



flex®

Flex Power Modules

**DC/DC Solutions for Industrial
and Transportation/Railway**

Ruggedized DC/DC Power Modules

A long-exposure photograph of a city street at night. The scene is dominated by light trails from traffic, with bright yellow and white streaks moving across the lower half of the frame. In the background, several tall skyscrapers are visible, their windows glowing with light. The sky is dark, and the overall color palette is a mix of cool blues and warm yellows. The text "Powering your innovation" is overlaid in the upper left quadrant in a bold, white, sans-serif font.

**Powering
your innovation**

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The Industrial marketplace

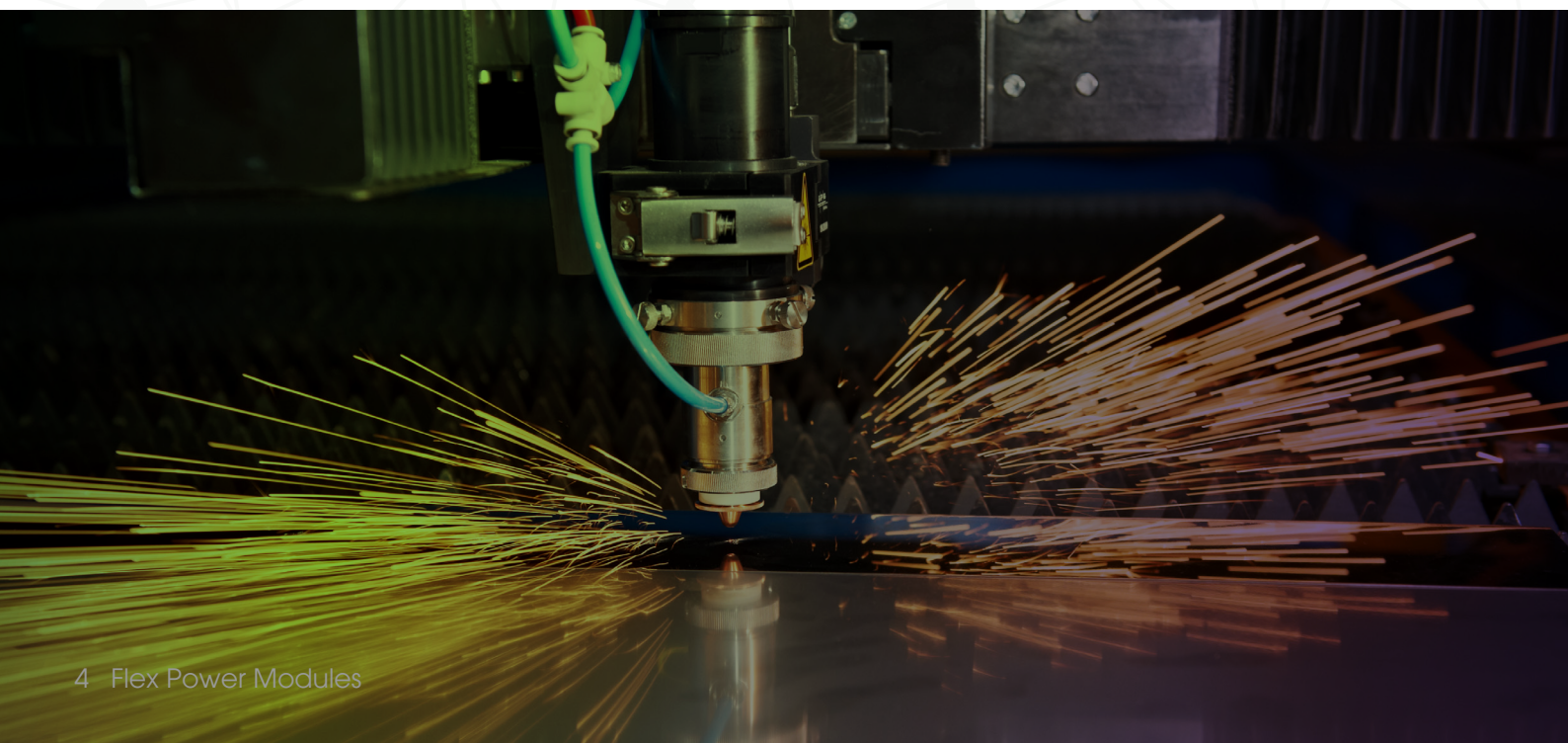
The Industrial market sector covers an extremely varied range of customers and applications including Process Control Equipment, Factory Automation Equipment, Robotics, Test & Measurement Equipment, Automatic Test Equipment, Alternative Energy & Smart Grids to name a few.

