

**SERIES: DQD20 | DESCRIPTION: DC-DC CONVERTER**
**FEATURES**

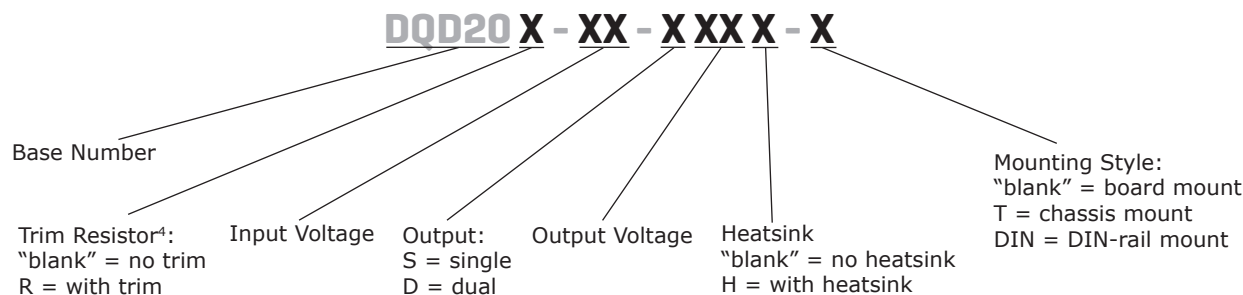
- up to 20 W isolated output
- single and dual regulated outputs
- over voltage, input under voltage, short circuit, and over current protections
- remote on/off control
- 1,500 Vdc isolation
- -40 ~ 85°C temperature range, with derating
- certified to IEC/EN 62368-1
- PCB, chassis and DIN-rail mount options


**MODEL**

|              | input voltage |             | output voltage | output current | output power | ripple & noise <sup>1</sup> | efficiency <sup>2</sup> |
|--------------|---------------|-------------|----------------|----------------|--------------|-----------------------------|-------------------------|
|              | typ (Vdc)     | range (Vdc) | typ (Vdc)      | max (mA)       | max (W)      | max (mVp-p)                 | typ (%)                 |
| DQD20-24-S3  | 24            | 9~36        | 3.3            | 5,000          | 16.5         | 100                         | 88                      |
| DQD20-24-S5  | 24            | 9~36        | 5              | 4,000          | 20           | 100                         | 90                      |
| DQD20-24-S9  | 24            | 9~36        | 9              | 2,222          | 20           | 100                         | 90                      |
| DQD20-24-S12 | 24            | 9~36        | 12             | 1,667          | 20           | 100                         | 90                      |
| DQD20-24-S15 | 24            | 9~36        | 15             | 1,333          | 20           | 100                         | 90                      |
| DQD20-24-S24 | 24            | 9~36        | 24             | 833            | 20           | 100                         | 89                      |
| DQD20-24-S28 | 24            | 9~36        | 28             | 714            | 20           | 100                         | 91                      |
| DQD20-24-D5  | 24            | 9~36        | ±5             | ±2,000         | 20           | 200                         | 87                      |
| DQD20-24-D9  | 24            | 9~36        | ±9             | ±1,111         | 20           | 200                         | 87                      |
| DQD20-24-D12 | 24            | 9~36        | ±12            | ±833           | 20           | 200                         | 90                      |
| DQD20-24-D15 | 24            | 9~36        | ±15            | ±667           | 20           | 200                         | 90                      |
| DQD20-24-D24 | 24            | 9~36        | ±24            | ±416           | 20           | 200                         | 88                      |
| DQD20-48-S3  | 48            | 18~75       | 3.3            | 5,000          | 16.5         | 100                         | 88                      |
| DQD20-48-S5  | 48            | 18~75       | 5              | 4,000          | 20           | 100                         | 90                      |
| DQD20-48-S9  | 48            | 18~75       | 9              | 2,222          | 20           | 100                         | 90                      |
| DQD20-48-S12 | 48            | 18~75       | 12             | 1,667          | 20           | 100                         | 91                      |
| DQD20-48-S15 | 48            | 18~75       | 15             | 1,333          | 20           | 100                         | 91                      |
| DQD20-48-S24 | 48            | 18~75       | 24             | 833            | 20           | 100                         | 91                      |
| DQD20-48-D5  | 48            | 18~75       | ±5             | ±2,000         | 20           | 200                         | 86                      |
| DQD20-48-D9  | 48            | 18~75       | ±9             | ±1,111         | 20           | 200                         | 87                      |
| DQD20-48-D12 | 48            | 18~75       | ±12            | ±833           | 20           | 200                         | 89                      |
| DQD20-48-D15 | 48            | 18~75       | ±15            | ±667           | 20           | 200                         | 89                      |
| DQD20-48-D24 | 48            | 18~75       | ±24            | ±416           | 20           | 200                         | 90                      |

Notes: 1. The ripple and noise is measured at 10%~100% load and 20MHz bandwidth. 0% ~10% load ripple & noise is less than or equal to 5%Vo; the ripple & noise test adopts the parallel line test method, see the ripple & noise test instructions for details.  
2. The efficiency is tested at full load.  
3. Unless otherwise specified, all values or indicators in this manual are tested at Ta=25°C, humidity<75%RH, rated input voltage and rated load (pure resistance load).

## PART NUMBER KEY



Notes: 4. The trim resistor is only available for the single output models.

