

REF69001 : Half-bridge drive for SiC case module

Contents

1. REF69001 : Half-bridge drive for SiC case module Brief
2. SiC case modules solve challenges in power distribution applications
3. Applications and topologies
 - 3-1. PV Inverter
 - 3-2. UPS / ESS
 - 3-3. xEV fast Charger

Half-bridge drive for SiC case module

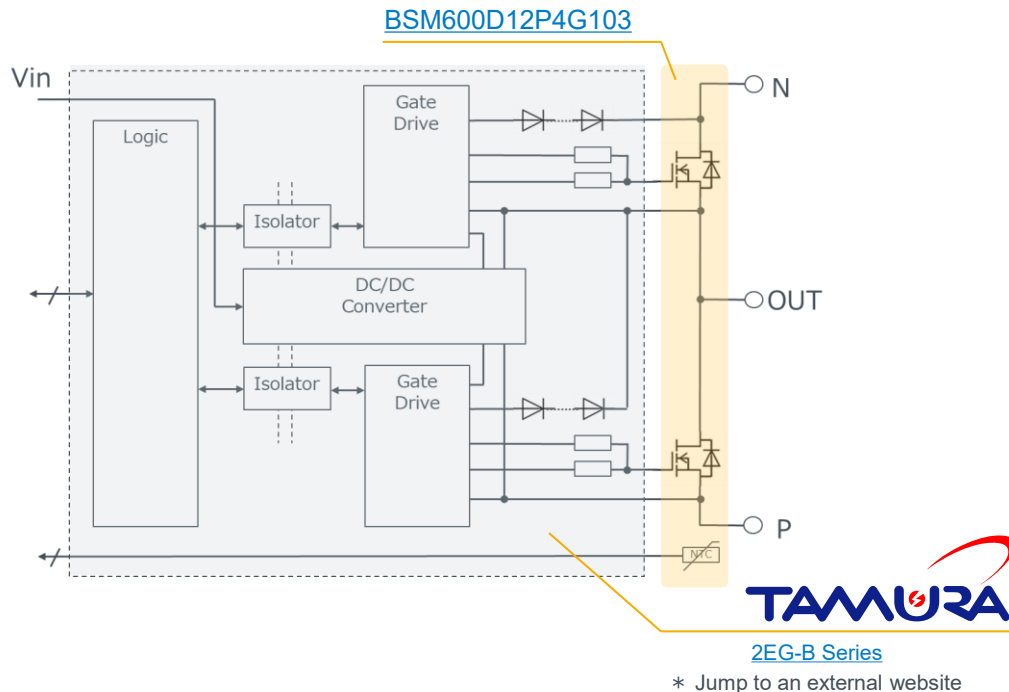
REF69001 – Reference Design

Feature

- SiC case module and Gate drive board kit used in power electronics equipment exceeding 100kW.
- A Gate drive board for a half-bridge module and DC-DC converter for gate drive circuit.
- The gate voltage, gate resistance, and short-circuit protection are optimized for the SiC module.
- TAMURA Corporation development board. ([Gate Drivers for ROHM](#) Jump to an external website)



<Block Diagram>



<Specification>

1200V, 567A SiC Half Bridge Module (BSM600D12P4G103)

Input Voltage : $V_{in}=15V$, HV bus voltage=800V

Drive Current : 600A

Gate Drive Current : 43A peak

Gate Voltage for SiC : +18V/-2V

Short Circuit Protection : $t_{sc}=2.2\mu s$

<Circuit configuration>

Half-bridge circuits are applicable to many topological circuits.

