

20W, DC/DC Power Converter

SDU20G

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Introduction

The SDU20G series are 1.5KV isolated 20Watt DC/DC converters with standard DIP1"x1" footprint. Designed with high efficiency, they operate in a wide temperature range from -40°C to +85°C. Other features include wide 4:1 input voltage range, remote on/off control, output trimming, under voltage, over voltage, over current, and short circuit protections. These converters are ideally suitable for battery operated equipment, measurement equipment, telecom, wireless network, industrial control system.

Features

- Rated power: 20W Max
- Input voltage range 4:1
- Regulated single output
- High efficiency up to 91%
- Isolation voltage 1.5KVDC
- Remote On/Off control
- Output trimming $\pm 10\%$
- Operating temperature range: -40 ~ +85°C ambient
- RoHS compliant
- Compact 1"x1" package
- Under voltage, over voltage, over current, and short circuit protection
- Designed to meet UL/EN/IEC 62368-1
- 3 year warranty

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Part numbers

Model Number	Input Voltage [VDC]			V _{OUT} [VDC]	Output Current [mA]		Efficiency [%] Typ.	Capacitive Load [uF] Max.
	Nom.	Range	*Max.		Max.	Min.		
SDU20G2403	24	9-36	40	3.3	5000	0	88	10000
SDU20G2405	24	9-36	40	5	4000	0	90	10000
SDU20G2406	24	9-36	40	6	3333	0	89	10000
SDU20G2412	24	9-36	40	12	1667	0	90	1600
SDU20G2415	24	9-36	40	15	1333	0	91	1000
SDU20G2424	24	9-36	40	24	833	0	91	500
SDU20G2405D	24	9-36	40	±5	±2000	0	87	2000
SDU20G2412D	24	9-36	40	±12	±833	0	90	800
SDU20G2415D	24	9-36	40	±15	±667	0	90	600
SDU20G2424D	24	9-36	40	±24	±417	0	89	300
SDU20G4803	48	18-75	80	3.3	5000	0	88	10000
SDU20G4805	48	18-75	80	5	4000	0	90	10000
SDU20G4812	48	18-75	80	12	1667	0	91	1600
SDU20G4815	48	18-75	80	15	1333	0	91	1000
SDU20G4824	48	18-75	80	24	833	0	91	500
SDU20G4805D	48	18-75	80	±5	±2000	0	86	2000
SDU20G4812D	48	18-75	80	±12	±833	0	90	800
SDU20G4815D	48	18-75	80	±15	±667	0	90	600
SDU20G4824D	48	18-75	80	±24	±417	0	90	300

* Only typical models are listed. Other models may be available upon request.

* Input voltage exceed the Max. value may cause permanent damage.

* Add suffix "A" to the model numbers for "Ctrl" pin removed before delivery. E.g. SDU20G2405A

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Electrical characteristics

Unless otherwise indicated, specifications are measured at $T_A=25^{\circ}\text{C}$, nominal input voltage, full load after warm up.

Parameter	Condition	Min.	Type	Max.	Unit	Note
Input current Full load	$V_{IN, Nom} = 24V$	-	920	-	mA	
	$V_{IN, Nom} = 48V$		460			
Input current No load	$V_{IN, Nom} = 24V$	-	35	-	mA	
	$V_{IN, Nom} = 48V$		20			
Reflected ripple current		-	30	-	mA	
Input voltage surge 1 second max	$V_{IN, Nom} = 24V$	-0.7	-	50	Vdc	
	$V_{IN, Nom} = 48V$	-0.7		100		
Startup input voltage	$V_{IN, Nom} = 24V$	-	-	9	VDC	
	$V_{IN, Nom} = 48V$			18		
Input under voltage shutdown	$V_{IN, Nom} = 24V$	5.5	6.5	-	VDC	
	$V_{IN, Nom} = 48V$	12	15.5			
Startup time		-	10	-	mS	
Remote On/Off control “Ctrl” pin open or logic high [ON] “Ctrl” pin grounded or logic low [OFF]	Logic high	3.5	-	12	VDC	Positive Logic
	Logic low	0	-	1.2	VDC	
	Ctrl pin current	-	2	7	mA	
Output voltage accuracy	$I_{OUT}=0$ to 100%	-	± 1	± 3	%	
Line regulation Full load, $V_{IN} = V_{IN, Min}$ to $V_{IN, Max}$	Main output	-	± 0.2	± 0.5	%	
	Other output		± 0.5	± 1.0		
Load regulation $I_{OUT}=5\%$ to 100% of $I_{OUT, rated}$		-	± 0.5	± 1.0	%	

