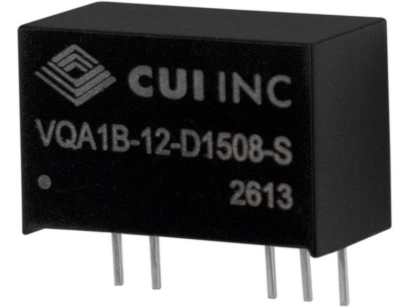


**SERIES:** VQA1B-S | **DESCRIPTION:** IGBT DRIVER DC-DC

**FEATURES**

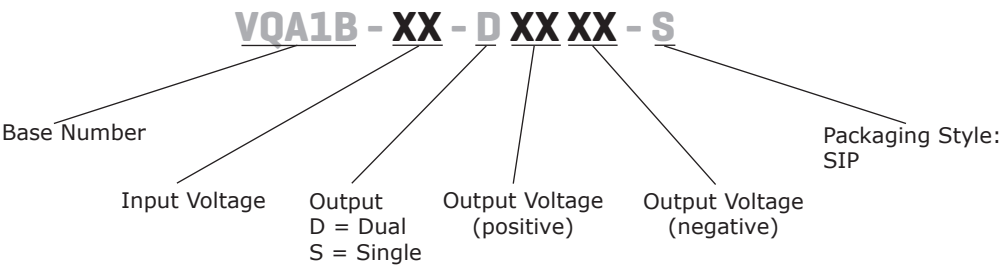
- designed for IGBT and SiC driver applications
- 7,000 Vdc isolation voltage
- CMTI >200 kV/μS
- -40 ~ 105°C temperature range with derating
- continuous short circuit protection
- EN/IEC 62368-1 certified


**MODEL**

|                  | <b>input voltage</b> |                    | <b>output voltage</b> | <b>output current</b> | <b>ripple and noise<sup>1</sup></b> | <b>efficiency<sup>2</sup></b> |
|------------------|----------------------|--------------------|-----------------------|-----------------------|-------------------------------------|-------------------------------|
|                  | <b>typ (Vdc)</b>     | <b>range (Vdc)</b> | (Vdc)                 | <b>max (mA)</b>       | <b>max (mVp-p)</b>                  | <b>typ (%)</b>                |
| VQA1B-5-D1505-S  | 5                    | 4.5~5.5            | 15<br>-5              | 80<br>-40             | 150                                 | 80                            |
| VQA1B-5-D1509-S  | 5                    | 4.5~5.5            | 15<br>-8.7            | 80<br>-40             | 150                                 | 81                            |
| VQA1B-5-D1803-S  | 5                    | 4.5~5.5            | 18<br>-3.5            | 80<br>-40             | 150                                 | 81                            |
| VQA1B-5-D2004-S  | 5                    | 4.5~5.5            | 20<br>-4              | 80<br>-40             | 150                                 | 84                            |
| VQA1B-5-D2005-S  | 5                    | 4.5~5.5            | 20<br>-5              | 80<br>-40             | 150                                 | 81                            |
| VQA1B-12-D1508-S | 12                   | 10.8~13.2          | 15<br>-8              | 100<br>-80            | 150                                 | 82                            |
| VQA1B-12-D1509-S | 12                   | 10.8~13.2          | 15<br>-8.7            | 80<br>-40             | 150                                 | 84                            |
| VQA1B-15-D1509-S | 15                   | 13.5 ~ 16.5        | 15<br>-8.7            | 80<br>-40             | 150                                 | 85                            |
| VQA1B-15-D1709-S | 15                   | 13.5 ~ 16.5        | 17<br>-8.7            | 80<br>-40             | 150                                 | 85                            |
| VQA1B-15-D2005-S | 15                   | 13.5 ~ 16.5        | 20<br>-5              | 80<br>-40             | 150                                 | 85                            |
| VQA1B-15-S09-S   | 15                   | 13.5 ~ 16.5        | 9                     | 111                   | 150                                 | 86                            |
| VQA1B-24-D1509-S | 24                   | 21.6~26.4          | 15<br>-8.7            | 80<br>-40             | 150                                 | 88                            |

- Notes:
1. Measured with 20 MHz bandwidth (peak-peak) using parallel line test method.
  2. Efficiency is measured at nominal input voltage and rated output load.
  3. The input voltage must not exceed the specified range; otherwise, it may cause permanent, irreparable damage.
  4. Unless otherwise specified, all parameters in this datasheet were measured at Ta = 25°C, humidity < 75% RH, and nominal input voltage.

PART NUMBER KEY



INPUT

| parameter                   | conditions/description | min  | typ    | max | units |
|-----------------------------|------------------------|------|--------|-----|-------|
| current (full load/no load) | VQA1B-5-D1505-S        |      | 327/32 |     | mA    |
|                             | VQA1B-5-D1509-S        |      | 370/32 |     | mA    |
|                             | VQA1B-5-D1803-S        |      | 362/32 |     | mA    |
|                             | VQA1B-5-D2004-S        |      | 410/32 |     | mA    |
|                             | VQA1B-5-D2005-S        |      | 419/32 |     | mA    |
|                             | VQA1B-12-D1508-S       |      | 204/7  |     | mA    |
|                             | VQA1B-12-D1509-S       |      | 145/7  |     | mA    |
|                             | VQA1B-15-D1509-S       |      | 116/6  |     | mA    |
|                             | VQA1B-15-D1709-S       |      | 127/6  |     | mA    |
|                             | VQA1B-15-D2005-S       |      | 136/6  |     | mA    |
|                             | VQA1B-15-S09-S         |      | 78/6   |     | mA    |
|                             | VQA1B-24-D1509-S       |      | 72/3   |     | mA    |
| input voltage (1 sec max)   | 5 Vdc input models     | -0.7 |        | 9   | Vdc   |
|                             | 12 Vdc input models    | -0.7 |        | 18  | Vdc   |
|                             | 15 Vdc input models    | -0.7 |        | 21  | Vdc   |
|                             | 24 Vdc input models    | -0.7 |        | 30  | Vdc   |
| filter                      | capacitance filter     |      |        |     |       |

