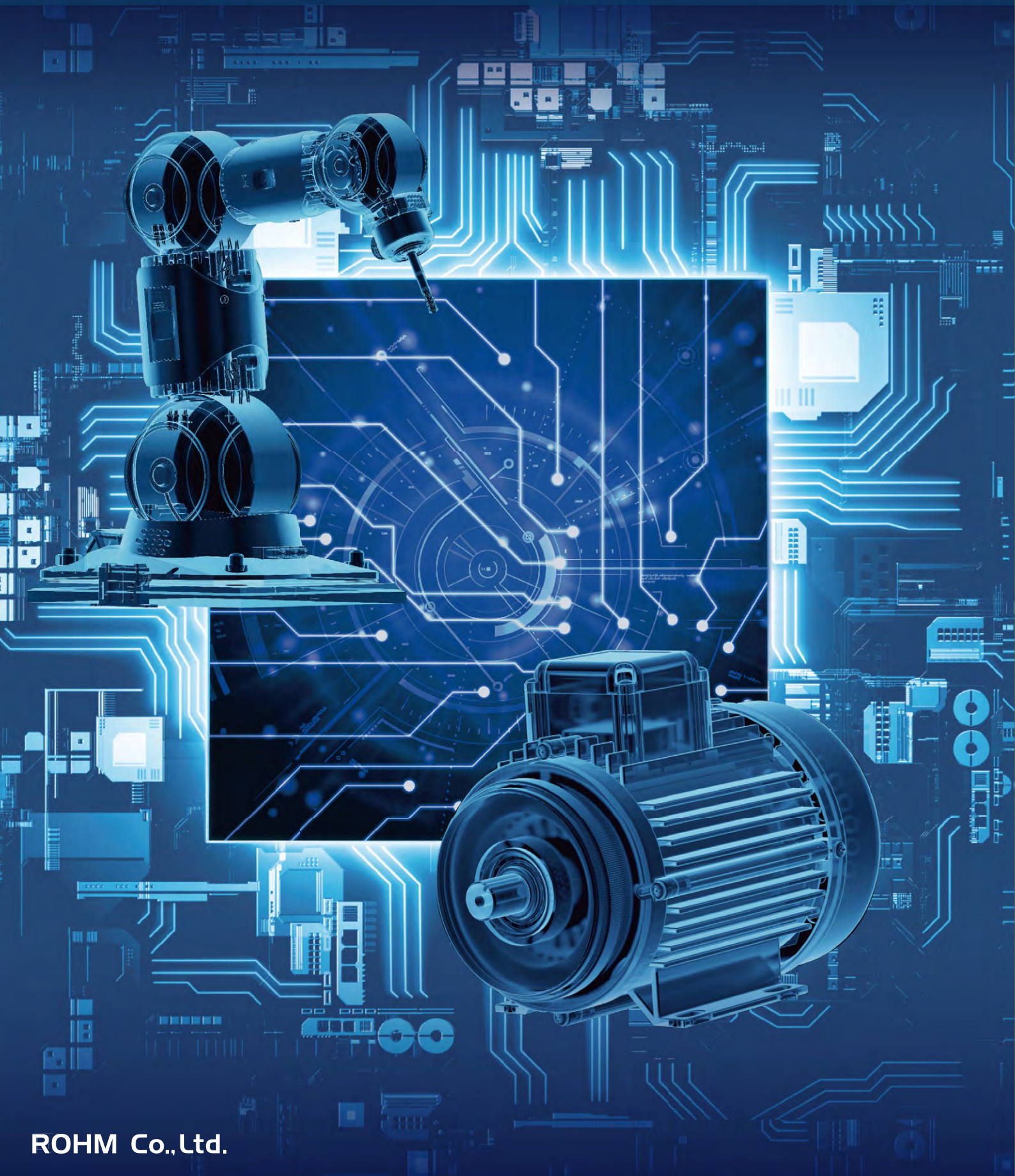
Industrial Motor

Industrial Motor Solutions Catalog

Ver.1.0

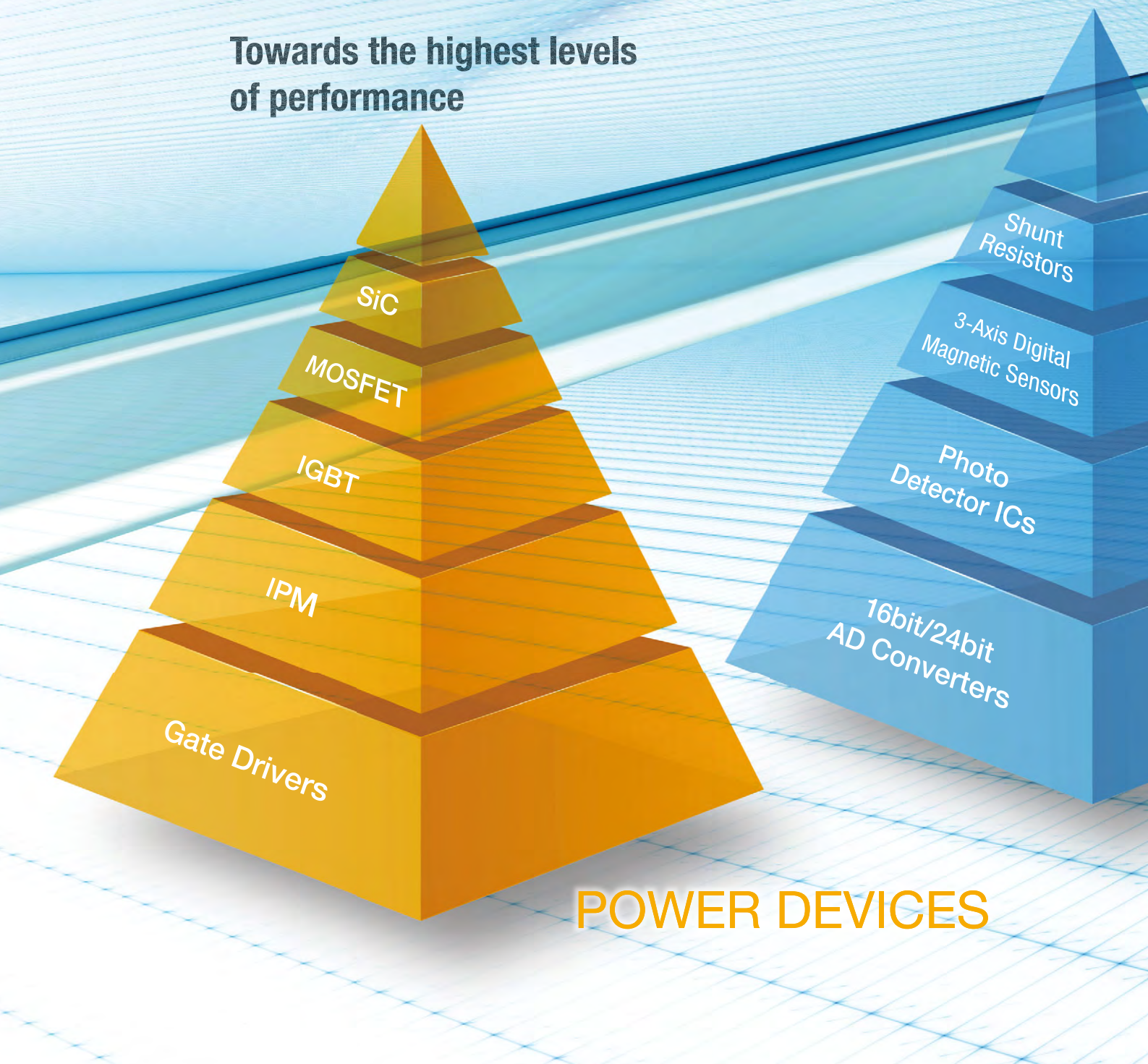


ROHM Co.,Ltd.

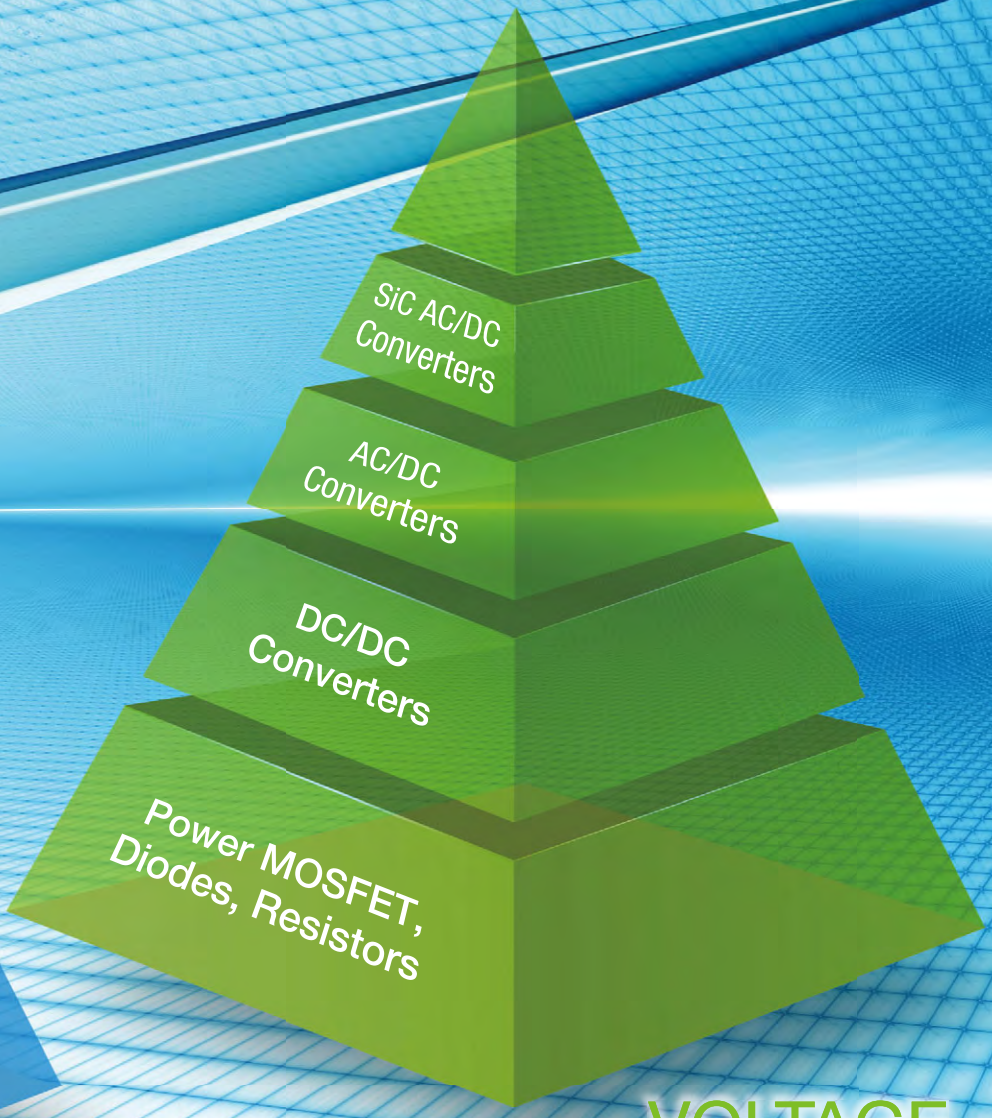
2020 System Solutions Declaration

Proposal for Industrial Motor Drive Systems

As a device maker, ROHM proposes solutions that improve on individual device technologies and contribute to customer designs from a system perspective. ROHM is committed to providing customers with system solutions in 2020.



Towards the ideal system solution



VOLTAGE REGULATORS

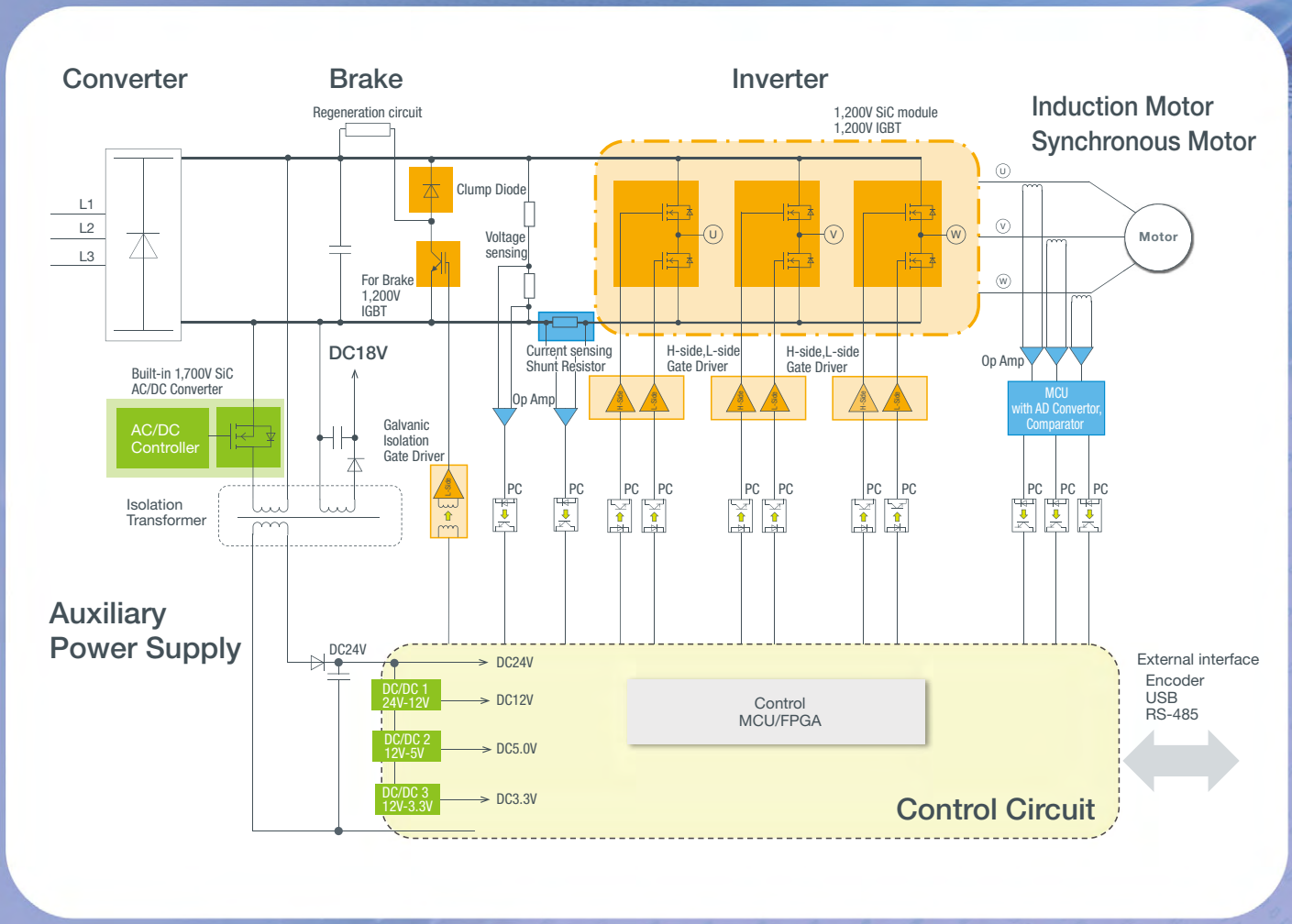
SENSOR INTERFACES

3-phase AC400V Input AC Drive System

The 3-phase AC400V (AC200V) input AC Drive is one application that tests the limits of power devices. As a pioneer in SiC, ROHM leads the industry in developing not only SiC devices, but IGBTs as well that meet the needs of customers in the industrial sector.
In addition to devices, we contributes to product development that takes into account the customer's set, from gate drivers to AC/DC converters with built-in SiC for power supply control.

Power Devices　Sensor I/F　Voltage Regulators

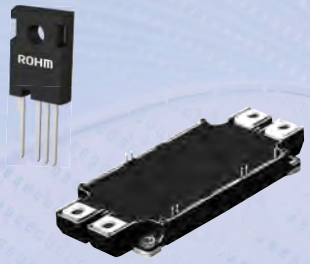
System Block Diagram



Featured Products for Inverters

1,200V/1,700V SiC Devices & Power Modules

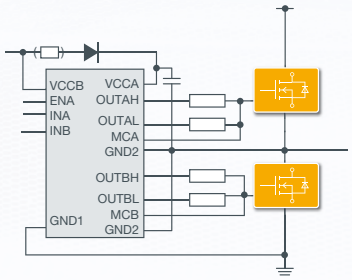
ROHM offers power devices optimized for a variety of sets, from SiC wafers and chips to power modules and 4-pin package types that eliminate the effects of the L component.



High/Low Side Gate Drivers

Timing deviations and noise issues due to isolated connections to the control circuit can cause shoot-through current in power devices, affecting the entire system. ROHM high and low side gate drivers solve the issue of shoot-through current by generating a drive signal based on the 2 control signals from the high and low sides of the input logic block, making it ideal for inverter systems.

Typical application



3,750V Isolated Gate Drivers

ROHM gate drivers with integrated 3,750V isolation element is designed to drive IGBTs for brake applications. This makes it possible to drive IGBTs directly without an isolating optocoupler.

1,700V AC/DC Converters with Built-in SiC MOSFET

Inverters also require high withstand voltage for the auxiliary power supply. ROHM combines a 1,700V SiC MOSFET and AC/DC converter IC into a single compact package, contributing to smaller auxiliary power supplies.

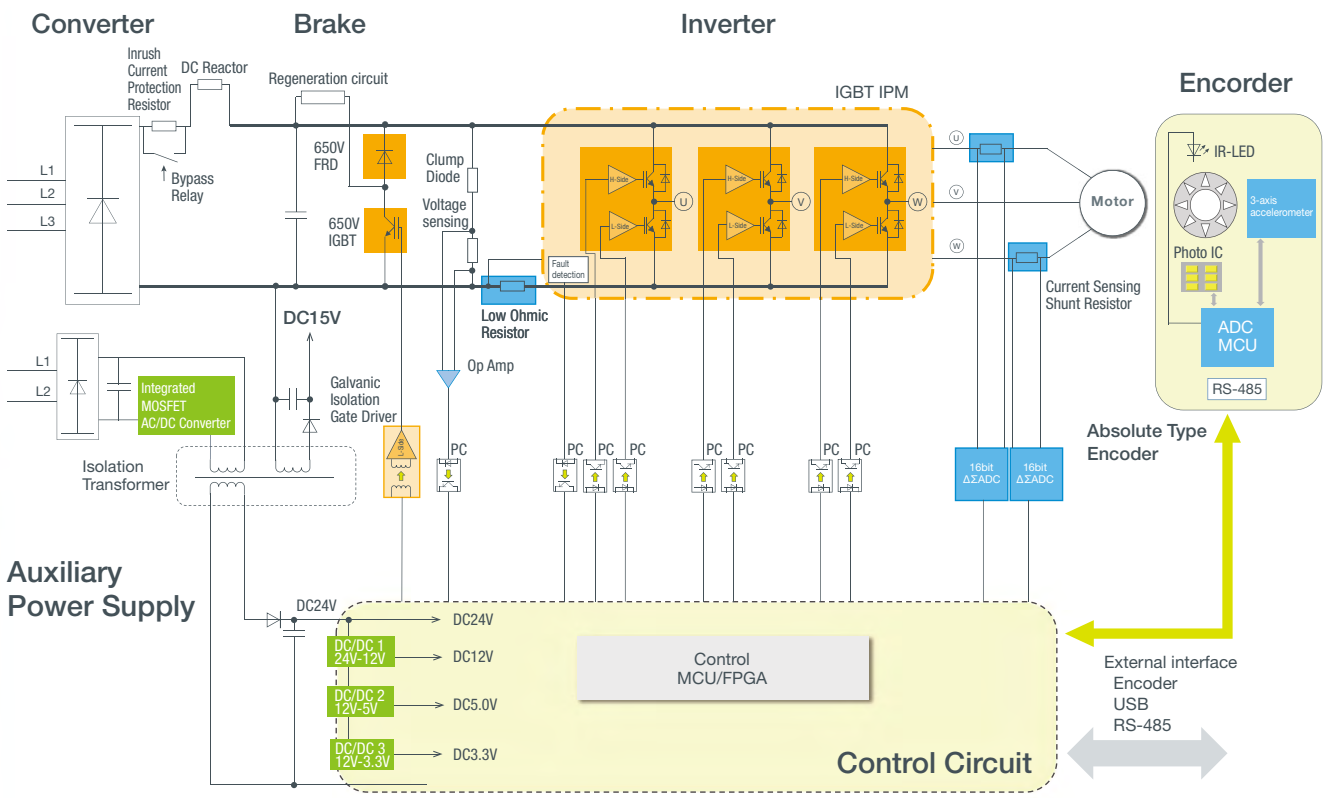
CONTENTS

3-phase AC100V to AC240V Input AC Servo System

ROHM leverages its extensive resources for 3-phase AC100V to AC240V servo systems centered on gate drivers and power-device-integrated IPMs (IGBT Intelligent Power Modules). And in addition to power devices, various sensors important for AC servo systems are available. A considerable lineup is offered for control systems, including Kionix 3-axis accelerometers specialized for industrial equipment together with LAPIS Technology's robust MCUs utilizing advanced analog technologies.

