

PART NUMBER: VCD40 series

DESCRIPTION: DC/DC converter

features

- 40W isolated output
- efficiency to 90%
- fixed 350 KHz switching frequency
- 2:1 input range
- regulated outputs
- continuous short circuit protection
- six sided metal case
- 2" x 2" size
- industry standard pin-out



model ⁴ number	input voltage	output voltage	output current	input current		efficiency
				no load	full load	
VCD40-D12-S2R5	9-18 VDC	2.5 VDC	10000 mA	200mA	2422mA	86%
VCD40-D12-S3R3	9-18 VDC	3.3 VDC	10000 mA	200mA	3161mA	87%
VCD40-D12-S5	9-18 VDC	5 VDC	8000 mA	200mA	3745mA	89%
VCD40-D12-S12	9-18 VDC	12 VDC	3333 mA	200mA	3703mA	90%
VCD40-D12-S15	9-18 VDC	15 VDC	2666 mA	200mA	3702mA	90%
VCD40-D12-D12	9-18 VDC	±12 VDC	1800 mA	100mA	4186mA	86%
VCD40-D12-D15	9-18 VDC	±15 VDC	1400 mA	100mA	4070mA	86%
VCD40-D12-T312	9-18 VDC	3.3/±12V	6A/±0.4A	200mA	2917mA	84%
VCD40-D12-T315	9-18 VDC	3.3/±15V	6A/±0.3A	200mA	2857mA	84%
VCD40-D12-T512	9-18 VDC	5.0/±12V	6A/±0.4A	200mA	3837mA	86%
VCD40-D12-T515	9-18 VDC	5.0/±15V	6A/±0.3A	200mA	3779mA	86%
VCD40-D24-S3R3	18-36 VDC	3.3 VDC	8000 mA	100 mA	1325 mA	87%
VCD40-D24-S5	18-36 VDC	5 VDC	8000 mA	100 mA	1961 mA	89%
VCD40-D24-S12	18-36 VDC	12 VDC	3333 mA	100 mA	2048 mA	88%
VCD40-D24-S15	18-36 VDC	15 VDC	2666 mA	100 mA	1985 mA	89%
VCD40-D24-D12	18-36 VDC	±12 VDC	1800 mA	100 mA	2069 mA	87%
VCD40-D24-D15	18-36 VDC	±15 VDC	1400 mA	100 mA	2011 mA	87%
VCD40-D24-T312	18-36 VDC	3.3/±12 V	6A/±0.4 mA	100 mA	1441 mA	85%
VCD40-D24-T315	18-36 VDC	3.3/±15 V	6A/±0.3 mA	100 mA	1412 mA	85%
VCD40-D24-T512	18-36 VDC	5.0/±12 V	6A/±0.4 mA	100 mA	1897 mA	87%
VCD40-D24-T515	18-36 VDC	5.0/±15 V	6A/±0.3 mA	100 mA	1868 mA	87%
VCD40-D48-S3R3	36-75 VDC	3.3 VDC	8000 mA	50 mA	655 mA	82%
VCD40-D48-S5	36-75 VDC	5 VDC	8000 mA	50 mA	969 mA	90%
VCD40-D48-S12	36-75 VDC	12 VDC	3333 mA	50 mA	1000 mA	89%
VCD40-D48-S15	36-75 VDC	15 VDC	2666 mA	50 mA	992 mA	89%
VCD40-D48-D12	36-75 VDC	±12 VDC	1800 mA	50 mA	1034 mA	87%
VCD40-D48-D15	36-75 VDC	±15 VDC	1400 mA	50 mA	1006 mA	87%
VCD40-D48-T312	36-75 VDC	3.3/±12 V	6A/±0.4A	50 mA	712 mA	86%
VCD40-D48-T315	36-75 VDC	3.3/±15 V	6A/±0.3A	50 mA	698 mA	86%
VCD40-D48-T512	36-75 VDC	5.0/±12 V	6A/±0.4A	50 mA	938 mA	88%
VCD40-D48-T515	36-75 VDC	5.0/±15 V	6A/±0.3A	50 mA	923 mA	88%

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INPUT

input voltage range	12V:	9-18V
	24V:	18-36V
	48V:	36-72V
under voltage lockout	12 Vin power up	8.8 V
	12 Vin power down	8.0 V
	24 Vin power up	17 V
	24 Vin power down	16 V
	48 Vin power up	34 V
	48 Vin power down	32 V
input filter	Pi type	

