



Features

- Wide 2 : 1 Input Voltage Range(4.5~9V,9~18V,18~36V,36~75V)
- Input / Output Isolation Voltage: 1.5K Vdc
- Extended Operating Temperature Range: -40°C to +85°C
- Output Short Circuit Protection:
Continuous & Auto Recovery
- Over Voltage Protection: Clamp Mode
- UL94V-0 Package Material
- Lead Free Design, RoHS Compliant
- 24pin DIP Package with Industry-Standard Footprint
- Customer Design Available



Description

The BQA3R Series are isolated 3W DC/DC converters. Designed with highly efficiency, allow the operating temperature range of these units to be -40°C to +85°C in a 24 pin DIP package with industry-standard footprint. Further features include wide 2 : 1 input voltage range, short-circuit protection and over voltage protection.

Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

Technical Specification

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

| Model Number | Input Voltage Range | Output Voltage (Vdc) | Output Current (mA) | | Input Current (mA) | | Eff. ⁽²⁾ (%) | Capacitive Load, max. ⁽³⁾ (uF) |
|--------------|-------------------------|----------------------|--------------------------|------------|--------------------|-----------|-------------------------|---|
| | | | Min. Load ⁽¹⁾ | Full. Load | No Load | Full Load | | |
| BQA3-05S0R | 4.5~9V Nominal:5Vdc | 3.3 | 0 | 600 | 46 | 552 | 76 | 4000 |
| BQA3-05S1R | | 5 | 0 | 500 | 44 | 646 | 81 | 4000 |
| BQA3-05S2R | | 12 | 0 | 250 | 62 | 769 | 82 | 4000 |
| BQA3-05S3R | | 15 | 0 | 200 | 67 | 760 | 83 | 4000 |
| BQA3-05D1R | | ±5 | 0 | ±250 | 55 | 638 | 82 | 1000 |
| BQA3-05D2R | | ±12 | 0 | ±125 | 83 | 766 | 82 | 1000 |
| BQA3-05D3R | | ±15 | 0 | ±100 | 89 | 765 | 82 | 1000 |
| BQA3-12S0R | 9~18V Nominal:12Vdc | 3.3 | 0 | 600 | 26 | 223 | 78 | 4000 |
| BQA3-12S1R | | 5 | 0 | 500 | 24 | 263 | 83 | 4000 |
| BQA3-12S2R | | 12 | 0 | 250 | 35 | 314 | 84 | 4000 |
| BQA3-12S3R | | 15 | 0 | 200 | 36 | 311 | 84 | 4000 |
| BQA3-12D1R | | ±5 | 0 | ±250 | 29 | 262 | 83 | 1000 |
| BQA3-12D2R | | ±12 | 0 | ±125 | 44 | 313 | 84 | 1000 |
| BQA3-12D3R | | ±15 | 0 | ±100 | 59 | 317 | 83 | 1000 |
| BQA3-24S0R | 18~36V Nominal:24Vdc | 3.3 | 0 | 600 | 20 | 112 | 78 | 4000 |
| BQA3-24S1R | | 5 | 0 | 500 | 23 | 133 | 82 | 4000 |
| BQA3-24S2R | | 12 | 0 | 250 | 26 | 157 | 84 | 4000 |
| BQA3-24S3R | | 15 | 0 | 200 | 26 | 156 | 84 | 4000 |
| BQA3-24D1R | | ±5 | 0 | ±250 | 22 | 133 | 83 | 1000 |
| BQA3-24D2R | | ±12 | 0 | ±125 | 30 | 159 | 83 | 1000 |
| BQA3-24D3R | | ±15 | 0 | ±100 | 40 | 160 | 82 | 1000 |
| BQA3-48S0R | 36~75V Nominal:48Vdc | 3.3 | 30 | 600 | 10 | 57 | 76 | 4000 |
| BQA3-48S1R | | 5 | 0 | 500 | 9 | 67 | 81 | 4000 |
| BQA3-48S2R | | 12 | 0 | 250 | 11 | 79 | 83 | 4000 |
| BQA3-48S3R | | 15 | 0 | 200 | 12 | 79 | 83 | 4000 |
| BQA3-48D1R | | ±5 | 0 | ±250 | 10 | 67 | 82 | 1000 |
| BQA3-48D2R | | ±12 | 0 | ±125 | 14 | 79 | 82 | 1000 |
| BQA3-48D3R | | ±15 | 0 | ±100 | 18 | 80 | 82 | 1000 |