Power Devices　Sensor I/F　Voltage Regulators

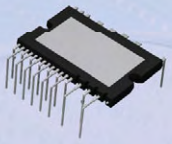
System Block Diagram



Featured Products for AC Servos

600V IGBT IPMs (Standard Power Modules)

ROHM integrates high-performance IGBT-equipped IPMs in standard IPM packages. Advanced recovery characteristics enable low EMI. ROHM is ushering a new era for IPMs by leveraging its considerable strengths in high accuracy temperature sensors and proprietary fault signals.



Brake IGBTs, Fast Recovery Diodes

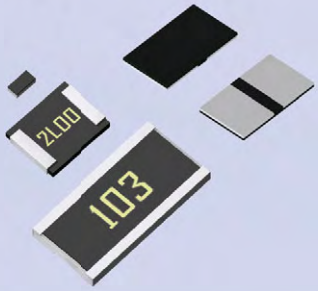
650V IGBTs and fast recovery diodes that receive regenerative power during i-braking are available in a variety of packages designed to quickly react to the back electromotive force of the motor.

3,750V Isolated Gate Drivers

ROHM gate drivers with integrated 3,750V isolation element are designed to drive IGBTs for brake applications directly without an isolating optocoupler.

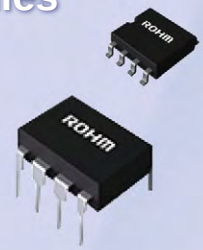
Current Sense Shunt Resistors

The shunt resistor is a key device used for detecting the current of the UVW phases in servo drive applications. ROHM offers an unprecedented lineup, including the GMR series with metal plate that delivers exceptional operational stability along with the LTR series featuring a pioneering side electrode configuration.



AC/DC Converters for Primary Power Supplies

ROHM's BM2P series has been market-tested in commercial power supplies. In addition to an integrated 650V/800V MOSFET, a comprehensive support system is provided for power supply design, including evaluation boards and various application materials. The optimized design meets the needs of primary power supplies.



CONTENTS

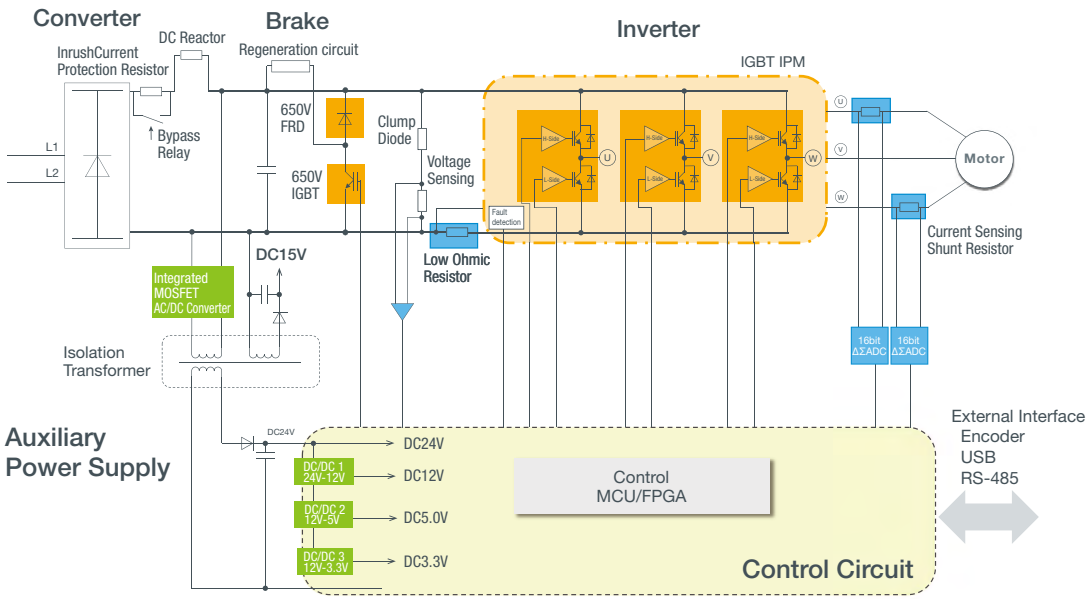
AC100V to AC240V, DC24V to DC48V Non-Isolated Motor Drive System

Even for non-isolated motors used in welfare equipment, electric wheelchairs, battery-driven AGVs, and industrial applications such as automatic and platform doors, ROHM supplies products in accordance with system needs that accelerate set development.

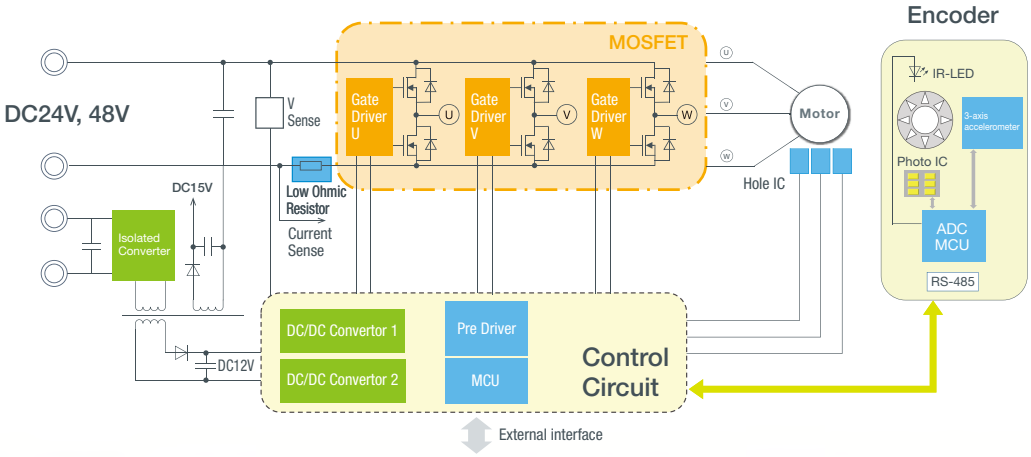
Power Devices　Sensor I/F　Voltage Regulators

System Block Diagram

Single-phase AC100V to AC400V Non-Isolated Motor Drive System



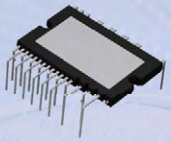
DC24V to DC48V Industrial Motor Drive System



Featured Products for Non-Isolated Motors

600V IGBT IPMs (Standard Power Modules)

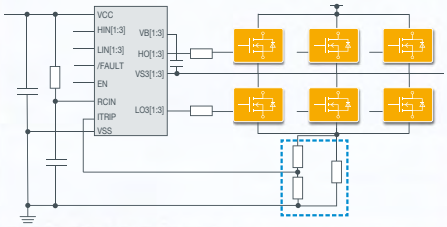
ROHM integrates high-performance IGBT-equipped IPMs in standard IPM packages. Advanced recovery characteristics enable low EMI. ROHM is ushering a new era for IPMs by leveraging its considerable strengths in high accuracy temperature sensors and proprietary fault signals.



IGBT/MOSFET High Side/Low Side 3-phase Gate Drivers

The BS2130 series is designed to drive all channel gates of 3-phase motor drivers on a single chip. Intelligent 2ch High/Low side drive is provided. ROHM's broad lineup supports a variety of applications.

Typical application



16bit MCUs for Industrial Equipment

LAPIS MCUs are equipped with a wide array of analog I/O interfaces. A broad operating temperature range of –40°C to +105°C meets the demands of industrial equipment. Additional features include hardware safety and software self-diagnostic functions.

+105°C
Resistant to heat

14 hardware safety functions ensure worry-free use in home appliances.

LAPIS Technology's ML62Q1000 Series MCUs — 14 — Prevents product accidents

Integrates 10 software self-diagnostic functions

Complies with the IEC/UL 60730 international standard for automotive electrical control equipment

IEC60730-1 Annex H Software class B
Sample self-diagnostic software provided

DC/DC Converters for Control Power Supplies

Designers can select from among a broad lineup of DC/DC converters for control boards according to the input voltage and output voltage/current.

CONTENTS

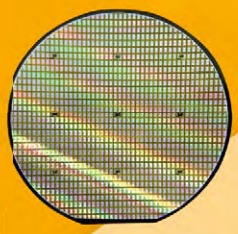
POWER DEVICE

ROHM responds to customer needs by providing superior characteristics in various form factors along with design solutions that maximize performance.

ROHM meets market demands by offering everything from semiconductor chips to modules...

Power Module

Case type
(Full SiC Module)
Mold type
IPM etc…



Discrete

TO-220
TO-247
TO-252/TO-263S
etc…

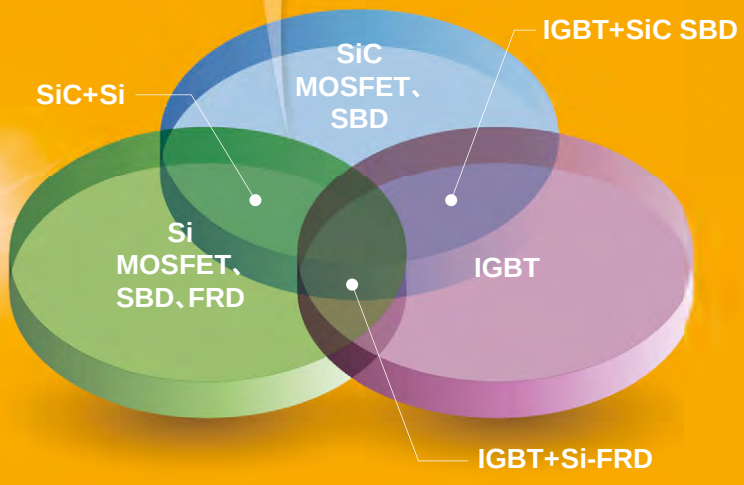
IC

Gate driver
Temperature/
High Voltage monitor
AC/DC
etc…

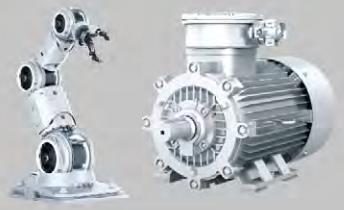
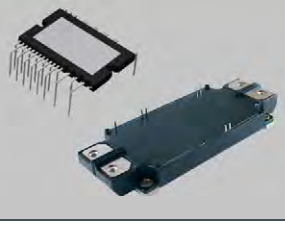
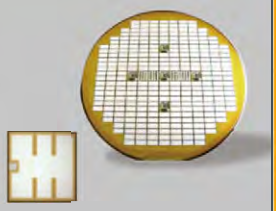
Device

SiC (SBD/MOSFET)
IGBT
Hybrid MOS
Super Junction MOSFET
Fast Recovery Diodes
Schottky Barrier Diodes
Shunt Resistor

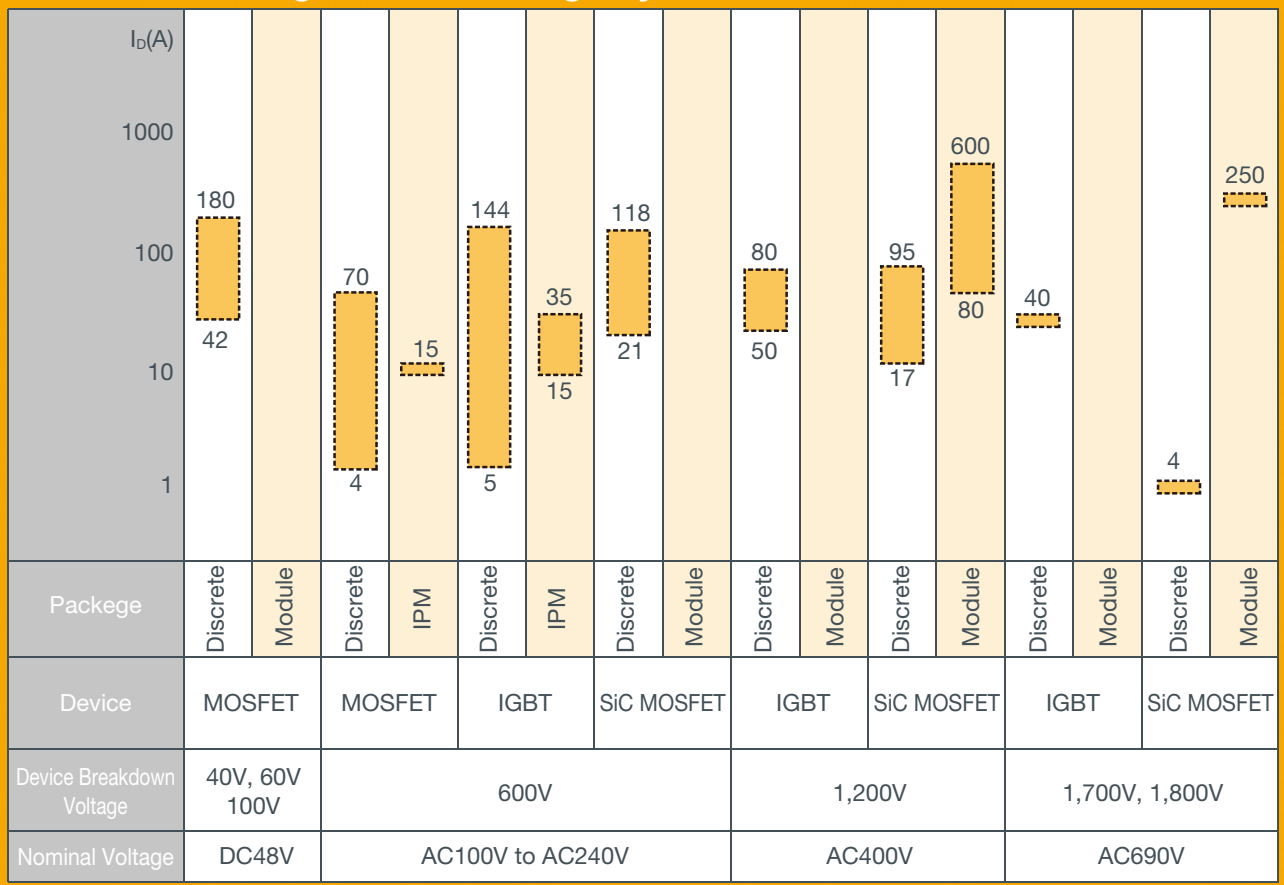
ROHM power device lineup expands application scope



Power Devices by Application

Application		Module	Discrete	Wafer/Chip
				
DC24V DC48V	Fan Motors Compact Mobility	●Mold IPM 2A/250V ●Compact Mobility Reference Design	●MOSFET 40V, 60V, 100V	
AC100V to AC240V	AC Servos AC Drive	●IGBT-IPM 15A, 20A, 30A, 35A ●MOS-IPM 15A ●Mold IPM 1.5A, 2.5A	●IGBT ●MOSFET 600V, 650V ●SiC MOSFET ●SiC SBD ●FRD	●IGBT ●SiC MOSFET ●SiC SBD
AC400V	AC Drive AC Servos	●Full SiC Module 80A, 120A, 180A 300A, 400A, 600A	●IGBT ●SiC MOSFET ●SiC SBD	●IGBT ●SiC MOSFET ●SiC SBD
AC690V	AC Drive	●Full SiC Module 250A	●IGBT 40A, 80A	IGBT 40A, 80A

Withstand Voltage/Current Range by Device

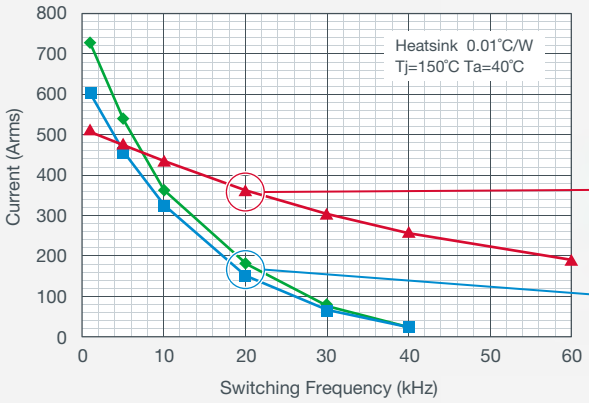


SiC Power Devices

ROHM's industry-leading high voltage/high current power devices accelerate innovation in the industrial motor sector.

Maintains high efficiency even with increased current

Simulation Results: Max Current vs Switching Frequency



Simulation condition

Water cooling — 3 phase inverter

Voltage	600V
Power factor	1
Modulation factor	0.9

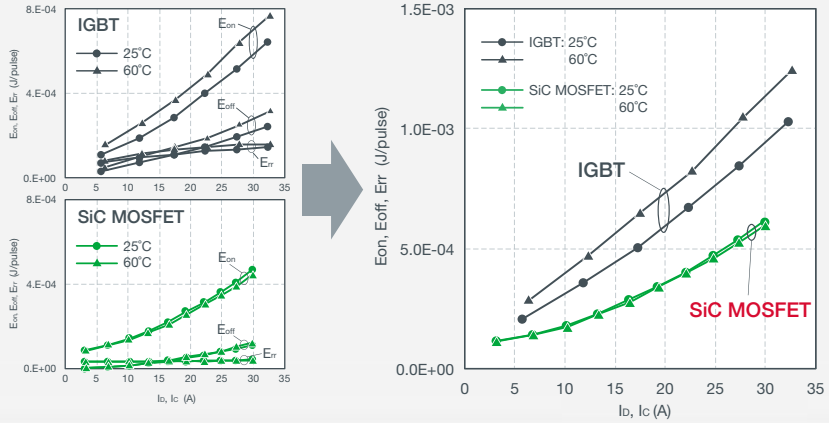
ROHM Full SiC Power Module 600A
BSM600D12P3G001

Market available
IGBT module, 600A

ROHM full SiC power modules support higher currents even in the high frequency band.

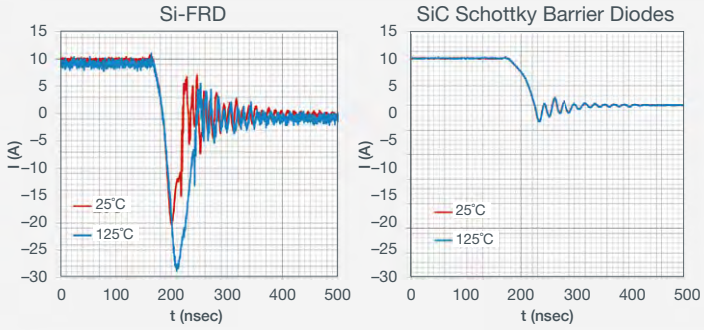
Superior SiC MOSFET switching performance

Current vs Switching Loss



Ideal Recovery Characteristics of SiC Schottky Barrier Diodes

SBD Trr



MOSFET BodyDiode Trr

Full SiC Module Lineup

ROHM high performance modules integrate the most advanced high current/high current power devices.

