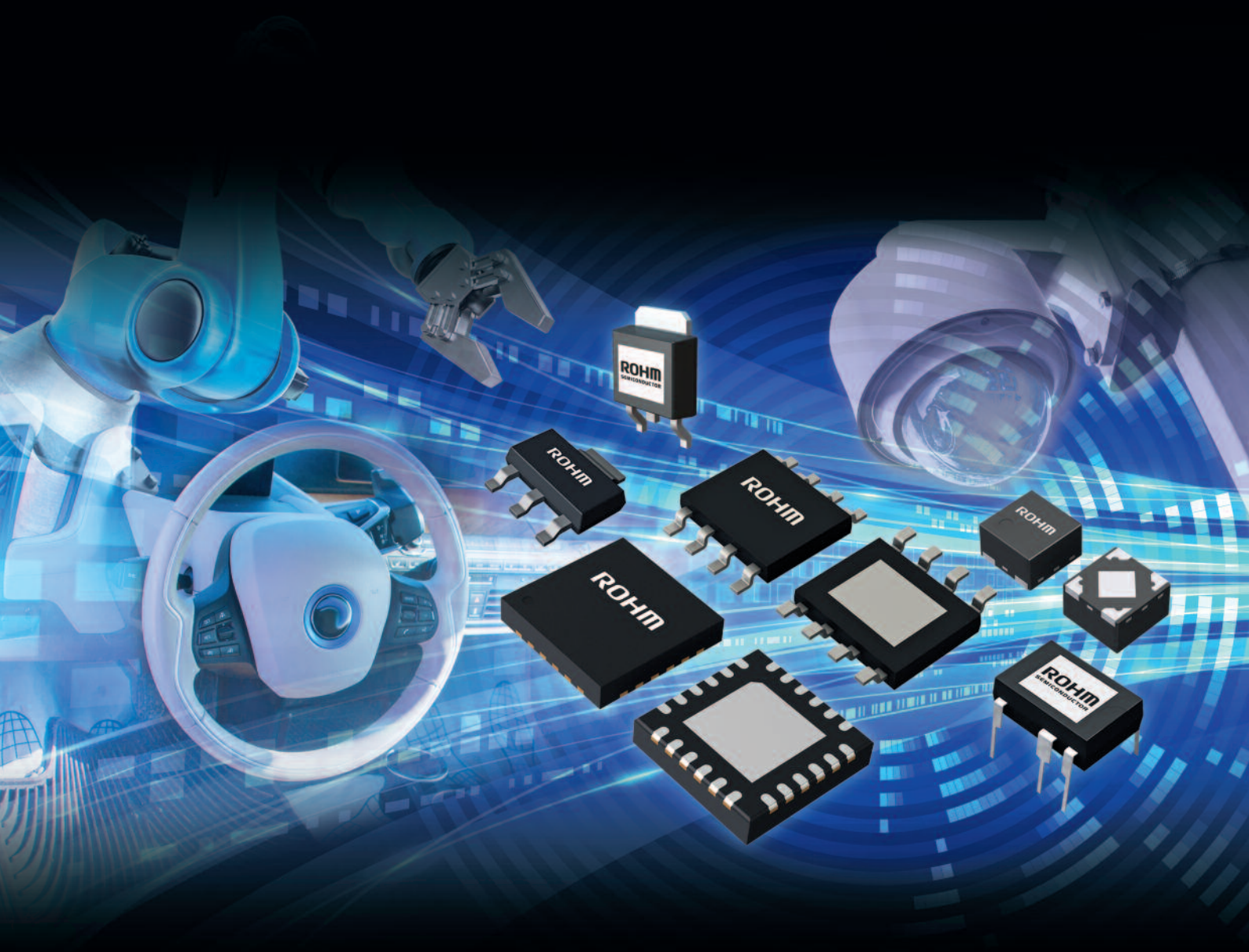
ROHM SEMICONDUCTOR

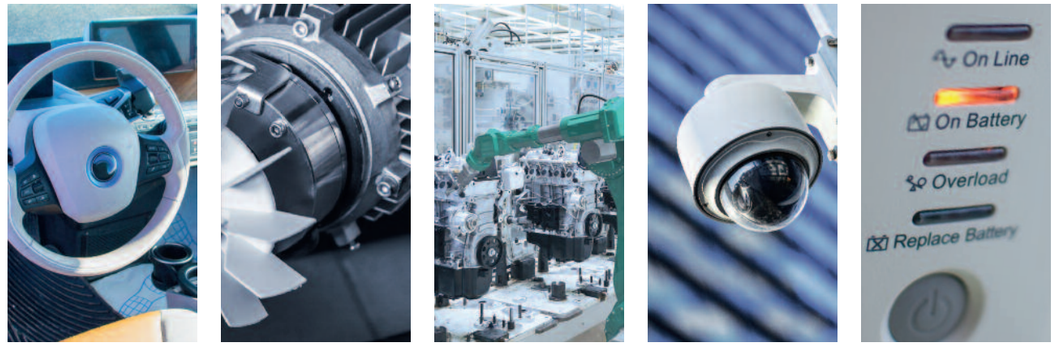
PRODUCT CATALOG

POWER MANAGEMENT V1.0

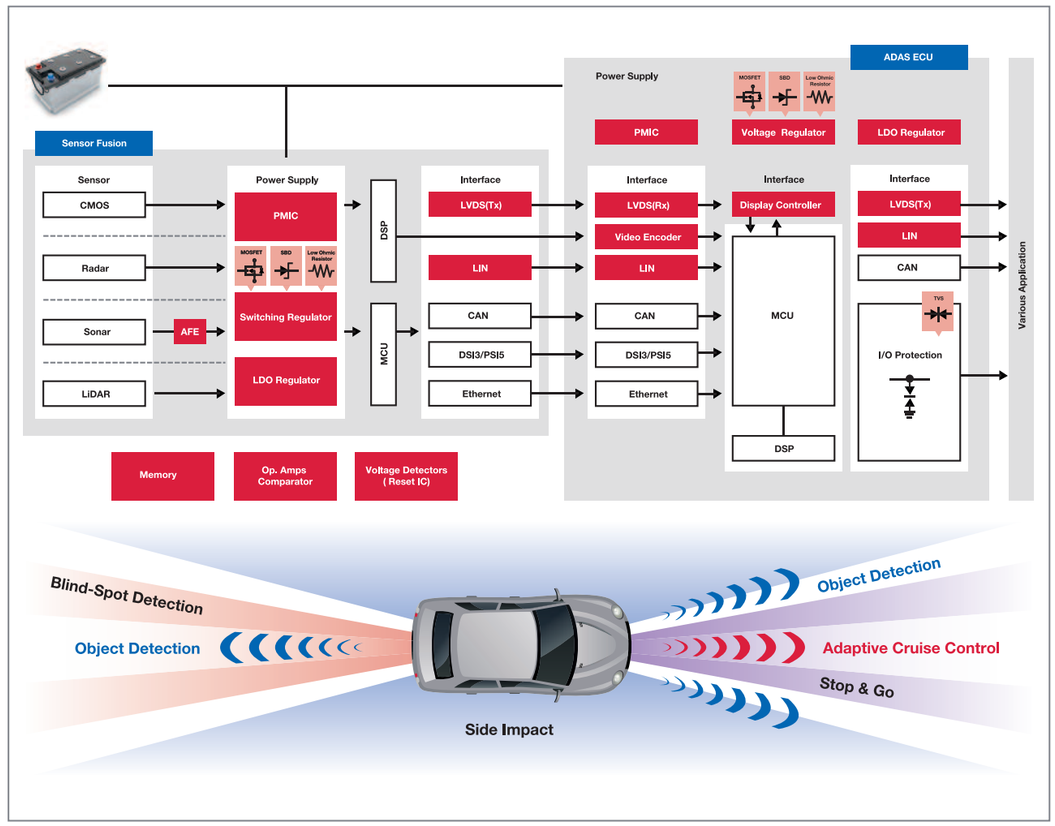


INTRODUCTION

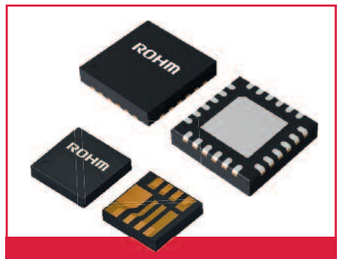
Target Applications



Application example: ADAS (Advanced Driver Assistance System)

