



# DC/DC Converters for Industrial Equipment

For 60V, 48V, 24V power rail BD9G500EFJ-LA, BD9F500QUZ

June 29, 2021

Industrial and Consumer G

Analog and Power Application Dept. FAE2 Div.

System Solution Engineering HQ

# ROHM Power Supply ICs Lineup

We combine analog and control technologies to provide high-performance power supply ICs.

ACDC Converters

Wireless Power Supplies

DCDC Converters

USB Power Delivery ICs

Linear Regulators

Power Management Switches

## A wealth of market experience

### Automotive



Cluster

Car Navigation

Car Audio

Camera Module

### Industry



PLC

Power Conditioner

Inverter

Working machinery

### Infrastructure



Base Station

ATM

Router

Surveillance cameras

### Office appliance



Printer

MFP

Projector

Phone

### Mobile / IT



Smartphone

PC

HDD/SSD

Server

### Home appliance



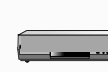
Washing machine

Refrigerator

Air conditioning

Vacuum cleaner

### Consumer



TV












DVD/BD

Camera

Doorphone

# Generic Switching Regulators Product Roadmap

We will respond to customer needs by enhancing our lineup of DCs/DCs for industrial equipment for 60V, 48V, and 24V power rails.

2019	2020	2021	2022
 <b>QFN3.0mm</b> <b>BD9D300MUV</b> (3A) Low Iq/100%duty Vin=4V to 17V f=1.25M	<div>   <b>NEW</b>  <b>HTSOP-J8</b>  <b>BD9G500EFJ-LA</b> (5A)                      Vin=7V to 76V                      High Current                 </div> <div>   <b>NEW</b>  <b>QFN3.0mm</b>  <b>BD9F500QUZ</b> (5A)                      Low Iq                      Vin=4.5V to 36V                      f=600k/1M/2.2M                 </div> <div>   <b>NEW</b>  <b>TSOT23-8L</b>  <b>BD9E304FP4-LBZ</b> (3A)                      Low Iq                      Vin=5V to 36V                      f=300k                      CS: 3Q.2021                 </div> <div>   <b>TSOT23-6L</b>  <b>BD9E105FP4-Z</b> (1A)  <b>BD9E200FP4-Z</b> (2A)  <b>BD9E201FP4-Z</b> (2A)                      Low Iq                      Vin=4.5V to 36V                      f=300k/500k                      Under Development                 </div> <div>   <b>NEW</b>  <b>TSOT23-8L</b>  <b>BD9A201FP4-LBZ</b> (2A)                      Industrial Model                      Vin=2.7V to 5.5V                      f=1M                      CS: 3Q.2021                 </div>	<div>   <b>HTSOP-J8</b>  <b>BD9G145EFJ-LA</b> (1A)                      Vin=4.5V to 104.5V                      Under Development                 </div> <div>   <b>FcQFN</b>  <b>BD9DB00MF</b> (20A)  <b>BD9DA00MF</b> (12A)                      Vin=4.5V to 18V                      Wireless PKG                      Under Development                 </div> <div>   <b>FcQFN1.5mm</b>  <b>BD9B206MF-Z</b> (2A)  <b>BD9B306MF-Z</b> (3A)  <b>BD9B406MF-Z</b> (4A)                      Low Iq (4uA)                      Vin=2.5V to 5.5V                      100%Duty, BOOT less                      Under Development                 </div>	<div>   <b>QFN4.0mm</b>  <b>BD9G146MUF-LA</b> (1A)                      Vin=4.5V to 104.5V                      Under Development                 </div> <div>   <b>FcQFN</b>  <b>BD9DB0xMF</b>                      Vin=4.5V to 18V                      Wireless PKG                      PMPus                      Planning                 </div>

## **[BD9G500EFJ-LA] Upper Compatible to BD9G341AEFJ**

Suggestion for customers who are in trouble due to insufficient output current capability

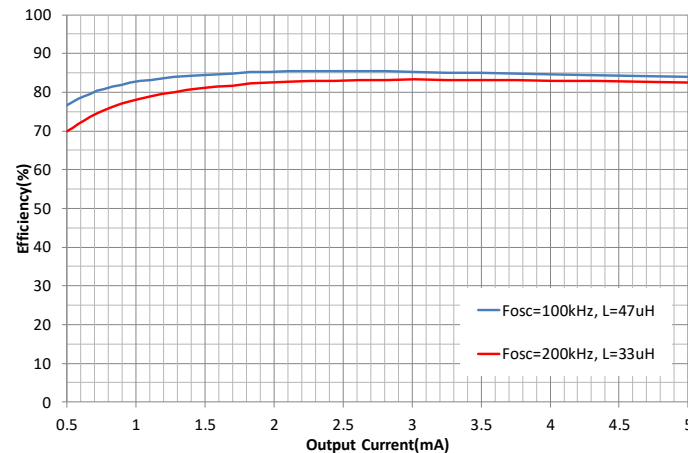
Industry-leading DC/DC for 80V absolute maximum rating

# 7 V to 76 V Input, 5 A integrated High - Side MOSFET Single Buck DC/DC Converter BD9G500EFJ-LA

**80V absolute maximum rating, VIN maximum 76V, Io maximum 5A,  
High Efficiency DC/DC.**

## Features

- Wide input voltage range from 7V to 76V
- Integrated high-side N-ch FET
- Current mode
- Adjustable frequency from 100kHz to 650kHz
- Built-in soft start function 20ms
- Over Current Protection (OCP)
- Under Voltage Lockout (UVLO)
- Thermal Shutdown (TSD)
- Over Voltage Protection (OVP)
- HTSOP-J8 package



## Application

- Industrial distributed power applications
- Battery powered equipment

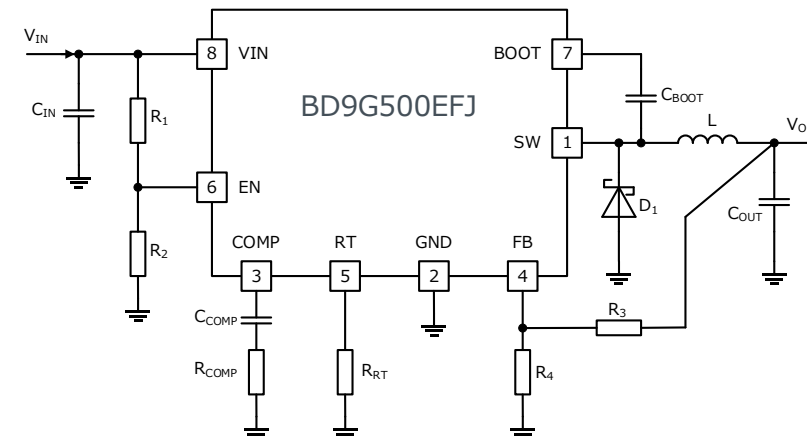
## Specification Summary

- Input voltage : 7V to 76V
- **Input voltage absolute maximum rating is 80V**
- Reference voltage :  $1.0V \pm 1.0\%$  ( $-40^{\circ}C \sim 125^{\circ}C$ )
- Output current : **5.0A (Max)**
- Switching frequency : 100kHz to 650kHz
- High-side NMOS :  $100m\Omega$  (Typ)
- Shutdown current :  $0\mu A$



W(Typ) x D(Typ) x H(Max)  
4.9mm x 6.0mm x 1.0mm

## Application Circuit



# Power supplies for industrial equipment for 60V and 48V power rails

**BD9G500EFJ-LA, BD9G341AEFJ is a DC/DC with the maximum rating of 80V and a maximum operating voltage of 76V. Pin-compatible design enable to share same PCB pattern for different output current range.**

NEW	Name	Absolute maximum rating	Output current	Operating temperature range	Switching frequency	Reference voltage	FET Ron	Input voltage range
	BD9G500EFJ-LA	80V	<b>5A</b>	<b>-40 – 125°C</b>	100 – 650 kHz	<b>1.0V±1%</b>	100mΩ	7 – 76V
	BD9G341AEFJ-LB	80V	3A	-40 – 85°C	50 – 750 kHz	1.0V±2%	100mΩ	12 – 76V

BD9G500EFJ-LA, BD9G341AEFJ Table.

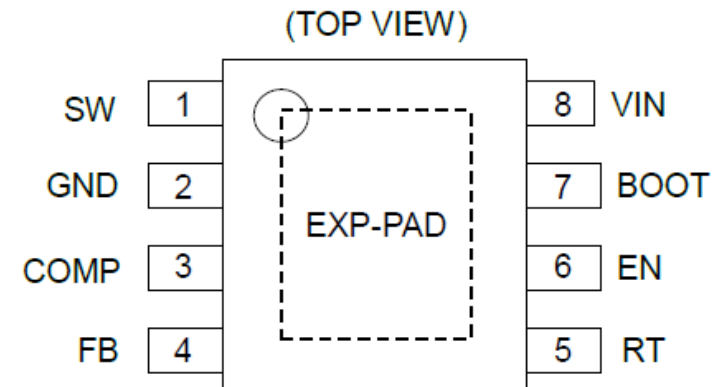
Blue bold is the dominant point.

