



# P-DUKE POWER

## PDS02W · PDH02W Series

DC-DC Converter  
Up to 2 Watts

### 3

YEARS  
WARRANTY

ROHS  
COMPLIANT

REACH  
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway



**3000**  
VDC  
Isolation  
Voltage

**1600**  
VDC  
Isolation  
Voltage

**4 : 1**  
Wide  
Input  
Range

**TINY**  
Output  
Ripple

**NO**  
Min. Load  
Required

**REMOTE**  
**ON**  
**OFF**

**SCP**

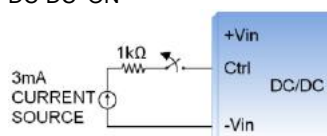
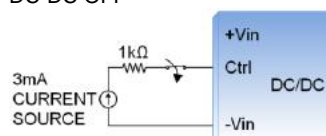
### PART NUMBER STRUCTURE

PDS02	-	48	S	05	W	H
Series Name		Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Input Range	Isolation Options
<b>PDS</b> : SMD type <b>PDH</b> : DIP type		12:4.5~18 24:9~36 48:18~75	<b>S</b> :Single          <b>D</b> :Dual	<b>3P3</b> :3.3 <b>05</b> :5 <b>09</b> :9 <b>12</b> :12 <b>15</b> :15  <b>05</b> :±5 <b>12</b> :±12 <b>15</b> :±15	4 : 1	<b>□</b> :Standard type 1600VDC isolation <b>H</b> :3000VDC isolation

**TECHNICAL SPECIFICATION** All specifications are typical at nominal input, full load and 25°C unless 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
PDS(H)02-12S3P3W	4.5 ~ 18	3.3	500	30	74	3300
PDS(H)02-12S05W	4.5 ~ 18	5	400	30	79	1680
PDS(H)02-12S09W	4.5 ~ 18	9	222	35	79	1000
PDS(H)02-12S12W	4.5 ~ 18	12	167	30	80	820
PDS(H)02-12S15W	4.5 ~ 18	15	134	35	81	680
PDS(H)02-12D05W	4.5 ~ 18	±5	±200	35	76	±1000
PDS(H)02-12D12W	4.5 ~ 18	±12	±83	35	81	±470
PDS(H)02-12D15W	4.5 ~ 18	±15	±67	35	81	±330
PDS(H)02-24S3P3W	9 ~ 36	3.3	500	20	74	3300
PDS(H)02-24S05W	9 ~ 36	5	400	20	79	1680
PDS(H)02-24S09W	9 ~ 36	9	222	20	79	1000
PDS(H)02-24S12W	9 ~ 36	12	167	20	80	820
PDS(H)02-24S15W	9 ~ 36	15	134	20	82	680
PDS(H)02-24D05W	9 ~ 36	±5	±200	20	76	±1000
PDS(H)02-24D12W	9 ~ 36	±12	±83	20	81	±470
PDS(H)02-24D15W	9 ~ 36	±15	±67	20	81	±330
PDS(H)02-48S3P3W	18 ~ 75	3.3	500	10	74	3300
PDS(H)02-48S05W	18 ~ 75	5	400	10	78	1680
PDS(H)02-48S09W	18 ~ 75	9	222	10	79	1000
PDS(H)02-48S12W	18 ~ 75	12	167	10	81	820
PDS(H)02-48S15W	18 ~ 75	15	134	10	82	680
PDS(H)02-48D05W	18 ~ 75	±5	±200	10	76	±1000
PDS(H)02-48D12W	18 ~ 75	±12	±83	10	81	±470
PDS(H)02-48D15W	18 ~ 75	±15	±67	10	81	±330

## INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	12Vin(nom)	4.5	12	18	VDC
	24Vin(nom)	9	24	36	
	48Vin(nom)	18	48	75	
Start up time	Constant resistive load Power up Remote ON/OFF		5		ms
			5		
Input surge voltage	1 second, max.			25	VDC
				50	
				100	
Input filter		Capacitor type			
Remote ON/OFF	Ctrl pin applied current via 1kΩ	DC-DC ON	Open or high impedance		
		DC-DC OFF	2	3	4
		Remote off input current		2.5	mA
<p>Application circuit</p> <p>DC-DC ON</p>  <p>DC-DC OFF</p> 					