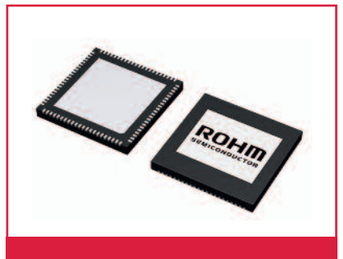


Range of ROHM's Analog ICs for Power Management

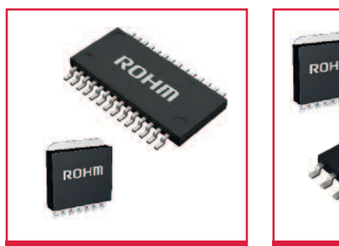


SWITCHING REGULATORS

LINEAR REGULATORS

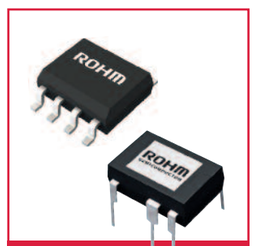


PMICs

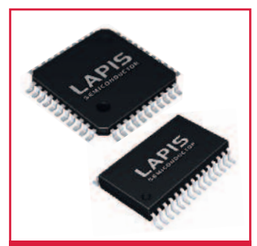


LED DRIVERS

MOTOR DRIVERS

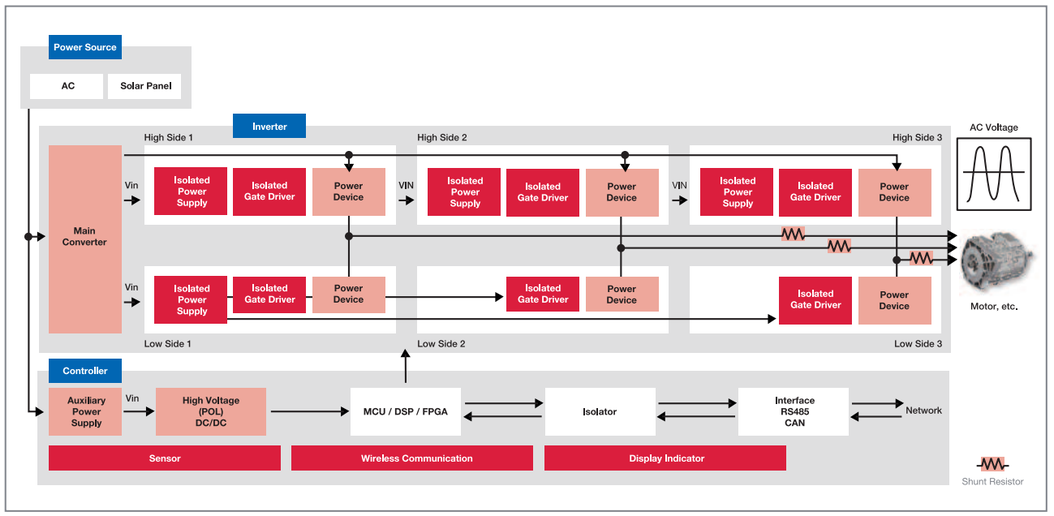


AC/DC CONVERTER ICs



BATTERY MONITORING ICs

Application example: Inverter



■ Focus on ROHM's Power Management solutions / ■ Available ROHM products

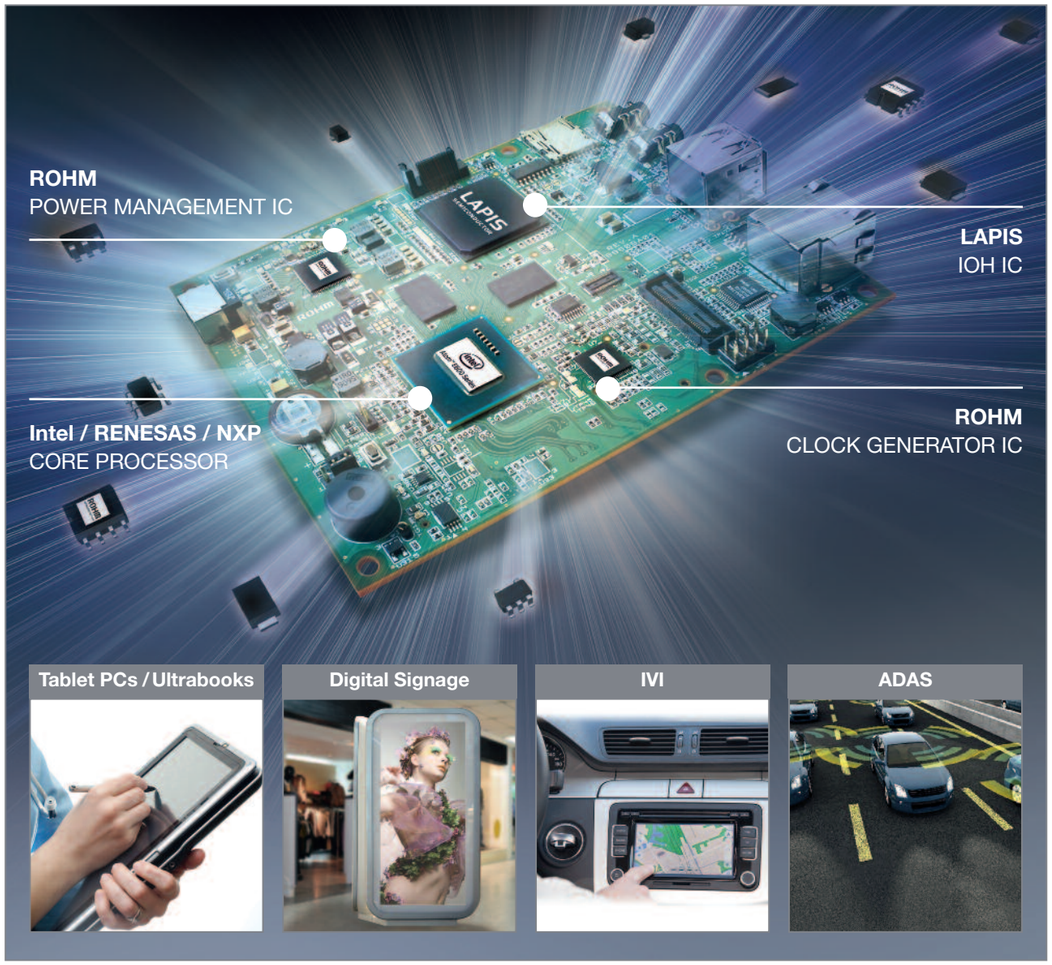
POWER MANAGEMENT ICs

Based on long term experience with Discrete Power Devices, ROHM Semiconductor offers a broad lineup of integrated Power Management ICs for various applications. This includes a broad lineup of DC/DC Converters & LDOs as well as fully integrated PMICs. All new products are especially focusing on low Iq for Green Energy and high reliability applications for the Industrial Market.

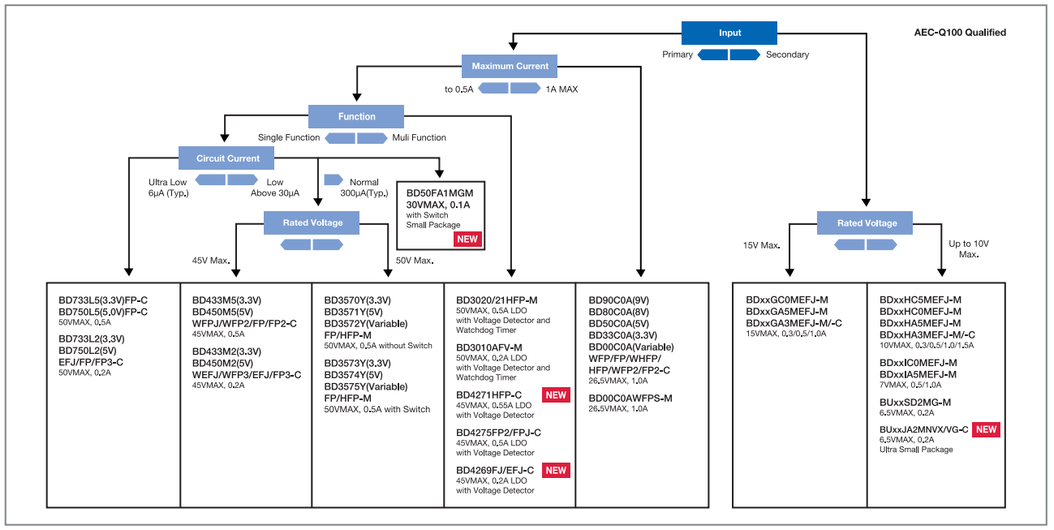
PMICs for dedicated MCU platform

Developed in close cooperation with partners like Intel, Renesas and NXP – ROHM's Power Management ICs offer complete solutions for embedded MCU platforms.

