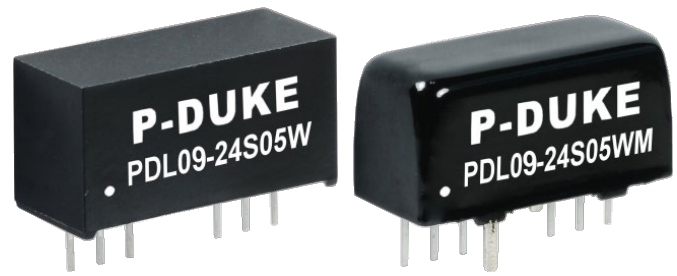


## Features

- 4:1 Wide input 4.5~75V DC
- Isolation Voltage: 1600V DC
- Operating Temperature Range: -40~100°C
- Approved to cURus, UKCA, CE, RoHS, REACH
- Safety standards to IEC/EN/UL 62368-1
- Efficiency up to 89%
- EMC Class A & B Certified



Ideal Power's 43PDL09-xyzW 9W Series Pin Connection DC/DC Converters are certified to cURus, UKCA, CE, RoHS, REACH & IEC/UL/EN 62368-1 Standards and comply with Efficiency Regulations. These are primarily used in ITE, Video & Audio Industries and customised solutions are available upon request.

### Part Number Structure

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

**Models**

Model Number	Input Range	Output Voltage	Output current @Full Load	Input Current @ No Load	Efficiency	Maximum Capacitor Load
	V DC	V DC	mA	A	%	μF
43PDL09-24S3P3WM	9~36	3.3	2000	5	82	2600
43PDL09-24S05WM	9~36	5	1600	5	85	1300
43PDL09-24S09WM	9~36	9	1000	5	88	800
43PDL09-24S12WM	9~36	12	750	5	88	560
43PDL09-24S15WM	9~36	15	600	5	89	560
43PDL09-24S24WM	9~36	24	375	9	90	200
43PDL09-24D05WM	9~36	±5	±800	9	90	±800
43PDL09-24D12WM	9~36	±12	±375	9	86	±390
43PDL09-24D15WM	9~36	±15	±300	9	89	±200
43PDL09-48S3P3WM	18~75	3.3	2000	3	87	2600
43PDL09-48S05WM	18~75	5	1600	3	82	1300
43PDL09-48S09WM	18~75	9	1000	3	85	800
43PDL09-48S12WM	18~75	12	750	3	88	560
43PDL09-48S15WM	18~75	15	600	3	89	560
43PDL09-48S24WM	18~75	24	375	3	89	200
43PDL09-48D05WM	18~75	±5	±800	3	89	±800
43PDL09-48D12WM	18~75	±12	±375	3	86	±390
43PDL09-48D15WM	18~75	±15	±300	4	87	±200

**Input Specifications**

Parameter	Conditions	Min	Typ	Max	Unit
Operating input voltage range	24Vin(nom)	9	24	36	V DC
	48Vin(nom)	18	48	75	
Start-up time	Constant resistive load	Power up	--	50	ms
		Remote ON/OFF	--	50	
Input surge voltage	100 Second, max.	24Vin(nom)	--	50	V DC
		48Vin(nom)	--	100	
Input filter	Capacitor Type				
Ctrl pin applied current via 1kΩ	DC_DC ON	Open or 0~0.5V DC			
	DC_DC OFF	3~12V DC			
	Input current of Ctrl pin	2	--	4	mA
	Remote off input current	--	2.5	--	

