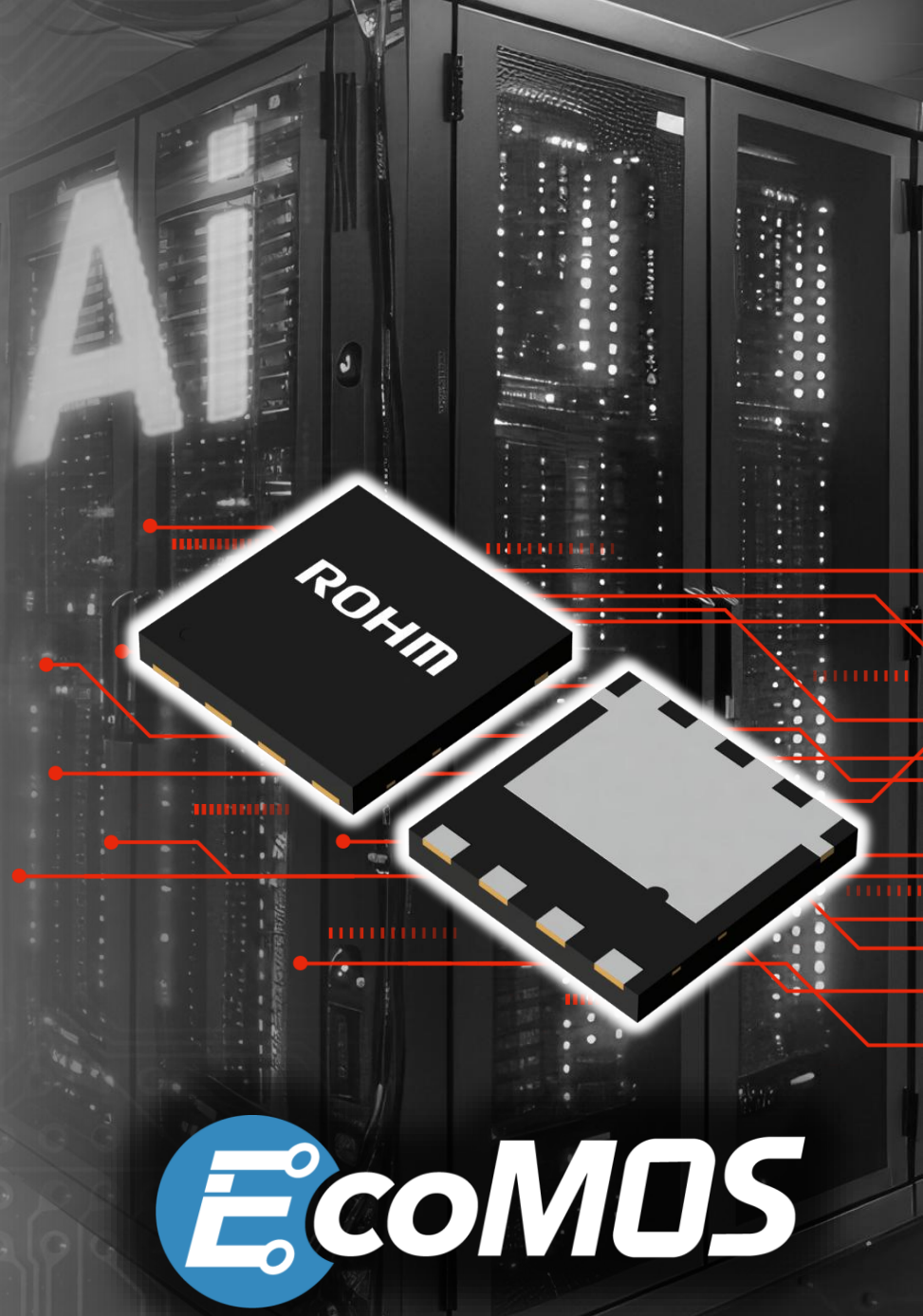
ROHM SEMICONDUCTOR

Electronics for the Future

ROHM Introduces a New MOSFET for AI Servers with Industry-Leading* SOA Performance and Low ON-Resistance