Module type	V_{DSS}	I_D (Tc=60℃)	Part No.	MOSFET type		Topology	Status
C type  122×45.6mm	1,200V	80A	BSM080D12P2C008	2G	Planer	Half bridge	on MP
		120A	BSM120D12P2C005			Half bridge	
			BSM120C12P2C201			Chopper (boost)	
		180A	BSM180D12P3C007	3G	Trench	Half bridge	
			BSM180D12P3C202			Chopper (boost)	
E type  152×62mm	1,200V	180A	BSM180D12P2C002	2G	Planer	Half bridge	on MP
			BSM180C12P2E202			Chopper (boost)	
		300A	BSM300D12P2E001			Half bridge	
			BSM300D12P3E005	3G	Trench	Half bridge	
			BSM300C12P3E201			Chopper (boost)	
			BSM300C12P3E301			Chopper (back)	
	1,700V	250A	BSM250D17P2E004	2G	Planer	Half bridge	
G type  152×62mm Low Ls 10nH	1,200V	400A	BSM400D12P2G003	2G	Planer	Half bridge	on MP
			BSM400D12P3G002	3G	Trench	Half bridge	
			BSM400C12P3G202			Chopper (boost)	
		600A	BSM600D12P3G001			Half bridge	
			BSM600C12P3G201			Chopper (boost)	

SiC Device Lineup

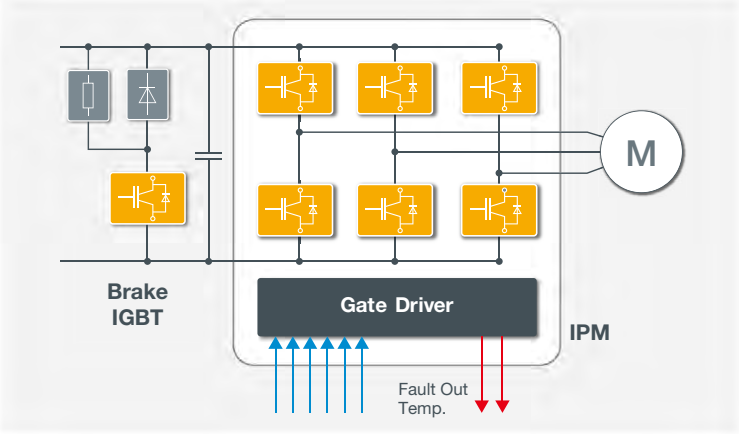
A superior lineup of SiC MOSFETs and Schottky barrier diodes is offered in a variety of form factors, from bare dies to power and surface mount packages.

2G SBD	650V	6A	8A	10A	12A	15A	20A	30A	40A
	1,200V	5A	10A	15A	20A	30A	40A	—	—
3G SBD JBS	650V	2A	4A	6A	8A	10A	12A	15A	20A
2G MOS Planar	650V	120mΩ	—	—	—	—	—	—	—
	1,200V	450mΩ	280mΩ	160mΩ	80mΩ	—	—	—	—
	1,700V	1,150mΩ	750mΩ	—	—	—	—	—	—
3G MOS Trench	650V	120mΩ	80mΩ	60mΩ	30mΩ	22mΩ	17mΩ	—	—
	1,200V	160mΩ	105mΩ	80mΩ	40mΩ	30mΩ	22mΩ	—	—

Note1: Indicates the JEDEC package notation. ( ) denotes ROHM package type.

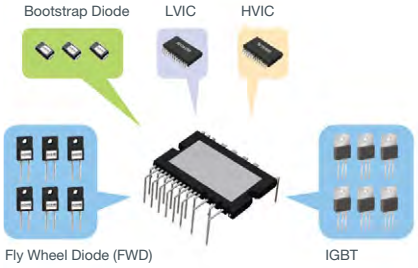
IGBT Devices and IPMs

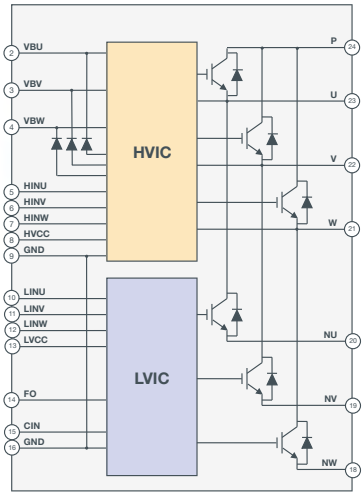
ROHM provides a lineup of IPMs that facilitate motor system design along with a broad range of chips and packages designed to improve the performance of motor systems.



600V IGBT IPMs (3rd Gen.)

Standard IPM packaged in a general-purpose inverter further reduces EMI.





- Inverter Block
  600V Low Saturation Voltage IGBT Low V_F, High-Speed trr FWD
- Bootstrap Diodes (Fast Recovery)
  trr=80ns@0.1A
- HVIC (Upper Arm Gate Driver)
  600V SOI (Silicon-On-Insulator) Process
  ⇒Latch-up free
  Bootstrap diode block current limit
  UVLO (Floating power supply)
- LVIC (Lower Arm Gate Driver)
  UVLO, SCP, TSD, VOT
  Fault Output

  UVLO: Under Voltage Locked Out
  SCP: Short Circuit Protection
  TSD: Thermal Shut Down
  VOT: Analog Temperature Output

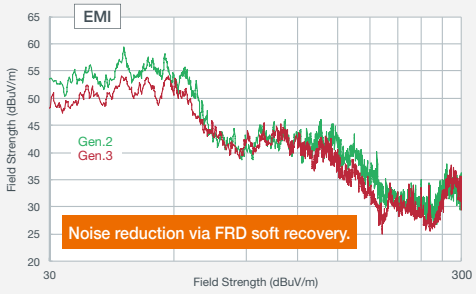
600V IGBT IPM Lineup

Power Devices	Gen.	Target Applications	Part No.	Rating	Thermal Protective Function
IGBT	3	AC Drive AC servo	New BM64374S-VA	600V/15A	TSD/VOT
			New BM64375S-VC	600V/20A	TSD/VOT
			New BM64377S-VC	600V/30A	TSD/VOT
			New BM64378S-VC	600V/35A	TSD/VOT

TSD: Thermal Shut Down
VOT: Analog Temperature Output

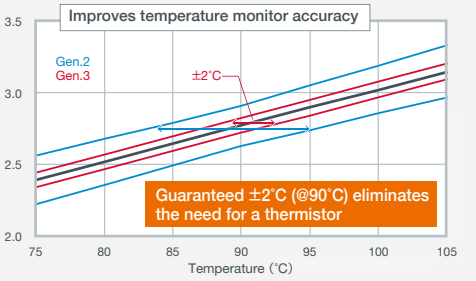
Improves FRD soft recovery characteristics

EMI characteristics optimized for IGBTs



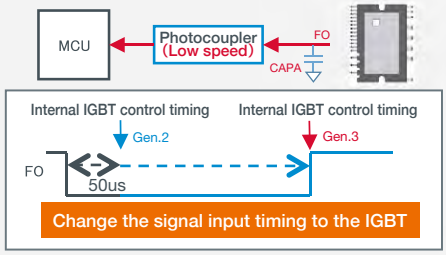
Guaranteed ±2°C Temperature Monitor Accuracy

Eliminates the need for a thermistor



Easy-to-Use Fault Signal

System comprised of a low-speed photocoupler



Field Stop Trench IGBTs: RGT series

650V Products/5μs Short-Circuit Withstand Time

Part No.	I_C (A)		$V_{CE(sat)}$ (V)		t_f (ns)		C_{ies} (pF)		C_{res} (pF)		Built-in FRD	V_F (V)		t_{rr} (ns)		Package
	25°C	100°C	Typ	I_C (A)	Typ	I_C (A)	Typ	V_{CE} (V)	Typ	V_{CE} (V)		Typ	I_F (A)	Typ	I_F (A)	
RGT8TM65D	5	3	1.65	4	71	4	220	30	220	30	✓	1.45	4	40	4	TO-220NFM
RGT16TM65D	9	5	1.65	8	95	8	450		450			1.4	8	42	8	
RGT20TM65D	10	6	1.65	10	104	10	610		610			1.4	8	42	8	
RGT30TM65D	14	8	1.65	15	75	15	780		780			1.5	15	55	15	
RGT40TM65D	17	10	1.65	20	60	20	1,070		1,070			1.45	20	58	20	
RGT50TM65D	21	13	1.65	25	65	25	1,400		1,400			1.45	20	58	20	
RGT40TS65D	40	20	1.65	20	60	20	1,070	30	1,070	30	✓	1.45	20	58	20	TO-247N
RGT50TS65D	48	25	1.65	25	65	25	1,400		1,400			1.45	20	58	20	
RGT60TS65D	55	30	1.65	30	60	30	1,730		1,730			1.35	20	58	20	
RGT80TS65D	70	40	1.65	40	55	40	2,210		2,210			1.35	20	58	20	
RGT00TS65D	85	50	1.65	50	62	50	2,770		2,770			1.45	30	54	30	
RGT8BM65D	8	4	1.65	4	71	4	220	30	4.5	30	✓	1.45	4	40	4	TO-252
RGT16BM65D	16	8	1.65	8	95	8	450		8			1.4	8	42	8	
RGT8NS65D	8	4	1.65	4	71	4	220	30	4.5	30	✓	1.45	4	40	4	TO-263S (LPDS) TO-262
RGT16NS65D	16	8	1.65	8	95	8	450		8			1.4	8	42	8	
RGT20NS65D	20	10	1.65	10	104	10	610		9			1.4	8	42	8	
RGT30NS65D	30	15	1.65	15	75	15	780		13			1.5	15	55	15	
RGT40NS65D	40	20	1.65	20	60	20	1,070		18			1.45	20	58	20	
RGT50NS65D	48	25	1.65	25	65	25	1,400		22			1.45	20	58	20	
RGT8NL65D	8	4	1.65	4	71	4	220	30	4.5	30	✓	1.45	4	40	4	LPDL
RGT16NL65D	16	8	1.65	8	95	8	450		8			1.4	8	42	8	
RGT20NL65	20	10	1.65	10	104	10	610		9			—	—	—	—	
RGT20NL65D												1.4	8	42	8	
RGT30NL65D	30	15	1.65	15	75	15	780		13			1.5	15	55	15	
RGT40NL65D	40	20	1.65	20	60	20	1,070		18			1.45	20	58	20	
RGT50NL65D	48	25	1.65	25	65	25	1,400		22			1.45	20	58	20	

The data table above is shown as reference. Please be advised to check data sheets for consideration.

Field Stop Trench IGBTs: RGS series

650V Products/8μs Short-Circuit Withstand Time

Part No.	I_C (A)		$V_{CE(sat)}$ (V)		t_f (ns)		C_{ies} (pF)		C_{res} (pF)		Built-in FRD	V_F (V)		t_{rr} (ns)		Package
	25°C	100°C	Typ	I_C (A)	Typ	I_C (A)	Typ	V_{CE} (V)	Typ	V_{CE} (V)		Typ	I_F (A)	Typ	I_F (A)	
RGS60TS65DHR	56	30	1.65	30	101	30	980	30	13	30	✓	1.45	30	98	30	TO-247N
RGS80TS65DHR	73	40	1.65	40	96	40	1,240		16			1.45	30	98	30	
RGS00TS65DHR	88	50	1.65	50	91	50	1,570		23			1.45	30	98	30	
RGS00TS65EHR	88	50	1.65	50	91	50	1,570		23			1.45	50	113	50	

1,200V Products/10μs Short-Circuit Withstand Time

Part No.	I_C (A)		$V_{CE(sat)}$ (V)		t_f (ns)		C_{ies} (pF)		C_{res} (pF)		Built-in FRD	V_F (V)		t_{rr} (ns)		Package
	25°C	100°C	Typ	I_C (A)	Typ	I_C (A)	Typ	V_{CE} (V)	Typ	V_{CE} (V)		Typ	I_F (A)	Typ	I_F (A)	
☆RGS30TSX2DHR	30	15	1.7	15	TBD	15	TBD	30	TBD	30	✓	1.65	15	TBD	15	TO-247N
New RGS50TSX2DHR	50	25	1.7	25	205	25	2,095		12			1.65	25	182	25	
New RGS80TSX2DHR	80	40	1.7	40	227	40	2,820		25			1.65	40	198	40	

☆: Under Development

Ideal for Brake Circuits

For AC100V to AC240V (650V Withstand)	RGT series (4 to 50A@100°C), RGTV series (30 to 80A@100°C)
For AC400V (1,200V Withstand)	RGS series (15 to 40A@100°C)

IGBT Devices

IGBTs for motors are available in both chip and package form factors.

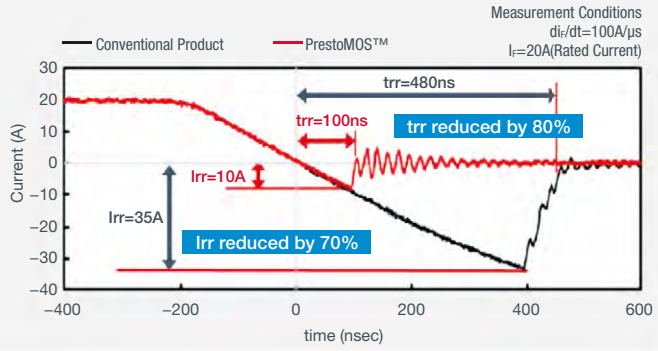
Note1: Indicates the JEDEC package notation. ( ) denotes ROHM package type.

PrestoMOS™ Devices

ROHM PrestoMOS™ achieves the industry's fastest recovery time by optimizing the diode integrated into the 600V super junction MOSFET. The superior design contributes to improved regenerative performance of motor systems and absorption of back electromotive force during braking.

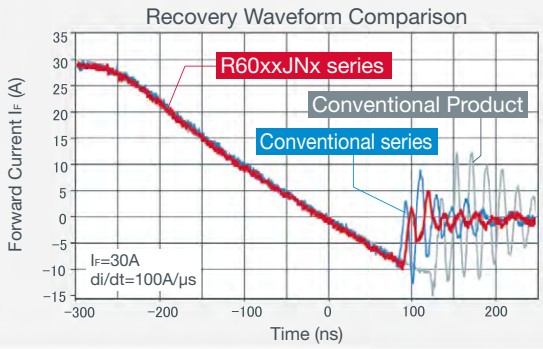
Reverse recovery time (trr) reduced 80%

Decreasing switching loss improves regenerative performance

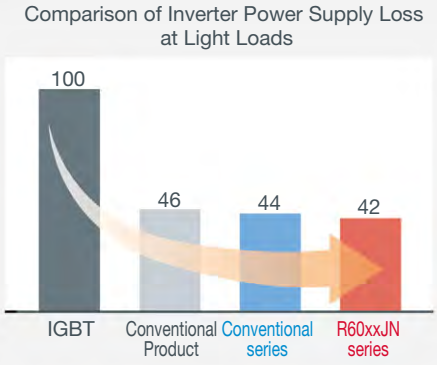


Improves soft recovery characteristics

Achieves lower noise in motor systems



Power Supply Loss Halved at Light Loads



R60xxJNx series

VDS=600V		Package			
		TO-252 〈DPAK〉	TO263S [SC-84] (LPTS) 〈D2PAK〉	(TO220FM) 〈TO-220FP〉	TO-247AD (TO-247)
RDS(on) Typ (mΩ)	1,100	R6004JND3	R6004JNJ	R6004JNX	
	720	R6006JND3	R6006JNJ	R6006JNX	
	600	R6007JND3	R6007JNJ	R6007JNX	
	450	R6009JND3	R6009JNJ	R6009JNX	
	350		R6012JNJ	R6012JNX	
	220		R6018JNJ	R6018JNX	
	200		R6020JNJ	R6020JNX	
	180				New R6020JNZ4
	150				New R6025JNZ4
	140			R6025JNX	
	110			R6030JNX	New R6030JNZ4
	90				New R6042JNZ4
	60				New R6050JNZ4
	45				New R6070JNZ4

Note1: Indicates the JEDEC package notation. ( ) denotes ROHM package type, [ ] JEITA code, 〈 〉General code

Molded IPM

Molded IPM with built-in PrestoMOS™ provides high efficiency drive. Supports more compact applications such as fan motors. (Resin mold type)

High Voltage 3-Phase Brushless DC Motor Drivers (6-Input Control Type)

Part No.	Control method	Withstand Voltage (V)	Output Current (A)	Output ON Resistance (Ω) (Typ)	Diode Forward Voltage (V)	Package
BM6241FS	6-Input Control	250	2.0	0.9	0.9	SSOP-A54_23
BM6242FS	6-Input Control	600	1.5	2.7	1.1	SSOP-A54_23
BM6243FS	6-Input Control	600	2.0	1.7	1.1	SSOP-A54_23

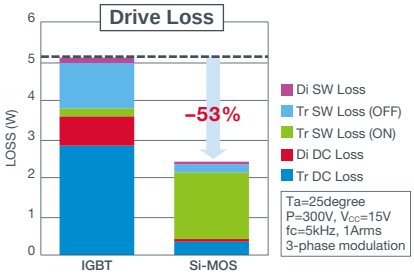
SSOP-A54_23

MOS-IPM

Integrated PrestoMOS™ reduces loss in the low-current region vs IGBT IPMs.

Power Devices	Gen.	Target Applications	Part No.	Rating	Temperature Protection Function	status
Si MOS	1	AC Drive AC servo	**BM65364S-VA BM65364S-VC**	600V/15A	TSD	MP

HSDIP25



Note: "Presto MOS" is a trademark or a registered trademark of ROHM Co., Ltd.

Fast Recovery Diodes

650V withstand voltage safely absorbs back electromotive force during braking, while optimized soft recovery characteristics enable low noise.

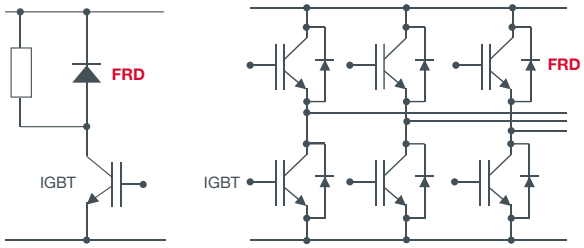
Easily achieves lower noise in motor systems

Features

Our portfolio includes ultra-low-V_F and ultra-fast trr models that balance the trade-off between recovery time (t_{rr}) and forward voltage (V_F)

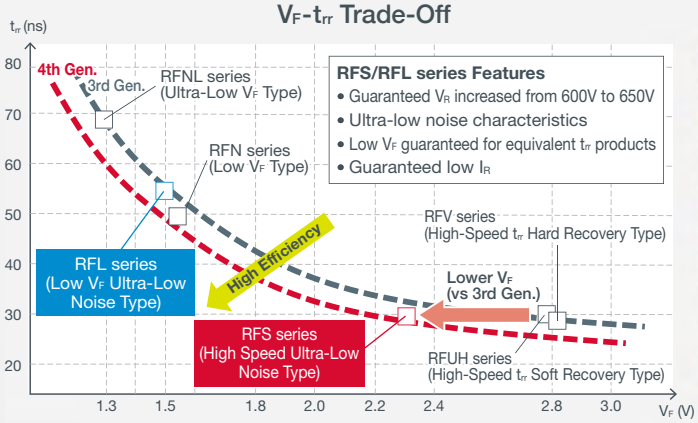
- Low V_F/Ultra-low noise (RFL series)
- High-speed t_{rr}/Ultra-low noise (RFS series)
- The RFL series, characterized by soft recovery characteristics, reduces noise (including ringing).
- The RFS series reduces recovery energy via fast recovery.
- 650V withstand provides the necessary breakdown voltage for brake circuits

Application Circuit

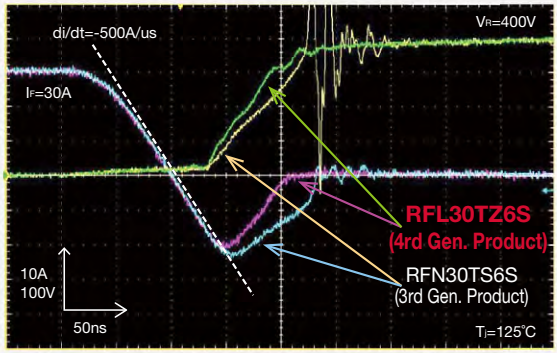


Brake circuit　　Inverter circuit

V_F-t_{rr} Trade-Off



Recovery Waveform Comparison: 4th Gen. vs 3rd Gen.