Providing Solutions for SoC



AUTOMOTIVE LINEAR REGULATORS



Highlight: Ultra Low Iq Current LDO Regulators – BD7xxLx-C Series

- Ultra-low quiescent current: 6µA (Typ.)
- Output transistor: Low saturation Pch DMOS (3Ω Typ.)
- VCC maximum voltage: 50V
- Output current: 200mA (Max.) / 500mA (Max.)
- Output voltage: 3.3V±2% / 5.0V±2%
- Enables low ESR ceramic capacitors
- Integrated output current control circuit
- Built-in thermal shutdown

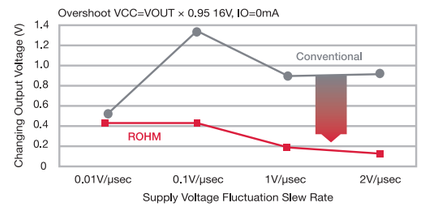
Current	Part No.	HTSOP-18	SOT223-4F	TO252-3
200mA	BD733L2	✓	✓	✓
Output	BD750L2	✓	✓	✓
500mA	BD733L5	–	–	✓
Output	BD750L5	–	–	✓

HTSOP-J8

SOT223-4

TO252-3

Output Comparison



Highlight: Ultra small 1x1mm LDOs

Key Features:

- Offering several series of CMOS LDOs in ultra small 1x1mm package
- High Ripple Rejection
- Low Current Consumption

SSON004

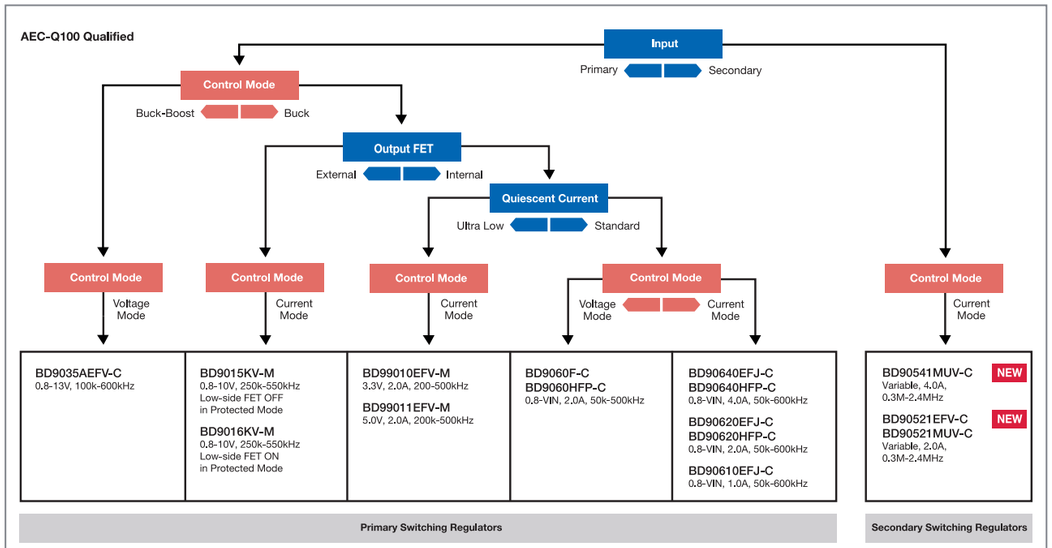
Lineup:

- **BUXXTH5WNVX Series:** 500mA; Vin: 1.7V to 6.0V; Output: 1.05V to 3.5V (4types)
- **BUxxTD2WNVX Series:** 200mA; Vin: 1.7V to 6.0V; Output: 1.00V to 3.4V (27types)
- **BUxxUA3WNVX Series:** 300mA; Vin: 1.7V to 5,5V; Output: 1.00V to 3.7V (31types)

AUTOMOTIVE SWITCHING REGULATORS

ROHM Semiconductor offers a large selection of specialized DC/DC-Converters and LDOs for Automotive.

Automotive Grade Buck Converters



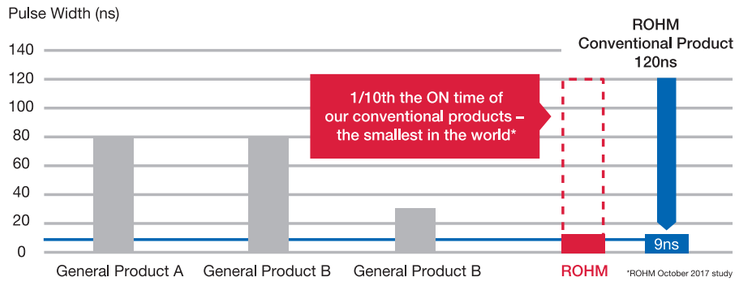
AEC-Q100 Qualified

Input Rail Voltage (V)	2.5 2.6 2.7 3.5 3.6 3.7 3.8 3.9 4.0 4.5 5.0 5.5 5.6 5.7 5.8 5.9 6.0 7.0 8.0 9.0 10 12 14 16 18 20 24 26 28 30 33 35 36 40 42 48 50 60 70
Output Current (A)	
Ext.	**BD9035AEFV-C** Back-Boost — 125°C
	♦**BD9015KV-M** / ♦**BD9016KV-M** 2ch
4.0	**BD90640EFJ-C / BD90640HFP-C** — 125°C
	♦**BD9S400MUF-C** — 125°C 2MHz
3.0	♦**BD9S300MUF-C** — 125°C 2MHz
2.5	**BD90620EFJ-C / BD90620HFP-C** — 125°C
2.0	**UD:** ♦**BD8P250MUF-C** — 125°C 2MHz
	♦**BD9S200MUF-C** — 125°C 2MHz
	♦**BD99010EFV-M / BD99011EFV-M**
	BD9060F / BD9060HFP-C — 125°C
1.25	**BD9610EFJ-C** — 125°C
1.0	**UD:** ♦**BD9S1xxNUX-C** — 125°C 2MHz; ♦**BD9V100MUF-C** — 125°C 2MHz
0.8	**UD:** ♦**BD8P250MUF-C + BD90302NUF-C** Back-Boost — 125°C 2MHz
0.6	♦**BD9S000NUX-C** — 125°C 2MHz

New devices marked in red / **UD:** Under development / ♦Quasi-resonant / Series: Primary [48V] / Primary [12V/24V] / Secondary / Rated Voltage / **125°C:** 125°C available / **2MHz:** fsw≥2MHz switching

Highlight: 2MHz Nano Pulse Control Synchronous Buck Converter BD9V100MUF-C

State-of-the-art 9ns Minimum ON-time Control

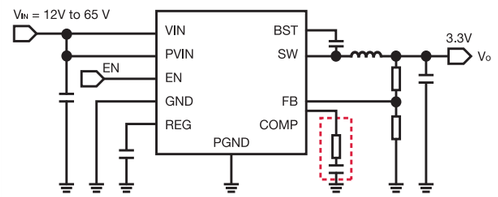


VQFN24V4040
Backside heat sink achieves greater miniaturization

Features:
- Direct conversion from 48V to 3.3V or 5V (at 2MHz)
- State-of-the-art 9ns minimum ON-time control
- Enables 1-stage buck configuration even with large step-down ratios

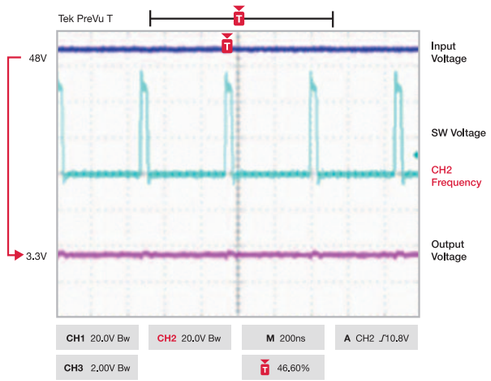
Specifications:
- Input voltage: 16V to 60V (Absolute Maximum Ratings 70V)
- Output switch current: 1A (Max.)

