

# Flex Power Modules

## DC/DC Converters for Data Center Applications

2026

flex

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# Powering your innovation

## About Flex Power Modules

Flex Power Modules specializes in designing and manufacturing scalable DC/DC converter solutions that enhance efficiency across data center, telecom, industrial, and transportation markets. As a global leader in digitally enabled DC/DC converters, we offer a broad spectrum of both isolated and non-isolated solutions. Our products are distinguished by PMBus compatibility, supported by our powerful and free software design tool – Flex Power Designer, ensuring that our solutions are not only powerful but also easy to integrate and optimize for maximum system efficiency.

## Data center applications

Our extensive product portfolio is tailored for the unique power requirements of data centers, which typically operate within a narrow 40-60V supply voltage range, distinct from the wider 36-72V input voltage required in telecom applications. In the data center market, we provide highly efficient power solutions for cloud, storage, hyperscale computing, AI, and network security applications. We lead innovation in this sector by employing advanced LLC and SCC topologies and cutting-edge components to achieve exceptional power densities. Additionally, our Vertical Power Delivery (VPD) designs facilitate direct underside connections to the power pins of processors and ASICs, further enhancing efficiency and performance in demanding data center environments.

Vertical Power Delivery is transforming the way data centers manage their power needs, offering a groundbreaking approach that significantly reduces energy losses and enhances overall efficiency. Traditional lateral power delivery methods often result in substantial power dissipation across the printed circuit board (PCB), leading to higher energy costs and increased thermal management challenges. By contrast, VPD minimizes the distance power travels by positioning voltage regulators directly beneath high-demand processors, such as those used in generative AI (GenAI) applications. This proximity reduces power plane resistance and improves current density, leading to a dramatic decrease in power losses and a more reliable, efficient power supply.

For technical support, please email pm.info@flex.com



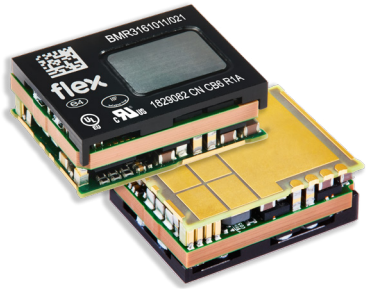
# 48V Non-isolated unregulated DC/DC converters

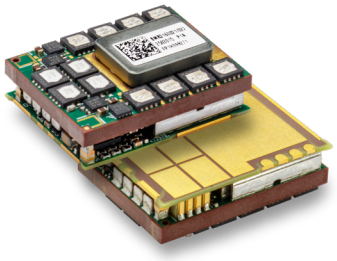
## DIGITAL IBC CONVERTER WITH A FIXED RATIO 4:1

### BMR316 (1000W / 2800W$_{pk}$)

**Main features**

- Unregulated 4:1 fixed ratio converter
- Continuous power 1 kW; peak power 2.8kW
- Efficiency up to 97.7%
- High density IBC up to 15,528W/in$^3$ (942W/cm$^3$)
- Non-isolated DC/DC converter
- Digital PMBus interface
- LGA industry standard footprint and pinout
- Optimized thermal design for cold wall mounting
- Variants available with internal & external PG pull-up
- Optional base address 0x6n/0x1n



**Dimensions**

23.4 x 17.8 x 7.65mm / 0.92 x 0.7 x 0.3 in

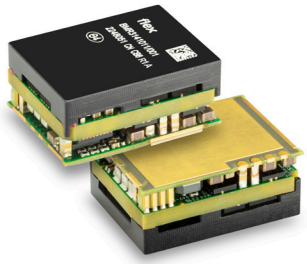
| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ RANGE (V) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|
| BMR3161011/021 | 38-60 | 9.5-15 | 1000 | 2800 | 97.7 |
| BMR3160021/024* | 38-60 | 9.5-15 | 1000 | 2800 | 97.7 |

* open frame

### BMR314 (800W / 1500W$_{pk}$)

**Main features**

- Unregulated 4:1 fixed ratio converter
- Continuous power 800W; peak power 1.5kW
- High efficiency up to 97.4% at half load
- Non-isolated DC/DC converter
- Digital interface compatible with PMBus



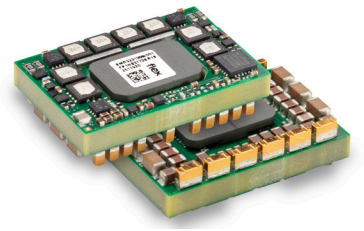
**Dimensions**

23.4 x 17.8 x 9.6 mm / 0.92 x 0.7 x 0.38 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $P_{OUT}$ (W) | $P_{OUT\ PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|
| BMR3141011/001 | 38-60 | 9.5-15 | 800 | 1500 | 97.4 |

