



## Pin assignments & Function



<Top View>

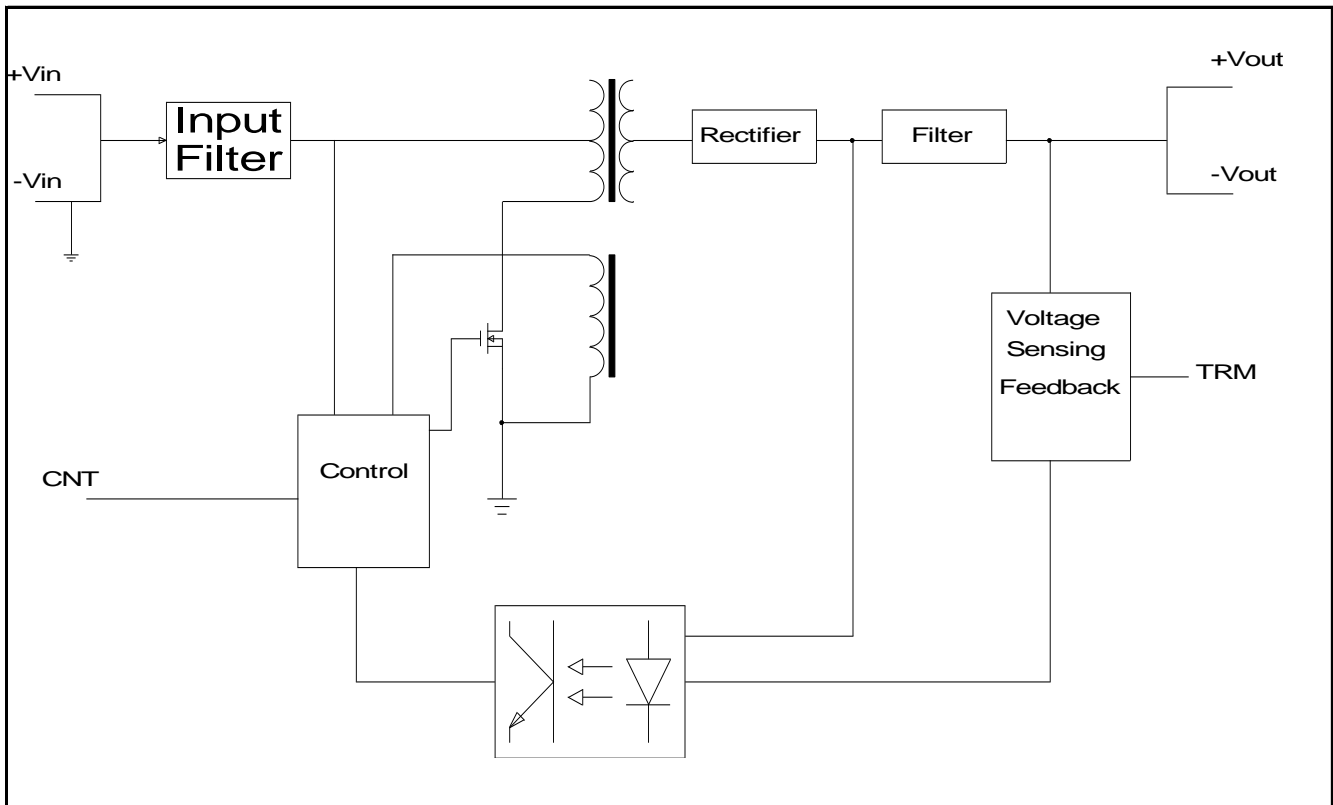
### - Single Output Name & Function

PIN No.	NAME	FUNCTION
1	+Vin	Positive terminal for Vin
2	-Vin	Negative terminal for Vin
3	CNT	Remote on/off Control
4	TRM	Vout variation( $\pm 10\%$ ) by external parts
5	-Vout	Negative terminal for Vout
6	-Vout	Negative terminal for Vout
7	+Vout	Positive terminal for Vout
8	+Vout	Positive terminal for Vout

