

Single Output Module



Dual Output Module



Size: 0.77 x 0.39 x 0.49in
(19.5 x 9.8 x 12.50mm)



FEATURES

- Fixed Input Voltage
- Unregulated Dual and Single Outputs
- High Efficiency
- Reinforced Insulation
- I/O Isolation Test Voltage: 4.2kVAC or 6kVDC
- Compact SIP Package
- Patient Leakage Current: Max 2µA
- Short Circuit Protection
- Internal Surface Mounted Design
- Industry Standard Pin-Out
- RoHS Compliant
- EN60601-1, ANSI/AAMI ES60601-1 Approval (1xMOPP/2xMOOP)

DESCRIPTION

The DCSMU2 series of DC/DC converters offers 2 watt of output power in a compact SIP package. This series consists of 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) 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.	Typ..		
DCSMU2-05S05	5VDC	4.5-5.5VDC	5VDC	40mA	400mA	1000µF	73%	77%	UL/CE	2W
DCSMU2-05S12			12VDC	17mA	167mA	470µF	75%	79%		
DCSMU2-05S15			15VDC	14mA	133mA	470µF	75%	79%		
DCSMU2-12S05	12VDC	10.8-13.2VDC	5VDC	40mA	400mA	1000µF	72%	76%	UL/CE	2W
DCSMU2-12S12			12VDC	17mA	167mA	470µF	75%	79%		
DCSMU2-12S15			15VDC	14mA	133mA	470µF	77%	81%		
DCSMU2-15S05	15VDC	13.5-16.5VDC	5VDC	40mA	400mA	1000µF	73%	77%	UL	2W
DCSMU2-15S15			15VDC	14mA	133mA	470µF	78%	82%		
DCSMU2-24S05	24VDC	21.6-26.4VDC	5VDC	40mA	400mA	1000µF	75%	79%	UL/CE	2W
DCSMU2-24S12			12VDC	17mA	167mA	470µF	78%	82%		
DCSMU2-24S15			15VDC	14mA	133mA	470µF	80%	84%		

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.		
DCSMU2-05D05	5VDC	4.5-5.5VDC	±5VDC	±20mA	±200mA	470µF	74%	78%	UL/CE	2W
DCSMU2-05D09			±9VDC	±12mA	±111mA	470µF	74%	78%		
DCSMU2-05D12			±12VDC	±9mA	±83mA	220µF	74%	78%		
DCSMU2-05D15			±15VDC	±7mA	±67mA	220µF	76%	80%		
DCSMU2-12D05	12VDC	10.8-13.2VDC	±5VDC	±20mA	±200mA	470µF	70%	74%	UL/CE	2W
DCSMU2-12D09			±9VDC	±12mA	±111mA	470µF	76%	80%		
DCSMU2-12D12			±12VDC	±9mA	±83mA	220µF	76%	80%		
DCSMU2-12D15			±15VDC	±7mA	±67mA	220µF	73%	77%		
DCSMU2-15D05	15VDC	13.5-16.5VDC	±5VDC	±20mA	±200mA	470µF	73%	77%	-	2W
DCSMU2-15D09			±9VDC	±12mA	±111mA	470µF	76%	80%		
DCSMU2-15D15			±15VDC	±7mA	±67mA	220µF	69%	73%		
DCSMU2-24D05	24VDC	21.6-26.4VDC	±5VDC	±20mA	±200mA	470µF	75%	79%	UL/CE	2W
DCSMU2-24D09			±9VDC	±12mA	±111mA	470µF	77%	81%		
DCSMU2-24D12			±12VDC	±9mA	±83mA	220µF	78%	82%		
DCSMU2-24D15			±15VDC	±7mA	±67mA	220µF	77%	81%		