# DIGITAL IBC CONVERTER WITH A FIXED RATIO 8:1

## BMR323 (600W / 1200W$_{pk}$)



### Main features

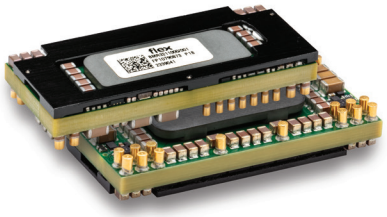
- Unregulated 8:1 fixed ratio converter
- Non-isolated IBC
- Digital interface compatible with PMBus
- Continuous power 600W and peak power 1.2kW
- High efficiency up to 97.8%
- Parallelable up to 6 units
- Based on HSC technology

### Dimensions

27 x 18 x 6.7 mm / 1.06 x 0.71 x 0.26 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $P_{OUT}$ (W) | $P_{OUT\ PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|
| BMR3231000/001 | 40-60 | 5-7.5 | 600 | 1200 | 97.8 |

## BMR321 (750W / 1500W$_{pk}$)



### Main features

- Unregulated 8:1 fixed ratio converter
- Continuous power 750W; peak power 1.5kW
- High efficiency above 98%
- Non-isolated, digital
- Digital interface compatible with PMBus
- Parallelable up to 3 units
- New technology low voltage bus ideal for AI
- Following Open Compute Project standard OAM v2.0

### Dimensions

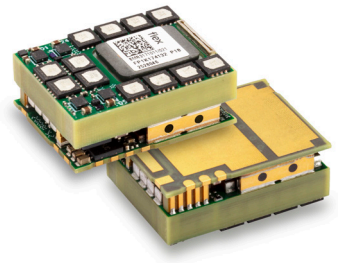
41.47 x 17.67 x 6.9 mm / 1.63 x 0.69 x 0.27 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $P_{OUT}$ (W) | $P_{OUT\ PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|
| BMR3211000/001 | 40-60 | 5-7.5 | 750 | 1500 | 98.4 |

## BMR317 (up to 1000W / 2500W$_{pk}$)

**Main features**

- Unregulated 8:1 fixed ratio converter
- Continuous power 800W; peak power 2 kW
- Efficiency up to 97.2%
- Open frame
- Non-isolated, digital
- Digital interface compatible with PMBus
- LGA footprint and pinout



23.4 x 17.8 x 8.7 mm / 0.92 x 0.7 x 0.34 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $P_{OUT}$ (W) | $P_{OUT\ PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|
| BMR3170011/021 | 40-60 | 5-7.5 | 800 | 2000 | 97.2 |
| BMR3170011/031 | 40-60 | 5-7.5 | 1000 | 2500 | TBD |

# 48V Non-isolated regulated DC/DC converters

## DIGITAL DC/DC CONVERTER

### Quarter brick | BMR350 (up to 1300W / 1700W$_{pk}$)



**Main features**

- Fully regulated output
- High efficiency up to 98%
- Digital interface and compatible with DOSA 7-pin standard
- Event data recorder
- Both Active Current Sharing and Droop Load Sharing parallelable options available

**Dimensions**

58.4 x 36.8 x 12.5 mm / 2.3 x 1.45 x 0.47 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|---|
| BMR3502100/031* | 40-60 | 12 | 72 | 860 | 1200 | 97.7 |
| BMR3504102/002** | 40-60 | 12 | 72 | 860 | 1200 | 97.8 |
| BMR3504250/531* | 40-60 | 12 | 108 | 1300 | 1700 | 97.8 |
| BMR350x253/803** | 40-60 | 12.2 | 108 | 1300 | 1700 | 97.7 |
| BMR3502101/801* | 40-60 | 12.12 | 72 | 860 | — | 97.8 |
| BMR3502102/802 | 40-60 | 12.12 | 50 | 600 | — | 98.1 |

*Active Current Sharing **Droop load share

### Quarter brick | BMR351 (up to 1600W / 2320W$_{pk}$)



**Main features**

- Fully regulated output of 12V
- Efficiency 97.8%
- Event data recorder
- Paralleling with DLS or ACS
- Available as open frame and baseplated

**Dimensions**

58.4 x 36.8 x 14.2-14.7 mm / 2.3 x 0.89 x 0.56-0.58 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|---|
| BMR3512202/002 | 40-60 | 12.2 | 136 | 1600 | 2320 | 97.8 |
| BMR3512201/031* | 40-60 | 12.2 | 136 | 1600 | 2320 | 97.8 |