What is common throughout all these applications is the need for high reliability, high performance and rugged DC/DC solutions, often running from 24V and/or 12V supply voltages, rather than the 48V more widely found in ICT applications.

Flex Power Modules is committed to grow its product offering in this area, expanding on our total portfolio for the Industrial marketplace.

Features of our Industrial DC/DC Converters

- » Fully encapsulated designs in most cases
- » Ultra-wide 4:1 and 8:1 input ranges
- » Meets IEC/EN/UL62368-1 (previously 60950-1)
- » Isolation voltages from 1500V to 2250V
- » MTBF figures up to 8 Mhrs



The Transportation/Railway marketplace

Modern railway systems require a wide range of DC/DC converters to power a variety of monitoring and control units to assure its high reliability and high performance.

Flex Power Modules provides a series of products which are designed to meet the most stringent electrical and environmental specifications. These products can work under dust, moisture, severe vibration and other harsh conditions. European standard EN 50155 was established to provide internationally recognized standards for these type of applications.

Features of our Transportation/Railway DC/DC Converters

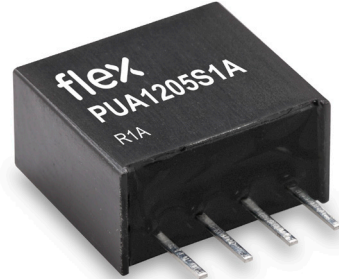
- » Compliant to EN50155
- » Ultra-wide input ranges from 12-160V
- » Up to 4000 V Isolation
- » MTBF up to 5 Mhrs



PUA-A Series / SIP4

Key Features:

- » No minimum load required
- » Isolation voltages 1000-2000 V
- » MTBF figures up to 13 Mhrs
- » Meets IEC/EN/UL62368-1



Picture: PUA-A

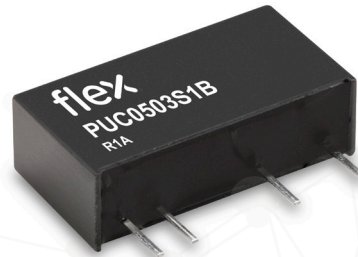
Series name	V _{in} Nominal (V)	V _{out} Nominal (V)	Power (W)	Efficiency (%)
PUAxxxxS1A	3.3/5/12/15/24	3.3/5/12/15	1	75-81*

Dimensions:
11.5 x 6 X 10 mm
(0.45 x 0.23 x 0.36 in)

PUB-B & PUC-B Series / SIP7

Key Features:

- » No minimum load required
- » Isolation voltages 3000-4000 V & 6000 V
- » MTBF figures up to 18 Mhrs
- » Meets IEC/EN/UL62368-1



Picture: PUC-B

Dimensions:
19.7 x 7.1 x 11.5 mm
(0.78 x 0.28 x 0.45 in)

Series name	V _{in} Nominal (V _{DC})	V _{out} Nominal (V _{DC})	Power (W)	Efficiency (%)
PUBxxxxxB	3.3/5/12/15/24	3.3/5/12/15/±3.3/±5/±12/±15/(+15/-9)	1-2W	76.5-88*
PUCxxxxxB	3.3/5/12/15/24	3.3/5/12/15/±3.3/±5/±12/±15/(+15/-9)	1-2W	76.5-88*

PUB-M Series / SMD

Key Features:

- » No minimum load required
- » Isolation voltages 3000 V
- » MTBF figures up to 18 Mhrs
- » Meets IEC/EN/UL62368-1



Picture: PUB-M

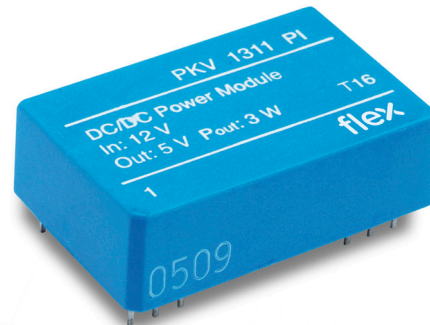
Series name	V _{in} Nominal (V)	V _{out} Nominal (V)	Power (W)	Efficiency (%)
PUBxxxxxxM	5/12/24	5/12/±5	1-2	76-86.5