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Output ripple and noise 20MHz bandwidth	Single Out Dual Out	-	50 100	100 200	mVp-p	
Cross regulation $I_{OUT, main}=50\%$ of $I_{OUT, rated}$, $I_{OUT, other}=10\%$ to 100% of $I_{OUT, rated}$	Dual output	-	-	± 5	%	
Temperature coefficient	Full load	-	-	± 0.03	%/°C	
Dynamic load response $I_{OUT}=25\%\sim 50\%\sim 75\%$ of $I_{OUT, rated}$	Peak deviation** Peak deviation Recovery time	-	± 5 ± 3 300	± 8 ± 5 500	% V_{OUT} % V_{OUT} μS	** $V_{OUT}=3.3, 5, 6V$
Output voltage trim	Trim range	-	-	± 10	% V_{OUT}	
Output over voltage protection		110	-	160	% V_{OUT}	
Output over current protection		110	150	200	% I_{OUT}	
Output short circuit protection		Continuous, automatic recovery				
Input filter		PI filter				
Hot plug		None				

* Operating with less than 5% of rated load will not cause damage to the converters, but the performances data may not fall into the specifications, and stable operating is not assured.

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General Specifications

Parameters	Condition	Min.	Typ.	Max.	Unit	Notes
Isolation voltage 1 minute, leakage current 1mA max.	I/P to O/P	1500	-	-	VDC	
Isolation resistance Tested at 500VDC	I/P to O/P	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	I/P to O/P	-	2000	-	pF	
Switching frequency*	Full load	-	300	-	KHz	
Operating temperature	See “Derating Curve”	-40	-	+85	°C	
Storage temperature		-55	-	+125	°C	
Storage humidity	None condensing	5	-	95	%RH	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Vibration		IEC/EN61373 – Category 1, Grade B				
Cooling method		Free air convection				
Case material		Aluminum alloy				

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MTBF	MIL-HDBK-217F	>1,000,000 Hours, T _A =25°C
Design based on standards		UL/EN/IEC 62368-1
Safety certifications		EN/IEC 62368-1
EMC		CISPR32, EN55032 Class B with external circuit IEC/EN61000-4-2, 3, 4, 5, 6
Size, and Weight		25.4 x 25.4 x 12 mm, 21g

* Switching frequency is measured at full load. The converter reduces the switching frequency at low load (less than 50% load) for better efficiency.