### - Dual Output Name & Function

PIN No.	NAME	FUNCTION
1	+Vin	Positive terminal for Vin
2	-Vin	Negative terminal for Vin
3	CNT	Remote on/off Control
4	-Vout	Negative terminal for Vout
5	No Pin	
6	Com	The common ground of Vout
7	No Pin	
8	+Vout	Positive terminal for Vout

## Internal Circuit Architecture



## Maximum Ratings

Characteristics		Symbol	Min.	Typ.	Max.	Unit
Input Voltage Continuous	SDS20 - 24 - XX	Vin	18	-	36	VDC
	SDS20 - 48 - XX		36	-	76	
	SDD20 - 24 - XXXX		18	-	36	
	SDD20 - 48 - XXXX		36	-	76	
Operating Ambient Temperature		Ta	-40	-	85	°C
Storage Temperature		Tstg	-40	-	105	°C
Withstand Voltage			-	-	500	Vac

## Electrical Characteristics

### – Input Section

Ta : 25°C, Vin : Typical Input Voltage

Characteristics		Symbol	Min.	Typ.	Max.	Unit
Operating Voltage Range	SDS20 – 24 – XX	Vin	18	24	36	VDC
	SDS20 – 48 – XX		36	48	76	
	SDD20 – 24 – XXXX		18	24	36	
	SDD20 – 48 – XXXX		36	48	76	
Maximum Input Current (Vin : min., Io : 100%)	SDS20 – 24 – XX	Iin			1.30	A
	SDS20 – 48 – XX				0.70	
	SDD20 – 24 – XXXX				1.30	
	SDD20 – 48 – XXXX				0.70	
Maximum No Load Input Current (Vin : rated)	SDS20 – 24 – 3R3, 05			70		mA
	SDS20 – 24 – 12, 15		30			
	SDS20 – 48 – 3R3, 05		40			
	SDS20 – 48 – 12, 15		30			
	SDD20 – 24 – XXXX		30			
	SDD20 – 48 – XXXX		20			

### – Output Section

Ta : 25°C, Vin : Minimum, Typical, Maximum Input Voltage

Characteristics		Symbol	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		Vo	–	–	±2	%
Regulation	Line Regulation (From min. Vin to max. Vin, constant load)		–	–	±0.5	%
	Load Regulation (From no load to maximum load)		–	–	±1	%
	Cross Regulation(Dual) (minimum load : 10% Load)				±3	%
Output Ripple and Noise (Vin : Rated, Io : Max., BW : 20MHz, use the external capacitor(47uF, 105) between +Vo and -Vo)		mVp-p	–	1% of Vout	–	mV (peak to peak)

Characteristics		Symbol	Min.	Typ.	Max.	Unit
Output Current	SDS20 - XX - 3R3	I <sub>o</sub>	-	-	4.0	A
	SDS20 - XX - 05		-	-	4.0	
	SDS20 - XX - 12		-	-	1.7	
	SDS20 - XX - 15		-	-	1.4	
	SDD20 - XX - 1212		0.085	-	0.85	
	SDD20 - XX - 1515		0.07	-	0.70	
Output Current Limit (OCP : Over Current Protection, recovers automatically)			105	-	-	%
Dynamic Load Response (V <sub>in</sub> : Rated, I <sub>o</sub> : from 50% to 100%, from 100% to 50%, BW : 20MHz, Freq. : 100Hz, Duty : 0.5, Tr/Tf : 100us use the external capacitor(1uF) between +V <sub>o</sub> and -V <sub>o</sub> )			-	-	3% of V <sub>out</sub>	mV (peak to peak)
Start - Up Time		T <sub>start</sub>	-	-	10	ms
Turn - on Overshoot			-	-	5	%
Efficiency (V <sub>in</sub> : Rated, I <sub>o</sub> : Max.)	SDS20 - 24 - 3R3		-	86	-	%
	SDS20 - 24 - 05		-	88	-	
	SDS20 - 24 - 12		-	89	-	
	SDS20 - 24 - 15		-	90	-	
	SDS20 - 48 - 3R3		-	86	-	%
	SDS20 - 48 - 05		-	87	-	
	SDS20 - 48 - 12		-	89	-	
	SDS20 - 48 - 15		-	90	-	
	SDD20 - 24 - 1212		-	89	-	%
	SDD20 - 24 - 1515		-	89	-	
	SDD20 - 48 - 1212		-	89	-	%
	SDD20 - 48 - 1515		-	89	-	