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	
	10% Load to 100% Full Load	Single	-0.5		+0.5	
		Dual	-0.8		+0.8	
Cross regulation	Asymmetrical load 25%/100% FL	Dual	-5.0		+5.0	%
Ripple and noise	20MHz bandwidth			30		mVp-p
Temperature coefficient			-0.02		+0.02	%/°C
Transient response recovery time	25% load step change			250		µs
Short circuit protection						Continuous, automatics recovery

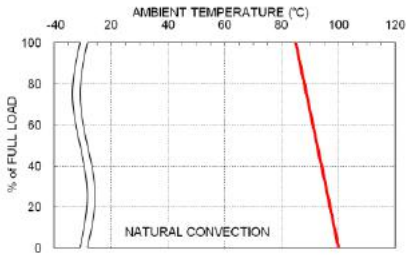
GENERAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output Standard Type Suffix "H"	1600 3000			VDC
Isolation resistance	500VDC		1			GΩ
Isolation capacitance					50 50	pF
Switching frequency	Full load to minimum load		100			kHz
Safety approvals	IEC/ EN/ UL62368-1				UL:E193009 CB:UL(Demko)	
Weight					4.5g (0.16oz)	
MTBF	MIL-HDBK-217F				6.594 x 10 <sup>6</sup> hrs	

ENVIRONMENTAL SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating		-40		+85	°C
	With derating		+85		+100	
Maximum case temperature					100	°C
Storage temperature range			-55		+125	°C
Thermal shock						MIL-STD-810F
Vibration						MIL-STD-810F
Relative humidity						5% to 95% RH
Lead-free reflow solder process	Only for SMD type					IPC J-STD-020E
Moisture sensitivity level(MSL)	Only for SMD type					IPC J-STD-033C Level 2a

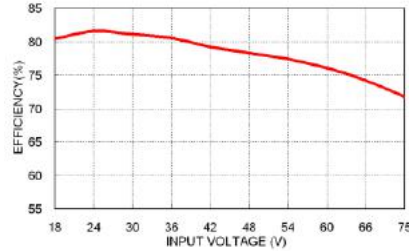
EMC SPECIFICATIONS			
Parameter	Conditions		Level
EMI	EN55032	With external components	Class A, Class B
EMS	EN55024		
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV	Perf. Criteria A
Radiated immunity	EN61000-4-3	10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4	± 2kV	Perf. Criteria A
		With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)	
Surge	EN61000-4-5	±1kV	Perf. Criteria A
		With An external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)	
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.

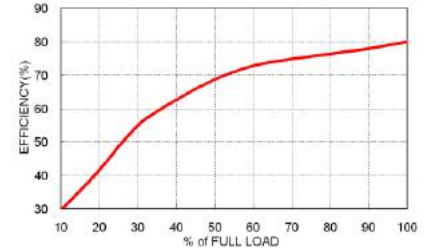
### CHARACTERISTIC CURVE



PDS02-48S05W Derating Curve



PDS02-48S05W Efficiency vs. Input Voltage



PDS02-48S05W Efficiency vs. Output Load

### FUSE CONSIDERATION

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.

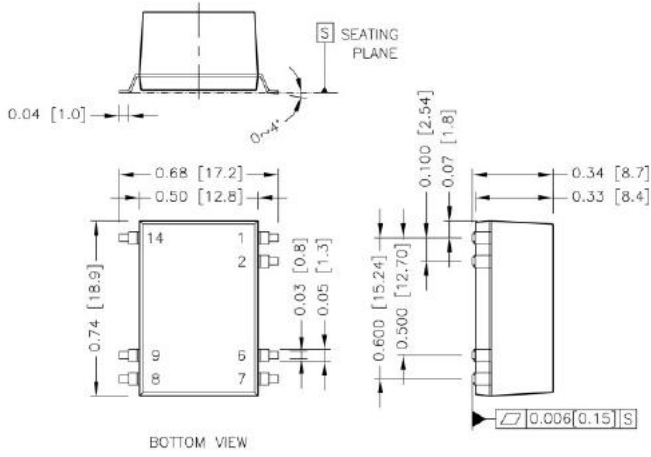
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
PDS(H)02-12S□□W \ PDS(H)02-12D□□W	1.6	Slow-Blow
PDS(H)02-24S□□W \ PDS(H)02-24D□□W	1	Slow-Blow
PDS(H)02-48S□□W \ PDS(H)02-48D□□W	1	Slow-Blow

The table based on the information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