## BD9G500EFJ-LA Advantages

- Increases the output current
- Expands the operating temperature range
- Improves the output voltage accuracy
- 10-year supply guaranteed

BD9G500EFJ-LA is Rohm's high quality design standard

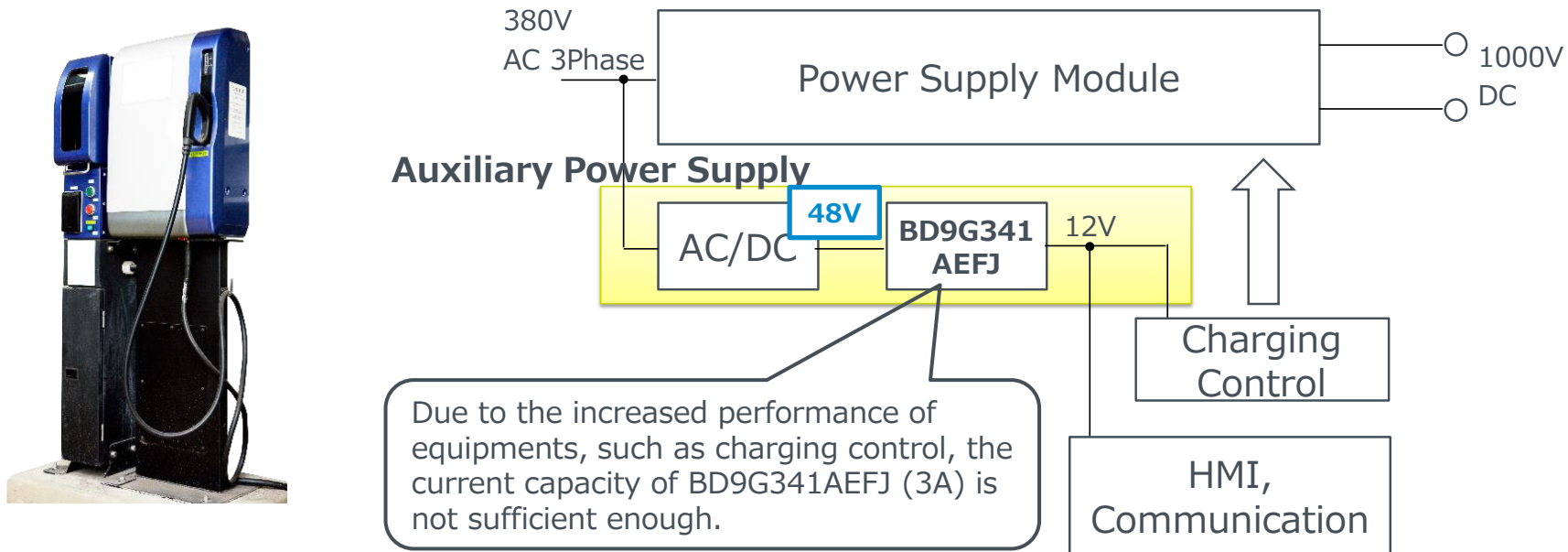
It is a product that conforms to the LA rank.



BD9G500EFJ-LA, BD9G341AEFJ  
Terminal Arrangement

# Power supplies for industrial equipment for 60V and 48V power rails - Examples of Design-Win

**BD9G500EFJ-LA can replace BD9G341AEFJ when better performance is required in next generation applications.**



BD9G500EFJ-LA, an upper compatible product with a pin-compatible current capacity of 5A

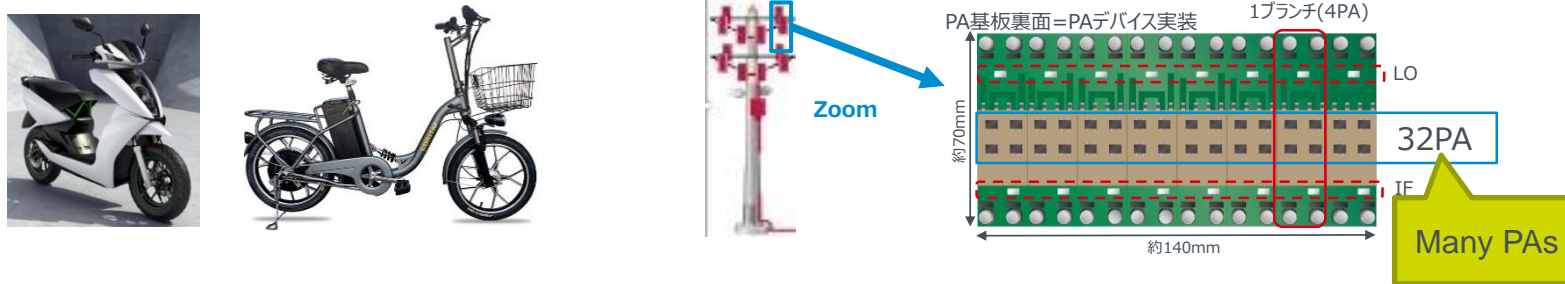


**A replacement evaluation was carried out from BD9G341AEFJ in a existing PCB layout. And the result was immediately OK.**

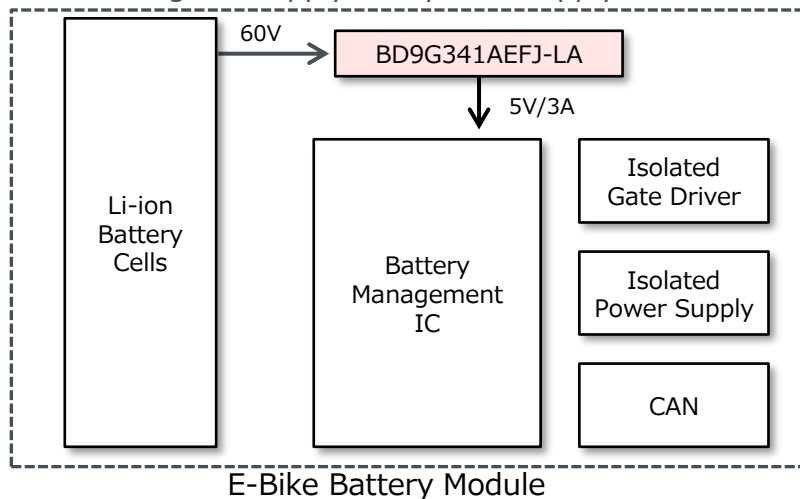
# Power supplies for industrial equipment for 60V and 48V power rails - Examples of Design-Win

- Li-ion Battery equipment up to 17 cell series. Particularly, 11 to 16 cells are optimal.
- Equipment that operates from 48VDC power supplies, such as base stations and data centers. In general, it is necessary to be operating up to an input voltage of 72V.

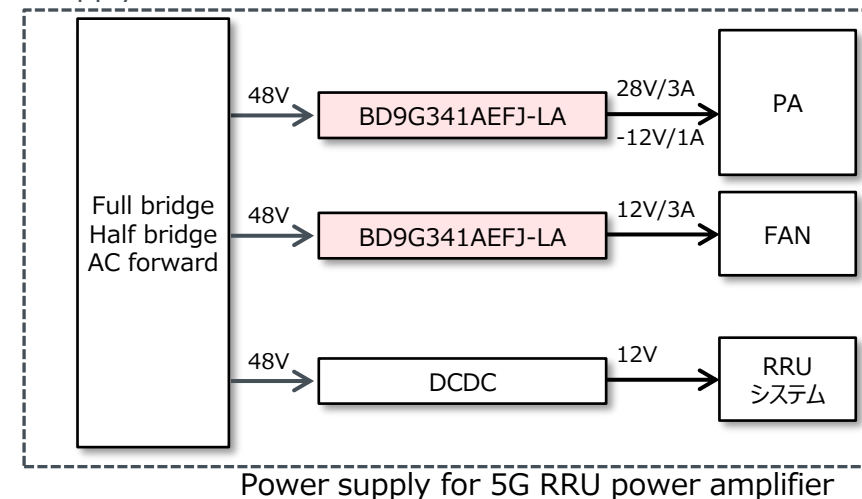
**BD9G500EFJ-LA and BD9G341AEFJ with a maximum operating voltage of 76V are ideal for in such cases.**



Electric bicycle, using 60V (14-cell) battery module on electric bike. Equipped with BMS for battery monitoring. 5V supply as a power supply for BMS.



The base station RRU (Remote Radio Unit) supplies power to the antenna at 48VDC. 28V or -12V for PA and 12V supply for FAN motors.