## Isolation Characteristics

Characteristics		Symbol	Min.	Typ.	Max.	Unit
Withstand Voltage (AC500V, 1minute)	Input – Output		–	–	500	Vac
	Input – Case		–	–	500	Vac
	Output – Case		–	–	500	Vac
Isolation Resistance (DC500V at 25°C and 70%RH)	Output – Case	Riso	100	–	–	MΩ

## General Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Remote on / off control (CNT Pin, Negative Logic Module on : Logic Low or Short to –Vin Module off : Logic High or open)	CNT				
External Trim Adj. Range (TRM Pin, Vout variation by external parts)	TRM	–10	–	+10	%
Switching Frequency					kHz
MTBF (MIL-HDBK-217F)			4.5 x 10 <sup>5</sup>		hrs
Dimension (W x H x L)			45.7 x 13.0 x 30.5		mm
Weight		–	18.0	–	grams

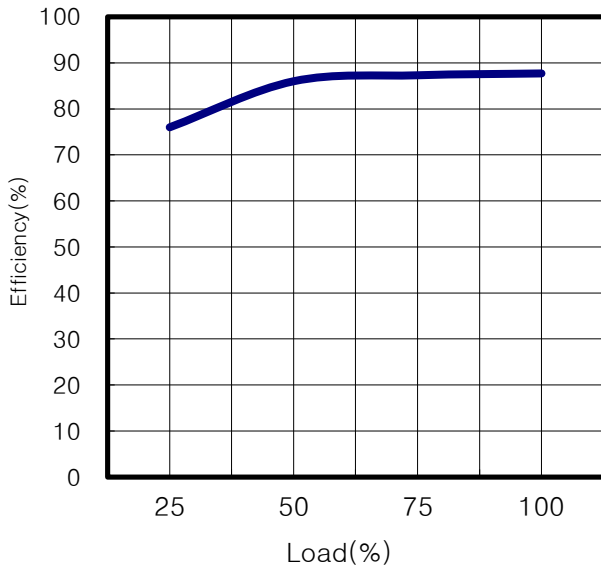
## Environment

Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operating Temperature Range	Ta	–40	–	85	°C
Operating Humidity (non Condensing)		5	–	95	%RH
Storage Temperature	Tstg	–40	–	105	°C