Current Mode Control Provides Easy Phase Compensation

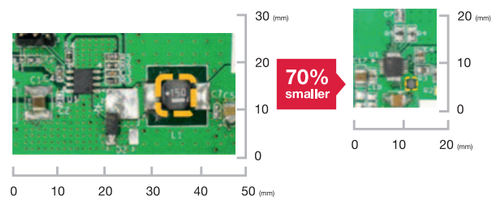


Current mode control ensures easy phase compensation with fewer external components

Direct Conversion from 48V to 3.3V MCU Power Supply



Mounting Area Reduction by 2MHz Operation



1175mm² (47x25mm) ➔ 360mm² (18x20mm)
Inductorsize (Reference) 6mm² ➔ 2.4mm²

INDUSTRIAL LINEAR REGULATORS

Industrial linear regulators for Industrial

Output*	0.1-0.15	0.2	0.3	0.5-0.55	1.0	1.5	2.0	3.0	4.0	External MOSFET
Input*										
45-50		BD7xxL2 BD3010A BD4xxM2 BD4269FJ	BD4269EFJ	BD7xxL5 BD357xY BD3020 BD3021 BD4xxM5 BD42754						
30-36	BDxxFA1		BD3650	BA78Mxx	BA78xx BAxxCC0 BDxxC0A BDxxFC0		BAxxDD0 BD00D0A BDxxFD0			
18					BAxxBC0 BD37210 BD37215	BAxxJC5				
15			BDxxGA3	BDxxGA5	BDxxGC0 BA1117					
10			BDxxHA3	BDxxHA5	BDxxHC0	BDxxHC5				
6.0-7.0	BHxxNB1 BHxxPB1 BHxxRB1 BHxxSA3	BUxxJA2 BUxxSA4 BUxxSD2 BUxxTA2 BUxxTD2 BUxxTD3	BHxxM0A	BDxxIA5 BDxxKA5 BUxxSA5 BUxxSD5 BD37201	BDxxIC0					
6.0-7.0				BD3507 BD3540 BD3550	BD3541 BD3551		BD3506 BD3552	BD3508 BD3512	BD3509	BD3504 BD3521

High voltage for automotive and industrial

General application

Ultra-low voltage/ Large current for CPU/DSP (Dual power supply)

Low voltage/Low current for portable equipment

*Output Current (A) / *Input Voltage Rating (V)

Highlight: High Voltage 100mA LDO Regulators

- High output voltage accuracy : ±1%
- Supports compact 1uF ceramic capacitors
- Overcurrent protection, thermal shutdown circuits
- High withstand voltage: 30V
- Soft Start
- Output Current: 100mA
- Pin compatible with 78L series from other suppliers

Small surface mount package

SOT89-3K
(4.5×4.095×1.6mm)

Pd=1.67W with built-in heat sink (ROHM standard mounting board)

Line-up

Part No.	BD30	BD33	BD50	BD54	BD60	BD70	BD80	BD90	BDJ0	BDJ2	BDJ5
Voltage (V)	3	3.3	5	5.4	6	7	8	9	10	12	15

INDUSTRIAL SWITCHING REGULATORS

Standard and Industrial Grade Buck Converters

BD9x Series: Pin Compatible Standard Buck Converter Series

ROHM's single output buck DC/DC converters provide a power supply solution that satisfies your specification requirements based on a matrix of input voltage and output current. In the product name of BD9x Family, the numeric value "9" following "BD" represents the "buck" topology, the subsequent alphabet represents the maximum rated input voltage and the subsequent numeric value represents the output current.

Input*	3.3	5.0	12	24	48	60
Output*						
6.0						
5.0		BD9Cxxx Series				
4.0	BD9Axxx BD9Bxxx					
3.0	Series	BD9Dxxx Series		BD9Gxxx Series		
2.0			BD9Exxx Series			
1.0			BD9Vxxx Series			
0.5			BD9Gxxx Series			

*Input Power Rail Voltage (V) / *Output Current (A)

Part No. Description

B	D	9	A	3	0	0

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

Maximum Rated Input Voltage and Control Mode
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

Serial No.
00, 01, 02, ...

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

Note: There are some part numbers that do not conform with this rule

Highlight: Ultra Small Low Ringing Switching Regulator

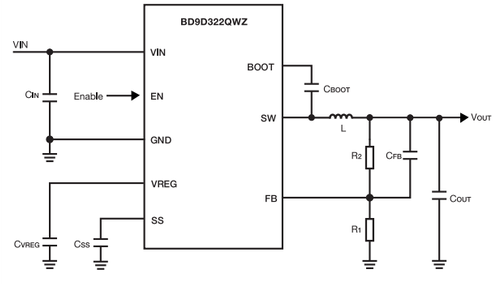
The BD9A302QWZ, BD9B304QWZ, BD9D322QWZ, and BD9D323QWZ adopt ultra small packages, reducing the surface mounted as well as the parasitic inductance existing inside the circuit. In addition, the ringing in the switching waveform and unwanted radiation are reduced by decreasing the trace area of a loop that has a large variation in the switching current on the PCB.

Product example:	**BD9D322QWZ**
Input voltage range:	4.5 to 18 V
Output voltage range:	0.765 to 7.0 V
Reference-voltage:	0.765V±1.6%
Output current:	3A
Switching frequency:	700kHz
Integrated switch FET:	80mΩ, 50mΩ
Current consumption:	0.7mA

Ultra Small Package UMMP008Z2020

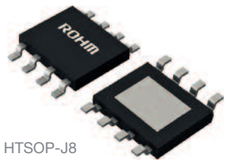
- Output 3A
- Large current per area
- 2.0×2.0mm = 4.0mm²

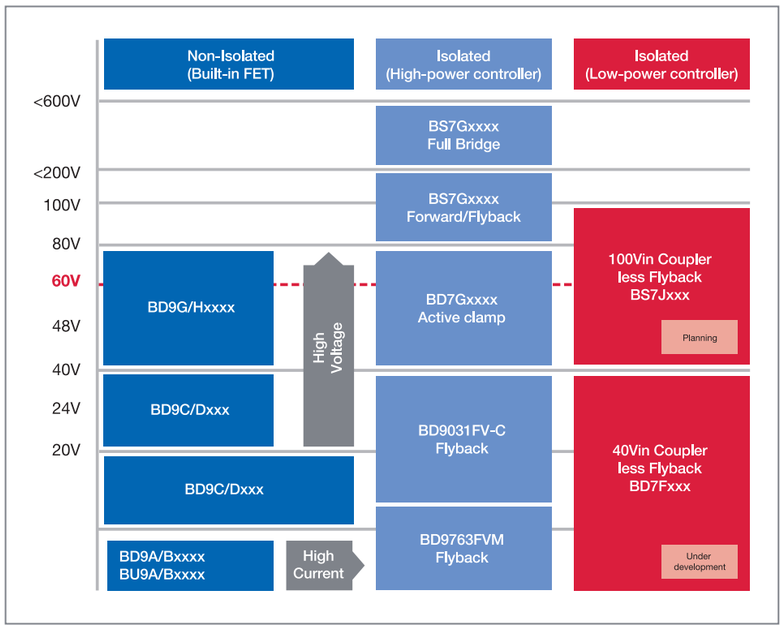
BD9D322QWZ Application Circuit



ISOLATED REGULATORS

ROHM Semiconductor offers a wide line-up of DC/DC controllers for high voltage and high current applications, featuring various protection features and isolated topologies.

