



P-DUKE POWER

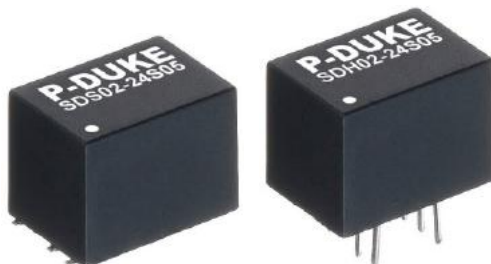
SDS02 • SDH02 Series

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

CE UK
CA

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 Options
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)		4.5	5	9	VDC	
	12Vin(nom)		9	12	18		
	24Vin(nom)		18	24	36		
	48Vin(nom)		36	48	75		
Start up time	Constant resistive load	Power up	10		20	ms	
		Remote ON/OFF	10		20		
Input surge voltage	1 second, max.	5Vin(nom)			15	VDC	
		12Vin(nom)			25		
		24Vin(nom)			50		
		48Vin(nom)			100		
Input reflected ripple current	With external components.	5Vin(nom)	30		mAp-p		
		12Vin(nom)	30				
		24Vin(nom)	30				
		48Vin(nom)	30				
Input filter	Capacitor type						
Remote ON/OFF	Ctrl pin applied current via 1kΩ	DC-DC ON	Open or high impedance			mA	
		DC-DC OFF	2.0	3.0	4.0		
		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 90% Load	Single	-0.5		+0.5	
		Dual	-0.8		+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		μ s
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			G Ω
Isolation capacitance		Standard Suffix "H"			50 50	pF
Switching frequency			100			kHz
Safety meets			IEC/ EN/ UL62368-1			
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

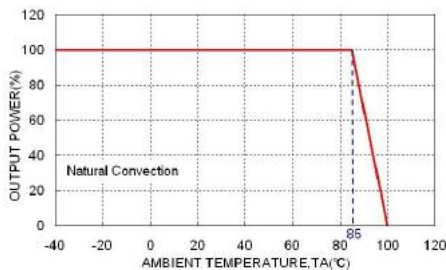
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating ambient temperature	Without derating	-40		+85	°C
Maximum case temperature				105	°C
Storage temperature range		-55		+125	°C
Thermal shock				MIL-STD-810F	
Vibration				MIL-STD-810F	
Relative humidity				5% to 95% RH	
Lead-free reflow solder process	Only for SMD type			IPC J-STD-020E	
Moisture sensitivity level(MSL)	Only for SMD type			IPC J-STD-033C Level 2	

EMC SPECIFICATIONS

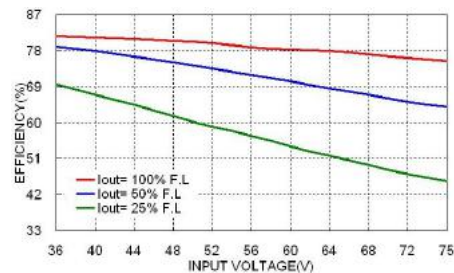
Parameter	Conditions	Level
EMI	EN55032	Class A, Class B
EMS	EN55024	
ESD	EN61000-4-2	Air ± 8 kV and Contact ± 6 kV
Radiated immunity	EN61000-4-3	10 V/m
Fast transient	EN61000-4-4	± 2 kV
Surge	EN61000-4-5	With an external input filter capacitor (Nippon chemi-con KY series, 220 μ F/100V.) ± 1 kV
Conducted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

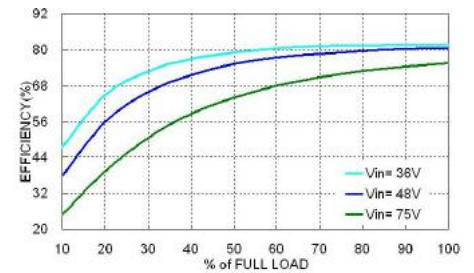
CHARACTERISTIC CURVE



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.