# Power supplies for industrial equipment for 60V and 48V power rails - Comparison Table

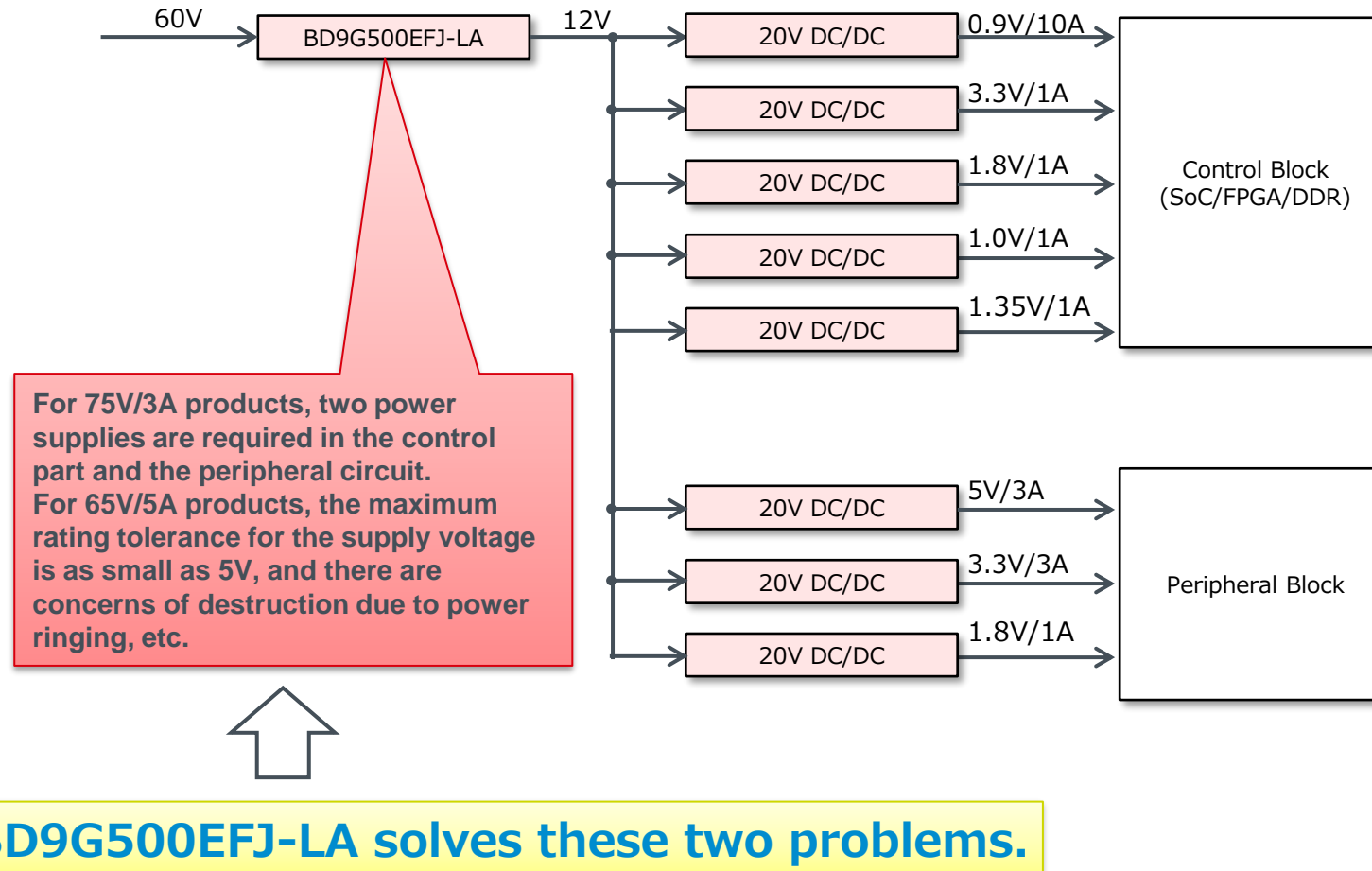
The **BD9G500EFJ-LA** has an advantage in maximum rating, output voltage accuracy, and maximum load current.

This DCDC matches the best for the devices that need 60V or more for power supply.

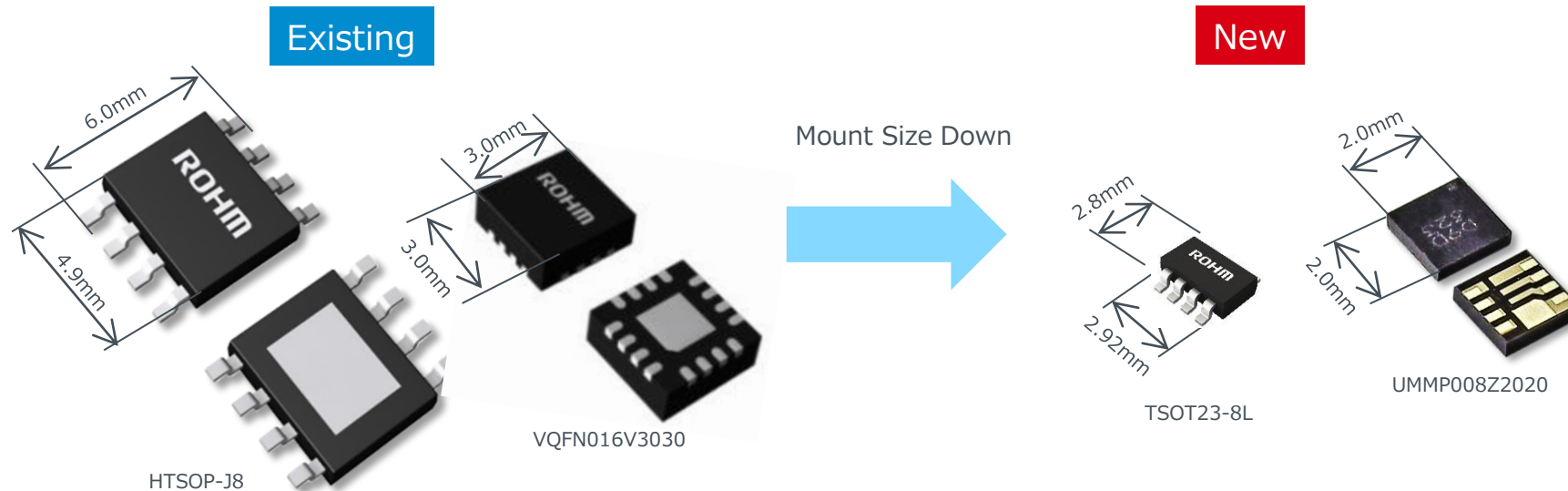
Parameter	ROHM		Company A		Company B
	BD9G500EFJ	BD9G341AEFJ	xxxxxxx	xxxxxxxxxxx	xxxxxxx
Absolute Maximum Voltage VIN (V)	<b>80</b>	<b>80</b>	76	<b>65</b>	<b>60</b>
Operating Voltage Range (V)	7 - <b>76</b>	12 - <b>76</b>	6 - <b>75</b>	4.5 - 60	4.3 - 60
Maximum Output Current (A)	<b>5</b>	3	3	<b>5</b>	3
Accuracy (%)	<b>1.0</b>	<b>2.0</b>	<b>1.5</b>	<b>1.0</b>	<b>2.0</b>
Internal FET Ron (mΩ)	100	<b>150</b>	<b>170</b>	92	<b>85</b>
Topology	Chopper	Chopper	Chopper	Chopper	Chopper
Package	HTSOP-J8 4.9 x 6.0	HTSOP-J8 4.9 x 6.0	<b>TSSOP-20EP</b> <b>6.4 x 6.5</b>	HSOIC (8) 4.9 x 6.0	MSOP-16 4.0 x 4.9

# Power supplies for industrial equipment for 60V and 48V power rails – Application Examples

**BD9G500EFJ-LA is the ideal primary power LSI for the 60V Vin system, taking advantage of its high voltage and high current capacity.**

