Structure: Silicon Monolithic Integrated Circuit

Product Name: Synchronous rectification step-up DC/DC converter for mobile phone

Type: **BD6061GUT**

Features: Synchronous rectification step-up DC/DC converter
No external schottky diode required

○Absolute Maximum Ratings (Ta=25deg)

Parameter	Symbol	Rating	Unit	Condition
Maximum applied voltage1	VMAX1	7(*1)	V	VIN , EN , VFB , TEST
Maximum applied voltage2	VMAX2	20(*1)	V	SW , VOUT
Power dissipation	Pd	800(*2)	mW	
Operating temperature range	Topr	-30 to +85	deg	
Storage temperature range	Tstg	-55 to +150	deg	

(*1) These values are based on GND and GNDA pins.
(*2) This value is the measurement value that was mounted on the PCB by ROHM.
(50mm×58mm×1.75mm glass epoxy Board)
Temperature deleting: 6.4mW/deg from Ta>25deg

○Recommended operating conditions (Ta=-30 to +85deg)

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
Supply voltage	Vin	2.7	3.6	5.5	V	

This product isn't designed to protect itself against radioactive rays.

Status of this document
The English version of this document is the formal specification.
A customer may use this translation version only for a reference to help reading the formal version.
If there are any differences in translation version of this document,formal version takes priority.

Application example
・ROHM cannot provide adequate confirmation of patents.
・The product described in this specification is designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys).
Should you intend to use this product with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.
・ROHM assumes no responsibility for use of any circuits described herein, conveys no license under any patent or other right, and makes no representations that the circuits are free from patent infringement.

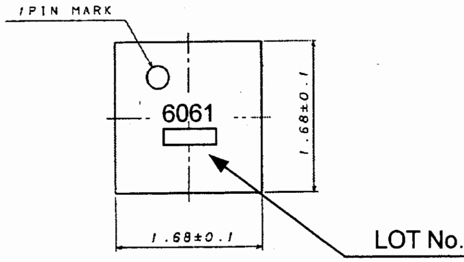
○Electrical Characteristics

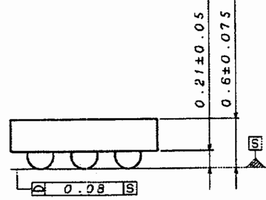
(Unless otherwise noted, Ta = -30 to +85deg, Vin=3.6V)

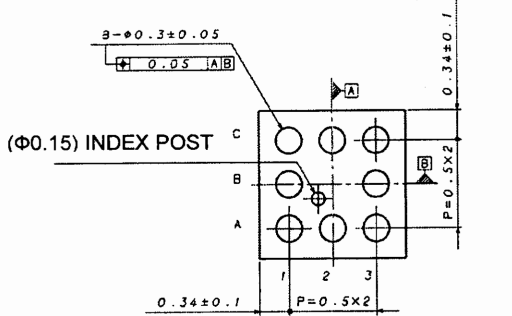
Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
EN Terminal						
EN Low threshold voltage	VthL	-	-	0.4	V	
EN High threshold voltage	VthH	1.4	-	-	V	
EN Input current	Iin	-	18.3	30	uA	EN=5.5V
EN Output current	Iout	-2	-0.1	-	uA	EN=0
Switching Regulator						
Input voltage range	Vin	3.1	-	5.5	V	
Quiescent Current	Iq	-	0.1	2	uA	EN=0V
Current Consumption	Idd	-	4.3	5.8	mA	EN=2.6V,VFB=1.0V,VIN=3.6V
Feedback voltage	Vfb	0.47	0.5	0.53	V	
Inductor current limit	Icoil	270	350	430	mA	Vin=3.6V (*1)
SW saturation voltage	Vsat	-	0.3	0.8	V	Isw=200mA,Vout=13V
SW on resistance P	Ronp	-	4	8	Ohm	Ipch=200mA,Vout=13V
Switching frequency	fSW	0.8	1.0	1.2	MHz	
Duty cycle limit	Duty	82.7	85	-	%	VFB=0V
Output voltage range	Vo	-	-	18	V	
Over voltage limit	Ovl	18	18.5	19	V	VFB=0V
Start up time	Ts	-	0.5	1.0	ms	

*1. This parameter is tested with dc measurement.

○External dimensions





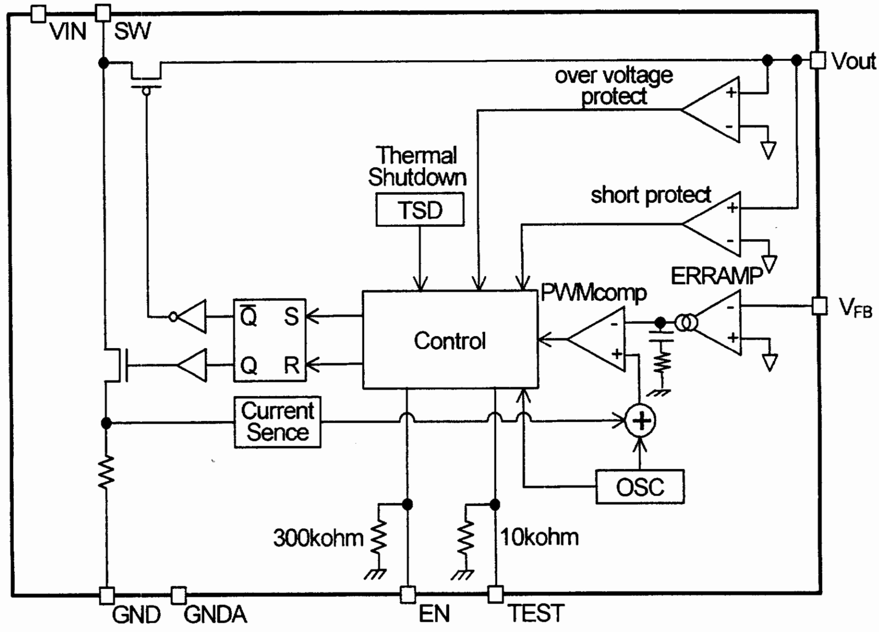


VCSP60N1(8Pin)   (Unit : mm)

