

BM2SC12xFP2-LBZ

TO263-7L Package
(10.18 mm × 4.43 mm × 15.5 mm)

ROHM announces the AC/DC converter ICs with a built-in 1700V SiC MOSFET, [BM2SC12xFP2-LBZ](#) in the TO 263-7L package, optimized for [industrial](#) applications focusing on auxiliary power supplies for street lamps, commercial air-conditioning systems, general-purpose inverters and for AC servos drives.

An auxiliary power supply is an essential and vital part of industrial applications to deliver different levels of DC voltages for gate drivers and control units. By applying existing Si MOSFET devices, the designer cannot achieve higher efficiency and increased out power because of the higher losses of Si devices. The existing solutions require a heatsink and additional components which increase both the losses of the devices and also the size of the system by additional space. To design an auxiliary power supply with existing Si devices will also be expensive because of a larger Bill of Material (BOM).

ROHM's BM2SC12xFP2-LBZ power ICs are the Quasi-resonant (QR) AC/DC converters with an integrated 1700V SiC MOSFET in a single compact surface mount package (TO263). These ICs are the right fit and best in class products for industrial auxiliary power supply solutions in terms of efficiency, shortening design time, simplifying the circuitry and reducing additional components by offering integrated solutions. These ICs also increase product reliability by minimizing the risk of component failure.

When used in 400VAC 48W output auxiliary power supplies, besides enabling automatic board mounting that was not previously possible, the number of external parts can be significantly reduced compared with standard configurations – from 12 parts and heat sink to just one.

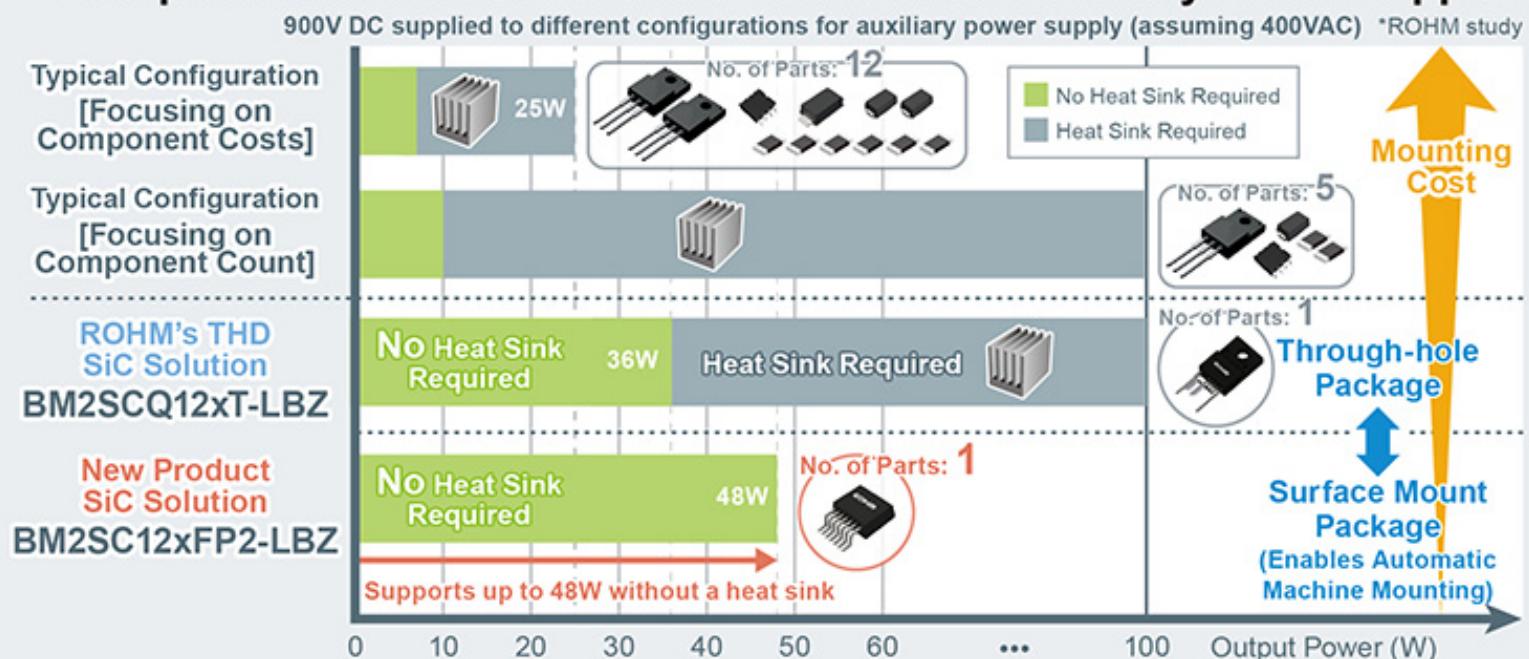
At the same time, adopting a SiC MOSFET improves power efficiency by up to 5% and minimizes the risk of component failure. This makes it possible to dramatically increase reliability and energy savings in industrial equipment while significantly reducing mounting area and costs.