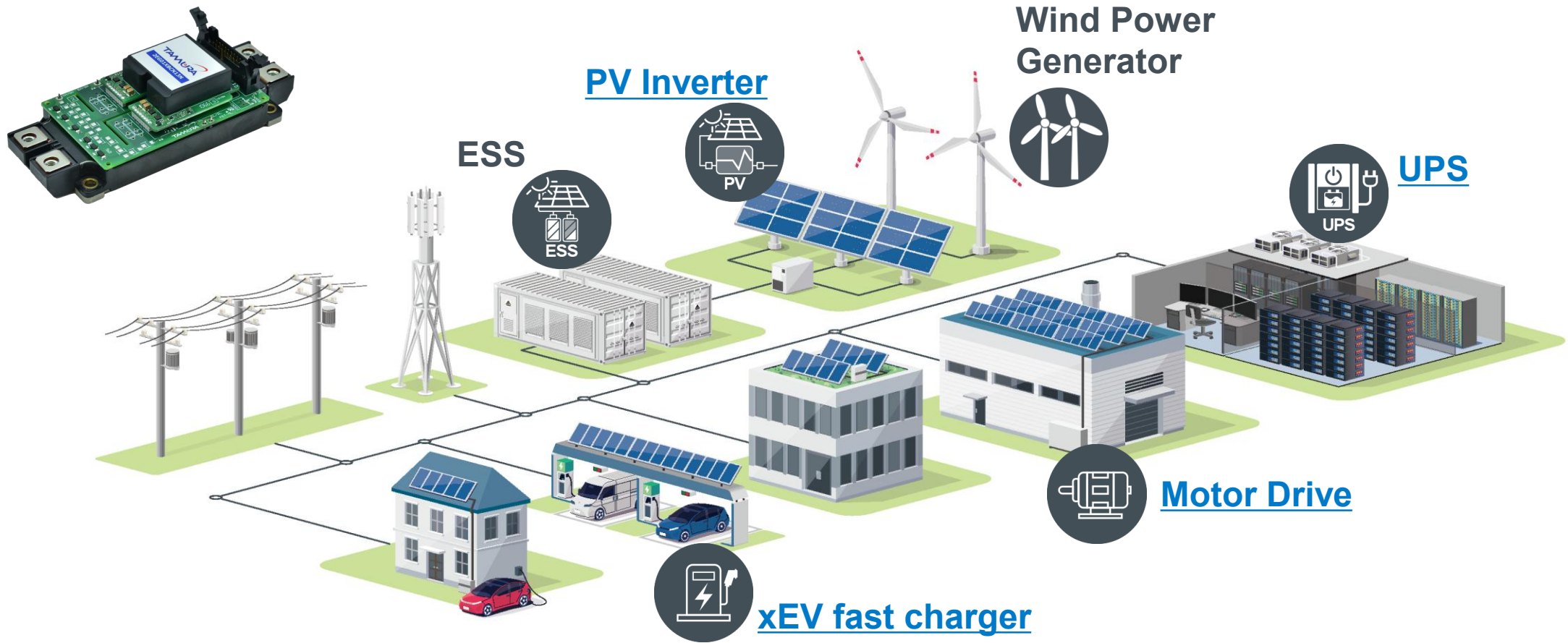
Gate drivers and DC-DC converter for gate voltage optimized for driving SiC modules.

Protection functions (short-circuit protection, mirror clamp, temperature detection).

* For more details about the board, please contact TAMURA Cooperation.