Endorsed by a major global cloud platform provider



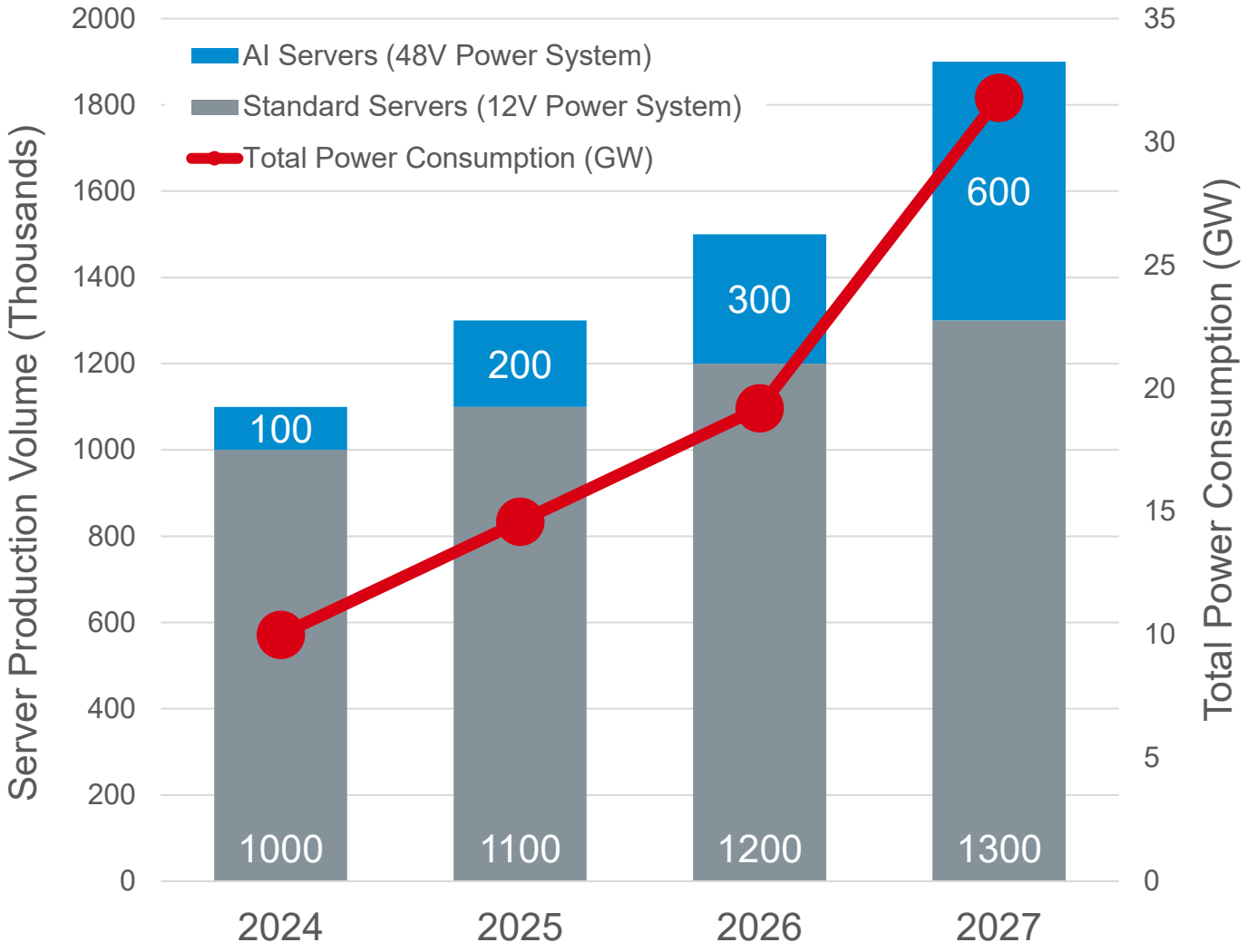
July 1, 2025
ROHM Co., Ltd.
Marketing Communication Department

*ROHM July 1, 2025 study on existing 8080-size 100V power MOSFETs

Contents

Power Challenges

Server Production Forecast and Power Consumption Trend



The AI server market is projected to expand by sixfold over the four years starting from 2024

As AI technology rapidly evolves

Power consumption is projected to increase by threefold

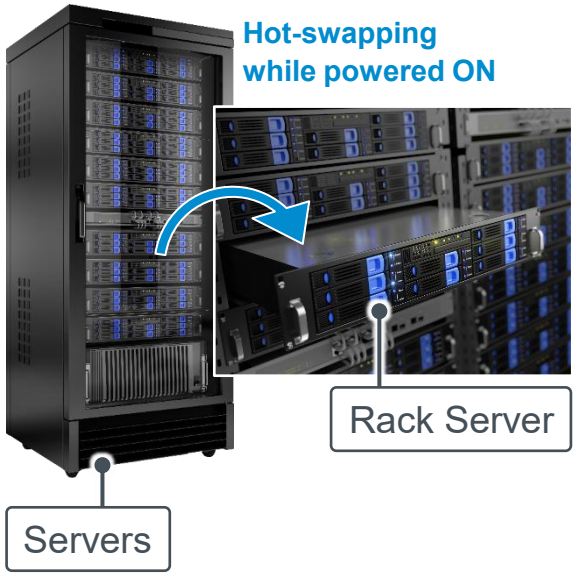
According to ROHM's estimates, calculations are based on 600W per conventional server and 3000W per AI server