○Terminals

BALL	BALL Name
A1	GNDA
A2	EN
A3	TEST
B1	VIN
B3	VFB
C1	VOUT
C2	SW
C3	GND

○Block diagram



○ Cautions on use

(1) Absolute Maximum Ratings
An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down devices, thus making impossible to identify breaking mode such as a short circuit or an open circuit. If any special mode exceeding the absolute maximum ratings is assumed, consideration should be given to take physical safety measures including the use of fuses, etc.

(2) Power supply and GND line
Design PCB pattern to provide low impedance for the wiring between the power supply and the GND lines. Pay attention to the interference by common impedance of layout pattern when there are plural power supplies and GND lines. Especially, when there are GND pattern for small signal and GND pattern for large current included the external circuits, please separate each GND pattern. Furthermore, for all power supply terminals to ICs, mount a capacitor between the power supply and the GND terminal. At the same time, in order to use a capacitor, thoroughly check to be sure the characteristics of the capacitor to be used present no problem including the occurrence of capacity dropout at a low temperature, thus determining the constant.

(3) GND voltage
Make setting of the potential of the GND terminal so that it will be maintained at the minimum in any operating state. Furthermore, check to be sure no terminals are at a potential lower than the GND voltage including an actual electric transient.

(4) Short circuit between terminals and erroneous mounting
In order to mount ICs on a set PCB, pay thorough attention to the direction and offset of the ICs. Erroneous mounting can break down the ICs. Furthermore, if a short circuit occurs due to foreign matters entering between terminals or between the terminal and the power supply or the GND terminal, the ICs can break down.

(5) Operation in strong electromagnetic field
Be noted that using ICs in the strong electromagnetic field can malfunction them.

(6) Input terminals
In terms of the construction of IC, parasitic elements are inevitably formed in relation to potential. The operation of the parasitic element can cause interference with circuit operation, thus resulting in a malfunction and then breakdown of the input terminal. Therefore, pay thorough attention not to handle the input terminals, such as to apply to the input terminals a voltage lower than the GND respectively, so that any parasitic element will operate. Furthermore, do not apply a voltage to the input terminals when no power supply voltage is applied to the IC. In addition, even if the power supply voltage is applied, apply to the input terminals a voltage lower than the power supply voltage or within the guaranteed value of electrical characteristics.

(7) External capacitor
In order to use a ceramic capacitor as the external capacitor, determine the constant with consideration given to a degradation in the nominal capacitance due to DC bias and changes in the capacitance due to temperature, etc.

(8) Thermal shutdown circuit (TSD)
When junction temperatures become 175°C (typ) or higher, the thermal shutdown circuit operates and turns a switch OFF. The thermal shutdown circuit, which is aimed at isolating the LSI from thermal runaway as much as possible, is not aimed at the protection or guarantee of the LSI. Therefore, do not continuously use the LSI with this circuit operating or use the LSI assuming its operation.

(9) Thermal design
Perform thermal design in which there are adequate margins by taking into account the permissible dissipation (Pd) in actual states of use.

(10) DC/DC converter
Please select the low DCR inductors to decrease power loss for DC/DC converter.

— Information for board assembly —

Package : VCSP60N1

〈A table of contents〉

1. Construction and materials .... 1/10 page
2. External dimensions .... 2/10 page
3. Reference land terminal area .... 3/10 page
4. Recommend soldering conditions .... 4/10 ~ 5/10page
5. Packing specification .... 5/10 ~ 9/10page
6. Store products and allowance time to mounting .... 10/10 page
7. Meaning of marking lot number .... 10/10 page
8. Regarding the underfill material .... 10/10 page
9. Note .... 10/10 page

