

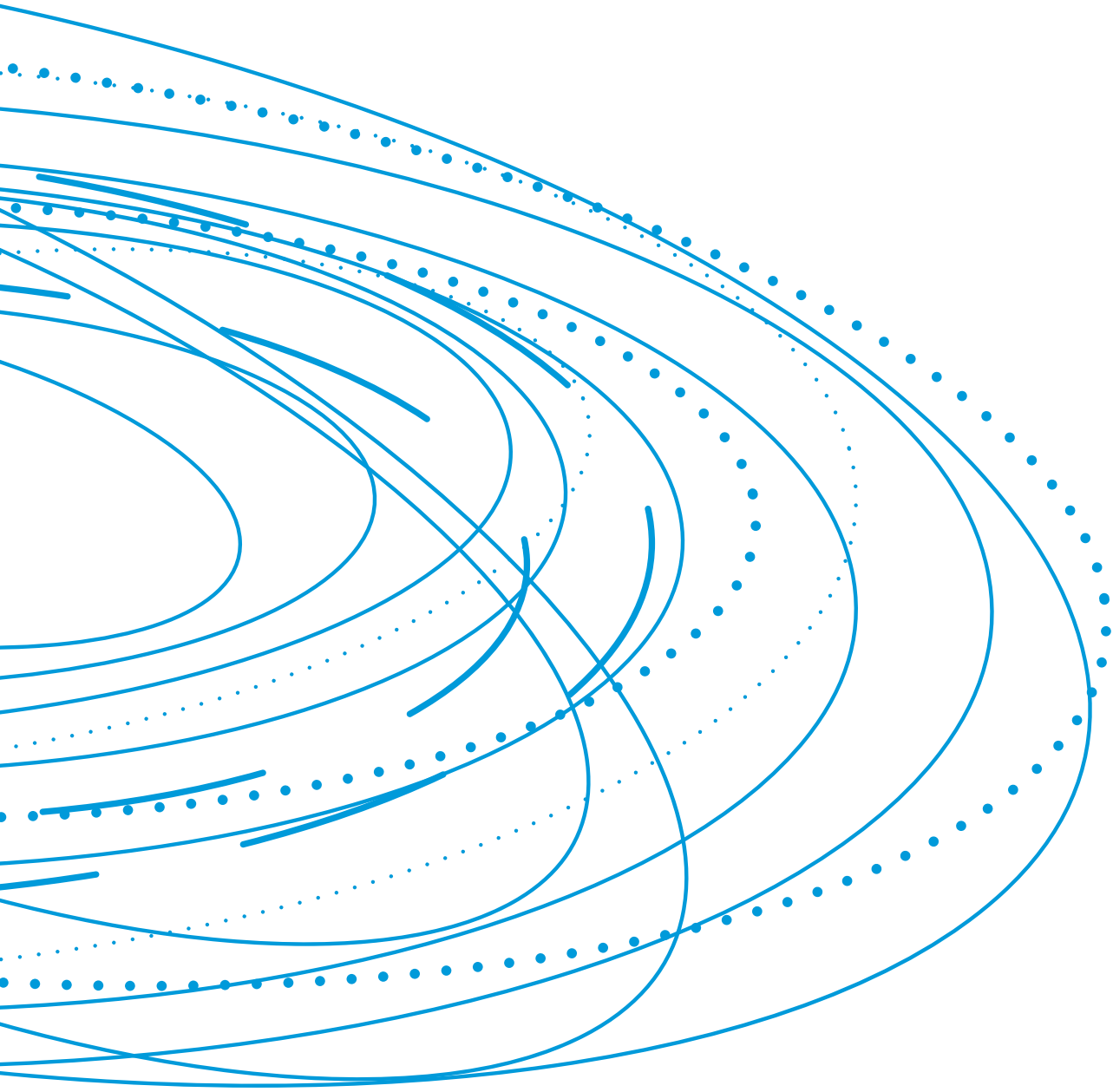
flex[®]

POWER MODULES

DC/DC solutions for industrial and transportation/ railway

Ruggedized DC/DC power modules





Powering
your innovation.