Output

voltage accuracy	single / dual output	±1.5% max.
	triple: main	±1.5% max.
	auxiliary	±5.0% max.
transient response:	75-100% step load change	
	error band	±5% Vout nominal
	recovery time	<300 μS
output voltage adjustment range	90-110%	
ripple & noise	20MHz BW	
	2.5 V & 3.3 V & 5 V	20 mV RMS, max., 50 mV pk-pk, max.
	12 V & 15 V	20 mV RMS, max., 75 mV pk-pk, max.
temperature coefficient	±0.02%/°C	
line regulation ¹	single/dual	±0.5% max.
	triple...main	±1.0% max.
	auxiliary	±5.0% max.
load regulation ²	single/dual	±0.5% / ±1.0% max.
	triple...main	±2.0% max.
	auxiliary	±5.0% max.
over-voltage protection	3.3 V	3.6 V
	5 V	6.2 V
	12 V	15 V
	15 V	18 V
output current limit	% nom. output	110-140%
short circuit protection	continuous	

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GENERAL SPECIFICATIONS

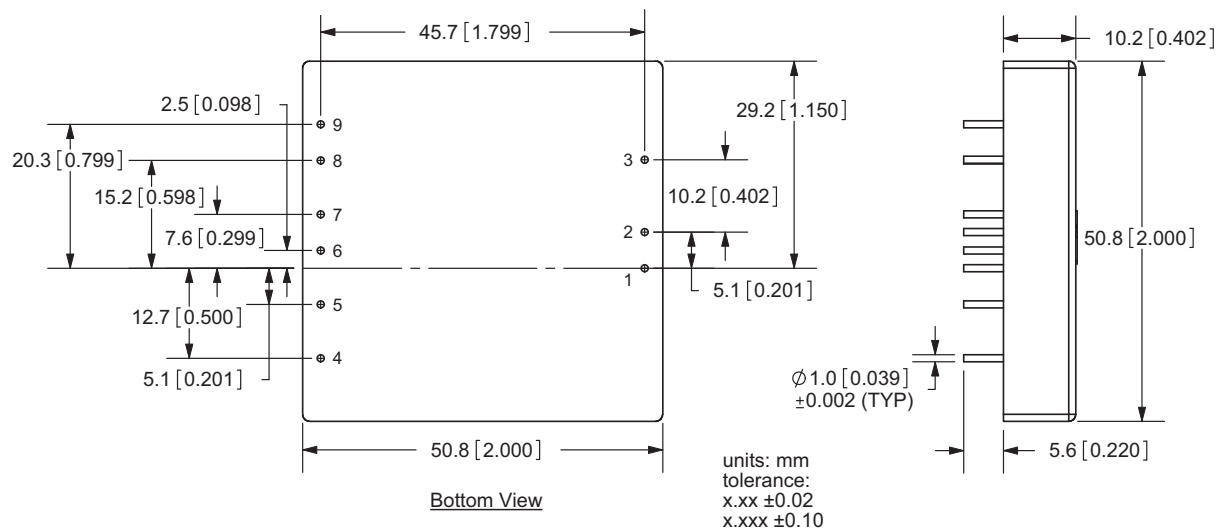
efficiency		see table
isolation voltage	(input to output)	1500VDC min.
Isolation Resistance		10 ⁹ Ohm min.
switching frequency	350KHz, typical	
case grounding	connected to output common	
operating temp. range ⁵		-40°C to 85°C
case temp. ⁵	100°C max.	
storage temp.	-55°C to 125°C	
thermal shutdown	case temp.	110°C typ.
cooling	free-air convection	
EMI/RFI	six sided continuous shield	
dimensions	2x2x0.4 inches (50.8x50.8x10.2mm)	
weight	65 g	
case material	black coated copper with non-conductive base	

NOTES:

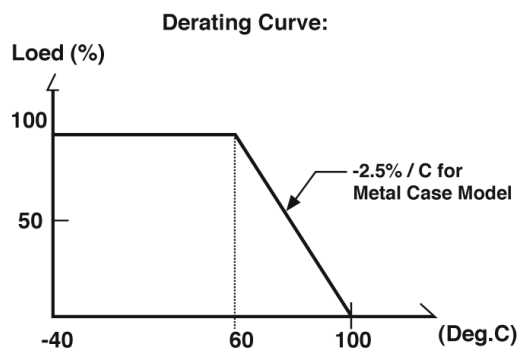
1. measured from high line to low line
2. measured from full load to 10% load
3. logic compatibility CMOS or open collector TTL, ref. to -Vin
 - module ON >3.5 VDC to 75 VDC or open circuit
 - module OFF <1.8 VDC
4. suffix "N" to the model number with negative logic remote ON/OFF
 - module ON <1.8 VDC
 - module OFF >3.5 VDC to 75 VDC or open circuit
5. ± sense if ±sense is not being used the +sense should be connected to +Vout and the -sense should be connected to the -Vout
6. maximum case temperature under any operating condition should not exceed 100°C

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DIMENSIONS (mm)


Pin #	Single Output	Dual Output	Triple
	Function	Function	Function
1	+V Input	+V Input	+V Input
2	-V Input	-V Input	-V Input
3	ON / OFF	ON / OFF	ON / OFF
4	NC	NO Pin	+Aux. Out
5	-Sense	+V Output	Common
6	+Sense	Common	-Aux. Out
7	+V Output	Common	+V Output
8	-V Output	-V Output	-V Output (Common)
9	Trim	Trim	NC

DERATING CURVE


Natural Convection, 20ft./min.(0.1m/s)
 Case Temperature Limit to 100°C max.

