

Size:
0.86 x 0.37 x 0.44 inches
21.8 x 9.3 x 11.2 mm

FEATURES

- RoHS Compliant
- 2 Watts Output Power
- Remote On/Off Control
- 1500VDC I/O Isolation
- High Efficiency up to 82%
- High Power Density in SIP-8 Package
- Small Footprint: 0.86” x 0.37”
- Fully Regulated Single & Dual Outputs
- Ultra Wide 4:1 Input Voltage Ranges
- -40°C to +90°C Operating Temperature Range
- Short Circuit Protection
- CSA/UL/IEC/EN 60950-1 Safety Approvals (Pending)

DESCRIPTION

The DCMCU2 series of DC/DC power converters consists of fully regulated single and dual output models with 4:1 ultra wide input voltage ranges of 4.5-18 VDC, 9-36 VDC, and 18-75 VDC. These converters provide 2 Watts of output power in a very small SIP-8 package occupying only 0.32 square inches on the PCB. An excellent efficiency allows an operating temperature range up to +75°C at full load without derating. Further features include 1500VDC I/O isolation, remote on/off control, and short circuit protection. These converters are RoHS compliant and have CSA/UL/IEC/EN 60950-1 safety approvals. These converters’ very compact dimensions make them an ideal solution for many space critical applications in battery powered instrumentations.

MODEL SELECTION TABLE

SINGLE OUTPUT MODELS

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Ripple & Noise	Output Power	Efficiency	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
DCMCU2-12S33	12 VDC (4.5 - 18 VDC)	3.3 VDC	0mA	500mA	60mA	183mA	50mVp-p	1W	75%	1000µF
DCMCU2-12S05		5 VDC	0mA	400mA		208mA	50mVp-p	1W	80%	1000µF
DCMCU2-12S12		12 VDC	0mA	167mA		204mA	50mVp-p	1W	82%	170µF
DCMCU2-12S15		15 VDC	0mA	134mA		204mA	50mVp-p	1W	82%	110µF
DCMCU2-24S33	24 VDC (9 - 36 VDC)	3.3 VDC	0mA	500mA	30mA	92mA	50mVp-p	1W	75%	1000µF
DCMCU2-24S05		5 VDC	0mA	400mA		104mA	50mVp-p	1W	80%	1000µF
DCMCU2-24S12		12 VDC	0mA	167mA		102mA	50mVp-p	1W	82%	170µF
DCMCU2-24S15		15 VDC	0mA	134mA		102mA	50mVp-p	1W	82%	110µF
DCMCU2-48S33	48 VDC (18 - 75 VDC)	3.3 VDC	0mA	500mA	20nA	46mA	50mVp-p	1W	74%	1000µF
DCMCU2-48S05		5 VDC	0mA	400mA		52mA	50mVp-p	1W	80%	1000µF
DCMCU2-48S12		12 VDC	0mA	167mA		51mA	50mVp-p	1W	82%	170µF
DCMCU2-48S15		15 VDC	0mA	134mA		51mA	50mVp-p	1W	82%	110µF

DUAL OUTPUT MODELS

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Ripple & Noise	Output Power	Efficiency	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
DCMCU2-12D05	12 VDC (4.5 - 18 VDC)	±5 VDC	0mA	±200mA	60mA	208mA	50mVp-p	1W	80%	±470µF
DCMCU2-12D12		±12 VDC	0mA	±83mA		202mA	50mVp-p	1W	82%	±100µF
DCMCU2-12D15		±15 VDC	0mA	±67mA		204mA	50mVp-p	1W	82%	±47µF
DCMCU2-24D05	24 VDC (9 - 36 VDC)	±5 VDC	0mA	±200mA	30mA	104mA	50mVp-p	1W	80%	±470µF
DCMCU2-24D12		±12 VDC	0mA	±83mA		101mA	50mVp-p	1W	82%	±100µF
DCMCU2-24D15		±15 VDC	0mA	±67mA		102mA	50mVp-p	1W	82%	±47µF
DCMCU2-48D05	48 VDC (18 - 75 VDC)	±5 VDC	0mA	±200mA	20mA	52mA	50mVp-p	1W	80%	±470µF
DCMCU2-48D12		±12 VDC	0mA	±83mA		51mA	50mVp-p	1W	82%	±100µF
DCMCU2-48D15		±15 VDC	0mA	±67mA		51mA	50mVp-p	1W	82%	±47µF