Max Dimensions:
15.25 x 11.2 x 8 mm
(0.6 x 0.44 x 0.31 in)

PKV (1.65-3W) DIL Package

Key Features:

- » Fully encapsulated package
- » Ultra-wide 4:1 input range
- » Isolation voltages 1500 V
- » MTBF > 0.65 Mhrs



Picture: PKV

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKV3110PI	9-36	3.3	0.5	1.7	73
PKV3211PI	9-36	5	0.5	2.5	82
PKV3313PI	9-36	12	0.3	3	82
PKV3315PI	9-36	15	0.2	3	82
PKV3222PI	9-36	+5/-5	0.25/0.25	2.5	82
PKV3321PI	9-36	+12/-12	0.1/0.1	3	82
PKV3325PI	9-36	+15/-15	0.1/0.1	3	80
PKV5110PI	18-72	3.3	0.5	1.7	73
PKV5211PI	18-72	5	0.5	2.5	82
PKV5313PI	18-72	12	0.3	3	82
PKV5315PI	18-72	15	0.2	3	82
PKV5222PI	18-72	+5/-5	0.25/0.25	2.5	82
PKV5321PI	18-72	+12/-12	0.1/0.1	3	82
PKV5325PI	18-72	+15/-15	0.1/0.1	3	82

Dimensions:
31.8 x 20.3 x 10.7 mm
(1.25 x 0.80 x 0.42 in)

Power Modules for Industrial & 12/24/36/48V Transportation

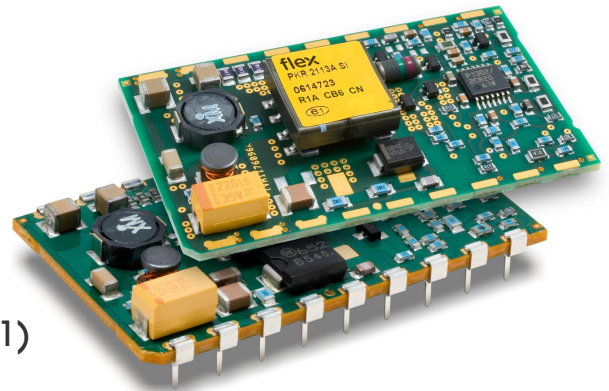
PKR (6-15W)

1.11" x 1.88"

Through hole and SMD

Key Features:

- » Cost effective open frame design
- » Ultra-wide 4:1 and 2:1 input range
- » Meets IEC/EN/UL62368-1 (previously 60950-1)
- » 1500 V Isolation
- » MTBF figure up to 6 Mhrs



Picture: PKR

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKR2610A	18-36	3.3	2	6.6	82
PKR2111A	18-36	5	2	10	85
PKR2113A	18-36	12	1	12	87.5
PKR2221A	18-36	+12/-12	0.6/0.6	14.9	86.6
PKR5113	18-75	12	0.9	11	86

Dimensions:
47.8 x 28.1 x 8.0 mm
(1.88 x 1.11 x 0.32 in)

PKE (15-30W) 1" x 1" Package

Key Features:

- » Fully encapsulated package
- » Ultra wide 4:1 input range
- » Meets IEC/EN/UL62368-1 (previously 60950)
- » Isolation voltage up to 1500 V
- » MTBF up to 5 Mhrs



Picture: PKE

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKE3210PI	9-36	3.3	4.5	15	84.6
PKE3211PI	9-36	5	3	15	88
PKE3213PI	9-36	12	1.3	15	86.5
PKE3215PI	9-36	15	1	15	85.8
PKE3221PI	9-36	+12/-12	0.6/0.6	15	84
PKE3225PI	9-36	+15/-15	0.5/0.5	15	84
PKE3310PI	9-36	3.3	7	23	87
PKE3311PI	9-36	5	6	30	90
PKE3313PI	9-36	12	2.5	30	90
PKE3315PI	9-36	15	2	30	90
PKE3316ZPI	9-36	24	1.3	30	90
PKE3316JPI	9-36	48	0.6	30	89
PKE3316HPI	9-36	54	0.46	25	89
PKE5210PI	18-75	3.3	4.5	15	84.1
PKE5211PI	18-75	5	3	15	84.3
PKE5213PI	18-75	12	1.3	15	86.3
PKE5215PI	18-75	15	1	15	84.4
PKE5221PI	18-75	+12/-12	0.6/0.6	15	83
PKE5225PI	18-75	+15/-15	0.5/0.5	15	83
PKE5310PI	18-75	3.3	7	23	87
PKE5311PI	18-75	5	6	30	90
PKE5313PI	18-75	12	2.5	30	90
PKE5315PI	18-75	15	2	30	90
PKE5316ZPI	18-75	24	1.3	30	90
PKE5316JPI	18-75	48	0.6	30	89
PKE5316HPI	18-75	54	0.46	25	89

