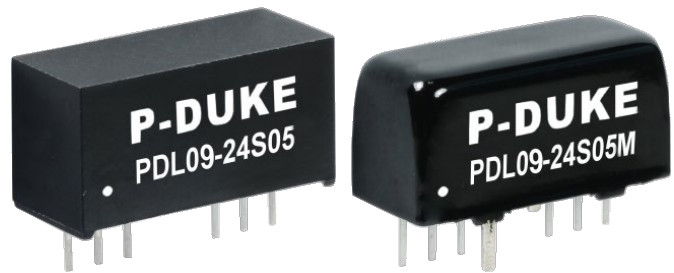


Features

- 2:1 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 90%
- EMC Class A & B Certified



Ideal Power's 43PDL09-xyz 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	M
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Case Options
		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: <u>+5</u> 12: <u>+12</u> 15: <u>+15</u>	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
43PDL09-12S3P3M	9~18	3.3	2000	7	81	2600
43PDL09-12S05M	9~18	5	1600	7	85	1300
43PDL09-12S09M	9~18	9	1000	10	87	800
43PDL09-12S12M	9~18	12	750	10	88	560
43PDL09-12S15M	9~18	15	600	10	89	560
43PDL09-12S24M	9~18	24	375	13	89	200
43PDL09-12D05M	9~18	±5	±800	13	85	±800
43PDL09-12D12M	9~18	±12	±375	13	88	±390
43PDL09-12D15M	9~18	±15	±300	14	89	±200
43PDL09-24S3P3M	18~36	3.3	2000	5	82	2600
43PDL09-24S05M	18~36	5	1600	5	85	1300
43PDL09-24S09M	18~36	9	1000	5	88	800
43PDL09-24S12M	18~36	12	750	5	89	560
43PDL09-24S15M	18~36	15	600	5	90	560
43PDL09-24S24M	18~36	24	375	7	90	200
43PDL09-24D05M	18~36	±5	±800	7	86	±800
43PDL09-24D12M	18~36	±12	±375	7	89	±390
43PDL09-24D15M	18~36	±15	±300	10	87	±200
43PDL09-48S3P3M	36~75	3.3	2000	3	82	2600
43PDL09-48S05M	36~75	5	1600	3	85	1300
43PDL09-48S09M	36~75	9	1000	3	88	800
43PDL09-48S12M	36~75	12	750	3	89	560
43PDL09-48S15M	36~75	15	600	3	89	560
43PDL09-48S24M	36~75	24	375	3	89	200
43PDL09-48D05M	36~75	±5	±800	3	86	±800
43PDL09-48D12M	36~75	±12	±375	3	87	±390
43PDL09-48D15M	36~75	±15	±300	4	87	±200

Input Specifications

Parameter	Conditions	Min	Typ	Max	Unit	
Operating input voltage range	12Vin(nom)	9	12	18	V DC	
	24Vin(nom)	18	24	36		
	48Vin(nom)	36	48	75		
Start-up time	Constant resistive load	Power up	--	50	--	ms
		Remote ON/OFF	--	50	--	
Input surge voltage	100 Second, max.	12Vin(nom)	--	--	36	V DC
		24Vin(nom)	--	--	50	
		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	3	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 1µF/50V X7R MLCC	12Vout, 15Vout, 24Vout	--	75	--	
Temperature coefficient			-0.02	--	+0.02	%/°C
Transient response recovery time	25% Load step change		--	250	--	µs
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	--	--	
Metal case	1000	--	--			
Isolation resistance	500VDC		1	--	--	GΩ
Isolation capacitance			--	--	50	pF
			--	--	50	
Switching frequency			--	400	--	kHz
			--	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 ⁶ hrs		
		Plastic case		2.696 x 10 ⁶ hrs		

Environmental Specifications

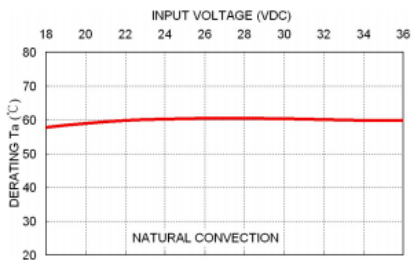
Parameter	Conditions	Min	Typ	Max	Unit
Operating ambient temperature	With derating	-40	--	+100	
Maximin case temperature		--	--	100	°C
Storage temperature range		-55	--	+125	
Thermal Shock		MIL-STD-810F			
Vibration		MIL-STD-810F			
Relative humidity		5% to 95% RH			