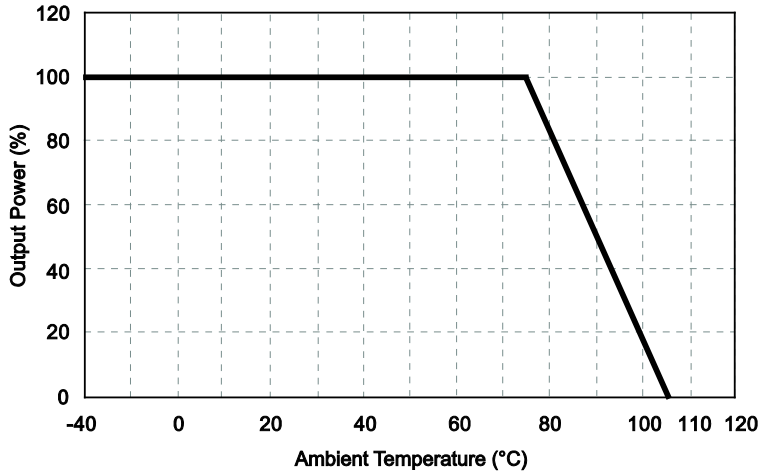
SPECIFICATIONS: DCMCU2 SERIES

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

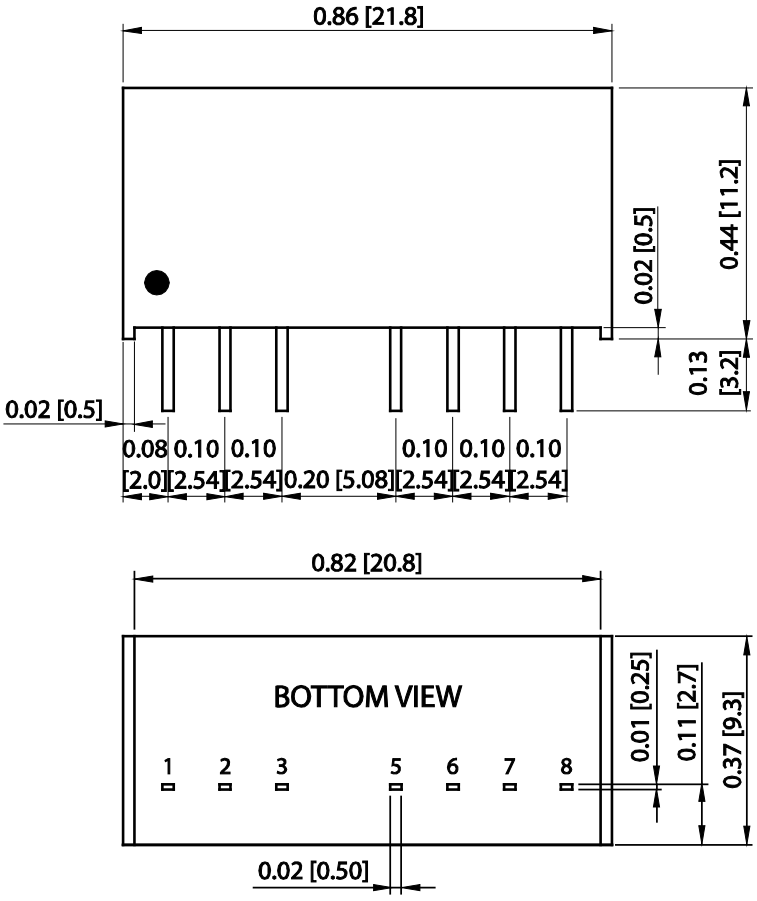
SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
INPUT SPECIFICATIONS					
Input Voltage Range	12VDC nominal input models	4.5	12	18	VDC
	24VDC nominal input models	9	24	36	
	48VDC nominal input models	18	48	75	
Input Surge Voltage (1 sec. max.)	12VDC nominal input models	-0.7		25	VDC
	24VDC nominal input models	-0.7		50	
	48VDC nominal input models	-0.7		100	
Start-up Threshold Voltage	12VDC nominal input models	3	4	4.5	VDC
	24VDC nominal input models	4.5	6	9	
	48VDC nominal input models	8.5	12	18	
Input Current		See Table			
Under Voltage Shutdown	12VDC nominal input models			4	VDC
	24VDC nominal input models			8	
	48VDC nominal input models			16	
Short Circuit Input Power				1500	mW
Input Fuse	12VDC nominal input models	1000mA slow-blow type			
	24VDC nominal input models	500mA slow-blow type			
	48VDC nominal input models	250mA slow-blow type			
Internal Filter Type	All models	Capacitor type			
OUTPUT SPECIFICATIONS					
Output Voltage		See Table			
Output Voltage Setting Accuracy	At 50% load and nominal Vin			±2.0	%Vnom.
Output Voltage Balance	Dual output, balanced loads		±1.0	±2.0	%
Line Regulation	Low line to high line		±0.3	±0.5	%
Load Regulation	No load to full load		±0.5	±1.0	%
Minimum Load		No minimum load requirements			
Output Power				2	W
Output Current		See Table			
Ripple & Noise	20MHz bandwidth		50	100	mVp-p
Transient Recovery Time	25% load step change		300	500	µs
Transient Response Deviation	25% load step change		±3	±5	%
Temperature Coefficient			±0.01	±0.02	%/°C
PROTECTION					