Dimensions:
25.4 x 25.4 x 10.8 mm
(1.0 x 1.0 x 0.43 in)

PKE-A (40W)

1" x 2" Package

Key Features:

- » Fully encapsulated package
- » Ultra wide 8:1 input range
- » Meets IEC/EN/UL62368-1 (previously 60950-1)
- » Isolation up to 2250 V
- » MTBF up to 4 Mhrs



Picture: PKE-A

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKE8410API	9-75	3.3	9.1	30	87
PKE8411API	9-75	5	8	40	88
PKE8413API	9-75	12	3.3	40	91
PKE8415API	9-75	15	2.7	40	89

Dimensions:
50.8 x 25.4 x 11.9 mm
(2.0 x 1.0 x 0.47 in)

PKU-S (50W)

1/16 Brick

Key Features:

- » Ultra-wide 4:1 input range
- » Meets IEC/EN/UL62368-1 (previously 60950-1)
- » Isolation voltage up to 2250 V
- » MTBF figures up to 8 Mhrs



Picture: PKU-S

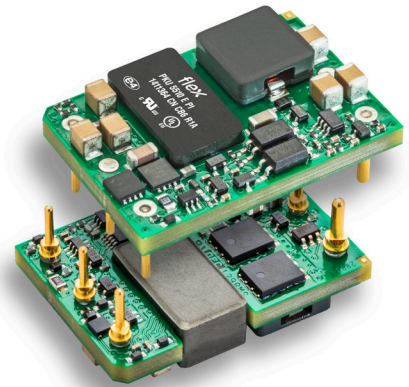
Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKU3510SPI	9-36	3.3	15	50	90
PKU3511SPI	9-36	5	10	50	90
PKU3513SPI	9-36	12	4.2	50	88
PKU3515SPI	9-36	15	3.3	50	88
PKU3516ZSPI	9-36	24	2.1	50	91
PKU5510SPI	18-75	3.3	15	50	90
PKU5511SPI	18-75	5	10	50	90
PKU5513SPI	18-75	12	4.2	50	90
PKU5515SPI	18-75	15	3.3	50	90
PKU5516ZSPI	18-75	24	2.1	50	91

Dimensions:
35.3 x 25 x 10.4 mm
(1.39 x 0.98 x 0.41 in)

PKU-E (50W) 1/16 Brick Through hole and SMD

Key Features:

- » Open frame designs
- » Ultra-wide 4:1 input range
- » Meets IEC/EN/UL62368-1 (previously 60950-1)
- » 2250 V isolation
- » MTBF figures up to 4.9 Mhrs



Picture: PKU-E

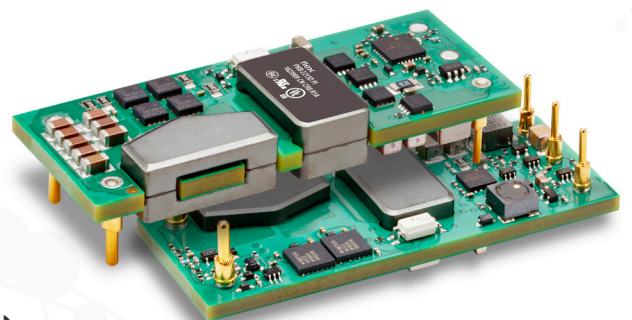
Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKU5510E	18-75	3.3	15	50	92
PKU5511E	18-75	5	10	50	92
PKU5513E	18-75	12	4.2	50	91.7

Dimensions:
33.02 x 22.86 x 9.4 mm
(1.3 x 0.9 x 0.37 in)