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The industrial market

The industrial market needs high reliability, high performance and rugged DC/DC solutions for a wide range of applications, including:

- Process control
- Factory automation
- Robotics
- Test and measurement
- Automatic test equipment
- Alternative energy
- Smart grids

These DC/DC solutions often run from 24V and/or 12V supply voltages, rather than the 48V more widely found in information and communication technology (ICT) applications.

Flex Power Modules has expanded its DC/DC portfolio for the industrial market.

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 1500 V to 6000 V
- MTBF figures up to 171 Mhrs

The transportation/ railway market

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

Meet stringent electrical and environmental specifications

Flex provides a series of power modules for railway systems designed to meet the most stringent electrical and environmental specifications. These products can work under dust, moisture, severe vibration and other harsh conditions. Our transportation/railway DC/DC converters meet European standard EN 50155, the internationally recognized standard for railway applications.

Features of our transportation/railway DC/DC converters

- Compliant to EN50155
- Ultra-wide input ranges from 12-160V
- Up to 4000 V Isolation

Power modules for industrial & 12/24/36/48V transportation

PUA-A SERIES / 1 W

SIP4



Key features:

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

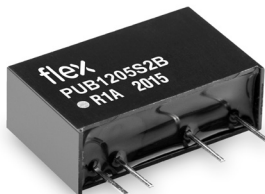
Dimensions:

11.5 x 6 x 10 mm
(0.45 x 0.23 x 0.36 in)

Series name	V _{in} (V)	V _{out} (V)	Power (W)	Efficiency (%)	Isolation (V)
PUA-1A	3.3/5/12/24	3.3/5/12/15	1	75-84	2000

PUB-B SERIES / 1-2 W

SIP7



Key features:

- No minimum load required
- Isolation voltage 4000 V
- MTBF figures up to 18 Mhrs
- Meets IEC/EN/UL62368-1

Dimensions:

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

Series name	V _{in} (V)	V _{out} (V)	Power (W)	Efficiency (%)	Isolation (V)
PUB-1B	3.3/5/12/24	3.3/12/±12/±15/(+15/-9)	1	74-82	4000
PUB-2B	3.3/5/12/24	3.3/12/±12/±15/(+15/-9)	2	77-86	4000

PUC-B SERIES / 1-2 W

SIP7



Key features:

- No minimum load required
- Isolation voltage 6000 V
- MTBF figures up to 15 Mhrs
- Meets IEC/EN/UL62368-1

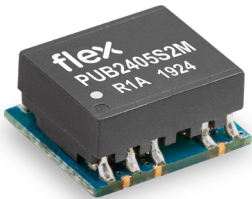
Dimensions:

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

Series name	V _{in} (V)	V _{out} (V)	Power (W)	Efficiency (%)	Isolation (V)
PUC-1B	5/12/24	3.3/5/12/±5/±12/±15	1	76-80	6000
PUC-2B	5/12/24	3.3/5/12/±5/±12/±15	2	77-85	6000

PUB-M SERIES / 1-2 W

SMD



Key features:

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

Dimensions:

15.25 x 11.2 x 8 mm
(0.6 x 0.44 x 0.31 in)

Series name	V _{in} (V)	V _{out} (V)	Power (W)	Efficiency (%)	Isolation (V)
PUB-1M	5/12/24	5	1	75-81	3000
PUB-2M	5/12/24	5/12/±5	2	78-83	3000

PKV / 1.65-3 W

DIL package



Key features:

- Fully encapsulated package
- Wide 4:1 input range
- Isolation voltage 1500 V
- MTBF > 0.65 Mhrs

Dimensions:

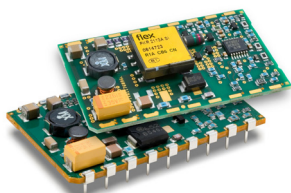
31.8 x 20.3 x 10.7 mm
(1.25 x 0.80 x 0.42 in)

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

PKR / 6-15 W

1.11" x 1.88"

Through hole and SMD



Key features:

- Cost effective open frame design
- 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

Dimensions:

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

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

PKE / 15-30 W

1" x 1" package



Key features:

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

Dimensions:

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

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

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

Dimensions:

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

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

PKU-S / 50 W

1/16 brick



Key features:

- 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

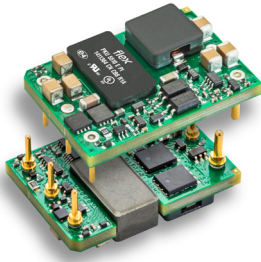
Dimensions:

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

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

PKU-E / 50 W

1/16 brick through hole and SMD package



Key features:

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

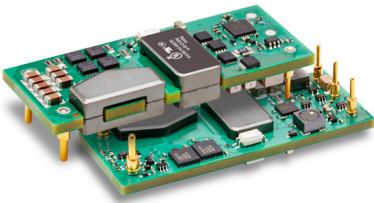
Dimensions:

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

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

PKB-D / 240 W

1/8 brick through hole and SMD package



Key features:

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

Dimensions:

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

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

Power modules for 72/96/110V railway systems

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

PKE-A / 30 W

1"x 2" package



Key features:

- Fully encapsulated package
- Wide 43-160 V 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

Dimensions:

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

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

PKM-A / 100-150 W

1/4 brick package



PKM-A



PKM-A w/o heatsink

Key features:

- Fully encapsulated package
- 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

Dimensions:

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

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

PKJ / 200-300 W

1/2 brick package



Key features:

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

Dimensions:

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

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

Ultra-wide input power modules for 24-110V railway applications

PKM-W / 50-100 W

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

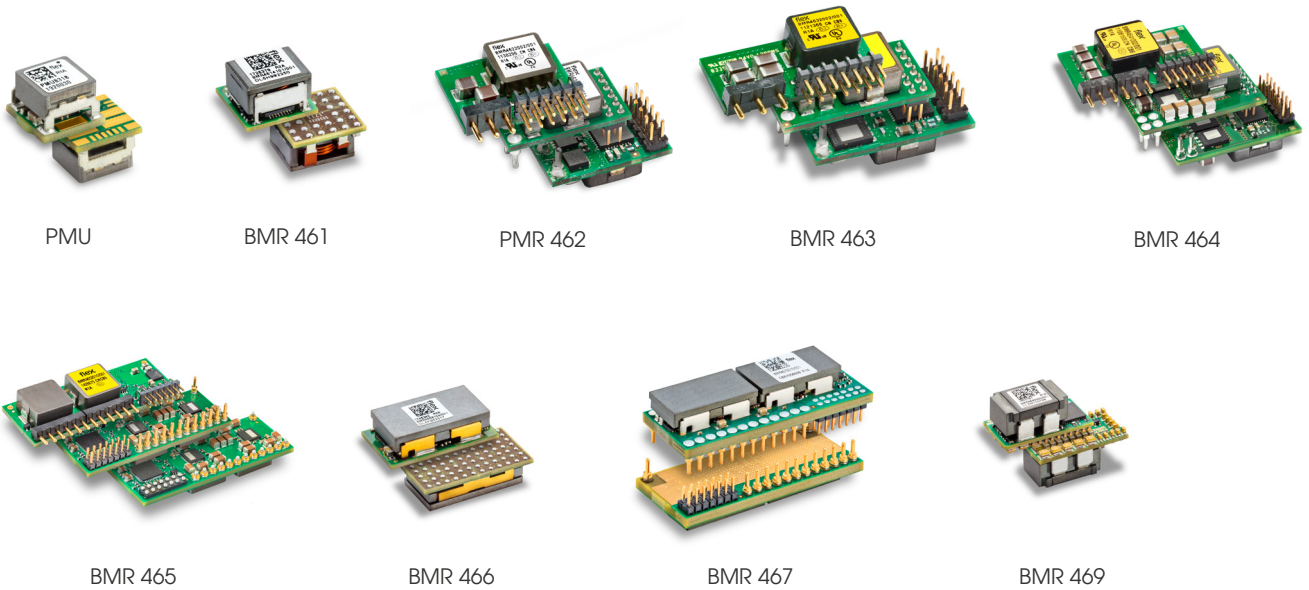
Dimensions:

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

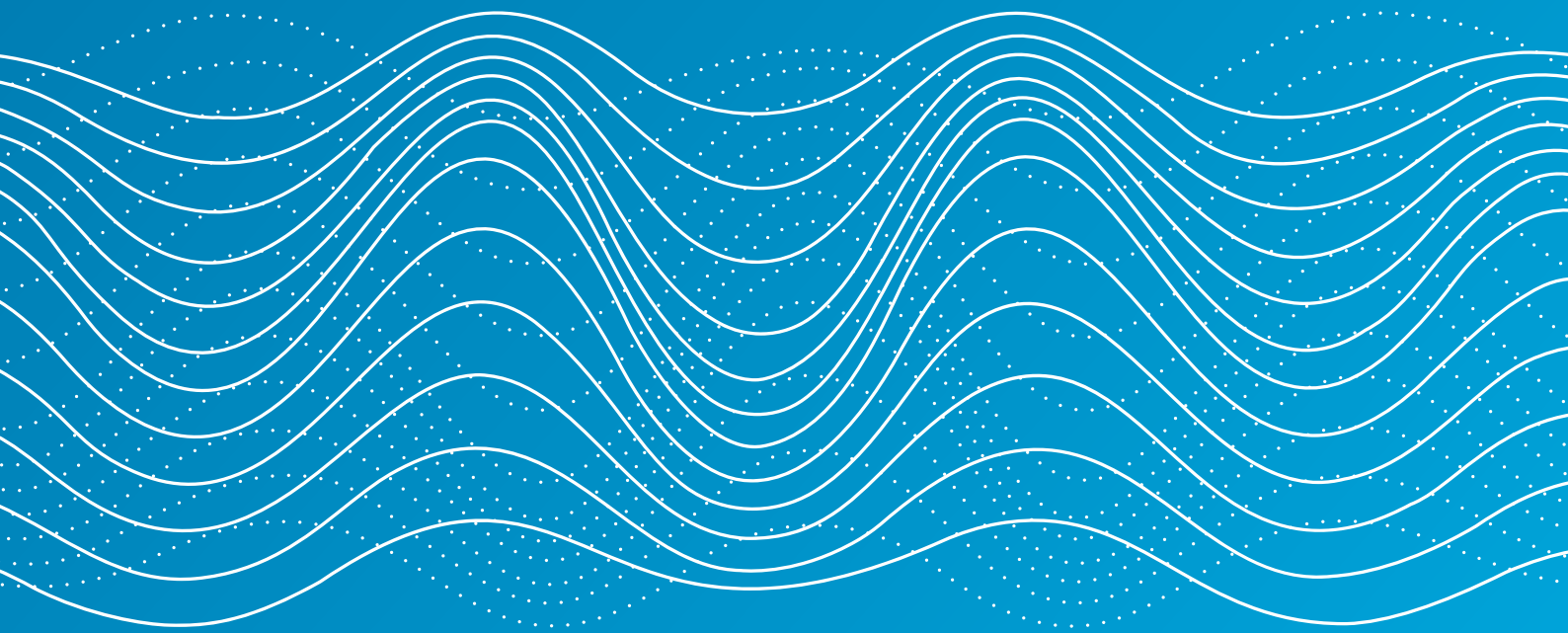
Series name	V _{in} range (V _{DC})	V _{out} nominal (V _{DC})	I _{out} (A)	Power (W)	Efficiency (%)
PKM7510WPI	12-160	3.3	15.2A	50	86
PKM7511WPI	12-160	5	10	50	87
PKM7513WPI	12-160	12	4.17	50	90
PKM7517KWPI	12-160	13.8	3.62	50	90
PKM7515WPI	12-160	15	3.33	50	90
PKM7516ZWPI	12-160	24	2.08	50	90
PKM7516JWPI	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

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 industrial, transportation and ICT market. The BMR-families below incorporate a digital interface for easy monitoring, configuration and control.



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



For more information, please visit www.flexpowermodules.com or email us to pm.info@flex.com.

Flex Power Modules, a business line of Flex, is a leading manufacturer and solution provider of scalable DC/DC power converters primarily serving the data processing, communications, industrial and transportation markets. Offering a wide range of both isolated and non-isolated solutions, its digitally-enabled DC/DC converters include PMBus compatibility supported by the powerful **Flex Power Designer software tool**. Further information can be found at www.flexpowermodules.com or on [LinkedIn](#).

Flex (Reg. No. 199002645H) is the manufacturing partner of choice that helps a diverse customer base design and build products that improve the world. Through the collective strength of a global workforce across 30 countries and responsible, sustainable operations, Flex delivers technology innovation, supply chain, and manufacturing solutions to various industries and end markets. For more information, visit flex.com.