## INPUT

| parameter                         | conditions/description                          |                                                      | min                                            | typ    | max | units |
|-----------------------------------|-------------------------------------------------|------------------------------------------------------|------------------------------------------------|--------|-----|-------|
| input voltage range               | 24 Vdc input models                             |                                                      | 9                                              | 24     | 36  | Vdc   |
|                                   | 48 Vdc input models                             |                                                      | 18                                             | 48     | 75  | Vdc   |
| input current (full load/no load) | 24 Vdc input; 3.3 Vdc output model              |                                                      |                                                | 781/33 |     | mA    |
|                                   | 24 Vdc input; 5, 9 Vdc output model             |                                                      |                                                | 926/33 |     | mA    |
|                                   | 24 Vdc input; 12, 15 Vdc output models          |                                                      |                                                | 926/5  |     | mA    |
|                                   | 24 Vdc input; 24, 28 Vdc output models          |                                                      |                                                | 915/5  |     | mA    |
|                                   | 48 Vdc input; 3.3 Vdc output models             |                                                      |                                                | 390/17 |     | mA    |
|                                   | 48 Vdc input; 5, 9 Vdc output models            |                                                      |                                                | 463/17 |     | mA    |
|                                   | 48 Vdc input; 12, 15, 24 Vdc output models      |                                                      |                                                | 457/5  |     | mA    |
|                                   | 24 Vdc input; $\pm 5$ Vdc output model          |                                                      |                                                | 957/33 |     | mA    |
|                                   | 24 Vdc input; $\pm 9$ Vdc output model          |                                                      |                                                | 946/6  |     | mA    |
|                                   | 24 Vdc input; $\pm 12, \pm 15$ Vdc output model |                                                      |                                                | 926/5  |     | mA    |
|                                   | 24 Vdc input; $\pm 24$ Vdc output model         |                                                      |                                                | 947/5  |     | mA    |
|                                   | 48 Vdc input; $\pm 5$ Vdc output model          |                                                      |                                                | 484/17 |     | mA    |
|                                   | 48 Vdc input; $\pm 9$ Vdc output model          |                                                      |                                                | 472/5  |     | mA    |
|                                   | 48 Vdc input; $\pm 12, \pm 15$ Vdc output model |                                                      |                                                | 468/5  |     | mA    |
|                                   | 48 Vdc input; $\pm 24$ Vdc output model         |                                                      |                                                | 463/5  |     | mA    |
| surge voltage                     | 1 second max                                    |                                                      |                                                |        |     |       |
|                                   | 24 Vdc input models                             |                                                      | -0.7                                           |        | 50  | Vdc   |
|                                   | 48 Vdc input models                             |                                                      | -0.7                                           |        | 100 | Vdc   |
| turn-off voltage threshold        | at full load                                    |                                                      |                                                |        |     |       |
|                                   | 24 Vdc input models                             |                                                      | 5                                              | 7      | 9   | Vdc   |
|                                   | 48 Vdc input models                             |                                                      | 11                                             | 13     | 18  | Vdc   |
| filter                            | Pi filter                                       |                                                      |                                                |        |     |       |
| no load power consumption         |                                                 |                                                      |                                                | 0.1    |     | W     |
| remote on/off <sup>5</sup>        | module on                                       | single outputs                                       | CTRL pin suspended or pulled high (2.5~12 Vdc) |        |     |       |
|                                   |                                                 | dual outputs                                         | CTRL pin suspended or pulled high (3.3~12 Vdc) |        |     |       |
|                                   | module off                                      | CTRL pin connected to -Vin or pulled low (0~1.2 Vdc) |                                                |        |     |       |
| input current when off            |                                                 |                                                      |                                                | 3      |     | mA    |

Notes: 5. The voltage of CTRL pin is relative to -Vin pin.

## OUTPUT

| parameter               | conditions/description              | min | typ | max    | units   |
|-------------------------|-------------------------------------|-----|-----|--------|---------|
| maximum capacitive load | 3.3 Vdc output models               |     |     | 10,000 | $\mu$ F |
|                         | 5, $\pm 5$ Vdc output models        |     |     | 5,000  | $\mu$ F |
|                         | 9 Vdc output models                 |     |     | 3,000  | $\mu$ F |
|                         | $\pm 9$ Vdc output models           |     |     | 2,000  | $\mu$ F |
|                         | 12, $\pm 12$ Vdc output models      |     |     | 1,000  | $\mu$ F |
|                         | 15, $\pm 15$ Vdc output models      |     |     | 800    | $\mu$ F |
|                         | 18 Vdc output models                |     |     | 600    | $\mu$ F |
|                         | 24, $\pm 24$ , 28 Vdc output models |     |     | 500    | $\mu$ F |

## OUTPUT

| parameter                    | conditions/description                              | min         | typ  | max  | units |
|------------------------------|-----------------------------------------------------|-------------|------|------|-------|
| voltage accuracy             | single outputs                                      |             | ±1   | ±2   | %     |
|                              | dual outputs                                        | Vo1<br>Vo2  | ±1   | ±2   | %     |
|                              |                                                     |             | ±.5  | ±3   | %     |
| voltage regulation           | full voltage range, nominal load                    |             | ±0.2 | ±0.5 | %     |
| load regulation              | 5% ~ 100% load                                      |             | ±0.5 | ±1   | %     |
| transient response recovery  | 25% rated load step change                          |             |      |      |       |
|                              | single outputs                                      |             | 250  | 500  | µs    |
|                              | dual outputs                                        |             | 300  | 500  | µs    |
| transient response deviation | 25% rated load step change                          |             | ±5   | ±8   | %     |
|                              | 3.3, 5, ±5 Vdc output models                        |             | ±3   | ±5   | %     |
|                              | all other models                                    |             |      |      |       |
| start-up time                | at rated input voltage and constant resistance load |             | 10   |      | ms    |
| switching frequency          | PWM mode                                            |             | 280  |      | kHz   |
| adjustability                | single outputs                                      | via trim    | 90   | 110  | %     |
|                              | dual outputs                                        | unavailable |      |      |       |

## PROTECTIONS

| parameter                | conditions/description            | min | typ | max | units |
|--------------------------|-----------------------------------|-----|-----|-----|-------|
| over current protection  |                                   | 110 |     | 220 | %     |
| over voltage protection  | single outputs                    | 110 |     | 200 | %     |
|                          | dual outputs                      | 120 |     | 200 | %     |
| short circuit protection | continuous, auto recovery, hiccup |     |     |     |       |
| output overshoot         |                                   |     |     | 10  | %     |

## SAFETY AND COMPLIANCE

| parameter                     | conditions/description                                             | min       | typ   | max | units |
|-------------------------------|--------------------------------------------------------------------|-----------|-------|-----|-------|
| isolation voltage             | input to output for 1 minute, 0.5 mA max                           | 1,500     |       |     | Vdc   |
|                               | input/output to case for 1 minute, 0.5 mA max                      | 1,000     |       |     | Vdc   |
| isolation capacitance         | input to output, (100 kHz, 0.1V)                                   |           | 1,000 |     | pF    |
| safety approvals <sup>6</sup> | certified to 62368-1: IEC, EN                                      |           |       |     |       |
| conducted emissions           | CISPR32/EN55032 Class B (see recommended circuit)                  |           |       |     |       |
| radiated emissions            | CISPR32/EN55032 Class B (see recommended circuit)                  |           |       |     |       |
| ESD                           | IEC/EN61000-4-2 Contact ±6 kV, Air ±8 kV, Perf. Criteria B         |           |       |     |       |
| radiated immunity             | IEC/EN61000-4-3 10 V/m, Perf. Criteria A (see recommended circuit) |           |       |     |       |
| conducted immunity            | IEC/EN61000-4-6 3 Vrms, Perf. Criteria A (see recommended circuit) |           |       |     |       |
| MTBF                          | as per MIL-HDBK-217F at 25 °C                                      | 1,000,000 |       |     | hours |
| RoHS                          | yes                                                                |           |       |     |       |

Notes: 6. Output is only considered as ES1 if the input source meets reinforced insulation requirements from primary AC source or any hazardous voltage source.  
Unit maintains only functional insulation from input to output

## ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature | see derating curve     | -40 |     | 85  | °C    |
| max case temperature  |                        |     |     | 105 | °C    |
| storage temperature   |                        | -55 |     | 125 | °C    |
| operating humidity    | non condensing         | 5   |     | 95  | %     |