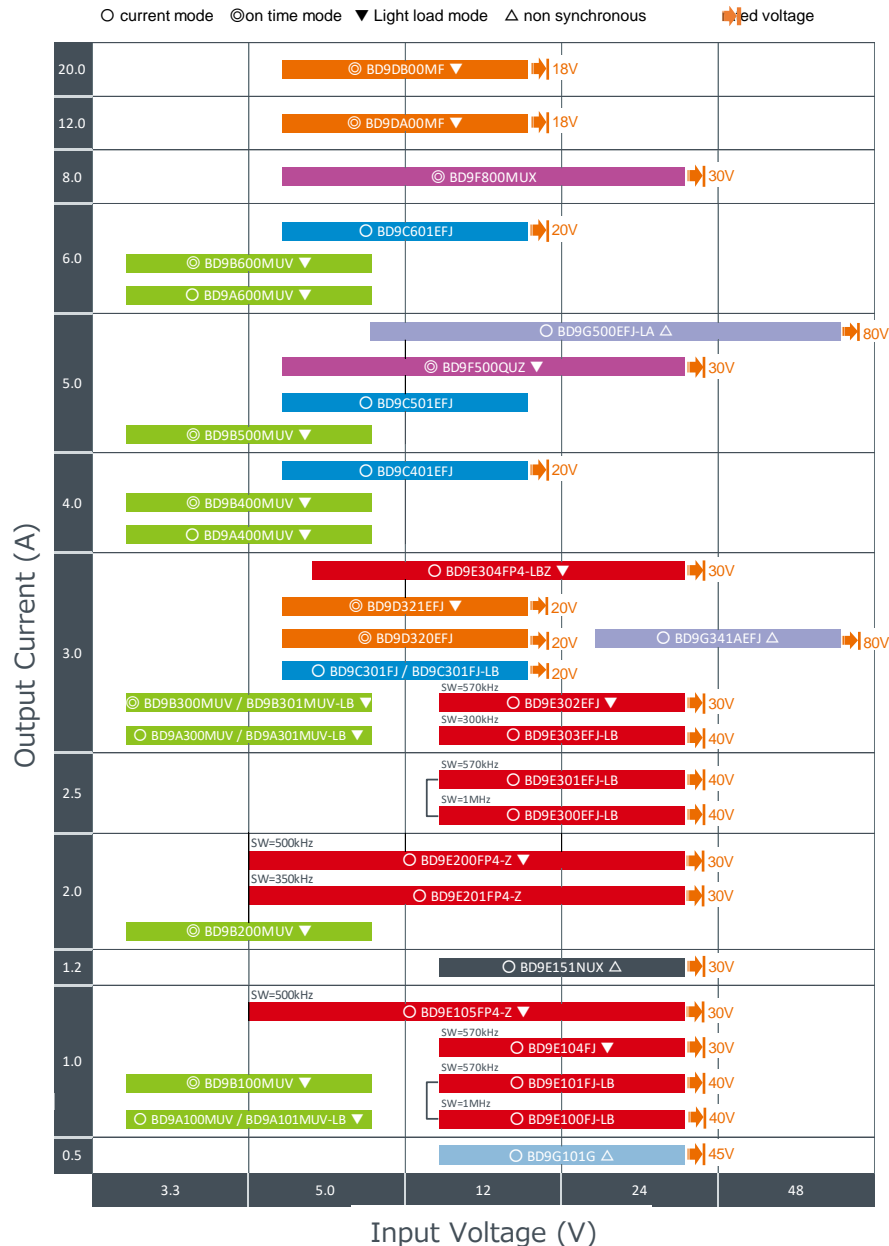


24V 3A DC/DC BD9E304FP4-LBZ  
5V 2A DC/DC BD9A201FP4-LBZ  
5V 3A DC/DC BD9B305QUZ  
17V 3A DC/DC BD9D300MUV



# ROHM's general-purpose Buck Converter

## BD9□series



High-voltage and high-current products are Rohm's strengths.

### Part Number Explanation

B D 9 A 3 0 0

#### Topology

9 : Buck  
8 : Boost, Boost-Buck, Inverting

#### Serial No.

00/01/02/...

#### Max. Rated Input Voltage and Control Method

A : ≤7V   Current Mode  
B : ≤7V   ON Time  
C : ≤20V   Current Mode  
D : ≤20V   ON Time  
E : ≤40V   Current Mode  
F : ≤40V   ON Time  
G, V : ≤ 80V   Current Mode

#### Output Current

1 : ≤1A  
2 : ≤2A  
3 : ≤3A  
4 : ≤4A  
...  
A : ≤ 10A  
...  
Z : Controller

Note : Some products may not comply with the above guidelines

## **[BD9F500QUZ] Small size, Frequency selection, High efficiency**

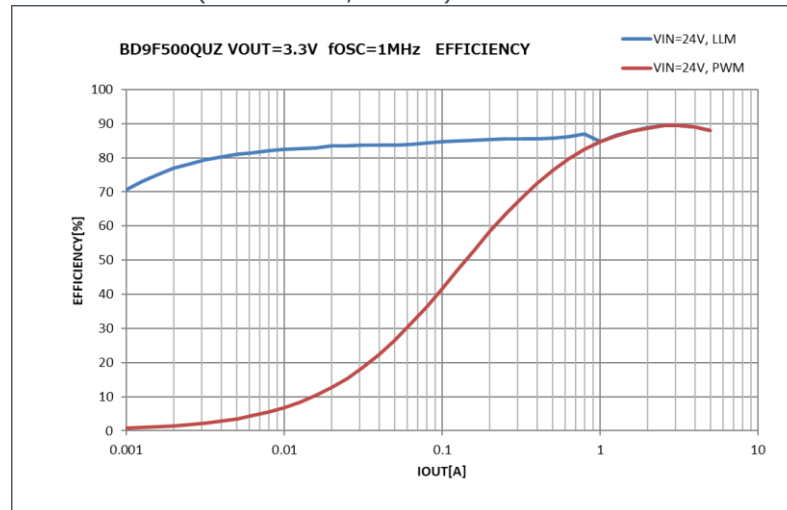
Suggestion for the requirement to product miniaturization or  
low heat generation

# 4.5 V to 36 V input, 5 A integrated MOSFET Synchronous Buck DC/DC BD9F500QUZ

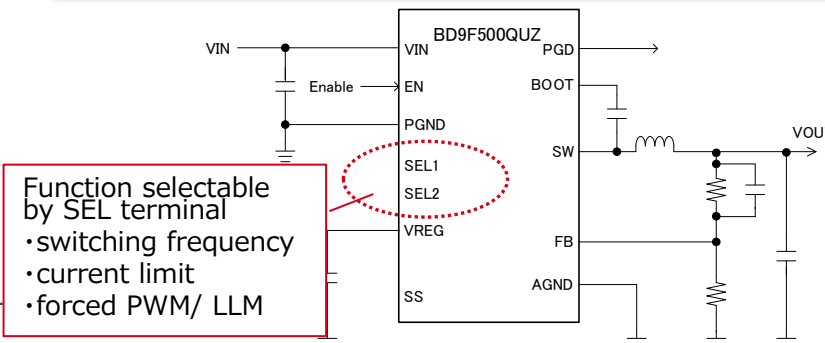
## 3mm<sup>2</sup>、5 A max output, function selectable IC – minimize PCB size

### Features

- Achieve high efficiency at all load area and high voltage rating.  
Reduction of self current consumption contributes low power even at light load. – Target Efficiency: 80%(24V⇒3.3V, 3mA)  
85% or more (24V⇒3.3V, 2~3A)

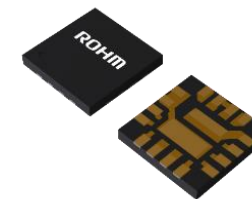


### Application Circuit

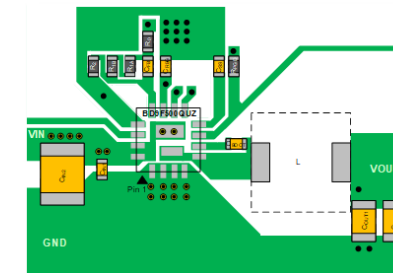


### Specification Summary

- Input Voltage Range : 4.5V to 36V
- Output Voltage Range : 0.6V to 14V
- Reference Voltage : 0.6V±1.0%
- Output Current : 5A
- Switching Frequency : 600kHz/1MHz/2.2MHz(Typ)
- Output Built-in MOSFET :  
H-MOS/L-MOS:40mΩ(Typ)/22mΩ(Typ)
- Fixed On Time Control DC/DC Converter
- Synchronous Rectifier Type
- Deep LLM Control Method (light load)
- Self Current Consumption 20μA(Typ)
- Select 2 Output Over Current Protection Values
- Output Over Voltage Protection / Output Discharge
- Power Good Output
- Adjustable Soft Start (OPEN;2ms)
- Various Protection (TSD/UVLO/SCP/OCP/OVP)
- 3.0mm x 3.0mm x 0.4mm(Max.) 0.5mm pitch  
(VMMP16LZ3030)
- SEL Pin LOGIC