OUTPUT

| parameter               | conditions/description                              | min | typ   | max   | units |
|-------------------------|-----------------------------------------------------|-----|-------|-------|-------|
| capacitive load         | VQA1B-5-D1505-S, VQA1B-12-D1509-S, VQA1B-15-D2005-S |     |       | 1,000 | µF    |
|                         | VQA1B-5-D1509-S, VQA1B-5-D1803-S, VQA1B-15-D1709-S  |     |       | 680   | µF    |
|                         | VQA1B-5-D2004-S, VQA1B-5-D2005-S                    |     |       | 470   | µF    |
|                         | all other models                                    |     |       | 2,200 | µF    |
| voltage accuracy        | 10%~100% load, see derating curves                  |     |       |       |       |
| line regulation         | 10% ~ 100% load                                     |     |       |       |       |
|                         | positive output                                     |     | ±1.2  | ±1.5  | %     |
|                         | negative output                                     |     | ±1.2  | ±1.5  | %     |
| load regulation         | 10% ~ 100% load                                     |     |       |       |       |
|                         | positive output                                     |     | 6     | 15    | %     |
|                         | negative output                                     |     | 8     | 15    | %     |
| temperature coefficient | at full load                                        |     | ±0.04 | ±0.1  | %/°C  |
| switching frequency     | at full load, nominal input                         |     | 250   |       | kHz   |

**OUTPUT (CONTINUED)**

| parameter      | conditions/description |                        | min   | typ   | max   | units |
|----------------|------------------------|------------------------|-------|-------|-------|-------|
| output voltage | VQA1B-5-D1505-S        | +Vo Vin=5V, +Io=80mA   | 13.88 | 14.63 | 15.38 | Vdc   |
|                |                        | -Vo Vin=5V, +Io=-40mA  | 4.40  | 4.80  | 5.05  | Vdc   |
|                | VQA1B-5-D1509-S        | +Vo Vin=5V, +Io=80mA   | 14.25 | 15.00 | 15.75 | Vdc   |
|                |                        | -Vo Vin=5V, +Io=-40mA  | 8.70  | 9.14  | 9.57  | Vdc   |
|                | VQA1B-5-D1803-S        | +Vo Vin=5V, +Io=80mA   | 16.56 | 17.46 | 18.36 | Vdc   |
|                |                        | -Vo Vin=5V, +Io=-40mA  | 2.67  | 2.96  | 3.14  | Vdc   |
|                | VQA1B-5-D2004-S        | +Vo Vin=5V, +Io=80mA   | 19.5  | 20.50 | 21.50 | Vdc   |
|                |                        | -Vo Vin=5V, +Io=-40mA  | 3.58  | 3.90  | 4.10  | Vdc   |
|                | VQA1B-5-D2005-S        | +Vo Vin=5V, +Io=80mA   | 19.10 | 20.10 | 21.10 | Vdc   |
|                |                        | -Vo Vin=5V, +Io=-40mA  | 4.37  | 4.78  | 5.03  | Vdc   |
|                | VQA1B-12-D1508-S       | +Vo Vin=12V, +Io=100mA | 14.40 | 15.15 | 15.90 | Vdc   |
|                |                        | -Vo Vin=12V, +Io=-80mA | 7.60  | 8.00  | 8.40  | Vdc   |
|                | VQA1B-12-D1509-S       | +Vo Vin=12V, +Io=80mA  | 13.95 | 14.70 | 15.45 | Vdc   |
|                |                        | -Vo Vin=12V, +Io=-40mA | 8.52  | 8.96  | 9.40  | Vdc   |
|                | VQA1B-15-D1509-S       | +Vo Vin=15V, +Io=80mA  | 14.17 | 14.93 | 15.68 | Vdc   |
|                |                        | -Vo Vin=15V, +Io=-40mA | 7.96  | 8.40  | 8.84  | Vdc   |
|                | VQA1B-15-D1709-S       | +Vo Vin=15V, +Io=80mA  | 15.98 | 16.83 | 17.68 | Vdc   |
|                |                        | -Vo Vin=15V, +Io=-40mA | 7.96  | 8.40  | 8.84  | Vdc   |
|                | VQA1B-15-D2005-S       | +Vo Vin=15V, +Io=80mA  | 18.70 | 19.70 | 20.70 | Vdc   |
|                |                        | -Vo Vin=15V, +Io=-40mA | 5.00  | 5.40  | 5.65  | Vdc   |
|                | VQA1B-15-S09-S         | +Vo Vin=15V, +Io=80mA  | 8.64  | 9.09  | 9.54  | Vdc   |
|                |                        | -Vo -                  | -     | -     | -     | Vdc   |
|                | VQA1B-24-D1509-S       | +Vo Vin=24V, +Io=+80mA | 13.95 | 14.70 | 15.45 | Vdc   |
|                |                        | -Vo Vin=24V, +Io=-40mA | 8.35  | 8.79  | 9.23  | Vdc   |

