



P-DUKE POWER

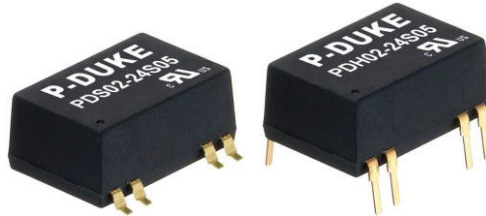
PDS02 • PDH02 Series

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

UL US CB CE UK CA

3000
VDC
Isolation
Voltage

1600
VDC
Isolation
Voltage

2 : 1
Input
Range

TINY
Output
Ripple

NO
Min. Load
Required

REMOTE
ON
OFF

SCP

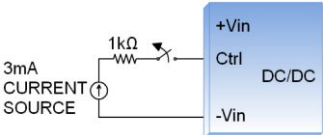
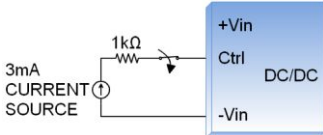
PART NUMBER STRUCTURE

PDS02 - **48** **S** **05** **H**

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)	Isolation Options
PDS : SMD type PDH : DIP type	05 :4.5~9 12 :9~18 24 :18~36 48 :36~75	S :Single D :Dual	3P3 :3.3 05 :5 09 :9 12 :12 15 :15 05 :±5 12 :±12 15 :±15	<input type="checkbox"/> :Standard type 1600VDC isolation H :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)02-05S3P3	4.5 ~ 9	3.3	500	35	74	3300
PDS(H)02-05S05	4.5 ~ 9	5	400	35	80	1680
PDS(H)02-05S09	4.5 ~ 9	9	222	40	79	1000
PDS(H)02-05S12	4.5 ~ 9	12	167	35	81	820
PDS(H)02-05S15	4.5 ~ 9	15	134	40	83	680
PDS(H)02-05D05	4.5 ~ 9	±5	±200	40	78	±1000
PDS(H)02-05D12	4.5 ~ 9	±12	±83	40	81	±470
PDS(H)02-05D15	4.5 ~ 9	±15	±67	40	82	±330
PDS(H)02-12S3P3	9 ~ 18	3.3	500	20	75	3300
PDS(H)02-12S05	9 ~ 18	5	400	20	81	1680
PDS(H)02-12S09	9 ~ 18	9	222	20	79	1000
PDS(H)02-12S12	9 ~ 18	12	167	20	81	820
PDS(H)02-12S15	9 ~ 18	15	134	20	84	680
PDS(H)02-12D05	9 ~ 18	±5	±200	25	78	±1000
PDS(H)02-12D12	9 ~ 18	±12	±83	25	83	±470
PDS(H)02-12D15	9 ~ 18	±15	±67	25	82	±330
PDS(H)02-24S3P3	18 ~ 36	3.3	500	10	75	3300
PDS(H)02-24S05	18 ~ 36	5	400	10	81	1680
PDS(H)02-24S09	18 ~ 36	9	222	10	79	1000
PDS(H)02-24S12	18 ~ 36	12	167	10	84	820
PDS(H)02-24S15	18 ~ 36	15	134	10	84	680
PDS(H)02-24D05	18 ~ 36	±5	±200	10	79	±1000
PDS(H)02-24D12	18 ~ 36	±12	±83	10	84	±470
PDS(H)02-24D15	18 ~ 36	±15	±67	10	84	±330
PDS(H)02-48S3P3	36 ~ 75	3.3	500	7	75	3300
PDS(H)02-48S05	36 ~ 75	5	400	7	81	1680
PDS(H)02-48S09	36 ~ 75	9	222	7	79	1000
PDS(H)02-48S12	36 ~ 75	12	167	7	82	820
PDS(H)02-48S15	36 ~ 75	15	134	7	82	680
PDS(H)02-48D05	36 ~ 75	±5	±200	7	78	±1000
PDS(H)02-48D12	36 ~ 75	±12	±83	7	83	±470
PDS(H)02-48D15	36 ~ 75	±15	±67	7	83	±330