SiC case modules solve challenges in power distribution applications

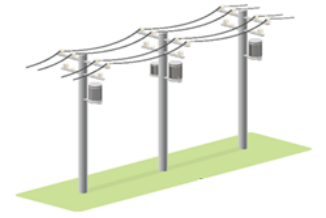
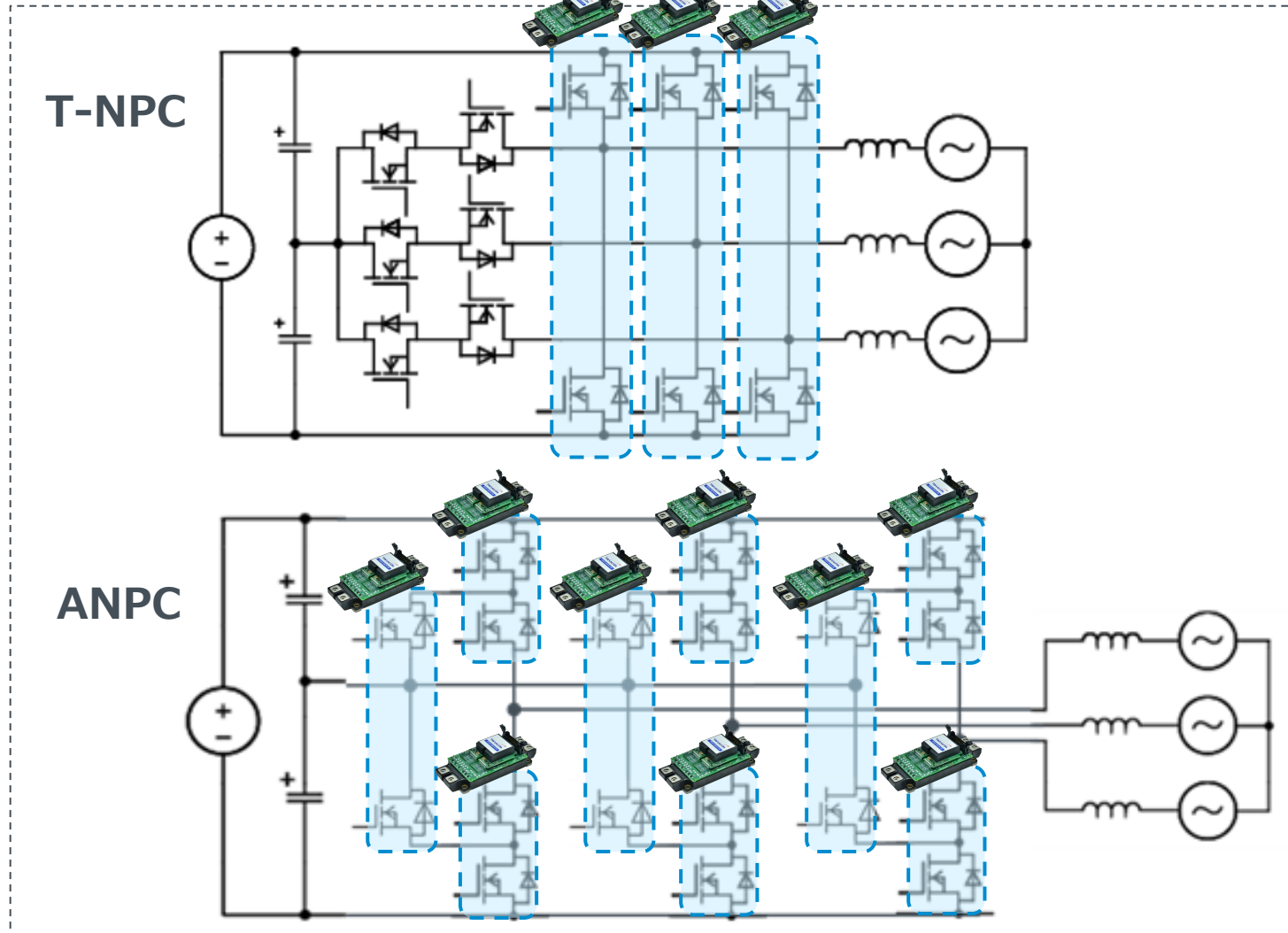
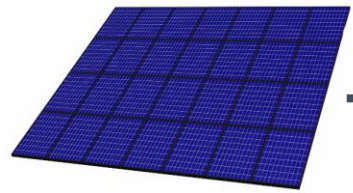
In power distribution applications including renewable energy, 2-in-1 case module with multiple devices (chips) arranged in parallel are commonly used in high-power devices exceeding 100kW. The 2-in-1 half-bridge module can be used in many topologies, leading to expected benefits such as reduced design and management effort through component commonality, and cost savings through procurement consolidation. SiC case modules offer advantages over conventional IGBT modules, including higher efficiency and smaller reactor size due to high-speed operation. The verified KIT with gate driver board and module comes pre-tuned with SiC drive peripheral circuits, including protection features, significantly reducing circuit design time. Furthermore, TAMURA Corporation's gate drive boards, which are suitable for mass production, can contribute to simplifying the mass production process.



