

Switching Regulator Series
Isolated Flyback DC/DC Converter
BD7J200EFJ-LB EVK
BD7J200EFJ-EVK-002 (48V→12V, 1A)

<High Voltage Safety Precautions>

◇ Read all safety precautions before use

Please note that this document covers only the **BD7J200EFJ-LB** evaluation board (BD7J200EFJ-EVK-002) and its functions. For additional information, please refer to the datasheet.

To ensure safe operation, please carefully read all precautions before handling the evaluation board



Depending on the configuration of the board and voltages used,

Potentially lethal voltages may be generated.

Therefore, please make sure to read and observe all safety precautions described in the red box below.

Before Use

- [1] Verify that the parts/components are not damaged or missing (i.e. due to the drops).
- [2] Check that there are no conductive foreign objects on the board.
- [3] Be careful when performing soldering on the module and/or evaluation board to ensure that solder splash does not occur.
- [4] Check that there is no condensation or water droplets on the circuit board.

During Use

- [5] Be careful to not allow conductive objects to come into contact with the board.
- [6] **Brief accidental contact or even bringing your hand close to the board may result in discharge and lead to severe injury or death.**

Therefore, DO NOT touch the board with your bare hands or bring them too close to the board.

In addition, as mentioned above please exercise extreme caution when using conductive tools such as tweezers and screwdrivers.

- [7] If used under conditions beyond its rated voltage, it may cause defects such as short-circuit or, depending on the circumstances, explosion or other permanent damages.
- [8] Be sure to wear insulated gloves when handling is required during operation.

After Use

- [9] The ROHM Evaluation Board contains the circuits which store the high voltage. Since it stores the charges even after the connected power circuits are cut, please discharge the electricity after using it, and please deal with it after confirming such electric discharge.
- [10] Protect against electric shocks by wearing insulated gloves when handling.

This evaluation board is intended for use only in research and development facilities and should be handled **only by qualified personnel familiar with all safety and operating procedures.**

We recommend carrying out operation in a safe environment that includes the use of high voltage signage at all entrances, safety interlocks, and protective glasses.

Switching Regulator Series

Isolated Flyback DC/DC Converter BD7J200EFJ-LB EVK

BD7J200EFJ-EVK-002 (48V→12V, 1A)

BD7J200EFJ-EVK-002 delivers an output 12 volts from an input 48 volts using BD7J200EFJ-LB, Isolated Flyback DC/DC converter integrated circuit, with output current rating of maximum 1A.

Performance specification

These are representative values, and it is not a guaranteed against the characteristics.

$V_{IN} = 48V$, $V_{OUT} = 12V$, unless otherwise specified.

Parameter	Min	Typ	Max	Units	Conditions
Input Voltage		48.0		V	
Output Voltage		12.0		V	R4=2kΩ, R5=78.7kΩ
Output Current Range	100		1000	mA	Maximum Output Power: 12W
Operating Frequency		400		kHz	
Maximum Efficiency		84		%	$I_o = 1000mA$

EVK

PCB size: 70mm×50mm×1.6mm



Figure 1. BD7J200EFJ-EVK-002

Top View

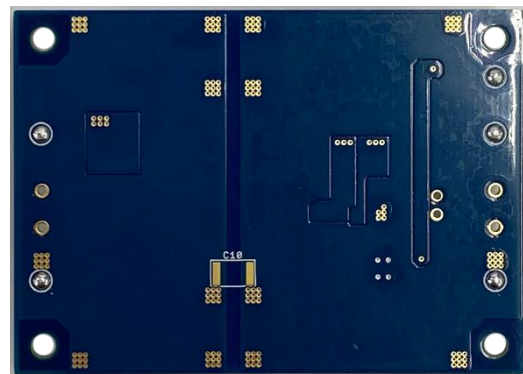


Figure 2. BD7J200EFJ-EVK-002

Bottom View

Operation Procedures

1. Necessary equipments
 - (1) DC power-supply capable of supplying 48V / 1A
 - (2) Maximum 1A load
 - (3) DC voltmeter
2. Connecting the equipments(as shown in Figure 3)
 - (1) Preset DC power-supply to 48V and turn off.
 - (2) Set the load less than 1A and disable.
 - (3) Connect the power-supply to VIN and GND pins with a pair of wire.
 - (4) Connect the load to VOUT+ and VOUT- pins with a pair of wire.
 - (5) Connect the voltmeter1 to VIN and GND pins to measure input voltage.
 - (6) Connect the voltmeter2 to VOUT+ and VOUT- pins to measure output voltage.
 - (7) Turn on the power supply.
 - (8) Check if the value of voltmeter2 is 12V.
 - (9) Enable the load.