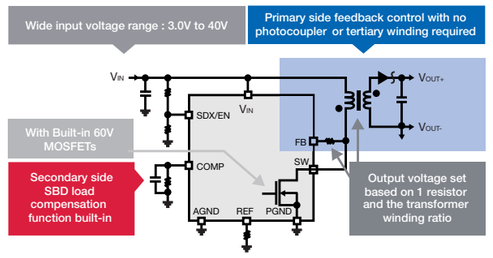




Highlight: BD7Fx00EFJ-LB feedback less, isolated flyback DC/DC controller

Key Features:
- High-speed load response via adaptive on-time control
- Automatic “light load mode” ensures high efficiency across all load conditions
- Eliminates the need for parts that cross the isolation boundary, improving functional safety
- Output voltage adjustable with external resistor and transformer winding ratio
- Evaluation Boards available
- Small and compact solution

Type	BD7F100EFJ-LB	BD7F200EFJ-LB
Absolute Max. Rating	45V	45V
Operating Supply Range	3-40V	3-40V
Switching Frequency	400kHz(typ)	400kHz(typ)
Current-Limit (MOSFET)	1.25A(typ)	2.75A(typ)



New development BD7Jxxx (Samples Q4-18)

Operating Supply Voltage Range up to 80V

AC/DC CONVERTER & CONTROLLER

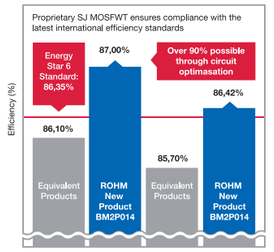
ROHM Semiconductor offers a wide line-up of AC/DC Converters for external MOSFET as well as fully integrated converters with internal MOSFETs.

AC/DC Converter IC Series BM2POxx Series

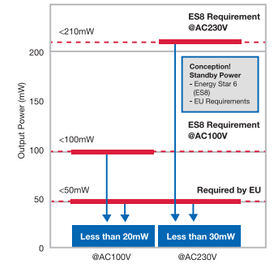
Built-in 650V Super Junction MOSFET

ROHM’s proprietary super junction MOSFETs feature class-leading efficiency and miniaturization. ROHM’s broad lineup enables customers to select the ideal solution based on application requirements (i.e. current, protection circuits).

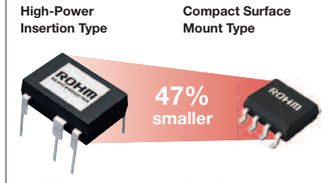
High efficiency contributes to greater energy savings



Improved efficiency minimizes standby power



Compact package achieved through low heat generation



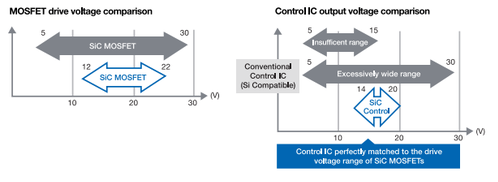
AC/DC Converter Control ICs for SiC Drive BD7682 Series

Maximizing the performance of SiC contributes to dramatically improved power savings and miniaturization

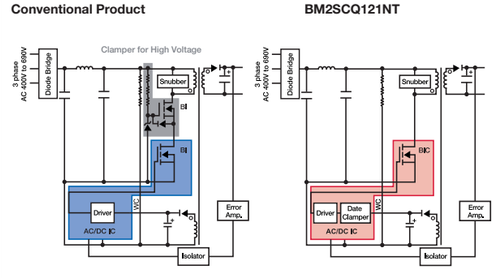
ROHM fuses analog design and SiC device technologies to maximize SiC performance and significantly reduce power consumption.

Features:
- Internal driver circuit maximizes SiC MOSFET performance
- Low-noise, high efficiency quasi-resonant system supports uo to 150W power supplies
- Multiple protection circuits enable high voltage operation

MOSFET drive voltage comparison

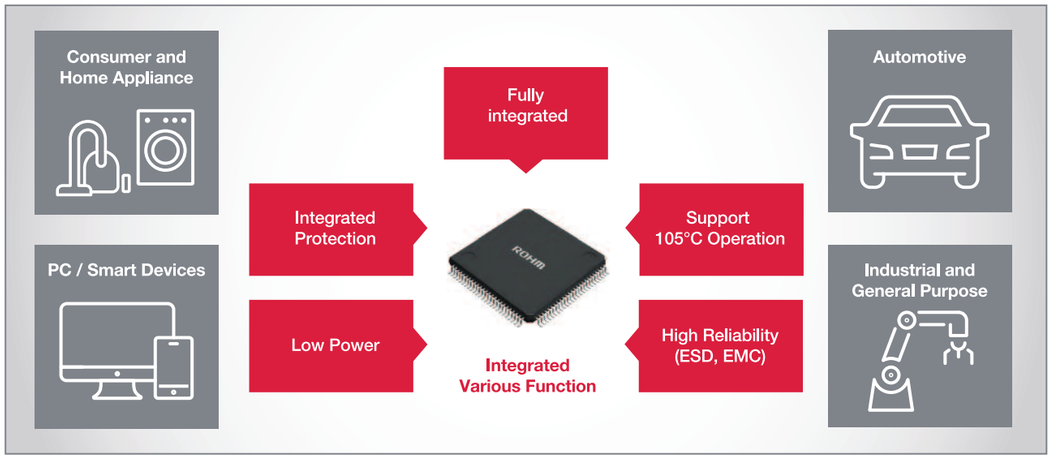


Achieves greater miniaturization



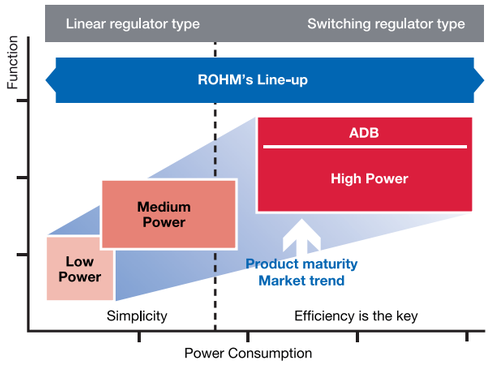
LED AND MOTOR DRIVERS

ROHM Semiconductor offers a wide range of high integrated LED and Motor Drivers for Automotive, Industrial and consumer market.



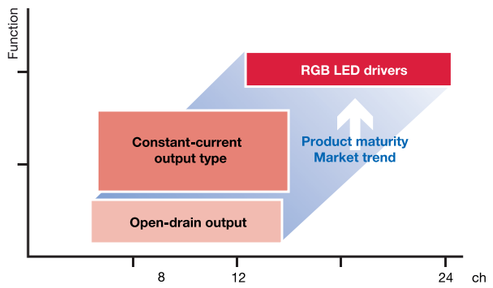
Automotive LED Driver / Target Applications / Product Map

Exterior



Automotive LED driver market is picking up with DRL, CHMSL, leading the way and very mature. Owing to the design flexibility of LEDs, RCL, turn Indicator Lamps are also starting to go LED way. Heat-dissipation is the key issue preventing Low/ High beam implementation, but with the advent of ADB (Adaptive Driving Beam), LED will be the key.

Interior



Dashboard lights, Ambient lighting, Dome and Map lighting, Center stack lighting, and others make-up the Automotive interior lighting. Heads-up display also uses LEDs lights, as shown in the block diagram in Page 13.
In interior lighting, the number of channels, control interface, and to some extent the output type (open-drain, constant-current, etc.) is the key.