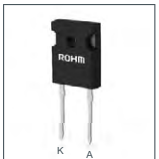


Conditions: I_F=30A, V_R=400V, di/dt=500A/μs, T_j=125°C

Power Fast Recovery Diodes (RFL series) (Under Development)

RFL series (Low V_F Ultra-Low Noise Type)

Part No		Package	I_o (A)	I_{FSM} (A) sin 60Hz	V_F Max (V)		I_R Max (μA)		t_{rr} Max (ns)	Circuit
Part No.	Product Performance Code					I_F (A)		V_R (V)		
☆ **RFL30TZ6S**	G	TO-247GE-2L	30	200	1.5	30	5	650	55	Single
☆ **RFL60TZ6S**	G	TO-247GE-2L	60	320	1.5	60	10	650	75	Single



TO-247N-2L

☆: Under Development

Power Fast Recovery Diodes (RFS series) (Under Development)

RFS series (High-Speedt_{rr} Ultra-Low Noise Type)

Part No		Package	I_o (A)	I_{FSM} (A) sin 60Hz	V_F Max (V)		I_R Max (μA)		t_{rr} Max (ns)	Circuit
Part No.	Product Performance Code					I_F (A)		V_R (V)		
☆ **RFS20TJ6S**	G	TO-220ACFP	20	120	2.3	20	5	650	30	Single
☆ **RFS30TZ6S**	G	TO-247GE-2L	30	160	2.3	30	5	650	40	Single
☆ **RFS60TZ6S**	G	TO-247GE-2L	60	250	2.3	60	10	650	55	Single

TO-220ACFP

G: halogen free　t_{rr} condition: I_F=0.5A, I_R=1A, I_{rr}=0.25xI_R

☆: Under Development

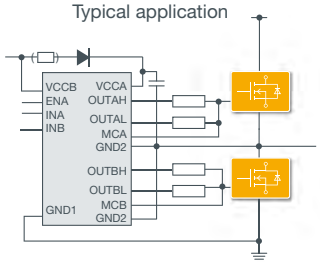
Gate Drivers

Multichannel gate drivers make inverter drive circuits more compact.

Reliably configure half bridge applications

Prevents simultaneous high side and low side ON. Configure motor systems with a 1,200V high side floating voltage to achieve greater safety along with functionality.

Typical application

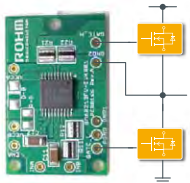


SSOP-B20W
6.50mm×8.10mm×2.01mm

Evaluation Boards

BM60213FV-C Board
Include bootstrap circuit for high-side power supply

Controller
Digital Control signal



IGBT
RGWxxxx65x
(ROHM)

IGBT
RGWxxxx65x
(ROHM)

BM60213FV-EVK001
Board size: 33mm×21mm

IGBT/MOSFET High Side/Low Side Gate Driver Lineup

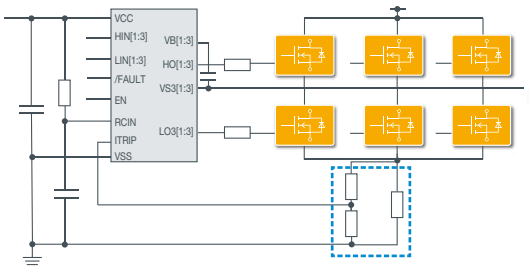
CH	Part No.	Low Side Power Supply Voltage	High side Floating Offset Voltage	Output Drive	Minimum Input Pulse Width	UVLO (On/Off)	Miller Clamp	Package
2ch	**BM60212FV-C**	10 to 24V	1,200V	3A	60ns (Max)	8.5V/9.5V	✓	SSOP-B20W
	BM60213FV-C				60ns (Max)	8.5V/9.5V	—	

Compact 6ch High/Low Side System Configuration

Built-in bootstrap diode simplifies system structure (BS2132F).
Flexible overcurrent detection value improves system safety.

6ch Gate Driver (BS2132F)

Typical application

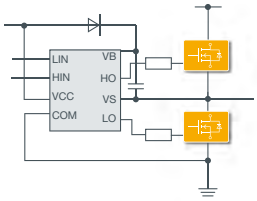


SOP28
18.50mm×9.90mm×2.41mm

Arbitrarily set the overcurrent detection value

2ch Gate Driver

Typical application



SOP8
5.00mm×6.20mm×1.71mm

IGBT/MOSFET High Side/Low Side 3-Phase Bridge Driver Lineup

No of Ch	Part No.	Low Side Power Supply Voltage	High Side Floating Offset Voltage	Output Drive (Io+/Io−)	UVLO (V)	Input/Output Delay Time	Dead Time	Overcurrent Protection	Fault Output	Built-in Bootstrap Diode	Package
6ch	**BS2130F-G**	11.5 to 20V	600V	120mA/ −250mA	9.4V/ 10.4V	630/ 580ns	300ns	✓	✓	—	SOP28
	BS2132F									Built-in Bootstrap Diode	

IGBT/MOSFET High Side/Low Side Gate Driver Lineup

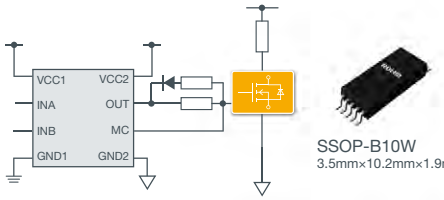
No of Ch	Part No.	Low Side Power Supply Voltage	High Side Floating Offset Voltage	Output Drive (Io+/Io−)	UVLO (V)	Input/Output Delay Time	Dead Time	Package
2ch	**BS2101F**	10 to 18V	600V	60mA/ −130mA	8.2V/ 8.9V	220ns	—	SOP8
	BS2103F						160ns	
	BS2114F	10 to 20V		500mA/ −500mA		250ns		

Isolated Gate Drivers (Galvanic Isolation)

3,750V isolation voltage enable direct drive of power devices

Thin package contributes to system miniaturization.

Typical application



SSOP-B10W
3.5mm×10.2mm×1.9mm

Two types of compact evaluation boards facilitate pre-evaluation in customer sets.

Single
1ch Gate Driver Board

Controller → Digital Control signal

SiC MOSFET
SCT3xxx
(ROHM)

BM61S40RFV-EVK001 Board size: 33mm×16mm

Totem Pole
2ch Gate Driver Board

Controller → Digital Control signal

MOSFET
R65xxKNx
(ROHM)

MOSFET
R65xxKNx
(ROHM)

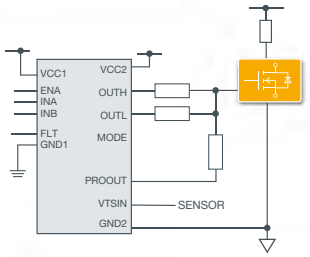
BM61M41RFV-EVK002 Board size: 33mm×32mm

3,750V Isolated Gate Driver Lineup

No of Ch	Part No.	Input Side Supply Voltage	Isolation Voltage	Output Side Supply Voltage	Minimum Input Pulse Width	Output Drive	UVLO [On/Off]	Miller Clamp	Additional Functions	Package
1ch	**BM61S40RFV-C**	5V±0.5V	3,750V	16 to 20V	60ns (Max)	4A	14.5V/15.0V	✓	OVP	SSOP-B10W
	BM61S41RFV-C			16 to 24V	60ns (Max)		14.5V/15.0V	✓	—	
	BM61M41RFV-C			9 to 24V	60ns (Max)		7.4V/7.8V	✓	—	

2,500V isolation voltage and multiple safety functions improve motor system reliability

- Gate monitoring function detects power device drive abnormalities
- Soft turn OFF provides stable control of power devices
- Temperature shutdown prevents thermal runaway
- Built-in isolated power supply facilitates the configuration of power supplies for power devices



SSOP-B20W
6.50mm×8.10mm×2.01mm

SOP16WM
10.34mm×10.31mm×2.64mm

SSOP-B28W
9.2 mm×10.4 mm×2.4 mm

2,500V Isolated Gate Driver Lineup

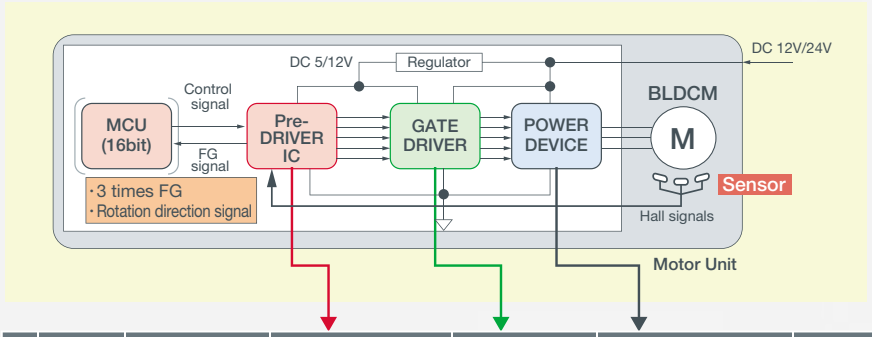
No of Ch	Part No.	Input Side Supply Voltage	Isolation Voltage	Output Side Supply Voltage	Output Drive	UVLO (On/Off)	Miller Clamp	Negative Voltage	Short Protection	Fault Output	Temp. Monitor	Additional Functions	Package
1ch	**BM6105AFW-LBZ**	5V±0.5V	2,500V	13.3 to 20V	4.5A	11.3V/12.3V	✓	✓	✓	✓	—	—	SOP16WM
	BM6101FV-C			14 to 24V	3A	11.5V/12.5V	✓	✓	✓	✓	—	TSD, DESAT, Soft Turn OFF	SSOP-B20W
	BM6102FV-C			14 to 20V		11.5V/12.5V	✓	—	✓	✓	—	TSD, DESAT, Soft Turn OFF	
	BM6108FV-LB			10 to 24V		9.05V/9.55V	✓	✓	✓	✓	—	DESAT, Soft Turn OFF	
	BM6109FV-C			14 to 18V	4.5A	12V/12.5V	✓	—	✓	✓	✓	OCP,OT, Soft Turn OFF	SSOP-B28W
	BM60052AFV-C	4 to 32V (built-in SW regulator)		10 to 20V	3A	Adjustable by settings	✓	✓	—	✓	—	TSD, DESAT, Soft Turn OFF	
	BM60054AFV-C						✓	✓	✓	✓	—	TSD, DESAT, Soft Turn OFFT	
	BM60055FV-C	4.5 to 30V (built-in SW regulator)		9 to 24V	5A		✓	—	✓	✓	—	TSD, Temperature Compensation of OC, Soft Turn OFF	
	BM60060FV-C	8 to 24V (built-in SW regulator)		13.5 to 24V	9A	11.5V/12.5V	✓	—	✓	✓	✓	Temperature Compensation of OC, Soft Turn OFF	

Motor Drive Reference Design for Compact Mobility and Other Battery-Powered Devices

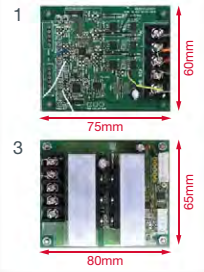
ROHM provides total design support by offering a low-voltage non-isolated motor drive reference design powered by rechargeable batteries optimized for compact mobility such as short-range commuting, transportation to medical and nursing sites, and AGV with AI intelligent control.

Three reference designs (up to 50W/up to 150W/up to 300W) to suit various application needs.

ROHM offers three reference designs that provide the optimum solution according to motor output.
For applications that require low-speed and high torque from the start, ROHM's pre-driver, gate driver, and MOSFET are utilized to achieve a compact, high efficiency design solution.

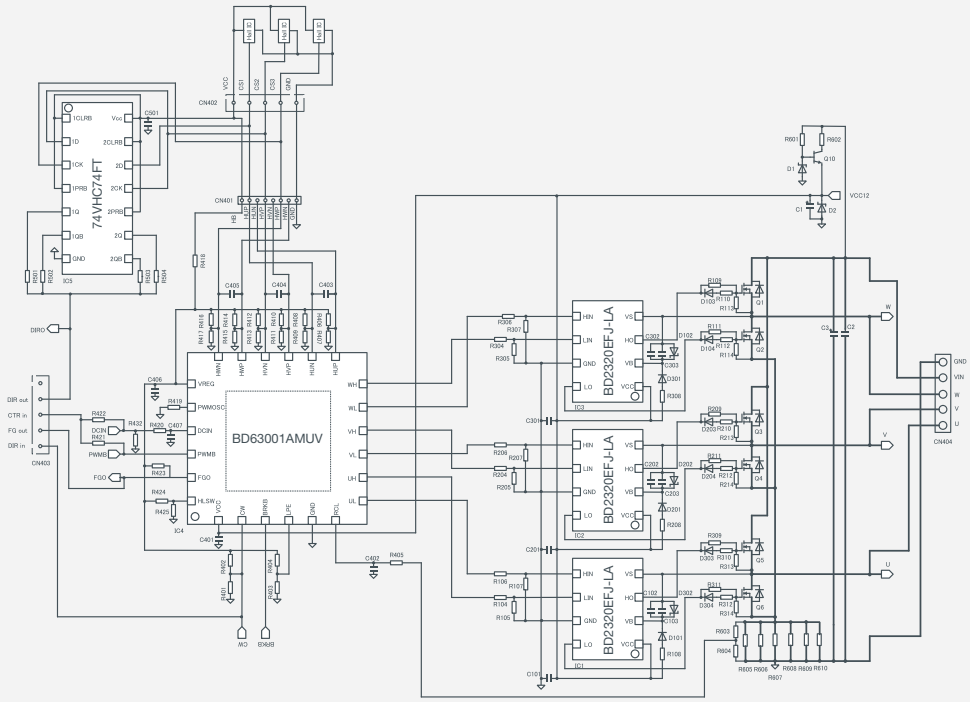


External Appearance



	Supply Voltage	Motor Output	Pre-Driver	Gate Driver	Power Devices (MOS FET)	Additional Functions	Board Part No.
1	12V (Typ)	up to 50W	BD63001AMUV ·120° commutation drive using 3 Hall sensors ·Forward/reverse input ·Short brake input ·1×FG output	BD63001AMUV	Pch MOS+Nch MOS (Dual MOS recommended)	·5V output LDO ·3×FG output ·Forward/reverse detection output ·Speed servo (MCU)	RMS332 SD-011
2	12V/24V (Typ)	50 to 150W		BD2320EFJ-LA BS2114FS I_O=500mA/−500mA	Nch MOS	·5V, 12V output LDO ·3×FG output ·Forward/reverse detection output ·Speed servo (MCU)	RMS332 SD-012
3	24V (Typ)	150 to 300W			Nch MOS	·12V simple power supply ·Forward/reverse detection output	RMS332 SD-010

~300W Motor Drive Reference Design Circuit



3-phase Brushless Pre-Driver BD63001AMUV

This 3-phase brushless pre-driver is optimized for SPM motor drive that features superior battery-powered rotation/stop and acceleration/deceleration control.

Features

- Internal 120˚ commutation logic
- PWM control method
- Short brake
- Rotation direction switching
- FG output
- Multiple protection circuits

VQFN024V4040
4.00mm×4.00mm×1.00mm

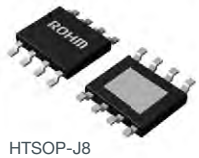
New

Half-Bridge Driver for MOSFET Drive BD2320EFJ-LA

ROHM's gate driver utilizes a 100V withstand voltage process to drive high and low side MOSFETs on a single chip.

Features

- High side floating voltage: +100V
- Output source current: 3.5A
- Output sink current: 4.5A
- Built-in bootstrap diode between V_{CC}-V_B
- VS negative voltage DC tolerance –(15V-V_{CC})
- Operating temp. range: –40˚C to +125˚C



HTSOP-J8
4.90mm×6.00mm×1.00mm

Single Nch Power MOSFET (40V/60V/100V) Lineup

Part No.	V_{DSS} (V)	I_D (A)	P_D (W) (Ta=25˚C)	$R_{DS(on)}$ Typ (mΩ)				Package
				V_{GS}=10V		V_{GS}=4.5V		
				Typ	Max	Typ	Max	
RQ3G150GN	40	39	20	5.1	7.2	6.4	8.9	(HSMT8) 3333size
RQ3G100GN	40	27	15	11.0	14.3	14.1	18.3	
RQ3L090GN	60	30	20	10.3	13.9	14.6	21.4	
RS1G300GN	40	80	35	1.9	2.5	2.4	3.0	(HSOP8) Single
RS1G180MN	40	57	30	5.0	7.0	6.7	9.2	
RS1G120MN	40	34	25	11.6	16.2	15.6	20.7	
RS1L180GN	60	68	39	4.2	5.6	5.9	8.5	
RS1L120GN	60	36	27	9.3	12.7	13.4	19.8	
RS1P600BE	100	60	35	7.5	9.7	—	—	
RD3G600GN	40	60	40	2.8	3.6	3.3	4.3	TO-252 〈DPAK〉
RD3G400GN	40	40	26	5.6	7.5	7.0	9.5	
RD3L08BGN	60	80	119	4.2	5.5	5.7	8.1	
RD3L220SN	60	22	20	18.0	26.0	21.0	30.0	
RD3P08BBD	100	80	119	8.6	11.6	—	—	
RD3P200SN	100	20	20	33.0	46.0	—	—	
RJ1G12BGN	40	120	178	1.38	1.86	1.54	2.08	TO-263AB (LPTL)
RJ1G08CGN	40	80	78	4.2	5.6	5.0	6.7	
RJ1L12BGN	60	120	192	2.1	2.9	2.7	4.1	
RJ1L08CGN	60	80	96	5.3	7.0	7.4	10.7	
RJ1P12BBD	100	120	178	3.8	5.3	—	—	
RSJ650N10	100	65	100	6.5	9.1	—	—	TO-263S (LPTS)
RSJ301N10	100	30	50	33.0	48.0	—	—	

Note: Indicates the JEDEC package notation. ( ) ROHM Package, 〈 〉 GENERAL Code.

