



P-DUKE POWER

SDS02 · SDH02 Series

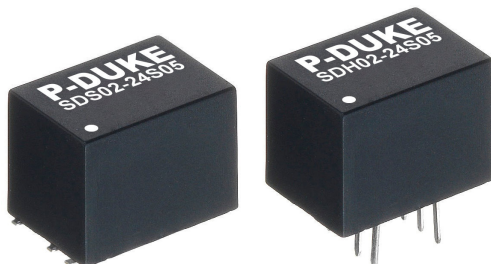
DC-DC Converter
Up to 2.01 Watts

3

YEARS
WARRANTY

ROHS
COMPLIANT

REACH
COMPLIANT



Automation



Datacom



IPC



Industry



Measurement



Telecom



Automobile



Boat



Charger



Medical



PV



Railway



3000
VDC
Isolation
Voltage

1600
VDC
Isolation
Voltage

2 : 1
Input
Range

NO
Min. Load
Required

REMOTE
ON
OFF

SCP

PART NUMBER STRUCTURE

SDS02 -

48

S

05

H

Series Name

Input
Voltage
(VDC)

Output
Quantity

Output
Voltage
(VDC)

Isolation
Option

SDS: SMD type
SDH: 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
24: 24

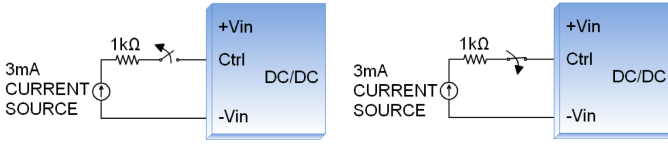
05: ±5
12: ±12
15: ±15

□: 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
SDS(H)02-05S3P3	4.5 ~ 9	3.3	500	34	77	2200
SDS(H)02-05S05	4.5 ~ 9	5	400	34	81	1000
SDS(H)02-05S09	4.5 ~ 9	9	222	42	82	660
SDS(H)02-05S12	4.5 ~ 9	12	167	42	84	550
SDS(H)02-05S15	4.5 ~ 9	15	134	42	85	440
SDS(H)02-05S24	4.5 ~ 9	24	83	42	85	200
SDS(H)02-05D05	4.5 ~ 9	±5	±200	42	81	±660
SDS(H)02-05D12	4.5 ~ 9	±12	±83	42	85	±330
SDS(H)02-05D15	4.5 ~ 9	±15	±67	42	85	±220
SDS(H)02-12S3P3	9 ~ 18	3.3	500	24	78	2200
SDS(H)02-12S05	9 ~ 18	5	400	24	81	1000
SDS(H)02-12S09	9 ~ 18	9	222	28	82	660
SDS(H)02-12S12	9 ~ 18	12	167	28	84	550
SDS(H)02-12S15	9 ~ 18	15	134	28	85	440
SDS(H)02-12S24	9 ~ 18	24	83	28	85	200
SDS(H)02-12D05	9 ~ 18	±5	±200	28	81	±660
SDS(H)02-12D12	9 ~ 18	±12	±83	28	85	±330
SDS(H)02-12D15	9 ~ 18	±15	±67	28	86	±220
SDS(H)02-24S3P3	18 ~ 36	3.3	500	10	78	2200
SDS(H)02-24S05	18 ~ 36	5	400	10	81	1000
SDS(H)02-24S09	18 ~ 36	9	222	14	82	660
SDS(H)02-24S12	18 ~ 36	12	167	14	84	550
SDS(H)02-24S15	18 ~ 36	15	134	14	85	440
SDS(H)02-24S24	18 ~ 36	24	83	14	85	200
SDS(H)02-24D05	18 ~ 36	±5	±200	14	81	±660
SDS(H)02-24D12	18 ~ 36	±12	±83	14	85	±330
SDS(H)02-24D15	18 ~ 36	±15	±67	14	86	±220
SDS(H)02-48S3P3	36 ~ 75	3.3	500	7	77	2200
SDS(H)02-48S05	36 ~ 75	5	400	7	81	1000
SDS(H)02-48S09	36 ~ 75	9	222	8	82	660
SDS(H)02-48S12	36 ~ 75	12	167	8	84	550
SDS(H)02-48S15	36 ~ 75	15	134	8	85	440
SDS(H)02-48S24	36 ~ 75	24	83	8	85	200
SDS(H)02-48D05	36 ~ 75	±5	±200	8	81	±660
SDS(H)02-48D12	36 ~ 75	±12	±83	8	85	±330
SDS(H)02-48D15	36 ~ 75	±15	±67	8	85	±220