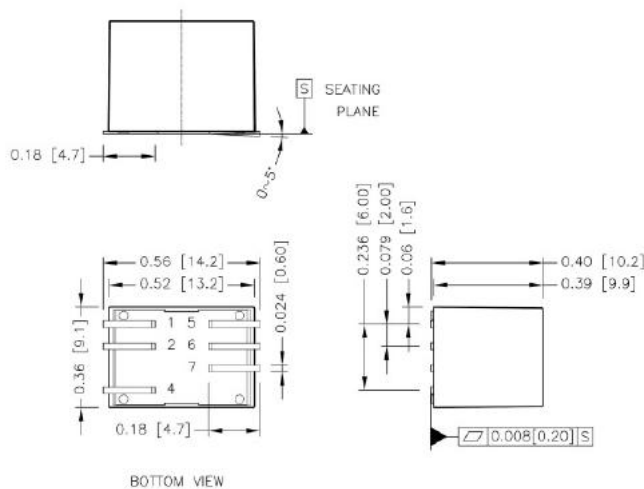
The input line fuse suggest as below :

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

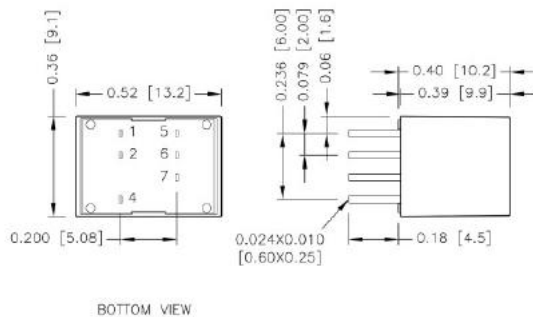


PIN CONNECTION

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

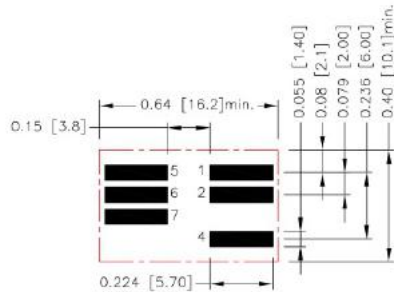
1. All dimensions in inch [mm]
2. Tolerance :x.xx±0.02 [x.x±0.5]
x.xxx±0.010 [x.xx±0.25]
3. Pin dimension tolerance ±0.004[0.10]

SDH02: DIP TYPE



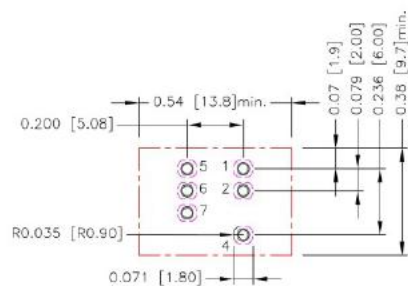
RECOMMENDED PAD LAYOUT

SMD TYPE



All dimensions in inch[mm]
Pad size(lead free recommended)
Top view pad:0.224x0.055[5.70x1.40]

DIP TYPE



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

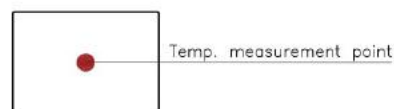
THERMAL CONSIDERATIONS

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 “Maximum case temperature”.

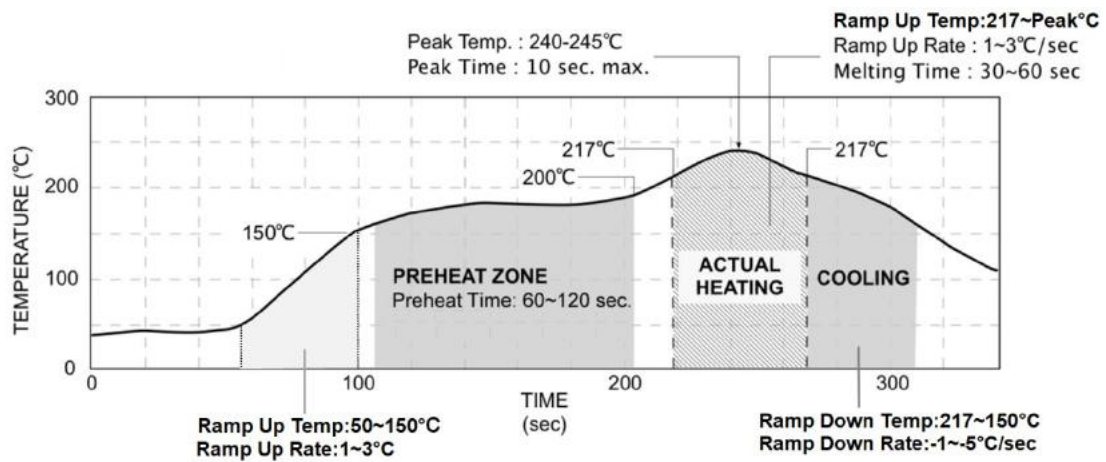
When operating, adequate cooling must be provided to maintain the test point temperature at or below “Maximum case temperature”.

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.