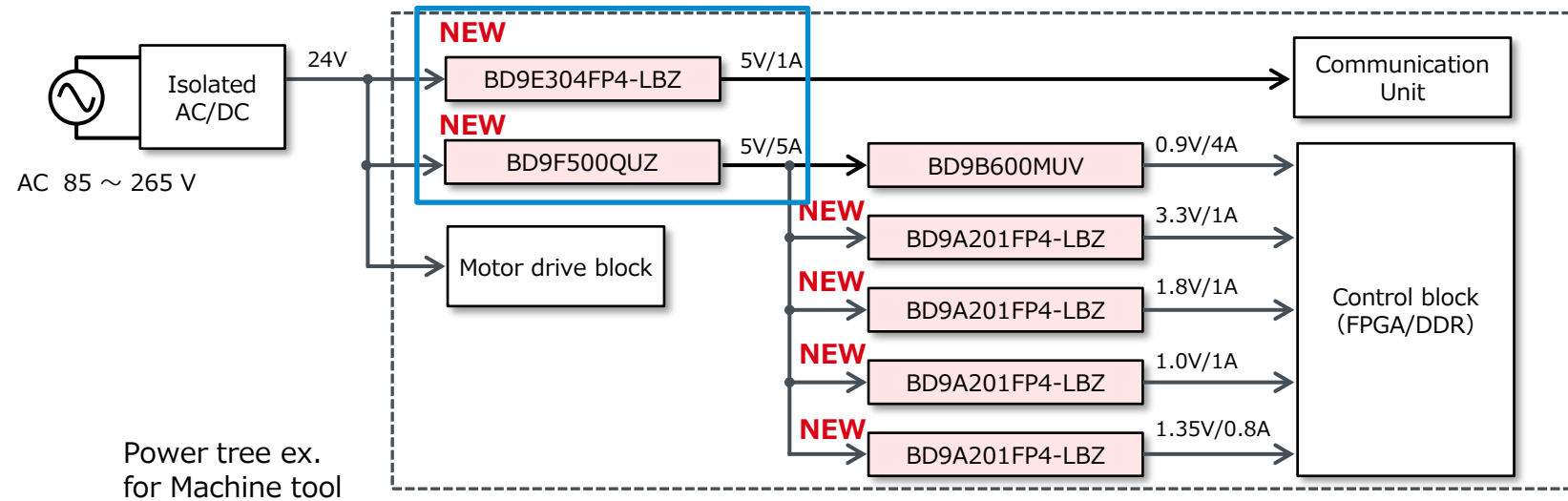


VMMP16LZ3030  
(3.0mmX3.0mm)  
wireless technology realize  
the high efficiency



PCB image

## ROHM's DC/DC convertor can be optimized in all power supply system for industrial equipment.



### New release : BD9F500QUZ

- 3.0mmX3.0mm package, up to 5A output
- function changeable suitable for customer requirement by 2 terminal setting.
- input voltage range : 4.5V ~ 36V (absolute:39V)
- output voltage range : 0.6V ~ 14V
- reference voltage : 0.6V±1.0%
- output current : up to 5A
- built-in low Ron FET : 40mΩ, 22mΩ
- fast load transient by constant on time control
- synchronous type : needless the external SBD
- built-in soft start function
- rich protect function
  - OCP/over current protection, SCP/short circuit protection
  - TSD/thermal shut down, UVLO/under voltage lock out

### Under development : BD9E304FP4-LBZ

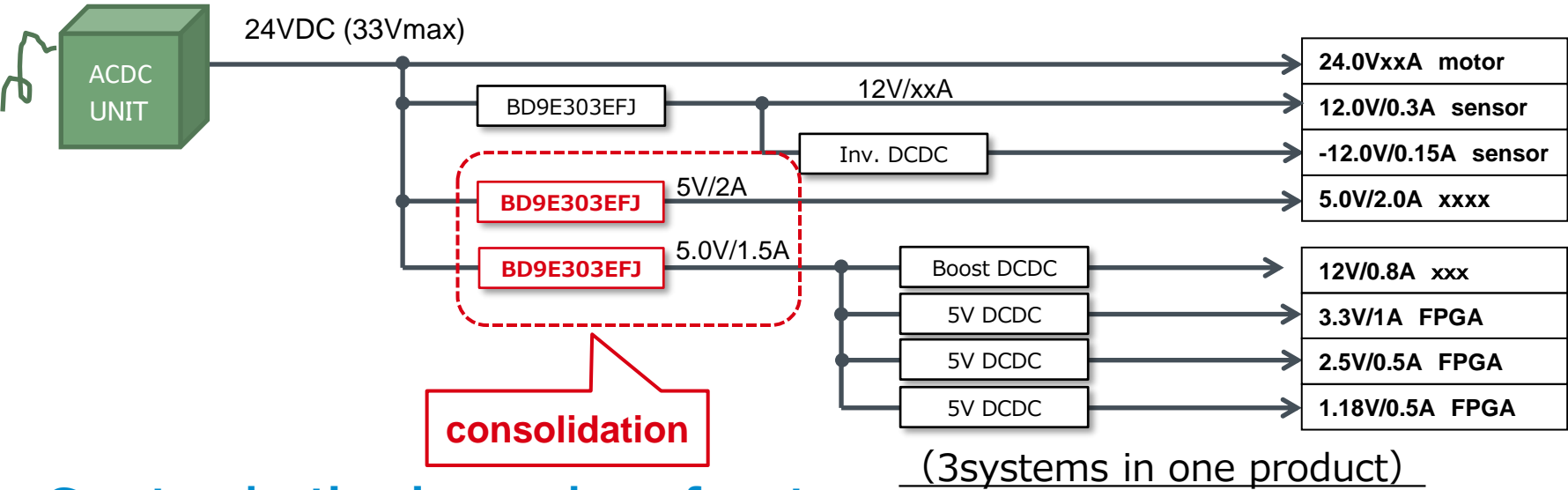
- long-term supply for industrial equipment
- High efficiency at all load range with ROHM original light load mode
- input voltage range : 4.5V ~ 36V (absolute:39V)
- output voltage range : 0.7V or  $V_{IN} \times 0.1 \sim V_{IN} \times 0.8V$
- reference voltage : 0.6V±1.0%
- output current : up to 3A
- built-in low Ron FET : 90mΩ, 60mΩ
- fast load transient by current mode
- synchronous type : needless the external SBD
- built-in soft start function
- rich protect function
  - OCP/over current protection, SCP/short circuit protection
  - TSD/thermal shut down, UVLO/under voltage lock out

# DC/DC convertor for 24V power rail

## BD9F500QUZ adopting example



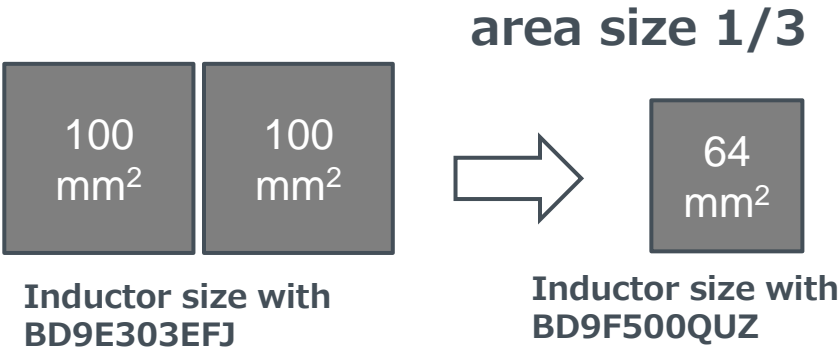
**BD9F500QUZ reduces the component by half and minimalizes the inductor size.**



**Great reduction in number of parts**

**BD9F500QUZ / BD9E303EFJ comparison**

	BD9F500QUZ	BD9E303EFJ
Package	VMMP16L3030 3.0 x 3.0 mm	HTSOP-J8 4.9 x 6.0 mm
Iout	5 A	3 A
Frequency	600 kHz / 1 MHz / 2.2 MHz	300 kHz
L value	1.5 $\mu$ H - 4.7 $\mu$ H	10 $\mu$ H - 22 $\mu$ H
L size	8.0 x 8.0 mm	10.0 x 10.0 mm



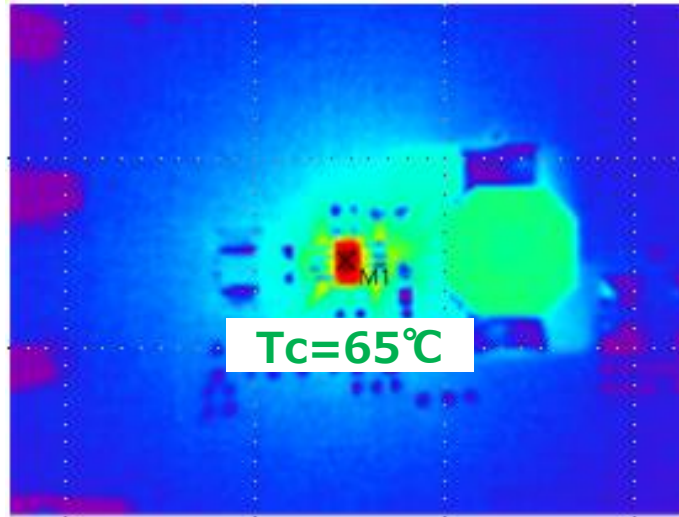


# DC/DC convertor for 24V power rail

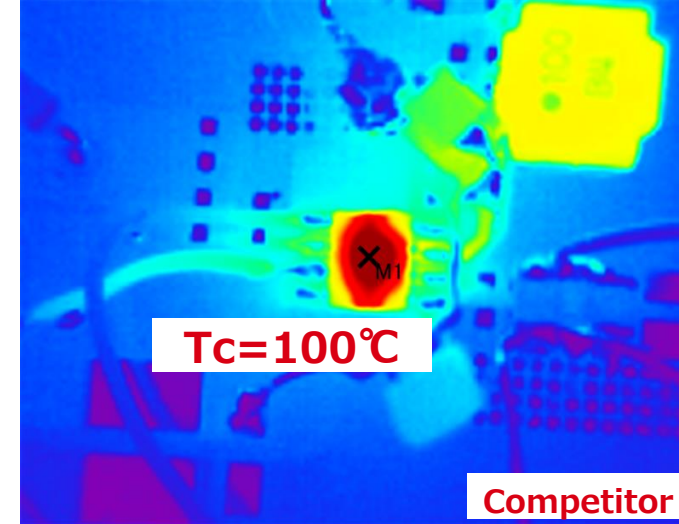
## BD9F500QUZ Feature

### Small size and low heat generation by the latest circuit technology

Low heat generation by circuit technology and the wireless package!