Differences Between AI Servers and Conventional Servers

Parameter	AI Servers	Conventional Servers
Primary Applications	AI inference/training, large-scale data processing, etc.	Web services, file servers, business systems, etc.
Embedded Processors	GPUs, AI accelerators, etc.	CPU-centered
Power Supply Configuration	**48V systems are mainstream**	**12V systems are mainstream**
Power Consumption	**High** (Approx. 3000W or more per unit)	**Low** (Approx. 600W per unit)
Cooling Method	Liquid cooling (Air cooling may be insufficient in some cases)	Air cooling is common
Network Bandwidth	High bandwidth (e.g. high-speed interconnects)	Standard ethernet

AI servers require higher density, higher load, and higher efficiency power supplies

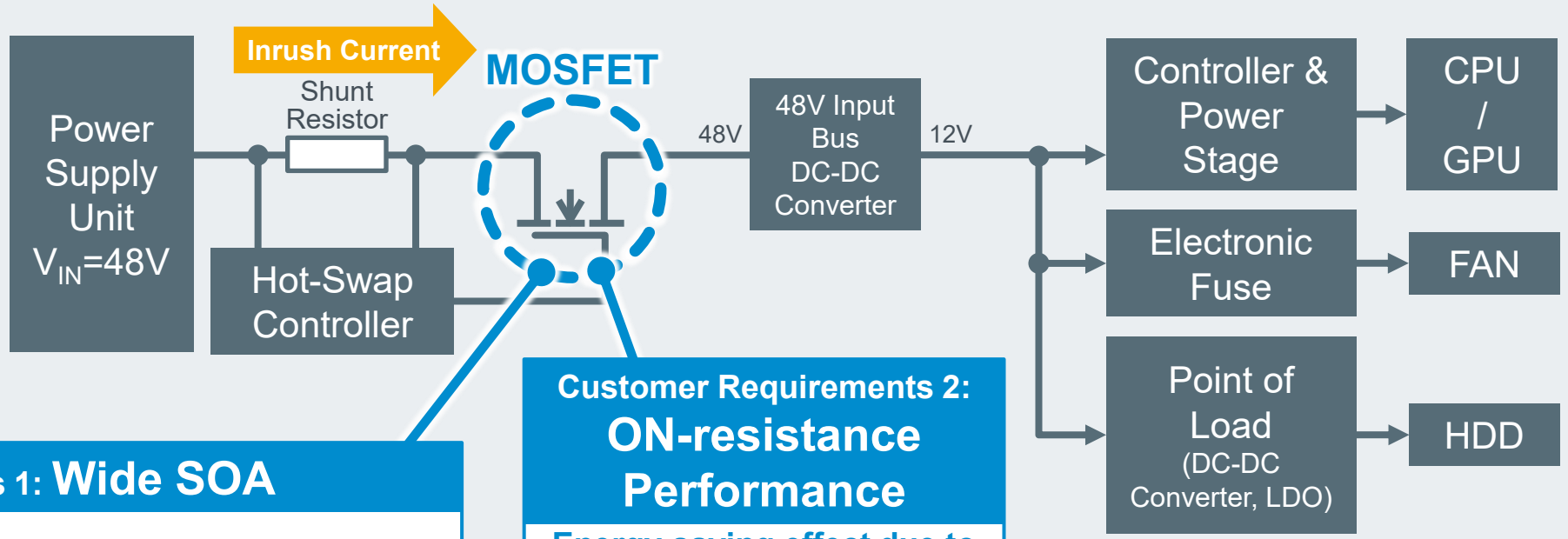
What is Hot-Swapping in Servers?



Sample Schematic Diagram of a Server Power Supply

SOA: Safe Operating Area
HSC: Hot-Swap Controller

HSC Operation: Prevents inrush current from being instantaneously applied to components



