



# P-DUKE POWER

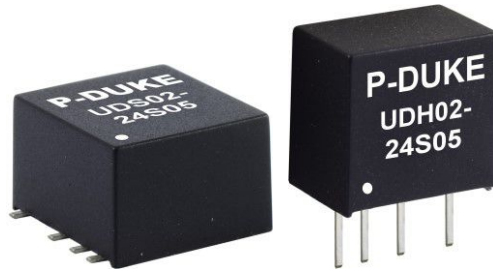
## UDS02 · UDH02 Series

DC-DC Converter  
Up to 2.01 Watts

**3**  
YEARS  
WARRANTY

ROHS  
COMPLIANT

REACH  
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway

CE UK  
CA

**1600**  
VDC  
Isolation  
Voltage

**2 : 1**  
Input  
Range

**NO**  
Min. Load  
Required

**SCP**

### PART NUMBER STRUCTURE

Series Name	Input Voltage (VDC)	Output Quantity	Output Voltage (VDC)
<b>UDS</b> : SMD type	<b>05</b> :4.5~13.2	<b>S</b> :Single	<b>3P3</b> :3.3
<b>UDH</b> : SIP type	<b>12</b> :9~18		<b>05</b> :5
	<b>24</b> :18~36		<b>09</b> :9
	<b>48</b> :36~75		<b>12</b> :12
			<b>15</b> :15
			<b>24</b> :24
		<b>D</b> : Dual	<b>05</b> :± 5
			<b>12</b> :±12
			<b>15</b> :±15

**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
UDS(H)02-05S3P3	4.5 ~ 13.2	3.3	500	55	77	3300
UDS(H)02-05S05	4.5 ~ 13.2	5	400	55	80	1680
UDS(H)02-05S09	4.5 ~ 13.2	9	222	55	80	1000
UDS(H)02-05S12	4.5 ~ 13.2	12	167	65	83	820
UDS(H)02-05S15	4.5 ~ 13.2	15	134	65	82	680
UDS(H)02-05S24	4.5 ~ 13.2	24	83	65	82	220
UDS(H)02-05D05	4.5 ~ 13.2	±5	±200	65	78	±1000
UDS(H)02-05D12	4.5 ~ 13.2	±12	±83	65	82	±470
UDS(H)02-05D15	4.5 ~ 13.2	±15	±67	65	80	±330
UDS(H)02-12S3P3	9 ~ 18	3.3	500	25	77	3300
UDS(H)02-12S05	9 ~ 18	5	400	25	80	1680
UDS(H)02-12S09	9 ~ 18	9	222	25	80	1000
UDS(H)02-12S12	9 ~ 18	12	167	25	84	820
UDS(H)02-12S15	9 ~ 18	15	134	32	83	680
UDS(H)02-12S24	9 ~ 18	24	83	32	83	220
UDS(H)02-12D05	9 ~ 18	±5	±200	32	79	±1000
UDS(H)02-12D12	9 ~ 18	±12	±83	32	83	±470
UDS(H)02-12D15	9 ~ 18	±15	±67	32	81	±330
UDS(H)02-24S3P3	18 ~ 36	3.3	500	15	77	3300
UDS(H)02-24S05	18 ~ 36	5	400	15	78	1680
UDS(H)02-24S09	18 ~ 36	9	222	15	80	1000
UDS(H)02-24S12	18 ~ 36	12	167	15	84	820
UDS(H)02-24S15	18 ~ 36	15	134	15	84	680
UDS(H)02-24S24	18 ~ 36	24	83	15	82	220
UDS(H)02-24D05	18 ~ 36	±5	±200	15	80	±1000
UDS(H)02-24D12	18 ~ 36	±12	±83	15	83	±470
UDS(H)02-24D15	18 ~ 36	±15	±67	15	82	±330
UDS(H)02-48S3P3	36 ~ 75	3.3	500	8	76	3300
UDS(H)02-48S05	36 ~ 75	5	400	8	79	1680
UDS(H)02-48S09	36 ~ 75	9	222	8	80	1000
UDS(H)02-48S12	36 ~ 75	12	167	8	83	820
UDS(H)02-48S15	36 ~ 75	15	134	8	83	680
UDS(H)02-48S24	36 ~ 75	24	83	8	82	220
UDS(H)02-48D05	36 ~ 75	±5	±200	8	78	±1000
UDS(H)02-48D12	36 ~ 75	±12	±83	8	82	±470
UDS(H)02-48D15	36 ~ 75	±15	±67	8	80	±330

**INPUT SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating input voltage range	5Vin(nom)		4.5	5	13.2	VDC
	12Vin(nom)		9	12	18	
	24Vin(nom)		18	24	36	
	48Vin(nom)		36	48	75	
Start up time	Constant resistive load	Power up		5	15	ms
Input surge voltage	1 second, max.	5Vin(nom)			15	VDC
		12Vin(nom)			25	
		24Vin(nom)			50	
		48Vin(nom)			100	
Input filter			Capacitor type			