PKB-D (240W) 1/8 Brick Through hole and SMD package

Key Features:

- » Open frame designs, baseplate option
- » Ultra-wide 2:1 input range
- » Meets IEC/EN/UL62368-1 (previously 60950-1)
- » 2250 V isolation
- » MTBF figures up to 10 Mhrs



Picture: PKB-D

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKB2213D	18-36	12	20	240	95

Dimensions:
58.4 x 22.7 x 9.6 mm
(2.3 x 0.9 x 0.38 in)

Power Modules for 72/96/110V Railway

In the transportation sector DC/DC converters for railway have special characteristics and must withstand greater disruptive forces, are subject to greater demands for operational safety, durability and thermal shock.

PKE-A (30W) 1" x 2" Package

Key Features:

- » Fully encapsulated package
- » Ultra-wide 43-160V input range for 72/96/110V applications
- » Meets IEC/EN/UL62368-1 (previously 60950-1) and EN50155
- » Isolation voltage up to 2250 V
- » MTBF figures up to 5 Mhrs



Picture: PKE-A

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKE7311API	43-160	5	6	30	88
PKE7313API	43-160	12	2.5	30	90
PKE7315API	43-160	15	2	30	90
PKE7316ZAPI	43-160	24	1.3	30	89
PKE7316JAPI	43-160	48	0.6	30	88

Dimensions:
50.8 x 25.4 x 11.4 mm
(2.0 x 1.0 x 0.45 in)

PKM-A (100-150W) 1/4 Brick Package

Key Features:

- » Fully encapsulated package
- » Ultra-wide 60-160V input range for 110V applications
- » Meets IEC/EN/UL62368-1 (previously 60950-1) and EN50155
- » Isolation voltage up to 4000 V
- » MTBF figures up to 4 Mhrs



Picture: PKM-A



Picture: PKM-A w/o heatsink

Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKM7111API	60-160	5	20	100	86
PKM7113API	60-160	12	8.3	100	86
PKM7115API	60-160	15	6.7	100	86
PKM7116ZAPI	60-160	24	4.2	100	89
PKM7116JAPI	60-160	48	2.1	100	90
PKM7116HAPI	60-160	54	1.85	100	90
PKM7213API	60-160	12	12.5	150	86
PKM7215API	60-160	15	10	150	88
PKM721ZAPI	60-160	24	6.3	150	89
PKM7216JAPI	60-160	48	3.13	150	90
PKM7216HAPI	60-160	54	2.78	150	90
PKM7216HAPI	60-160	54	2.78	150	90

Dimensions:
57.9 x 36.8 x 12.7 mm
(2.28 x 1.45 x 0.5 in)

PKJ (200-300W) 1/2 Brick Package

Key Features:

- » Fully encapsulated package
- » Ultra-wide 60-160V input range for 110V applications
- » Meets IEC/EN/UL62368-1 (previously 60950-1) and EN50155
- » 4000 V Isolation
- » MTBF figures up to 5 Mhrs



Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKJ7213PI	60-160	12	16.8	200	89
PKJ7217KPI	60-160	13.8	14.5	200	89
PKJ7215PI	60-160	15	14.5	200	89
PKJ7216ZPI	60-160	24	8.4	200	91
PKJ7216JPI	60-160	48	4.2	200	91
PKJ7216HPI	60-160	54	3.7	200	91
PKJ7313PI	60-160	12	25	300	89
PKJ7317KPI	60-160	13.8	21.7	300	89
PKJ7315PI	60-160	15	20	300	89
PKJ7316ZPI	60-160	24	12.5	300	90
PKJ7316JPI	60-160	48	6.3	300	90
PKJ7316HPI	60-160	54	5.6	300	91

Dimensions:
61 x 57.9 x 12.7 mm
(2.4 x 2.3 x 0.5 in)

PKM-W (50-100W)

1/4 Brick Package

Key Features:

- » Fully encapsulated package
- » Ultra-wide 12/14-160V input range for universal railway applications
- » Meets IEC/EN/UL62368-1 (previously 60950-1) and EN50155
- » 4000V Isolation
- » MTBF figures up to 5.8 Mhrs

