

## VRA\_D-20W & VRB\_D-20W Series

### 20W, WIDE INPUT, ISOLATED & REGULATED SINGLE&DUAL OUTPUT DC-DC CONVERTER



multi-country patent protection **RoHS**

#### FEATURES

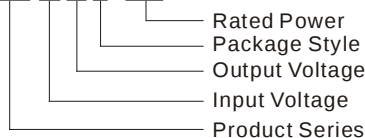
- Efficiency up to 87%
- Wide (2:1) Input Range
- 1.5KVDC Input/Output Isolation
- Over Voltage protection
- Output Short Circuit Protection
- Operating Temperature: -40°C to +71°C
- Internal SMD construction
- Metal Shielding Package
- Industry Standard Pin out
- MTBF>1,000,000 hours
- RoHS Compliance

#### Application

The VRA\_D-20W & VRB\_D-20W series offer 20W of output, the VRA\_D-20W & VRB\_D-20W series with 2:1 wide input voltage of 9-18,18-36 and 36-75VDC and features 1500VDC isolation, short-circuit and over current protection, as well as six sided shielding. All models are particularly suited to tele-communications, industrial, test equipments power.

#### MODEL SELECTION

VRB1203D-20W



#### PRODUCT PROGRAM

| Part Number    | Input         |       | Output        |              | Efficiency (%，Typ) | capacitance (max,UF) |
|----------------|---------------|-------|---------------|--------------|--------------------|----------------------|
|                | Voltage (VDC) |       | Voltage (VDC) | Current (mA) |                    |                      |
|                | Nominal       | Range |               |              |                    |                      |
| VRA1205D-20W   | 12            | 9-18  | ±5            | ±2000        | 80                 | ±3400                |
| VRA1212D-20W   |               |       | ±12           | ±833         | 82                 | ±680                 |
| VRA1215D-20W   |               |       | ±15           | ±666         | 82                 | ±450                 |
| VRA1224D-20W * |               |       | ±24           | ±416         | 83                 | ±220                 |
| VRB1203D-20W   |               |       | 3.3           | 5400         | 86                 | 13000                |
| VRB1205D-20W   |               |       | 5             | 4000         | 79                 | 6800                 |
| VRB1212D-20W   |               |       | 12            | 1666         | 81                 | 2200                 |
| VRB1215D-20W   |               |       | 15            | 1333         | 82                 | 755                  |
| VRB1224D-20W   |               |       | 24            | 833          | 83                 | 500                  |
| VRA2405D-20W   | 24            | 18-36 | ±5            | ±2000        | 81                 | ±3400                |
| VRA2412D-20W   |               |       | ±12           | ±833         | 86                 | ±680                 |
| VRA2415D-20W   |               |       | ±15           | ±666         | 86                 | ±450                 |
| VRA2424D-20W * |               |       | ±24           | ±416         | 86                 | ±220                 |
| VRB2403D-20W   |               |       | 3.3           | 5400         | 86                 | 13000                |
| VRB2405D-20W   |               |       | 5             | 4000         | 81                 | 6800                 |
| VRB2412D-20W   |               |       | 12            | 1666         | 83                 | 2200                 |
| VRB2415D-20W   |               |       | 15            | 1333         | 85                 | 755                  |
| VRB2424D-20W   |               |       | 24            | 833          | 85                 | 500                  |
| VRA4805D-20W   | 48            | 36-75 | ±5            | ±2000        | 81                 | ±3400                |
| VRA4812D-20W   |               |       | ±12           | ±833         | 86                 | ±680                 |
| VRA4815D-20W   |               |       | ±15           | ±666         | 86                 | ±450                 |
| VRA4824D-20W * |               |       | ±24           | ±416         | 86                 | ±220                 |
| VRB4803D-20W   |               |       | 3.3           | 5400         | 87                 | 13000                |
| VRB4805D-20W   |               |       | 5             | 4000         | 83                 | 6800                 |
| VRB4812D-20W   |               |       | 12            | 1666         | 84                 | 2200                 |
| VRB4815D-20W   |               |       | 15            | 1333         | 84                 | 755                  |
| VRB4824D-20W   |               |       | 24            | 833          | 86                 | 500                  |
| *Designing.    |               |       |               |              |                    |                      |

#### INPUT SPECIFICATIONS

| Item                                    | Test conditions | Min                       | Typ  | Max | Units |
|-----------------------------------------|-----------------|---------------------------|------|-----|-------|
| Start voltage                           | 12Vinput models | 8.6                       | 8.8  | 9   | VDC   |
|                                         | 24Vinput models | 17.5                      | 17.8 | 18  |       |
|                                         | 48Vinput models | 34                        | 35   | 36  |       |
| Input filter                            |                 | L-C                       |      |     |       |
| Start up time                           |                 |                           | 20   |     | MS    |
| Method of Remote (Reference point: GND) | on              | 3.5-40VDC or open circuit |      |     |       |
|                                         | off             | GND or Low Voltage(<1.2V) |      |     |       |