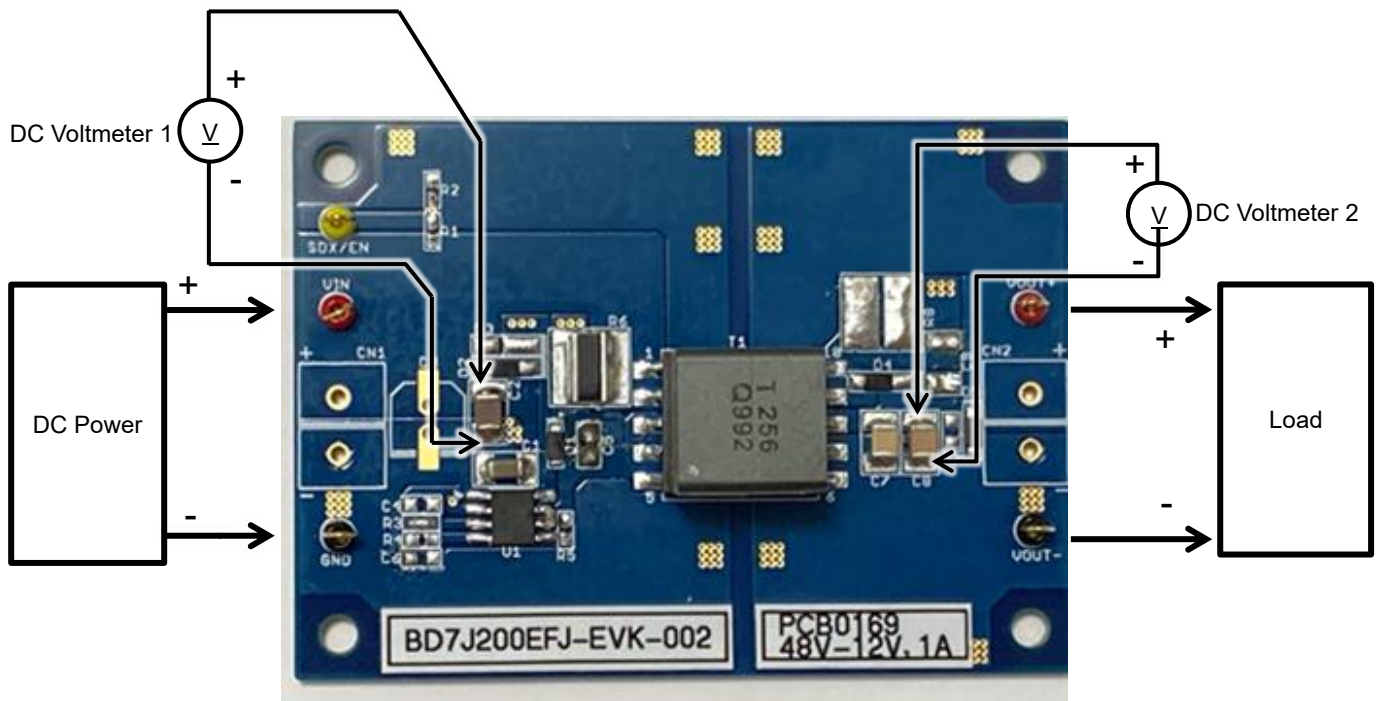


Figure 3. Connection Diagram

Circuit Diagram

$V_{IN} = 48V$, $V_{OUT} = 12V$

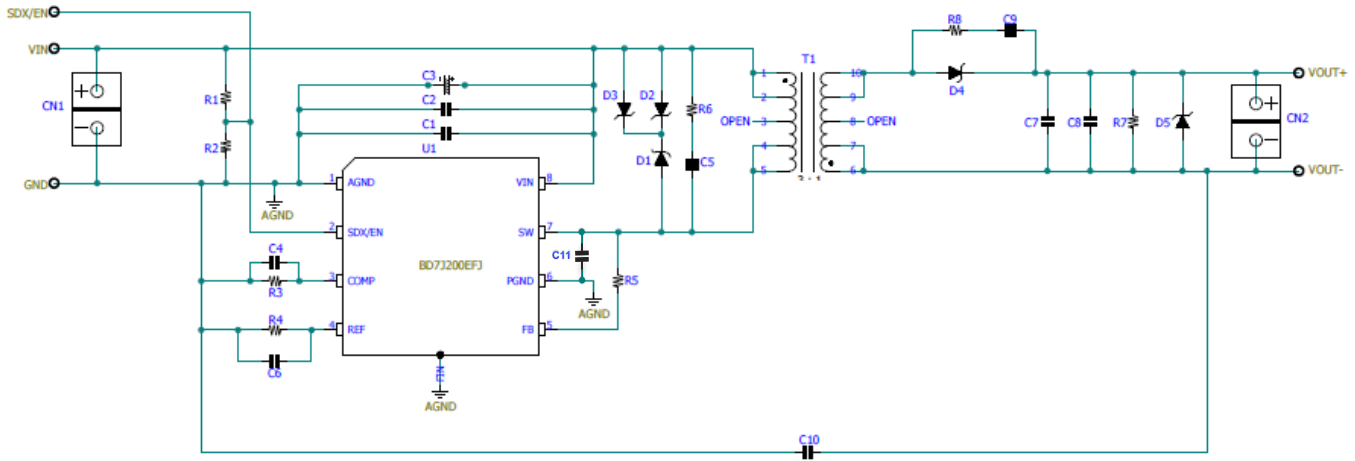


Figure 4. BD7J200EFJ-EVK-002 Circuit Diagram

Bill of Materials

Table 1. Bill of Materials

No.	Value	Description	Size	Part Number / Series	Manufacturer
C1	1 μ F	Capacitor, Chip, 100V, X7R	3216	GRM31CR72A105KA01	MURATA
C2	10 μ F	Capacitor, Chip, 100V, X7S	3225	GRM32EC72A106KE05	MURATA
C3	-	Notinstalled	-	-	-
C4	-	Notinstalled	-	-	-
C5	100pF	Capacitor, Chip, 100V, C0G	1608	GCM1885C2A101JA16	MURATA
C6	-	Notinstalled	-	-	-
C7	22 μ F	Capacitor, Chip, 25V, X7R	3225	GRM32ER71E226KE15	MURATA
C8	47 μ F	Capacitor, Chip, 16V, X6S	3225	GRT32EC81C476KE13L	MURATA
C9	-	Notinstalled	-	-	-
C10	-	Notinstalled	-	-	-
C11	100pF	Capacitor, Chip, 250V, C0G	2012	GRM21A5C2E101JW01	MURATA