In addition, ROHM's Evaluation board BM2SC123FP2-EVK-001 using our AC/DC BM2SC123FP2-LBZ IC is available to support designers. This board delivers power up to 48W at 400VAC without any heatsink. The test result of the evaluation board shows the output voltage (24V) is constant and independent from input voltage.

ROHM leads the industry in developing ICs that maximize the performance of SiC power semiconductors, including the offering of through-hole package AC/DC converter ICs equipped with a high voltage, low-loss SiC MOSFET in 2019.

ROHM is committed to continuing to develop advanced analog control ICs and power semiconductors, such as SiC devices, while providing optimized solutions that contribute to greater energy savings and performance in industrial equipment.

Comparison of AC/DC Converter Solutions for Auxiliary Power Supplies

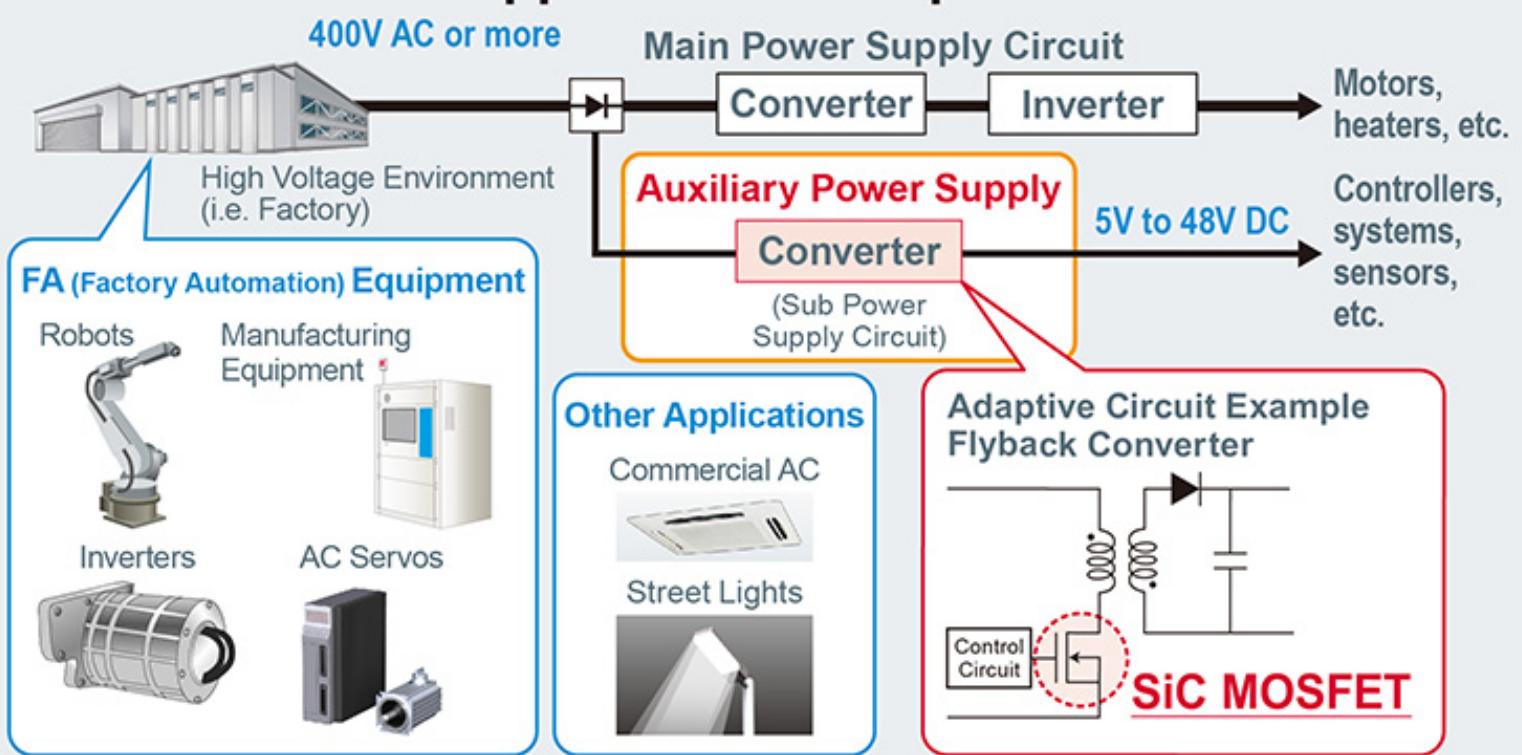


ROHM's new products adopt a surface mount package that reduces both component count and mounting costs

Key Features

