Size: 0.45in x 0.24in x 0.39in
(11.5mm x 6mm x 10mm)

FEATURES

- Wide Input Range
- RoHS & REACH Compliant
- 3000VDC Isolation Voltage
- 1600VDC Isolation Voltage
- Unregulated
- Short Circuit Protection
- Compact Size
- IEC/EN/UL62368-1 Safety Approvals

APPLICATIONS

- Automation
- Datacom
- IPC
- Industrial
- Measurement
- Telecom

DESCRIPTION

The SUD1 series of unregulated DC/DC converters offers up to 1 watt of output power 0.45” x 0.24” x 0.39” compact package. This series consists of single output models with a wide input voltage range. The SUD2 series is RoHS and REACH compliant, is protected against short circuit conditions, and has IEC/EN/UL62368-1 safety approvals.

MODEL SELECTION TABLE

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise	No Load Input Current	Output Power	Maximum Capacitive Load	Efficiency
			Min Load	Full Load					
SUD1-33S33	3.3VDC (2.9~3.6VDC)	3.3VDC	30.3mA	303mA	100mVp-p	65mA	1W	150µF	72%
SUD1-33S05		5VDC	20mA	200mA		65mA		100µF	74%
SUD1-33S09		9VDC	11mA	110mA		85mA		22µF	78%
SUD1-33S12		12VDC	8.3mA	83mA		85mA		47µF	78%
SUD1-33S15		15VDC	6.6mA	66mA		85mA		33µF	80%
SUD1-33S24		24VDC	4.2mA	42mA		90mA		33µF	79%
SUD1-05S33	5VDC (4.5~5.5VDC)	3.3VDC	30.3mA	303mA	100mVp-p	50mA	1W	150µF	72%
SUD1-05S05		5VDC	20mA	200mA		50mA		100µF	70%
SUD1-05S09		9VDC	11mA	110mA		50mA		22µF	78%
SUD1-05S12		12VDC	8.3mA	83mA		60mA		47µF	78%
SUD1-05S15		15VDC	6.6mA	66mA		50mA		33µF	80%
SUD1-05S24		24VDC	4.2mA	42mA		60mA		33µF	79%
SUD1-12S33	12VDC (10.8~13.2VDC)	3.3VDC	30.3mA	303mA	100mVp-p	25mA	1W	150µF	72%
SUD1-12S05		5VDC	20mA	200mA		25mA		100µF	71%
SUD1-12S09		9VDC	11mA	110mA		25mA		22µF	73%
SUD1-12S12		12VDC	8.3mA	83mA		25mA		47µF	76%
SUD1-12S15		15VDC	6.6mA	66mA		25mA		33µF	74%
SUD1-12S24		24VDC	4.2mA	42mA		25mA		33µF	79%
SUD1-15S33	15VDC (13.4~16.4VDC)	3.3VDC	30.3mA	303mA	100mVp-p	18mA	1W	150µF	71%
SUD1-15S05		5VDC	20mA	200mA		18mA		100µF	71%
SUD1-15S09		9VDC	11mA	110mA		20mA		22µF	75%
SUD1-15S12		12VDC	8.3mA	83mA		18mA		47µF	81%
SUD1-15S15		15VDC	6.6mA	66mA		18mA		33µF	81%
SUD1-15S24		24VDC	4.2mA	42mA		20mA		33µF	80%
SUD1-24S33	24VDC (21.6~26.4VDC)	3.3VDC	30.3mA	303mA	100mVp-p	14mA	1W	150µF	71%
SUD1-24S05		5VDC	20mA	200mA		14mA		100µF	71%
SUD1-24S09		9VDC	11mA	110mA		14mA		22µF	75%
SUD1-24S12		12VDC	8.3mA	83mA		14mA		47µF	81%
SUD1-24S15		15VDC	6.6mA	66mA		14mA		33µF	81%
SUD1-24S24		24VDC	4.2mA	42mA		14mA		33µF	80%