EMC Specifications

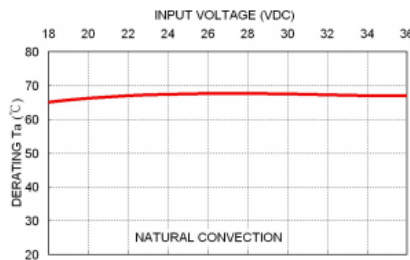
Parameter		Conditions	Level
EMI	EN55022	With external components	Class A, Class B
EMS	EN55024		
ESD	EN61000-4-2	Air \pm 8kV and Contact \pm 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	20 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	\pm 2kV	Perf. Criteria A
	43PDL09-12□□□ 43PDL09-24□□□	With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

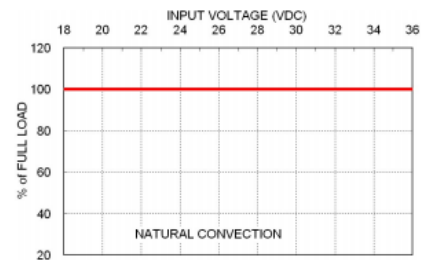
Characteristic Curve



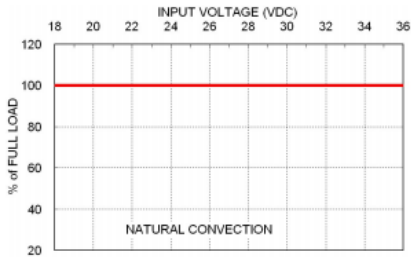
43PDL09-24S12 Derating Ta vs. Input Voltage (at Full Load)



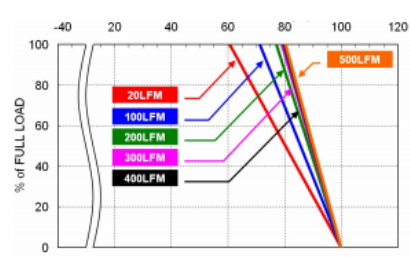
43PDL09-24S12M Derating Ta vs. Input Voltage (at Full Load)



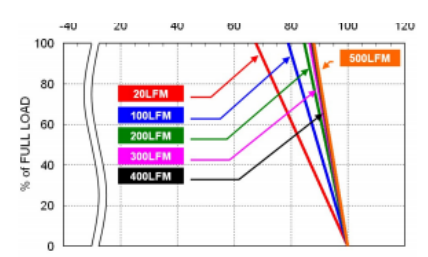
43PDL09-24S12 Load Derating v.s. Input Voltage (at Ta=55°C)



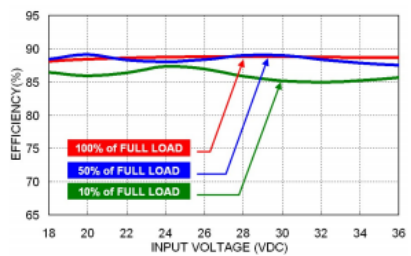
43PDL09-24S12M Load Derating vs. Input Voltage (at Ta=60°C)