Customer Requirements 2: ON-resistance Performance

Energy-saving effect due to always ON operation

Customer Requirements 1: Wide SOA

HSC Operation

The HSC slowly turns the MOSFET ON

➡ **Voltage and current applied with a fixed pulse width**

Customer Feedback

- Pw=1ms to 10ms required
- Trend of increasing component power consumption

Large Current = Wide SOA

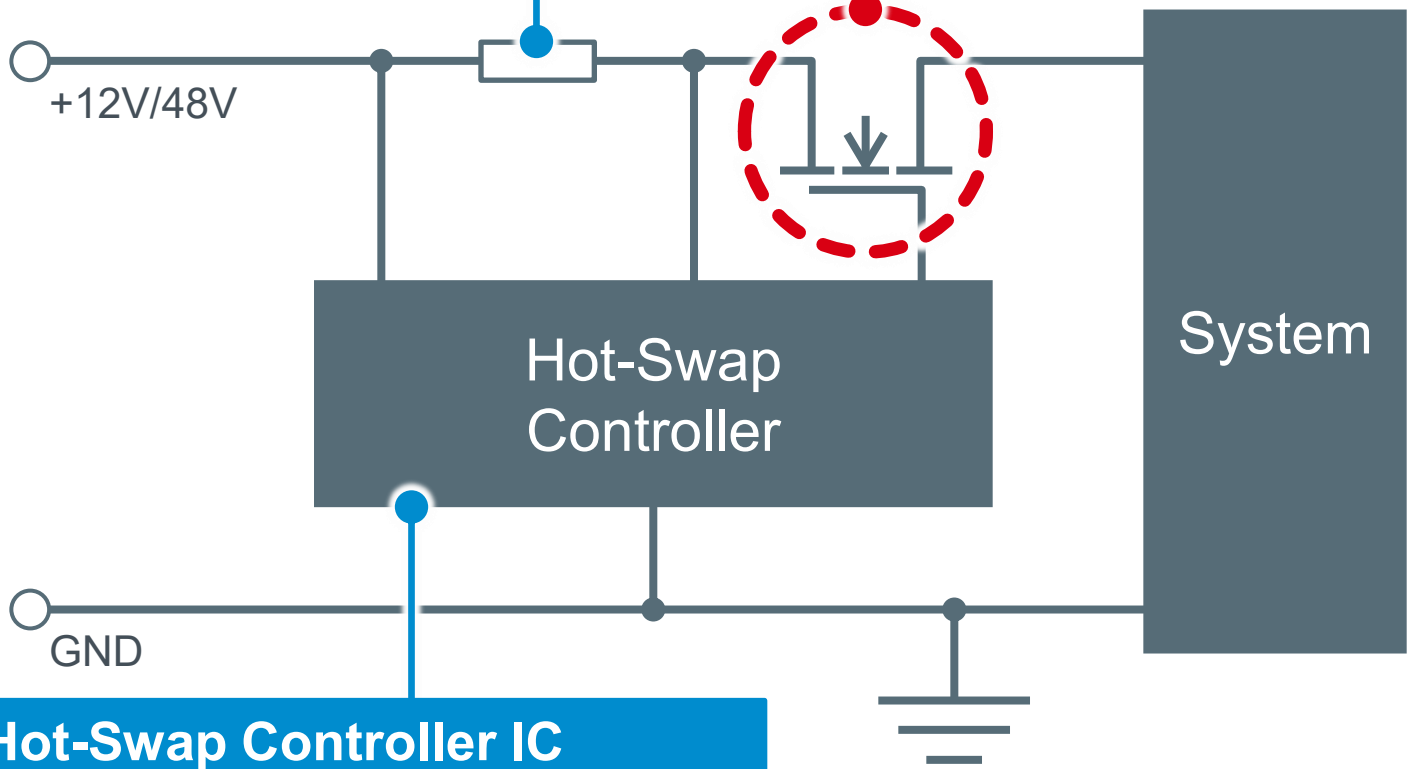
Hot-Swap Circuit

Resistor for Hot-Swap Circuits

PMR Series
(Conventional type for current detection)

N-channel MOSFETs for Hot-Swap Circuits

New **RY7P250BM (100V)**
RS7E200BG (30V)