**PROTECTIONS**

| parameter                | conditions/description    | min | typ | max | units |
|--------------------------|---------------------------|-----|-----|-----|-------|
| short circuit protection | continuous, auto-recovery |     |     |     |       |

**SAFETY AND COMPLIANCE**

| parameter                    | conditions/description                                                 | min            | typ | max | units      |
|------------------------------|------------------------------------------------------------------------|----------------|-----|-----|------------|
| isolation voltage            | input to output for 1 minute, 1 mA max                                 | 5,000<br>7,000 |     |     | Vac<br>Vdc |
| isolation capacitance        | input to output, 100 kHz/0.1 V                                         |                | 5   | 10  | pF         |
| transient immunity           | common mode                                                            | 200            |     |     | kV/μs      |
| continuous withstand voltage |                                                                        | 2,400          |     |     | Vdc        |
| safety approvals             | certified to 62368-1: IEC, EN                                          |                |     |     |            |
| EMI                          | CISPR32/EN55032 Class B (with external filter, see recommended Fig. 4) |                |     |     |            |
| ESD                          | EN 61000-4-2, Contact: ±8 kV, perf. Criteria B                         |                |     |     |            |
| MTBF                         | as per MIL-HDBK-217F, at 25°C                                          | 3,500,000      |     |     | hours      |

**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         | 5   |     | 95  | %     |

SOLDERABILITY

| parameter                            | conditions/description | min | typ | max | units |
|--------------------------------------|------------------------|-----|-----|-----|-------|
| pin soldering resistance temperature | wave soldering, 5-10s  | 255 | 260 | 265 | °C    |
|                                      | hand soldering, 3-5s   | 350 | 360 | 370 | °C    |

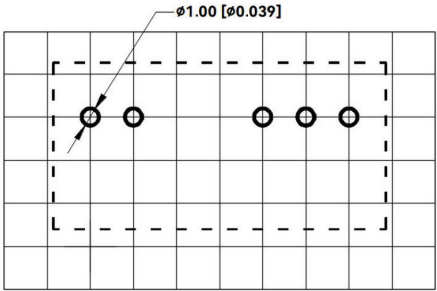
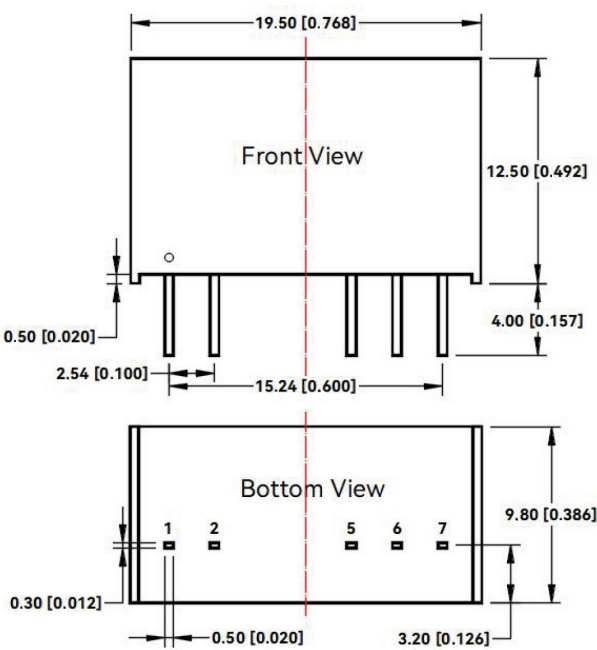
MECHANICAL

| parameter      | conditions/description                                      | min | typ | max | units |
|----------------|-------------------------------------------------------------|-----|-----|-----|-------|
| dimensions     | 19.50 x 9.80 x 12.50 [0.768 x 0.386 x 0.492 inch]           |     |     |     | mm    |
| material       | black plastic, flame-retardant and heat-resistant (UL94V-0) |     |     |     |       |
| weight         |                                                             |     | 4.3 |     | g     |
| cooling method | natural convection                                          |     |     |     |       |

MECHANICAL DRAWING

units: mm [inch]  
tolerance: ±0.50 [±0.020]  
pin section tolerance: ±0.1 [±0.004]

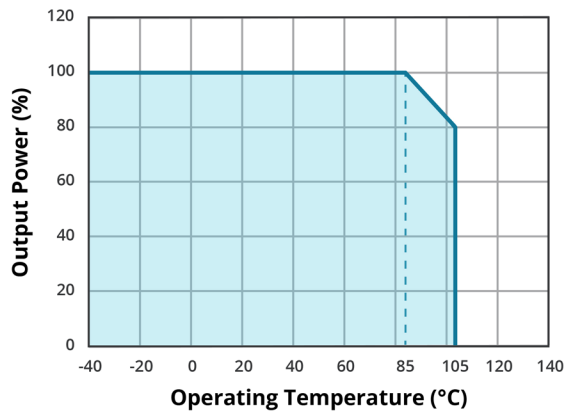
| PIN CONNECTIONS |          |
|-----------------|----------|
| PIN             | FUNCTION |
| 1               | Vin      |
| 2               | GND      |
| 5               | -Vo      |
| 6               | COM      |
| 7               | +Vo      |