24V input, 3.3V/4A output  
(600kHz setting)



Using Wireless package can achieve the reduction of power loss and heat dissipation, which turns to high efficiency and low heat generation.



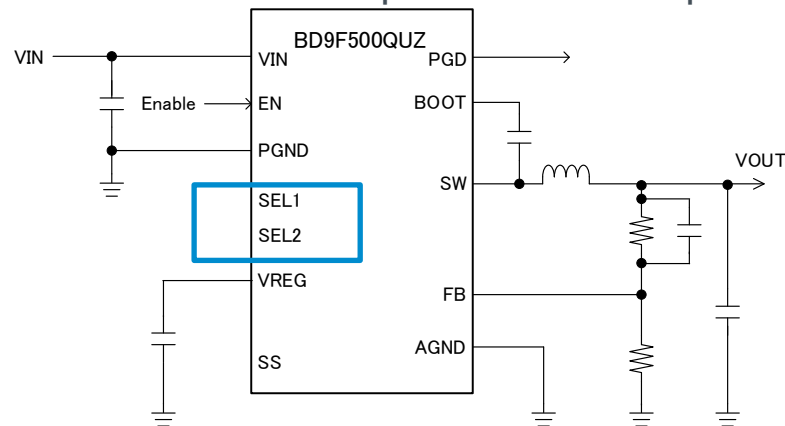
No need of heat sink components  
No need of controller such as external MOSFET or Di

# DC/DC convertor for 24V power rail

## BD9F500QUZ Feature

**Function can be easily changed to meet the requirement. Easy to optimize.**

Switching frequency, overcurrent detection and switching mode are easily to be changed by SEL1, SEL2 terminals. Optimal design is possible in all required situation in set development such as power supply size, load response, noise reduction and low power consumption.



BD9F500QUZ typ. application

SEL1	SEL2	FREQ	OCP	MODE
L	L	1MHz	6.5A(Typ)	Light Load
L	M			PWM Continuation
H	L		4.0A(Typ)	Light Load
H	M			PWM Continuation
M	L	600kHz	6.5A(Typ)	Light Load
M	M			PWM Continuation
L	H		4.0A(Typ)	Light Load
M	H			PWM Continuation
H	H	2.2MHz	4.0A(Typ)	PWM Continuation

Easy to change the function by SEL terminal

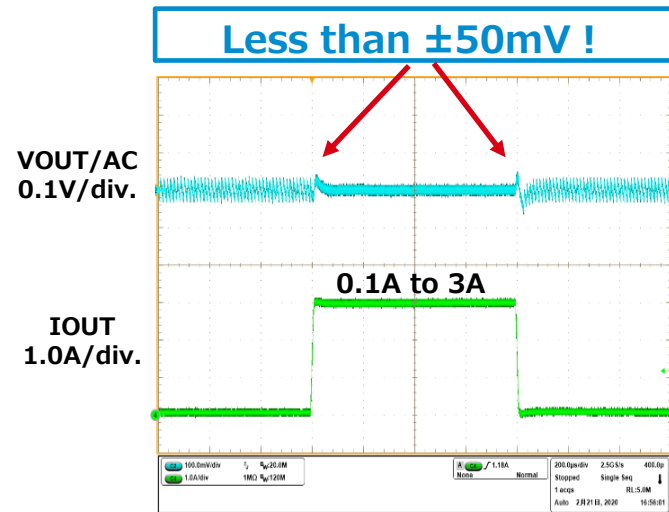
### 【Example of function change】

- Power supply size to be as small as possible! ...SEL1:H SEL2:H  
fsw=2.2MHz: minimize the inductor size
- Need the highest efficiency in the entire load up to 3A!  
...SEL1:M SEL2:L  
fsw=600kHz: low switching loss, LLM: high efficiency at light load

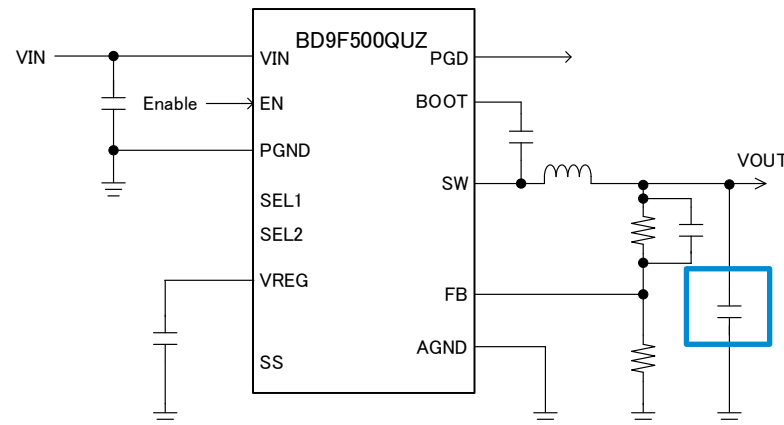
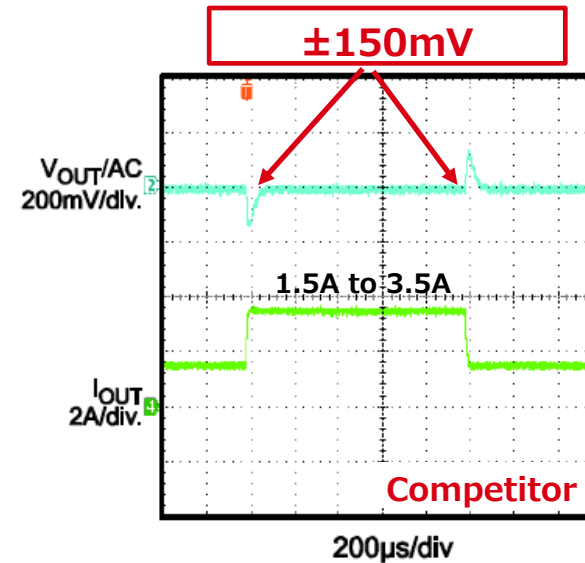
# DC/DC convertor for 24V power rail

## BD9F500QUZ Feature

Fast transient response by ROHM unique control system.  
Possible reduction of output capacitor (COUT).



24V input, 3.3V output  
(600kHz setting/light load mode)



Cout to control output voltage fluctuations can be reduced to 1/3 of conventional, thus reducing the number of components.

# DC/DC convertor for 24V power rail

## BD9F500QUZ - Comparison table

**BD9F500QUZ is the all-rounder in terms of power supply miniaturization, low heat generation and low power consumption.**

Item	ROHM	Company A		Company B	
	BD9F500QUZ	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx
PKG	VMMP16L3030 3.0 x3.0mm	SOIC-8 4.9 x3.9mm	WQFN30 6.0 x4.0mm	QFN-16 3.0 x4.0mm	QFN-20 3.0 x4.0mm
Input range	4.5 to 36V	4.5 to 28V	3.5 to 36V	3.3 to 36V	4.5 to 36V
Switching frequency	600k/1M/ 2.2MHz	340kHz	350k to 2.2MHz	350k to 2.2MHz	200k to 1MHz
Output current	5A	3A	5A	3.5A	5A
Number of external components	13	15	17	17	17
Efficiency 24V⇒5V/3A	92%	87%	93%	90%	91%
Efficiency 24V⇒5V/1mA	74%	29%	80%	45%	35%

## **[BD9E304FP4-LBZ] Small size, High efficiency, Flow Soldering**

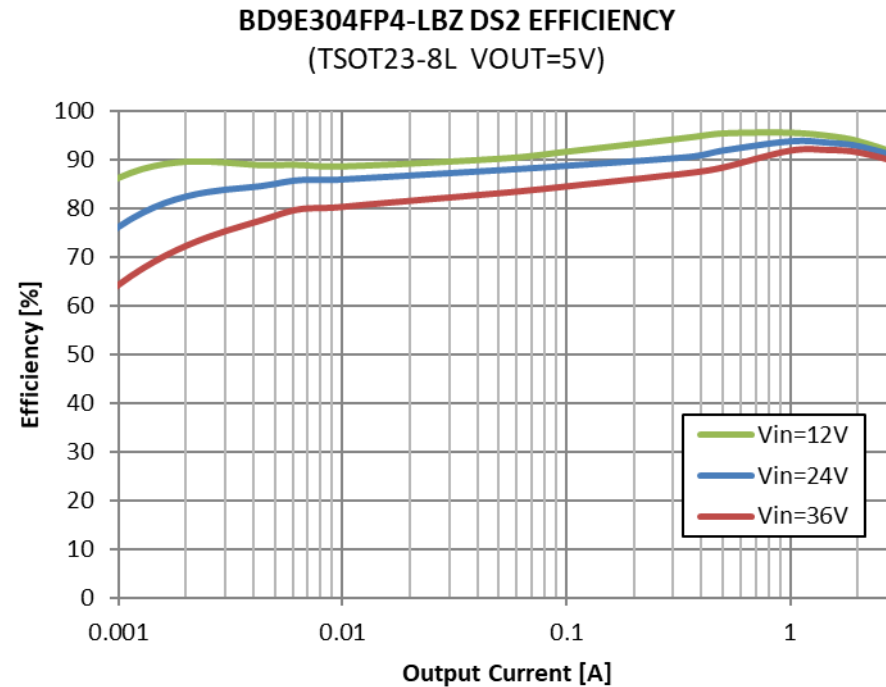
Suggestion for the requirement to product miniaturization or  
easy soldering