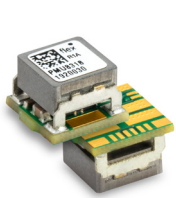


Series name	V _{in} Range (V _{DC})	V _{out} Nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKM7511WPI	12-160	5	10	50	87
PKM7513WPI	12-160	12	4.17	50	90
PKM7517KWPI	12-160	13.8	3.62	50	90
PKM7515WPI	12-160	15	3.33	50	90
PKM7516ZWPI	12-160	24	2.08	50	90
PKM7516JWPI	12-160	48	1.04	50	89
PKM7516HWPI	12-160	54	0.93	50	89
PKM7111WPI	14-160	5	20	100	89
PKM7113WPI	14-160	12	8.34	100	87
PKM7117KWPI	14-160	13.8	7.24	100	90
PKM7115WPI	14-160	15	6.66	100	90
PKM7116ZWPI	14-160	24	4.16	100	90
PKM7116JWPI	14-160	48	2.08	100	89
PKM7116HWPI	14-160	54	1.86	100	89

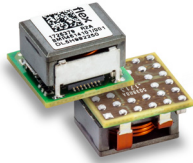
Dimensions:
57.9 x 36.8 x 12.7 mm
(2.28 x 1.45 x 0.5 in)

Point of Load (PoL)

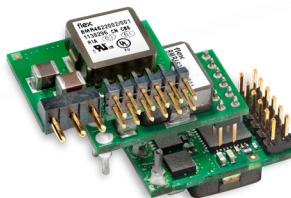
Flex Power Modules has also a wide range of Point of Load (PoL) products. Here is a selection of our PoL products, applicable for the Industrial, Transportation and ICT market. The BMR-families below incorporate a digital interface for easy monitoring, configuration and control.



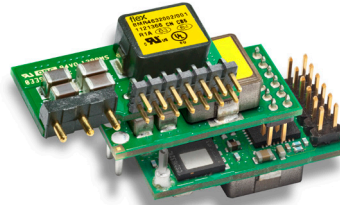
Picture: PMU



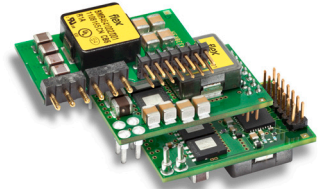
Picture: BMR 461



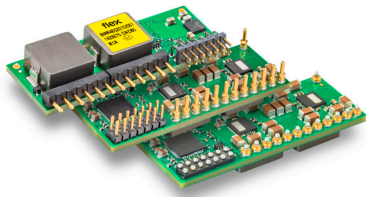
Picture: BMR 462



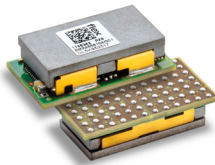
Picture: BMR 463



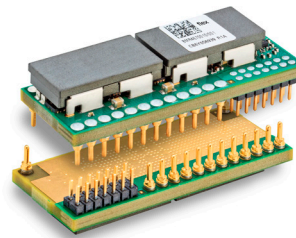
Picture: BMR 464



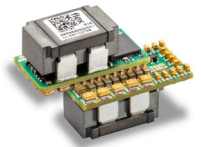
Picture: BMR 465



Picture: BMR 466



Picture: BMR 467



Picture: BMR 469

Series name	V _{in} (V)	V _{out} (V)	I _{out} (A)	Package
PMU8218	4.5-17	0.6-5	4	LGA
PMU8318	4.5-17	0.6-5	6	LGA
PMU8418	4.5-17	0.6-5	8	LGA
BMR461	4.5-14	0.6-5.0	6/12/18	LGA (BGA)
BMR462	4.5-14	0.6-5.0	12	TH/SMD/SIP
BMR463	4.5-14	0.6-3.3	20/25	TH/SMD/SIP
BMR464	4.5-14	0.6-3.3	40/50	TH/SMD/SIP
BMR466	4.5-14	0.6-1.8	60	LGA (BGA)
BMR465	7.5-14	0.6-1.8	90	TH/SMD/SIP
BMR467	7.5-14	0.6-1.8	120	TH/SMD/SIP
BMR469	7.5-14	0.6-5.0	2x40A/2x25A	SMD

Flex Power Modules, a division of Flex (NASDAQ: FLEX), designs and manufactures scalable power supply solutions that improve the operational efficiencies of advanced data center, IT information and communication networks. Flex Power Modules' products provide a complete on-board system solution for cloud, storage and server applications and address customer challenges while delivering superior quality, cost and performance scale.

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