**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	-1.0	--	+1.0	%
		Dual	-1.0	--	+1.0	
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0	--	+5.0	
Ripple and Noise	20MHz bandwidth	3.3Vout, 5Vout, 9Vout	--	50	--	mVp-p
	With a 1 $\mu$ F/50V X7R MLCC	12Vout, 15Vout, 24Vout	--	75	--	
Temperature coefficient			-0.02	--	+0.02	%/°C
Transient response recovery time	25% Load step change		--	250	--	$\mu$ s
Overload protection	% of lout 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	Metal case	1600	--	--	V DC	
			Plastic case	1600	--	--		
		Input (Output) to case	Metal case	1000	--	--		
Isolation resistance	500VDC		1	--	--	G $\Omega$		
Isolation capacitance			Metal case	--	--	50	pF	
			Plastic case	--	--	50		
Switching frequency			Single	--	400	--	kHz	
			Dual	--	500	--		
Safety approvals	IEC/ EN/ UL62368-1					UL:E193009 CB:UL(Demko)		
Case material			Metal case				Copper	
			Plastic case				Non-conductive black plastic	
Base material						None		
Potting material						Silicone (UL94 V-0)		
Weight			Metal case				5.9g (0.21oz)	
			Plastic case				4.8g (0.17oz)	
MTBF	MIL-HDBK-217F, Full load			Metal case				2.939 x 10 <sup>6</sup> hrs
				Plastic case				2.696 x 10 <sup>6</sup> hrs

**Environmental Specifications**

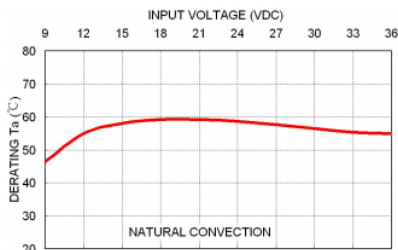
Parameter	Conditions		Min	Typ	Max	Unit
Operating ambient temperature	With derating		-40	--	+100	
Maximum case temperature			--	--	100	°C
Storage temperature range			-55	--	+125	
Thermal Shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH

**EMC Specifications**

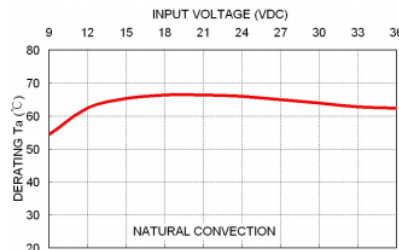
Parameter	Conditions		Level
EMI	EN55022	With external components	Class A, Class B
EMS	EN55024		
ESD	EN61000-4-2	Air $\pm$ 8kV and Contact $\pm$ 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	$\pm$ 2kV	Perf. Criteria A
	43PDL09-12□□□W 43PDL09-24□□□W	With an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V) and a TVS (SMDJ70A, 70V, 3000Watt peak pulse power) in parallel.	
	43PDL09-48□□□W	With an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) in parallel.	
Surge	EN61000-4-5	$\pm$ 2kV	Perf. Criteria A
	43PDL09-24□□□W	With an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V) and a TVS (SMDJ70A, 70V, 3000Watt peak pulse power) in parallel.	
	43PDL09-48□□□W	With an aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 $\mu$ F/100V) and a TVS (SMDJ120A, 120V, 3000Watt peak pulse power) in parallel.	
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

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

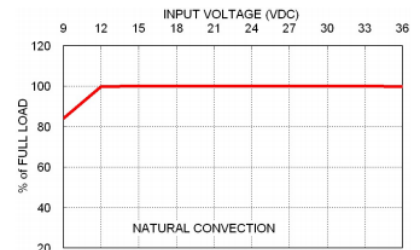
## Characteristic Curve



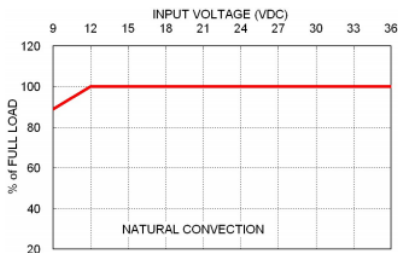
43PDL09-24S12W Derating Ta vs. Input Voltage (at Full Load)