*Active Current Sharing

## Quarter brick | BMR352 (2000W / 3000W$_{pk}$)



### Main features

- Fully regulated output of 12.2V
- Continuous power 2kW, peak power 3kW for < 0.5 sec
- Efficiency up to 97.7%
- Non-isolated DC/DC in quarter brick
- Event Data Recorder
- Parallel operation with Active Current Sharing
- Event data recorder

### Dimensions

58.4 x 36.8 x 14.5 mm / 2.30 x 1.45 x 0.58 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|---|
| BMR3522200/031 | 40-60 | 12.2 | 167 | 2000 | 3000 | 97.9 |

## Eighth brick | BMR353 (860W / 1200W$_{pk}$)



### Main features

- Fully regulated output of 12.2V
- Continuous power 860W, peak power 1200W
- Efficiency up to 97.4%
- Non-isolated & digital DC/DC
- Paralleling with Active Current Sharing

### Dimensions

58.4 x 22.7 x 12.8 mm / 2.3 x 0.89 x 0.5 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|---|
| BMR3532100/001 | 40-60 | 12.2 | 72 | 860 | 1200 | 97.4 |

# 48V Isolated regulated DC/DC converters

## DIGITAL DC/DC CONVERTER

### Eighth brick | BMR492 (up to 800W / 1100$W_{pk}$)



**Main features**

- Fully regulated output of 12V, 10.4V or 9V
- Continuous power up to 800W, peak power 1.1kW
- HRR (hybrid regulated ratio) available for selected models
- Efficiency up to 97.5%
- 1500V isolation
- Eighth brick form factor with through hole mount package
- Pre-bias start up
- Digital interface in 7 pin DOSA standard

**Dimensions**

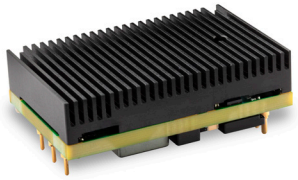
58.4 x 22.7 x 12.7 mm / 2.3 x 0.89 x 0.5 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|---|
| BMR4920300/864 | **40-60** | 12 | 67.3 | 800 | 1100 | 97.5 |
| BMR4920300/001 | **40-60** | 10.4 | 67.3 | 700 | 960 | 97.1 |
| BMR4920302/863 | **40-60** | 9 | 50 | 450 | — | 96.7 |
| BMR4920302/861 | 40-60 | 12 | 50 | 600 | — | 96.7 |
| BMR4920303/862 | 40-60 | 12 | 42 | 504 | — | 96.8 |

## Quarter brick | BMR491 (up to 1540W / 2450W$_{pk}$)

### Main features

- Fully regulated output of 12V or 24V
- Hybrid regulated ratio (HRR)
- Continuous power up to 1.5kW, peak power up to 2.4kW < 1 sec
- High efficiency up to 98%
- 1500V isolation
- Excellent thermal behavior
- Digital interface available in 4 and 7 pin DOSA standard
- Some variants are available with heatsink
- Paralleling with ACS and DLS





### Dimensions

58.4 x 36.8 x 14 mm / 2.3 x 1.45 x 0.57 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $V_{OUT}$ RANGE (V) | $P_{OUT}$ (W) | $P_{OUT_PEAK}$ (W) | η (%) |
|---|---|---|---|---|---|---|
| BMR4910203/851** | 40-60 | 12 | 8-13.2 | 1300 | — | 97.4 |
| BMR491xx02/853* | 40-60 | 12 | 8-13.2 | 1300 | — | 97.2 |
| BMR4912408/857(HRR) | 48-60 | 12 | 8-13 | 1540 | 2450 | 97.5 |
| BMR491xx07/856 (HRR) | 48-56 | 12 | 8-13.2 | 1400 | 2400 | 97.5 |
| BMR491x511/858** | 40-60 | 12 | 8-13 | 1300 | 1800 | 97 |
| BMR491xx06/855** | 40-60 | 12 | 8-13.2 | 1300 | — | 97.3 |
| BMR491xx14/880* | 40-60 | 12 | 8-13 | 1400 | 2400 | 97.5 |
| BMR491x510/871 | 40-60 | 24 | 16-26.4 | 1300 | — | 96.8 |