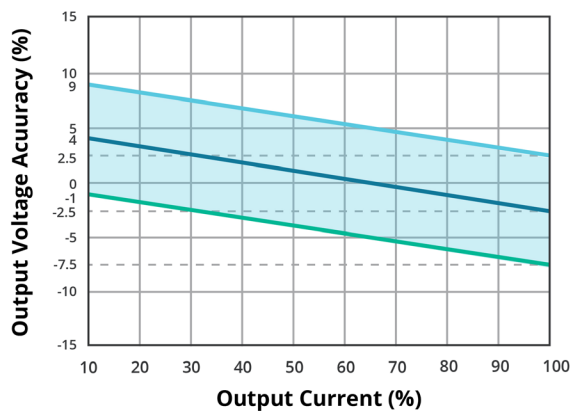
The grid distance is 2.54mm x2.54mm

## DERATING CURVES

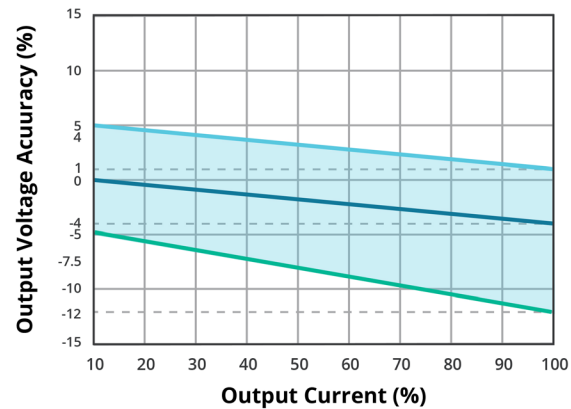
**TEMPERATURE DERATING CURVE**



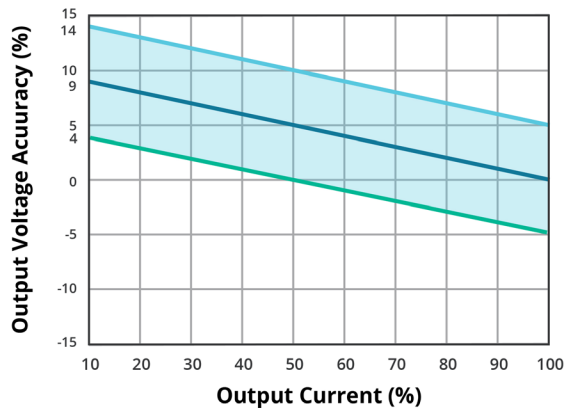
**OUTPUT REGULATION CURVE**  
**VQA1B-5-D1505-S**  
**(positive output, nominal input)**



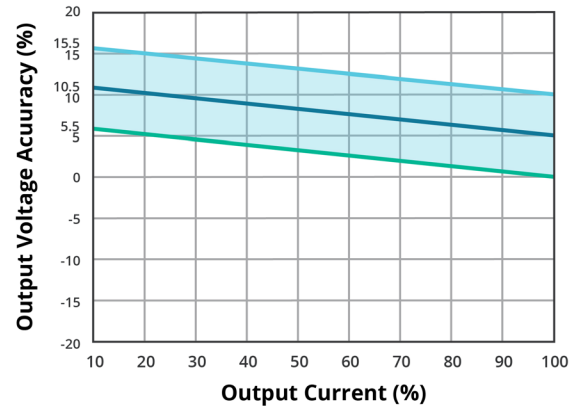
**OUTPUT REGULATION CURVE**  
**VQA1B-5-D1505-S**  
**(negative output, nominal input)**