D1	1A/90V	Diode, Schottky	3516	RB160MM-90	ROHM
D2	$V_z=36.0\sim$	Diode, Zener, $V_z=36.0\sim 40.0V$	3516	KDZV36B	ROHM
D3	-	Notinstalled	-	-	-
D4	3A/60V	Diode, Schottky	3516	RBR3MM60B	ROHM
D5	$V_z=13.3V\sim$	Diode, Zener, $V_z=13.3\sim 15.0V$	3516	KDZV13B	ROHM
R1	1M Ω	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF1004	ROHM
R2	68k Ω	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF6802	ROHM
R3	-	Short	-	-	-
R4	2k Ω	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF2001	ROHM
R5	78.7k Ω	Resistor, Chip, 1/16W, 1%	1005	MCR01MZPF7872	ROHM
R6	1k Ω	Resistor, Chip, 2W, 5%	3264	LTR100JZPJ102	ROHM
R7	-	Notinstalled	-	-	-
R8	-	Notinstalled	-	-	-
T1	70 μ H	Transformer, Np:Ns=5:2, $\pm 20\%$	13.5 \times 18.0 \times 12.5mm	CEP1311F-4812121R	sumida
U1	BD7J200EFJ	I.C. BD7J200EFJ, HTSOP-J8	4.90 \times 6.00 \times 1.00mm	BD7J200EFJ	ROHM