SPECIFICATIONS

All specifications are based on 25°C, Nominal Input Voltage, and Full Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range	3.3Vin(nom)		2.9	3.3	3.6	VDC
	5Vin(nom)		4.5	5	5.5	
	12Vin(nom)		10.8	12	13.2	
	15Vin(nom)		13.4	15	16.4	
	24Vin(nom)		21.6	24	26.4	
Input Filter			C Type			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy	Nominal Input		See Tolerance Envelope Curve			
Line Regulation	Input Voltage ±5% change		1.2%max/1% of Vin			
Load Regulation	10% to 100% Load	3.3Vout, 5Vout	-15		+15	%
		Others	-10		+10	
Output Power			See Table			
Output Current			See Table			
Maximum Capacitive Load			See Table			
Ripple & Noise	Measured by 20MHz Bandwidth			100		mVp-p
Temperature Coefficient			-0.1		+0.1	%/°C
PROTECTION						
Short Circuit Protection			Continuous Short Circuit Protection			
ENVIRONMENTAL SPECIFICATIONS						
Operating Temperature	Without Derating		-40		+85	°C
Storage Temperature			-55		+125	°C
Maximum Case Temperature					100	°C
Relative Humidity			5		95	%RH
Thermal Shock			MIL-STD-810F			
Vibration			MIL-STD-810F			
MTBF	MIL-HDBK-217F, Full Load			2,000,000		Hours
GENERAL SPECIFICATIONS						
Efficiency			See Table			
Switching Frequency	3.3Vin			95		kHz
	5Vin			110		
	12Vin			145		
	15,24Vin			100		
Isolation Voltage	1 minute (PIN1 to Output)	Standard Type	1600			VDC
		"H" Suffix(1)	3000			
Isolation Resistance	500VDC		1			GΩ
Isolation Capacitance					80	pF
PHYSICAL SPECIFICATIONS						
Weight			0.046oz (1.3g)			
Dimensions (L x W x H)			0.45in x 0.24in x 0.39in (11.5mm x 6mm x 10mm)			
Case Material			Non-Conductive Black Plastic			
Base Material			None			
Potting Material			Epoxy (UL94 V-0)			
SAFETY CHARACTERISTICS						
Safety Approvals			IEC/EN/UL62368-1			
EMI			Class			

NOTES

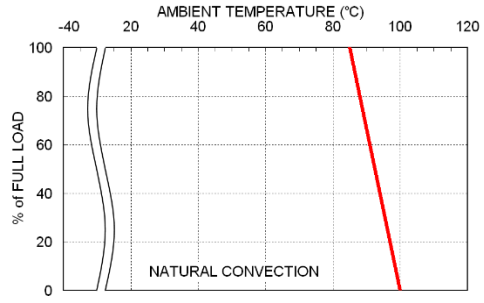
1. The extra protection of the pads between input and output should be needed in order to ensure that the isolation function won't be affected after the module is mounted on the PCB. For detailed information, refer to Recommended Pad Layout.
2. The output requires a minimum loading on the output to maintain specified regulation. Operation under no-load condition will not damage these devices; however they may not meet all listed specifications.
3. This product is Listed to applicable standard and requirements by UL.

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

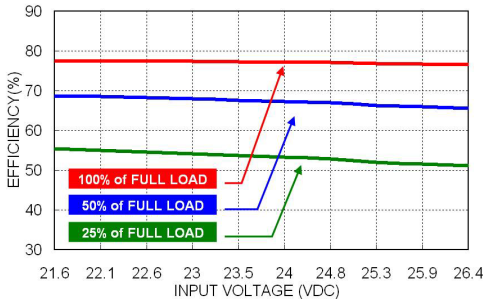
**Due to advances in technology, specifications subject to change without notice.*