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	5V Input		35	80	mA
		12V Input		15	40	
		15V Input		18	40	
		24V Input		10	25	
	Full Load	5V Input		520		mA
		12V Input		217		
15V Input			171			
Surge Voltage (1 Sec. Max.)	5V Input	-0.7		9	VDC	
	12V Input	-0.7		18		
	15V Input	-0.7		21		
	24V Input	-0.7		30		
Input Filter		Capacitance Filter				
Reflected Ripple Current ⁽²⁾	Module On		0.2		A	
Hot Plug		Unavailable				
OUTPUT SPECIFICATIONS						
Output Voltage		See Table				
Voltage Accuracy ⁽³⁾		See Typical Characteristic Curves				
Linear Regulation	Input Voltage Change: ±1%			±1.2	%	
Load Regulation	10-100% Load	5VDC Output		20	%	
		9VDC Output		15		
		12VDC Output		15		
		15VDC Output		15		
Max. Capacitive Load		See Table				
Output Current		See Table				
Ripple & Noise ⁽⁴⁾	20MHz Bandwidth		100	150	mVp-p	
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	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds.			300	°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	
Isolation	Input-Output, Electric strength test for 1 minute	4200			VAC	
		6000			VDC	
Patient Leakage Current ⁽⁶⁾	250VAC, 50/60Hz			2	µA	
Insulation Resistance	Input-Output resistance 500VDC	1000			MΩ	
Isolation Capacitance	Input-Output capacitance at 100KHz/0.1V		5		pF	
Transformer Creepage & Clearance Distance		5			mm	
PCB Creepage & Clearance Distance		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 Plastic, Flame-Retardant and Heat-Resistant (UL94-V0)				
Cooling Method		Free Air Convection				
SAFETY CHARACTERISTICS						
Safety Approval		EN60601-1, ANSI/AAMI ES60601-1 Approval (1xMOPP/2xMOOP)				
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	EN60061-1-2(IEC/EN61000-4-2)	Contact ±8kV	Performance Criteria B		

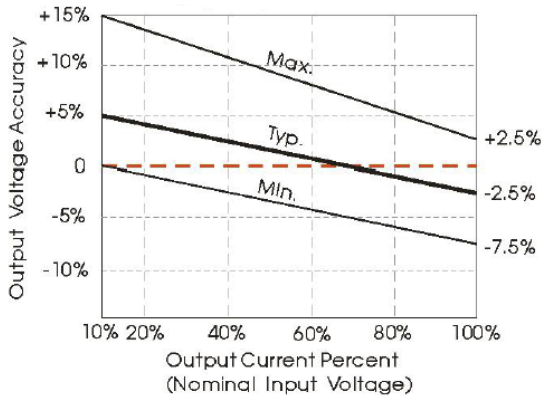
NOTES

1. The specified capacitive load value for positive and negative outputs are identical.
2. Contact factory for more information about reflected ripple current testing method.
3. Output voltage accuracy of DCSMU2-15D15 with 10% load, min. -5%
4. Ripple and noise tested with 'parallel cable' method. Contact factory for more information.
5. At the end of the short circuit duration, the supply voltage must be disconnected from the modules.
6. Patient leakage current and reinforced insulation is based on a 250VAC, 50/60Hz system input voltage.
7. 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.
8. See 'EMC (Class B) Compliance Circuit' for recommended circuit.
9. In order to guarantee product performance and data sheet compliance, product must be operated within specifications and load range requirement.
10. Maximum capacitive load offered was tested at input voltage range and full load.
11. Product customization is available. Contact factory for more information.
12. Products should be classified according to ISO14001 and related environmental laws and regulations and should be handled by qualified units.