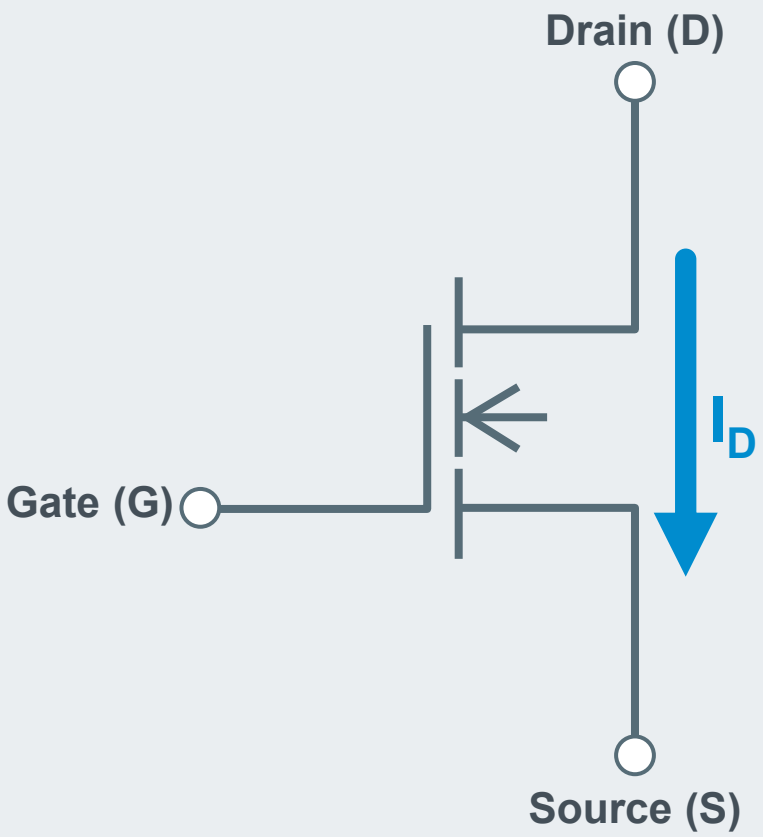


12V Hot-Swap Controller IC

BD12780MUV-LB (Under development)

MOSFETs - Key Devices in Power Control

Circuit Diagram (N-channel)



MOSFET Basics

- MOSFET (Metal–Oxide–Semiconductor FET) is an electronic switch for ON/OFF power control
- Used for a wide range of power-related applications such as power conversion, switching, and control circuits

Primary Applications

- Power supply circuits (i.e. buck/boost converters, protection)
- Hot-swap function (safe component replacement while powered ON)
- Motor control circuits (for industrial equipment, home appliances, and power tools)
- Inverter circuits (e.g. solar power systems, electric vehicles)

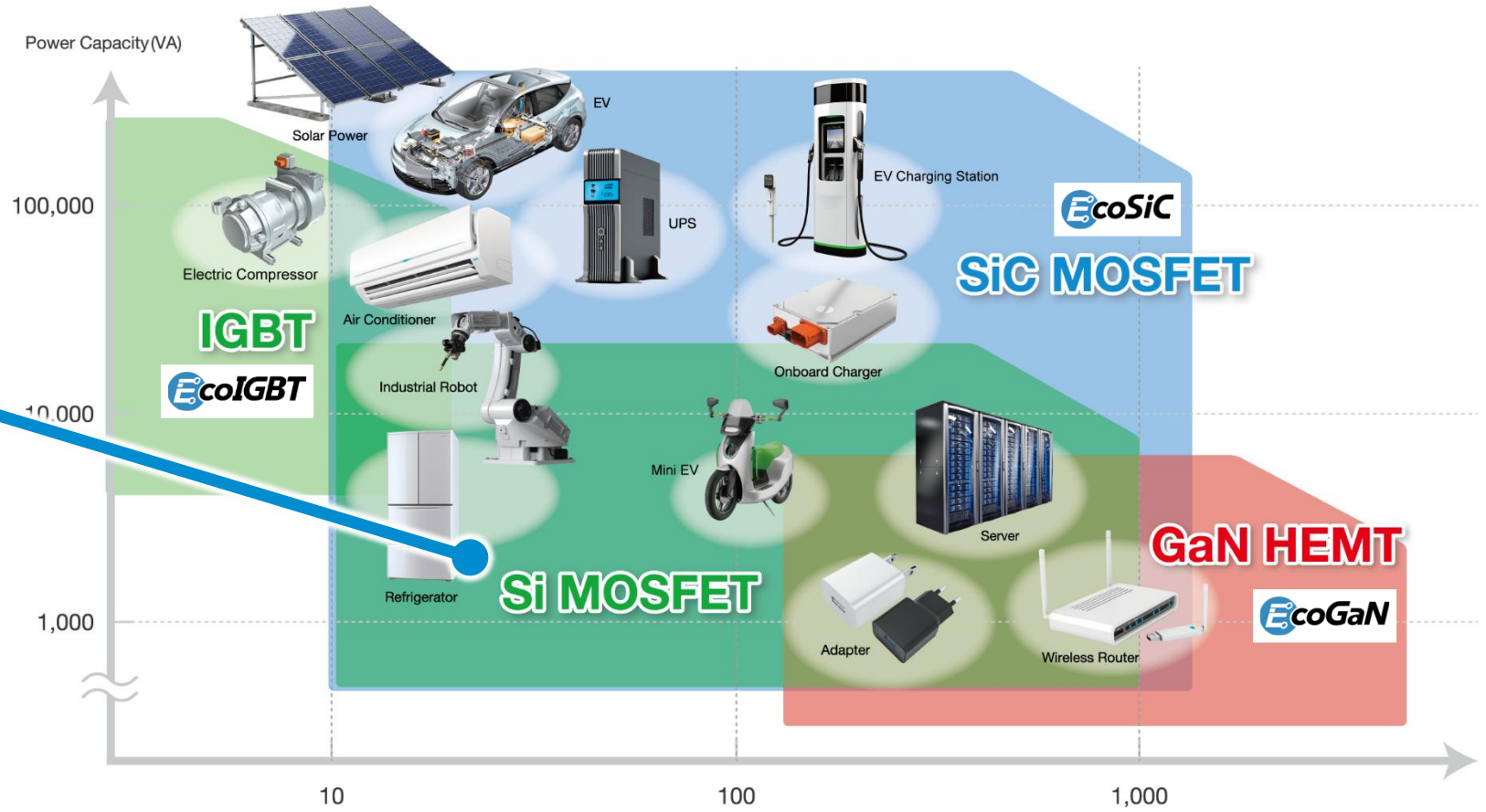
MOSFETs are essential switching devices for all types of power control

What is EcoMOS™?