Dual-Type Power MOSFET (HSOP8) Lineup

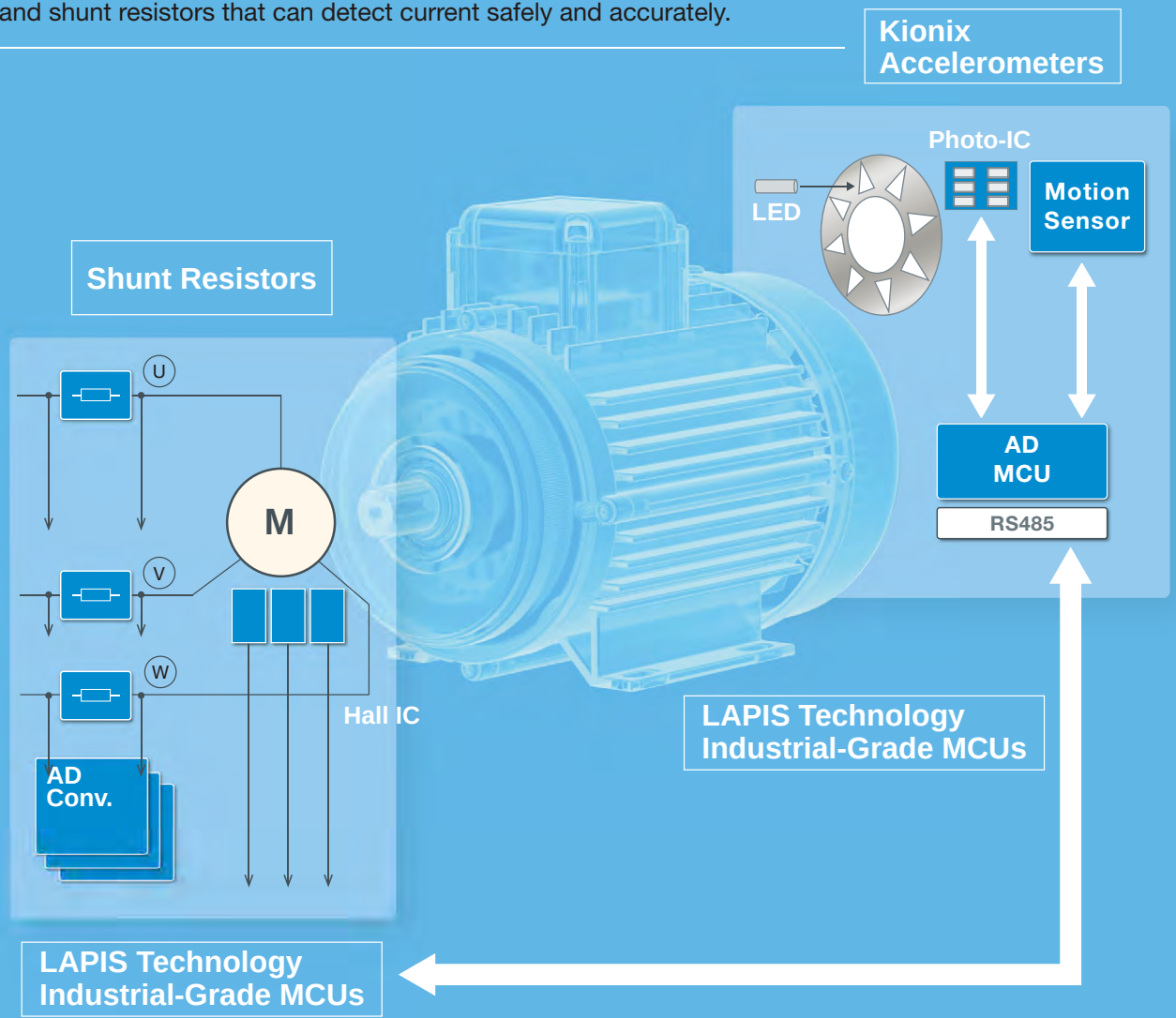
HP8Mxx series (HSOP8) Power Package | **Backside heat dissipation design** | **30V to 100V lineup supports industrial applications**

Part No.	Polarity (ch)	P_D (W) (Ta=25˚C)	V_{DSS} (V)	I_D (A) Tc=25˚C	$R_{DS(ON)}$ Typ (mΩ)		Size (mm)	Package
					V_{GS}=10V	V_{GS}=4.5V		
HP8MA2	N+P	7.0*	30	18.0*	7.5	11.7	6.0×5.0×1.0	(HSOP8)
			–30	–15.0*	13.2	21.0		
HP8M31			60	8.5*	46	52		
			–60	–8.5*	50	55		
New **HP8M51**			100	4.5*	120	130		
			–100	–4.5*	210	230		

Note: Indicates the JEDEC package notation. ( ) denotes ROHM package type. Note2: *PW≤1 s

SENSOR INTERFACE

Motion control requires sensors that can accurately detect movement. And AD converters for converting analog sensor signals into digital format. ROHM responds to the needs of industrial motors by offering a broad lineup that includes LAPIS Technology industrial-grade MCUs featuring a variety of analog interfaces (i.e. AD converters), Kionix 3-axis accelerometers capable of sensing device oscillation and other abnormalities, and shunt resistors that can detect current safely and accurately.



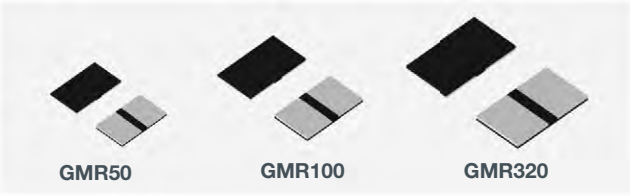
*1 Kionix, Inc. is a group company of ROHM. *2 LAPIS Technology Co., Ltd. is a group company of ROHM.

Ideal for current detection in high power motors

High Power Low Ohmic Shunt Resistors (Metal Plate)

GMR series

Shunt resistors used in the industrial equipment market demand greater safety, stability, and reliability. ROHM's GMR series contributes to improved system reliability by detecting current with high accuracy and low loss, even in the high power region.



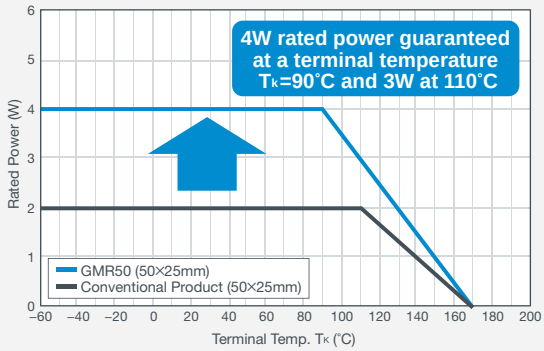
Reduces Surface Temperature Rise

Surface Temperature Comparison at 2W (Ta=25˚C)

Optimized electrode structure and resistive element design significantly reduce heat generation

Guaranteed High Rated Power

Terminal part Temperature vs Rated Power

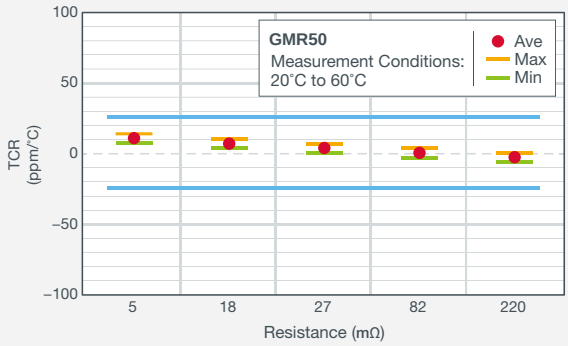


The GMR50 delivers the industry's highest rated power of 4W at a terminal temp. Tκ=90˚C and even 3W at Tκ=110˚C in the compact 5.0×2.5mm size

*ROHM July 2020 study

Excellent TCR Even in the Low Resistance Region

TCR



Achieves superior TCR characteristics even in the low resistance region by adopting a high performance alloy for the metallic resistive element

GMR series Lineup

Part No.	Size mm (inch)	Rated Power	Tolerance	Temperature Coefficient of Resistance*1 (ppm/˚C)	Resistance Range	Operating Temperature (˚C)
GMR50	5025 (2010)	3W (110°C) 4W (90°C)	F (±1%)	0 to +25	5mΩ	−65 to +170
				±25	10mΩ to 220mΩ (E24 series)*2	
GMR100	6432 (2512)	5W (110°C) 7W (70°C)	F (±1%)	0 to +25	5mΩ	
				±20	10mΩ to 220mΩ (E24 series)*2	
GMR320	7142 (2817)	7W(110°C) 10W(70°C)	F (±1%)	0 to +25	5mΩ	
				±25	10mΩ to 100mΩ (E24 series)*2	

*1 (+20˚C to +60˚C) *2 The development schedule may vary depending on the resistance value. Please inquire.

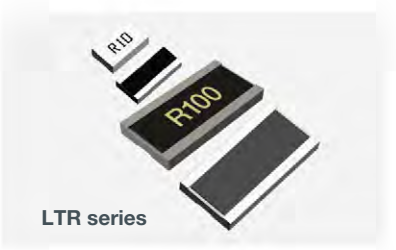
Ideal for current sensing in medium-power motors

Wide Terminal Thick-Film Chip Resistors

LTR Low Ohmic series

Configuring the terminals on the long sides shortens the distance between terminals, reducing mechanical stress on the solder joints. **This improves junction reliability during temperature changes.**

	MCR series (Standard Product)	LTR series (Wide Terminal)
Terminal Position	Long	Short
Effects of PCB Expansion/ Contraction	Junction Mechanical Stress: **Large**	Junction Mechanical Stress: **Small**



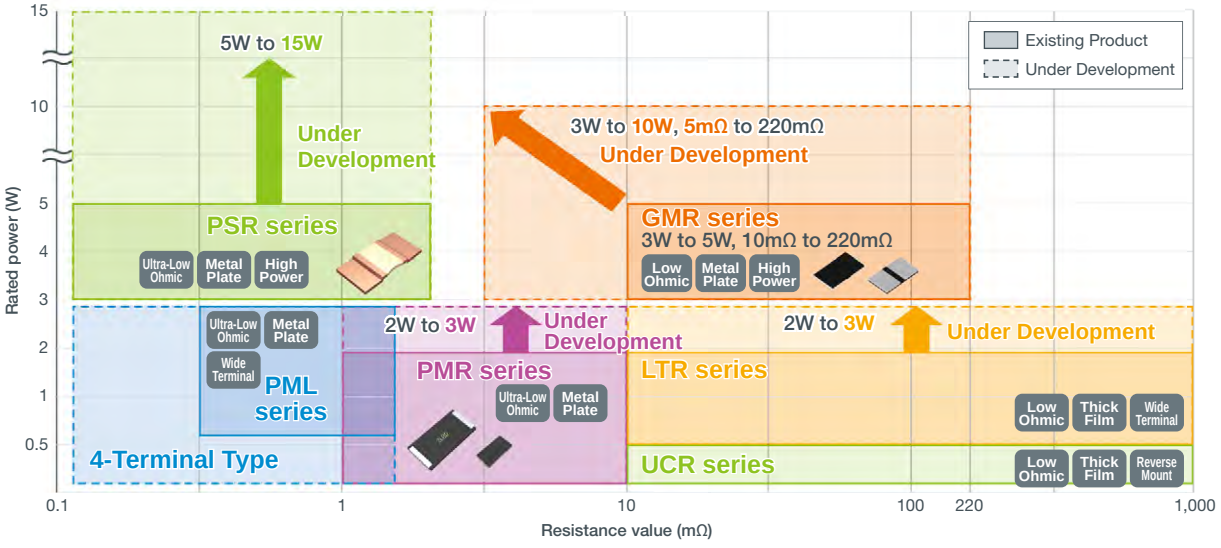
LTR series

Wide Terminal Low Ohmic Shunt Resistors: LTR series

Part No.	Size mm (inch)	Rated Power (+70°C) (W)	Tolerance	Temperature Coefficient of Resistance (ppm/°C)	Resistance value	Operating Temperature (°C)
LTR10	1220 (0508)	0.5W (1/2W)	J (±5%)	±150	47mΩ to 9.1Ω (E24 series)	–55 to +155
			F (±1%)			
LTR18	1632 (0612)	1W	J (±5%)	0 to 300 0 to 200 0 to 150 ±100	10mΩ to 18mΩ (E24 series) 20mΩ to 47mΩ (E24 series) 51mΩ to 470mΩ (E24 series) 510mΩ to 1Ω (E24 series)	
			F (±1%)			
LTR50	2550 (1020)	2W	J (±5%)	0 to 300 0 to 200 0 to 150 ±100	10mΩ to 18mΩ (E24 series) 20mΩ to 47mΩ (E24 series) 51mΩ to 91mΩ (E24 series) 100mΩ to 910mΩ (E24 series)	
			F (±1%)			
LTR100	3264 (1225)	2W	J (±5%)	±200	100mΩ to 910Ω (E24 series)	
			F (±1%)	0 to 150 0 to 100	100mΩ to 200mΩ (E24 series) 220mΩ to 910mΩ (E24 series)	
		☆3W	F (±1%)	☆ 0 to 300 ☆ 0 to 200 ☆ 0 to 150	10mΩ to 18mΩ (E24 series) 20mΩ to 47mΩ (E24 series) 51mΩ to 91mΩ (E24 series)	

Note: E24: Standard product ☆: Under Development

Shunt Resistor Lineup



Industrial-Grade 16bit Microcontrollers

ML62Q1000 series

Product Longevity 10 YEARS

ROHM GROUP LAPIS TECHNOLOGY

Feature 1 Wide operating temp. range –40˚C to 105˚C + High noise immunity

High temp. operation +105˚C

In contrast to standard MCUs that feature a guaranteed operating temperature range of –40˚C to +85˚C, LAPIS Technology ensure a range of –40˚C to +105˚C.

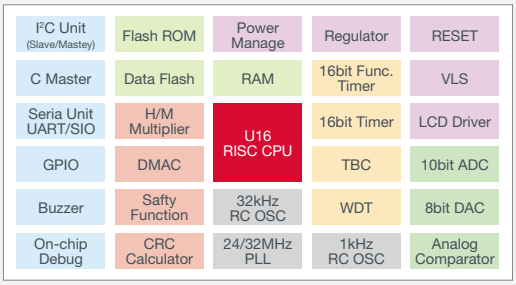
Supply Vlotage	Comparison Result	
	Company A	LAPIS Technology
1.0kV	✓	✓
1.2kV	✓	✓
1.4kV	✓	✓
1.6kV	–	✓
1.8kV	–	✓
2.0kV	–	✓

This new series maintains the noise resistance of LAPIS Technology's 'Tough' series of MCUs (ML62015x, ML62013x), which have been proven in noise testing to be superior compared with competitor MCUs.

Note: Distance between the antenna and test device: 0cm

Feature 2 Integrates a wide array of peripheral circuits, highaccuracy

ADCs, comparators, multifunction timers, PWM, and more



Feature 3 14 hardware + 10 software self-diagnostic functions

14 safety features by hardware can be used safely for home appliances

LAPIS Technology ML62Q1000 series MCUs — 14 — Prevent accidents of household electrical appliances

10 "self-diagnosis functions" by software are installed

Automatic electric control unit International standard IEC/UL 60730 compliant

IEC60730-1 Annex H Software class B

Self-diagnostic sample software provided

Conventional safety unctions

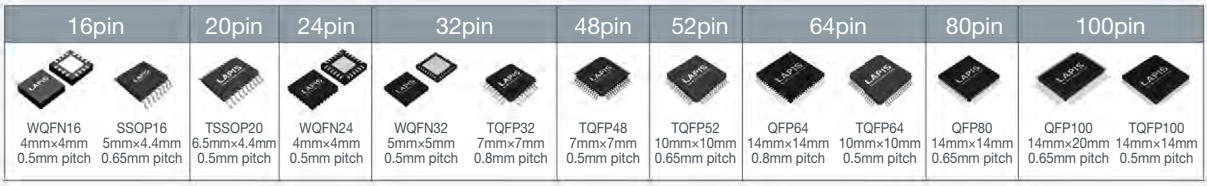
- RAM parity error
- RAM guard
- SFR guard
- Invalid memory access
- Oscillation frequency test
- A/D converter self-test

+

NEW! Safety functions

- Flash memory CRC calculation
- GPIO self-test
- UART self-test
- SSIO self-test
- I²C test
- WDT test
- Clock backup
- Port output level

Feature 4 Broad Package Lineup



ML62Q1000 series Specifications

	ML62Q1300 series	ML62Q1500 series
CORE	LAPIS U16	
Condition		
Operating Voltage (V)	1.6 to 5.5	
Operating frequency (Max)	Low-speed system clock: 32.768kHz/(internal RC oscillator), High-speed system clock: 24MHz/(PLL)	
Minimum instruction execution time	41ns/30.5μs	
Operating temperature (˚C)	–40 to +105	
ROM/RAM		
ROM architecture	Flash	
ROM size (Byte)	16K, 24K, 32K, 48K, 64K	32K, 48K, 64K, 96K, 128K, 160K, 192K, 256K
Data Flash size (Byte)	2K	4K, 8K
RAM size (Byte)	2K, 4K	8K, 16K
Function/Feature		
No. of Input Pins	—	2
No. of Input/Output Pins	12, 16, 20, 28	42, 46, 58, 72, 92
16bit Timer	4/(8bit×8), 6/(8bit×12)	6/(8bit×12), 8/(8bit×16)
16bit Multifunction Timer	4/(TMR, PWM, IGBT, Capture)	6/(TMR, PWM, IGBT, Capture) 8/(TMR, PWM, IGBT, Capture)
ADC (Successive Approximation)	10bit×6(SA type), 10bit×8(SA type)	10bit12(SA type), 10bit×16(SA type)
DAC	—, 8bit×1	8bit×1, 8bit×2
Comparator	1	2
I²C	Master Slave×1/Master×1	Master Slave×1/Master×2
SSIO/UART	UART Full-duplex communication	
	SSIO×2	SSIO×2/SSIO×3/SSIO×4/SSIO×6
Supply Voltage Detection	VLS×1	
External Interrupt	8	
Remarks	WDT, DMA, Multiplication and Division	WDT, DMA, Multiplication and Division
Package	SSOP16/WQFN16, TSSOP20, WQFN24, TQFP32/WQFN32	TQFP48, TQFP52, QFP64/TQFP64, QFP80, QFP100/TQFP100
Halogen-Free	YES	
Industrial-Grade	YES	

Sensing range up to ±64g

3-Axis Accelerometers for Industrial Equipment

Kionix®

Ideal for machine condition monitoring of industrial equipment

KX-134-1211 / KX132-1211

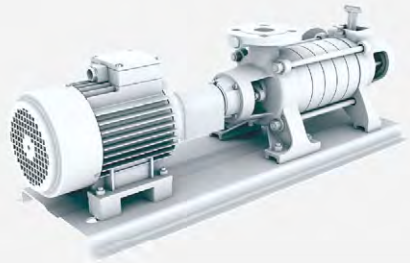
The KX132-1211 features a max. frequency band of 4,200Hz and acceleration detection range from ±2g to ±16g, while the high-grade KX134-1211 expands the frequency band to 8,500Hz and acceleration range from ±8g to ±64g. In addition, unlike conventional products that can operate only up to 85˚C, both models provide stable operation up to 105˚C. The higher operating temperature supports a wider range of frequency and acceleration detection, making them ideal for machine condition monitoring such as motor vibration analysis in industrial equipment.

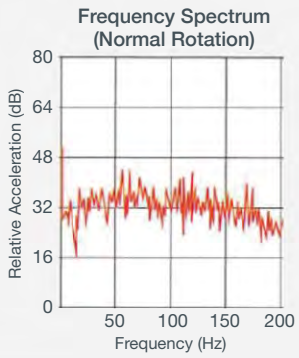
KX132 KX134

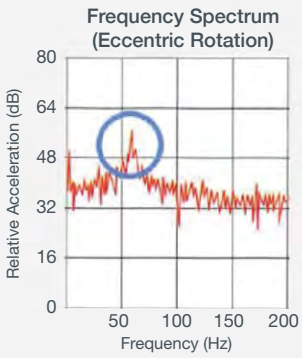
3-Axis Accelerometers for Industrial Equipment Lineup

Part No.	Frequency Band			g Range	Current Consumption	Operating temperature	Package Size (mm), Pin Count
	X Axis	Y Axis	Z Axis				
New KX132-1211	4,200Hz	4,200Hz	2,900Hz	±2g to ±16g	0.67μA (Low) 148μA (High)	−40˚C to +105˚C	2×2×0.9, 12pin
New KX134-1211	8,200Hz	8,500Hz	5,600Hz	±8g to ±64g			

Motor vibration monitoring Detecting abnormal behavior through frequency analysis







Expands the Application Range of 3-Axis Accelerometers in Industrial Equipment

Accelerometer Application Scope

Accelerometer

Gravity

Orientation

Expected Applications
- Smartphones
- Digital Cameras

Inclination

Expected Applications
- Projectors (Trapezoidal correction)

Vibration

Vibration

Expected Applications
- Motors (Abnormal Vibration Monitoring)
- **Active Meters (Pedometers)**

Motion

Expected Applications
- Auto Power ON/OFF (Power-Saving)
- Sports Coaching (Motion Tracking)
- Gaming (Input)

Free-Fall

Expected Applications
- HDD Protection

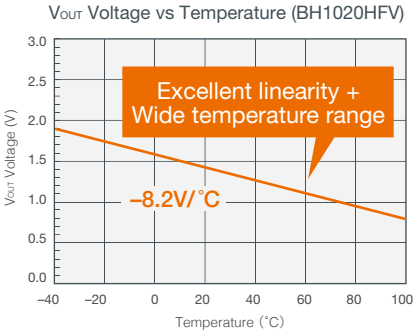
Impact

Impact

Expected Applications
- Surveillance Cameras (Reporting)
- Security Equipment

Temperature Sensor ICs

ROHM offers temperature sensor ICs that integrate a temperature detection element, constant current circuit, and high accuracy reference supply voltage on a single chip. This makes them ideal for virtually any electronic circuit requiring temperature detection.