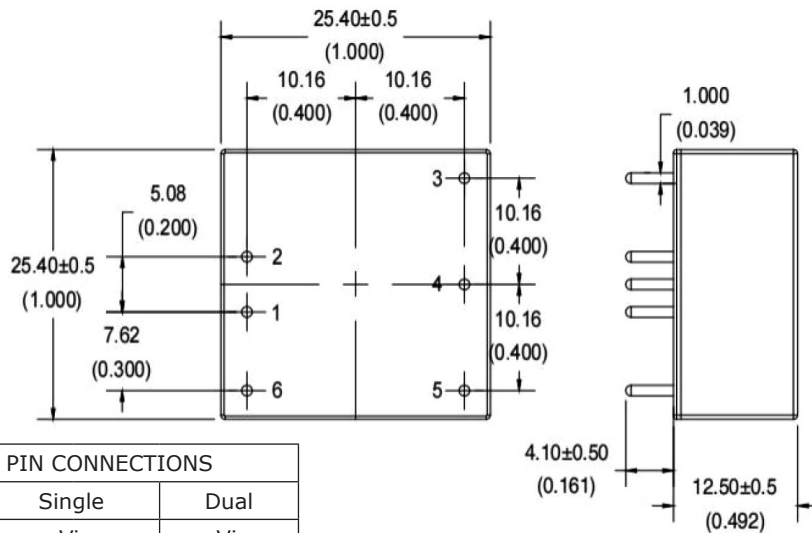
## MECHANICAL

| parameter     | conditions/description                                                          | min                          | typ | max | units |
|---------------|---------------------------------------------------------------------------------|------------------------------|-----|-----|-------|
| dimensions    | board mount: 25.4 x 25.4 x 12.5 [1.000 x 1.000 x 0.492 inches]                  |                              |     |     | mm    |
|               | board mount with heatsink: 25.4 x 25.4 x 18.0 [1.000 x 1.000 x 0.708 inches]    |                              |     |     | mm    |
|               | chassis mount: 76.0 x 31.5 x 21.3 [2.990 x 1.240 x 0.838 inches]                |                              |     |     | mm    |
|               | chassis mount with heatsink 76.0 x 31.5 x 26.0 [2.990 x 1.240 x 1.023 inches]   |                              |     |     | mm    |
|               | DIN-rail mount: 76.0 x 31.5 x 26.0 [2.990 x 1.240 x 1.023 inches]               |                              |     |     | mm    |
|               | DIN-rail mount with heatsink: 76.0 x 31.5 x 30.8 [2.990 x 1.240 x 1.212 inches] |                              |     |     | mm    |
| case material | aluminum                                                                        |                              |     |     |       |
| weight        | single output models                                                            | board mount                  | 15  |     | g     |
|               |                                                                                 | board mount with heatsink    | 19  |     | g     |
|               |                                                                                 | chassis mount                | 37  |     | g     |
|               |                                                                                 | chassis mount with heatsink  | 40  |     | g     |
|               |                                                                                 | DIN-rail mount               | 57  |     | g     |
|               |                                                                                 | DIN-rail mount with heatsink | 60  |     | g     |
|               | dual output models                                                              | board mount                  | 18  |     | g     |
|               |                                                                                 | board mount with heatsink    | 21  |     | g     |
|               |                                                                                 | chassis mount                | 39  |     | g     |
|               |                                                                                 | chassis mount with heatsink  | 42  |     | g     |
|               |                                                                                 | DIN-rail mount               | 59  |     | g     |
|               |                                                                                 | DIN-rail mount with heatsink | 62  |     | g     |
| cooling       | natural convection                                                              |                              |     |     |       |

## MECHANICAL DRAWING

### Board Mount

units: mm [inch]

pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]general tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]

| PIN CONNECTIONS |        |                   |
|-----------------|--------|-------------------|
| PIN             | Single | Dual              |
| 1               | -Vin   | -Vin              |
| 2               | +Vin   | +Vin              |
| 3               | +Vout  | +Vout             |
| 4               | No pin | Trim <sup>7</sup> |
| 5               | GND    | -Vout             |
| 6               | Ctrl   | Ctrl              |

Note: 7. Available option.

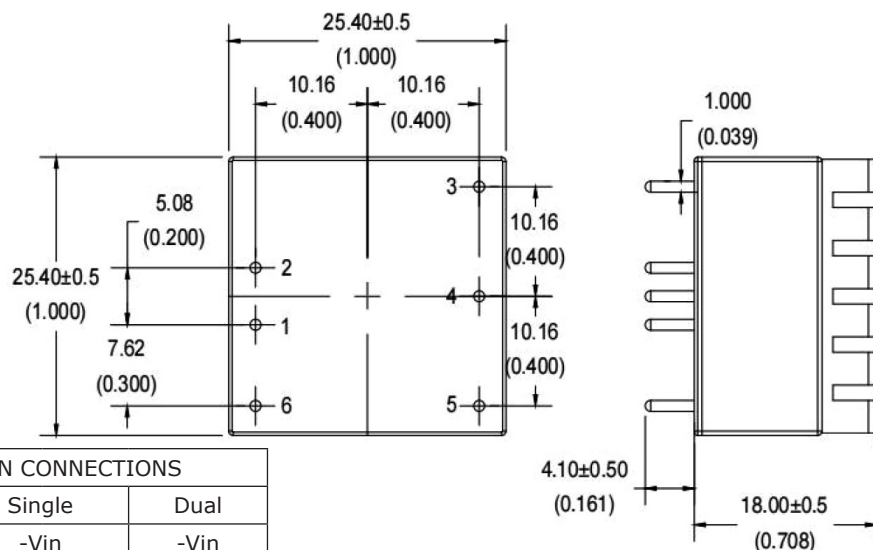
## MECHANICAL DRAWING (CONTINUED)

### Board Mount with Heatsink

units: mm [inch]

pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]

general tolerance:  $\pm 0.50$  [ $\pm 0.020$ ]



| PIN CONNECTIONS |        |                   |       |
|-----------------|--------|-------------------|-------|
| PIN             | Single |                   | Dual  |
| 1               | -Vin   |                   | -Vin  |
| 2               | +Vin   |                   | +Vin  |
| 3               | +Vout  |                   | +Vout |
| 4               | No pin | Trim <sup>7</sup> | COM   |
| 5               | GND    |                   | -Vout |
| 6               | Ctrl   |                   | Ctrl  |

Note: 7. Available option.