**OUTPUT REGULATION CURVE**  
**VQA1B-5-D1509-S**  
**(positive output, nominal input)**

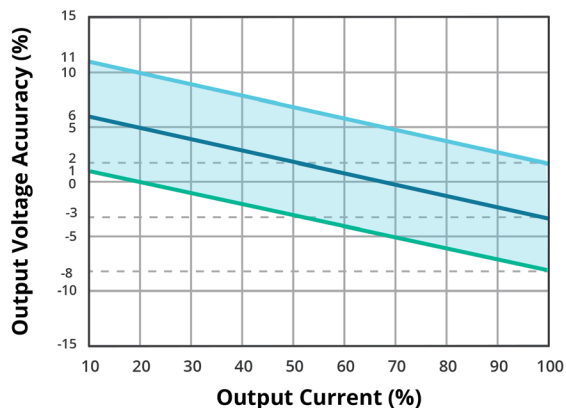


**OUTPUT REGULATION CURVE**  
**VQA1B-5-D1509-S**  
**(negative output, nominal input)**

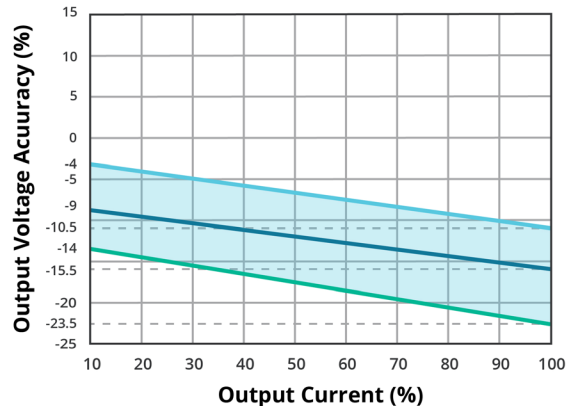


## DERATING CURVES

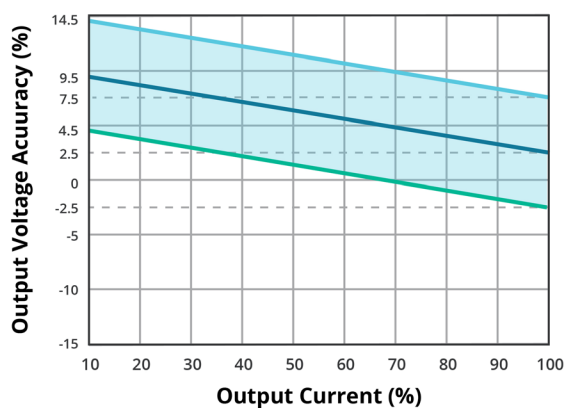
**OUTPUT REGULATION CURVE**  
**VQA1B-5-D1803-S**  
*(positive output, nominal input)*



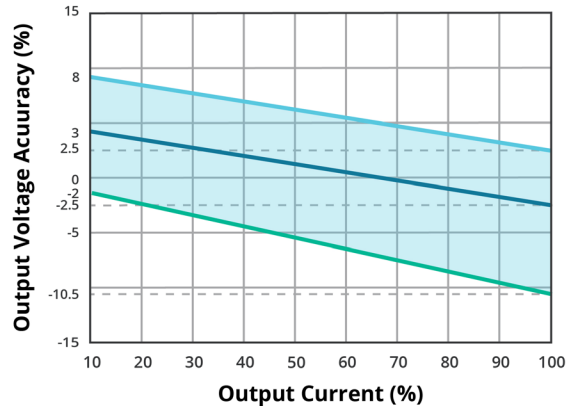
**OUTPUT REGULATION CURVE**  
**VQA1B-5-D1803-S**  
*(negative output, nominal input)*



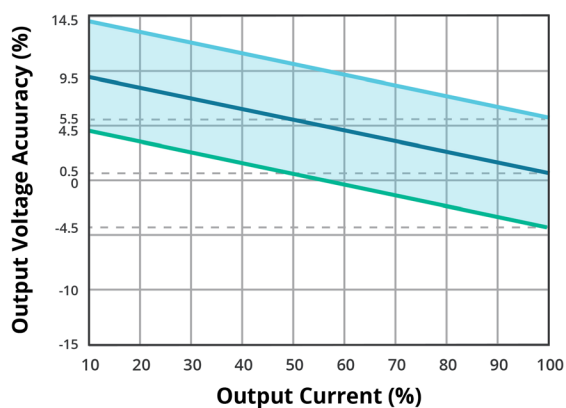
**OUTPUT REGULATION CURVE**  
**VQA1B-5-D2004-S**  
*(positive output, nominal input)*



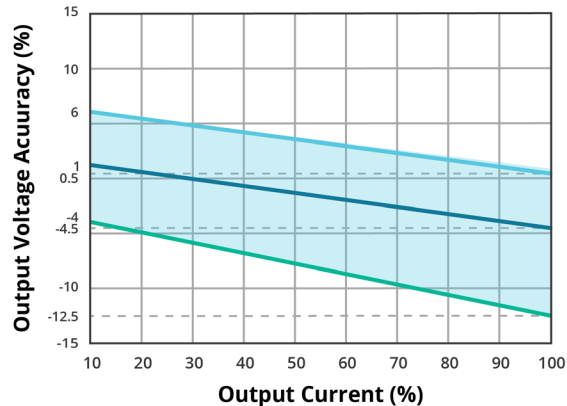
**OUTPUT REGULATION CURVE**  
**VQA1B-5-D2004-S**  
*(negative output, nominal input)*