## MECHANICAL DRAWING

### PDS02W

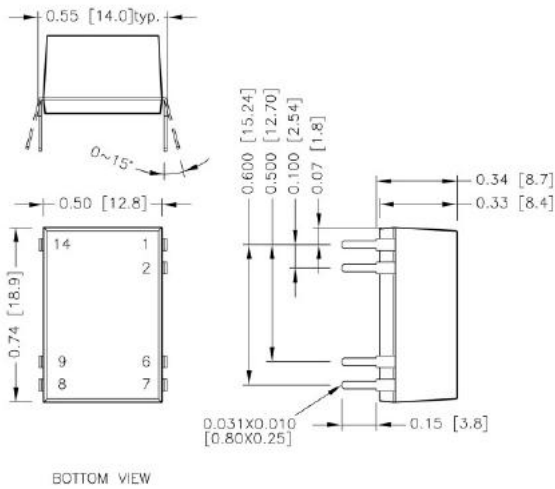


### PIN CONNECTION

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

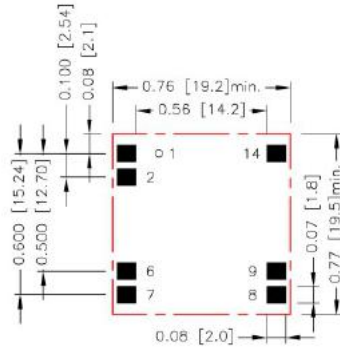
1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]  
x.xxx±0.01 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

### PDH02W



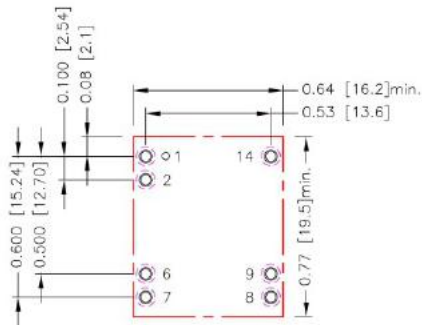
## RECOMMENDED PAD LAYOUT

### PDS02W



All dimensions in inch[mm]  
Pad size(lead free recommended)  
Top view pad:0.080x0.070[2.00x1.80]

### PDH02W



All dimensions in inch[mm]  
Pad size(lead free recommended)  
Through hole 1.2.6.7.8.9.14:  $\Phi 0.043$ [1.10]  
Top view pad 1.2.6.7.8.9.14:  $\Phi 0.055$ [1.40]  
Bottom view pad 1.2.6.7.8.9.14:  $\Phi 0.080$ [2.04]

## 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.

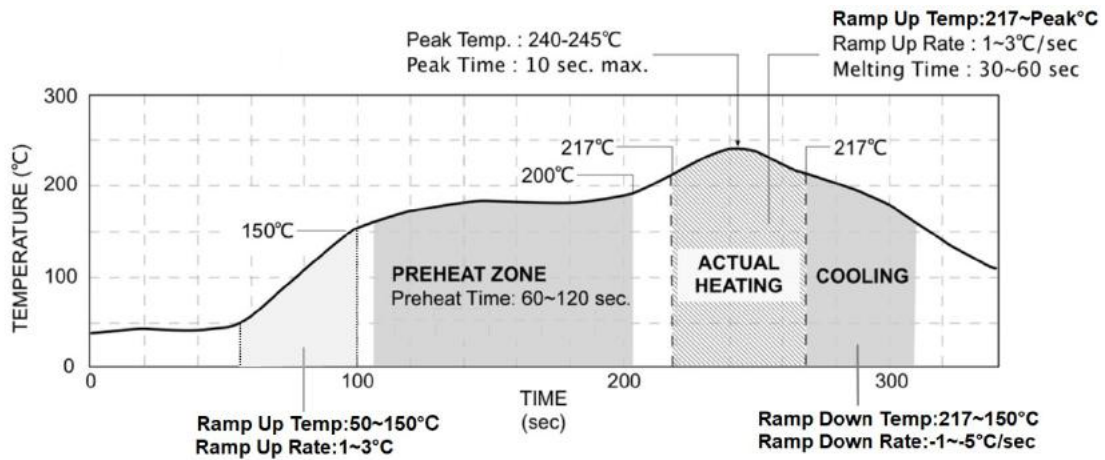
- Thermal test condition with vertical direction by natural convection (20LFM).



TOP VIEW



**LEAD FREE REFLOW PROFILE For SMD Type**



\*The curves define the maximum peak reflow temperature permissible measured on pin1 or Vin pin.



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