INPUT SPECIFICATIONS						
Parameter	Conditions			Min.	Typ.	Max. Unit
Operating input voltage range	05Vin(nom)			4.5	5	9
	12Vin(nom)			9	12	18
	24Vin(nom)			18	24	36
	48Vin(nom)			36	48	75
Start up time	Constant resistive load	Power up	5			ms
		Remote ON/OFF	5			
Input surge voltage	1 second, max.	05Vin(nom)			15	
		12Vin(nom)				
		24Vin(nom)				
		48Vin(nom)				
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	mA
		Remote off input current	2.5			mA
Application circuit		DC-DC ON				
		DC-DC OFF				

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, automatic recovery

GENERAL SPECIFICATIONS						
Parameter	Conditions			Min.	Typ.	Max. Unit
Isolation voltage	1 minute	Input to Output	Standard Type	1600		VDC
			Suffix "H"	3000		
Isolation resistance	500VDC			1		GΩ
Isolation capacitance				Standard Type		50
				Suffix "H"		50
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					7.137 x 10 ⁶ hrs

ENVIRONMENTAL SPECIFICATIONS

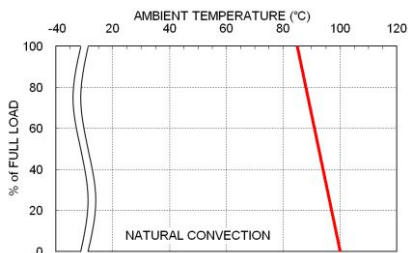
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating With derating	-40 +85		+85 +100	°C
Maximum case temperature				100	°C
Storage temperature range		-55		+125	°C
Thermal shock					MIL-STD-810F
Vibration					MIL-STD-810F
Relative humidity					5% to 95% RH
Lead-free 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

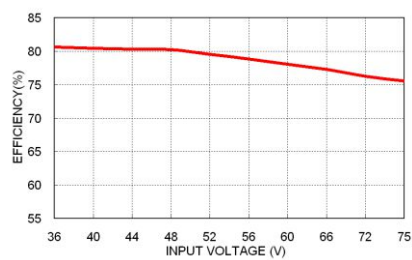
Parameter	Conditions	Level
EMI	EN55032 With external components	Class A, Class B
EMS	EN55035	
ESD	EN61000-4-2 Air ± 8 kV and Contact ± 6 kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 ± 2 kV	Perf. Criteria A
Surge	EN61000-4-5 ± 1 kV With an external input filter capacitor (Nippon chemi-con KY series, 220 μ F/100V)	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

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

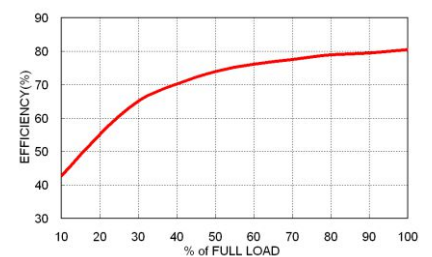
CHARACTERISTIC CURVE



PDS02-48S05 Derating Curve



PDS02-48S05 Efficiency vs. Input Voltage



PDS02-48S05 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.

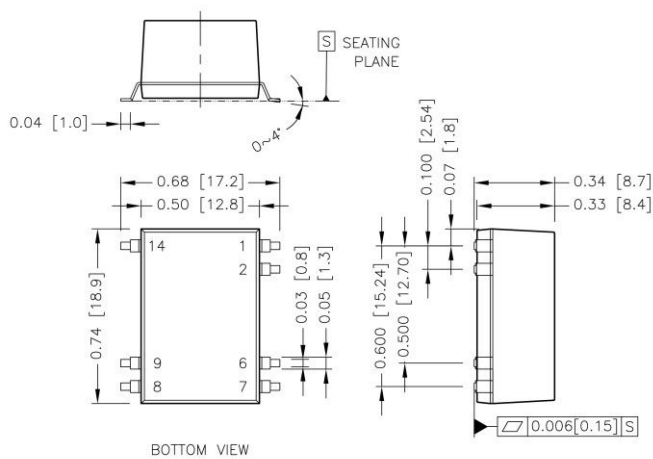
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
PDS(H)02-05S□□、PDS(H)02-05D□□	2	Slow-Blow
PDS(H)02-12S□□、PDS(H)02-12D□□	1.5	Slow-Blow
PDS(H)02-24S□□、PDS(H)02-24D□□	1	Slow-Blow
PDS(H)02-48S□□、PDS(H)02-48D□□	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