INPUT SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating input voltage range	5Vin(nom) 12Vin(nom) 24Vin(nom) 48Vin(nom)	4.5 9 18 36	5 12 24 48	9 18 36 75	VDC
Start up time	Constant resistive load Power up Remote ON/OFF		10 10	20 20	ms
Input surge voltage	1 second, max. 5Vin(nom) 12Vin(nom) 24Vin(nom) 48Vin(nom)			15 25 50 100	VDC
Input reflected ripple current	With external components. 5Vin(nom) 12Vin(nom) 24Vin(nom) 48Vin(nom)		30 30 30 30		mAp-p
Input filter				Capacitor type	
Remote ON/OFF	Ctrl pin applied current via 1kΩ DC-DC ON DC-DC OFF Remote off input current Application circuit DC-DC ON DC-DC OFF	Open or high impedance 2.0	3.0	4.0 2.5	mA mA
					

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 Dual 10% Load to 90% Load Single Dual	-1.0 -1.0 -0.5 -0.8		+1.0 +1.0 +0.5 +0.8	%
Cross regulation	Asymmetrical load 25%/100% FL	-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		250		μs
Short circuit protection					Continuous, automatic recovery

GENERAL SPECIFICATIONS

Parameter	Conditions	Min.	Typ.	Max.	Unit
Isolation voltage	1 minute Standard Suffix "H"	1600 3000			VDC
Isolation resistance	500VDC	1			GΩ
Isolation capacitance	Standard Suffix "H"			50 50	pF
Switching frequency		100			kHz
Safety meets				IEC/ UL/ EN60950-1	
Case material				Non-conductive black plastic	
Base material				Non-conductive black plastic	
Potting material				Silicone (UL94 V-0)	
Weight				2.7g (0.10oz)	
MTBF	MIL-HDBK-217F, Full load			6.670 x 10 ⁶	hrs

ENVIRONMENTAL SPECIFICATIONS

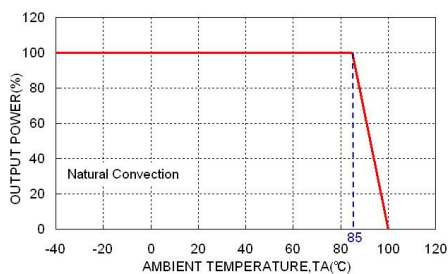
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-40		85	°C
Storage temperature range		-55		+125	°C
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	
Lead-free reflow solder process				IPC J-STD-020D	
Moisture sensitivity level(MSL)				IPC J-STD-033B Level 2	

EMC SPECIFICATIONS

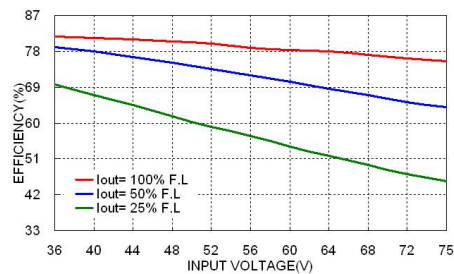
Parameter	Conditions	Level
EMI	EN55032 With external components.	Class A, Class B
ESD	EN61000-4-2 Air $\pm 8\text{kV}$ and Contact $\pm 6\text{kV}$	Perf. Criteria A
Radiated immunity	EN61000-4-3 10 V/m	Perf. Criteria A
Fast transient	EN61000-4-4 $\pm 2\text{kV}$	Perf. Criteria A
Surge	EN61000-4-5 With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

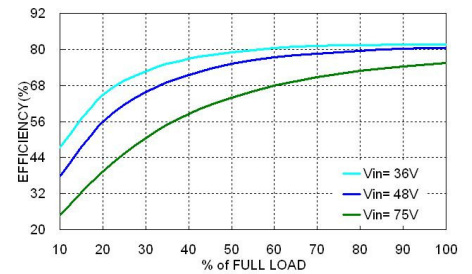
CHARACTERISTIC CURVE



SDS(H)02-48S05 Derating Curve



SDS(H)02-48S05 Efficiency vs. Input Voltage



SDS(H)02-48S05 Efficiency vs. Output Current

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.