*Active Current Sharing **Droop load share

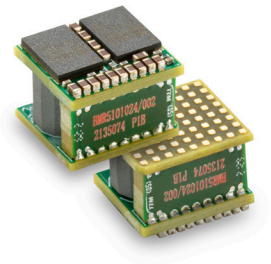
# Integrated Power Stages (VRM)

## DIGITAL 2-PHASE MODULE

### BMR510 (up to 80A / 140$A_{pk}$)

**Main features**

- Continuous current 80A, peak current up to 160A < 1 sec
- Efficiency up to 92%
- Non-isolated, digital converter
- Optimized for top-side cooling
- Current and temperature sense
- Accepts tri-state PWM signals
- Over-temperature and current limit protection
- Available as LGA and BGA mount
- Power stage on top of module
- Halogen-free
- BMR5101041/002 contains on-board output capacitance



BMR510x034/002



BMR5101041/002

**Dimensions**

BMR510x034/002: 10 x 9 x 7.6 mm / 0.406 x 0.362 x 0.29 in
BMR5101041/002: 10 x 9 x 9.5 mm / 0.406 x 0.362 x 0.37 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $I_{OUT_PEAK}$ (A) | η (%) |
|---|---|---|---|---|---|
| BMR510x034/002 | 4.5-15 | 0.5-1.3 | 80 (TDC)* | 160 total peak | 92 |
| BMR5101041/002 | 6-15 | 0.5-1.3 | 80 (TDC)* | 160 total peak | >90 |

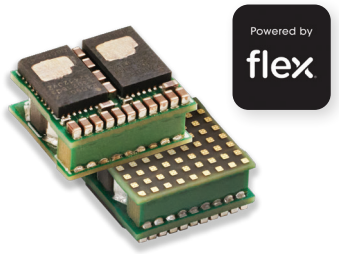
* Thermal design current

## RENESAS PARTNER PRODUCTS

### RRV29830 / RRV28830

**Main features**

- Designed and produced by Flex Power Modules
- Branded Renesas and with Renesas' SPS
- Non-isolated, digital converter
- Halogen-free
- Optimized for top side cooling
- TLVR variant available




**Dimensions**

RRV2x830: 10 x 9 x 5mm / 0.406 x 0.362 x 0.197 min

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | $I_{OUT_PEAK}$ (A) | η (%) |
|---|---|---|---|---|---|
| RRV29830 | 3-15 | 0.4-1.8 | 80 (TDC) | 160 total peak | 90 |
| RRV28830** | 3-15 | 0.4-1.8 | 80 (TDC) | 160 total peak | 87 |

** TLVR variant

# High Voltage Direct Current (HVDC)

## DIGITAL HVDC MODULE WITH A FIXED RATIO 16:1

### BMR720 (up to 10kW / 15kW$_{pk}$)

**Main features**

- HIgh-power converter with 10kW continuous and 15kW peak power
- Efficiency up to 98.1%
- Industry standard full brick converter
- Minimized power loss
- Based on LLC resonant topology



**Dimensions**

116.8 x 60.96 x 14.5 mm /4.6 x 2.4 x 0.57 in

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $P_{OUT}$ (KW) | $P_{OUT_PEAK}$ (KW) | η (%) |
|---|---|---|---|---|---|
| BMR7201100/001 | ±400 | 50 | 10 | 15 | 98.1 |

# Vertical Power Delivery

## A solution to offset environmental impact of AI chips

Vertical Power Delivery (VPD) offers a promising solution to mitigate the environmental impact of GenAI chips by significantly improving power efficiency within data centers. GenAI chips are known for their high-power demands, often requiring thousands of amperes of current. Traditional power delivery methods result in significant power losses due to the PDN (Power Delivery Network) resistance, leading to increased energy consumption. VPD addresses this issue by positioning voltage regulators directly beneath the processors, minimizing the distance electricity must travel and thereby reducing resistance and power losses.

By enhancing power delivery efficiency, VPD reduces the overall energy consumption of data centers, leading to lower carbon dioxide emissions. This reduction in emissions directly impacts the amount of carbon tax a data center would need to pay, resulting in significant cost savings. Moreover, the decreased energy consumption contributes to the global effort to reduce greenhouse gas emissions, aligning with sustainability goals and helping to combat climate change. Implementing VPD in data centers not only enhances performance but also plays a crucial role in reducing the environmental impact of the rapidly growing GenAI industry.