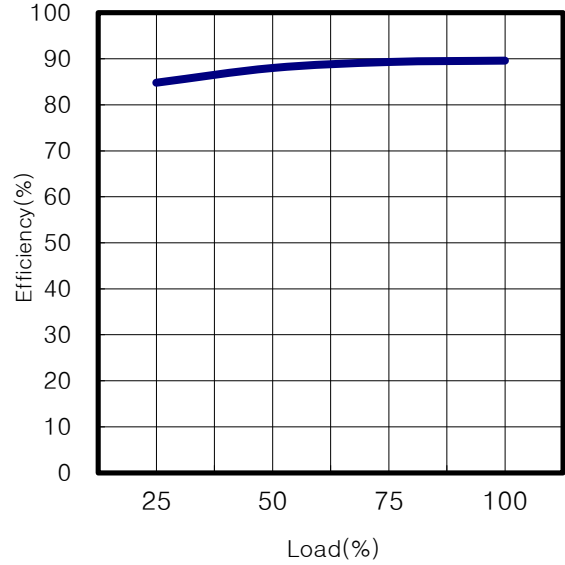
# Characteristics Curves

## Efficiency Curves

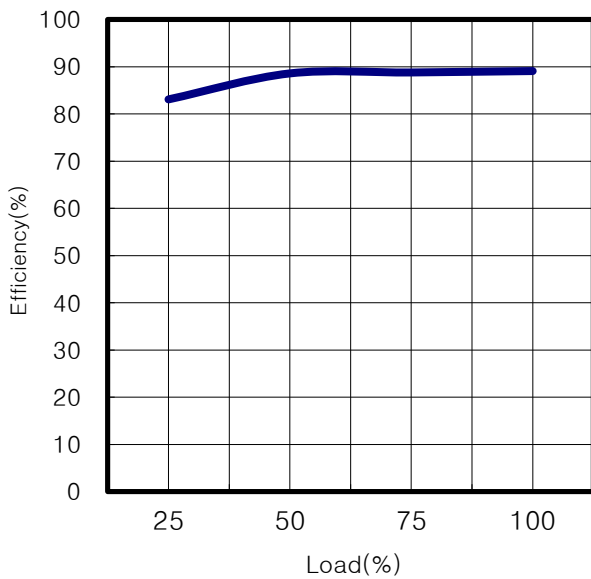
< SDS20 - 24 - 05 >



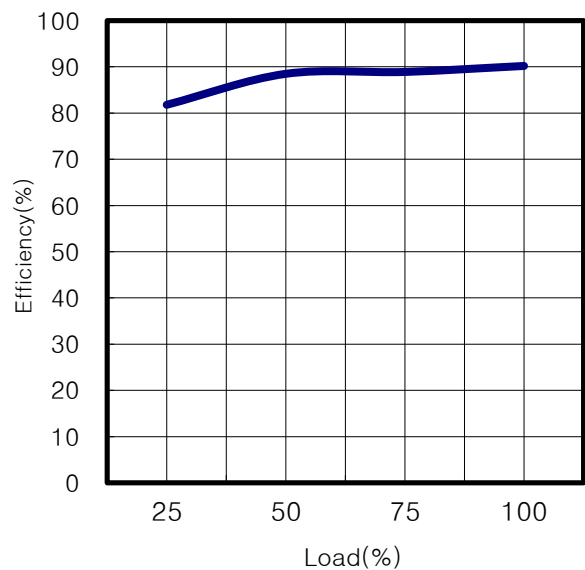
< SDS20 - 48 - 12 >



< SDD20 - 24 - 1212 >

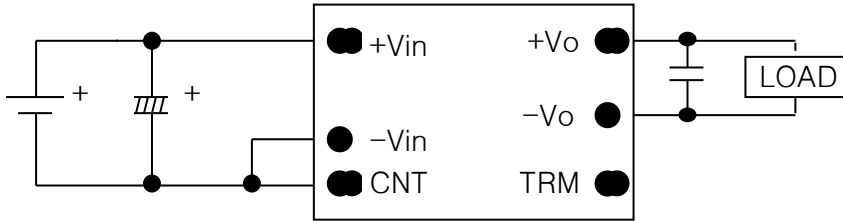


< SDD20 - 48 - 1515 >



# Application Sheet

## Basic Connection



## Input Section

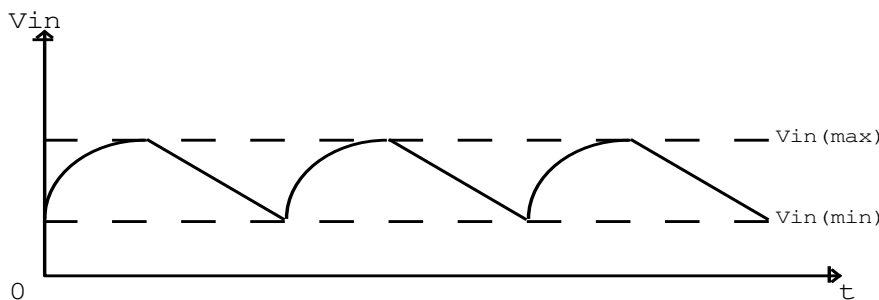
### - Input fuse

SD20 Series do not have internal fuse. To ensure safe operation, an external fuse(Regular or Slow Blow Type) is recommended.