**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 90% 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	Measured by 20MHz bandwidth			50		mVp-p
Temperature coefficient			-0.02		+0.02	%/°C
Transient response recovery time	25% load step change			500		µs
Short circuit protection			Continuous, automatics recovery			

**GENERAL SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Isolation voltage	1 minute	Input to Output	1600			VDC
Isolation resistance	500VDC		1			GΩ
Isolation capacitance			75			pF
Switching frequency			100			kHz
Safety meets			IEC/ EN/ UL62368-1			
Case material			Non-conductive black plastic			
Base material			None			
Potting material			Potting compound (UL94 V-0)			
Weight			2.1g(0.07oz)			
MTBF	MIL-HDBK-217F, Full load		5.735 x 10 <sup>6</sup>			hrs

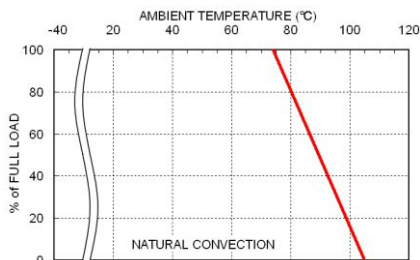
**ENVIRONMENTAL SPECIFICATIONS**

Parameter	Conditions		Min.	Typ.	Max.	Unit
Operating ambient temperature	With derating		-40		+105	°C
Maximum case temperature					105	°C
Storage temperature range			-55		+125	°C
Thermal shock			MIL-STD-810F			
Vibration			MIL-STD-810F			
Relative humidity			5% to 95% RH			
Moisture sensitivity level(MSL)	Only for SMD type Verification according to IPC J-STD-020E		IPC J-STD-033C Level 2			
Lead-free reflow solder process	Only for SMD type		The time above 217°C 30~60sec. Peak temperature 245°C max. Time above 240°C 10sec. max.			

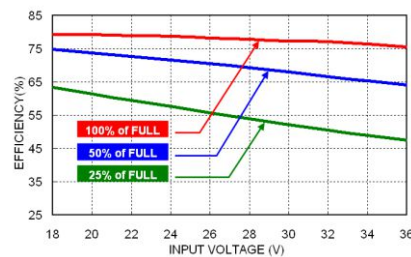
**EMC SPECIFICATIONS**

Parameter	Conditions	Level
EMI	EN55032	Class A · Class B
EMS	EN55035	
ESD	EN61000-4-2	Air ± 8kV and Contact ± 6kV
Radiated immunity	EN61000-4-3	10 V/m
Fast transient	EN61000-4-4	±2kV
Surge	EN61000-4-5	±1kV
		With an external input filter capacitor (Nippon chemi-con KY series, 220µF/100V)
Conducted immunity	EN61000-4-6	10 Vr.m.s
Power frequency magnetic field	EN61000-4-8	100A/m continuous; 1000A/m 1 second

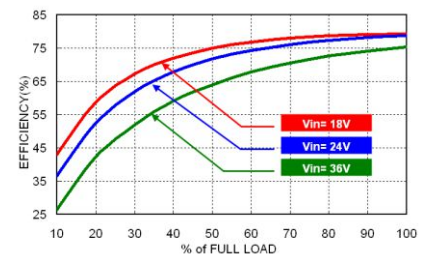
**CAUTION:** This power module is not internally fused. An input line fuse must always be used

**CHARACTERISTIC CURVE**


UDS(H)02-24S05 Derating Curve



UDS(H)02-24S05 Efficiency vs. Input Voltage



UDS(H)02-24S05 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.

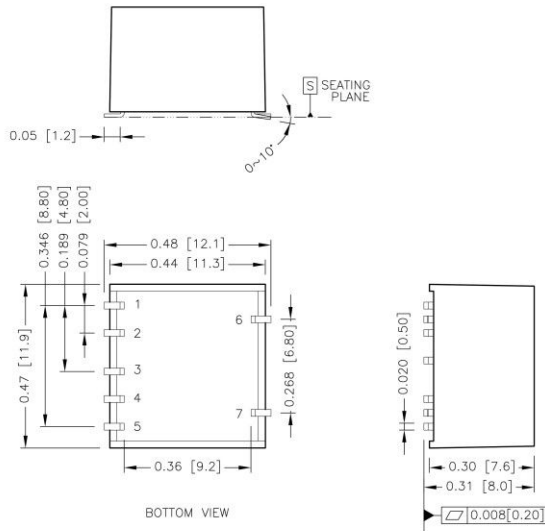
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
UDS(H)02-05S□□、UDS(H)02-05D□□	1	Slow-Blow
UDS(H)02-12S□□、UDS(H)02-12D□□	0.5	Slow-Blow
UDS(H)02-24S□□、UDS(H)02-24D□□	0.315	Slow-Blow
UDS(H)02-48S□□、UDS(H)02-48D□□	0.16	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**