**Input Specifications**

| | | |
|---------------|-------------------|----------|
| Input Voltage | 5V nominal input | 4.5-9Vdc |
| | 12V nominal input | 9-18Vdc |
| | 24V nominal input | 18-36Vdc |
| | 48V nominal input | 36-75Vdc |

| | | |
|-------------------------------------|---|---------------------------|
| Input filter | | Pi Type |
| | 5V input | 10Vdc |
| | 12V input | 25Vdc |
| Input surge voltage (100ms max.) | 24V input | 50Vdc |
| | 48V input | 100Vdc |
| Input reflected ripple current | Nominal Vin and full load | 100mA _{p-p} max. |
| Start up time | Nominal Vin and constant resistive load | 100ms max. |

Environmental Specifications

| | | |
|-------------------------------|--------------------------------|--|
| Operating ambient temperature | -40°C to +85°C (with derating) | |
| Maximum case temperature | +90°C | |
| Storage temperature range | -40°C to +125°C | |
| Relative humidity | 5% to 95% RH | |
| Temperature coefficient | ±0.02% / °C max. | |

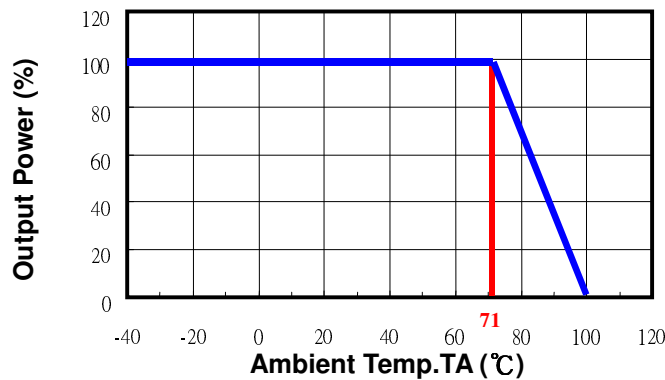
Output Specifications

| | | |
|--|---------------------------------------|--------------------------|
| Output power | 3 Watts max. | |
| Voltage accuracy | Full load and nominal Vin | ±1% |
| Minimum load | See table | |
| Line Regulation | LL to HL at full load | ±0.5% |
| | 25% load to full load | Single ±0.5% |
| Load Regulation | Balanced load | Dual ±0.5% |
| | Unbalanced load 25% to 100% full load | ±3% |
| Ripple and Noise | 20MHz bandwidth | 60mV _{p-p} max. |
| Over voltage protection (Zener Diode Clamp) | 3.3V _{out} models | 3.9V |
| | 5V _{out} models | 6.2V |
| | 12V _{out} models | 15V |
| | 15V _{out} models | 18V |
| Capacitive load | See table | |
| Over load protection | % of full load at nominal input | 110% typ. |
| Short circuit protection | Continuous, automatic recovery | |
| Transient response settling time | 50% load step change | 46ms max. |
| Transient response over shoot | di/dt=0.8A/μs | ≤ ±5% of Vo |

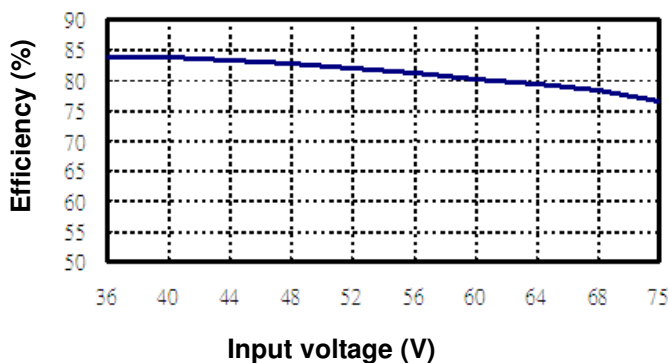


| General Specifications | | |
|------------------------------|-----------------|--|
| Efficiency | Nominal input | See table |
| Isolation voltage | Input to output | 1500Vdc |
| Isolation resistance | 500Vdc | 10 ⁹ Ohms min. |
| Isolation capacitance | | 280pF typ. |
| Switching frequency | | 150kHz typ. |
| Reliability, calculated MTBF | | 1.1 × 10 ⁶ Hrs |
| Physical Specifications | | |
| Case material | | Non-conductive black plastic |
| Base material | | Non-conductive black plastic |
| Potting material | | Silicon rubber (UL94V-0) |
| Dimensions | | 1.25 × 0.80 × 0.40 Inches (31.8 × 20.3 × 10.2 mm) |
| Weight | | 12.8g (0.45oz) (typical) |