1. Construction and materials

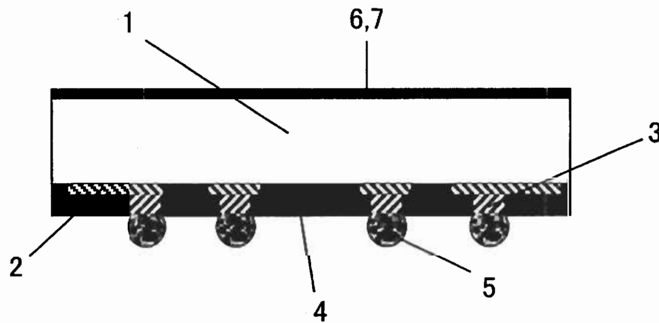
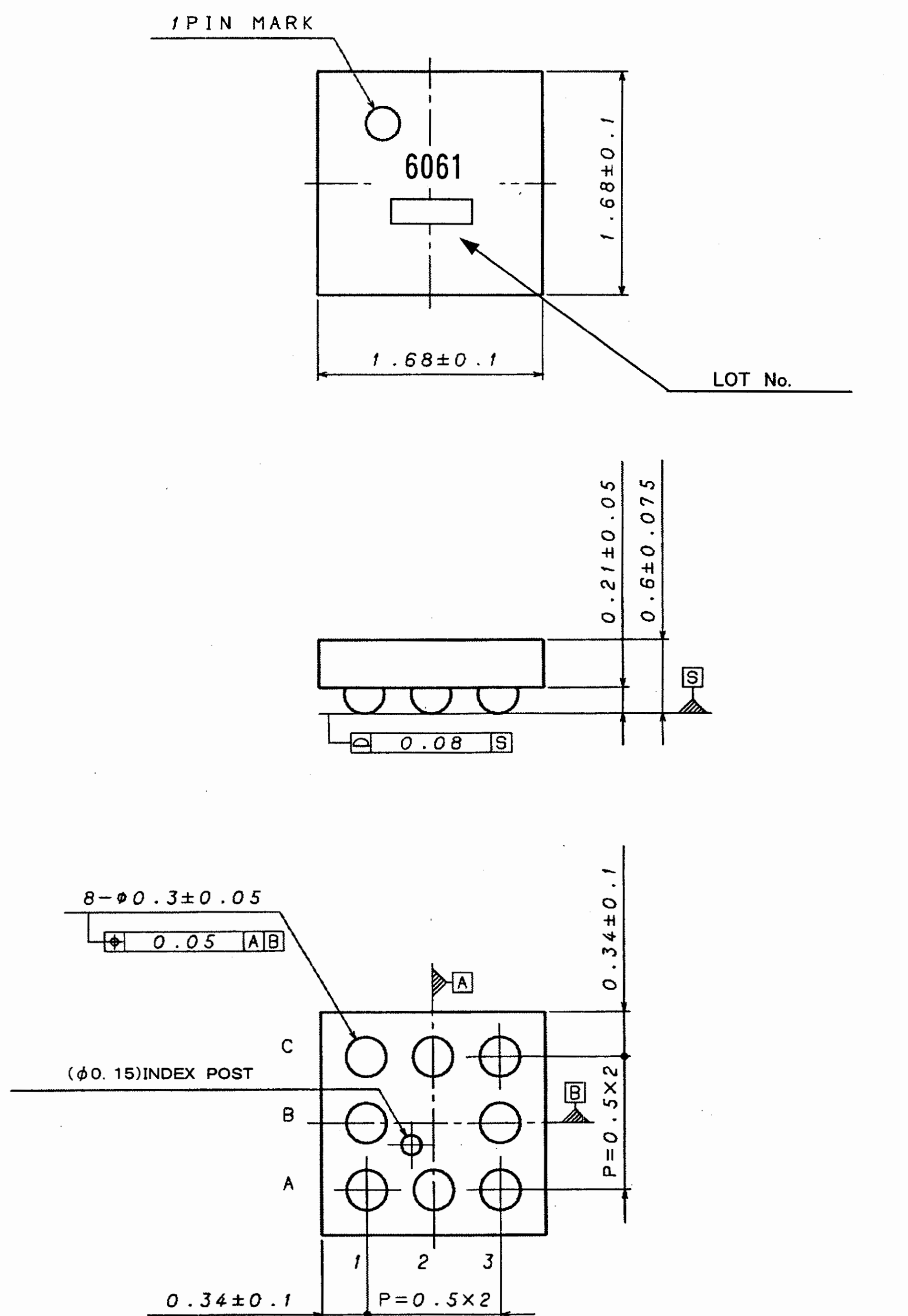


Figure1. Construction

No.	Part Name	Materials(Method)
1.	Die	Silicon
2.	Cu Layer	Cu
3.	Cu Post	Cu
4.	Encapsuration	Epoxy Resin
5.	Solder Ball	Sn−3.0Ag−0.5Cu Solder
6.	Encapsuration	Polyamide−imide Resin
7.	Marking	Laser Marking

A dry weight per one device : 0.003g

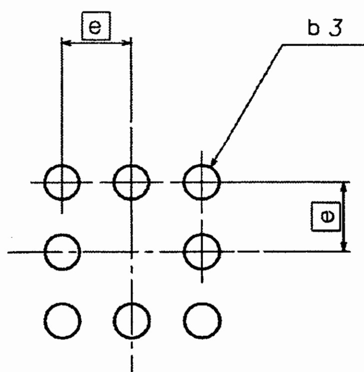
2. External dimensions



(Unit:mm)

Figure2. External dimensions

3. Reference land terminal area



(Unit:mm)

Reference symbol	Reference value
e	0.50
b3	0.25

Figure3. Reference land terminal area

(Notes)

Please set pattern design, taking into consideration flux cleaning conditions, solder joint strength, screen mask tolerance,bridge, heat dissipation and the others.