The BM2SC12xFP2-LBZ incorporates a 1700V SiC MOSFET along with control circuitry optimized for auxiliary power supplies in industrial equipment (i.e. SiC MOSFET gate drive circuit) in a dedicated package developed specifically for the internal SiC MOSFET. This series offers numerous advantages by providing the following features.

Application Examples



1. The industry's first 48W class surface mount package significantly reduces factory mounting costs

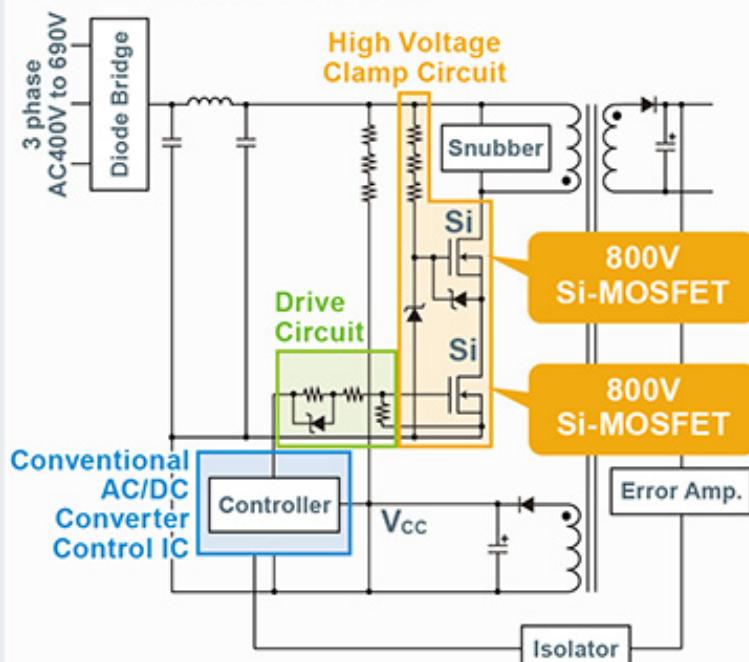
ROHM's new products adopt the TO263-7L surface mount package developed specifically for embedded SiC MOSFETs. Despite its small size, the novel package provides sufficient safety margin (package creepage distance) for handling high power, ensuring support for up to 48W (24V x 2A) output without a heat sink. What's more, enabling automatic board mounting by machine (not possible in the past for products in this range), together with requiring fewer external parts, contributes to significantly reducing assembly costs.