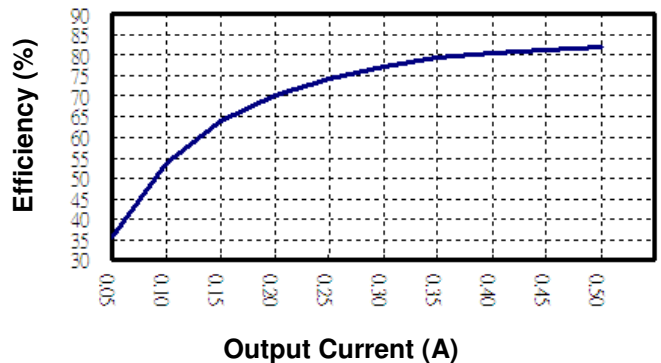
**BQA3R Series
Power Derating Curve⁽⁴⁾**



**BQA3-48S1R
Input voltage vs. Efficiency**



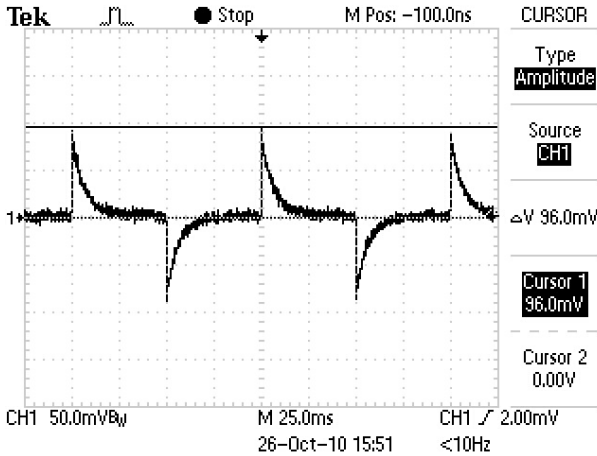
**BQA3-48S1R
Output Current vs. Efficiency**





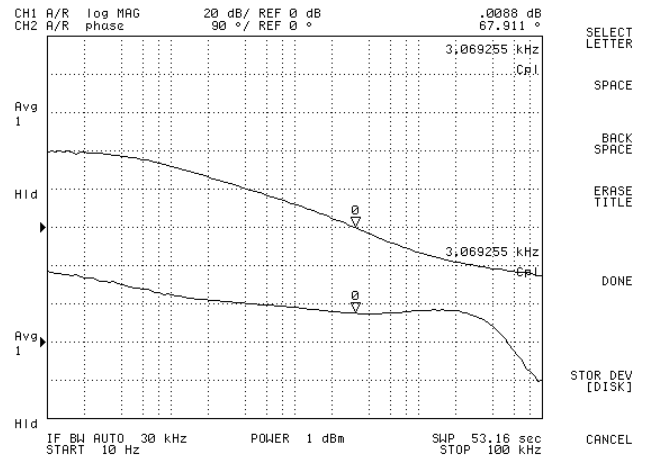
BQA3-48S1R

Transient Response at 50%~100% Max Load



BQA3-48S1R

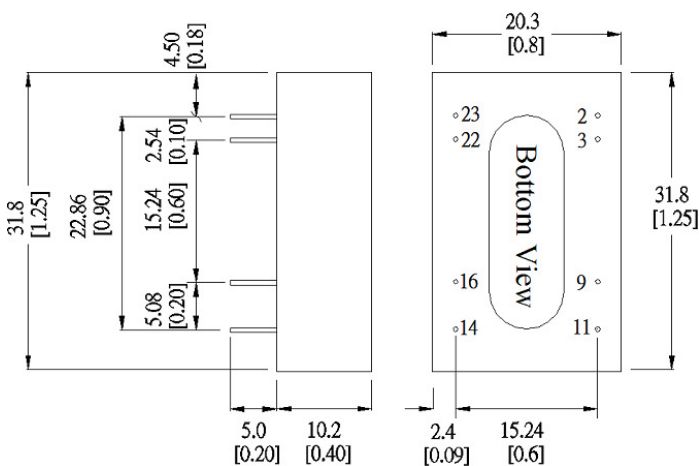
Loop Gain & Phase at Vi=48V, Full Load



Note

1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. Based on BQA3-48S1R.

Mechanical Dimensions



Unit: mm [inch]
 Tolerance: ±0.5 [0.02]
 Pin diameter $\Phi 0.5 \pm 0.05$ (0.02) ± 0.002

| Pin Assignment | | |
|----------------|---------|--------|
| Pin | Single | Dual |
| 2 | -Vin | -Vin |
| 3 | -Vin | -Vin |
| 9 | No pin | Common |
| 11 | No con. | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Common |
| 22 | +Vin | +Vin |
| 23 | +Vin | +Vin |

Specifications subject to change without notice.