

Single Output Module



Dual Output Module



Size: 0.76 x 0.39 x 0.49in
(19.5 x 9.8 x 12.50mm)



FEATURES

- Fixed Input Voltage
- Isolated and Unregulated Positive-Negative Dual and Single Outputs
- High Efficiency
- Reinforced Insulation
- Isolation Voltage: 4200VAC or 6000VDC
- Compact SIP Package
- Patient Leakage Current: Max 2µA
- Short Circuit Protection
- Internal Surface Mounted Design
- International Standard Pin-Out
- RoHS Compliant
- EN60601-1, ANSI/AAMI ES60601-1 Approval (1xMOPP/2xMOOP)
- IEC60950 Approval

DESCRIPTION

The DCSMU1 series of DC/DC converters offers 1 watt of output power in a compact SIP package. This series consists of isolated and unregulated single and dual output models with fixed input voltage. Each model features internal surface mounted design, reinforced insulation, and high efficiency. This series is also RoHS compliant and has EN60601-1, ANSI/AAMI ES60601-1 (1xMOPP/2xMOOP), and IEC60950 approvals.

MODEL SELECTION TABLE

Single Output Models

Model Number	Input Voltage		Output Voltage	Output Current		Max. Capacitive Load ⁽¹⁾	Typ. Efficiency @Full Load		Certification	Output Power
	Nominal	Range		Min.	Max.		Min.	Max.		
DCSMU1-03S03	3.3VDC	2.97-3.63VDC	5VDC	20mA	200mA	1000µF	67%	71%	-	1W
DCSMU1-05S05	5VDC	4.5-5.5VDC	3.3VDC	31mA	303mA	1000µF	69%	73%	UL/CE/CB	1W
DCSMU1-05S05			5VDC	20mA	200mA	1000µF	74%	78%		
DCSMU1-05S12			12VDC	9mA	84mA	470µF	72%	76%		
DCSMU1-05S15			15VDC	7mA	67mA	470µF	72%	76%		
DCSMU1-12S05	12VDC	10.8-13.2VDC	5VDC	20mA	200mA	1000µF	73%	77%	UL/CE/CB	1W
DCSMU1-12S12			12VDC	9mA	84mA	470µF	77%	81%		
DCSMU1-12S15			15VDC	7mA	67mA	470µF	77%	81%		
DCSMU1-24S05	24VDC	21.6-26.4VDC	5VDC	20mA	200mA	1000µF	72%	76%	UL/CE/CB	1W
DCSMU1-24S12			12VDC	9mA	84mA	470µF	74%	78%		
DCSMU1-24S15			15VDC	7mA	67mA	470µF	74%	78%		

MODEL SELECTION TABLE

Dual Output Models

Model Number	Input Voltage		Output Voltage	Output Current		Max. Capacitive Load ⁽¹⁾	Typ. Efficiency @Full Load		Certification	Output Power
	Nominal	Range		Min.	Max.		Min.	Max.		
DCSMU1-05D05	5VDC	4.5-5.5VDC	±5VDC	±10mA	±100mA	470µF	74%	78%	UL/CE	1W
DCSMU1-05D09			±9VDC	±6mA	±56mA	470µF	76%	80%		
DCSMU1-05D12			±12VDC	±5mA	±42mA	220µF	70%	74%		
DCSMU1-05D15			±15VDC	±4mA	±34mA	220µF	72%	76%		
DCSMU1-12D05	12VDC	10.8-13.2VDC	±5VDC	±10mA	±100mA	470µF	73%	77%	UL/CE	1W
DCSMU1-12D09			±9VDC	±6mA	±56mA	470µF	76%	80%		
DCSMU1-12D12			±12VDC	±5mA	±42mA	220µF	69%	73%		
DCSMU1-12D15	15VDC	13.5-16.5VDC	±15VDC	±4mA	±34mA	220µF	71%	75%	UL	1W
DCSMU1-15D15			±15VDC	±4mA	±34mA	220µF	68%	72%		
DCSMU1-24D05	24VDC	21.6-26.4VDC	±5VDC	±10mA	±100mA	470µF	71%	75%	UL/CE/CB	1W
DCSMU1-24D09			±9VDC	±6mA	±56mA	470µF	75%	79%		
DCSMU1-24D12			±12VDC	±5mA	±42mA	220µF	72%	76%		
DCSMU1-24D15			±15VDC	±4mA	±34mA	220µF	72%	76%		