## Eco-friendly innovation for a sustainable future

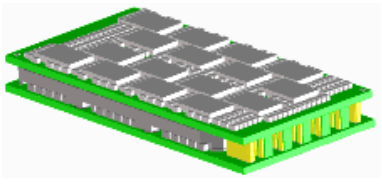
Adopting VPD not only boosts performance but also aligns with environmental sustainability goals. By lowering energy consumption, VPD helps data centers reduce their carbon footprint, offering a greener solution that supports global efforts to combat climate change. Additionally, the enhanced efficiency of VPD can lead to substantial cost savings, including lower electricity bills and reduced carbon taxes. As data centers continue to expand and their power demands grow, implementing VPD is a strategic move toward a more sustainable, cost-effective, and environmentally friendly future.

Increasing demands for ever higher current delivery driven by power hungry applications such as AI/ Machine Learning require new approaches to the IC power distribution networks.

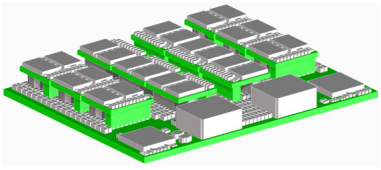
The challenges posed to supply high current, low voltage and extremely fast load transient response is solved by moving the voltage regulators to be placed directly under the processor on the bottom of the PCB, and is commonly referred to as Vertical Power Delivery (VPD).

By further optimizing the pinout of the VPD modules to match that of the processor it is feeding, connection resistance and inductance can be minimized to allow much lower voltage variation and power dissipation.

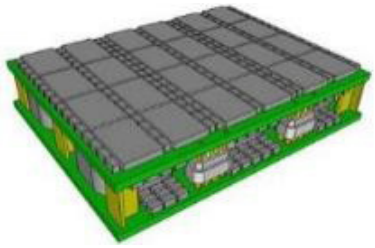
Complex custom VPD modules have been developed to feed various types of CPUs, GPUs, FPGAs, ASICs etc. Our VPDs offer solutions from 1-25 rails up to 288 phases, and can include up to 14000 solder ball connections.



VPD | 16 phases, 1 rail



VPD | 48 phases, 5 rails



VPD | 24 phases, 5 rails

# Point of Load Converters (4-80A)

We also have a wide range of Point of Load (PoL) products. Here is a selection of our PoL options applicable for data center applications. The BMR families below incorporate a digital interface for easy monitoring, configuration and control.

| PRODUCT NO. | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ (A) | η (%) | PACKAGE | DIMENSIONS |
|---|---|---|---|---|---|---|
| PMU8218 | 4.5-17 | 0.6-5 | 4 | 95 | LGA | 7.5 x 7.5 x 5.4 mm / 0.3 x 0.3 x 0.21 in |
| PMU8318 | 4.5-17 | 0.6-5 | 6 | 95 | LGA | 7.5 x 7.5 x 5.4 mm / 0.3 x 0.3 x 0.21 in |
| PMU8418 | 4.5-17 | 0.6-5 | 8 | 95 | LGA | 7.5 x 7.5 x 5.4 mm / 0.3 x 0.3 x 0.21 in |
| BMR461 | 4.5-14 | 0.6-5 | 6/12/18 | 96 | LGA (BGA) | 12.2×12.2×8 mm / 0.48×0.48×0.31 in |
| BMR463 | 4.5-14 | 0.6-3 | 25 | 97 | TH/SMD/SIP | 25.65×13.8×8.2 mm / 1.01×0.54×0.32 in |
| BMR464 | 4.5-14 | 0.6-3.3 | 50 | 97 | TH/SMD/SIP | 30.85×20×8.2 mm / 1.21×0.79×0.32 in |
| BMR466 | 4.5-14 | 0.6-1.8 | 60 | 95 | LGA (BGA) | 25.1×14.1×7 mm / 0.99×0.56×0.28 in |
| BMR4696001 | 7.5-14 | 0.6-5.5 (dual) | 2 x 25 | 94 | BGA | 50.8×19.05×10 mm / 2×0.75×0.39 in |
| BMR4690000 | 7.5-14 | 0.6-5.5 (dual) | 2 x 40 | 93 | SMD | 25.4×12.7×11.6 mm / 1×0.5×0.46 in |
| BMR4742002/001 | 6-15 | 0.6-3.3 | 80 | 95 | SIP | 33 x 8.6 x 19 mm / 1.3 x 0.34 x 0.75 in |
| BMR4732x01/001 | 6-15 | 0.6-5 | 40 | 95.1 | SIP | 26.3 x 8.8 x 15.6 mm / 1.04 x 0.35 x 0.61 in |
| BMR4731001/001 | 6-15 | 0.6-5 | 40 | 95.6 | SMD | 19×13×7.5 mm / 0.75×0.51×0.3 in |



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