Feature

BD1020HFV
- Linear response with respect to temperature
- Excellent temperature sensitivity (−8.2mV/°C)
- High accuracy (±1.5°C@Ta=+30°C)
- Low quiescent current (Typ 4.0μA)

BDJxxx0AHFV series
- Thermostat with power down function
- Integrated temperature sensor analog output
- Low current consumption (Typ 7.5μA)

HVSOF5
1.60mm×1.60mm×Max0.60mm

Analog Output Temperature Sensor IC

Part No.	Supply Voltage (V)	Temp. Accuracy (°C)		Temp. Sensitivity (mV/°C)	Output Voltage (V) (Ta=+30°C, VDD=3V)	Current Consumption (μA)	Operating Temp. (°C)	Package
		Ta=+30°C	Ta=−30, +100°C					
BD1020HFV	2.4 to 5.5	±1.5	±2.5	−8.2	1.3	4.0	−30 to +100	HVSOF5

Low Current Thermostat Output Temperature Sensor ICs

Part No.	Supply Voltage (V)	Detection Temp. (°C)	Detection Temp. Accuracy (°C)	Current Consumption (Normal/Power Down) (μA)	Output Topology	Operating Temp. (°C)	Package
BDJxxx0AHFV series	2.4 to 5.5	60/70/80	±2.5	7.5/0.3	Open drain (Active L)	−30 to +100	HVSOF5

Optical Sensors

Infrared LED

Photointerrupters

RPMD-0100
Photodiode

Infrared LED

Photodiode

Package	Part No.	Feature	Visible Light Filter	Absolute Max Rating		Specifications				
				VR (V)	PD(Max) (mW)	Photo Current (μA)	Dark Current (nA)	λP (nm)	tr, tf (ns)	θ1/2 (deg.)
Top View SMD	**RPMD-0100**	Thin and compact	✓	60	30	8	6Max	940	100	60

Infrared LED

Package	Part No.	Feature	Absolute Max Rating	Specifications						
			IF (mA)	IE (mW/sr)	IF(mA)	VF (V)	IF(mA)	λP (nm)	tr, tf (ns)	θ1/2 (deg.)
φ Resin	**SIR-34ST3F**	Ideal for remote control	100	10.5	50	1.3	100	950	1	27
	SIR-341ST3F	Compact, high power	75	18.1	50	1.3	50	940	1	16
φ Resin	**SIR-56ST3F**	Ideal for remote control	100	15.0	50	1.3	100	950	1	15
	SIR-563ST3F	Ideal for remote control	100	21.0	50	1.34	50	940	1	15
	SIR-568ST3F	High speed LED for optical communication	100	38.0	50	1.6	50	850	fc=50MHz	13
Side View Resin	**SIM-20ST**	General molded type	50	7.5	50	1.3	50	950	1	15
	SIM-22ST	General molded type	50	0.8	10	1.3	50	950	1	30
Top View SMD	**SIM-030ST**	Low-profile (0.9mm)	100	25.0	100	1.7	100	870	0.1	20
	SIM-040ST	High output	100	40.0	100	1.7	100	870	0.1	20

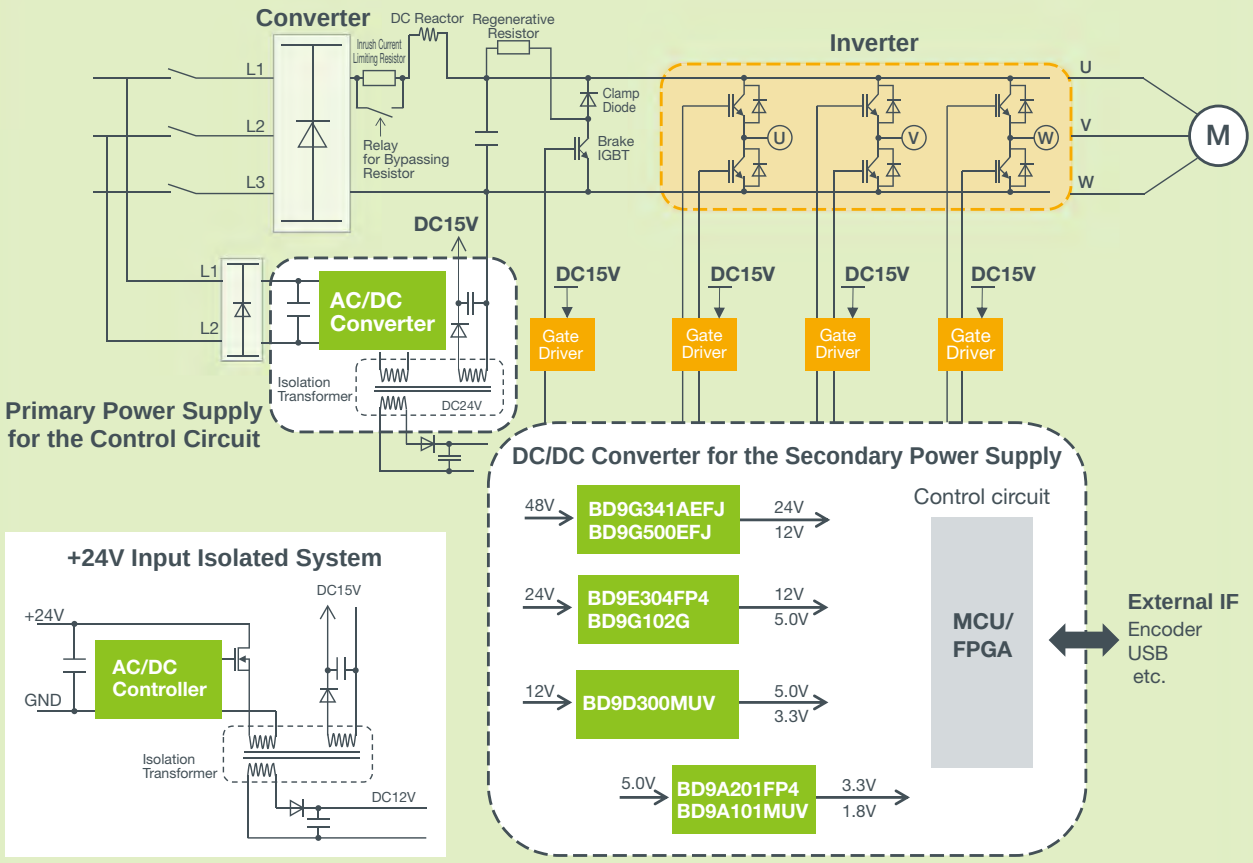
Transmission-Type Photointerrupters – Linear Phototransistor Output

Package	Appearance	Part No.	Specifications					
			Gap Width (mm)	Slit Width (mm)	IC (mA)	VCE (V)	IF(mA)	tr, tf (ns)
Ultra-Compact SMD		**RPI-0125**	1.2	0.3	0.45Min 4.95Max	5.0	20	10
Compact SMD		**RPI-0226**	2.0	0.3	0.1Min	5.0	5	50
Wide Gap, Power Saving, High Efficiency SMD		**RPI-0352E**	3.0	0.4	0.18Min	5.0	10	10
		New **RPI-0451E**	4.5	0.5	0.16Min	5.0	10	10
Ultra-Compact Leaded Type		**RPI-122**	0 .8	0.25	0.18Min 1.08Max	0.7	3	10
		**RPI-121**	0.8	0.4	0.7Min	5.0	20	10
		**RPI-125**	1.2	0.3	0.45Min 4.95Max	5.0	20	10
Leaded Type		**RPI-221**	2.3	0.4	0.2Min	5.0	20	10
		**RPI-222**	2.0	0.2	0.18Min 0.95Max	5.0	10	10
		**RPI-243**	2.0	0.4	0.5Min	5.0	20	10
		**RPI-246**	2.0	0.2	0.35Min 1.2Max	5.0	20	10
Wide Gap Leaded Type		**RPI-352**	3.0	0.4	0.2Min	5.0	20	10
		**RPI-441C1**	4.0	0.5	0.2Min	5.0	20	10
Wide Gap, Power Saving, High Efficiency Leaded Type		**RPI-441C1E**	4.0	0.5	0.2Min	5.0	10	10

VOLTAGE REGULATOR

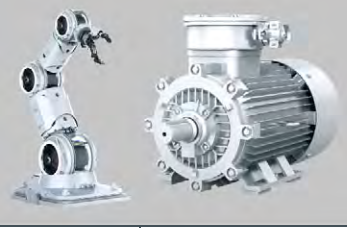
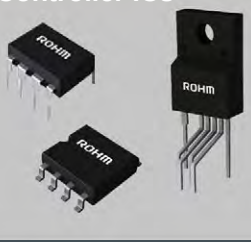
Motor control requires an accurate, stable supply of power. As a comprehensive power systems supplier, ROHM offers total solutions that leverage power device and power supply control technologies.

Control Power Supply Block Diagram



+24V Input Isolated System

Power Device by Application Primary Power Supply

Application		Controller ICs	Discrete	Diode Shunt Resistor
				
DC24V DC48V	AC Servos Robots	●Isolated (AC/DC) Controllers	●MOSFET 40V, 60V, 100V	〈Diodes〉 ●Schottky Barrier Diodes ●Fast Recovery Diodes ●Zener Diodes 〈Resistors〉 ●High Output Chip Resistors LTR series (Wide Terminal Type) ●Anti-Surge Chip Resistors ESR series ●High Voltage Chip Resistors KTR series
AC100V AC240V	AC Servos AC Drives Pumps Fans Production Equipment	●AC/DC Converter with Built-in 650V MOSFET ●Isolated AC/DC Controller	●MOSFET 650V, 800V	
AC400V	AC Drives AC Servos Machine Tools	●AC/DC Converter with Built-in 800V MOSFET ●Isolated AC/DC Controller	●IGBT ●SiC MOSFET ●SiC SBD	
AC690V	AC Drives	●AC/DC Converters with Built-in 1,700V SiC MOSFET ●Isolated AC/DC Controller	●IGBT 40A, 80A	

Application Support Tools

〈Total Design Support〉
- ●Reference Design
- ●Custom Circuit Support
- ●Transformer Design Support
- ●Integrated Design Support from AC/DC to DC/DC

〈Test Support〉
- ●Electrical Characteristics Support

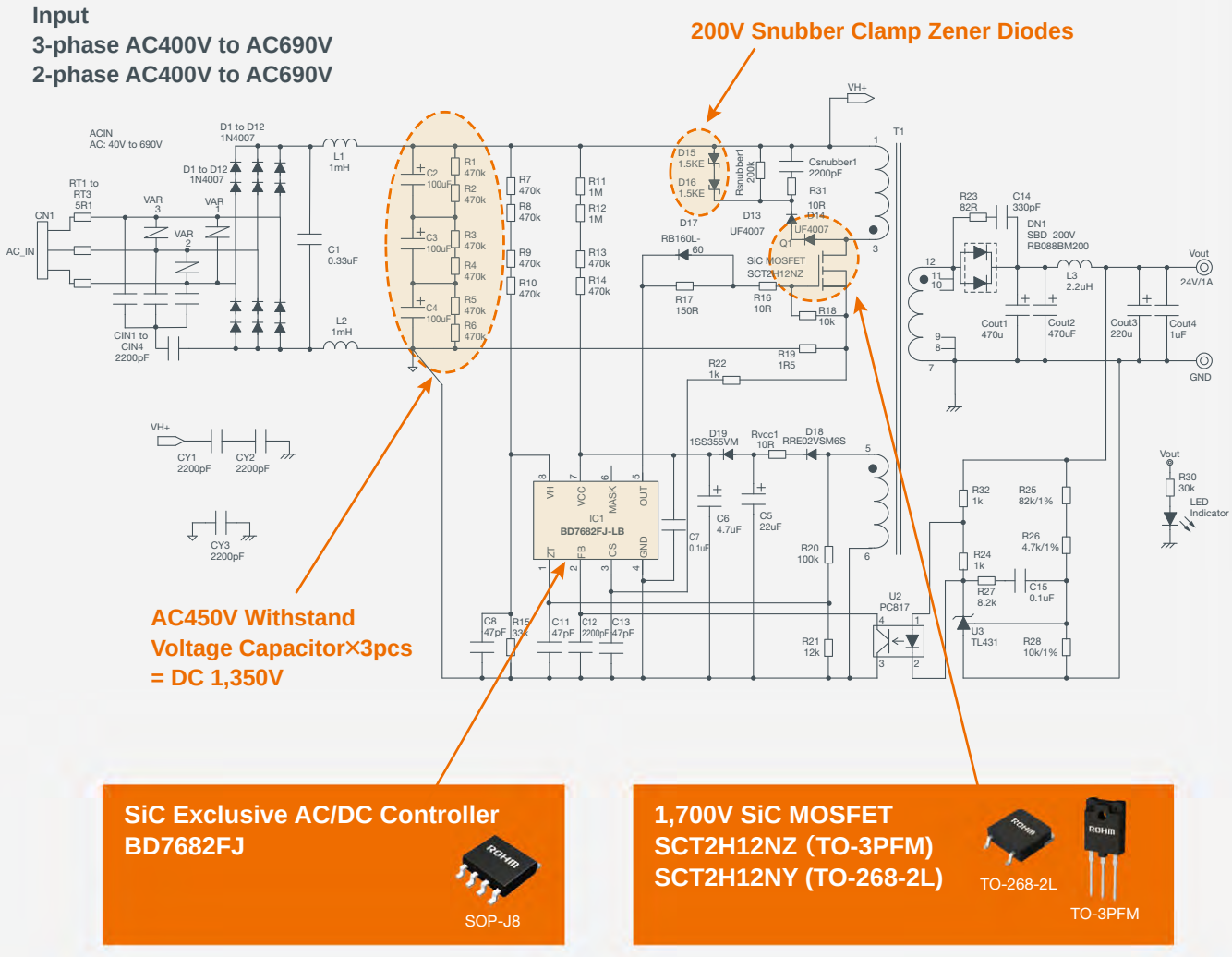
3m method EMI room

High Voltage Primary Power Supply IC series for AC400V to AC690V Control Power Supplies

ROHM has achieved a total solution that combines a primary power supply circuit utilizing a 1,700V high-speed low $R_{DS(on)}$ SiC MOSFET with a dedicated controller. This solution is available with or without a built-in SiC MOSFET, providing worldwide applicability. An evaluation kit and application notes are also offered that facilitate customer set design.

AC400V to AC690V Input Compatible
Primary Power Supply Reference Design Utilizing a 1,700V SiC MOSFET + SiC-Dedicated AC/DC Controller Reference Design
(AC400V/AC690V Input AC/DC Reference Board BD7682FJ-LB EVK-402)

Input
3-phase AC400V to AC690V
2-phase AC400V to AC690V



1,700V SiC Solutions for Primary Power Supplies

1,700V SiC MOSFETs

SiC MOSFET developed exclusively for industrial auxiliary power supplies

TO-268-2L

TO-3PFM

Package	Part No.	$R_{DS(on)}$	I_D (A)
TO-268-2L	SCT2750NY	0.75Ω	5.9
TO-268-2L	SCT2H12NY	1.15Ω	4
TO-3PFM	SCT2H12NZ	1.15Ω	3.7

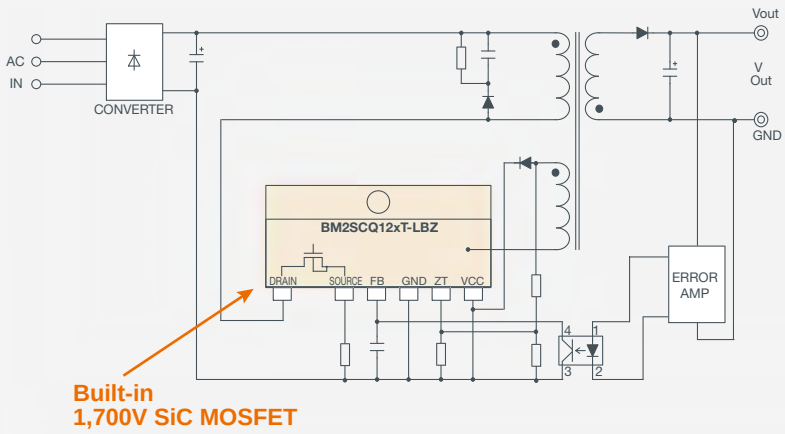
SiC Dedicated AC/DC Controllers BD768xFJ-LB series

AC/DC controller series optimized for high voltage input and SiC drive

SOP-8

Part No.	FBOLP Protection	V_{CC} OVP Protection
BD7682FJ-LB	Self-restart	Latch
BD7683FJ-LB	Latch	Latch
BD7684FJ-LB	Self-restart	Self-restart
BD7685FJ-LB	Latch	Self-restart

AC/DC Converters with Built-in 1,700V SiC MOSFET: BM2SCQ12xT-LBZ series



AC/DC converter integrates a 1,700V SiC MOSFET and SiC-dedicated controller

TO-220-6M

Part No.	FBOLP Protection	V_{CC} OVP Protection
BM2SCQ121T-LBZ	Self-restart	Latch
BM2SCQ122T-LBZ	Latch	Latch
BM2SCQ123T-LBZ	Self-restart	Self-restart
BM2SCQ124T-LBZ	Latch	Self-restart

AC400V/AC690V Input AC/DC Reference Board

Application notes and AC400V/AC690V input primary power supply evaluation boards are offered.

BM2SCQ123T-EVK-001
Input
3Phase AC300V to AC690V
(DC 900V)
Output 24V/2A

BD7682F-LB-EVK-401/402
Input
3Phase AC300V to AC690V
(DC 900V)
Output 24V/1A

Medium Voltage Primary Power Supply IC series for AC100V to AC240V Control Power Supplies

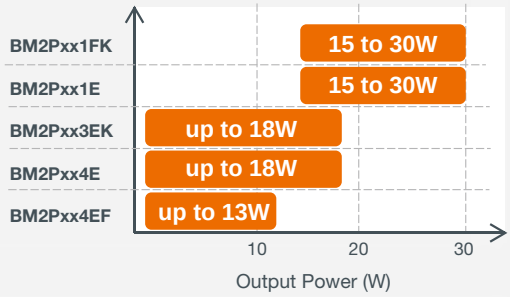
AC/DC Converter series with Built-in 650V/800V SiC MOSFET

ROHM offers AC/DC converter ICs with integrated 650V/800V MOSFET ideal for auxiliary power supply circuits that provide control of industrial equipment connected to commercial power supplies (AC100V to AC240V). Users can select between standard and industrial grade products. In addition, evaluation boards are available, developed utilizing ROHM's considerable experience and expertise.