## Chassis Mount

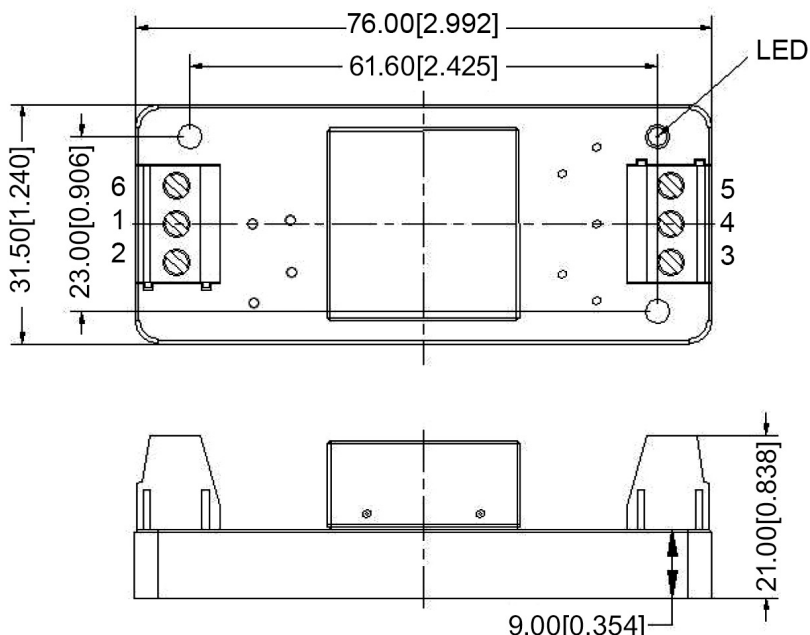
units: mm [inch]

pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]

general tolerance:  $\pm 0.50$  [ $\pm 0.02$ ]

wire range: 24~12 AWG

tightening torque: max 0.4 N·m



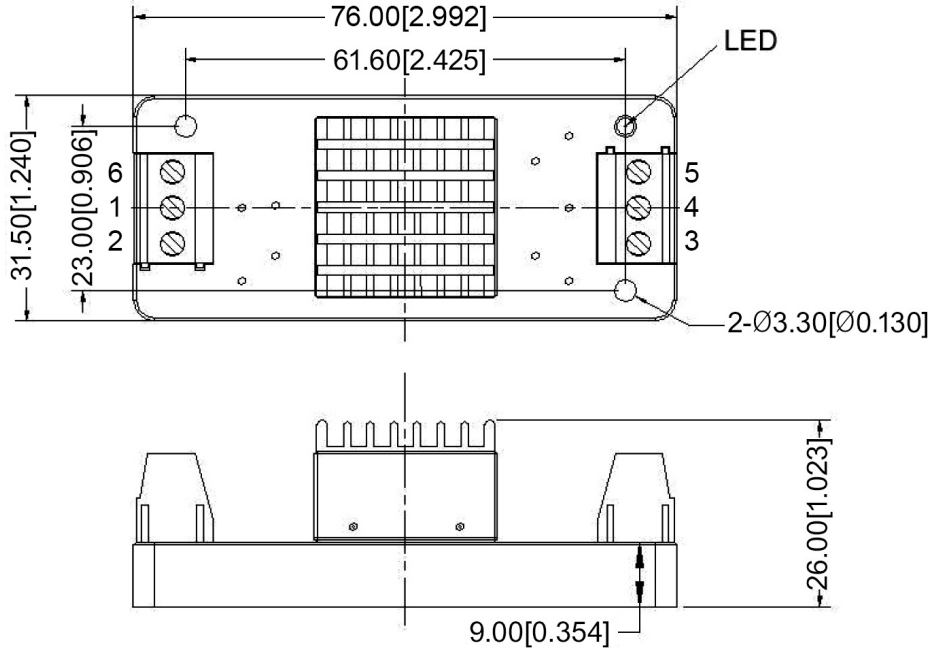
| PIN CONNECTIONS |        |                   |       |
|-----------------|--------|-------------------|-------|
| PIN             | Single |                   | Dual  |
| 1               | -Vin   |                   | -Vin  |
| 2               | +Vin   |                   | +Vin  |
| 3               | +Vout  |                   | +Vout |
| 4               | No pin | Trim <sup>7</sup> | COM   |
| 5               | GND    |                   | -Vout |
| 6               | Ctrl   |                   | Ctrl  |

Note: 7. Available option.

MECHANICAL DRAWING (CONTINUED)

Chassis Mount with Heatsink

units: mm [inch]  
pin diameter tolerance: ±0.10 [±0.004]  
general tolerance: ±0.50 [±0.02]  
wire range: 24~12 AWG  
tightening torque: max 0.4 N·m

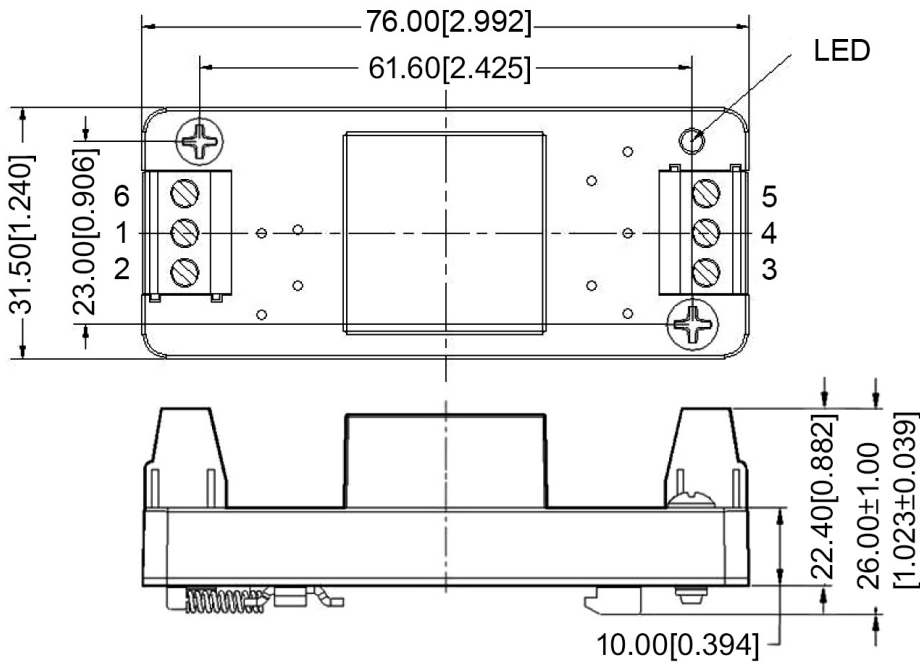


| PIN CONNECTIONS |        |                   |
|-----------------|--------|-------------------|
| PIN             | Single | Dual              |
| 1               | -Vin   | -Vin              |
| 2               | +Vin   | +Vin              |
| 3               | +Vout  | +Vout             |
| 4               | No pin | Trim <sup>7</sup> |
| 5               | GND    | -Vout             |
| 6               | Ctrl   | Ctrl              |

Note: 7. Available option.