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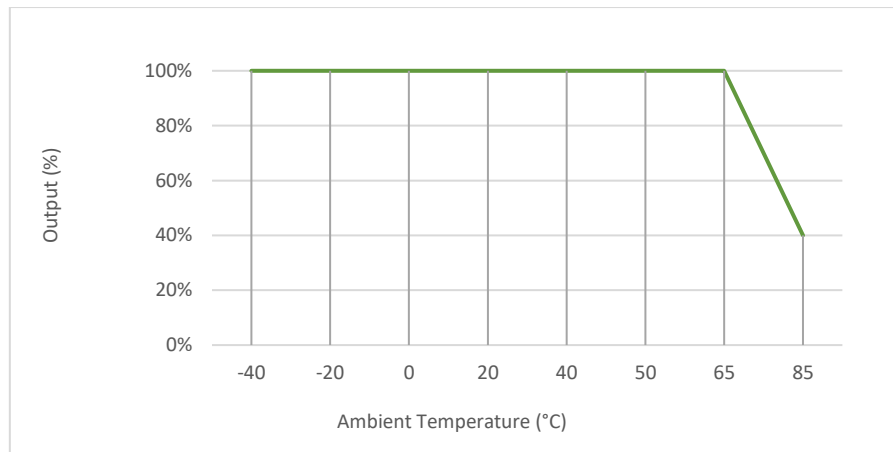
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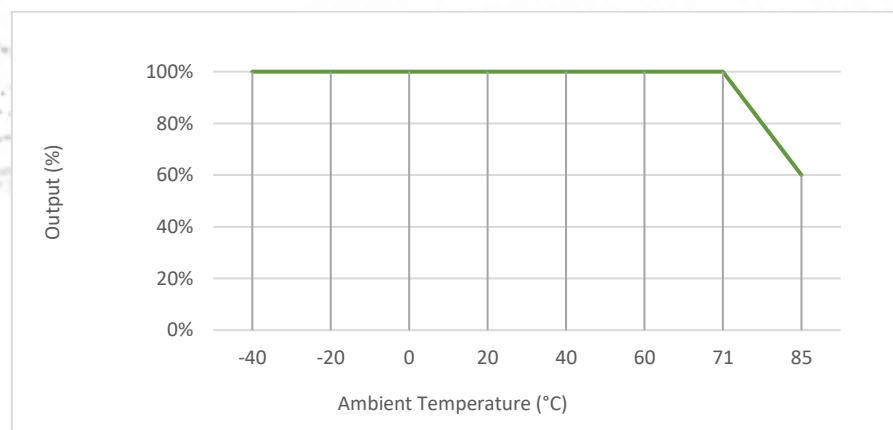
Characteristics Curves

Derating Curve

Output vs Ambient Temperature



$V_{OUT}=3.3 \dots 6V$, no heatsink



$V_{OUT}=12 \dots 24V$, no heatsink

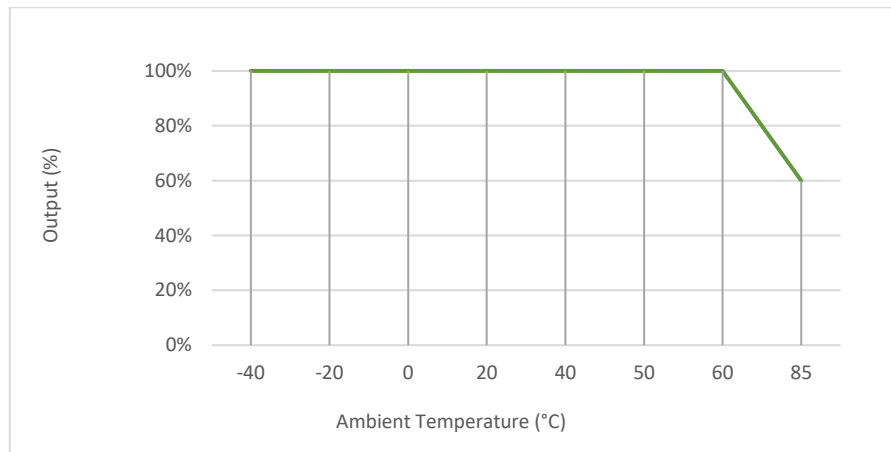
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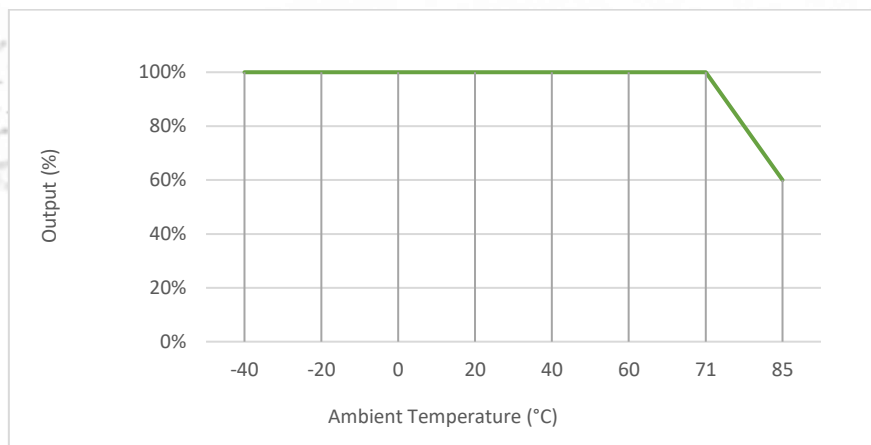