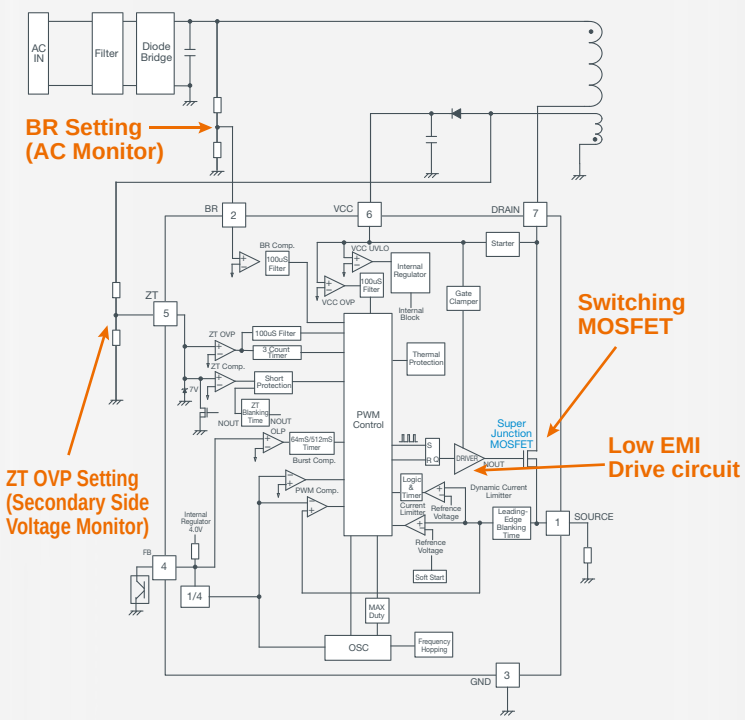
Features

1. Input AC voltage monitor (VH UVLO, OVP)
2. High accuracy secondary overvoltage protection (ZT OVP)
3. Current sense resistor open/short protection
4. Dynamic overcurrent limiter (2-pulse)
5. Optimized drive circuit reduces EMI
   LB grade guaranteed for 10 years or more

Lineup



IC Internal Block Diagram (Brief application circuit)



AC/DC Converter Lineup

Part No.	MOSFET		Oscillation Frequency (kHz)	BR		ZT OVP	Package
	V_{DS} (V)	$R_{DS(on)}$ (Ω)		UVLO	OVP		
BM2P0161/K	650/800	1/1.6	65	—	—	—	DIP7K
BM2P0361/0362	650	3	65	—	—	—	DIP7K
BM2P0163T	650	3	65	—	—	—	TO220-7M
BM2P061E/FK	650/800	0.96/1.6	65	YES	—	YES	DIP7AK
BM2P101E/FK	650/800	0.96/1.6	100	YES	—	YES	DIP7AK
BM2P131E/FK	650/800	0.96/1.6	130	YES	—	YES	DIP7AK
BM2P061H/HK	650/800	0.96/1.6	65	YES	YES	YES	DIP7AK
BM2P101H/HK	650/800	0.96/1.6	100	YES	YES	YES	DIP7AK
BM2P131H/HK	650/800	0.96/1.6	130	YES	YES	YES	DIP7AK
BM2P064E/063EK	650/800	3/3.5	65	YES	—	YES	DIP7AK
BM2P104E/103EK	650/800	3/3.5	100	YES	—	YES	DIP7AK
BM2P134E/133EK	650/800	3/3.5	130	YES	—	YES	DIP7AK
BM2P064EF/EKF	650/800	3/3.5	65	YES	—	YES	SOP8
BM2P104EF/EKF	650/800	3/3.5	100	YES	—	YES	SOP8
BM2P134EF/EKF	650/800	3/3.5	130	YES	—	YES	SOP8
BM2P064H/063HK	650/800	3/3.5	65	YES	YES	YES	DIP7AK
BM2P104H/103HK	650/800	3/3.5	100	YES	YES	YES	DIP7AK
BM2P134H/133HK	650/800	3/3.5	130	YES	YES	YES	DIP7AK
BM2P064HF/HKF	650/800	3/3.5	65	YES	YES	YES	SOP8
BM2P104HF/HKF	650/800	3/3.5	100	YE	YES	YES	SOP8
BM2P134HF/HKF	650/800	3/3.5	130	YESS	YES	YES	SOP8

Control ICs for AC100V to AC240V, DC24V to DC48V Power Supplies

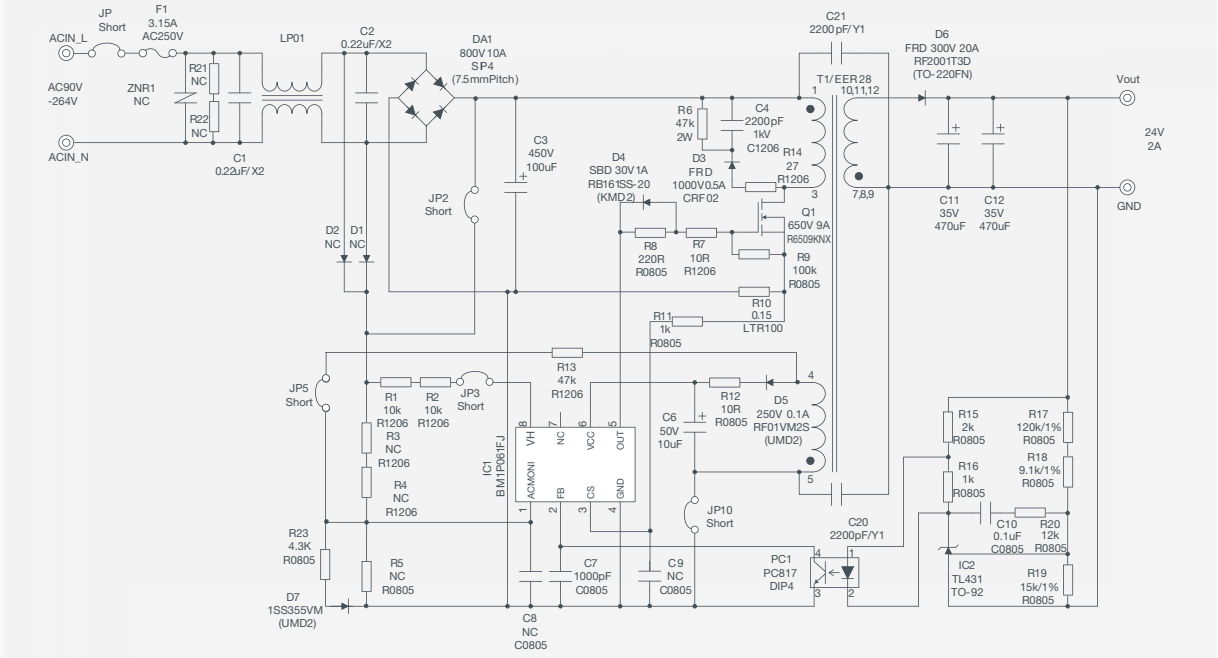
External MOSFET Type AC/DC Controller series

Isolation control ICs are widely used for commercial (AC100V to AC240V) and DC24V to DC48V power supplies. Users can configure isolated switching power supply circuits based on the input voltage of auxiliary power supplies by selecting form among low voltage MOSFETs in the case of DC24V/48V, or 650V/800V MOSFETs for commercial AC voltage input.

Features

1. Lineup includes 65kHz, 100kHz PWM, and QR (quasi-resonant) types
2. BR pin (AC voltage monitor) [applicable models only]
3. High accuracy secondary side overvoltage protection (ZT OVP) [applicable models only]
4. Current sense resistor open/short protection
5. Quasi-resonant noise prevention function (QR skip control) circuit

AC100V to AC240V Input 24V/2A Output PWM/QR Common Application Diagram



PWM/QR AC/DC Controller series

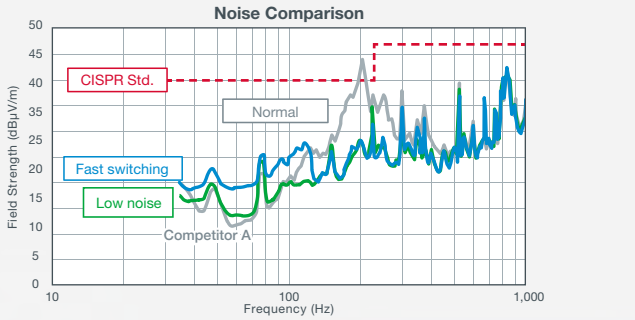
Part No.	POWER (Standard)	Startup Circuit	FET	Control		V_{CC} (V)			Brown Out		ZT OVP	Package
			$R_{DS(on)}$	Mode	Freaquency	Min	Max	OVP Protection	UVLO	OVP		
BD7672BG	MOS Dependent	External	Outside	PWM	65kHz	8.5	25	Latch	—	—	—	SSOP6
BD7673AG	MOS Dependent	External	Outside	PWM	65kHz	8.5	25	Latch	—	—	—	SSOP6
BD7679G	MOS Dependent	External	Outside	PWM	65kHz	8.5	25	Auto Restart	—	—	—	SSOP6
BM1P061FJ	MOS Dependent	Built-in	Outside	PWM	65kHz	8.9	26	Auto Restart	YES	—	—	SOP-J8
BM1P062FJ	MOS Dependent	Built-in	Outside	PWM	65kHz	8.9	26	Latch	YES	—	—	SOP-J8
BM1P065FJ	MOS Dependent	Built-in	Outside	PWM	65kHz	8.9	26	Auto Restart	YES	—	—	SOP-J8
BM1P066FJ	MOS Dependent	Built-in	Outside	PWM	65kHz	8.9	26	Latch	YES	—	—	SOP-J8
BM1P067FJ	MOS Dependent	Built-in	Outside	PWM	65kHz	8.9	26	Auto Restart	—	—	—	SOP-J8
BM1P068FJ	MOS Dependent	Built-in	Outside	PWM	65kHz	8.9	26	Latch	—	—	—	SOP-J8
BM1P101FJ	MOS Dependent	Built-in	Outside	PWM	100kHz	8.9	26	Auto Restart	YES	—	—	SOP-J8
BM1P102FJ	MOS Dependent	Built-in	Outside	PWM	100kHz	8.9	26	Latch	YES	—	—	SOP-J8
BM1P105FJ	MOS Dependent	Built-in	Outside	PWM	100kHz	8.9	26	Auto Restart	YES	—	—	SOP-J8
BM1P107FJ	MOS Dependent	Built-in	Outside	PWM	100kHz	8.9	26	Auto Restart	—	—	—	SOP-J8
BM1P10CFJ	MOS Dependent	Built-in	Outside	PWM	100kHz	9.3	55	—	—	—	Latch	SOP-J8
BM1Q002FJ	MOS Dependent	Built-in	Outside	QR	120kHz	8.9	26	Latch	—	—	Latch	SOP-J8
BM1Q011FJ	MOS Dependent	Built-in	Outside	QR	120kHz	8.9	26	Auto Restart	—	—	—	SOP-J7S
BM1Q021FJ	MOS Dependent	Built-in	Outside	QR	120kHz	8.9	26	Auto Restart	—	—	Auto Restart	SOP-J8
BM1Q104FJ	MOS Dependent	Built-in	Outside	QR	111kHz	14	30	—	—	—	Latch	SOP-J8

For Primary Power Supplies

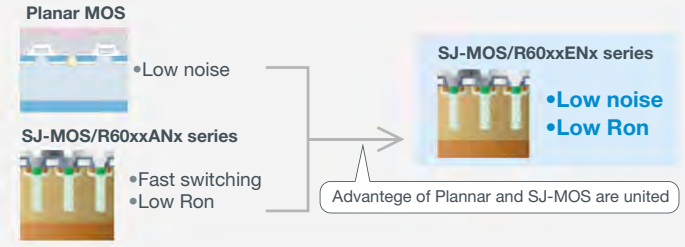
Power MOSFETs

ROHM develops medium power MOSFETs that focuses on 3 aspects (PrestoMOS™): low noise, high-speed switching, and fast recovery. ROHM PrestoMOS™ is ideal for motor drive. Low noise, high-speed switching 650V/800V MOSFETs are typically used to configure primary power supplies. Solutions that meet customer needs are available, tailored to each application.

Low Noise Type R6500ENX series 650V MOSFETs



Features



Low noise type R65xxENx series

Package	Part No	V_{DSS} (V)	I_D (A)	$R_{DS(on)}$ (Ω) V_{GS}=10V Typ	$R_{DS(on)}$ (Ω) V_{GS}=10V Max	Qg (nC) V_{GS}=10V Typ
TO-252 〈DPAK〉	R6502END3	650	1.7	3	3.3	6.5
	R6504END3		4	0.955	1.05	15
	R6507END3		7	0.605	0.665	20
	R6509END3		9	0.53	0.585	24
	R6511END3		11	0.36	0.4	32
TO-263 (LPTS)	R6504ENJ	650	4	0.955	1.05	15
	R6507ENJ		7	0.605	0.665	20
	R6509ENJ		9	0.53	0.585	24
	R6511ENJ		11	0.36	0.4	32
	R6515ENJ		15	0.28	0.315	40
	R6520ENJ		20	0.185	0.205	61
	R6524ENJ		24	0.16	0.185	70
(TO220FM)	R6504ENX	650	4	0.955	1.05	15
	R6507ENX		7	0.605	0.665	20
	R6509ENX		9	0.53	0.585	24
	R6511ENX		11	0.36	0.4	32
	R6515ENX		15	0.28	0.315	40
	R6520ENX		20	0.185	0.205	61
	R6524ENX		24	0.16	0.185	70
	R6530ENX		30	0.125	0.14	90
TO-247AD (TO-247)	R6520ENZ4	650	20	0.185	0.205	61
	R6524ENZ4		24	0.16	0.185	70
	R6530ENZ4		30	0.125	0.14	90
	R6535ENZ4		35	0.098	0.115	110
	R6547ENZ4		47	0.07	0.08	150
	R6576ENZ4		76	0.04	0.046	260

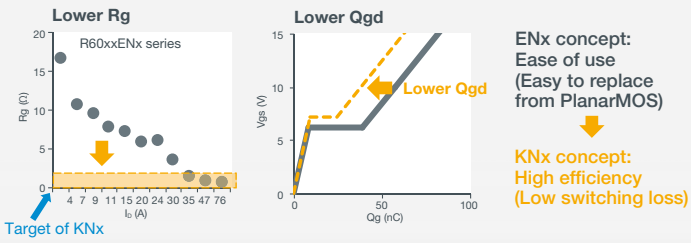
Note: Indicates the JEDEC package notation. ( ): ROHM Package, 〈 〉: GENERAL Code.

High-Speed Switching Type R6500KNX series 650V MOSFETs, R8000KNX series 800V MOSFETs

Features

2nd generation SJ-MOS ENx
•Low A*Ron •Low Noise

2nd generation SJ-MOS KNx
•Low A*Ron •Fast switching



Fast switching type R65xxKNx series

Package	Part No.	V_{DSS} (V)	I_D (A)	$R_{DS(on)}$ (Ω) V_{GS}=10V Typ	$R_{DS(on)}$ (Ω) V_{GS}=10V Max	Qg (nC) V_{GS}=10V Typ
TO-252 〈DPAK〉	R6504KND3	650	4	0.955	1.05	10
	R6507KND3		7	0.605	0.665	14.5
	R6509KND3		9	0.530	0.585	16.5
	R6511KND3		11	0.360	0.400	22
	R6504KNJ		4	0.955	1.05	10
TO-263 (LPTS)	R6507KNJ	650	7	0.605	0.665	14.5
	R6509KNJ		9	0.530	0.585	16.5
	R6511KNJ		11	0.360	0.400	22
	R6515KNJ		15	0.280	0.315	27.5
	R6520KNJ		20	0.185	0.205	40
	R6524KNJ		24	0.160	0.185	45
(TO220FM)	R6504KNX	650	4	0.955	1.05	10
	R6507KNX		7	0.605	0.665	14.5
	R6509KNX		9	0.530	0.585	16.5
	R6511KNX		11	0.360	0.400	22
	R6515KNX		15	0.280	0.315	27.5
	R6520KNX		20	0.185	0.205	40
	R6524KNX		24	0.160	0.185	45
	R6530KNX		30	0.125	0.140	56
TO-247AD (TO-247)	R6520KNZ4	650	20	0.185	0.205	40
	R6524KNZ4		24	0.160	0.185	45
	R6530KNZ4		30	0.125	0.140	56
	R6535KNZ4		35	0.098	0.115	72
	R6547KNZ4		47	0.070	0.080	100
	R6576KNZ4		76	0.040	0.046	165

Note: Indicates the JEDEC package notation. ( ): ROHM Package, 〈 〉: GENERAL Code.

Fast switching type R80xxKNX series

Package.	Part No.	I_D (A)	$R_{DS(on)}$ (Ω) V_{GS}=10V Typ	$R_{DS(on)}$ (Ω) V_{GS}=10V Max
TO-252 〈DPAK〉	New R8001KND3	0.8	7.200	8.700
	New R8002KND3	1.6	3.500	4.200
	New R8003KND3	3	1.500	1.800
	New R8006KND3	6	0.750	0.900

Package	Part No.	I_D (A)	$R_{DS(on)}$ (Ω) V_{GS}=10V Typ	$R_{DS(on)}$ (Ω) V_{GS}=10V Max
(TO220FM)	New R8002KNX	1.6	3.500	4.200
	New R8003KNX	3	1.500	1.800
	New R8006KNX	6	0.750	0.900
	New R8009KNX	9	0.500	0.600
	New R8011KNX	11	0.370	0.450
	☆ R8019KNX	19	0.200	0.240
TO-247AD (TO-247)	☆ R8011KNZ4	11	0.370	0.450
	☆ R8019KNZ4	19	0.200	0.240
	☆ R8052KNZ4	52	0.067	0.080

Note: Indicates the JEDEC package notation. ( ): ROHM Package, 〈 〉: GENERAL Code. ☆: Under Development

Note: "Presto MOS" is a trademark or a registered trademark of ROHM Co., Ltd.

For Secondary Side Rectification

Power Schottky Barrier Diodes

High-speed switching, low recovery current, low V_F diodes are ideal for the secondary side output AC/DC converters. Schottky barrier diodes feature no PN junction, significantly reducing recovery time. Although this makes them close to the ideal diode, silicon FRDs have been conventionally used due to issues related to breakdown voltage and leakage. ROHM's new Schottky barrier diodes expand the scope for secondary rectification applications by utilizing a high breakdown voltage, low-leakage structure that achieves close-to-ideal characteristics.

200V Power Schottky Barrier Diodes

Features

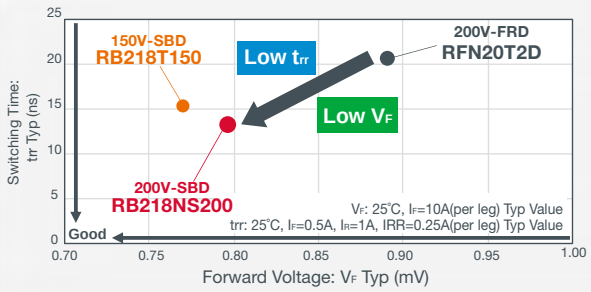
- Achieved 200V V_{RM} by developing high voltage process that complement FRD region.
- Proposed to high efficiency for switching power supplies by low V_F, short switching time which is SBD feature.

Applications

- switching power supplies (secondary side rectification)
- DC/DC converters
- LED lightning

TO-252 〈DPAK〉

TO-263S 〈D2PAK〉



Line up

Part No.	status	Package	Absolute Max Rating (T_C=25°C)				Electrical Characteristics (T_j=25°C)				Equivalent Circuit Diagram
			V_{RM}	I_o	I_{FSM}	T_j Max	V_F Max	cond	I_R Max	cond	
RB088BM200	MP	TO-252 〈DPAK〉	200V	5A×2	TBD	150°C	0.86V	I_F=5A	8μA	V_R=200V	
RB218BM200	MP			10A×2	TBD	150°C	0.86V	I_F=10A	15μA		
RB088NS200	MP	TO-263S 〈D2PAK〉		5A×2	TBD	150°C	0.86V	I_F=5A	8μA		
RB218NS200	MP			10A×2	TBD	150°C	0.86V	I_F=10A	15μA		

Note: Indicates the JEDEC package notation. 〈 〉: GENERAL Code.