4. Soldering conditions

4．1．Reflow condition with the Sn–Ag high–melting–point solder

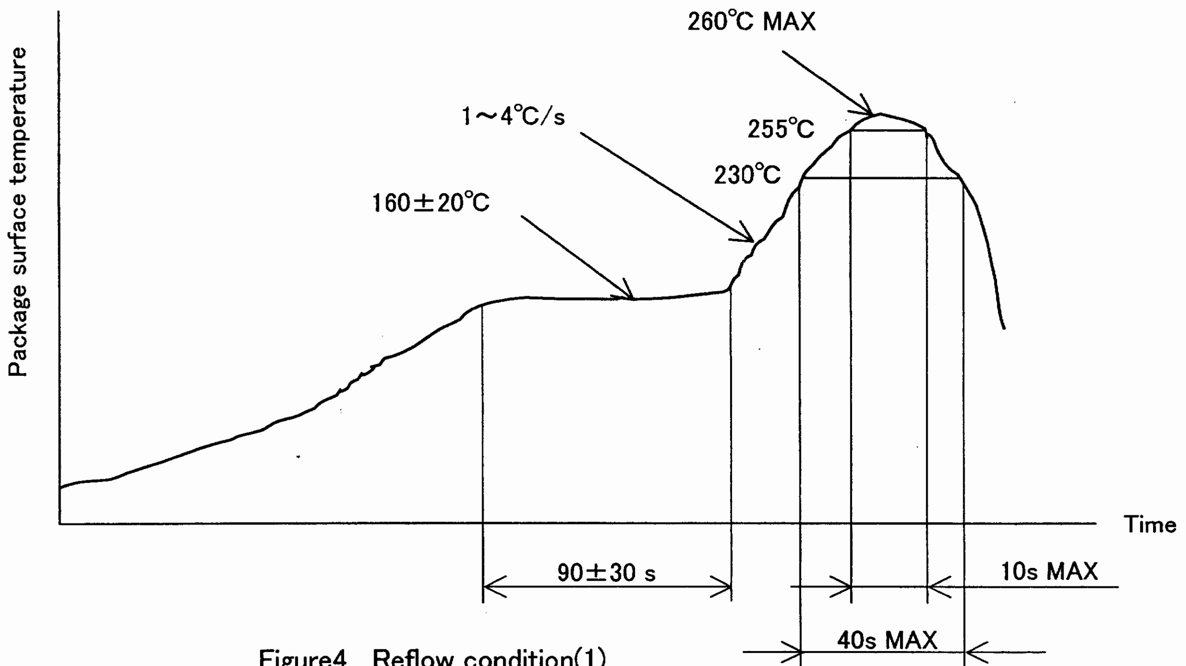


Figure4. Reflow condition(1)

(Notice)

(1)Additional heat is until 2–times.

4．1．1．Allowance reflow condition with the Sn–Ag high–melting–point solder

The above–mentioned profile is standard,and it can mount in the following profile with the preheating zone and the soldering zone.

Pre–heating temperature : 130℃～190℃
Pre–heating zone : 120s MAX
Soldering temperature : 220℃～230℃
Soldering zone : 60s MAX

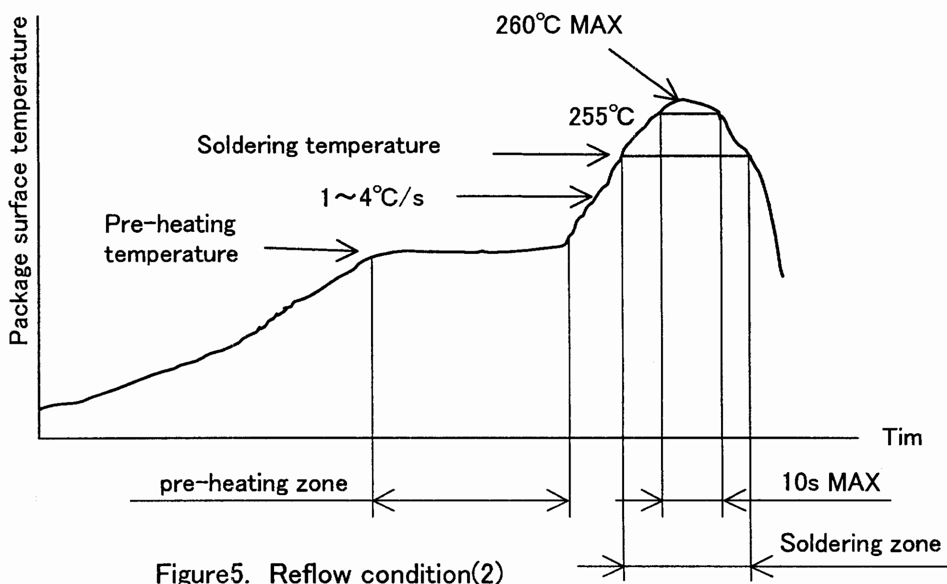


Figure5. Reflow condition(2)

(Notice)

(1)Additional heat is until 2–times.