Efficiency Curve

Efficiency vs Input Voltage



$V_{OUT}=\pm 5V$, no heatsink



$V_{OUT}=\pm 12, \pm 15, \pm 24V$, no heatsink

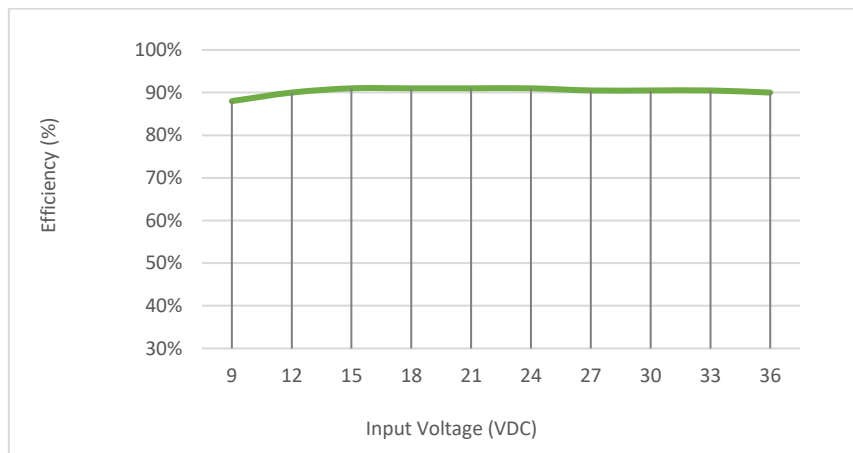
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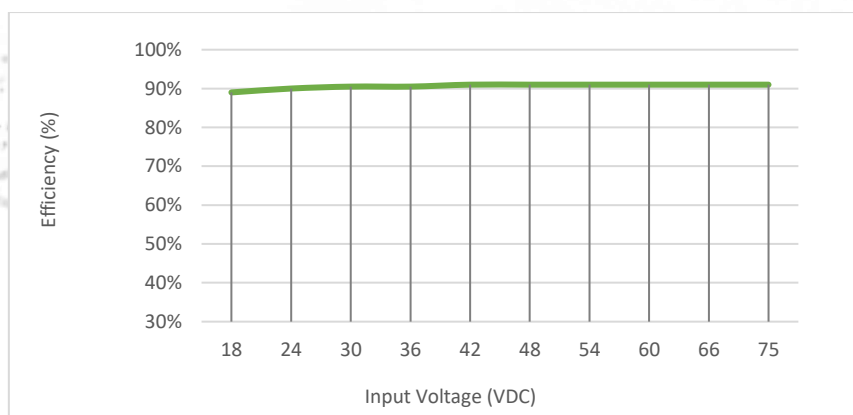