2. Achieves breakthrough miniaturization by replacing 12 components and heat sink with a single product

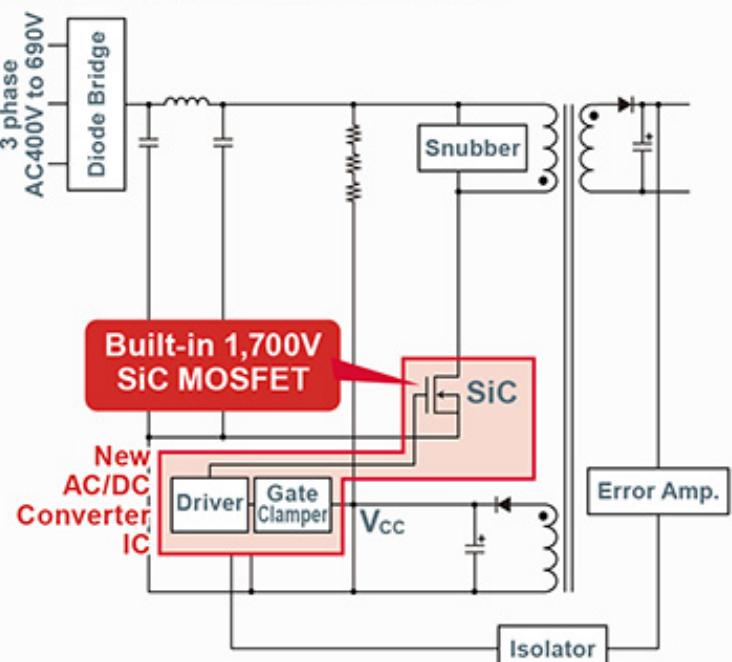
This new product replaces up to 12 components (AC/DC converter IC, 800V SiC MOSFET x 2, Zener diode x 3, resistor x 6) and heat sink utilized for conventional discrete Si MOSFET configurations, dramatically reducing the number of external parts required. In addition, the high withstand voltage and superior voltage noise resistance characteristics of the internal SiC MOSFET make it possible to reduce the size of components used for noise suppression.

Application Circuit and Adoption Results

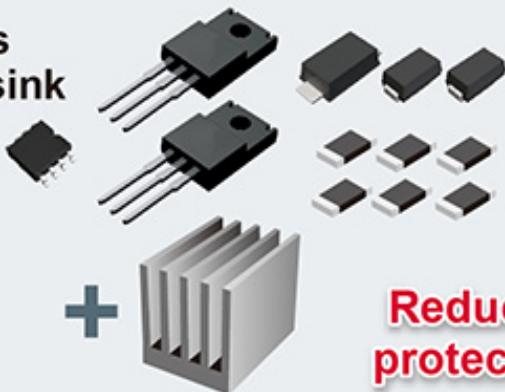
Conventional Solution



BM2SC12xFP2-LBZ Solution



12 parts
+ heat sink



1 part

Fewer parts required

Reduces risk of failure while multiple built-in protection functions ensure superior reliability

