

**SERIES:** VGDS2-SIP | **DESCRIPTION:** DC-DC CONVERTER

**FEATURES**

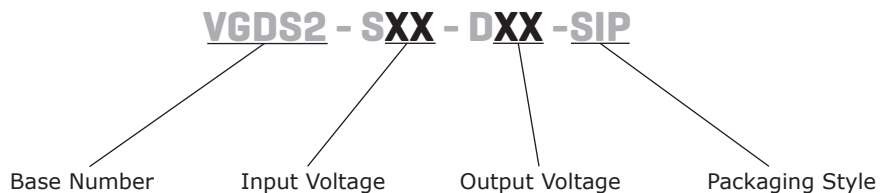
- 2 W isolated output
- industry standard 7 pin SIP package
- dual unregulated outputs
- 6,000 Vdc isolation
- short circuit protection
- wide temperature (-40~105°C)
- efficiency up to 84%



MODEL	input voltage		output voltage (Vdc)	output current		output power max (W)	ripple and noise <sup>1</sup> max (mVp-p)	efficiency typ (%)
	typ (Vdc)	range (Vdc)		min (mA)	max (mA)			
VGDS2-S5-D5-SIP	5	4.5~5.5	±5	±20	±200	2	250	76
VGDS2-S5-D9-SIP	5	4.5~5.5	±9	±12	±111	2	250	78
VGDS2-S5-D12-SIP	5	4.5~5.5	±12	±9	±83	2	250	77
VGDS2-S5-D15-SIP	5	4.5~5.5	±15	±7	±67	2	250	78
VGDS2-S12-D5-SIP	12	10.8~13.2	±5	±20	±200	2	250	80
VGDS2-S12-D9-SIP	12	10.8~13.2	±9	±12	±111	2	250	84
VGDS2-S12-D12-SIP	12	10.8~13.2	±12	±9	±83	2	250	81
VGDS2-S12-D15-SIP	12	10.8~13.2	±15	±7	±67	2	250	84
VGDS2-S24-D5-SIP	24	21.6~26.4	±5	±20	±200	2	250	80
VGDS2-S24-D9-SIP	24	21.6~26.4	±9	±12	±111	2	250	77
VGDS2-S24-D12-SIP	24	21.6~26.4	±12	±9	±83	2	250	81
VGDS2-S24-D15-SIP	24	21.6~26.4	±15	±7	±67	2	250	82

Notes: 1. ripple and noise are measured at 20 MHz BW by "parallel cable" method with 1 µF ceramic and 10 µF electrolytic capacitors on the output.

**PART NUMBER KEY**



## INPUT

parameter	conditions/description	min	typ	max	units
operating input voltage	5 Vdc input models	4.5	5	5.5	Vdc
	12 Vdc input models	10.8	12	13.2	Vdc
	24 Vdc input models	21.6	24	26.4	Vdc
surge voltage	for maximum of 1 second				
	5 Vdc input models	-0.7		9	Vdc
	12 Vdc input models	-0.7		18	Vdc
	24 Vdc input models	-0.7		30	Vdc
filter	capacitance filter				

## OUTPUT

parameter	conditions/description	min	typ	max	units
line regulation	for Vin change of 1%			±1.2	%
load regulation	measured from 10% load to full load			15	%
voltage accuracy	see derating curves				
voltage balance <sup>1</sup>	dual output, balanced loads	±0.5	±1	%	
switching frequency	100% load, typical input	5Vdc input models	60		kHz
		12Vdc input models	80		kHz
		24Vdc input models	80		kHz
temperature coefficient			±0.03		%/°C

Notes: 1. Unbalanced loads should not exceed ±5%. If ±5% is exceeded, it may not meet all specifications.

## PROTECTIONS

parameter	conditions/description	min	typ	max	units
short circuit protection	continuous				

## SAFETY AND COMPLIANCE

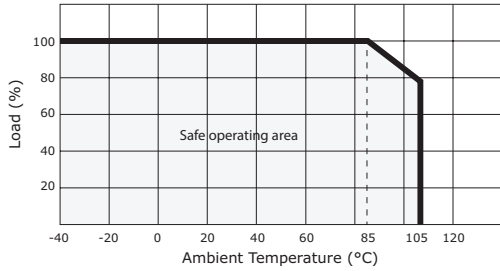
parameter	conditions/description	min	typ	max	units
isolation voltage	for 1 minute at 1 mA max.	6,000			Vdc
isolation resistance	at 500 Vdc	1,000			MΩ
MTBF	as per MIL-HDBK-217F @ 25°C	3,500,000			hours
RoHS	2011/65/EU				

## ENVIRONMENTAL

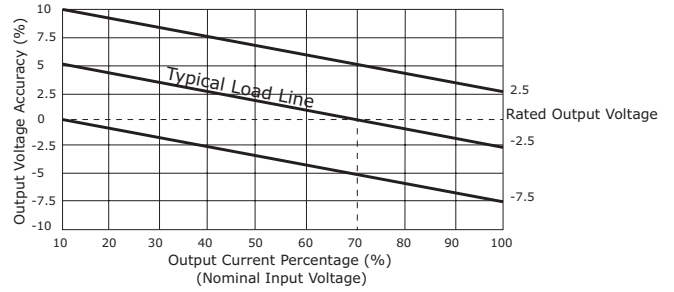
parameter	conditions/description	min	typ	max	units
operating temperature	see derating curve	-40		105	°C
storage temperature		-55		125	°C
storage humidity	non-condensing			95	%
temperature rise	at full load		25		°C
lead temperature	1.5 mm from case for 10 seconds			300	°C