DIN-rail Mount

units: mm [inch]  
pin diameter tolerance: ±0.10 [±0.004]  
general tolerance: ±0.50 [±0.02]  
wire range: 24~12 AWG  
tightening torque: max 0.4 N·m

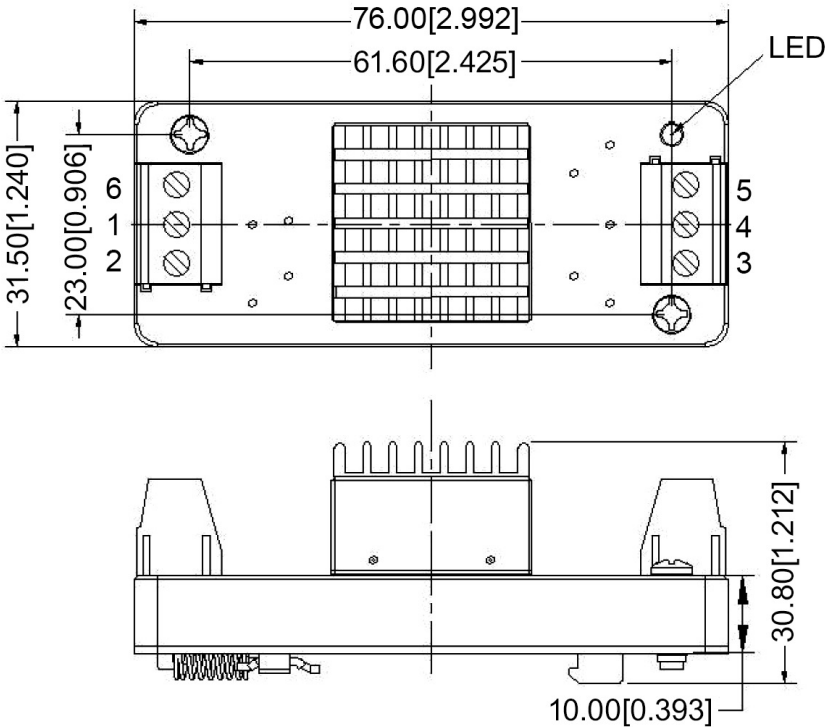


| PIN CONNECTIONS |        |                   |
|-----------------|--------|-------------------|
| PIN             | Single | Dual              |
| 1               | -Vin   | -Vin              |
| 2               | +Vin   | +Vin              |
| 3               | +Vout  | +Vout             |
| 4               | No pin | Trim <sup>7</sup> |
| 5               | GND    | -Vout             |
| 6               | Ctrl   | Ctrl              |

Note: 7. Available option.

MECHANICAL DRAWING (CONTINUED)

**DIN-rail Mount with Heatsink**  
units: mm [inch]  
pin diameter tolerance:  $\pm 0.10$  [ $\pm 0.004$ ]  
general tolerance:  $\pm 0.50$  [ $\pm 0.02$ ]  
wire range: 24~12 AWG  
tightening torque: max 0.4 N·m

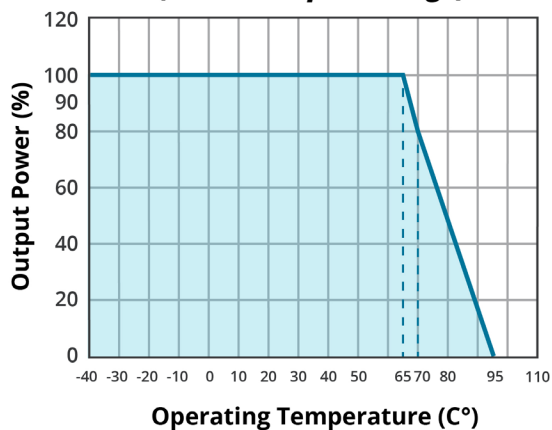


| PIN CONNECTIONS |        |                   |
|-----------------|--------|-------------------|
| PIN             | Single | Dual              |
| 1               | -Vin   | -Vin              |
| 2               | +Vin   | +Vin              |
| 3               | +Vout  | +Vout             |
| 4               | No pin | Trim <sup>7</sup> |
| 5               | GND    | -Vout             |
| 6               | Ctrl   | Ctrl              |

Note: 7. Available option.

## DERATING CURVES

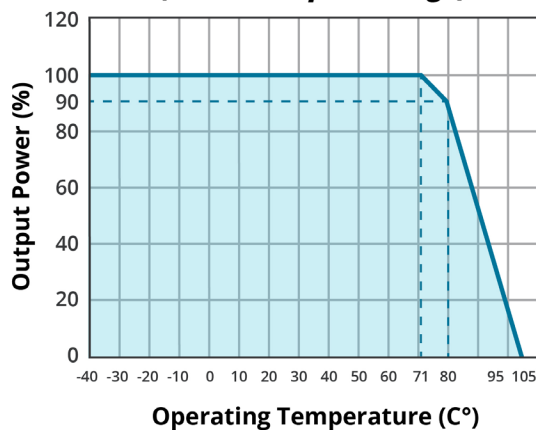
**TEMPERATURE DERATING CURVE**  
*single output models without heatsink*  
*(nominal input voltage)*



Key

3.3, 5 V output

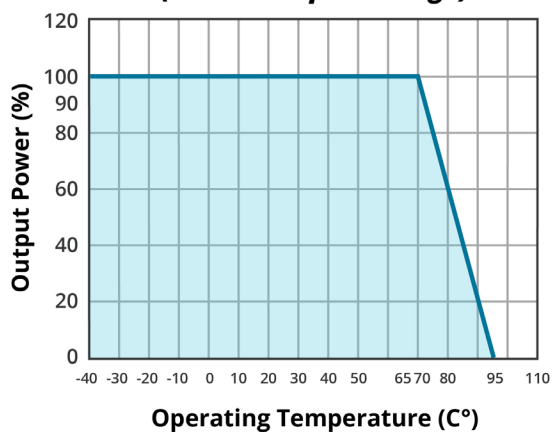
**TEMPERATURE DERATING CURVE**  
*single output models without heatsink*  
*(nominal input voltage)*



Key

>5 V output

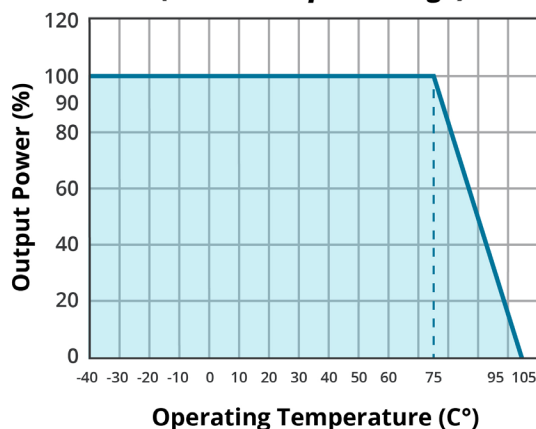
**TEMPERATURE DERATING CURVE**  
*single output models with heatsink*  
*(nominal input voltage)*



Key

3.3, 5 V output

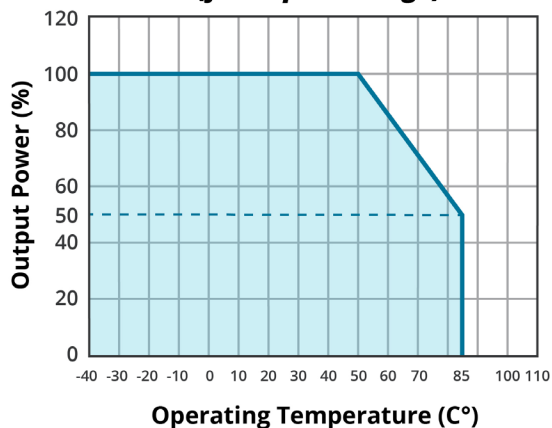
**TEMPERATURE DERATING CURVE**  
*single output models without heatsink*  
*(nominal input voltage)*



