDL09-24D12WM Derating Ta v.s. Input Voltage (at Full Load)

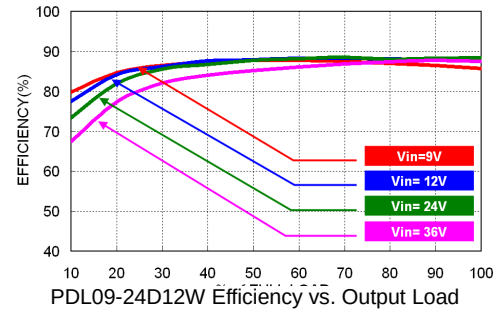
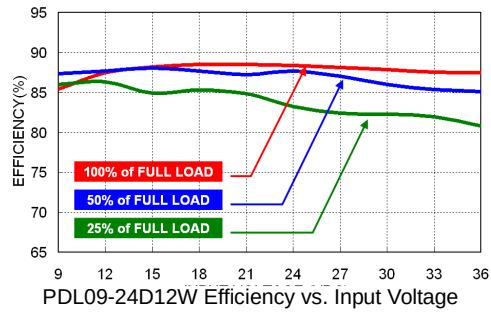
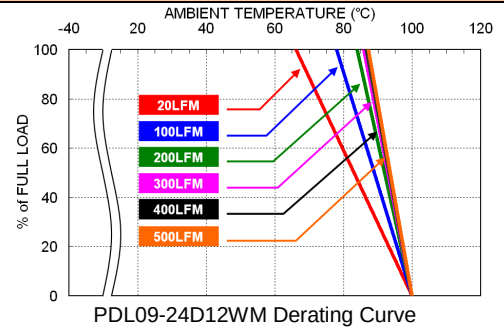
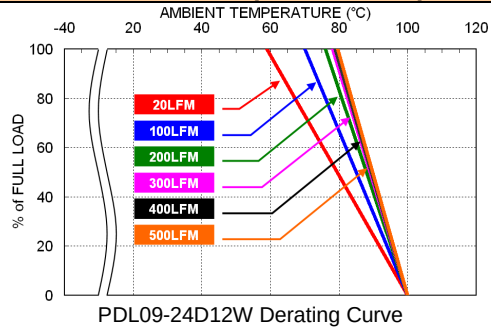


PDL09-24D12W Load Derating v.s. Input Voltage (at Ta=55°C)



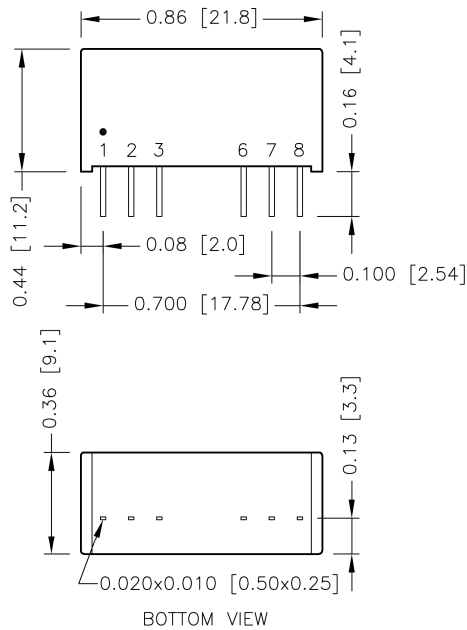
PDL09-24D12WM Load Derating v.s. Input Voltage (at Ta=60°C)

CHARACTERISTIC CURVE (CONTINUED)



MECHANICAL DRAWING

Standard type

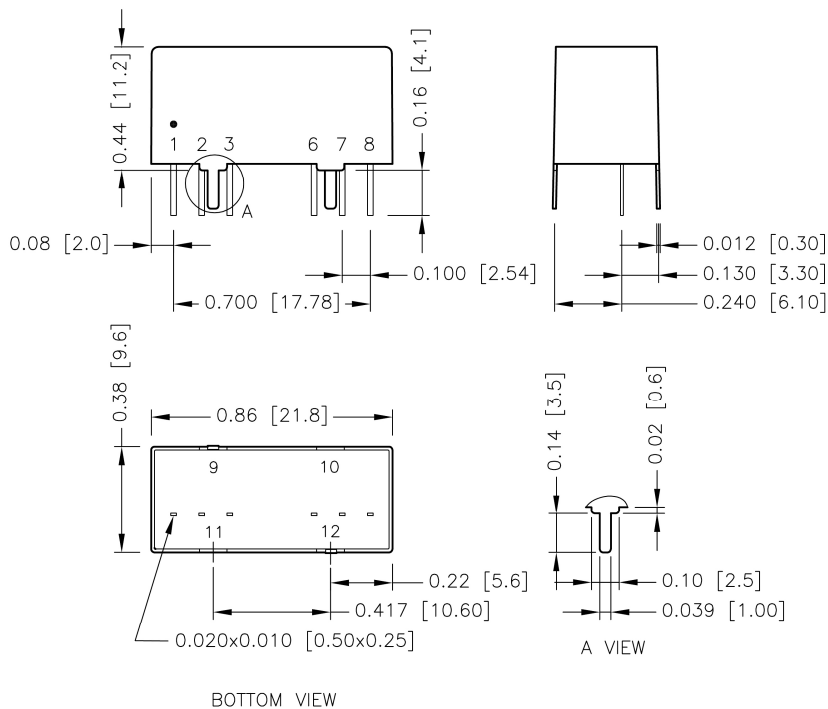


PIN CONNECTION

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

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]

Suffix "M"



PIN CONNECTION

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout
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]