	SD20 Series
24V input	4A
48V input	2A

### - Unstable Input

Input voltage is comprised of both the DC voltage(average rectified voltage)and the peak to peak ripple voltage. Peak to peak ripple voltage should be minimized so that the input voltage is within the standard input voltage range as follows.



< Unstable Input >

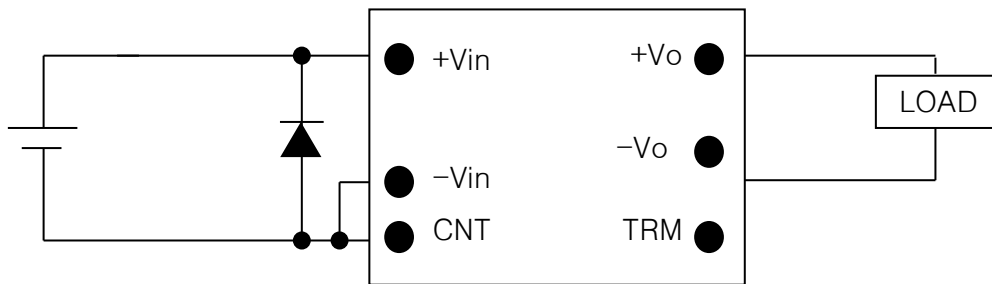


**- Battery Input**

When using a battery as the input power supply, make sure that the maximum and minimum input voltage do not away out of the standard input voltage range.

**- Input Reverse-polarity voltage protection**

Accidentally reversing the input connections could damage the module. Thus. If the connections may be accidentally reversed. Use a protective diode and an input fuse as shown below.



**- Remote On/Off Control(CNT)**

Without switching the input on/off, the output can be enabled and disabled using this function. This function is useful for sequence control when building multiple output power supplies. This control circuit is on the input side using the CNT pin. Ground of CNT pin is the input -V terminal. When not using this function, short CNT to input -V terminal.

CNT level for -Vin		OUTPUT
Low level	Short to -Vin	ON
High level	Open	OFF

< Negative Logic on/off Control >

**Output Section**

**- Output Ripple and Noise Measurement Method**

The measurement for output ripple and noise are based on normal probe with 20MHz bandwidth scope. Upon measurement of the ripple voltage, make sure that the scope probe leads are not too long. If a precise measurement can be made, the noise occurs from circumference must be reduced.

**- Line Regulation**

The line regulation means to the change in output voltage when the input voltage is varied within the input voltage range, at constant load and constant ambient temperature. The measurement point for the input and output voltage are  $\pm V_{in}$  pins,  $\pm V_{out}$  pins respectively.

**- Load Regulation**

The load regulation means to the change in output voltage when the load is changed from minimum load to maximum load, at constant input voltage and constant ambient temperature. The measurement point for the input and output voltage are  $\pm V_{in}$  pins,  $\pm V_{out}$  pins respectively.

**- Output Voltage adjustment (TRM)**

The output voltage can be varied within  $\pm 10\%$  of the standard output voltage when use the external parts-resistors and variable resistor.

External Resistors :

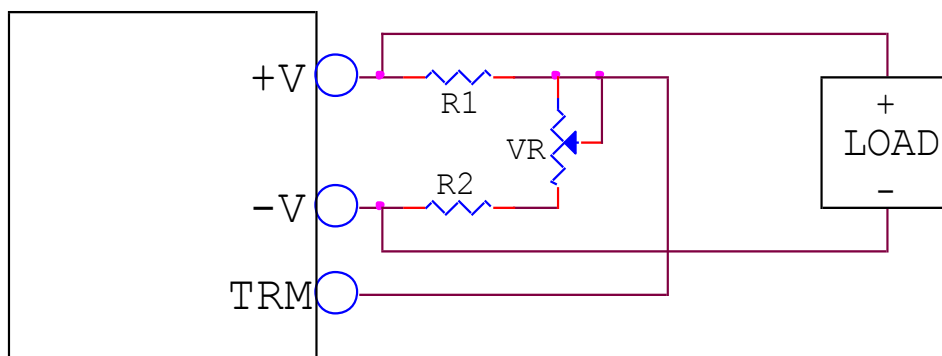
Resistance tolerance  $\pm 5\%$

Variable Resistor(VR) :