Efficiency Curve

Efficiency vs Input Voltage



SDU20G2405, with full Load

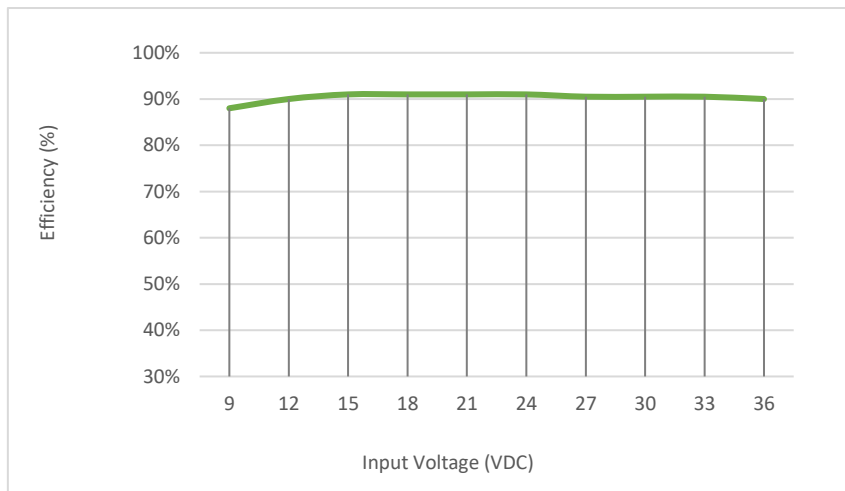


SDU20G4812, with full Load

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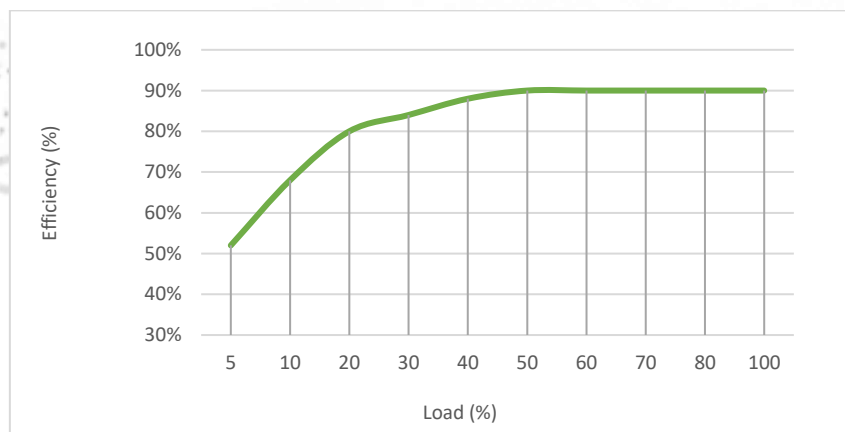
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SDU20G2405D, with full Load