Key

>5 V output

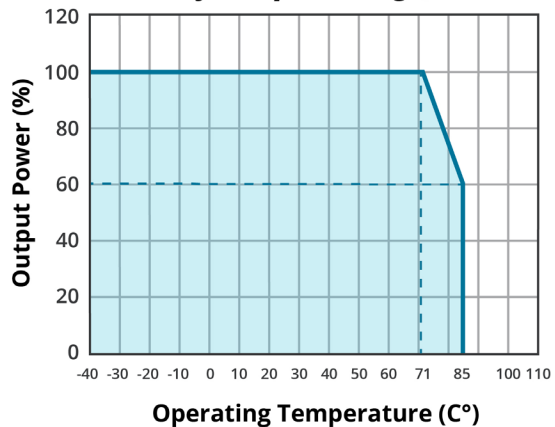
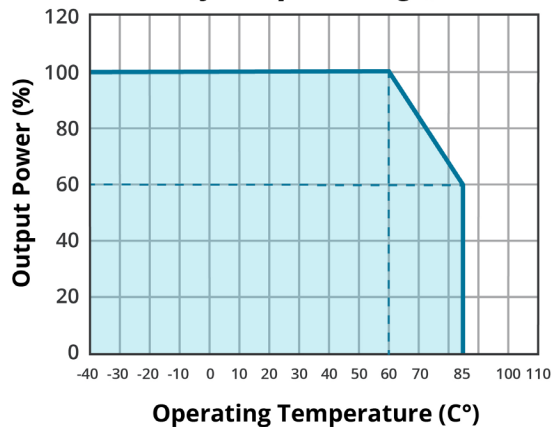
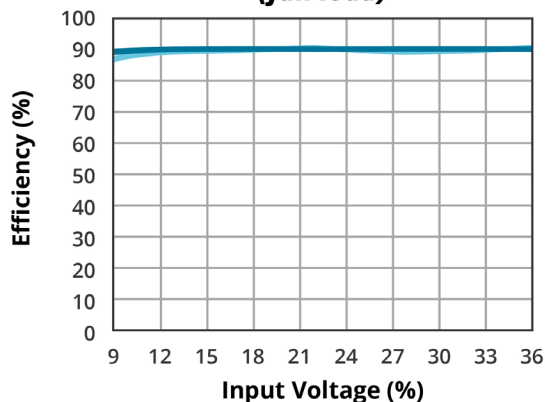
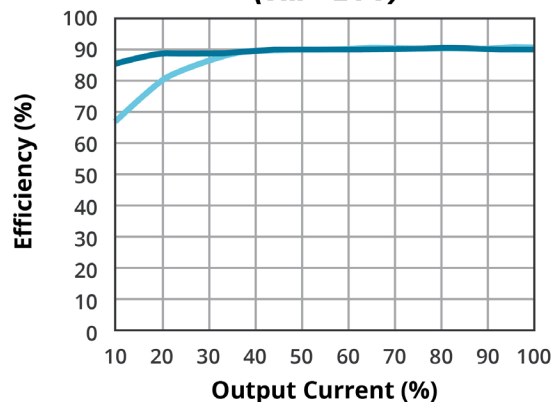
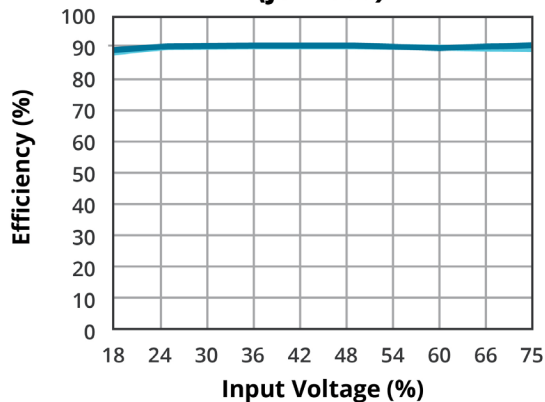
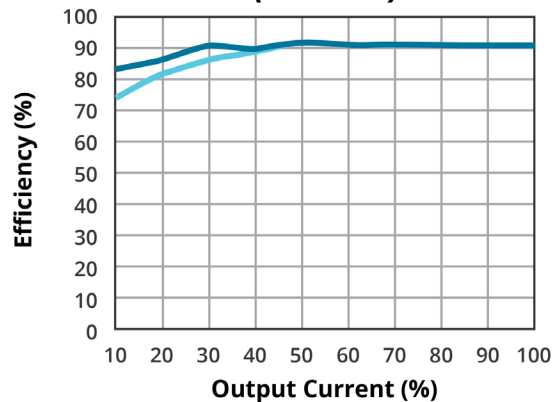
**TEMPERATURE DERATING CURVE**  
*single output models without heatsink*  
*(full input voltage)*



Key

single output  
models

## EFFICIENCY CURVES

**TEMPERATURE DERATING CURVE**  
*dual output models*  
*(full input voltage)***TEMPERATURE DERATING CURVE**  
*dual output models*  
*(full input voltage)***EFFICIENCY VS INPUT VOLTAGE**  
*(full load)***EFFICIENCY VS OUTPUT CURRENT**  
*(Vin = 24 V)***EFFICIENCY VS INPUT VOLTAGE**  
*(full load)***EFFICIENCY VS OUTPUT CURRENT**  
*(Vin = 48 V)*

## RIPPLE AND NOISE TEST INSTRUCTION

- The ripple noise test requires the following setup:
  - 12 twisted pair cables.
  - An oscilloscope configured to Sample Mode with a bandwidth of 20 MHz.
  - A 100 MHz bandwidth probe with the capacitor and ground removed.
  - Capacitors C2 (0.1  $\mu\text{F}$ ), a polypropylene capacitor, and C3 (10  $\mu\text{F}$ ), a high-frequency, low-resistance electrolytic capacitor, connected in parallel to the probes and one side of the twisted pair.
  - C0 and C1 refer to the application circuit as per the recommended specifications.
- The ripple noise procedure:
 

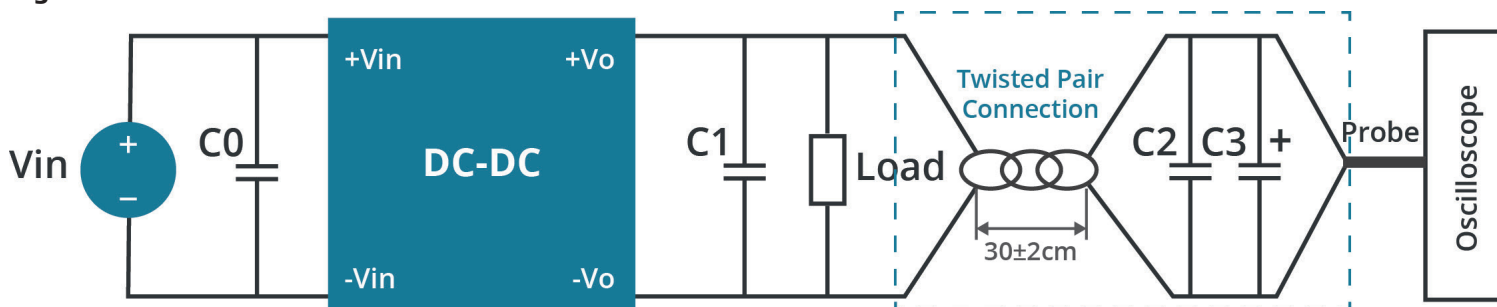
Connect the module input terminal (INPUT) to the input power supply.