SPECIFICATIONS

All specifications are based on 25°C, Humidity <75%RH, Nominal Input Voltage, and Rated Output 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			See Table			
Input Current	No Load	3.3V Input		45	70	mA
		5V Input		35	60	
		12V Input		15	40	
		15V Input		18	40	
		24V Input		10	25	
	Full Load	3.3V Input		426		mA
		5V Input		274		
		12V Input		114		
		15V Input		93		
		24V Input		56		
Surge Voltage (1 Sec. Max.)	3.3V Input		-0.7		7	
	5V Input		-0.7		9	
	12V Input		-0.7		18	
	15V Input		-0.7		21	
	24V Input		-0.7		30	
Input Filter			Capacitor Filter			
Reflected Ripple Current ⁽²⁾	Module On			0.2		A
Hot Plug			Unavailable			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy			See Tolerance Envelope Curve			
Linear Regulation	Input Voltage Range: ±1%	3.3V Output			±1.5	%
		Others			±1.2	
Load Regulation	10-100% Load	3.3V/5V Output			20	%
		Others			15	
Max. Capacitive Load			See Table			
Output Current			See Table			
Ripple & Noise ⁽³⁾	20MHz Bandwidth	3.3V Output		80	150	mVp-p
		Others		70	120	
Temperature Coefficient	100% Full Load			±0.02		%/°C
PROTECTION						
Short Circuit Protection ⁽⁴⁾					3	S
ENVIRONMENTAL SPECIFICATIONS						
Operating Temperature	See Derating Curves		-40		85	°C
Storage Temperature			-55		125	°C
Casing Temperature Rise	Ta=25°C			25		°C
Storage Humidity	Non-Condensing				95	%RH
MTBF	MIL-HDBK-217F@25°C		3500			k hours
GENERAL SPECIFICATIONS						
Efficiency	@Full Load			See Table		
Switching Frequency	100% Load, Nominal Input Voltage			100		kHz
Insulation Voltage	Input-Output, with test time of 1 minute		4200			VAC
			6000			VDC
Patient Leakage Current ⁽⁵⁾	250VAC, 50/60Hz				2	µA
Insulation Resistance	Input-Output, Isolation Voltage 500VDC		1000			MΩ
Isolation Capacitance	Input-Output, 100KHz/0.1V			5		pF
Transformer Creepage			5			mm
Transformer Clearance			5			mm
PCB Creepage & Clearance			5.5			mm
PHYSICAL SPECIFICATIONS						
Weight			0.15oz (4.2g)			
Dimensions (L x W x H)			0.76 x 0.39 x 0.49in (19.5 x 9.8 x 12.50mm)			
Case Material			Black Flame-Retardant and Heat-Resistant Plastic (UL94-V0)			
Cooling Method			Free Air Convection			
SAFETY CHARACTERISTICS						
Safety Approval			EN60601-1, ANSI/AAMI ES60601-1 Approval (1xMOPP/2xMOOP), IEC60950			
Emissions	CE	EN60601-1-2/CISPR 11 Group 1			Class B ⁽⁷⁾	
	RE	EN60601-1-2/CISPR 11 Group 1			Class B ⁽⁷⁾	
Immunity	ESD	EN60601-1-2(IEC/EN61000-4-2)	Contact ±8kV	Perf. Criteria B		