Efficiency vs Load

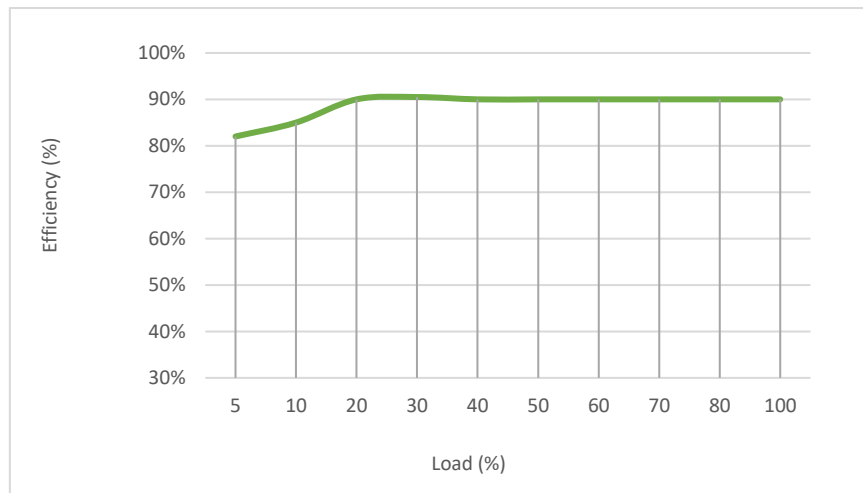


SDU20G2405, with nominal input voltage

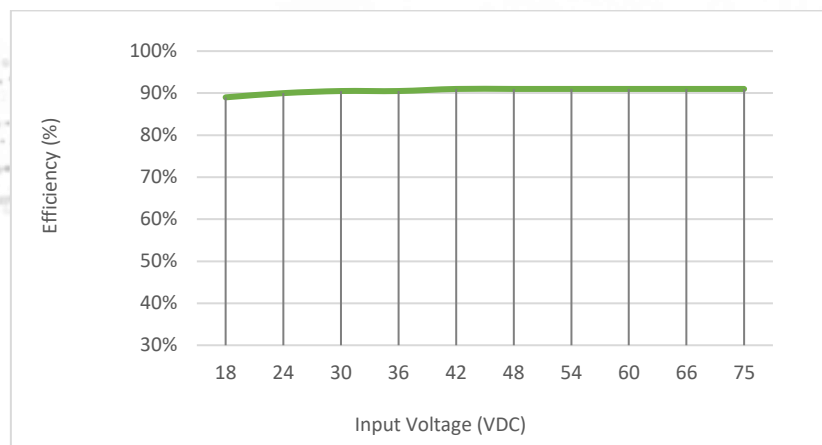
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SDU20G4812, with nominal input voltage



SDU20G2405D, with nominal input voltage

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Recommended External Circuit

Note

*Typical application circuit is to further lower the input and output ripple. It is not required for general use.

*Recommended component specifications are typical values. Excessive external capacitive load may cause startup problem.

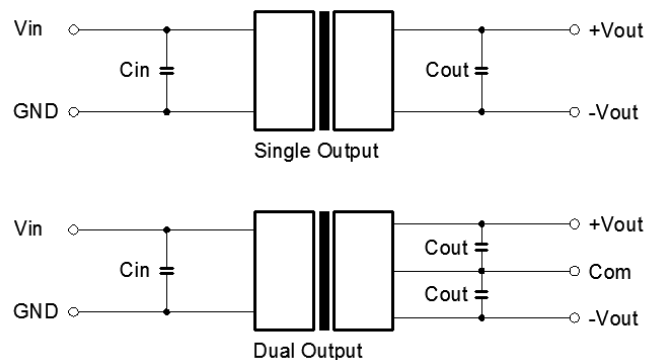


Figure 1: Typical External Circuit

Recommend component spec

Input voltage	24V	48V
C_{IN}	100uF, 50V	10...47uF, 100V
C_{OUT}	10uF	

Circuit for EMC Enhancement

*Use this application circuit to meet Class B EMC performance

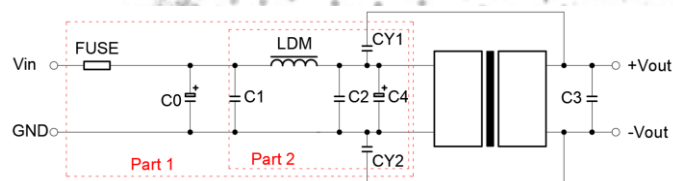


Figure 2. Circuit for EMC enhancement, Single output

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Recommended component spec

Component	LDM1	C0, C4	C1, C2	CY1, CY2
V_{IN}=24V	2.2uH, 4A	330uF, 50V	4.7uF, 50V	1nF, 2KV
V_{IN}=48V	2.2uH, 2A	330uF, 100V	4.7uF, 100V	1nF, 2KV

* Fuse to be selected according to application needs.