Board Layout

EVK PCB information

Number of Layers	Material	Board Size
4	FR-4	70mm x 50mm x 1.6mmt

The following are layers of the BD7J200EFJ-EVK-002

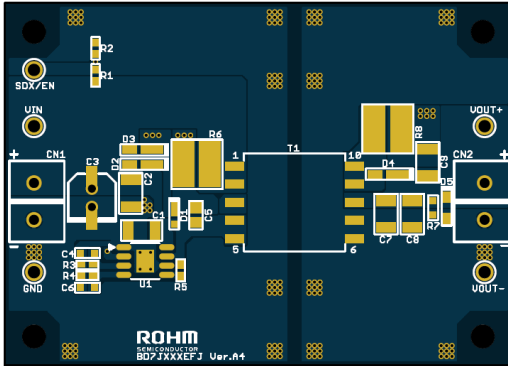


Figure 5. Top silk screen, layout
(Top View)

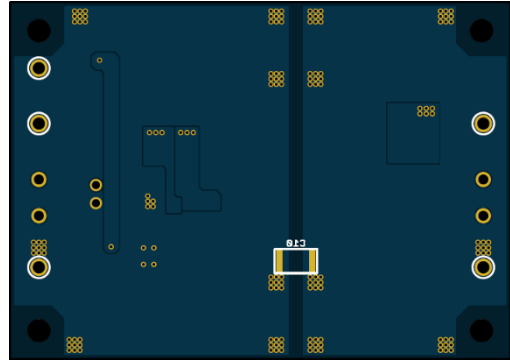


Figure 6. Bottom silk screen, layout
(Top View)

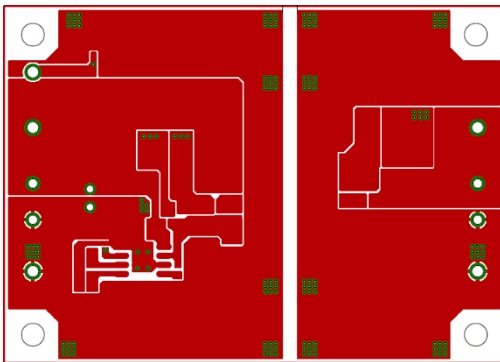


Figure 7. Top Layer layout
(Top View)

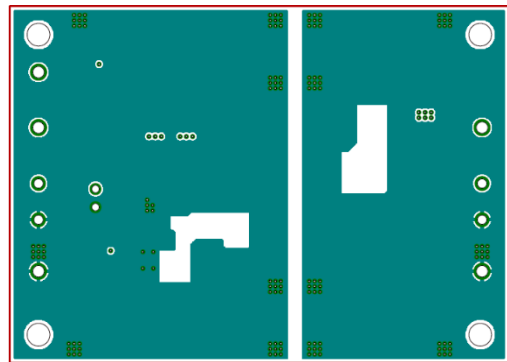


Figure 8. Middle Layer1 layout
(Top View)

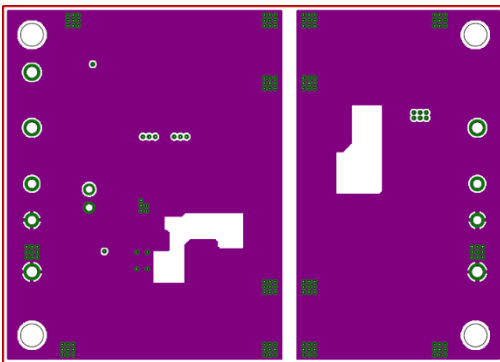


Figure 9. Middle Layer2 layout
(Top View)

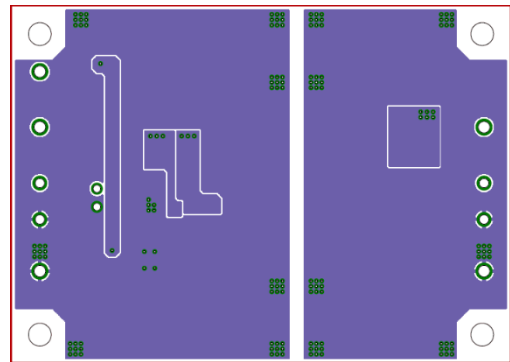


Figure 10. Bottom Layer layout
(Top View)