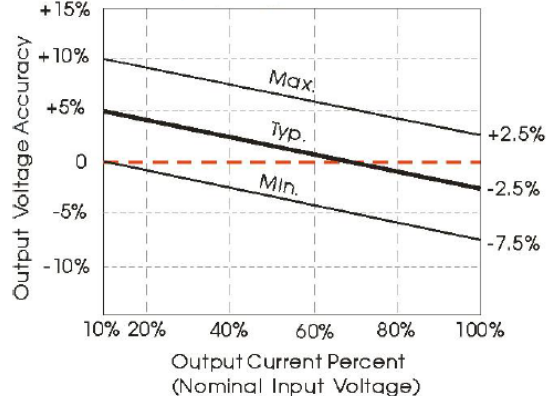
**Due to advances in technology, specifications subject to change without notice.*

CHARACTERISTIC CURVES

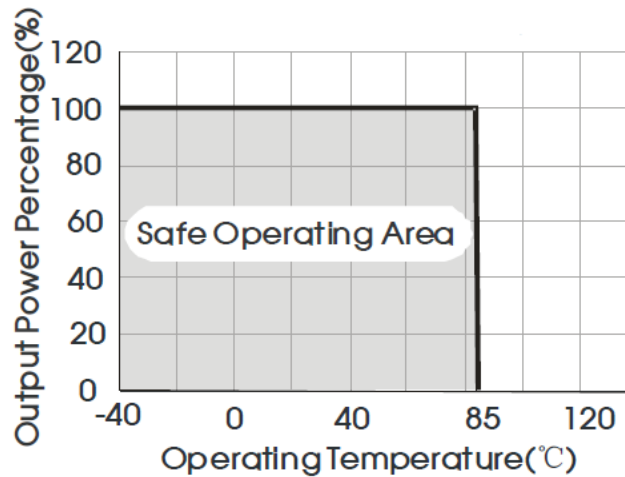
Output Regulation Curve 5VDC Output



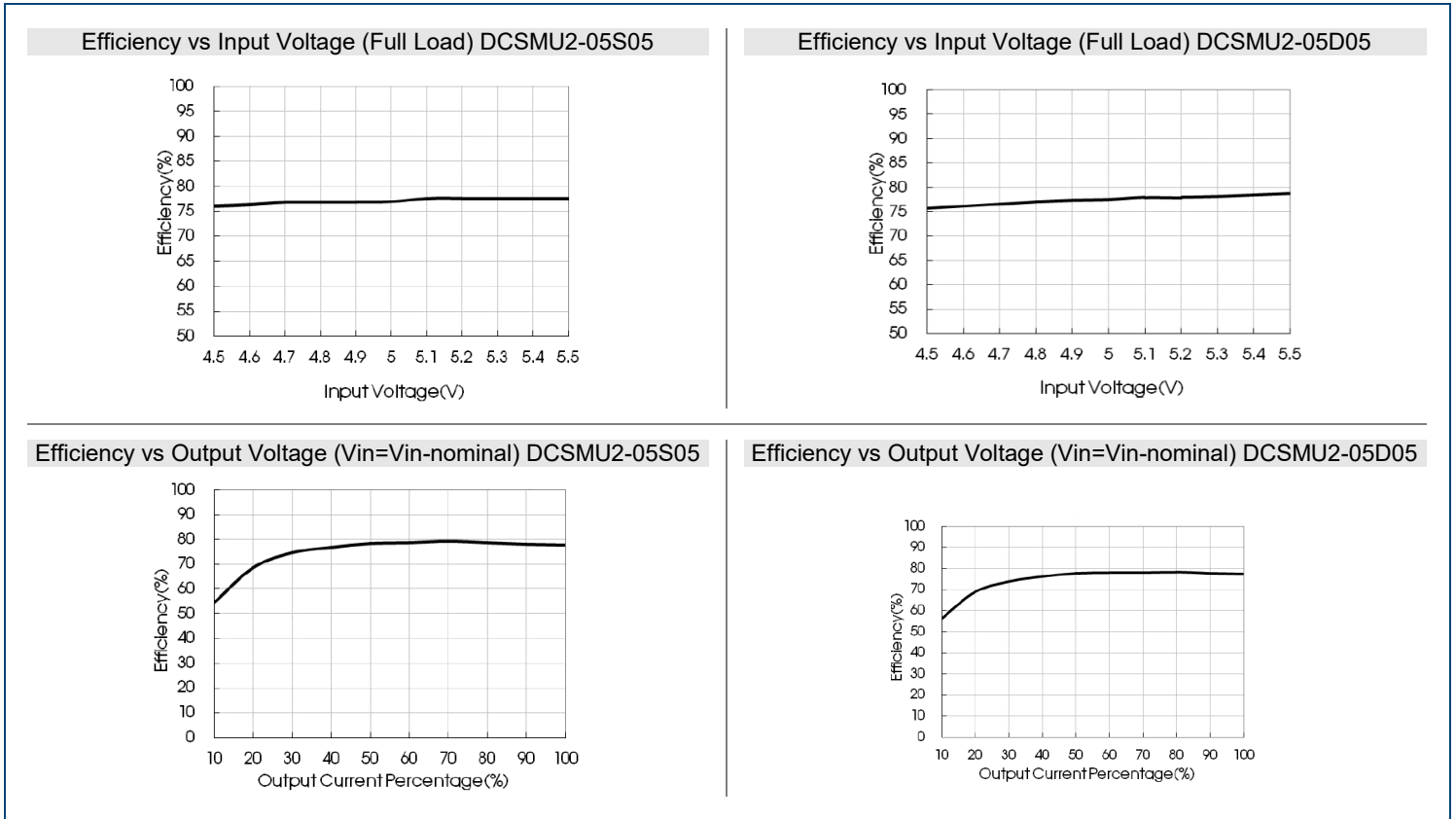
Output Regulation Curve Other Outputs



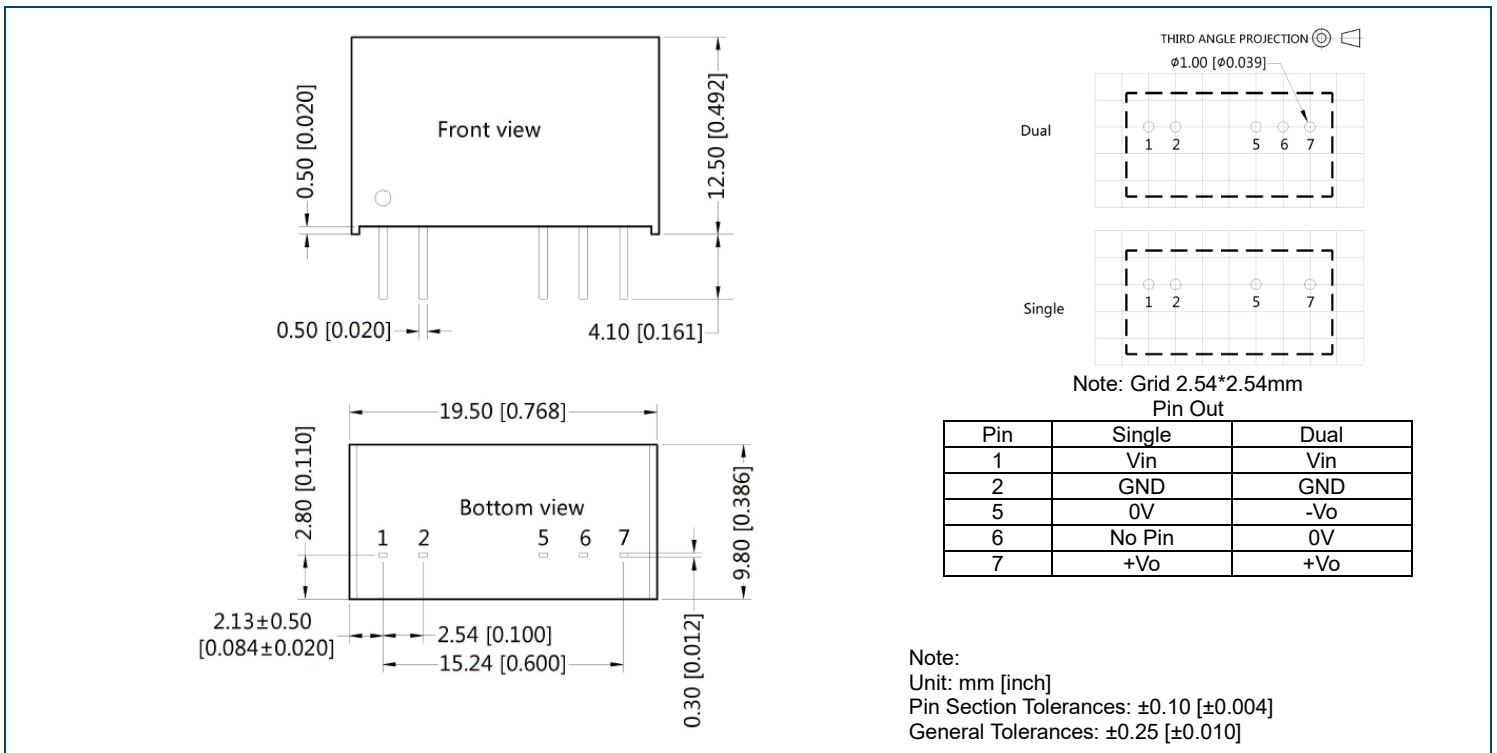
Temperature Curve



EFFICIENCY CURVES



MECHANICAL DRAWINGS



DESIGN REFERENCE

1. Typical Application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 1.