**OUTPUT REGULATION CURVE**  
**VQA1B-5-D2005-S**  
*(positive output, nominal input)*

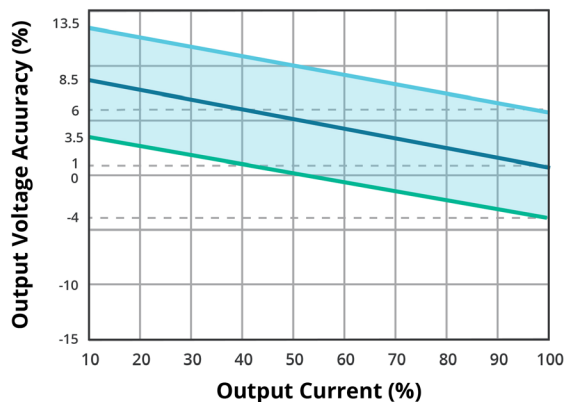


**OUTPUT REGULATION CURVE**  
**VQA1B-5-D2005-S**  
*(negative output, nominal input)*

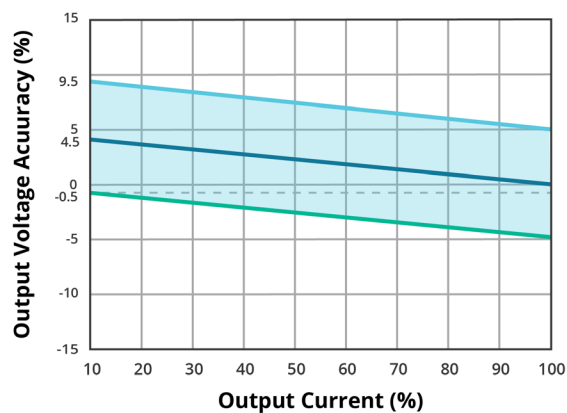


## DERATING CURVES (CONTINUED)

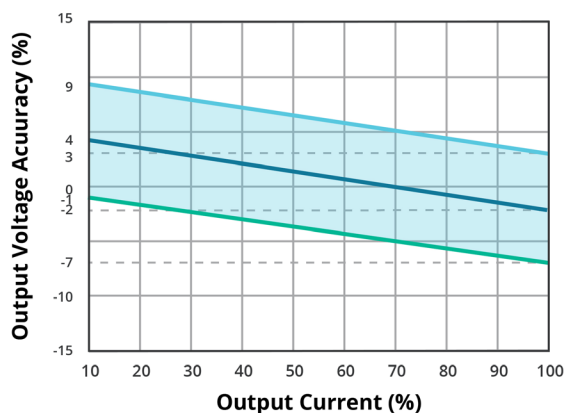
**OUTPUT REGULATION CURVE**  
**VQA1B-12-D1508-S**  
(positive output, nominal input)



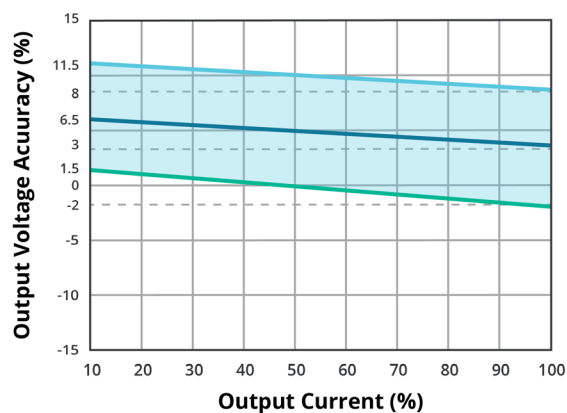
**OUTPUT REGULATION CURVE**  
**VQA1B-12-D1508-S**  
(negative output, nominal input)



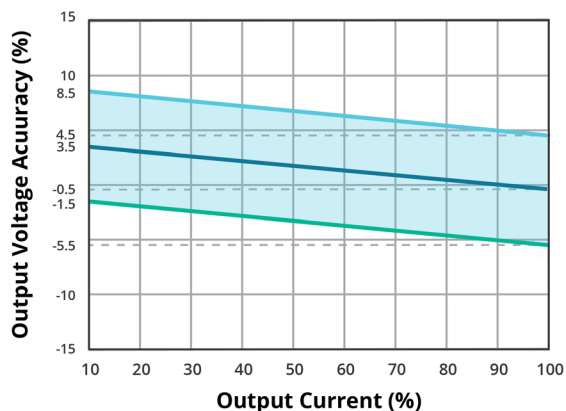
**OUTPUT REGULATION CURVE**  
**VQA1B-12-D1509-S**  
(positive output, nominal input)



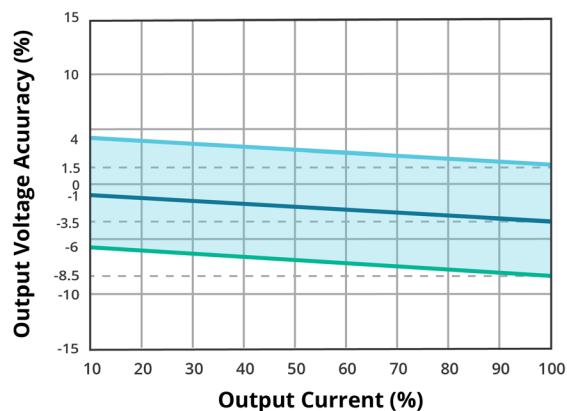
**OUTPUT REGULATION CURVE**  
**VQA1B-12-D1509-S**  
(negative output, nominal input)