4. 2. Reflow conditions with Sn-Pb solder

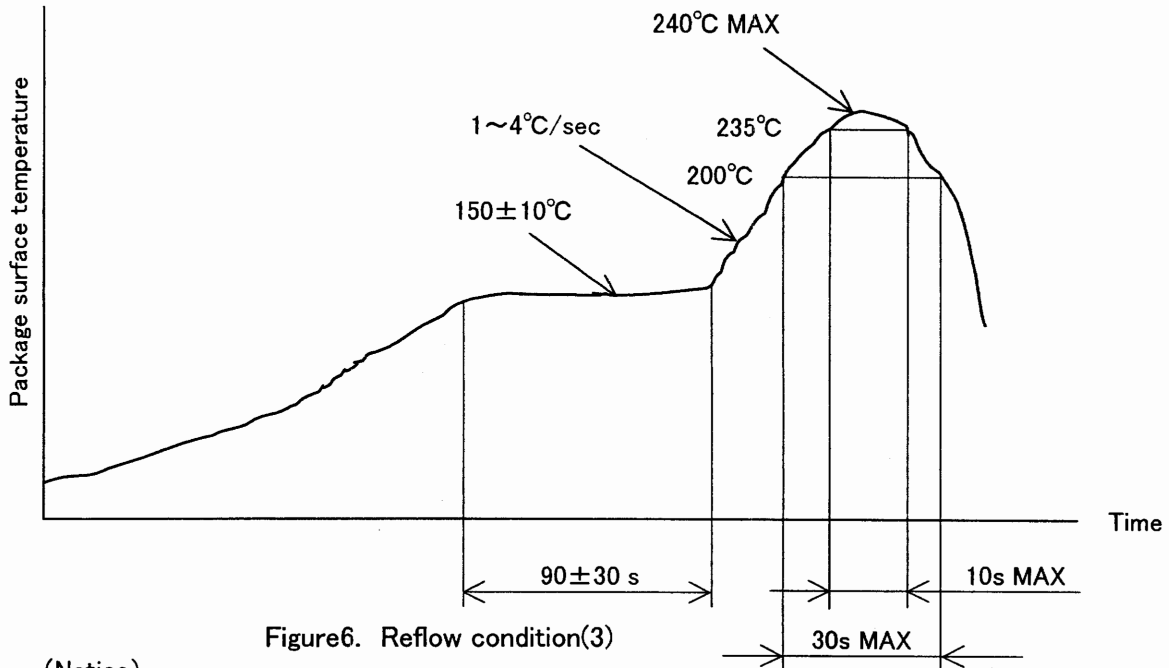


Figure6. Reflow condition(3)

(Notice)

(1) Additional heat is until 2-times.

(2) The Sn-Pb solder recommends the above-mentioned profile,and it can set up to the profile of Sn-Ag solder.
If the mounting condition in your company does not exceed standard of our company, it can mount on your company mounting conditions.

(3) Caution : This package is used Sn-Ag-Cu solder for a terminal solder ball.
Since there is a possibility of reducing mounting when it is mounted with the solder of Sn-Pb.

4. 3. Flow-soldering

Flow-soldering method mounting is not recommended.

4. 4. Partical heat supply method (by soldering iron)

Flow-soldering method mounting is not recommended.

5. Packing specification

5. 1. Packing type and quantity,Direction of taping

Packing type	Taping
Packing quantity	3,000pcs/Reel
Direction of Taping	E2 (1pin of an Ic faces to reel side)

ROHM CO.,LTD.

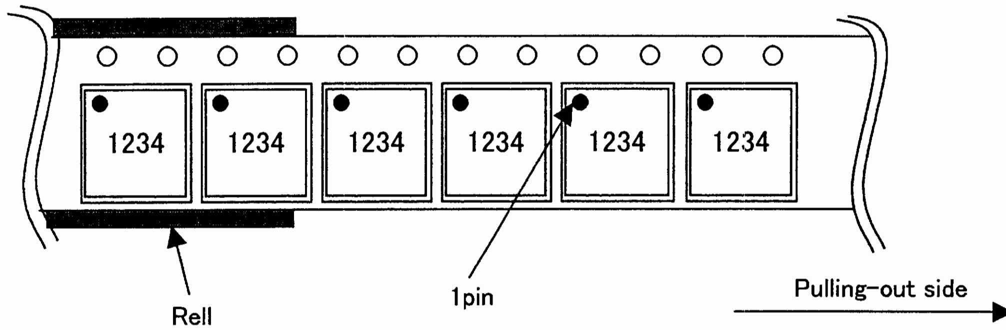


Figure7. Direction of taping(E2)