Topologies for PV Inverter



PV Inverter

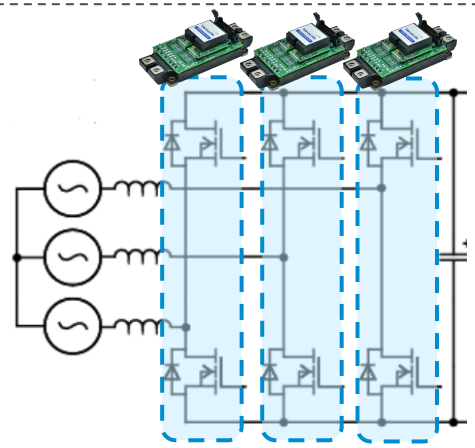


Topologies for UPS and ESS

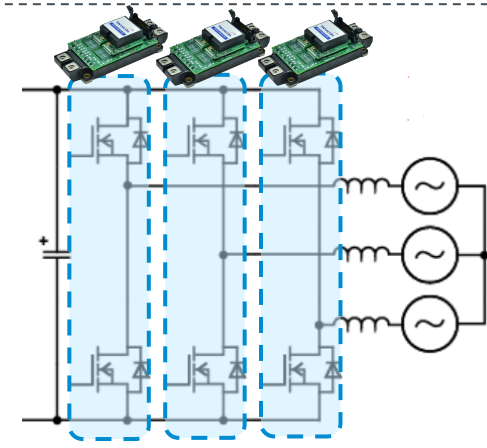


UPS / ESS

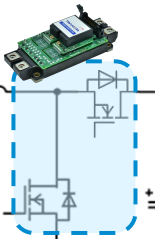
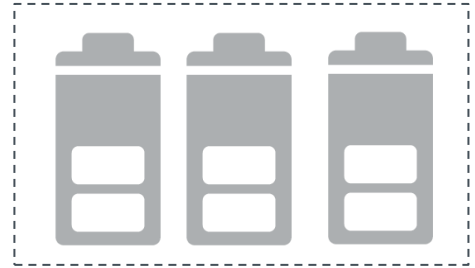
AC



B6(AC-DC)



B6(Inverter)