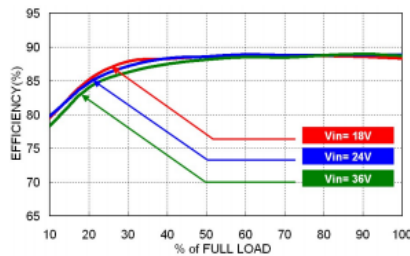
43PDL09-24S12 Derating Curve



43PDL09-24S12M Derating Curve



43PDL09-24S12 Efficiency vs. Input Voltage



43PDL09-24S12 Efficiency vs. Output Load

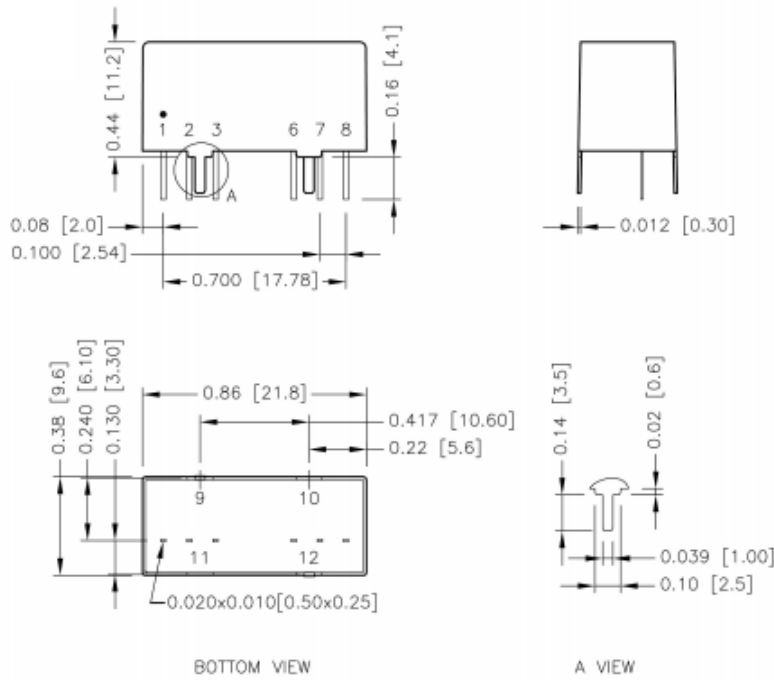
Fuse Considerations

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
43PDL09-12S□□, 43PDL09-12D□□	3.15	Slow-Blow
43PDL09-24S□□, 43PDL09-24D□□	2.5	Slow-Blow
43PDL09-48S□□, 43PDL09-48D□□	1.25	Slow-Blow

Mechanical Drawing

Standard type
Metal case



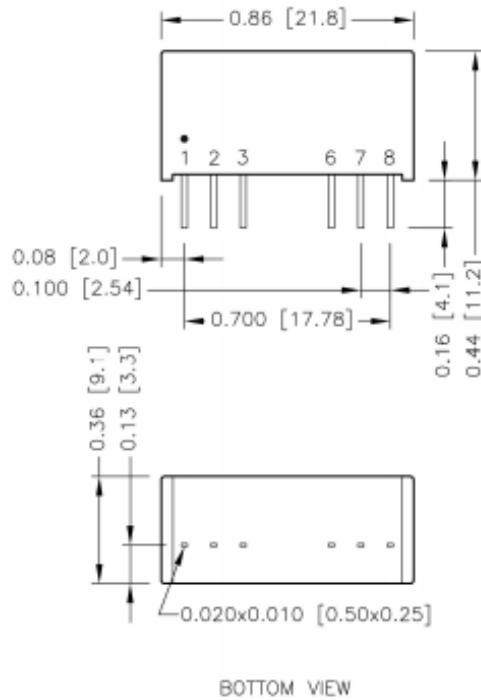
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

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



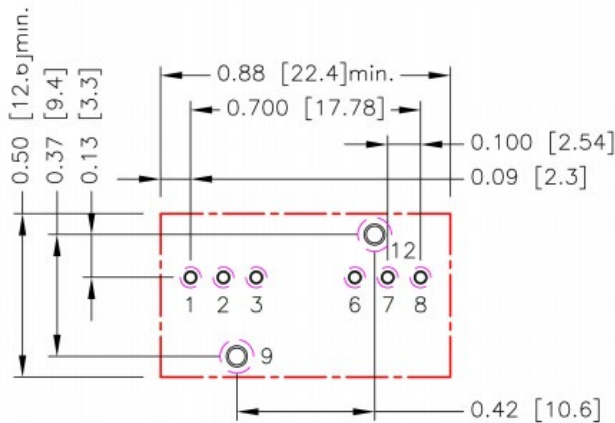
1. All dimensions in inch (mm)
2. Tolerance :x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
3. Pin pitch tolerance ±0.01 (0.25)
4. Pin dimension tolerance ±0.004(0.1)

DIP Pin Connection

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

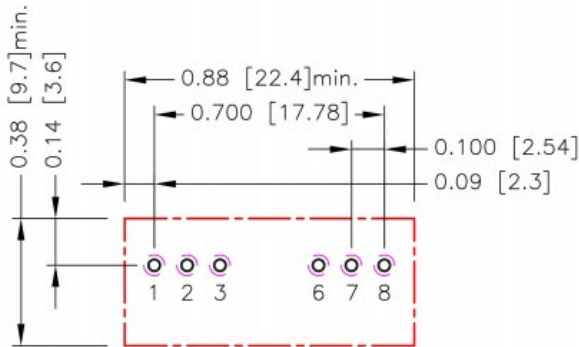
Recommended Pad Layout

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

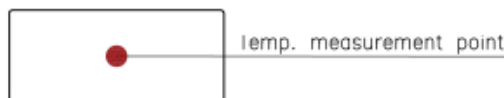


All dimensions in inch[mm]
 Pad size(lead free recommended)
 Through hole 1.2.3.6.7.8: $\Phi 0.031[0.80]$
 Top view pad 1.2.3.6.7.8: $\Phi 0.039[1.00]$
 Bottom view pad 1.2.3.6.7.8: $\Phi 0.063[1.60]$

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