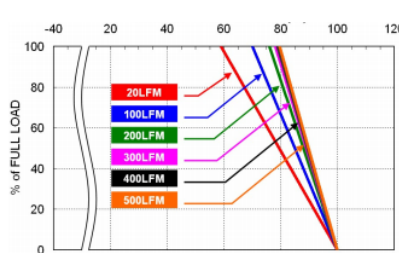
43PDL09-24S12WM Derating Ta vs. Input Voltage (at Full Load)



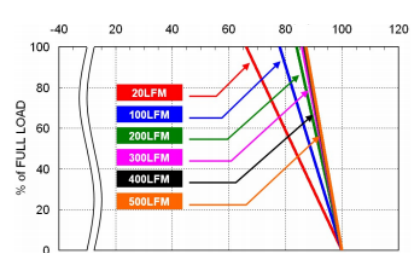
43PDL09-24S12W Load Derating v.s. Input Voltage (at Ta=55°C)



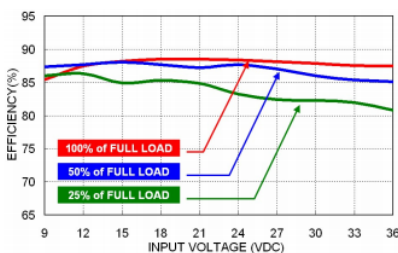
43PDL09-24S12WM Load Derating vs. Input Voltage (at Ta=60°C)



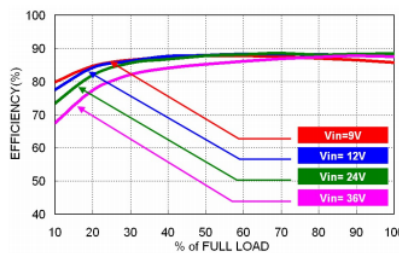
43PDL09-24S12W Derating Curve



43PDL09-24S12WM Derating Curve



43PDL09-24S12W Efficiency vs. Input Voltage



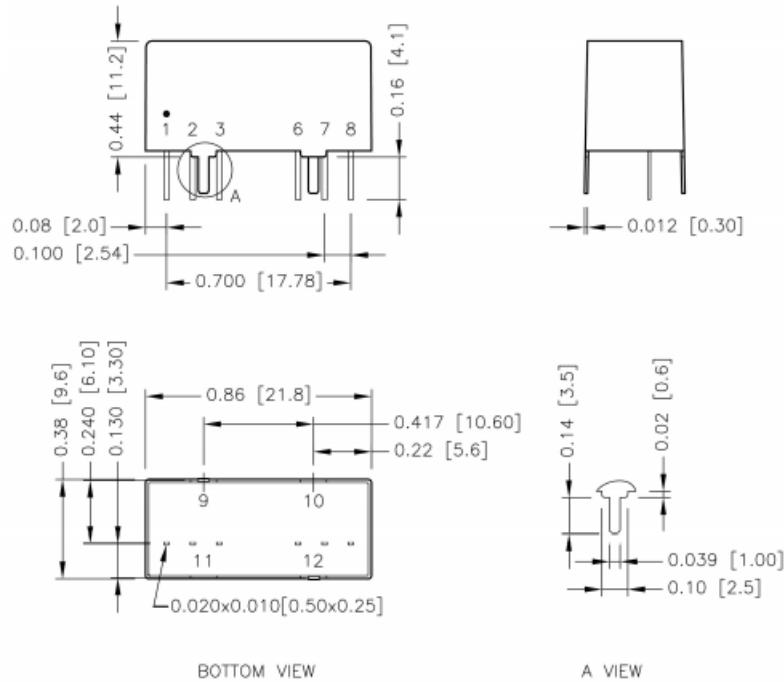
43PDL09-24S12W Efficiency vs. Output Load

## Fuse Considerations

This power module is not internally fused. An input line fuse must always be used. This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture. To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
43PDL09-24S□□W, 43PDL09-24D□□W	3.15	Slow-Blow
43PDL09-48S□□W, 43PDL09-48D□□W	1.25	Slow-Blow