Short Circuit Protection		Continuous			
REMOTE ON/OFF CONTROL					
Converter On		Open or high impedance			
Converter Off		2~4mA current applied via 1KΩ resistor			
Standby Input Current	Supply off and nominal Vin		2.5		mA
GENERAL					
Efficiency		See Table			
Switching Frequency			300		KHz
Isolation Voltage (Input to Output)	60 seconds	1500			VDC
Isolation Resistance	500VDC	1000			MΩ
Isolation Capacitance	100kHz, 1V		250	500	pF
Maximum Capacitive Load		See Table			
ENVIRONMENTAL SPECIFICATIONS					
Operating Temperature Range	Natural convection	-40		+90	°C
Case Temperature				+105	°C
Storage Temperature		-55		+125	°C
Humidity	Non-condensing			95	% RH
Cooling		natural convection			
Lead Temperature	1.5mm from case for 10 seconds			260	°C
MTBF (calculated)	MIL-HDBK-217F at 25°C, Ground Benign	1,000,000			hours
PHYSICAL SPECIFICATIONS					
Weight		0.16oz (4.66g)			
Dimensions (L x W x H)		0.86 x 0.37 x 0.44 inch (21.8 x 9.3 x 11.2 mm)			
Case Material	Flammability to UL 94V-0 rated	Non-conductive black plastic			
Pin Material		Alloy 42			
SAFETY & EMC					
Safety Approvals (pending)	UL/cUL 60950-1 recognition (CSA certificate), IEC/EN 60950-1 (CB-scheme)				

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

DERATING CURVE



MECHANICAL DRAWING



PIN CONNECTIONS		
PIN	SINGLE OUTPUT	DUAL OUTPUT
1	-Vin	-Vin
2	+Vin	+Vin
3	Remote On/Off	Remote On/Off
5	No Connection	No Connection
6	+Vout	+Vout
7	-Vout	Common
8	No Connection	-Vout

Notes:

1. Unit: inches [mm]
2. Tolerance: X.XX±0.02 [X.X±0.5]
   X.XXX±0.01 [X.XX±0.25]
3. Pin Tolerance: ±0.004 [±0.1]
4. All dimensions are for reference only

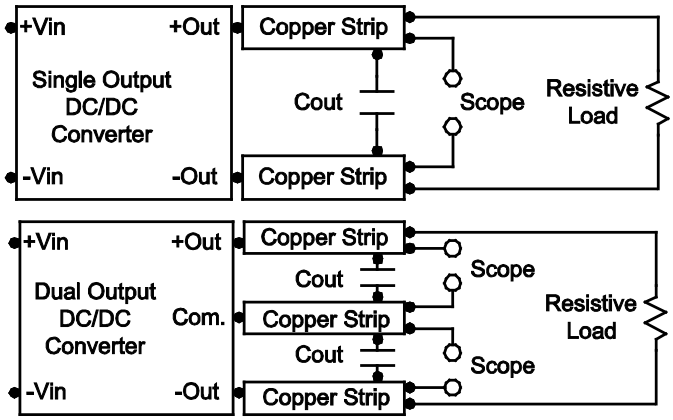
Physical Characteristics:

1. Weight: 0.16oz (4.66g)
2. Case Material: Non-conductive black plastic (flammability to UL 94V-0 rated)
3. Pin Material: Alloy 42

TEST CONFIGURATIONS

Peak-to-Peak Output Noise Measurement Test

Use a 0.47µF ceramic capacitor. Scope measurement should be made by using a BNC socket, measurement bandwidth is 0-20MHz. Position the load between 50mm and 75mm from the DC/DC converter.



DESIGN & FEATURE CONSIDERATIONS

Remote On/Off

Negative logic remote on/off turns the module OFF during a logic high voltage on the remote on/off pin and ON during a logic low. To turn the module ON and OFF, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. A logic high is 2~4mA current applied via 1KΩ resistor. A logic low is open circuit or high impedance.

Maximum Capacitive Load

The DCMCU2 series has a limitation of maximum connected capacitance on the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the start-up time. The maximum capacitance can be found in the model selection table.

Over Current Protection

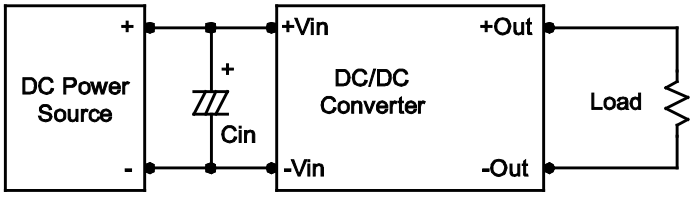
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure overload for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module.

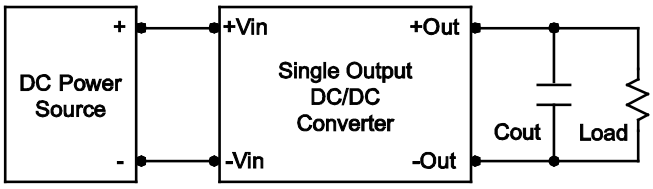
In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup.

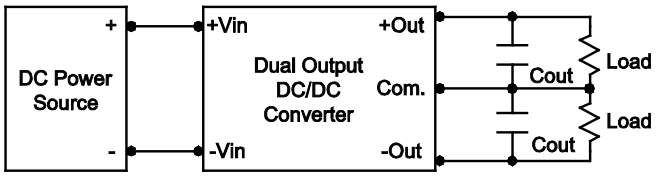
A capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100KHz) capacitor of 4.7µF for 12VDC nominal input models and 2.2µF for 24VDC and 48VDC nominal input models.



Output Ripple Reduction

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 3.3µF capacitors at the output.

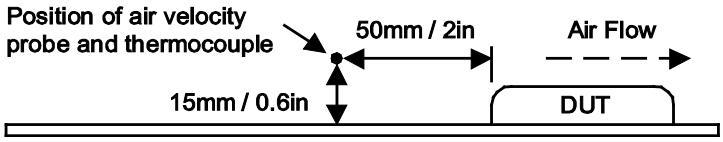




DESIGN & FEATURE CONSIDERATIONS

Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105°C. The derating curves are determined from measurements obtained in a test setup.



MODEL NUMBER SETUP

DCMCU	2	-	24	S	12
Series Name	Output Power		Input Voltage	No. of Outputs	Output Voltage
	2: 2 Watts		**12:** 4.5 – 18 VDC **24:** 9 – 36 VDC **48:** 18 – 75 VDC	**S:** Single Output	**3.3:** 3.3 VDC **05:** 5 VDC **12:** 12 VDC **15:** 15 VDC
				D: Dual Output	**05:** ±5 VDC **12:** ±12 VDC **15:** ±15 VDC

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 ISO9001-2008 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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