Automotive LED Driver / Line-up

Indicators	
Function	Serial-In / Parallel-Out Drivers RGB LED Drivers for cluster panels
Part No.	BD8378FV-M (8ch) BD8379FV-M (12ch) BD8388FV-M (8ch) BD8389FV-M (12ch) BD2808MUV-M (24ch)

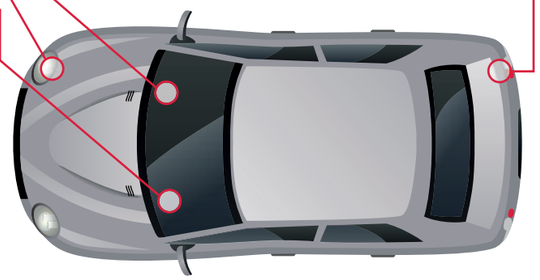
Head Lamps / DRLs	
Function	Boost / Buck / Buck-Boost DC/DC Constant Current Drivers
Part No.	BD18351EFV-M BD18391EFV-M ★ BD18395EFV / MUF-M ★

Cluster Panel / Car Navigation and AV Backlights	
Function	Boost / Buck / Buck-Boost DC/DC Constant Current Drivers
Part No.	BD9465MUV-M BD81A44EFV / MUV-M BD81A24EFV / MUV-M BD81A74EFV / MUV-M

Matrix LED Controller	
Function	Matrix LED Controller
Part No.	BD18362EFV-M BD183xxEFV-M ★

Rear / Turn Lamps	
Function	Constant Current Driver
Part No.	BD8372HFP/EFJ-M BD8374HFP/EFJ-M BD83732HFP-M BD83733HFP-M BD18340FV-M BD18341FV-M BD18342FV-M BD18343FV-M BD18345EFV-M ★ BD18346HFN-M ★

★ under development



Automotive Motor Driver (AEC-Q100 Qualified) / Line-up

Part No.	Output Channels	Rated Input (V)	Rated Output Current	Operating Temp.	Package	FRD/REV/ BRK/Hi-Z	Speed Control	Error Flag	
H Bridge Pre-driver / Apps: Power Window Lifter, Sun Roof Module, Wiper, Seat Positioning, etc.									
BD16950EFV-C	1 (Half 2ch)	40V / 5.5 to 40V	–	-40°C to 125°C	HTSSOP-B24	SPI	Direct PWM	–	
H Bridge Driver / Apps: HVAC Damper, Door Mirror									
BD16910EFV-M	1	60V / 8 to 16V	1A	-40°C to 110°C	HTSSOP-B20	Parallel	Direct PWM	OCP	
BD16912EFV-C	1	40V / 6 to 18V	3A	-40°C to 125°C	HTSSOP-B20	Parallel	Direct PWM	OCP, OVP, T, W	NEW
BD16922EFV-M	2	60V / 8 to 36V	1A	-40°C to 110°C	HTSSOP-B24	Parallel	Direct PWM	OCP	
BD16933EFV-C	1.5 (Half 3ch)	60V / 7 to 36V	1A	-40°C to 125°C	HTSSOP-B20	SPI	X	–	
BD16938EFV-C	4 (Half 8ch)	40V / 6.3 to 32V	1A	-40°C to 125°C	HTSSOP-B28	SPI	X	–	
BD16939EFV-C	3 (Half 6ch)	40V / 6.3 to 32V	1A	-40°C to 125°C	HTSSOP-B28	SPI	X	–	NEW

Line-up for Brushless DC Motor

Hall Sensor Drive Three-phase Driver (AEC-Q100 Qualified)
Apps: HVAC Blower Fan, Battery Cooling Fan, Seat Fan, General-purpose Fan etc.

Part No.	Motor Driving	Rated Input (V)	Rated Output Current	Operating Temperature	Package	Speed Control	Conduction Type	
BD16805FV-M	External N-N	60V / 8 to 18V	–	-40°C to 110°C	SSOP-B40	PWM	180°	
BD63030EKV-C	External N-N	50V / 6.5 to 18V	–	-40°C to 125°C	HTQFP64V	PWM/DC	180°	NEW
BD63035EFV-M	Internal P-N	36V / 8 to 28V	1.5A	-40°C to 105°C	HTSSOP-B20	DC	180°	

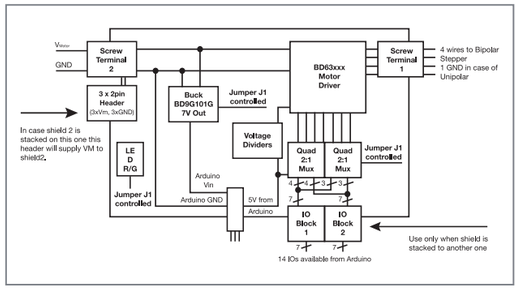
MOTOR DRIVERS

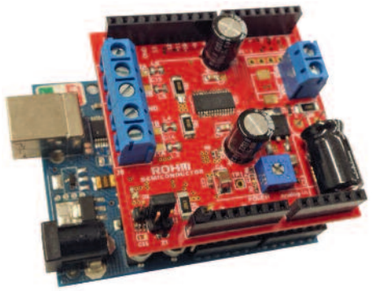
ROHM Semiconductor offers a broad lineup of H-Bridge and stepper motor drivers in a wide range of supply voltages, output currents and channels. Features like VREF-PWM conversion for H-bridge drivers and integrated protection functions grant high reliability operation, making them ideal for a wide range of applications.

Output Current	1.0A	2.0A	3.0A	4.0A	5.0A	...	30.0A
Application V							
3.3V				**0.5 - 2.0A**	Brush DC Motor Drivers		
				0.5 - 0.8A	Stepper Motor Drivers		
				0.6 - 1.0A	Single-Phase Brushless DC Motor Drivers		
				0.7 - 1.3A	3-Phase Brushless DC Motor Drivers		
12V				**0.5 - 3.0A**	Brush DC Motor Drivers		
				0.8 - 2.2A	Stepper Motor Drivers		
				1.2 - 3.5A	Single-Phase Brushless DC Motor Drivers		
				1.0 - 3.5A	3-Phase Brushless DC Motor Drivers		
24V				**0.5 - 5.0A**	Brush DC Motor Drivers		
36-50V				**0.8 - 3.0A**	Stepper Motor Drivers		
				1.5 - 3.5A	Single-Phase Brushless DC Motor Drivers		
				1.5 - 3.5A	3-Phase Brushless DC Motor Drivers		
				2.5A - ...	Gate Driver + Power Device		
250V				**2.0A**	High Voltage 3-Phase Brushless DC Motor Drivers		
				2.0A - ...	Gate Driver + Power Device		
600V				**1.5 - 2.5A**	High Voltage 3-Phase Brushless DC Motor Drivers		
				2.5A - ...	Gate Driver + Power Device		
				10 - 30A	IPM Intelligent Power Modules		

Highlight: EVK based on Arduino Platform

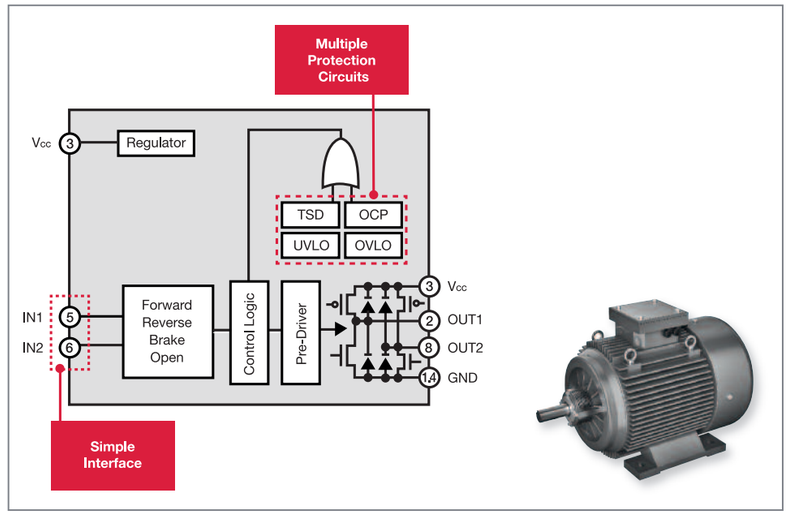
- Supports 1 stepper motor (or 2 DC motors)
- Designed to be stackable (max. 2 shields are supported)
- Package: HTSSOP-B28
- Driver IC: Re-use board for multiple pin-compatible ICs:
  - BD63710AEFV
  - BD63715AEFV
  - BD63720AEFV
  - BD63524AEFV
  - BD63843EFV
  - BD63847EFV
  - BD63873EFV
  - BD63875EFV
  - BD63510AEFV
  - BD63520AEFV
  - BD6425EFV
  - BD63872EFV
  - BD63876EFV
- Motor Voltage: 8 to 28V / 19 to 28V / 19 to 42V
- Max. Motor Current: 1A / 1.5A / 2A / 2.5A