**OUTPUT REGULATION CURVE**  
**VQA1B-15-D1509-S**  
(positive output, nominal input)

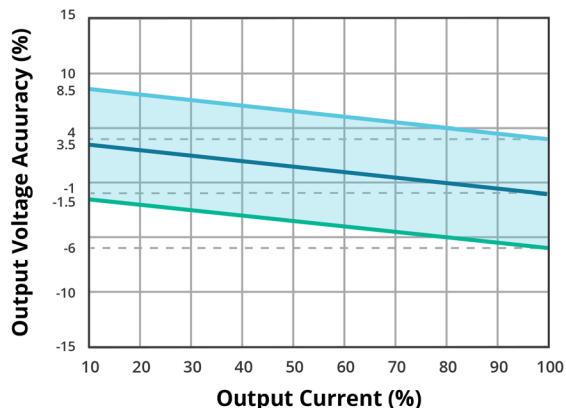


**OUTPUT REGULATION CURVE**  
**VQA1B-15-D1509-S**  
(negative output, nominal input)

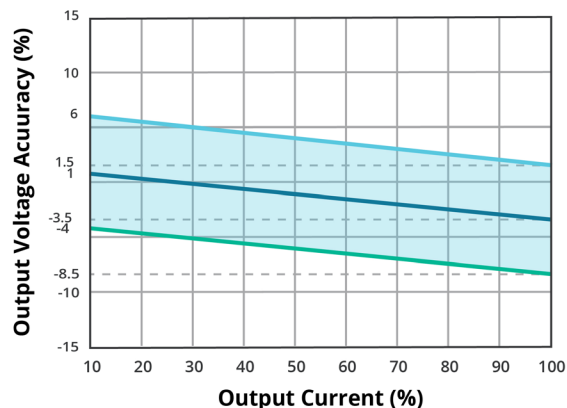


## DERATING CURVES (CONTINUED)

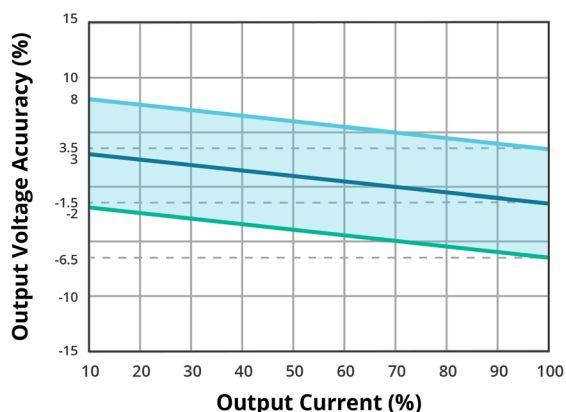
**OUTPUT REGULATION CURVE**  
**VQA1B-15-D1709-S**  
*(positive output, nominal input)*



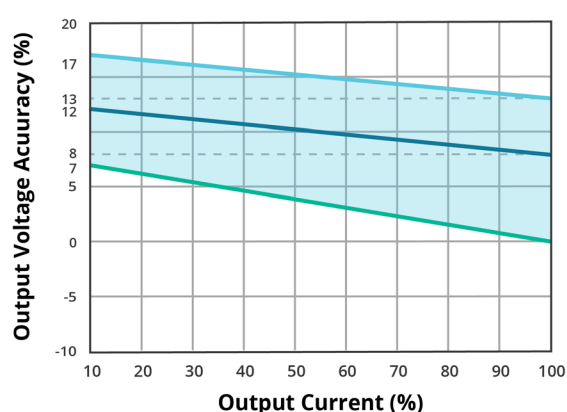
**OUTPUT REGULATION CURVE**  
**VQA1B-15-D1709-S**  
*(negative output, nominal input)*



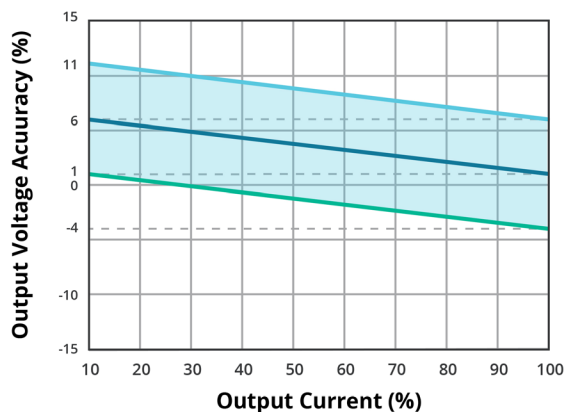
**OUTPUT REGULATION CURVE**  
**VQA1B-15-D2005-S**  
*(positive output, nominal input)*



**OUTPUT REGULATION CURVE**  
**VQA1B-15-D2005-S**  
*(negative output, nominal input)*

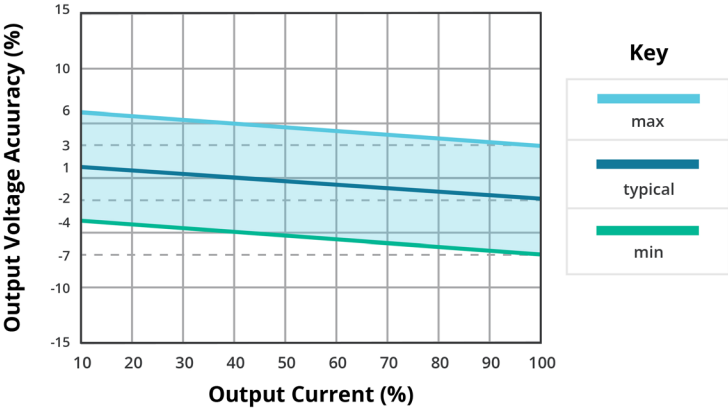


**OUTPUT REGULATION CURVE**  
**VQA1B-15-S09-S**  
*(nominal input)*

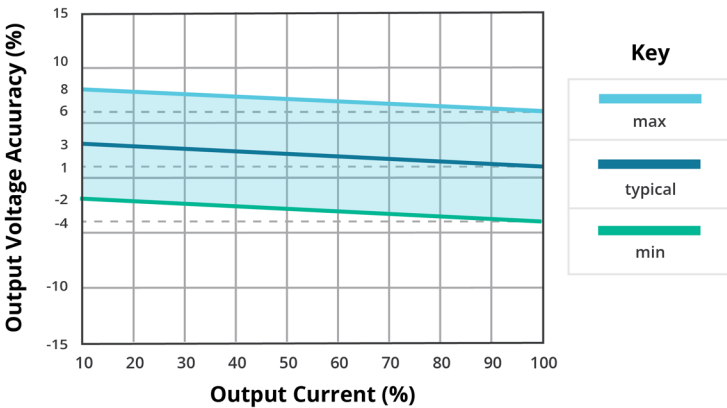


DERATING CURVES (CONTINUED)