**UDS02**

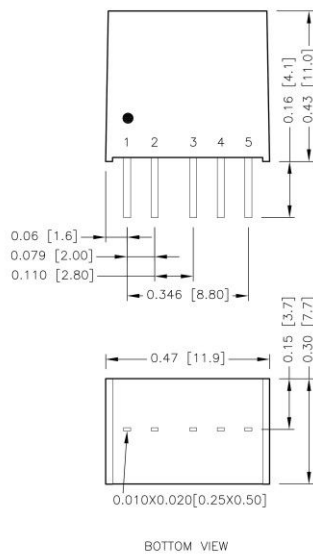


**PIN CONNECTION**

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	+Vout	+Vout
4	No Pin	Common
5	-Vout	-Vout
6	* NC	* NC
7	* NC	* NC

\* NC : No electrical characteristics

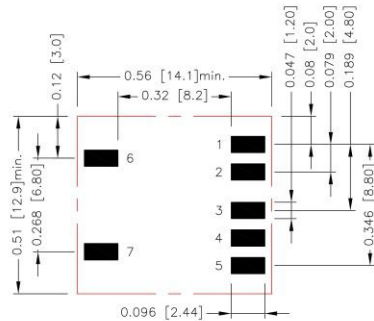
**UDH02**



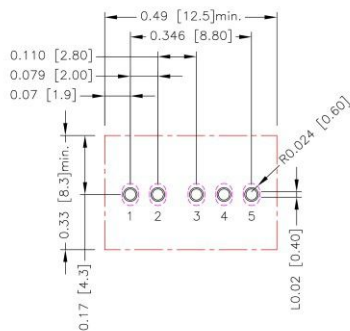
**PIN CONNECTION**

PIN	SINGLE	DUAL
1	-Vin	-Vin
2	+Vin	+Vin
3	+Vout	+Vout
4	No Pin	Common
5	-Vout	-Vout

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]

**RECOMMENDED PAD LAYOUT**
**UDS02**


All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Top view pad 1.2.3.4.5.6.7:0.096x0.047[2.44x1.20]

**UDH02**


All dimensions in inch[mm]  
 Pad size(lead free recommended)  
 Through hole 1.2.3.4.5:  $\Phi$ 0.031[0.80]  
 Top view pad 1.2.3.4.5:  $\Phi$ 0.039[1.00]  
 Bottom view pad 1.2.3.4.5:  
 Groove R0.024[0.60]L0.02[0.40]

**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.

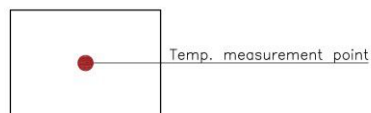
Heat is removed by conduction, convection, and radiation to the surrounding environment.

Proper cooling can be verified by measuring the point as the figure below.

The temperature at this location should not exceed "Maximum case temperature".

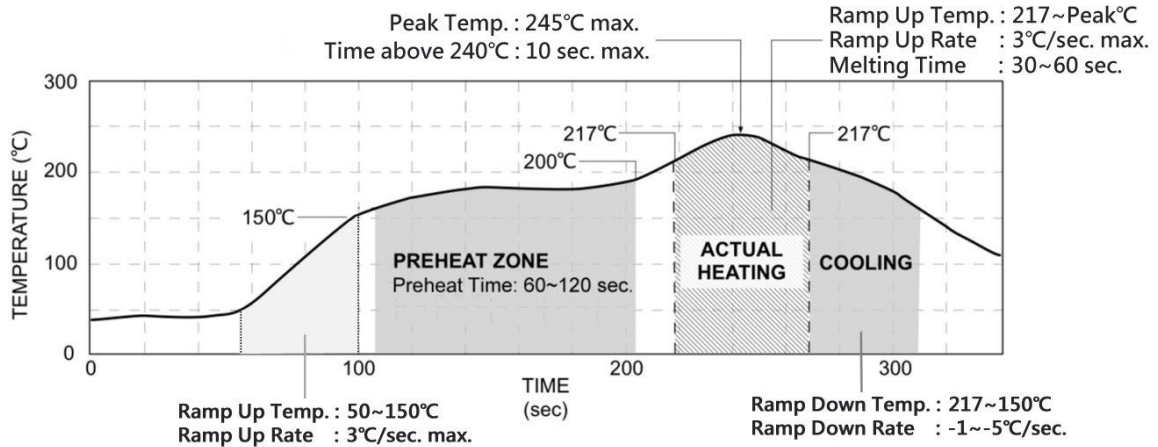
When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature".

You can limit this temperature to a lower value for extremely high reliability.



TOP VIEW

**LEAD FREE REFLOW PROFILE For SMD Type**



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