## DERATING CURVES

1. output power vs. ambient temperature



2. output voltage vs. output current

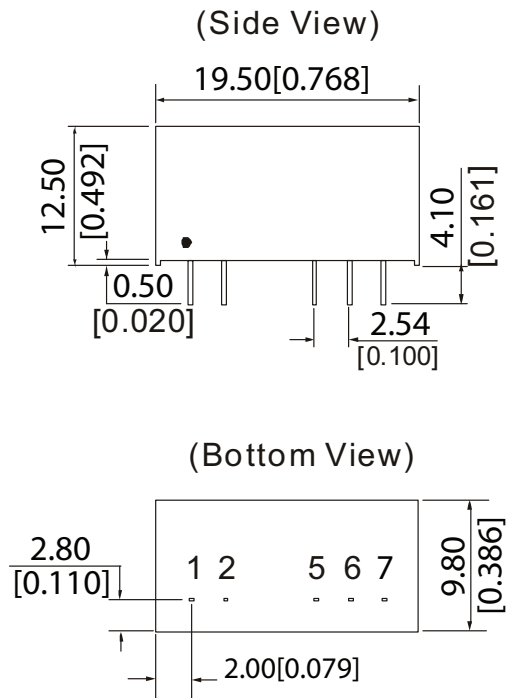


## MECHANICAL

parameter	conditions/description	min	typ	max	units
dimensions	19.5 x 9.80 x 12.5 (0.768 x 0.386 x 0.492 inch)				mm
case material	plastic (UL94-V0)				
weight			4.2		g

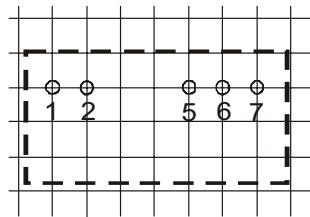
## MECHANICAL DRAWING

units: mm[inch]  
 tolerance:  $\pm 0.25\text{mm}[\pm 0.01 \text{ inch}]$   
 pin section tolerance:  $\pm 0.10\text{mm}[\pm 0.004 \text{ inch}]$



First Angle Projection

RECOMMENDED FOOTPRINT  
 Top view, grid: 2.54mm (0.1inch)  
 diameter: 1.00mm (0.039inch)



PIN CONNECTIONS	
PIN	FUNCTION
1	+Vin
2	GND
5	-Vo
6	0V
7	+Vo

## APPLICATION NOTES

### 1. Requirement on output load

To ensure that this module can operate efficiently and reliably, a minimum load is specified in addition to a maximum load. During operation, make sure that the specified range of input voltage is not exceeded and that the minimum output load is not less than 10% of the full load. This product should never be operated under no load. If the output of the power supply is small, please connect a resistor with proper resistance at the output end in parallel to increase the load.

### 2. Recommended testing and application circuit

If you want to further decrease the input/output ripple, an "LC" filtering network can be connected as per Figure 1.

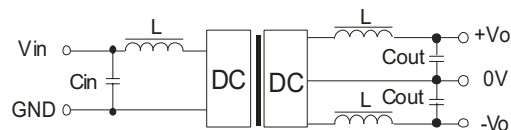


Figure 1

It should also be noted that the inductance and the frequency of the "LC" filtering network should be staggered with the dc-dc frequency to avoid mutual interference. However, the capacitance of the output filter capacitor must be correct. If the capacitance is too large then a startup problem may arise. The maximum capacitance for each output is 100  $\mu$ F. For every channel of output, provided that safe and reliable operation is ensured, the recommended capacitance of its filter capacitor should be what is shown in Table 1.

Table 1

Vin (Vdc)	Cin ( $\mu$ F)	Dual Vout (Vdc)	Cout ( $\mu$ F)
5	10	$\pm 5$	4.7
12	4.7	$\pm 9$	2.2
--	--	$\pm 12$	1.0
24	2.2	$\pm 15/ \pm 24$	0.47

It is not recommended to connect any external capacitor in the application field with less than a 0.5 W output.

### 3. Output voltage regulation and over-voltage protection circuit

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 output end in series. (Figure 2)

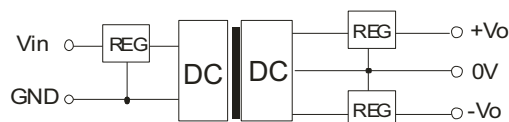


Figure 2

### 4. Overload protection

Under normal operating conditions, the output circuit of these dc-dc converters has no protection against overload. The simplest method is to connect a self-recovery fuse in series at the input end or add a circuit breaker to the circuit.

Note:

1. Operation under minimum load will not damage the converter; however, they may not meet all specifications listed.
2. Max. capacitive load tested at input voltage range and full load.
3. All specifications measured at:  $T_a=25^\circ\text{C}$ , humidity<75%, nominal input voltage and rated output load, unless otherwise specified.

## REVISION HISTORY

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<b>rev.</b>	<b>description</b>	<b>date</b>
1.0	initial release	06/20/2006
1.01	new template applied, V-Infinity branding removed	09/10/2012
1.02	updated datasheet	09/05/2014

The revision history provided is for informational purposes only and is believed to be accurate.



**CUI INC**<sup>®</sup>

**Headquarters**  
20050 SW 112th Ave.  
Tualatin, OR 97062  
**800.275.4899**

Fax 503.612.2383  
**cui.com**  
techsupport@cui.com

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