High Efficiency Power Schottky Barrier Diodes

Features

- Original trench MOS barrier structure achieves 70% reduction of reverse leakage current white keeping low forward voltage that provide stable switching operation in high temperature environment.

Applications

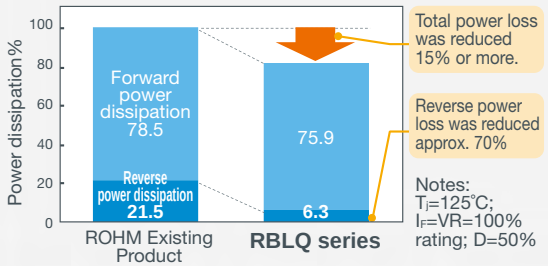
- Secondary rectification for switching power supply (e.g., AC/DC adapters, DC/DC converters), freewheeling and reverse polarity protection.

Specs

	RBLQ10RSM10	RBLQ10BM10	RBLQ20NL10C
Package	TO-277	TO-252	TO-263L
Principal Ratings	V_{RM}=100V I_O=10A	V_{RM}=100V I_O=10A	V_{RM}=100V I_O=20A (10Ax2)
Electrical Characteristics (T_j=25°C)	V_F=0.73V Max (at I_F=10A) I_R=100μA Max (at V_R=100V)	V_F=0.73V Max (at I_F=10A) I_R=100μA Max (at V_R=100V)	V_F=0.73V Max (at I_F=10A;per leg) I_R=100μA Max (at V_R=100V;per leg)
Electrical Characteristics (T_j=125°C)	V_F=0.68V Max (at I_F=10A) I_R=20mA Max (at V_R=100V)	V_F=0.68V Max (at I_F=10A) I_R=20mA Max (at V_R=100V)	V_F=0.68V Max (at I_F=10A;per leg) I_R=20mA Max (at V_R=100V;per leg)
Engineering Sample	● In preparation	● In preparation	● Jan.2020
Commercial Sample	Jan.2021	Jan.2021	Oct.2020
Production	These parts are plans production sequentially from march 2021.		

Note: Part number, specs and production schedule are subject to change without prior notice due to that products are under development.

Power dissipation simulation of high temperature switching



TO-277 6.5×4.3×1.1mm

TO-252 6.5×4.3×1.1mm

TO-263L 6.5×4.3×1.1mm

Remarks

We seriously consider your request:
-Bare wafer supply -Other packages
-Bare chip supply -Other current ratings
For details, please contact our sales.

Constant Voltage Regulators and Surge Absorption Diodes for Secondary Power Supplies

Constant voltage power supply devices are essential semiconductor components for power supplies. As such, LDO regulators developed as series regulator ICs and Zener diodes that can create constant voltage with a high degree of freedom are offered. Zener diodes, which are typically used for voltage clamping and surge absorption, have evolved to dedicated TVS diodes. Please consider ROHM Zener diodes for constant current and surge absorption applications.

LDO Regulator Lineup

Package	HVSOF5		HVSOF6		SSOP5 (SOT-23-5)		HTSOP-J8		TO252-3	
Dimmension (T×W×H) mm	1.6×1.6×0.6mm		1.6×3.0×0.75mm		2.9×2.8×1.25mm		4.9×6.0×1.0mm		6.5×9.5×2.5mm	
Rated Input Voltage	Output Voltage (Vo)	Output Current (Io)	Output Voltage (Vo)	Output Current (Io)	Output Voltage (Vo)	Output Current (Io)	Output Voltage (Vo)	Output Current (Io)	Output Voltage (Vo)	Output Current (Io)
45V									1.2V to 16V	0.5A
45V							3.3V, 5V	0.2A	3.3V, 5V	0.5A, 0.2A
35V							3V to 15V	1A	3V to 16V	1A, 0.5A
30V					5V	0.1A	3V to 12V	0.1A		
18V									1.5V to 10V	1A
15V							1.5V to 1.2V	1A, 0.5A, 0.3A		
10V							1.5V to 7V	1.5A, 1A, 0.5A, 0.3A		
7V			0.8V to 4.5V	1A			0.8V to 4.5V	1A, 0.5A	1V to 3.3V	0.5A
6.5V	1.5V to 3.4V	0.2A	1.5V to 3.4V	0.3A	1.8V to 3.3V	0.5A				
6.5V	1.2V to 3.3V	0.15A			1.0V to 3.4V	0.2A				

Zener Diode Lineup

Features

- Broad package lineup
- High reliability automotive-grade products offered

SOD-123FL (PMDU) 3.5×1.6×0.8mm

SOD-128 (PMDTM) ⟨SMAF⟩ 4.7×2.5×0.95mm

DO-214AC (PMDS) ⟨SMA⟩ 5.0×2.6×2.0mm

Series	Package	Peak Pulse Power	Circuit	Vz rank
KDZV	SOD-123FL (PUMU)	1W	Single	2.0 2.2 2.4 2.7 3.0 3.3 3.6 3.9 4.3 4.7 5.1 5.6 6.2 6.8 7.5 8.2 9.1 10 11 12 13 15 16 18 20 22 24 27 30 33 36
KDZLV	SOD-123FL (PMDU)	1W	Single	39 43 47 51 56 62 68 75 82 91 100 110 120 130 150
PDZV	SOD-128 (PMDTM) ⟨SMAF⟩	1W	Single	2.0 2.2 2.4 2.7 3.0 3.3 3.6 3.9 4.3 4.7 5.1 5.6 6.2 6.8 7.5 8.2 9.1 10 11 12 13 15 16 18 20 22 24 27 30 33 36
PTZ	DO-214AC (PMDS) ⟨SMA⟩	1W	Single	2.0 2.2 2.4 2.7 3.0 3.3 3.6 3.9 4.3 4.7 5.1 5.6 6.2 6.8 7.5 8.2 9.1 10 11 12 13 15 16 18 20 22 24 27 30 33 36

Low noise high reliability products added to the lineup (1W)

Note: Indicates the JEDEC package notation. ( ): ROHM Package, ⟨ ⟩: GENERAL Code.

TVS Lineup

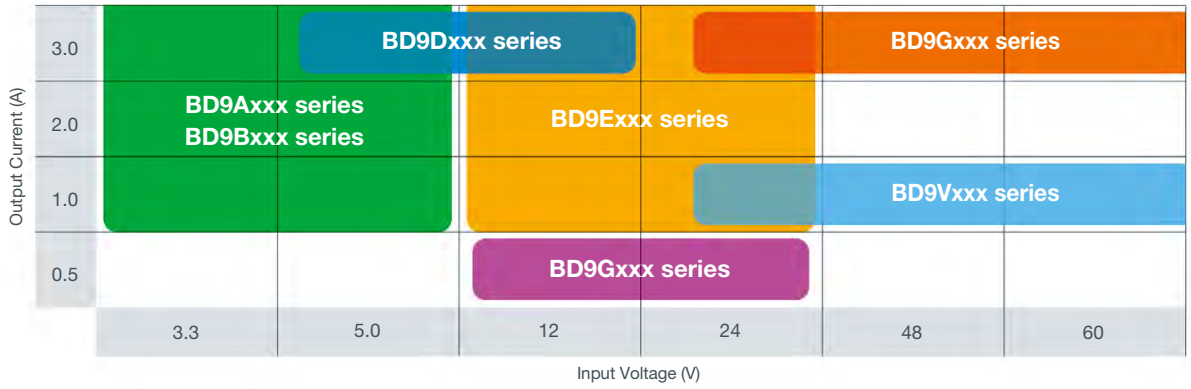
Part No.	Package	Peak Pulse Power (10/1000μs)	Circuit	V_{RWM} (V)
SMFxx	SOD-123FL (PMDU)	200W	Single	3 3.3 4.5 5 6 6.5 7 7.5 8 8.5 9 10 11 12 13 14 15 15 16 17 18 20 22 24 26 28 30 33
VSxxUA1LAM	SOD-128 (PMDTM)	600W	Single	3 3.3 4.5 5 6 6.5 7 7.5 8 8.5 9 10 11 12 13 14 15 15 16 17 18 20 22 24 26 28 30 33

Note: Indicates the JEDEC package notation. ( ): ROHM Package.

Secondary DC/DC Converters

The selection criteria for secondary power supplies is high efficiency voltage conversion in a compact size. However, as efficiency is a trade-off with primary power supplies, and compactness is a trade-off between higher efficiency and lower noise, the overall design requirements are becoming increasingly important. In response, ROHM offers an unprecedented lineup of DC/DC converters that supports the voltage and current requirements of secondary side power supplies to meet the functional and performance needs of each block. At the same time, to meet the varying power supply requirements of industrial motors we provide comprehensive support for primary and secondary power supply blocks.

Product Roadmap

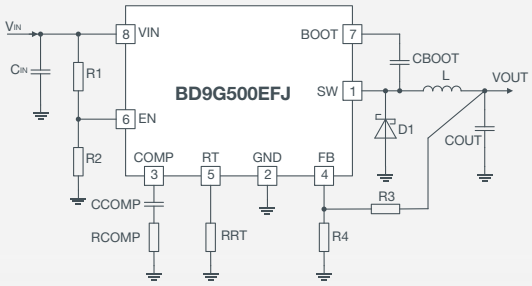


Featured Products

DC/DC for Secondary Side 48V Input Power Supplies

BD9G500EFJ-LA

V_{IN}: 7.0V to 76V
V_O: 1.0V to 0.7×V_{IN}
I_O: 5.0A (Max)
Fsw: 100kHz to 650kHz
$R_{DS(on)}$ HMOS: 100mΩ (Typ)

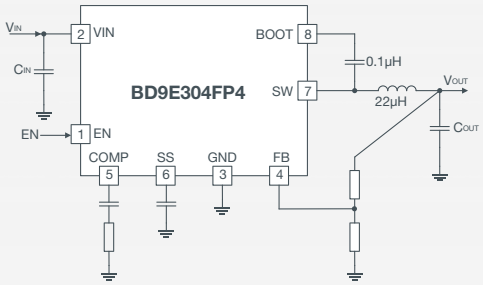


HTSOP-J8
4.9×6.0×1.0mm

DC/DC for Secondary Side 24V Input Power Supplies

BD9E304FP4-LBZ

V_{IN}: 4.5V to 36V
V_O: 1.0V to 0.7×V_{IN}
I_O: 3.0A
Fsw: 300kHz
$R_{DS(on)}$ HMOS: 90mΩ (Typ)
LNMOS: 60mΩ (Typ)

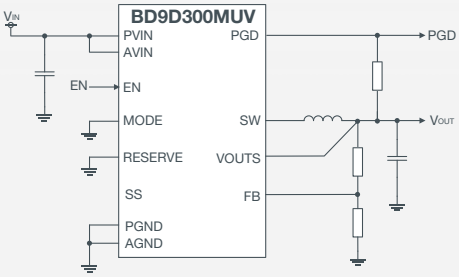


TSOT23-8
2.8×2.9×0.95mm

DC/DC for Secondary Side 12V Power Supplies

BD9D300MUV

V_{IN}: 4.0V to 17V
V_O: 0.9V to 5.25V
Fsw: 1.25MHz (Typ)
I_O: 3A
$R_{DS(on)}$ HMOS: 10mΩ
LMOS: 50mΩ



VQFN016V3030
3.0×3.0×1.0mm
0.5mm PITCH

ROHM Group Locations (Japan)

Sales Offices

Kyoto	Nagoya	Sendai
Tokyo	Matsumoto	Takasaki
Yokohama	Nishi-Tokyo	Utsunomiya

R&D Centers

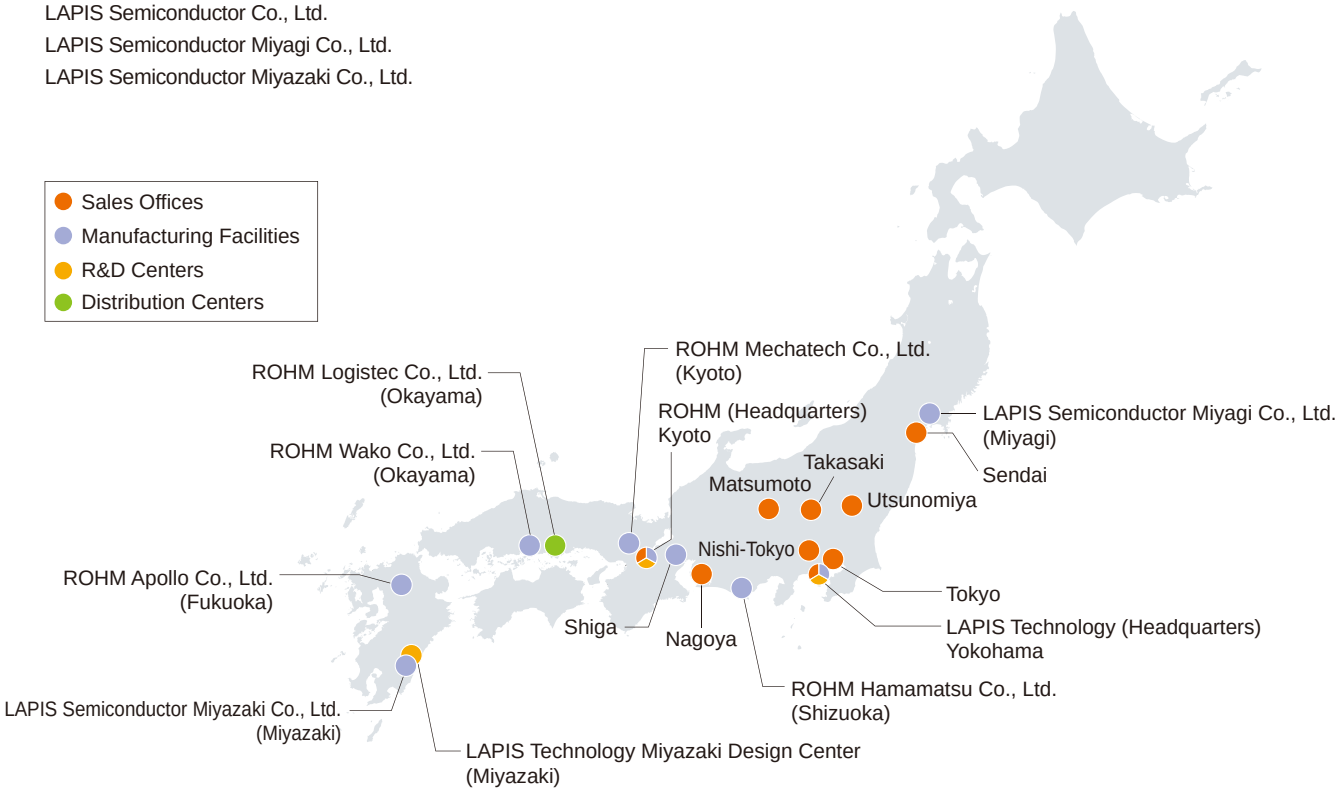
Kyoto Technology Center (Head Office)
Kyoto Technology Center (Kyoto Ekimae)
Yokohama Technology Center
LAPIS Technology Co., Ltd.(Shin-Yokohama)
LAPIS Technology Miyazaki Design Center

Manufacturing Facilities

ROHM Co., Ltd.
Shiga Plant
ROHM Hamamatsu Co., Ltd.
ROHM Wako Co., Ltd.
ROHM Apollo Co., Ltd.
ROHM Mechatech Co., Ltd.
LAPIS Semiconductor Co., Ltd.
LAPIS Semiconductor Miyagi Co., Ltd.
LAPIS Semiconductor Miyazaki Co., Ltd.

Distribution Centers

ROHM Logistec Co., Ltd.



ROHM Group Locations (Global)

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ASIA	ROHM Semiconductor Korea Corporation
	ROHM Semiconductor (Beijing) Co., Ltd.
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	ROHM Semiconductor Hong Kong Co., Ltd.
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	ROHM Semiconductor Malaysia Sdn. Bhd.
	ROHM Semiconductor India Pvt. Ltd.
AMERICA	ROHM Semiconductor U.S.A., LLC
EUROPE	ROHM Semiconductor GmbH

R&D Centers

ASIA	Korea Technical Center
	Beijing Technical Center
	Shanghai Technical Center
	Shenzhen Technical Center
	Taiwan Technical Center
	India Technical Center/India Design Center
AMERICA	Americas Technical Center (Santa Clara)
EUROPE	Europe Technical Center
	Finland Software Development Center

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	ROHM Semiconductor (China) Co., Ltd.
	ROHM Electronics Dalian Co., Ltd.
	ROHM-Wako Electronics (Malaysia) Sdn. Bhd.
	ROHM Mechatech Philippines, Inc.
	ROHM Mechatech (Thailand) Co., Ltd.
AMERICA	Kionix, Inc.
EUROPE	SiCrystal GmbH

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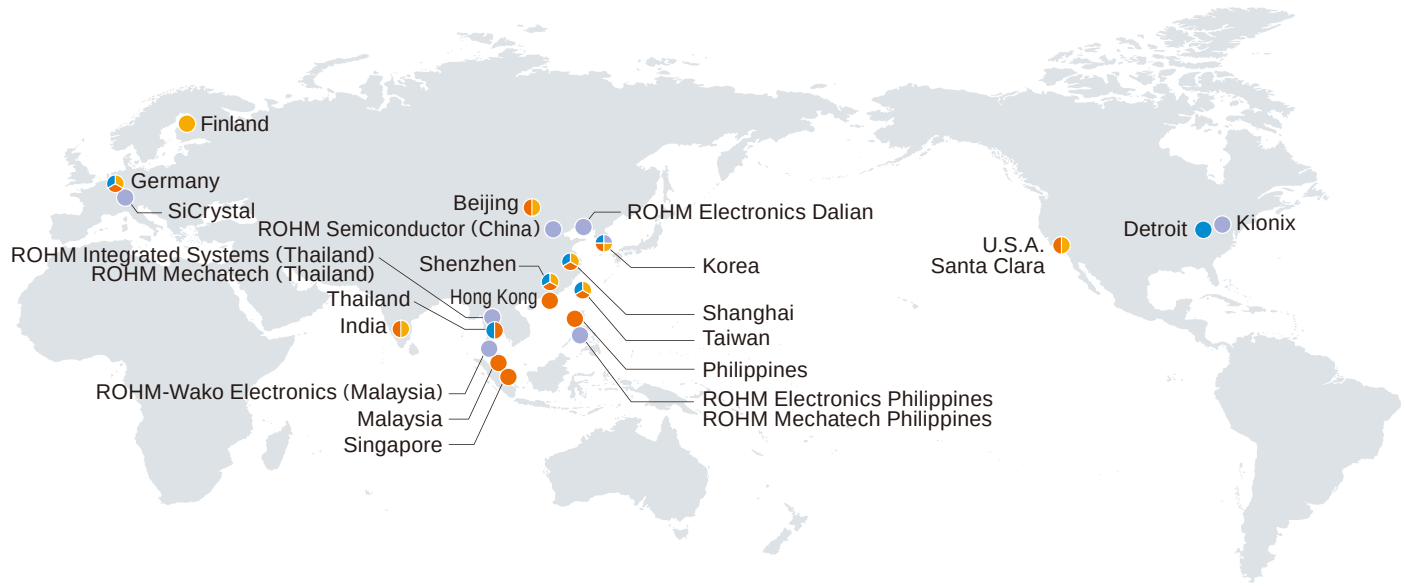
	Shanghai QA Center
	Shenzhen QA Center
	Taiwan QA Center
	Thailand QA Center
AMERICA	Americas QA Center
EUROPE	Europe QA Center



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Catalog No.63P7276E-B 12.2020 PDF

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