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TRIM INFORMATION

1. The value of Rtrim-up defined as:

$$R_{trim-up} = \left(\frac{R1 \times Vr}{Vo - Vo, nom} \right) - Rt \text{ (K}\Omega\text{)}$$

Where: R trim-up is the external resistor in Kohm.
 Vo,nom is the nominal output voltage.
 Vo is the desired output voltage.

R1 ,Rt and Vr are internal to the unit and are defined in Table 1.

For example, to trim-up the output voltage of 5.0V module (VCD40-D48-S5) by 5% to 5.25V, R trim-up is calculated as follows:

$$Vo - Vo, nom = 5.25 - 5.0 = 0.25V$$

$$R1 = 2.32 \text{ Kohm}$$

$$Rt = 8.2 \text{ Kohm}, Vr = 2.5$$

$$R_{trim-up} = \frac{2.32 \times 2.5}{0.25} - 8.2 = 15 \text{ (K}\Omega\text{)}$$

The value of R trim-down defined as:

$$R_{trim-down} = \frac{R1 \times (Vo - Vr)}{Vo, nom - Vo} - Rt \text{ (K}\Omega\text{)}$$

Where: R trim-down is the external resistor in Kohm.
 Vo,nom is the nominal output voltage.
 Vo is the desired output voltage.

R1 ,Rt and Vr are internal to the unit and are defined in Table 1.

For example, to trim-down the output voltage of 5.0V module (VCD40-D48-S5) by 5% to 4.75V, R trim-down is calculated as follows :

$$Vo, nom - Vo = 5.0 - 4.75 = 0.25 V$$

$$R1 = 2.32 \text{ Kohm}$$

$$Rt = 8.2 \text{ Kohm}, Vr = 2.5$$

$$R_{trim-down} = \frac{2.32 \times (4.75 - 2.5)}{0.25} - 8.2 = 12.68 \text{ (K}\Omega\text{)}$$

Table 1 - Trim Resistor Values

Model Number	Output Voltage(V)	R1 (Kohm)	Rt (Kohm)	Vr
VCD40-D24-S5 VCD40-D48-S5	5.0	2.32	8.2	2.5

Table 2 - Trim Resistor Values

Model Number	Output Voltage(V)	R1 (Kohm)	R2 (Kohm)	R3 (Kohm)	Rt (Kohm)	Vr
VCD40-D24-S3R3 VCD40-D48-S3R3	3.3V	2.74	1.8	0.27	9.1	1.24
VCD40-D24-S12 VCD40-D48-S12	12V	6.8	2.4	2.32	22	2.5
VCD40-D24-S15 VCD40-D48-S15	15V	8.06	2.4	3.9	27	2.5

In order to trim the voltage up or down one needs to connect the trim resistor either between the trim pin and -Vo for trim-up and between trim pin and +Vo for trim-down. The output voltage trim range is $\pm 10\%$. This is shown in Figures 1 and 2:

2. The output Voltage 3.3V, 12V and 15V value of Rtrim are defined as below:

$$R_{trim-up} = \left(\frac{Vr \times R1 \times (R2 + R3)}{(Vo - Vo, nom) \times R2} \right) - Rt \text{ (K}\Omega\text{)}$$

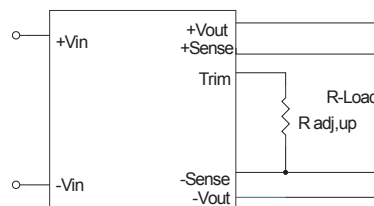
$$R_{trim-down} = R1 \times \left(\frac{Vr \times R1}{(Vo, nom - Vo) \times R2} - 1 \right) - Rt \text{ (K}\Omega\text{)}$$

Where: R trim-up is the external resistor in Kohm.

Vo,nom is the nominal output voltage.

Vo is the desired output voltage.

R1, R2, R3, Rt and Vr are internal to the unit and are defined in Table 2.

Figure 1. Trim-up Voltage Setup

Figure 2. Trim-down Voltage Setup