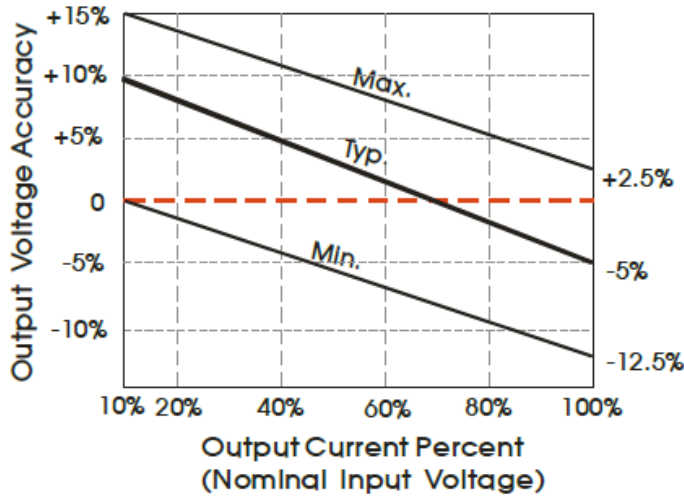
NOTES

1. Capacitive loads of positive and negative outputs are identical.
2. Contact factory for more information about reflected ripple current testing method.
3. Ripple and noise tested with 'parallel cable' method. Contact factory for specific operation methods.
4. Supply voltage must be discontinued at the end of short circuit duration which is less than 3s.
5. Patient leakage current and reinforced insulation is based on a 250VAC, 50/60Hz system input voltage.
6. The UL certification (ANSI/AAMI ES60601-1) of this series is approved, series meets 1xMOPP/2xMOOP when system input voltage is with 250VAC, 50/60Hz.
7. See 'EMC Typical Recommended Circuit' for recommended circuit.
8. If product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet.
9. Maximum capacitive load offered was tested at input voltage range and full load.
10. Products should be classified according to ISO14001 and related environmental laws and regulations and should be handled by qualified units.
11. Product customization is available. Contact factory for more information.

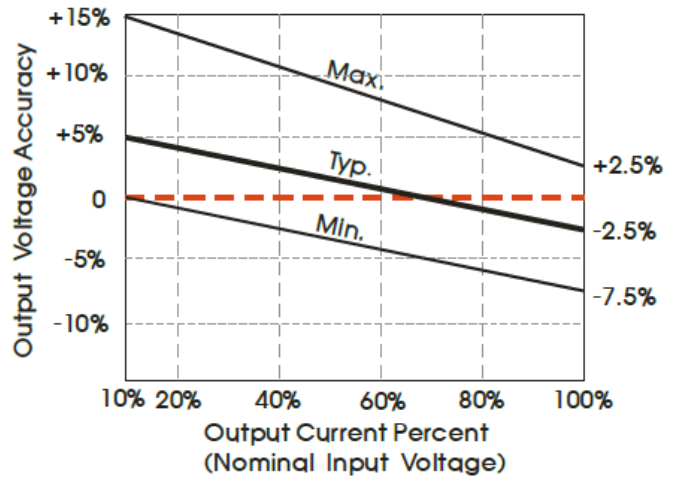
**Due to advances in technology, specifications subject to change without notice.*