Choosing suitable filter capacitor values is very important for a smooth operation of modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values, refer to Table 1.

For a tight output voltage regulation, including overvoltage, overcurrent and over temperature protection, we recommended the use of a linear regulator that is connected in series to the input and/or output terminals as shown in Fig. 2.

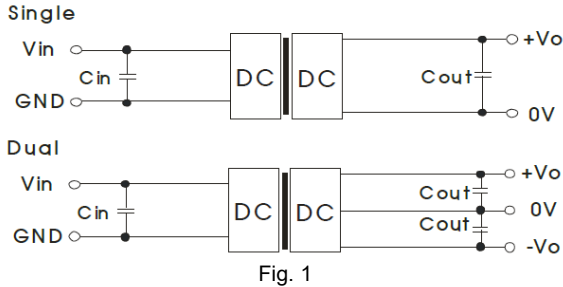


Fig. 1

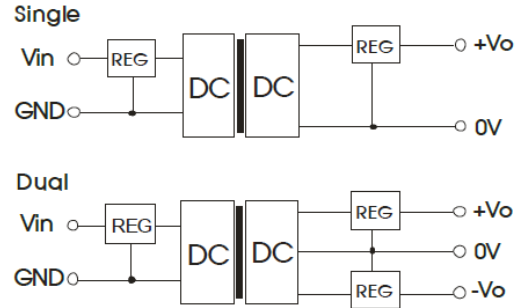


Fig. 2

Recommended Input and Output Capacitor Values (Table 1)

Vin (VDC)	Cin (μF)	Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
5	10	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 (CLASS B) Compliance Circuit

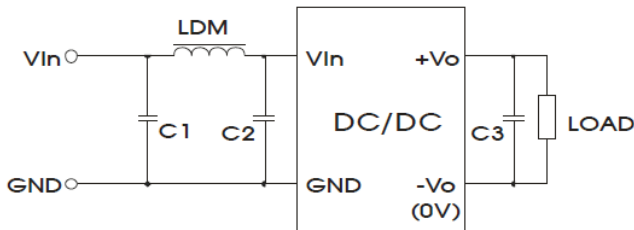


Fig. 3

Recommended EMC Filter Values (Table 2)

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

Note: C1 and C2 of DCSMU2-15D15 is 10μF/25V, LDM of DCSMU2-15D15 is 22μH.

4. Output Load Requirements

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

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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