3. Reduces man-hours and risk while multiple built-in protection functions provide superior reliability

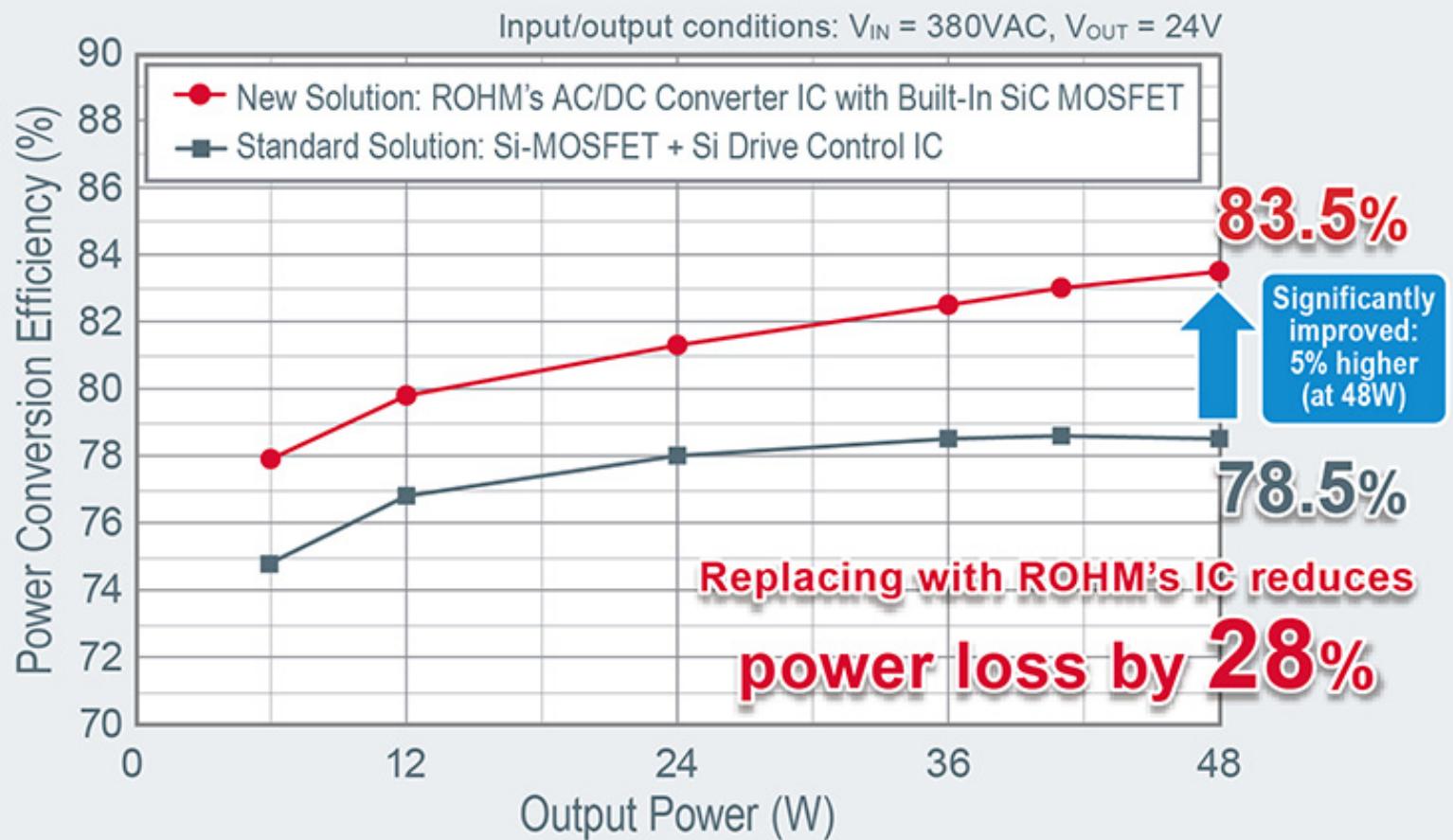
The BM2SC12xFP2 series reduces the man-hours required for component selection and reliability evaluation for the clamp and drive circuits while also minimizing component failure risk and simplifying the development load for SiC MOSFET adoption. In addition, overload protection (FB OLP), overvoltage protection (VCC OVP) for the supply voltage pin, and a high accuracy thermal shutdown function (TSD) (achieved through the built-in SiC MOSFET) are included, along with over current protection and secondary overvoltage protection functions. Incorporating multiple protection circuits for industrial power supplies that require continuous operation significantly improves system reliability.