**Mechanical Drawing**

 Standard type  
 Metal case


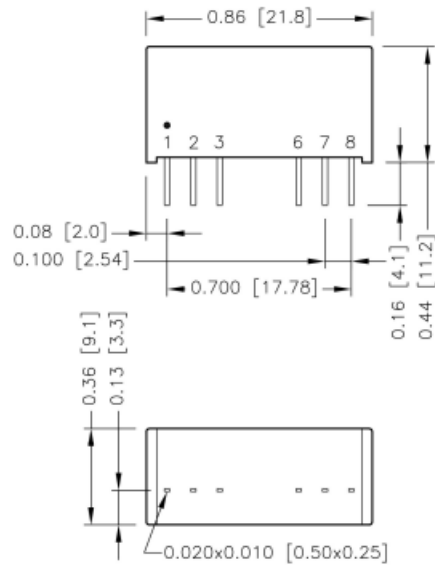
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)  
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

**DIP 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

Mechanical Drawing (Continued)

Plastic case



BOTTOM VIEW

1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)  
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

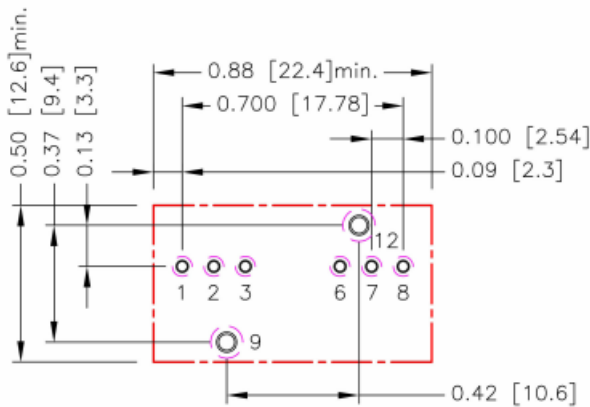
DIP Pin Connection

Pin	Single	Dual
1	-Vin	-Vin
2	+Vin	+Vin
3	Ctrl	Ctrl
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

DC - DC

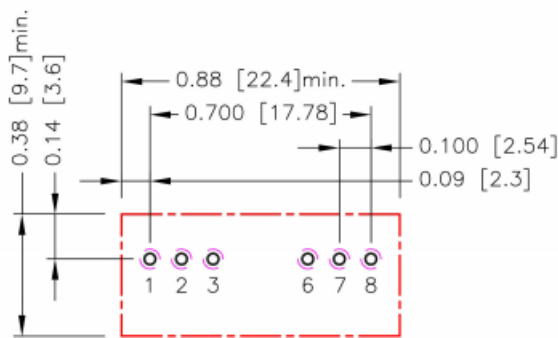
## Recommended Pad Layout

Standard Type  
Metal case



All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Through hole 1.2.3.6.7.8:  $\Phi 0.031[0.80]$   
 Through hole 9.12:  $\Phi 0.051[1.30]$   
 Top view pad 1.2.3.6.7.8:  $\Phi 0.039[1.00]$   
 Top view pad 9.12:  $\Phi 0.064[1.63]$   
 Bottom view pad 1.2.3.6.7.8:  $\Phi 0.063[1.60]$   
 Bottom view pad 9.12:  $\Phi 0.102[2.60]$

Plastic case

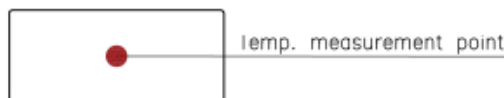


All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Through hole 1.2.3.6.7.8:  $\Phi 0.031[0.80]$   
 Top view pad 1.2.3.6.7.8:  $\Phi 0.039[1.00]$   
 Bottom view pad 1.2.3.6.7.8:  $\Phi 0.063[1.60]$

## Thermal Considerations

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding Environment. Proper cooling can be verified by measuring the point as the figure below. The temperature at this location should not exceed "Maximum case temperature". When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature". You can limit this Temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM).



TOP VIEW