OUTPUT REGULATION CURVE  
VQA1B-24-D1509-S  
(positive output, nominal input)



OUTPUT REGULATION CURVE  
VQA1B-24-D1509-S  
(negative output, nominal input)



TEST CONFIGURATIONS

Figure 1

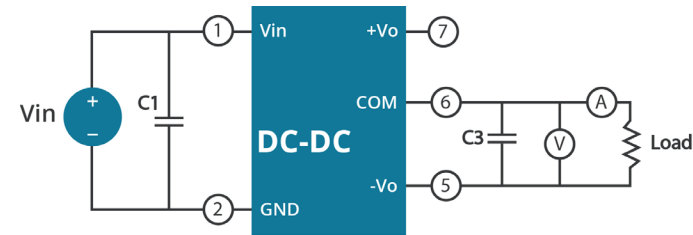
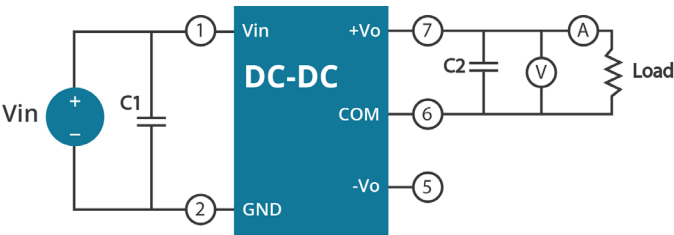


Figure 2



APPLICATION CIRCUIT

Figure 3

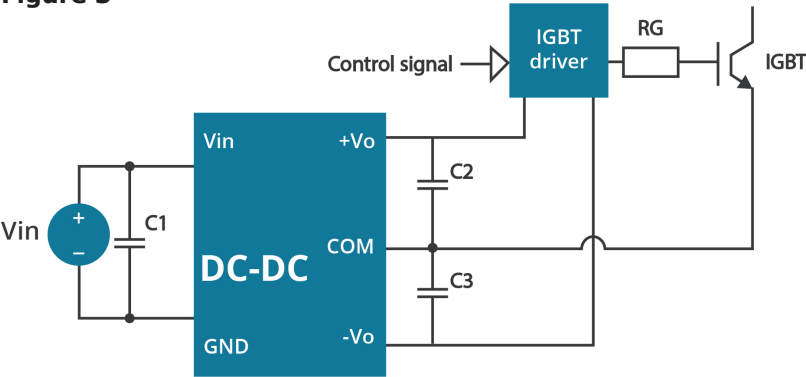


Table 1

| RECOMMENDED VALUE |                                                             |
|-------------------|-------------------------------------------------------------|
| C1, C2, C3        | 100 $\mu$ F / 35 V<br>(low internal resistance capacitance) |

Note: To reduce ripple noise, a 1  $\mu$ F to 10  $\mu$ F ceramic capacitor may be connected in parallel at the C2 and C3 terminals, respectively.

EMC RECOMMENDED CIRCUIT

Figure 4

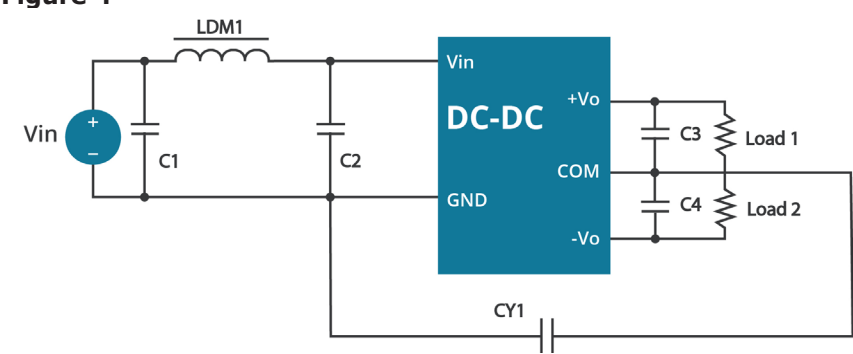


Table 2

| EMC RECOMMENDED PARAMETER |                    |
|---------------------------|--------------------|
| Vin                       | 5, 12, 15, 24 Vdc  |
| C1, C2                    | 4.7 $\mu$ F / 50 V |
| C3, C4                    | 10 $\mu$ F / 50 V  |
| LDM1                      | 33 $\mu$ H         |
| CY1                       | 330 pF             |

- Notes:
1. The leads connecting the power module to the IGBT driver should be as short as possible.
  2. The output filter capacitor should be placed as close as possible to the power module and IGBT driver.
  3. Because the IGBT gate drive current has a high peak value, it is recommended to use an electrolytic output filter capacitor with low ESR (internal resistance) on the power module output.
  4. The driver's average output power must be less than the PSU's rated output power.
  5. If used in environments with vibration, consider securing the module with adhesive (glue).
  6. The maximum capacitive load is verified under the specified input voltage range and full-load conditions.

## REVISION HISTORY

| rev. | description     | date       |
|------|-----------------|------------|
| 1.0  | initial release | 08/03/2026 |

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



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CUI offers a two (2) year limited warranty. Complete warranty information is listed on our website.

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