4. Maximizes SiC MOSFET performance to achieve dramatically improved power savings

The built-in gate driver circuit that drives the internal SiC MOSFET improves power conversion efficiency by as much as 5% over conventional Si MOSFET configurations by maximizing SiC MOSFET performance (ROHM May 2021 study). At the same time, a quasi-resonant method is adopted for the control circuit that enables operation at higher efficiency and lower noise than conventional PWM systems, minimizing the effects of noise in industrial equipment.

Si vs SiC Efficiency Comparison in an AC/DC Converter

*AC/DC converter ICs are used to draw out power from MOSFETs (ROHM study)



AC/DC Converter IC with Built-In SiC MOSFET Lineup

Part No.	Package	Supply Voltage Range	MOSFET	Operating Frequency	VCC OVP	FB OLP	Operating Temp Range
NEW BM2SC121FP2-LBZ	TO263-7L	15.0V to 27.5V	SiC MOSFET 1700V (Max.) 1.12Ω	120kHz (Max.)	Latch	Auto Restart	-40°C to +105°C
NEW BM2SC122FP2-LBZ					Latch	Latch	
NEW BM2SC123FP2-LBZ					Auto Restart	Auto Restart	
NEW BM2SC124FP2-LBZ					Auto Restart	Latch	
BM2SCQ121T-LBZ	TO220-6M				Latch	Auto Restart	
BM2SCQ122T-LBZ					Latch	Latch	
BM2SCQ123T-LBZ					Auto Restart	Auto Restart	
BM2SCQ124T-LBZ					Auto Restart	Latch	

Application Examples

- General-purpose inverters
- AC servos
- PLCs (Programmable Logic Controllers)
- Manufacturing equipment
- Robots
- Commercial air conditioners
- Industrial lighting (i.e. street lamps)

Optimized for auxiliary power supply circuits handling indicators, fans, relays, and PLC's in 400VAC industrial equipment

Availability

Pricing:

- IC: \$7.20/unit (samples, excluding tax)

Online Distributors



- Evaluation board (BM2SC123FP2-EVK-001): \$238.80/unit

Sales Launch Date:

May 2021 (Samples), October 2021 (In Mass Production)

Product Lineup

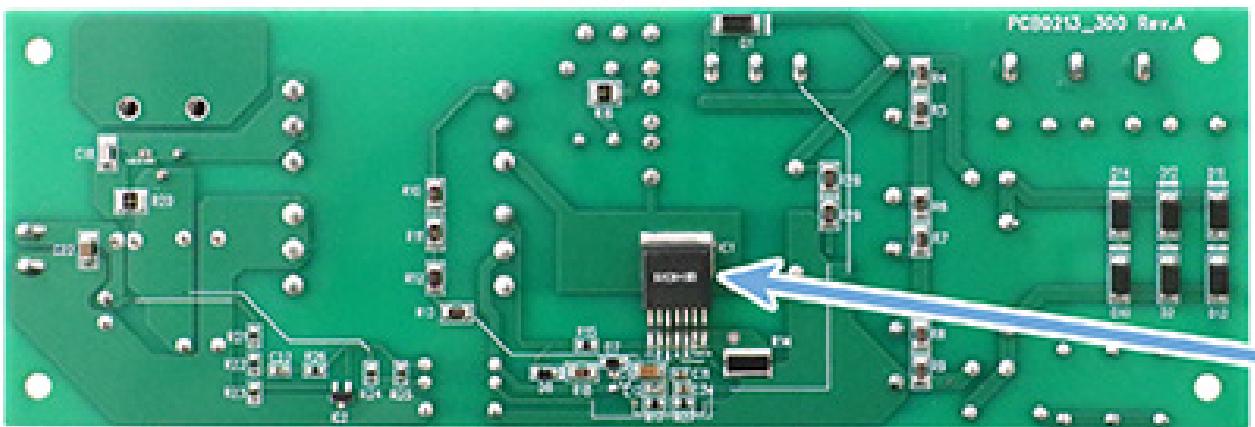
Description	Part No.
AC/DC Converters with Built-In 1700V SiC MOSFET	BM2SC121FP2-LBZ
	BM2SC122FP2-LBZ
	BM2SC123FP2-LBZ
	BM2SC124FP2-LBZ
BM2SC123FP2-LBZ Evaluation Board	BM2SC123FP2-EVK-001