# DCDC convertor for 24V power rail

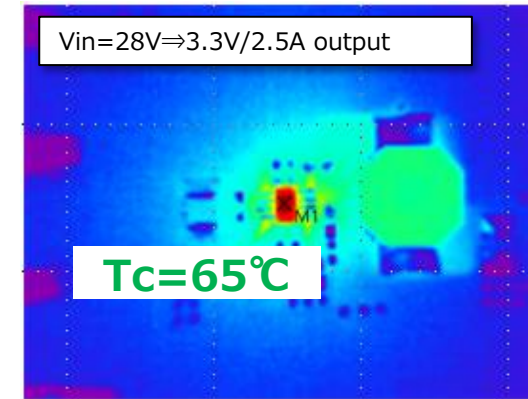
## BD9E304FP4-LBZ Feature

### Wireless type and TSOT23 package allowing for flow soldering.

BD9E304FP4 uses wireless type TSOT23 package. Small size and low heat generation are realized by reducing the loss of the IC itself. TSOT23 pkg can be easily mounted and removed.



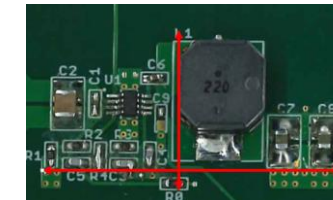
Achieve the high efficiency at all load range



Low heat generation



TSOT23-8L  
2.80mm×2.92mm×0.95mm (Max.)



Available to mount in a small space of 20mm x 35mm

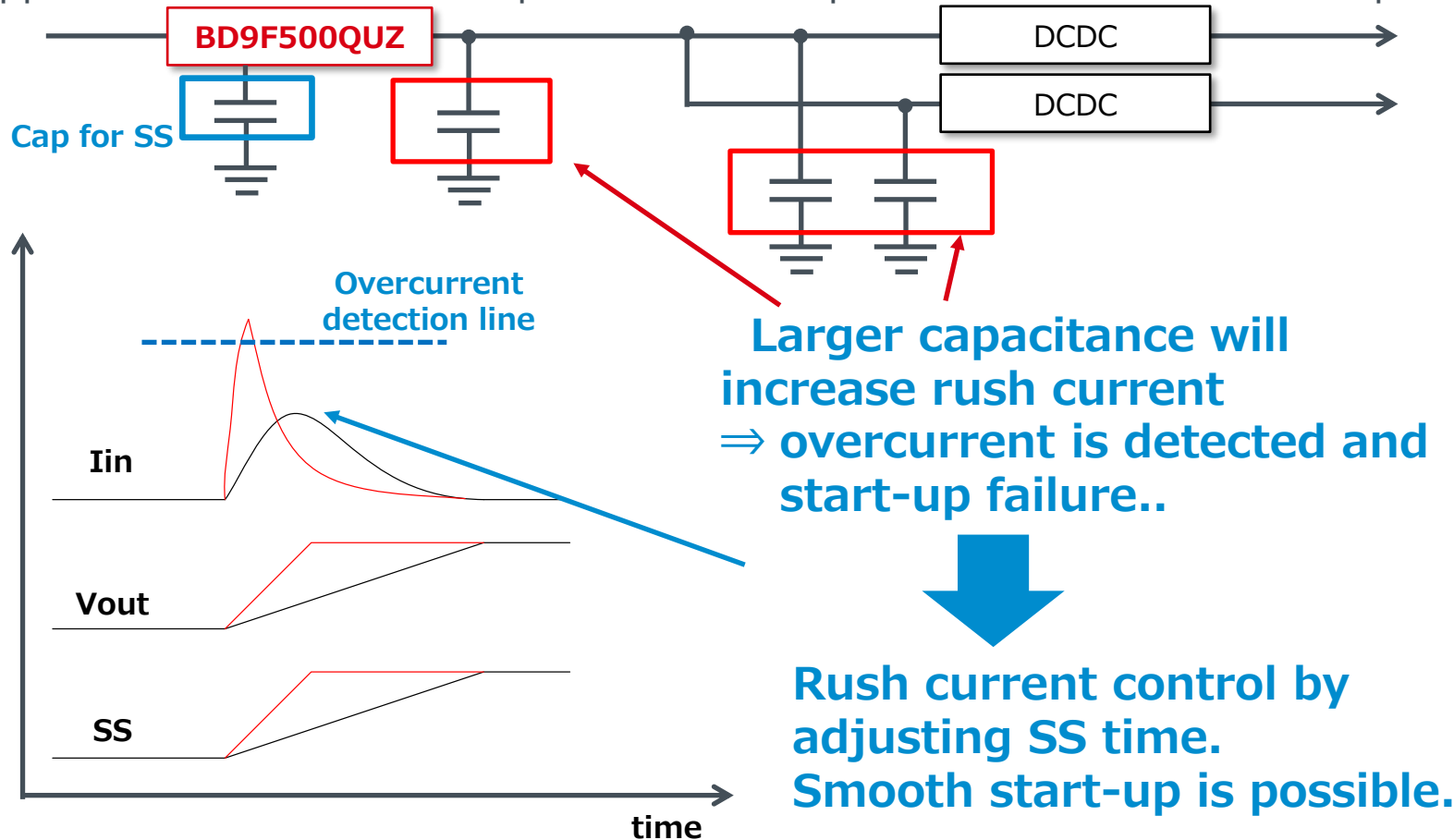
# DCDC convertor for 24V power rail

## BD9E304FP4-LBZ Feature

### Rush current can be easily reduced by changing soft start (SS) setting.

BD9E304FP4 has soft start as variable to accommodate various capacitance values at late circuit stage.

It suppresses rush current and prevents start-up failure due to overcurrent protection.



# DCDC convertor for 24V power rail

## BD9E304FP4-LBZ - Comparison table

**BD9E304FP4 is easy mount and high efficiency 40V voltage rating product.**

項目	ROHM	Company A		Company B	
	BD9E304FP4	xxxxxxx	xxxxxxx	xxxxxxx	xxxxxxx
PKG	TSOT23-8L 2.8 x2.9mm	SOT-23 2.8 x2.9mm	SOT-23 2.8 x2.9mm	SOIC-8 4.9 x6.0mm	HSOIC-8 3.9 x4.9mm
Input range	4.5 to 36V	4.5 to 28V	4.5 to 28V	4.5 to 28V	4.5 to 36V
Switching frequency	300kHz	400kHz	350kHz	570kHz	400kHz
Output current	3A	3A	3A	3A	3A
Number of external components	12	12	13	17	12
Efficiency 24V⇒5V/3A	92%	91%	92%	86%	90%
Efficiency 24V⇒5V/1mA	69%	68%	3%	20%	60%
SS variable	○	×	×	○	×



# 4.5 V to 36 V input, 3A Iout, integrated MOSFET Synchronous Buck DC/DC - BD9E304FP4-LB

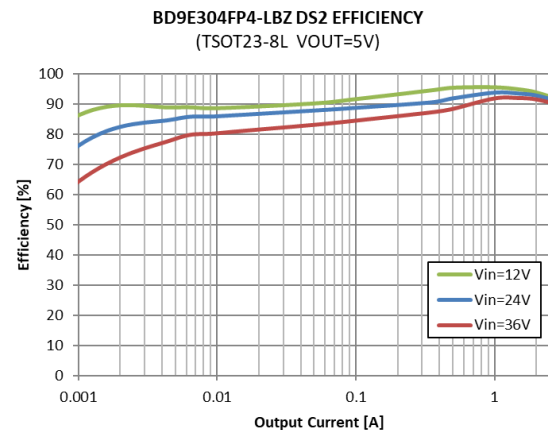
Sample available



Less than 3mm<sup>2</sup>, 3A max output, flow soldering available

## Features

- Achieved ultra high efficiency at light load responded.
- Achieve high speed load response characteristic by current mode control and phase compensation easily settable.
- Input voltage absolute maximum rating : 39V



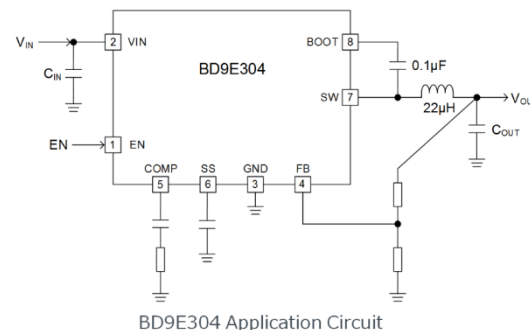
## Specification Summary

- Input voltage range : 4.5V to 36V (breakdown at 39V)
- Standard voltage : 0.6V±1.5%
- Output current : 3.0A
- Switching frequency : 300kHz
- Consumption current : 45μA
- Build-in Power MOSFET
  - High-side NMOS : 100mΩ (Typ.)
  - Low-side NMOS : 60mΩ (Typ.)
- Various protection function equipped.
  - Over current protection (OCP)
  - Short circuit protection function (SCP)
  - Thermal shutdown protection (TSD)
  - Under voltage lock out function (UVLO)
- Soft start function avoiding inrush current when supplying power.