Synchronous Chopper

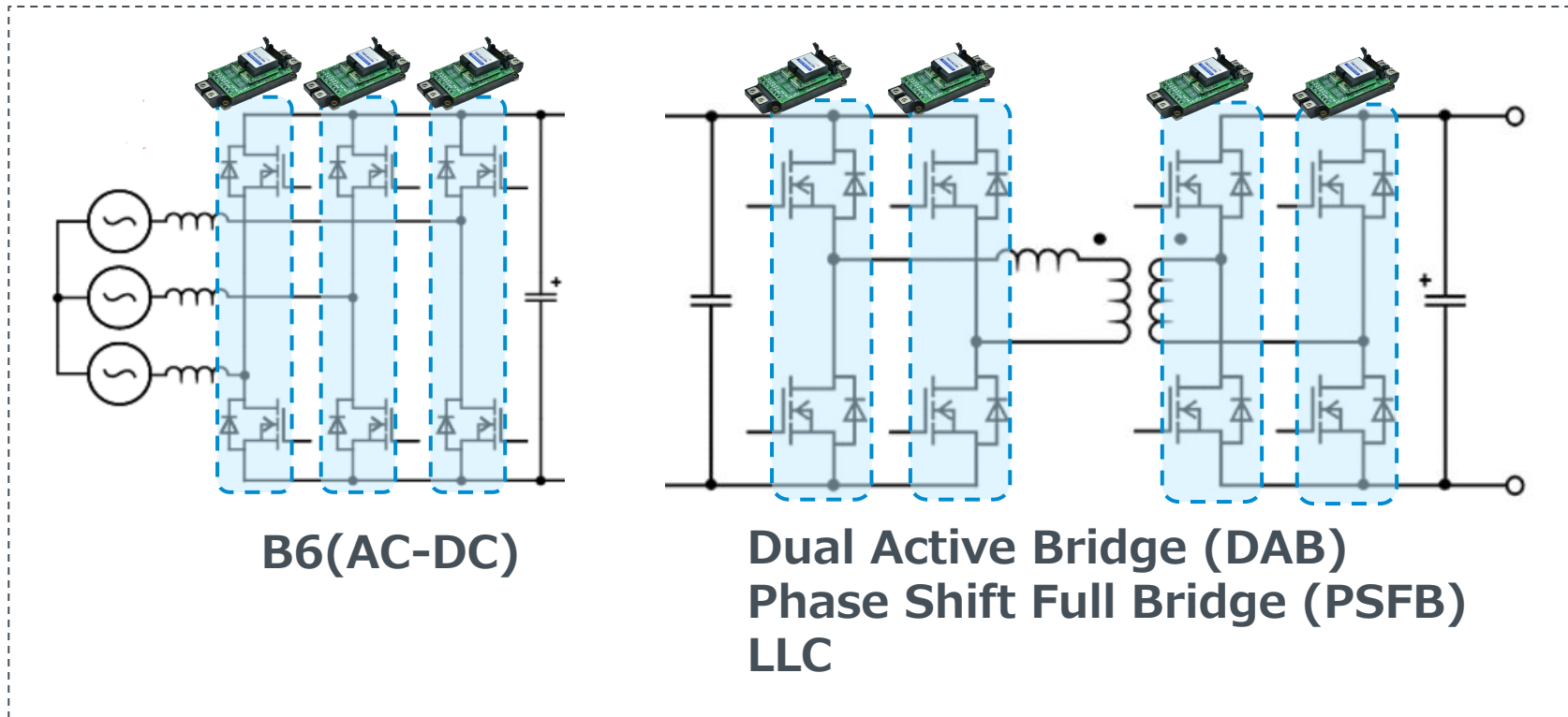


Topologies for xEV fast charger



xEV fast charger

AC





Electronics for the Future

Important Notes on the Use of Reference Designs

- 1) The contents of this document are subject to change without notice for the purpose of improvement.
- 2) ROHM provides reference designs (including, but not limited to, circuit diagrams, layout data, parts lists, reference boards and their evaluation results, etc.) and all materials related to evaluation boards (hereinafter collectively referred to as "Reference Designs, etc.") to customers for the purpose of referencing them in the development of devices, equipment, software, etc. incorporating ROHM products (hereinafter collectively referred to as "Customer Products"). The design, verification, etc. required for the development of the Customer's Product shall be done at the customer's responsibility and expense. In no event shall the customer use the Reference Designs, etc. for any purpose other than the purpose mentioned above.
- 3) Reference Designs, etc. are provided on an "as is" basis. ROHM disclaims all warranties, express or implied, including, but not limited to, warranties of usefulness, functionality, accuracy, merchantability, and fitness for a particular purpose. In no event shall ROHM be liable for any damages (including, but not limited to, lost profits or other incidental, consequential, or punitive damages) arising out of, related to or in connection with the use of or application of the Reference Designs, etc. whether in contract or tort. For the avoidance of doubt, ROHM does not warrant that the Reference Designs, etc. will work with the Customer's Product.
- 4) When using Reference Designs, etc. be sure to request and verify the latest specifications (including the specifications of the products that compose the Reference Design, etc.) separately.
- 5) The customer shall be responsible for implementing safety measures such as derating, redundant design, fire prevention, backup, and fail-safe measures, etc., to prevent personal injury, fire damage, etc., caused by the Customer's Product developed with Reference Designs, etc. ROHM assumes no liability whatsoever for any use in excess of the ratings or in case of failure to observe the instructions for use.
- 6) The application circuit examples, constants, and other information provided in Reference Designs, etc. are intended to illustrate standard operation and usage. Therefore, when designing for mass production, please take into account various external conditions.
- 7) Reference Designs, etc. are intended to show typical operations and examples of application circuits, etc., and do not constitute a license, express or implied, to implement or use any intellectual property rights or any other rights of ROHM or any other company. ROHM shall not be liable for any disputes arising from, related to or in connection with the use of the Reference Designs, etc.
- 8) Please make sure to contact ROHM and obtain ROHM's consent before using the Reference Designs, etc. for the following Customer's Product that requires particularly high reliability. Transportation equipment (in-vehicle, ship, railroad, etc.), trunk line communication equipment, traffic signal equipment, disaster and security equipment, safety equipment, medical equipment, servers, solar cells, power transmission systems, etc.
- 9) Do not use Reference Designs, etc. for the following Customer's Product that requires extremely high reliability. Aerospace equipment, nuclear power control equipment, submarine relay equipment, etc.
- 10) Do not use Reference Designs, etc. for military use, such as development of weapons of mass destruction, or for any other military purpose.
- 11) ROHM does not assume any liability for any accidents or damages caused by non-compliance with the descriptions in this document.
- 12) The information contained in this document has been carefully prepared to ensure accuracy. However, ROHM shall not be liable for any loss or damage incurred by customers due to errors or misprints in this document.
- 13) Do not reproduce or duplicate any part of this document in any form or by any means without ROHM's permission.



Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

<http://www.rohm.com/contact/>