Total resistance tolerance  $\pm 20\%$

Remaining Resistance : Value less than 1%

Vo	R1	R2	VR
3.3V	150 $\Omega$	680 $\Omega$	1k $\Omega$
5V	1k $\Omega$	680 $\Omega$	1k $\Omega$
12V	3.9k $\Omega$	680 $\Omega$	1k $\Omega$
15V	5.6k $\Omega$	750 $\Omega$	1k $\Omega$



< Trim Method >

**- Over Current Protection**

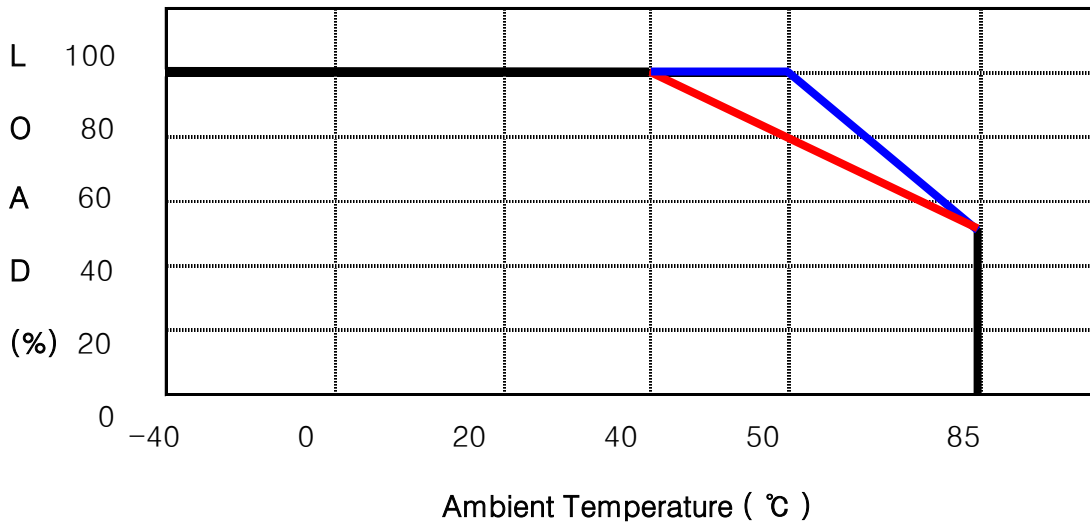
The SDS series is built into an OCP(Over Current Protection) circuit. When the OCP triggers, the output voltage will be fall. If overload condition is removed, the output will automatically recover.

## Environment

### - Temperature

#### Operation Temperature

The range of ambient temperature in °C over which a module can be operated safely at either rated or derated output power. Refer to derating curve as shown below.



※ Operating Temperature Range : From -40°C to 85°C

- : SDS20 Series, SDD20 Series
- : SDS20-XX-3R3, SDS20-XX-12, SDS20-XX-15, SDD20 Series
- : SDS20-XX-05 (SDS20-24-05, SDS20-48-05)

#### < Derating Curve >

### Storage Temperature

The range of ambient temperature in °C over which a module may be stored long term without damage. The storage temperature range is from -40°C to 105°C.

### - Humidity

#### Operation Humidity

The range of ambient humidity in % over which a module can be operated safely at either rated or derated output power. Refer to derating curve as shown below. The operating humidity range is from 5% to 95%RH.

#### Storage Humidity

The range of ambient humidity in % over which a module may be stored long term without damage. The storage humidity range is from 5% to 95%RH.

## Outline Dimensions

All dimensions are in mm and (inch)