5．2．Taping dimensions and reel dimensions

5．2．1．Taping dimensions

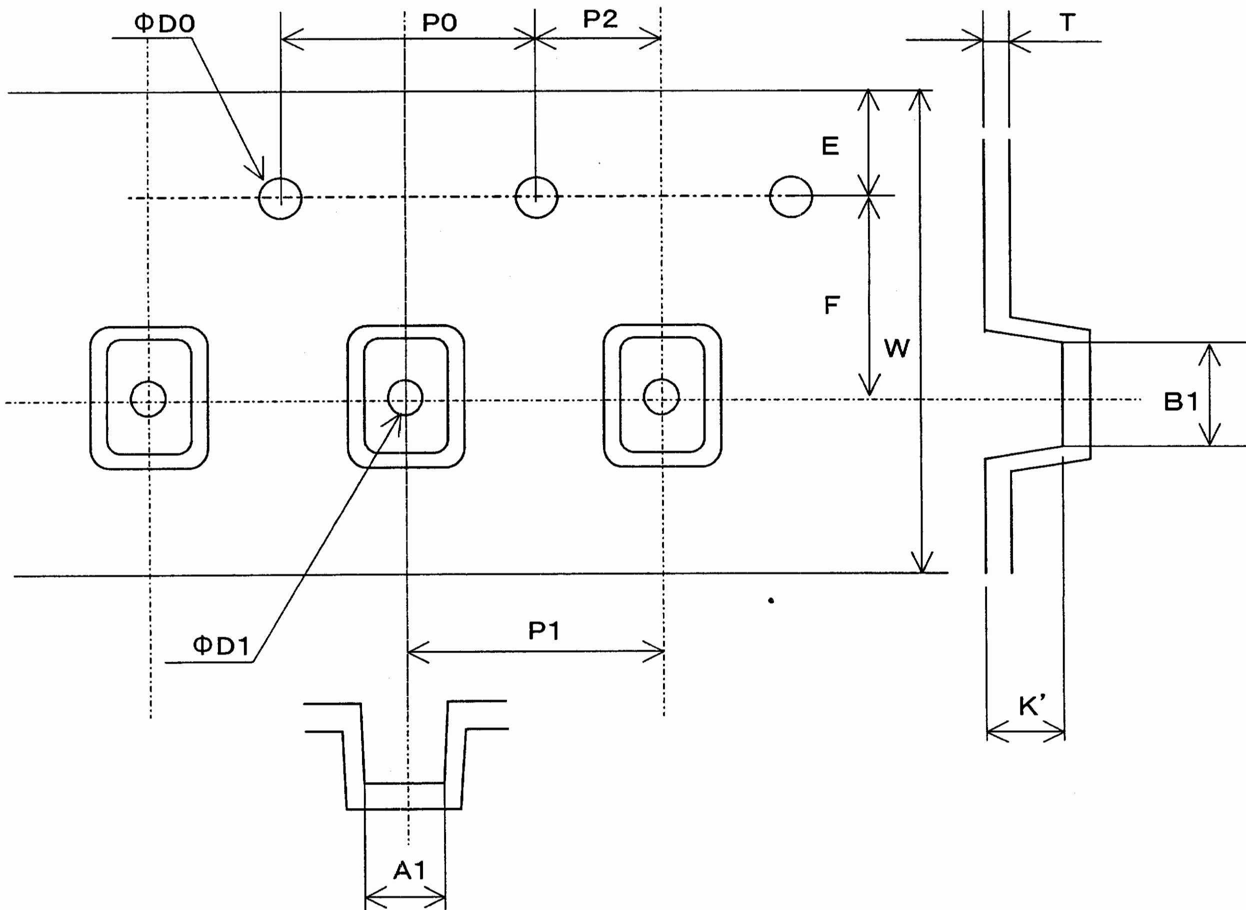
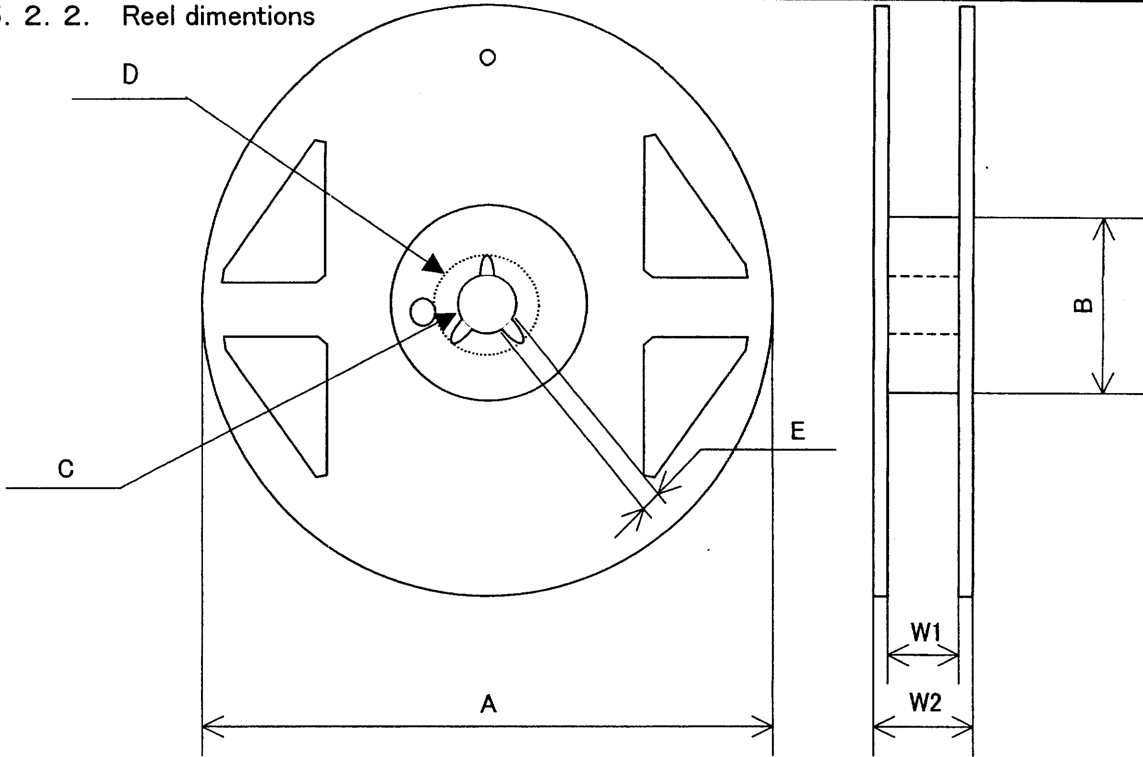


Figure8. Taping dimensions

(Unit:mm)

A1	B1	D0	D1	E	F	K'	P0	P1	P2	T	W
2.0 ±0.1	2.0 ±0.1	ϕ1.5 +0.1 −0	ϕ1.0 +0.1 −0	1.75 ±0.1	3.5 ±0.1	0.8 ±0.1	4.0 ±0.1	4.0 ±0.1	2.0 ±0.1	0.25 ±0.05	8.0 ±0.3

5. 2. 2. Reel dimentions



(Unit: mm)

A	B	C	D	E	W1	W2
φ180	80 ±1.0	13.0 ±0.2	20.2MIN	1.5MIN	9.4 ±1.0	13.4 ±1.0

Figure9. Reel dimensions

5. 3. Leader and trail of tape

5. 3. 1. Leader

Leader tape,which has no devices should have at least 40 pockets.

5. 3. 2. Trail

Trail tape,which has no devices should have at least 10 pockets.
Trail tape,is not fixed to reel.

5. 4. Marking of label

The label shown as Figure10 to be put on the reel and inner box.