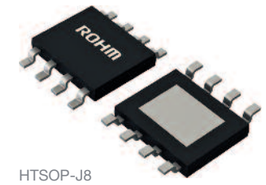




MOSFET integrated H-Bridge Driver Lineup

Compatible – Easy to Use – High Reliability





HTSOP-J8
(4.9×6.0×1.0mm)

NEW

36V Brush Motor Driver ICs BD62110AEFJ

Standard H-Bridge Drivers for Brushed DC Motors

Type	High Voltage >36V	Mid Voltage ~20V (Motor)	Mid Voltage ~18V	Low Voltage ~10V (Motor)	Low Voltage ~7V
1ch	BD6230F(0.5A)	BD65491FV(1.2A)	BD6220F(0.5A)	BD6736FV(1A)	BD6210F(0.5A)
	BD6231F(1A)	BD65496MUV(1.2A)	BD6221F(1A)	BD65494MUV(1A)	BD6210HFP(0.5A)
	BD6231HFP(1A)	–	BD6222FP(2A)	BD6376GUL(1A)	BD6211F(1A)
	BD60203EFV (1.7A)	–	–	–	–
	BD62105AFVM (0.5A)	–	–	–	–
	BD62120AEFJ (2A)	–	–	–	–
	BD63130AFM (3A@50V)	–	–	–	–
	BD63150AFM (5A@50V)	–	–	–	–
	BD6232FP(2A)	–	BD6222HFP(2A)	–	BD6211HFP(1A)
	BD6232HFP(2A)	–	–	–	BD6212FP(2A)
	BD6232HFP-LB (2A)	–	–	–	BD6212HFP(2A)
	BD62222HFP(2.5A)	–	–	–	
	BD62321HFP(3A)	BD63573EFV (1.2A)	–	–	–
	BD62110EFV(1A)	–	–	–	–
2ch	BD6236FP(1A)	BD65492MUV(1A)	BD6225FP(0.5A)	BD6735FV(1A)	–
	BD6236FM(1A)	–	BD6226FP(1A)	–	–
	BD6237FM(2A)	BD63565EFV (1A)	–	–	–
	BD62220EFV(2A)	–	–	–	–
	BD62210EFV(1A)	–	–	–	–

New devices marked in red

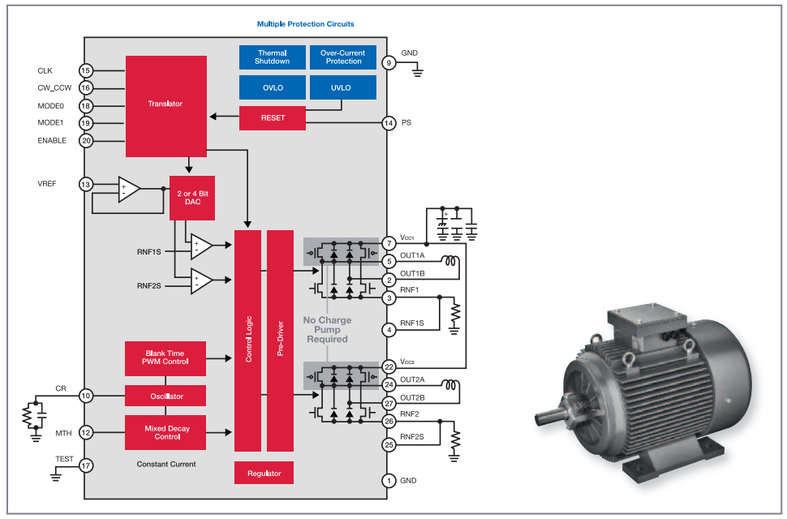
MOTOR DRIVERS

MOSFET integrated Stepper Driver Line-up

Wide Line-up – Easy to Use

36V Stepper Motor Drivers

HTSSOP-B28



Stepper Drivers ICs for Bipolar Stepper Motors

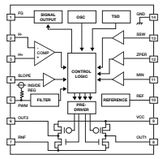
Type	High Voltage ~45V	Standard Type ~36V MicroStep	Standard Type ~36V ¼Step	Standard Type ~36V ½Step	Low Voltage ~15V
PARA-IN	BD6422EFV(1A)	–	BD6290EFV(0.8A)	BD63940EFV(1.2A)	BD6380EFV(1.0A)
	–	BD60223AEKV(1.5A)	BD6393FP(1.2A)	BD63960EFV(1.5A)	BD6381EFV(1.2A)
	–	–	BD6395FP(1.5A)	BD68720EFV(2.0A)	BD6382EFV(0.8A)
	–	–	BD68610EFV(1.0A)	–	–
	–	–	BD68620EFV(2.0A)	–	–
	–	–	BD63888AEKV (1.5A)	–	–
	–	–	BD68710EFV(1.0A)	–	–
	–	–	BD68715EFV(1.5A)	–	
CLK-IN	BD6423EFV(1.0A)	BD63510AEFV(1.0A)	BD63620AEFV(2.0A)	BD63610AEFV(0.8A)	–
	BD6425EFV(1.5A)	BD63511EFV(1.0A)	BD63710AEFV(1.0A)	BD63810EFV(0.8A)	–
	–	BD63520AEFV(2.0A)	BD63715AEFV(1.5A)	–	–
	–	BD63521EFV(2.0A)	BD63720AEFV(2.0A)	–	–
	–	BD63524AEFV(2.5A)	BD63725BEFV(2.5A)	–	–
	–	–	BD68888AEKV(1.5A)	–	–
	–	BD63525AEFV(2.5A)	BD63873EFV(1.0A)	–	–
	–	BD63843EFV	BD63875EFV(1.5A)	–	–
	–	BD63847EFV	–	–	–
	–	BD63860EFV	–	–	–
CLK/PARA -IN	–	BD63910MUV(1.0A)	BD63730EFV(3.0A)	–	–
	–	BD63920MUV(2.0A)	BD6383EFV(1.0A)	–	–
	–	–	BD6385EFV(1.5A)	–	–
	–	–	BD6387EFV(2.0A)	–	–
	–	–	BD6389FM(2.2A)	–	–

New devices marked in red

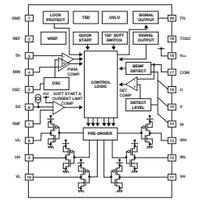
BLDC Driver – MOSFET integrated ICs

- **Low Vibration / Silent Drive**
  Sine Wave Drive, Tunable Parameters
- **Low Power Consumption / High efficiency**
  Low stand-by and operating current
- **High Reliability**
  Integrated protection circuits, large voltage/ current margins

Single Phase BLDC Drivers mainly for Fan Motors



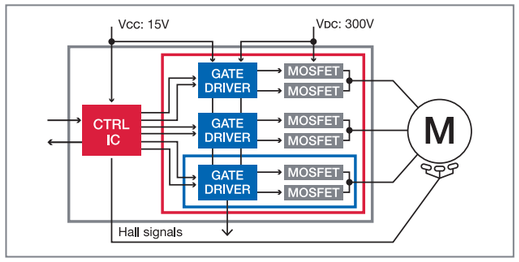
Three Phase BLDC Drivers for Fan Motors and others



BLDC Driver – MOSFET integrated IPM Modules

ROHM offers a product family of pin compatible High Voltage BLDC Motor Drivers

- This allows the selection of the required Energization, Voltage and Current Rating tailored for the customer's application
- This can be realized by pairing a Controller IC with a Driver IC or by selecting the Combined Controller + Driver Type



Controller Series		Driver Series		Combined Controller + Driver Series				
SSOP-A24		SSOP-A54_23		SSOP-A54_36				
150° Energization	BD62012AFS	600V/1.5A	600V/2.5A		250V/2.0A	600V/1.5A	600V/2.5A	Motor Poles
	BD62012AFS	BM6202FS	BM6203FS	120° Energization	BM6213FS	BM6204FS	BM6205FS	–
Sine Wave Energization	BD62011AFS			150° Energization	BM6214FS	BM6206FS	BM6207FS	–
	BD62014AFS			Sine Wave Energization	BM6215FS	BM6208FS	BM6209FS	–
						BM6228FS	BM6229FS	8 NEW
						BM6230FS	BM6231FS	10 NEW