BM2SC123FP2-LBZ Evaluation Board

Frontside



Backside



Mounted on the Backside



Terminology

SiC (Silicon Carbide), MOSFET (Metal Oxide Semiconductor Field Effect Transistor)

SiC is a compound comprised of silicon (Si) and carbon (C). It has shown to exceed the characteristics and limits of silicon when used as a semiconductor material. A MOSFET is a type of transistor - a basic semiconductor component. It acts as a switching device that can control the flow of current or ON/OFF operation by applying an external voltage.

AC/DC Converter

A type of power supply that converts voltage from AC (Alternating Current) to DC (Direct Current). Generally, AC flows from the outlet while most electronic devices operate on DC, necessitating electronic components for voltage conversion.

Auxiliary Power Supply

High power industrial equipment typically includes a main power supply circuit for operating the motor (primary machine) and a sub power supply circuit that powers the LED indicators, fans, relays, and control IC(s). This sub power supply circuit is considered an auxiliary power supply.

Power Semiconductor

A semiconductor used to convert voltage or current (depending on the application), whose performance is directly linked to the power efficiency of the system and/or device. This requires high voltage and current handling capability.

Latest News

2021-06-30

ROHM's New 80V Withstand 5A Output Power Supply ICs

2021-06-25

Posted the notice of resolution of the 63rd Ordinary General Meeting of Shareholders

2021-06-17

ROHM's Industry-first* AC/DC Converter ICs of Surface Mount Package with Built-In 1700V SiC MOSFET

2021-06-08

ROHM's new Support Site for Designers: Ensuring Functional Safety in Vehicles

2021-05-27

ROHM's High 8V Gate Withstand Voltage Marking Technology Breakthrough for 150V GaN HEMT

2021-05-26

Posted the convocation notice of the 63rd Ordinary General Meeting of Shareholders

2021-05-21

ROHM's 'Environmental Vision 2050'

2021-05-10

Posted financial results and related documents for fiscal year ended March 31, 2021

2021-05-07

Must read for those who have downloaded Rev.002. Released a major revision of the SiC application note (Rev.003)

2021-05-04

Expanded Lineup of Shunt Resistors Contributes to Miniaturization In High Power Applications

2021-04-29

New 600V IGBT IPMs Deliver Class-Leading Low Noise with Low Loss

2021-04-22

New White Chip LEDs: High Luminous Intensity (2.0cd) in a Class-Leading Small 1608 Size (Metric)

2021-04-15

32bit D/A Converter IC for Hi-Fi Audio Equipment

2021-04-07

ROHM Semiconductor Europe appoints Wolfram Harnack as new President

2021-03-18

ROHM and Sanden Huayu Hold an Opening Ceremony Announcing the Establishment of a Joint Technology Laboratory

2021-03-15

"ROHM was Selected as a White 500 Company 2021 Four Years in a Row" Certifying Outstanding Health and Productivity Management ...

2021-03-11

ROHM acquired the "Association for Business Innovation in harmony with Nature and Community Certification" sponsored by the G ...

2021-03-10

ROHM was recognized as "Sports Yell Company 2021" by Japan Sports Agency for the first time.

2021-03-03

Enactment of the ROHM Group Tax Policy

2021-03-01

ROHM Conducted an online class to Ritsumeikan High School