BD9E304FP4-LBZ  
TSOT23-8  
2.80mm×2.92mm×0.95mm (Max.)

## Application Circuit



## Application

- Home appliances
- Industry

Because it is under development, the contents of the description are subject to change without notice.  
Please check the data sheet for the latest specs.

# 2.7 V to 5.5 V input, 2A Iout, integrated MOSFET Synchronous Buck DC/DC BD9A201FP4-LB

Sample available

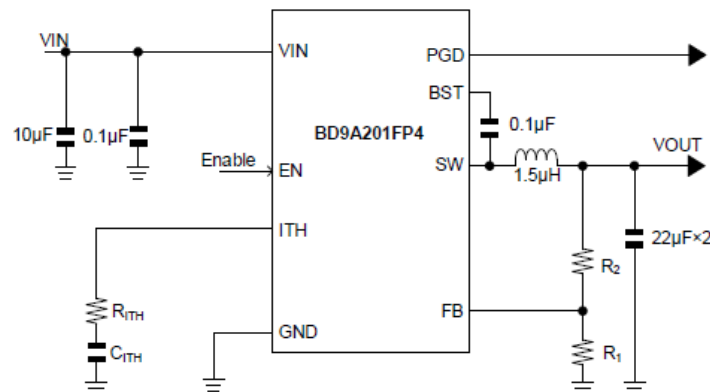


Support flow implementation by adopting TSOT23-8 small package.

## Features

- For it is Synchronized rectifier type with build-in MOSFET, external FET and diode formerly required are now unnecessary.
- Achieve high speed load response characteristic by current mode control and phase compensation easily settable.
- Suitable for adapter and secondary power supply with its wide input voltage range.
- Input voltage absolute maximum rating : 7V
- Build-in PGOOD function

## Application Circuit



## Specification Summary

- Input voltage range : 2.7V to 5.5V (breakdown at 7V)
- Standard voltage : 0.8V±1.0%
- Output current : 2.0A
- Switching frequency : 1MHz
- Build-in Power MOSFET
  - High-side NMOS : 50mΩ (Typ.)
  - Low-side NMOS : 50mΩ (Typ.)
- Various protection function equipped.
  - Over current protection (OCP)
  - Short circuit protection function (SCP)
  - Thermal shutdown protection (TSD)
  - Under voltage lock out function (UVLO)
- Soft start function avoiding inrush current when supplying power.



BD9A201FP4-LBZ  
TSOT23-8  
2.80mm×2.92mm×0.95mm (Max.)

## Application

- DC/DC power supply for Factory Automation device
- Secondary power supply and adapter device
- Communication device

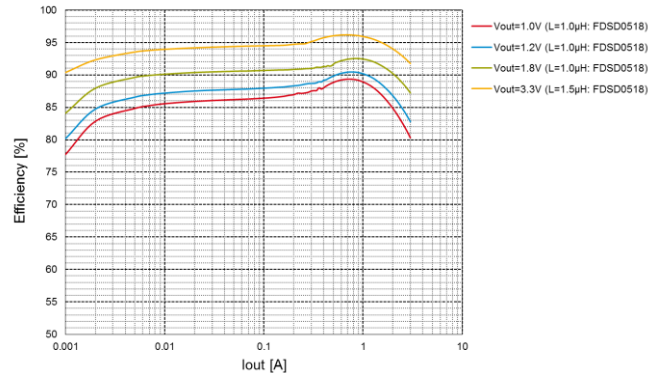
Because it is under development, the contents of the description are subject to change without notice.  
Please check the data sheet for the latest specs.

# 2.7 V to 5.5 V input, 3A Iout, integrated MOSFET Synchronous Buck DC/DC - BD9B305QUZ

**Contribute to board miniaturization using ultra-compact 2mm square package and L-miniaturization due to high-frequency operation.**

## Feature

- Contribute to Eco with high efficiency characteristic by Light Load Mode control.
- Achieved low costing by space-saving mount
  - Synchronized rectifier type with build-in MOSFET.
  - External FET and diode unnecessary.
- Small package and space-saving realize the low cost power supply system.



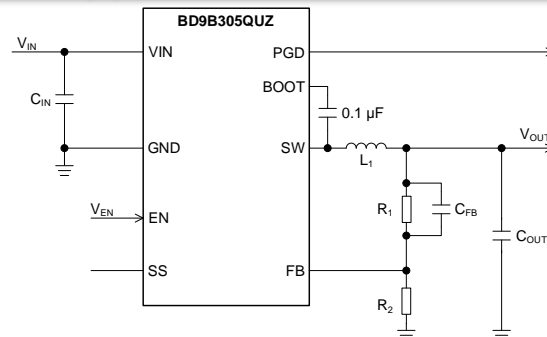
## Specification Summary

- Input Voltage range : 2.7V to 5.5V
- Output Voltage range : 0.6V to VIN x 0.8
- Reference voltage : 0.6V±1.5% (Ta=25°C)
- Switching Frequency : 1MHz
- Output Current : 3A
- Integrated Power MOSFET
  - High Side NMOS : 50mΩ
  - Low Side NMOS : 40mΩ
- Operating Current : 15µA
- Constant Overtime Topology
- DeepSLM Control
- Synchronous rectification
- Power Good Function
- Soft Start Adjustable
- Over Current Protection (OCP)
- Short Circuit Protection (SCP)
- Over Voltage Protection (OVP)
- Thermal shutdown (TSD)
- Under voltage lock out (UVLO)



VMMP08LZ2020  
2.0mm x 2.0mm x 0.5mm (Max)  
0.5mm Pitch

## Application Circuit



## Application

- LCD TV
- OA and Office Equipment
- Set Top Box
- POL Secondary Power Supply
- Power Supply for SoC and FPGA

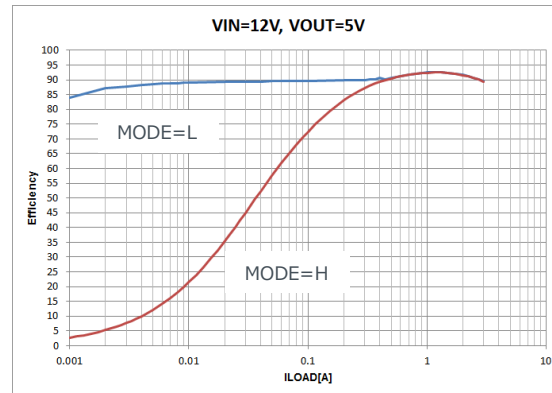
# 4 V to 17 V input, 3A Iout, integrated MOSFET Synchronous Buck DC/DC - BD9E305QUZ



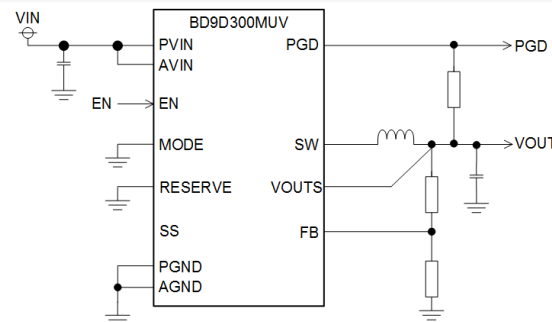
## Best IC for Li-ion battery 2-cell equipment with 100% Duty operation support.

### Feature

- High efficiency by the optimization of Driver Part
- Adoption of Fixed On Time Control achieves the high-speed load response without Phase Compensation Circuit
- Minimum External Components (Such as Capacitor for Internal Regulator)
- Optimum for 12V line and Li-ion battery 2 cell input



### Application Circuit



### Specification Summary

- Input Voltage Range : 4V to 17V
- Output Voltage Range : 0.9V to 5.25V
- Reference Voltage : 0.8V±1.0%
- Switching Frequency : 1.25MHz (Typ.)
- Maximum Output Current : 3A
- Circuit Current at Operation : 20μA(Typ.)
- Built-in Output FET On Resistance
  - High Side PMOS : 110mΩ
  - Low Side NMOS : 50mΩ
- Fixed On Time Control Method
- High Efficiency at light load by Deep SLLM control
- PWM/PFM Control
- External diode free by synchronous rectifier
- 100 % Duty Operation
- Various Protection Function
  - Over Current Protection (OCP), Short Protection (SCP)
  - Thermal Shutdown (TSD), Under Voltage Lockout (UVLO)
  - Over Voltage Protection (OVP, Latch)



VQFN016V3030  
3.0mm×3.0mm×1.0mm  
0.5mm PITCH

### Application

- 12V Input General Purpose
- Li-ion Battery 2 Cells
- USB
- POL Power Supply