Improved EMI versions marked in red

BLDC Driver – IGBT integrated IPM Modules

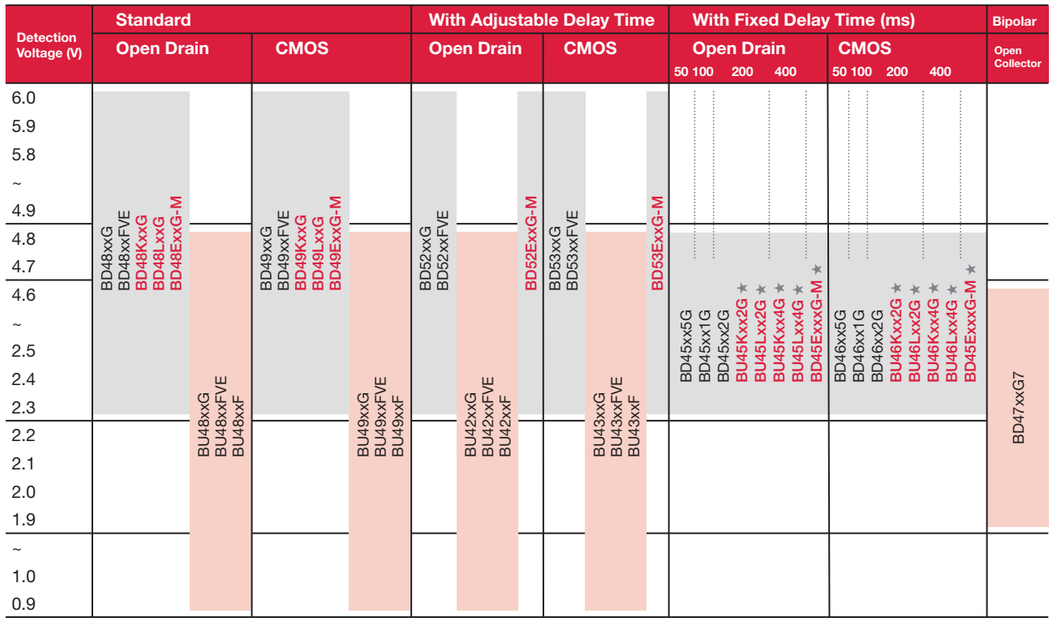
Key Features:

- 3phase DC/AC Inverter
- 600V / 10, 20 and 30A (Max. Current Rating)
- Int. Built-in Bootstrap Diode
- Int. High Side IGBT Gate Driver(HVIC) - SOI Process
- Int. Low Side IGBT Gate Driver(LVIC):
- Thermal Shutdown (TSD)
- Fault Signal (LVIC): SCP (Low Side IGBT), TSD, UVLO Fault

Input Freq.	Thermal Protect.	Package	600V/10A	600V/15A	600V/30A
<6kHz	TSD	HSDIP25	BM63363S-VA	BM63364S-VA	–
		HSDIP25VC	BM63363S-VC	BM63364S-VC	–
	VOT	HSDIP25	BM63563S-VA	BM63564S-VA	–
		HSDIP25VC	BM63563S-VC	BM63564S-VC	–
<20kHz	TSD	HSDIP25	BM63763S-VA	BM63764S-VA	BM63767S-VA
		HSDIP25VC	BM63763S-VC	BM63764S-VC	BM63767S-VC
	VOT	HSDIP25	BM63963S-VA	BM63964S-VA	BM63967S-VA
		HSDIP25VC	BM63963S-VC	BM63964S-VC	BM63967S-VC

VOLTAGE DETECTORS / RESET ICs & SWITCHES

The ROHM Semiconductor voltage detector IC series include a wide selection of Reset ICs with high accurate detection of ±1% , low current consumption, small thin packages and wide range of detection voltages. Default SSOP packages are pin- and function-compatible, so they can be used as replacement for existing IC.



★ under development

Highlight: AEC-Q100 Qualified – SSOP5 (SOT23-5) package Automotive Voltage Detectors

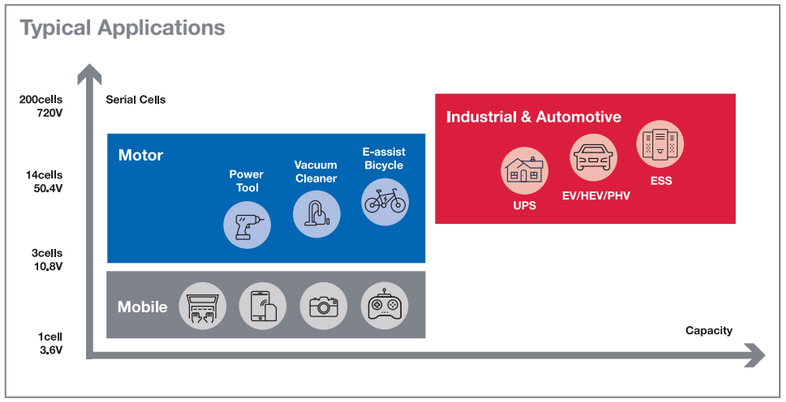
Part No.	Output type	Delay type	Current consumption	Temperature range	Detection voltage accuracy	Types
BD48ExxG-M	Nch Open drain output	–	0.85µA(Typ.)	-40°C to +105°C	±1% (Ta=+25°C) ±4% (Ta=-40°C to +105°C)	xx=23 to 60 (2.3V to 6.0V 0.1VStep)
BD49ExxG-M	CMOS output		2.70µA(Max.)			
BD45ExxG-M	Nch Open drain output	Built-in Delay	0.85µA(Typ.) 4.73µA(Max.)			xx=23 to 48 (2.3V to 4.8V 0.1V Step) y=5(50ms), y=1(100ms), y=2(200ms)
BD46ExxG-M	CMOS output					
BD52ExxG-M	Nch Open drain output	Adjustable Delay	0.85µA(Typ.) 2.70µA(Max.)			xx=23 to 60 (2.3V to 6.0V 0.1VStep)
BD53ExxG-M	CMOS output					
BD52xxG-2C	Nch Open drain output	Adjustable Delay	0.27µA(Typ.) 1.60µA(Max.)	-40°C to +125°C	±3% (Ta=-40°C to +125°C)	xx=09 to 50 (0.9V to 5.0V 0.1VStep)
BD53xxG-2C	CMOS output					

BATTERY MONITORING ICs

Li-ion Battery Monitoring LSI

ROHM Semiconductor/Lapis Semiconductor provide various Battery Monitoring ICs for industrial & automotive applications based on our dedicated high voltage tolerant wafer process and energy saving circuit design technology. Depending on system design, customers can use either a stand-alone device, an analog front-end (AFE) or a chipset (AFE+MCU).

ROHM GROUP
LAPIS SEMICONDUCTOR



Technology Features

- High voltage tolerant handling up to 16 cells
- Full-fledged protection functionality
- Energy saving design
- Optimized detection accuracy

Line-up

Stand-alone Type

Stand-alone type Battery monitoring LSI protects battery pack without microcontroller control. With additional microcontroller, cell voltage measurement and other functions are available.

Type	Part No.	Cell Series Connection	Voltage Detection	Driver	Notes	
Stand-alone	ML5203	4 - 7	±15mV	NMOS FET		
	ML5233	4 - 10	±15mV	NMOS FET		
	ML5235	5 - 13	±15mV	NMOS FET		
	ML5245	5 - 13	±25mV	NMOS FET	Upgraded from M5235	NEW
	ML5232	14	±20mV	NMOS FET	Max series for secondary protection Dual over-voltage alarm outputs Supports cell balancing	

Analog Front End Type

Analog Frond End type Battery monitoring LSI protects battery pack and supports functions such as cell voltage measurement, cell balancing and other functions, with controlled by microcontroller.

Type	Part No.	Cell Series Connection	Voltage Detection	Driver	Notes
Analog Front End	ML5236	14	±15mV	NMOS FET	Highside
	ML5238	16	±10mV	NMOS FET	
	ML5239	16	±10mV	NMOS FET	Multistage connection

ROHM Online Support

Visit our support for AC/DC and DC/DC products:

www.rohm.com/acdc-support

www.rohm.com/dcdc-support

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