CHARACTERISTIC CURVES

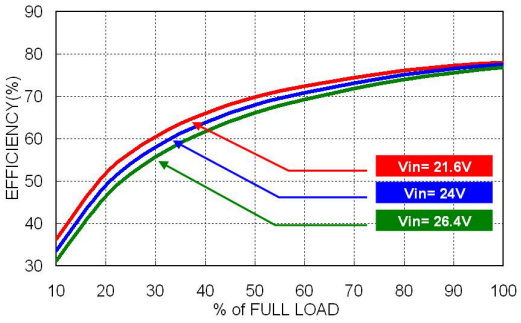
SUD1-24S12 Derating Curve



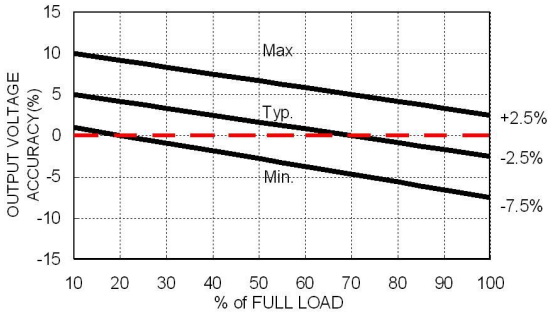
SUD1-24S12 Efficiency vs. Input Voltage



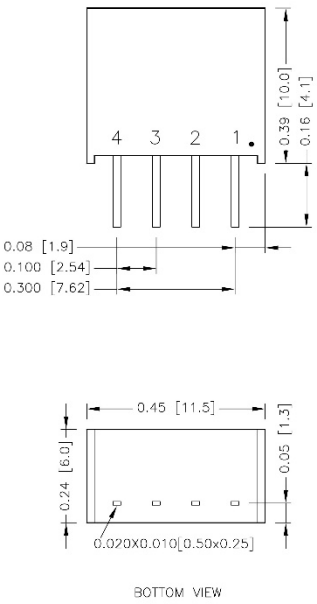
SUD1-24S12 Efficiency vs. Output Load



Tolerance Envelope



MECHANICAL DRAWINGS

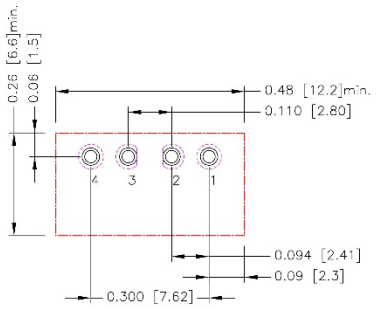


Pin Connection

PIN	DEFINE
1	-Vin
2	+Vin
3	-Vout
4	+Vout

Notes:
1. All dimensions in inch [mm]
   Tolerance: x.xx±0.02 [x.x±0.5]
   x.xxx±0.010 [x.xx±0.25]
2. Pin pitch tolerance: ±0.01 [0.25]
3. Pin dimension tolerance: ±0.004 [0.10]

RECOMMENDED PAD LAYOUT



All dimensions in inch[mm]
Pad size(lead free recommended)
Through hole 1.2.3.4:Φ0.031[0.80]
Top view pad 1.2.3.4:Φ0.039[1.10]
pad 2 to pad 3 spacing:0.067[1.70]
Bottom view pad 1.2.3.4:Φ0.063[1.60]
pad 2 to pad 3 spacing:0.067[1.70]

* Suffix ”H” :The extra protection of the pads between input(PIN 2) and output(PIN 3) needed in order to ensure that the isolation function won’t be affected after the module mounts on the PCB.

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 maximize flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse.
Suggested input line fuse :

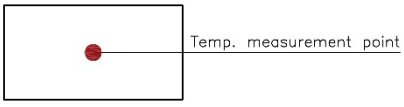
Model	Fuse Rating	Fuse Type
SUD1-33Sxx	0.8A	Slow-Blow
SUD1-05S33	0.5A	Slow-Blow
SUD1-12S33	0.315A	Slow-Blow
SUD1-15S33, SUD1-24S33	0.16A	Slow-Blow

Table is based on information provided in this data sheet on inrush energy and maximum DC input current at low Vin.

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

MODEL NUMBER SETUP

SUD	1	-	05	S	05	H
Series Name	Output Power		Input Voltage	Output Quantity	Ouptut Voltage	Isolation Options
			33: 3.3VDC **05:** 05VDC **12:** 12VDC **15:** 15VDC **24:** 24VDC	**S:** Single	**33:** 3.3 **05:** 5 **09:** 9 **12:** 12 **15:** 15 **24:** 24	**Blank:** Standard Type, 1600VDC Isolation **H:** 3000VDC Isolation

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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