The power capacity and operating frequency range of power devices can vary greatly depending on their materials and structure.

*EcoSiC™ is designed to operate as an SiC MOSFET, while EcoGaN™ is intended to function as a GaN HEMT

EcoMOS™ is ROHM's brand of silicon MOSFETs designed for energy-efficient applications in the power device sector. Widely utilized in applications such as home appliances, industrial equipment, and automotive systems, EcoMOS™ provides a diverse lineup that enables product selection based on key parameters such as noise performance and switching characteristics to meet specific requirements.



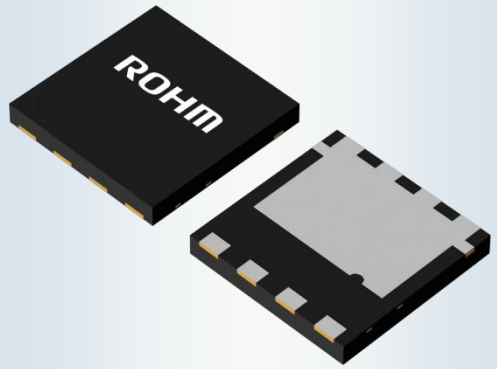
New Product

Product Overview: RY7P250BM

Features

- 100V power MOSFET ideal for 48V hot-swap circuits
- Industry-leading* SOA and low ON-resistance ($R_{DS(on)}$)
- Standard 8080-size package
- Certified as a recommended component by US cloud provider

*ROHM July 1, 2025 study on existing 8080-size 100V power MOSFETs



RY7P250BM
DFN8080-8S
(8.0mm × 8.0mm × 1.0mm)

Online Distributors

DigiKey

MOUSER ELECTRONICS

Farnell AN AVNET COMPANY

Key Specifications

Part No.	Polarity	V_{DSS} [V]	I_D [A]	$R_{DS(on)}$ Max. [mΩ] V_{GS}=10V	Ciss [pF]	Qg [nC] V_{GS}=10V	SOA V_{GS}=48V [A] Pw=10ms	SOA V_{GS}=48V [A] Pw=1ms	Package [mm]
New RY7P250BM	N-channel	100	250	1.86	11300	170	16	50	DFN8080-8S (8.0×8.0×1.0)