Reference Application Data

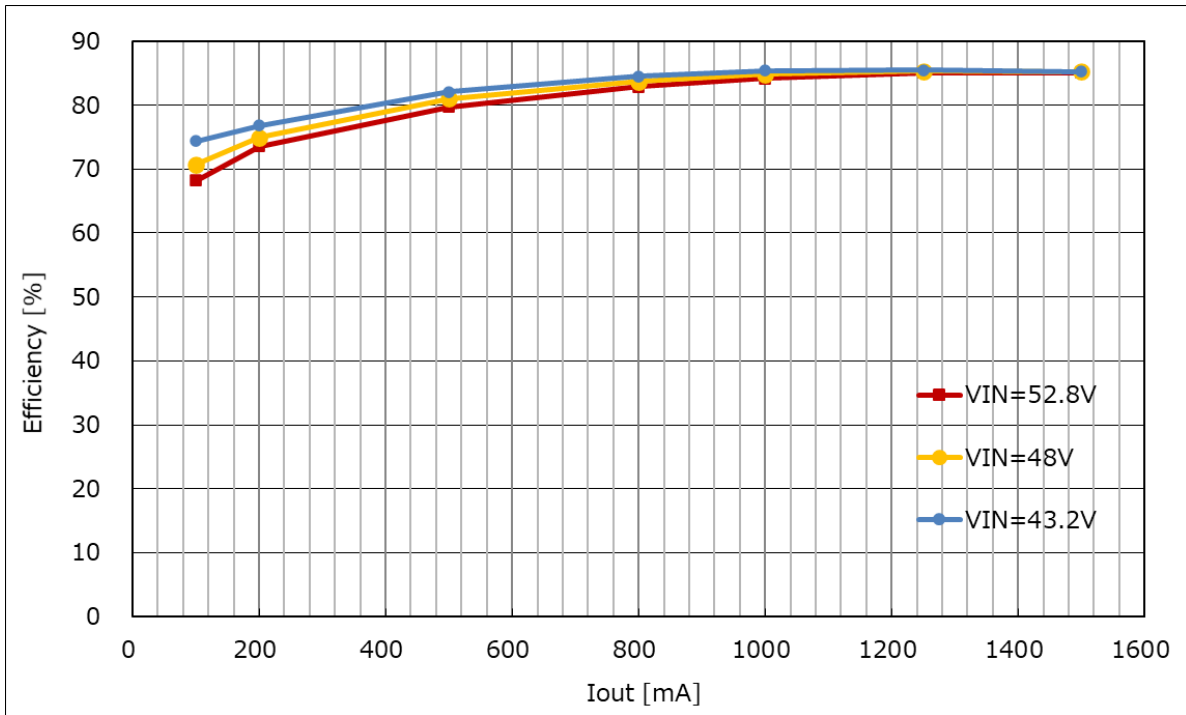


Figure 11. Power Conversion Efficiency vs Output Current

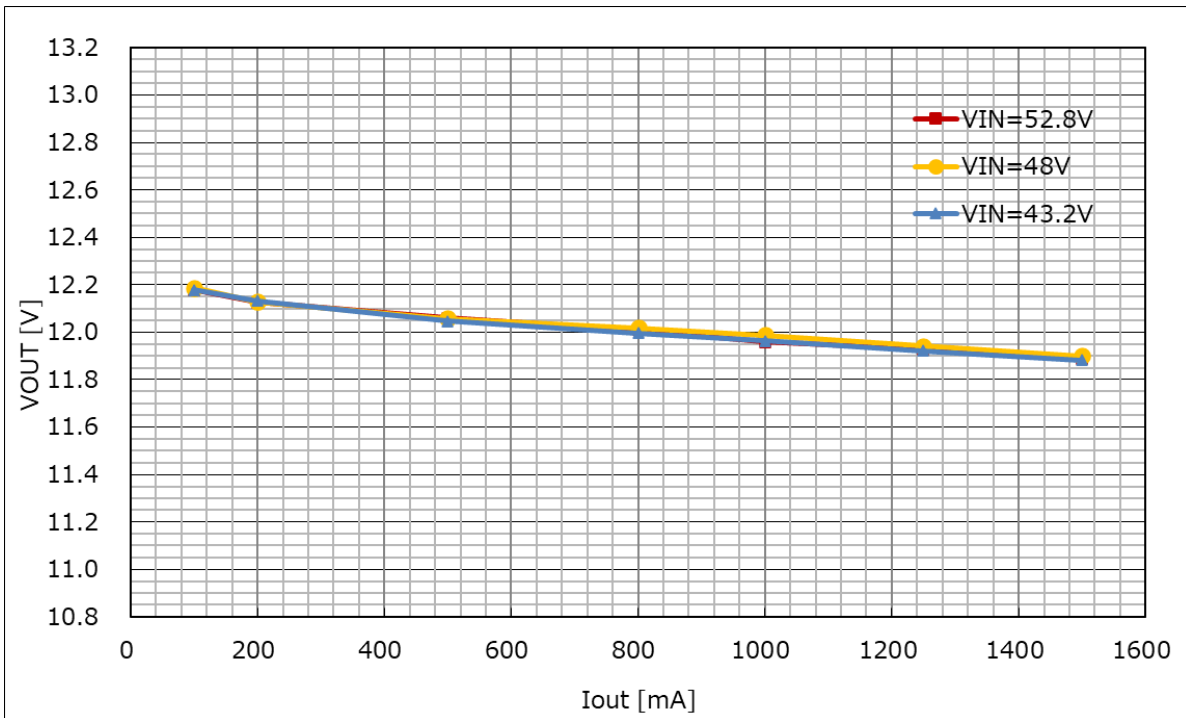
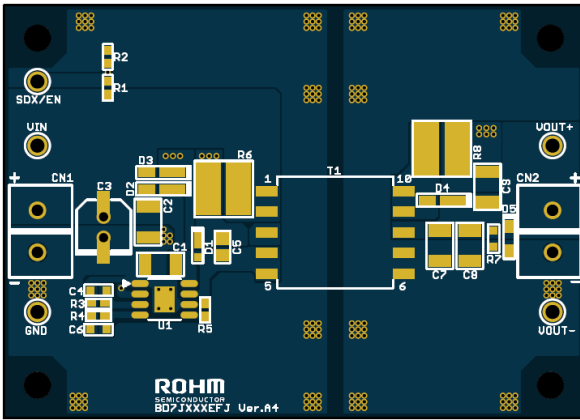


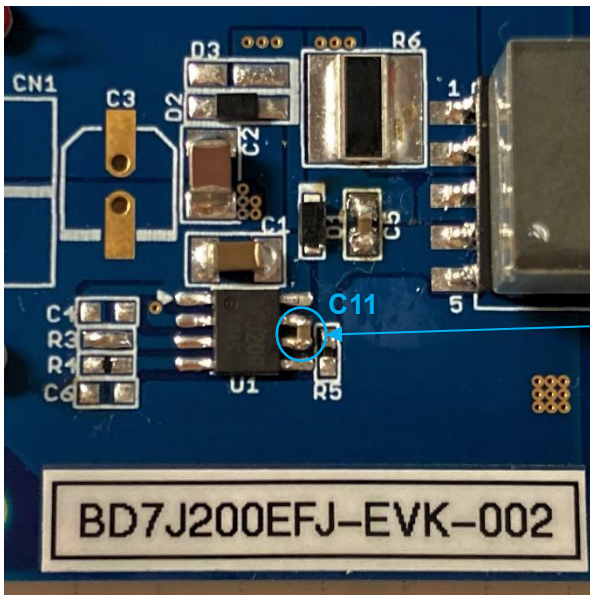
Figure 12. Load Regulation

C11 mounting method



※There is no land pattern for C11.

Figure 13. Top land pattern (Top View)



C11 mounting position
C11 is mounted on the lead terminals of U1_6pin (PGND) and U1_7pin (SW).

Figure 14. C11 mounting position

Revision History

Date	Revision Number	Description
9. Sep. 2021	001	Initial release

Notes

- 1) The information contained herein is subject to change without notice.
- 2) Before you use our Products, please contact our sales representative and verify the latest specifications :
- 3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Products beyond the rating specified by ROHM.
- 4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.
- 5) 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 or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.
- 6) The Products specified in this document are not designed to be radiation tolerant.
- 7) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.
- 8) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.
- 9) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.
- 10) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
- 11) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.
- 12) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.
- 13) This document, in part or in whole, may not be reprinted or reproduced without prior consent of ROHM.



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/>