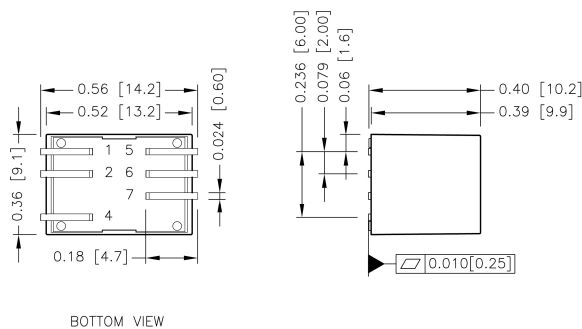
The input line fuse suggest as below :

Model	Fuse Rating (A)	Fuse Type
SDS(H)02-05S□□ ▸ SDS(H)02-05D□□	1	Slow-Blow
SDS(H)02-12S□□ ▸ SDS(H)02-12D□□	0.5	Slow-Blow
SDS(H)02-24S□□ ▸ SDS(H)02-24D□□	0.315	Slow-Blow
SDS(H)02-48S□□ ▸ SDS(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

SDS02: SMD TYPE

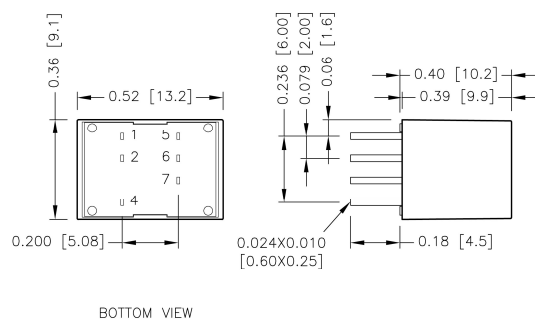


PIN CONNECTION

PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
4	Ctrl	Ctrl
5	NC	-Vout
6	-Vout	Common
7	+Vout	+Vout

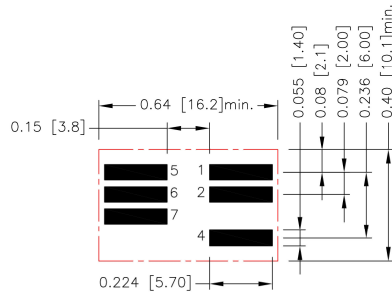
1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.01 [x.xx±0.25]
3. Pin pitch tolerance ±0.01 [0.25]
4. Pin dimension tolerance ±0.004 [0.10]

SDH02: DIP TYPE



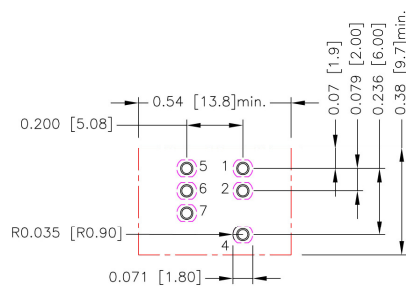
RECOMMENDED PAD LAYOUT

SMD TYPE



All dimensions in inch[mm]
Pad size(lead free recommended)
Top view pad:0.224x0.059[5.70x1.50]

DIP TYPE



All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.4.5.6.7: $\varnothing 0.035$ [$\varnothing 0.90$]
Top view pad 1.2.4.5.6.7: $\varnothing 0.044$ [$\varnothing 1.13$]
Bottom view pad 1.2.4.5.6.7:
Groove R0.035[R0.90]L-0.071[1.80]

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.

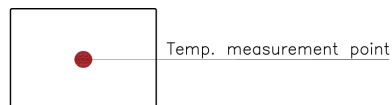
Heat is removed by conduction, convection, and radiation to the surrounding Environment.

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

The temperature at this location should not exceed 105°C.

When Operating, adequate cooling must be provided to maintain the test point temperature at or below 105°C.

Although the maximum point Temperature of the power modules is 105°C, you can limit this Temperature to a lower value for extremely high reliability.



TOP VIEW