CHARACTERISTIC CURVES

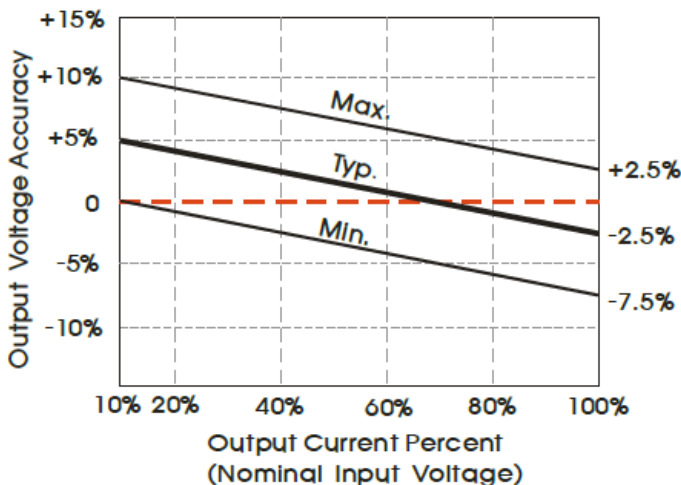
Tolerance Envelope Curve 3.3VDC Output



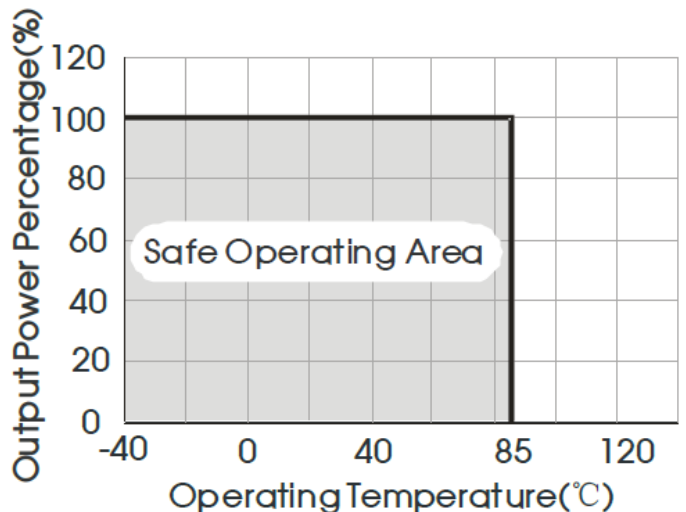
Tolerance Envelope Curve 5VDC Output



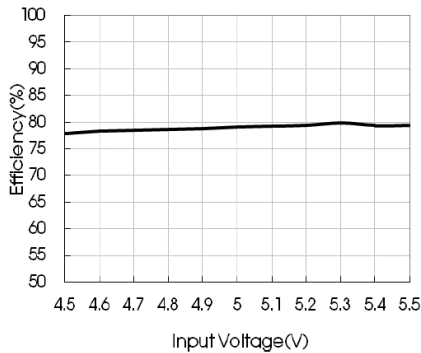
Tolerance Envelope Curve Other Outputs



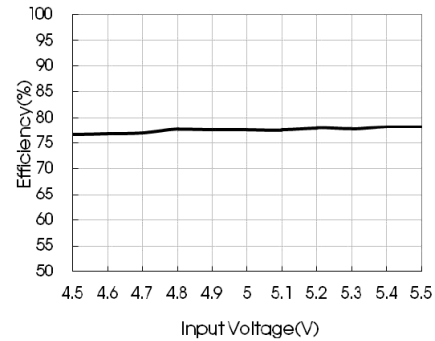
Temperature Curve



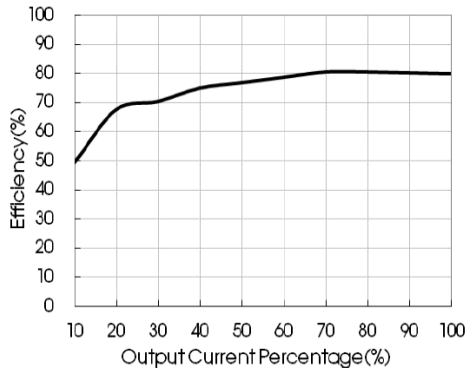
Efficiency vs Input Voltage (Full Load) DCSMU1-05S05



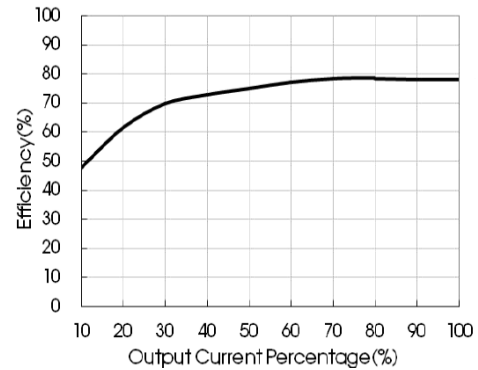
Efficiency vs Input Voltage (Full Load) DCSMU1-05D05