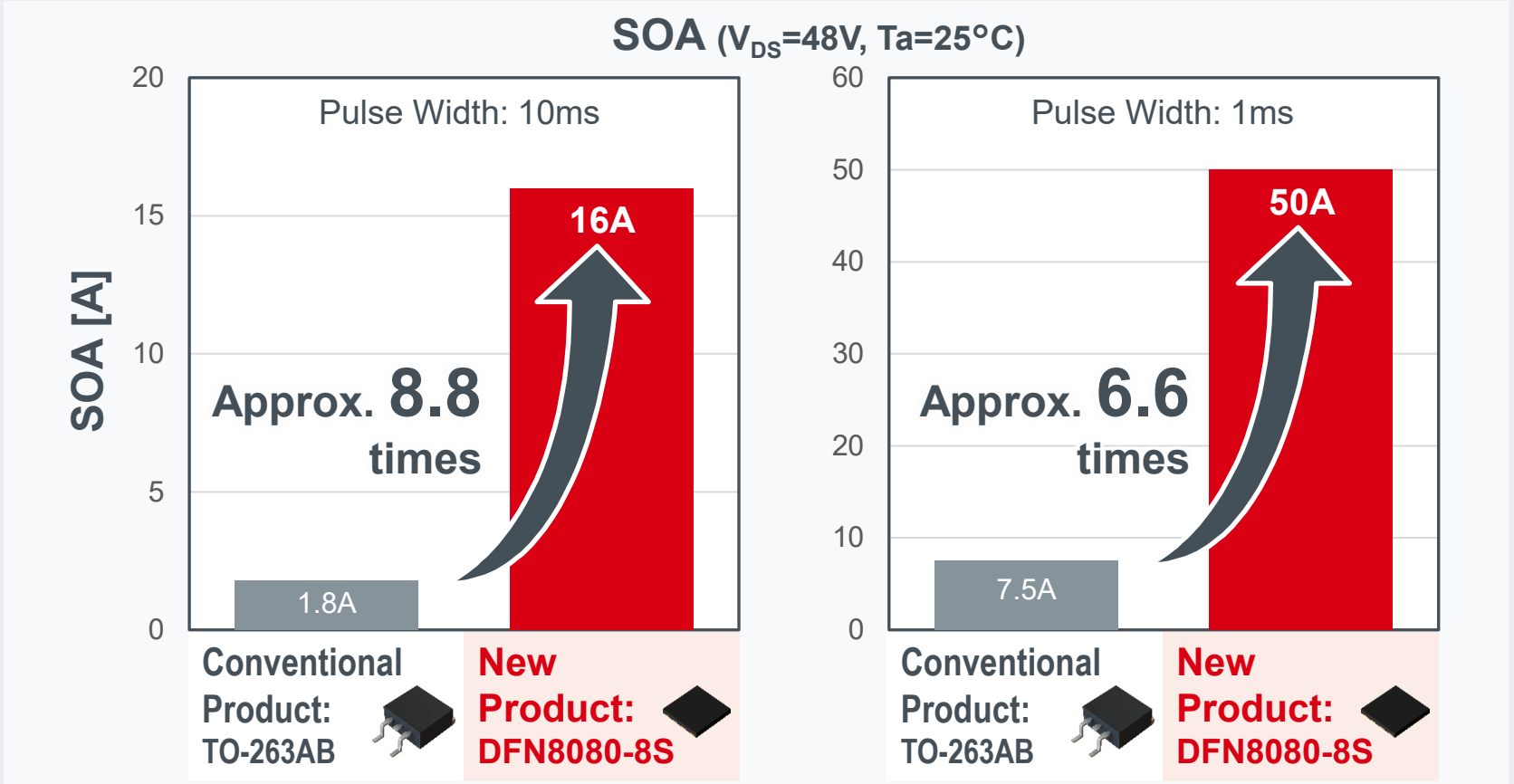
Product Video

URL: https://api01-platform.stream.co.jp/apiservice/plt3/NDc3%23MjM3OQ%3d%3d%23500%232d0%230%233FE2F8D9E400%23MDoyOjc6YTpmOzEwOzEwOzEw%23