Attach the power output terminal to the electronic load (LOAD) using the power line.

Sample the output from the power output port using a  $30 \pm 2$  cm twisted pair cable.

Ensure the cable is connected exclusively to the oscilloscope probe, maintaining proper polarity alignment.
- It is recommended to operate with a minimum 5% load or to connect an electrolytic capacitor with a high-frequency resistance of at least 470  $\mu\text{F}$ . Failure to do so may result in an increased output voltage ripple.
- For dual-channel output products, it is advised to maintain a load imbalance within  $\pm 5\%$ .

Figure 1



## RIPPLE AND NOISE TEST CIRCUIT

Figure 2

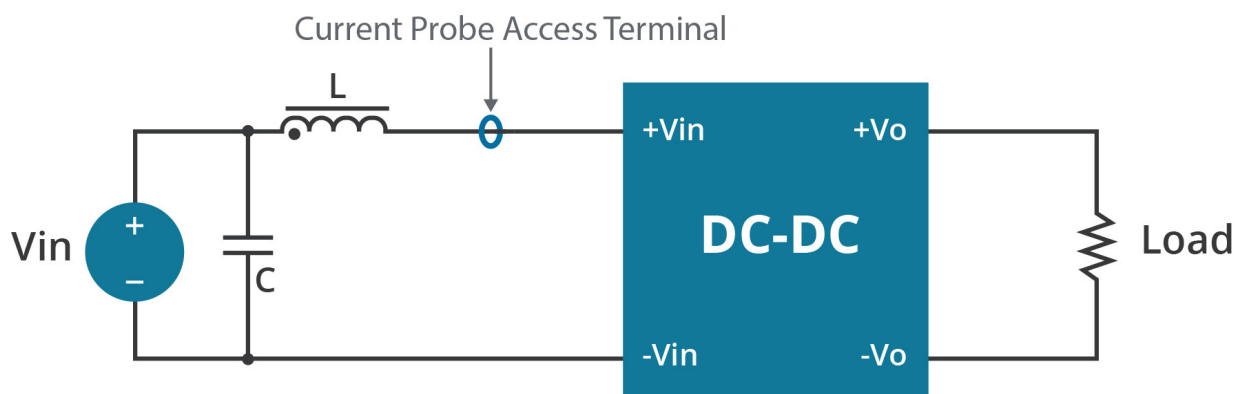
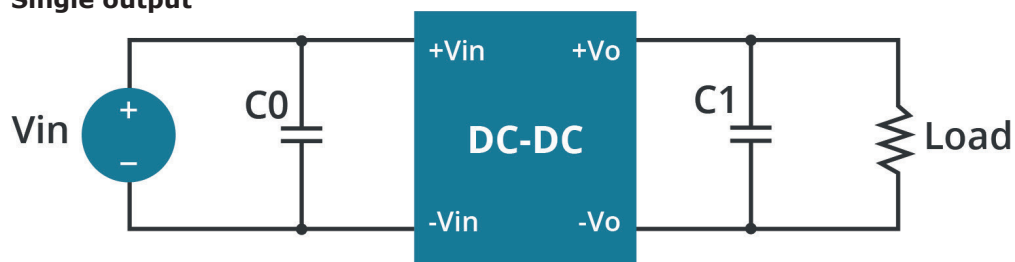


Table 1

| COMPONENT | PARAMETER                 |
|-----------|---------------------------|
| C         | 220 $\mu\text{F}$ / 100 V |
| L         | 4.7 $\mu\text{H}$ / 15 A  |

## APPLICATION NOTES

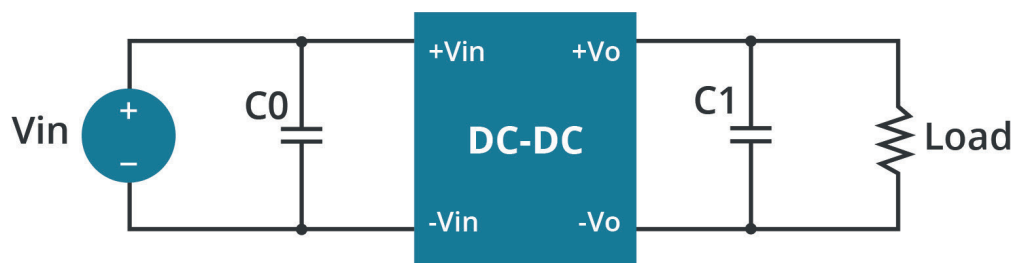
### Figure 3 Single output



### Table 2

| COMPONENT | PARAMETER           |
|-----------|---------------------|
| C0        | 100 $\mu$ F / 100 V |
| C1        | 22 $\mu$ F / 100 V  |

### Figure 4 Dual output

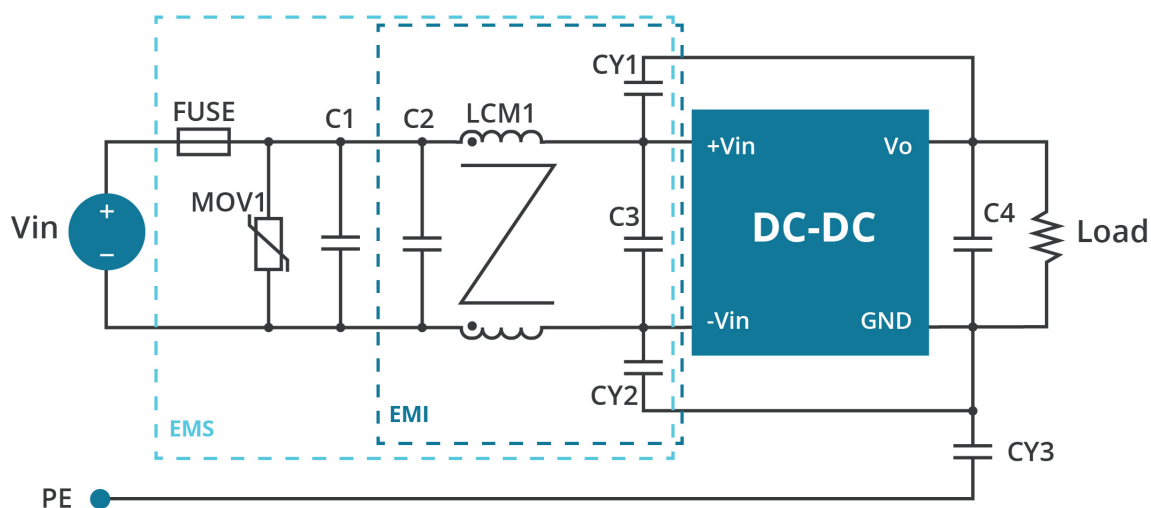


### Table 3

| COMPONENT | PARAMETER             |
|-----------|-----------------------|
| C0        | 47-100 $\mu$ F/ 100 V |
| C1        | 100 $\mu$ F/ 100 V    |