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## OUTPUT SPECIFICATIONS

| Item                     | Test conditions                | Min  | Typ    | Max  | Units |
|--------------------------|--------------------------------|------|--------|------|-------|
| Output voltage accuracy  | Refer to recommended circuit   |      | ±1     | ±3   | %     |
| Load regulation          | From 10% to 100% load          |      | ±0.5   | ±1   |       |
| Line regulation          | Input voltage from low to high |      | ±0.2   | ±0.5 |       |
| Cross regulation         |                                |      |        | ±5   |       |
| Ripple and noise         | Tested under 20MHz band        | 50   | 75     | 150  | mV    |
| Transient recovery time  | 25%load change                 |      | 200    | 300  | us    |
| Transient peak deviation |                                |      | ±2     | ±5   | %     |
| Over load protection*    | Input voltage range            | 120  | 130    | 150  | %     |
| Output Short Circuit     | Hiccup, automatics recovery    |      |        |      |       |
| Over voltage protection  | 3.3V                           | 3.63 |        | 4.29 | VDC   |
|                          | 5V                             | 5.5  |        | 6.5  |       |
|                          | 12V                            | 13.2 |        | 15.6 |       |
|                          | 15V                            | 16.5 |        | 19.5 |       |
|                          | 24                             | 26.4 |        | 31.2 |       |
| Temperature drift (Vout) |                                |      | 0.02   |      | %/°C  |
| Trim                     |                                |      | ±10%Vo |      | VDC   |

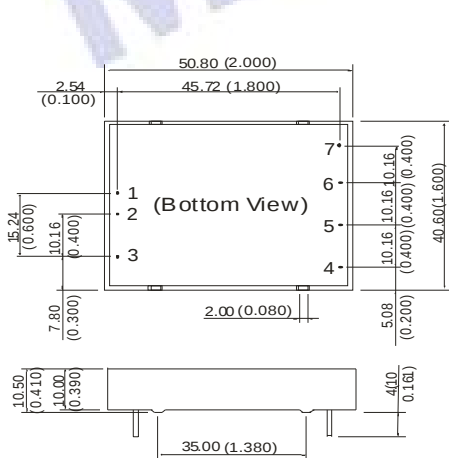
## COMMON SPECIFICATIONS

| Item                  | Test conditions                | Min | Typ  | Max | Units   |
|-----------------------|--------------------------------|-----|------|-----|---------|
| Operating Temperature |                                | -40 |      | 71  | °C      |
| Storage Temperature   |                                | -55 |      | 105 |         |
| Storage Humidity      |                                | 5   |      | 95  |         |
| Isolation voltage     | Test for 1 minute and 1 mA max |     | 1500 |     | VDC     |
| Isolation resistance  |                                |     | 500  |     | MΩ      |
| Isolation Capacitance | 100KHz / 1V                    |     | 1000 |     | pF      |
| Switching frequency   | Nominal, full load             |     | 300  |     | KHz     |
| MTBF                  |                                |     | 100  |     | K hours |
| Case Material         | Aluminous alloy                |     |      |     |         |
| Weight                |                                |     | 39   |     | G       |

Note:

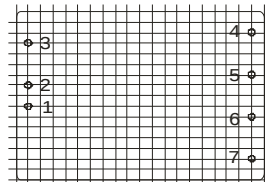
1. All specifications are measured at TA=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. The CTRL control pin voltage is referenced to GND.
3. Typical Eff value at nominal input voltage and full load.
4. Capacitor MAX load tested at nominal input voltage and constant resistive load.
5. Refer to the diagram of Output Voltage trim up/down for trim applications.
6. The products cannot be used in parallel and in plug and play.

## OUTLINE DIMENSIONS & FOOTPRINT DETAILS



First Angle Projection

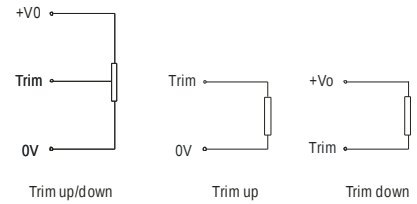
RECOMMENDED FOOTPRINT  
Top view, grid: 2.54mm (0.1inch),  
diameter: 1.50mm (0.059inch)



### FOOTPRINT DETAILS

| Pin | Single | Dual |
|-----|--------|------|
| 1   | Vin    | Vin  |
| 2   | GND    | GND  |
| 3   | Ctrl   | Ctrl |
| 4   | Trim   | Trim |
| 5   | 0V     | -Vo  |
| 6   | +Vo    | Com  |
| 7   | No pin | +Vo  |

## OUTPUT VOLTAGE TRIM



## RECOMMENDED CIRCUIT

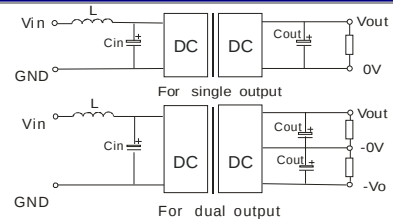
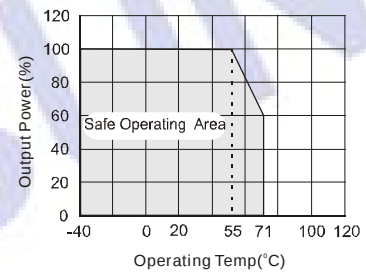


Fig.1

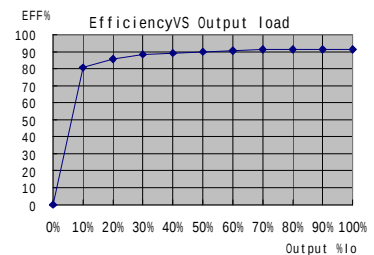
In order to obtain better performance for the DC/DC models, it's recommended that use input and output filters as Fig.1 shown..

## DERATING & EFFICIENCY CURVE

### Temperature derating curve



### Curve of Efficiency VS output load VRA2412D-20W



### Curve of Efficiency VS input Voltage VRA2412D-20W