New Product

Feature 1: Wide SOA

SOA Performance Comparison

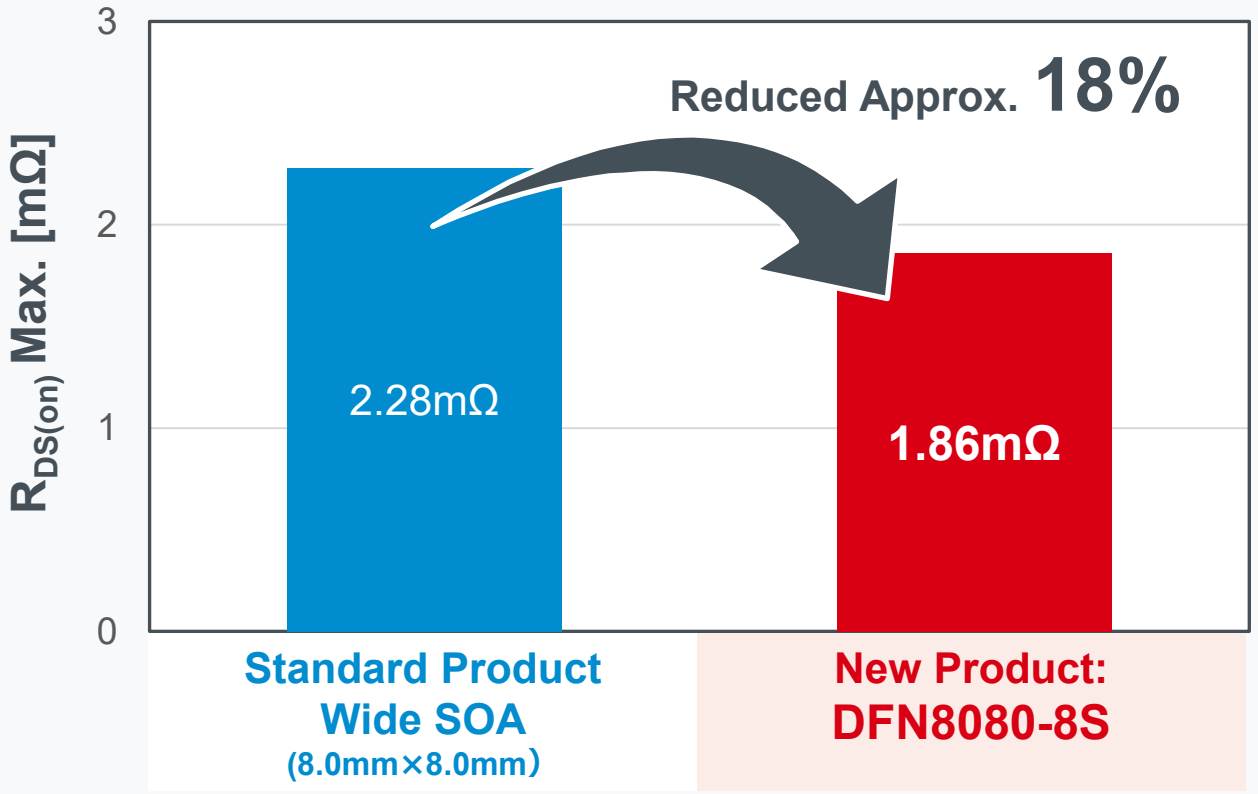


Significantly improved SOA tolerance enhances reliability and durability in high-load environments

New Product

Feature 2: Low ON-resistance

ON-resistance Comparison vs Standard 8080-Size Product (V_{GS}=10V、I_D=50A、Tj=25°C)



- Achieves a low ON-resistance of 1.86mΩ
- Deliver higher efficiency, reduced cooling requirements, and lower power costs for server-power supplies

Recommended Product by Cloud Platform Provider

The new product has been certified as a recommended component by leading global cloud platform provider

Key Points Evaluated

Features	Contents
Wide SOA	Safely handles inrush current and high-current loads during AI processing Meets the reliability standards required for cloud applications
High-efficiency through low ON-resistance	Reduces cooling load and power consumption by suppressing heat generation Ideal for high-density server operations
Standard 8080-size package	Easily replaceable in existing circuit designs Mass production system capable of large-scale manufacturing
Supply system	Stable supply was positively evaluated

Package Roadmap

Drain Current [A] (Ta=25°C, Tc=25°C, I_{DSL})

Higher Current

Package Size [mm²]

Higher Power

Compact Package

Package indicates JEDEC code.
( ) ROHM package, <> general package code.

DFN2020
⊿HUML2020L8
2.0×2.0×0.6
I_D=1A to 18A

(HSML3030L10)
3.0×3.0×0.6
I_D=7A to 11A

(TSMT8)
3.0×2.8×0.8
I_D=1.5A to 11A

DFN1616-7T
(HEML1616L7)
1.6×1.6×0.55
I_D=4.5A to 7.5A

SOT-323T, SOT-363T
TUMT3, 5, 6
2.0×2.1×0.77
I_D=0.7A to 6.5A

SOT-346T, SOT-25T, SOT-457T
TSMT3, 5, 6
2.9×2.8×0.85
I_D=1A to 8.5A

3333 Size

Large Current with Excellent Heat Dissipation

Under development
DFN3333FB-9S
3.3×3.3×0.65
I_D=50A to 210A
Source-down double-side cooling

Under development
DFN3333F-9S
3.3×3.3×1.0
I_D=50A to 210A
Source-down

(HSMT8)
3.3×3.3×0.8
I_D=6.5A to 125A

DFN3333-9DC
(HSML3030L9)
3.3×3.3×0.75
I_D=5.5A to 7A

5060 Size

R&D Phase
DFN5060
Stack structure

Planned

DFN 5060FB
Double-side cooling

DFN 5060F
Source-down

Large Current

New Announced in February 2025
DFN5060-8S
(DFN5060T8LSHAAE)
5.0×6.0×1.0
I_D=125A to 390A

(HSOP8)
5.0×6.0×1.0
I_D=4.5A to 300A

(SOP8)
5.0×6.0×1.75
I_D=2.5A to 18A

High Power Package

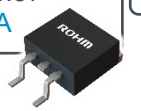
R&D Phase
DFN8060
8.0×6.0

Large Current

New Announced in May 2025
DFN8080-8S
⊿DFN8080T8LSHYAI
8.0×8.0×1.0
I_D=300A to 635A

Under development
TOLL
(TOLL9LSATAC)
9.9×10.43×2.3
I_D=195A to 295A

TO-263AB
(TO-263AB3LSHYAD)
10.16×15.1×4.57
I_D=40A to 260A



(TO-220AB)
10.16×29.07
×4.44
I_D=50A to 270A

TO-252
<DPAK>
(TO-252)
6.6×1.0×2.3
I_D=4A to 150A

TO-263S
<D2PAK>
(LPTS)
10.1×10.0×2.3
I_D=5A to 70A

TO-220FP
(TO-220FM)
10.0×29.0×4.5
I_D=5A to 205A

Electronics for the Future

ROHM Co.,Ltd.

Notes

- The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products").
- If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.
- Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.
- The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products.
- ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties.
- ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.
- If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.
- The content specified in this document is correct as of July 2025.