## EMC RECOMMENDED CIRCUIT

### Figure 5 Single output



### Table 4

|            |                  |                   |
|------------|------------------|-------------------|
| COMPONENT  | 24 Vdc           | 48 Vdc            |
| Fuse       | TBD by customer  |                   |
| MOV1       | 14D560K          | 14D101K           |
| LCM1       | 5 mH             |                   |
| C1, C2, C3 | 330 $\mu$ F/50 V | 330 $\mu$ F/100 V |
| C4         | 47 $\mu$ F/50 V  | 47 $\mu$ F/50 V   |
| CY1, CY2   | 2.2 nF/2 kV      |                   |

EMC RECOMMENDED CIRCUIT (CONTINUED)

Figure 6  
Dual output

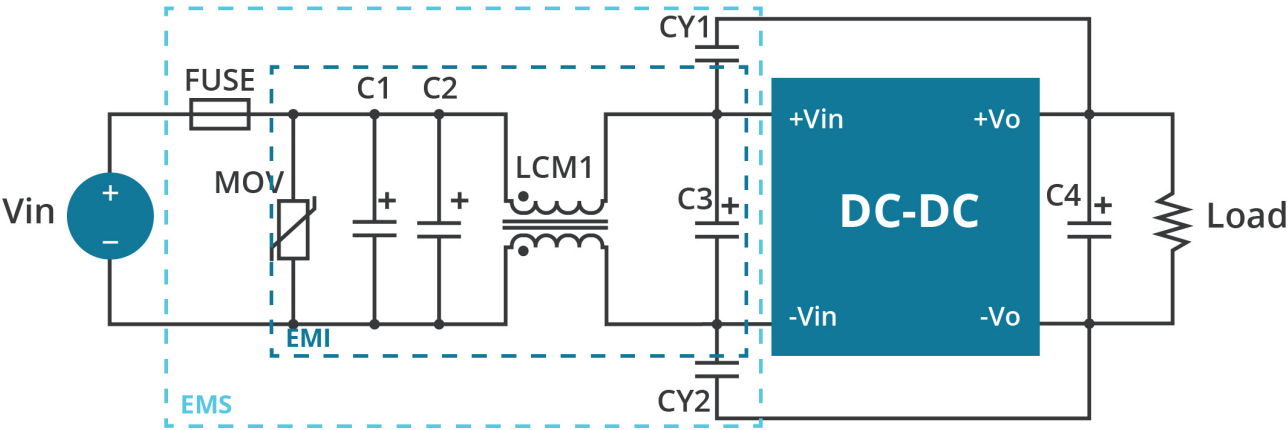


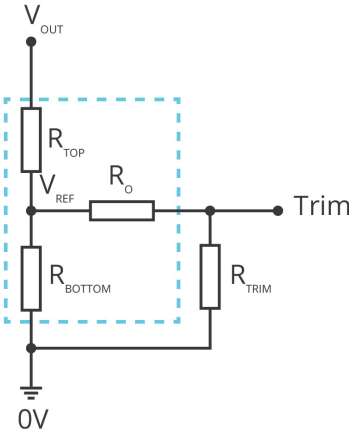
Table 5

| COMPONENT  | 24 Vdc           | 48 Vdc            |
|------------|------------------|-------------------|
| Fuse       | TBD by customer  |                   |
| MOV1       | 14D560K          | 14D101K           |
| LCM1       | 5 mH             |                   |
| C1, C2, C3 | 330 $\mu$ F/50 V | 330 $\mu$ F/100 V |
| C4         | 47 $\mu$ F/50 V  | 47 $\mu$ F/50 V   |
| CY1, CY2   | 2.2 nF/2 kV      |                   |

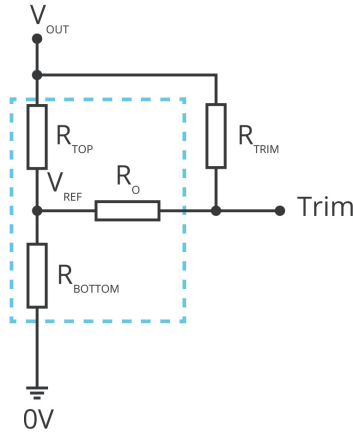
TRIM RESISTOR AND CALCULATION (SINGLE OUTPUT MODELS ONLY)

Figure 7

Trim up



Trim down



$$R_{TRIM} = \frac{a \cdot R_{BOTTOM}}{R_{BOTTOM} - a} - R_O$$
$$a = \frac{V_{REF}}{V_{OUT} - V_{REF}} \cdot R_{TOP}$$

Formula for Trim up

$$R_{TRIM} = \frac{a \cdot R_{TOP}}{R_{TOP} - a} - R_O$$
$$a = \frac{V_{OUT} - V_{REF}}{V_{REF}} \cdot R_{BOTTOM}$$

Formula for Trim down

Table 6

| V <sub>NOM</sub> | R <sub>TOP</sub> | R <sub>BOTTOM</sub> | R <sub>O</sub> | V <sub>REF</sub> |
|------------------|------------------|---------------------|----------------|------------------|
| (Vdc)            | (kΩ)             | (kΩ)                | (kΩ)           | (V)              |
| 3.3              | 4.22             | 2.55                | 18             | 1.25             |
| 5                | 5.10             | 5.10                | 20             | 2.50             |
| 9                | 9.31             | 3.58                | 24             | 2.50             |
| 12               | 18.0             | 4.75                | 33             | 2.50             |
| 15               | 18.0             | 3.60                | 30             | 2.50             |
| 24               | 30.0             | 3.48                | 30             | 2.50             |
| 28               | 20.0             | 2.94                | 30             | 2.50             |

Note: Value for R<sub>TOP</sub>, R<sub>BOTTOM</sub>, R<sub>O</sub>, and V<sub>REF</sub> refer to Table 6 (fixed internal values).  
R<sub>TRIM</sub>: Trim resistance  
a: User-defined parameter, no actual meanings  
V<sub>NOM</sub>: Nominal output voltage  
V<sub>OUT</sub>: Target output voltage

REVISION HISTORY

| rev. | description                                          | date       |
|------|------------------------------------------------------|------------|
| 1.0  | initial release                                      | 05/29/2025 |
| 1.01 | pin connections updated for the single output models | 01/21/2026 |
| 1.02 | trim resistor option added                           | 02/12/2026 |
| 1.03 | output current of the DQD20-24-S24 updated           | 03/26/2026 |

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



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