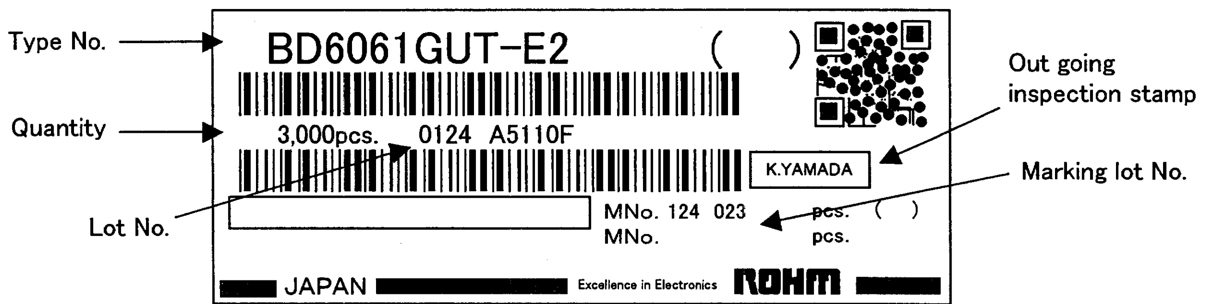


Figure10. Label marking

5. 5. Packing method

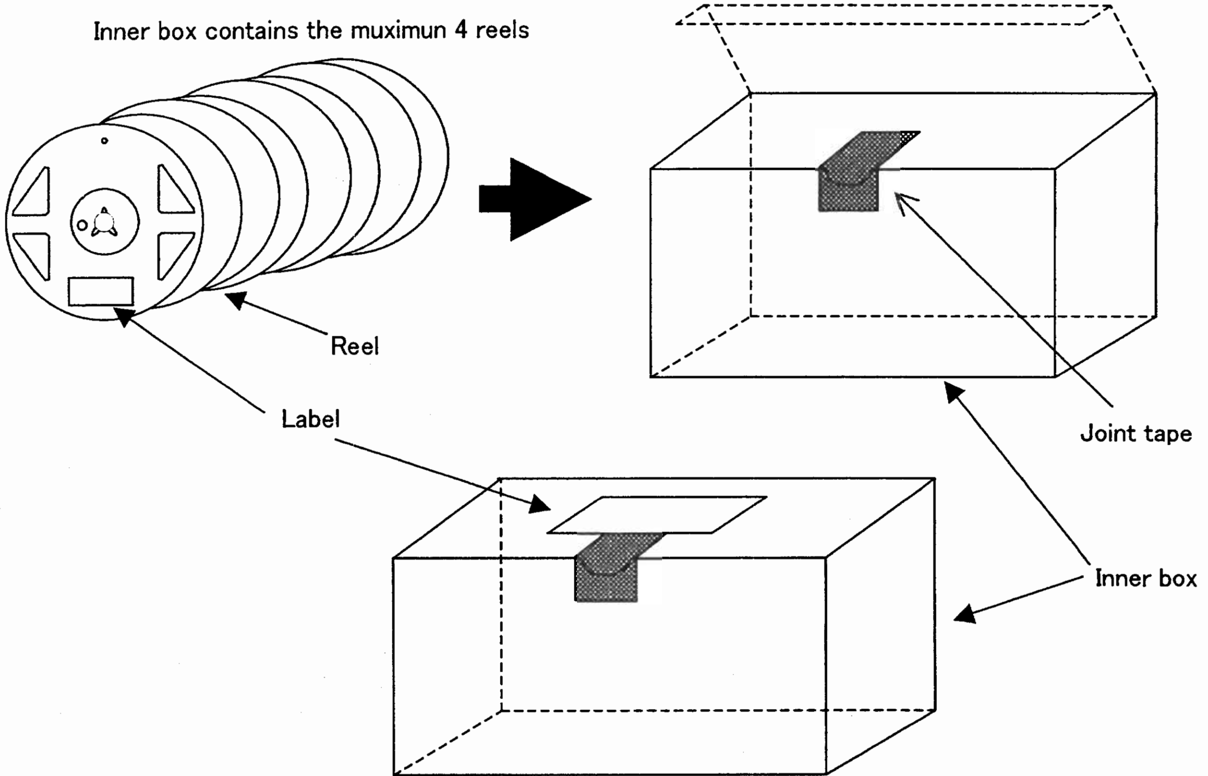


Figure11. Packing methods

Figure11. Packing methods

5. 6. Packing condition

The dimension of packing is as Figure 12 and it contains the maximum 4 inner boxes.