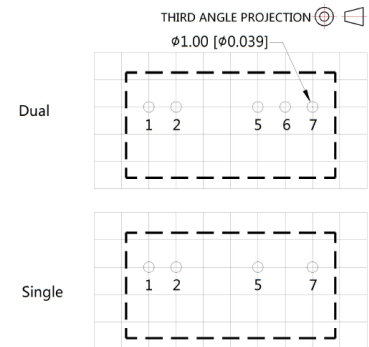
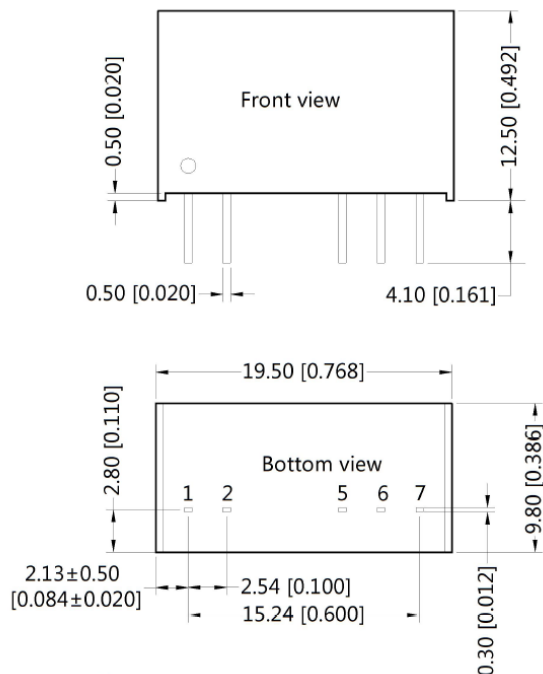
Efficiency vs Output Voltage (Vin=Vin-nominal) DCSMU1-05S05



Efficiency vs Output Load (Vin=Vin-nominal) DCSMU1-05D05



MECHANICAL DRAWINGS



Note: Grid 2.54*2.54mm
Pin Out

Pin	Single	Dual
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+Vo	+Vo

Note:
 Unit: mm [inch]
 Pin Section Tolerances: ±0.10 [±0.004]
 General Tolerances: ±0.25 [±0.010]

DESIGN REFERENCE

1. Typical Application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig. 1. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure models are running well, recommended capacitor load values as shown in Table 1.

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (see Fig. 2).

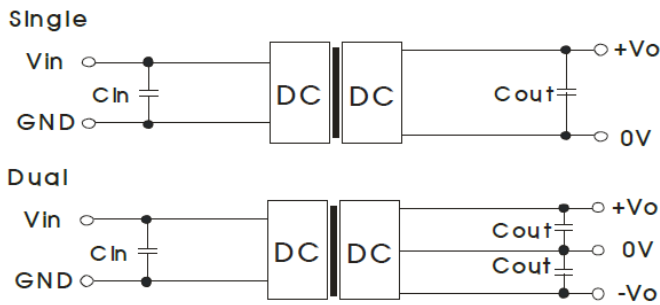


Fig. 1

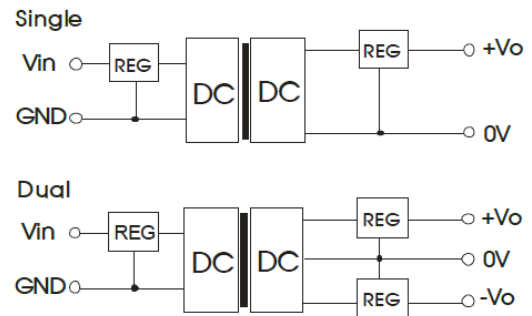


Fig. 2

.Recommended Capacitive Load Value Table (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
3.3/5	10	3.3/5	10	±5	4.7
12/15	4.7	12	2.2	±9	2.2
24	2.2	15	1	±12/±15	1

2. EMC Typical Recommended Circuit (CLASS B)

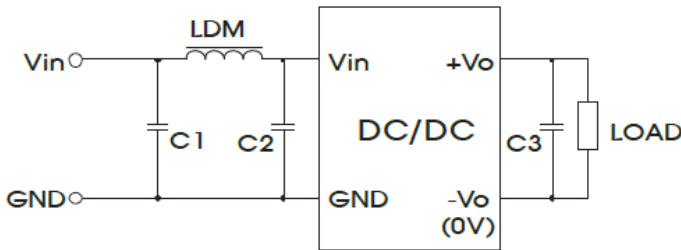


Fig. 3

Recommended Typical Circuit Parameters

Input Voltage (V)		3.3/5/12/15/24
EMI	C1,C2	4.7μF/50V
	C3	Refer to Cout in Fig. 1
	LDM	6.8μH

4. Output Load Requirements

In order to ensure the converter can work reliably with high efficiency, the minimum load should not be less than 10% rated load when it is used. If the needed power is indeed small, use parallel resistor on the output side (the sum of the efficient power and resistor consumption power is not less than 10%.

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: 2015 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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