PDS02



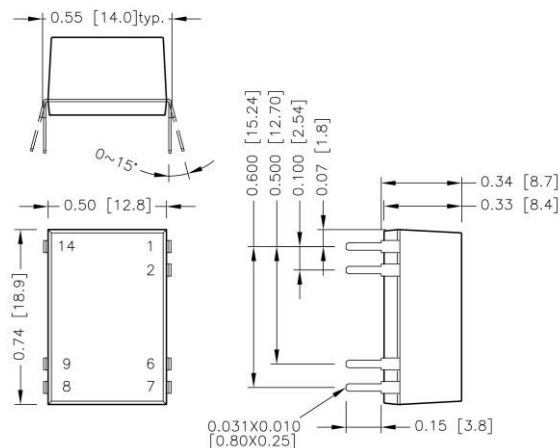
BOTTOM VIEW

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

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

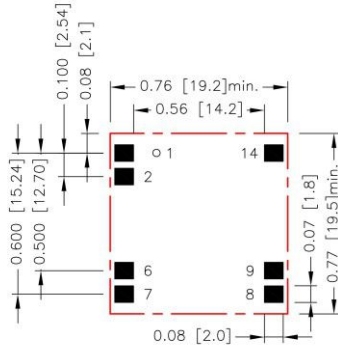
PDH02



BOTTOM VIEW

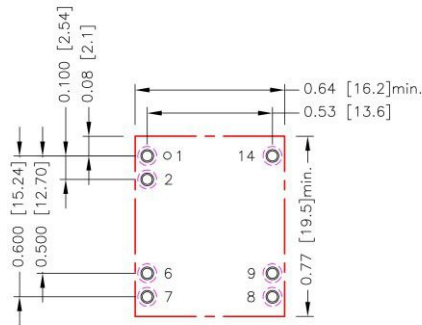
RECOMMENDED PAD LAYOUT

PDS02



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

PDH02

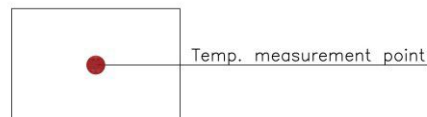


All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole1.2.6.7.8.9.14: Φ 0.043[1.10]
Top view pad1.2.6.7.8.9.14: Φ 0.055[1.40]
Bottom view pad1.2.6.7.8.9.14: Φ 0.080[2.04]

THERMAL CONSIDERATIONS

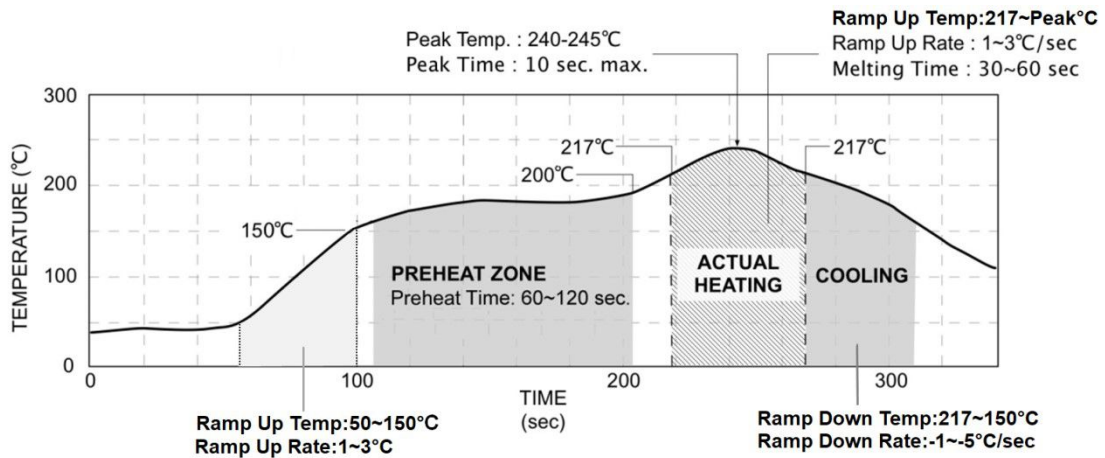
The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point 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.