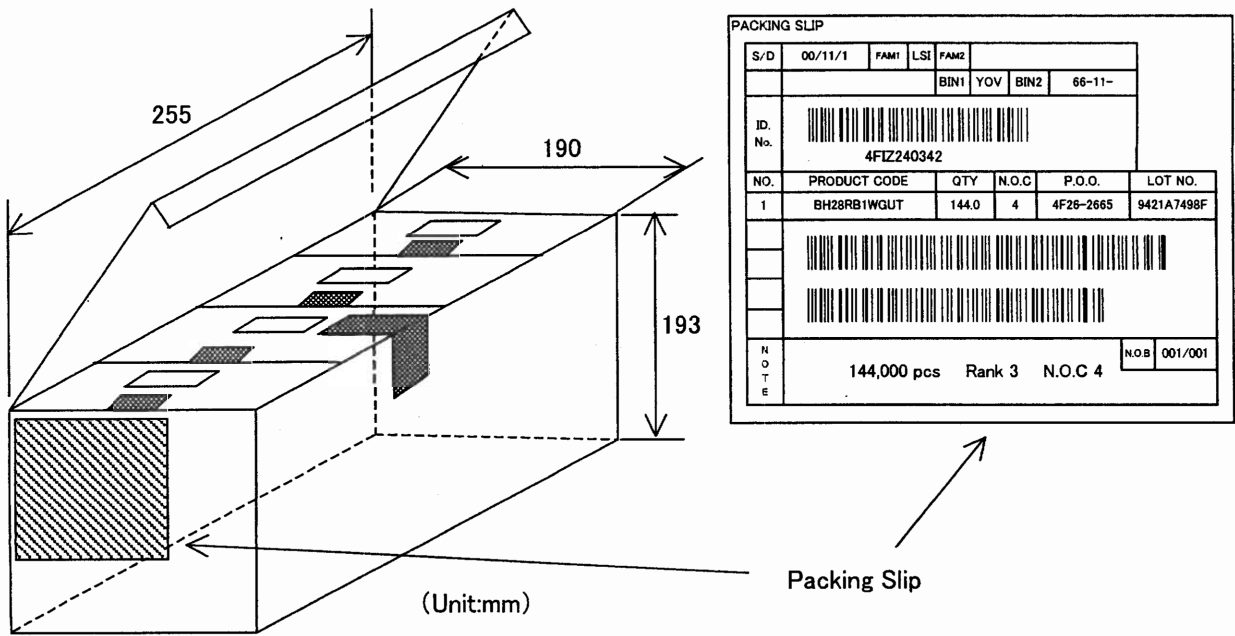


Figure12. Packing condition

5. 7. Packing materials

The used packing materials are mentioned as below.

The name of materials	The quality of the materials
Tape	PS
Cover tape	APET + PE
Reel	PS
Inner box	Card board box
Packing box	Card board box

5. 8. Others

5. 8. 1. Adhesion strength of cover tape

Adhesion strength of cover tape is 0.2～0.7N (20gf～70gf).
(Please refer to Figure13 for evaluation method.)

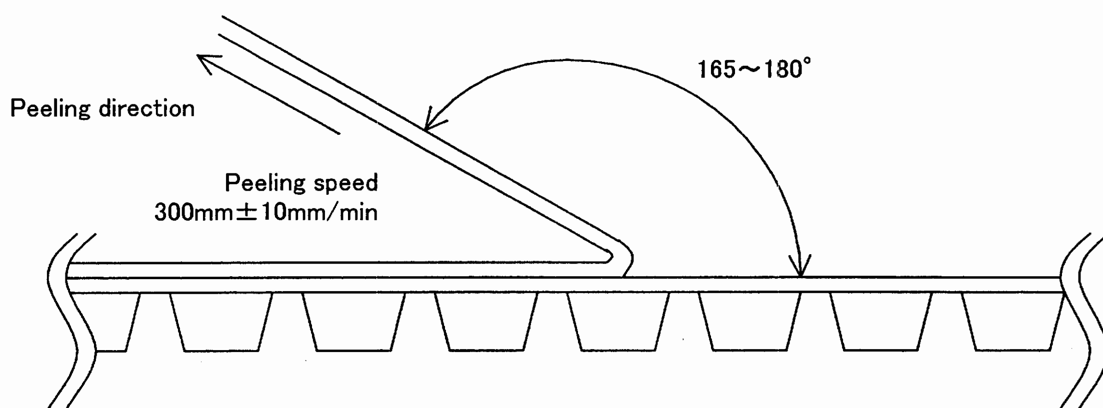


Figure13. The method of peeling test

5. 8. 2. Failure rate

The missing parts in taping is.
(1)Continuous missing is 0%.
(2)Discontinuous missing is MAX0.1%/1reel.

6. Strage condition and allowance time to mounting

6. 1. Strage condition

Please store products in the following conditions ;

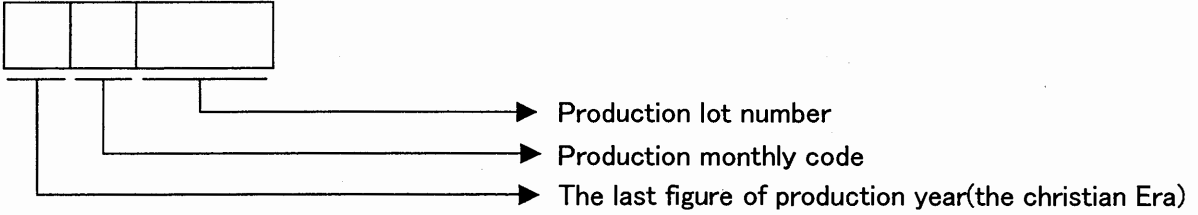
Temperature : 5 to 30℃ Humidity : 40 to 70%

6. 2. Allowance time from opening the package

This package dose not require additional drying treatment as long as the moisture condition at the mounting process is within our recommended mounting condition.

(Allowance time for products is within a year from delivery)

7. Meaning of marking lot number



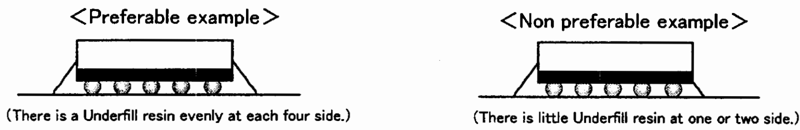
8. Regarding the underfill material

There are some cases that the underfill material is applied as purpose to reinforce the soldered junction of the package.

Since the mount reliability depends on the resin material or coating condition , it may deteriorate on the contrary.

Therefore , it is necessary to evaluate it sufficiently for its application .

In term of the coating condition , it is preferable that there is an enough material beyond the each four side of a packeage.



9. Note

Please handle the device with care not to damage to it physically and chemically.

And please handle the device with care not to impress ESD to it and be sure that human body,epuipment,tools and working table are grounded to earth.

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- View BD6061GUT-E2 on WIN SOURCE
- Rohm Semiconductor Information

Optimize Your Supply Chain with WIN SOURCE Solutions

- Global Sourcing Solution
- Obsolete Management
- Cost Control Management
- Shortage Management
- Alternative Solution
- Excess Inventory Management