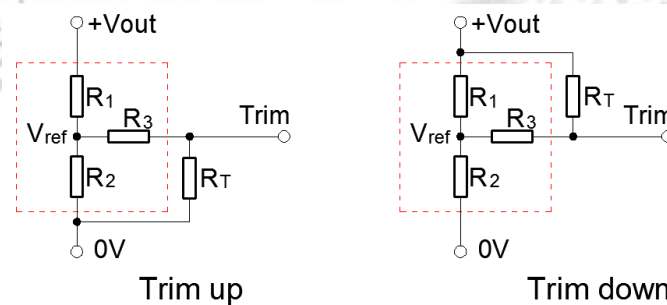
* C3 refer to C_{OUT} in Table 1

Circuits for Output Trim

* Components within the red block are internal components of the converter.

Internal Component Spec

V _{OUT} [V]	R1 [K Ohm]	R2 [K Ohm]	R3 [K Ohm]	V _{ref} [V]
3.3	10.0	6.064	13.622	1.25
5	2.4	2.344	13.622	2.5
12	8.2	2.153	17.346	2.5
15	12.0	2.388	21.016	2.5
24	10.0	1.158	10.714	2.5



* The formulas to calculate the desired resistance of Trim resistor "R_T".

$$\text{Trim up: } R_T = \frac{a R_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_{OUT} - V_{ref}} R_1$$

$$\text{Trim down: } R_T = \frac{a R_1}{R_1 - a} - R_3 \quad a = \frac{V_{OUT} - V_{ref}}{V_{ref}} R_2$$

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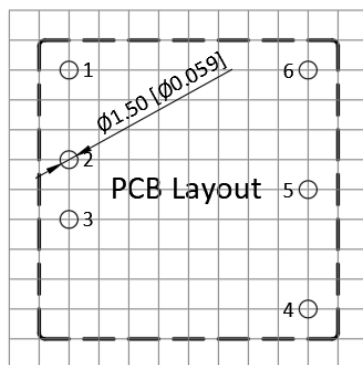
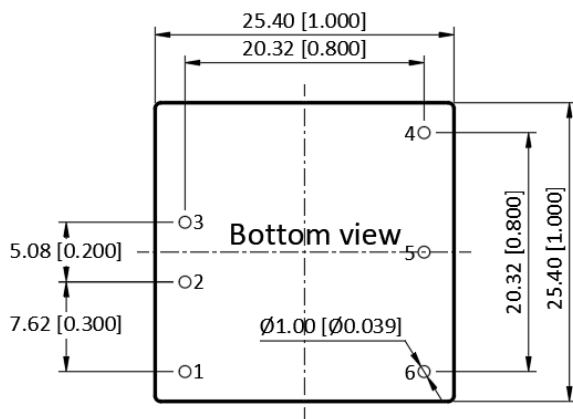
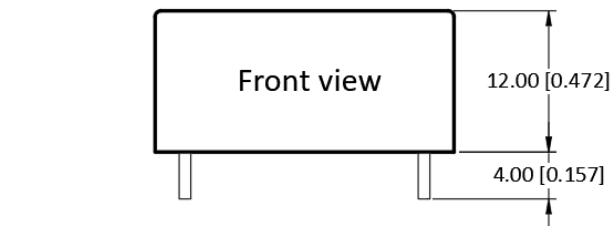
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Mechanical Specifications

No Suffix, Default Package

*Add suffix "A" to the model numbers for "Ctrl" pin removed before delivery. E.g. SDU20G2405



Pin Definition

Pin #	Single Out	Dual Out
1	Ctrl	Ctrl
2	GND	GND
3	V _{IN}	V _{IN}
4	+V _{OUT}	+V _{OUT}
5	Trim	0V
6	0V	-V _{OUT}

* Unless otherwise specified unit:
mm [inch]

* General tolerance: ± 0.50 [± 0.020]

* Pin thickness: ± 0.10 [± 0.004]

* Footprint grid 2.54 x 2.54 mm

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Ordering information

Ordering can be done via www.summit-electronics.com or via info@summit-electronics.com. Please contact us for more information. Customisation of the product is available on request.

Technical support

For all product questions please contact us via info@summit-electronics.com

Document revision

Rev	Date	Changes
2025v0.1	27-08-2025	First issue of document