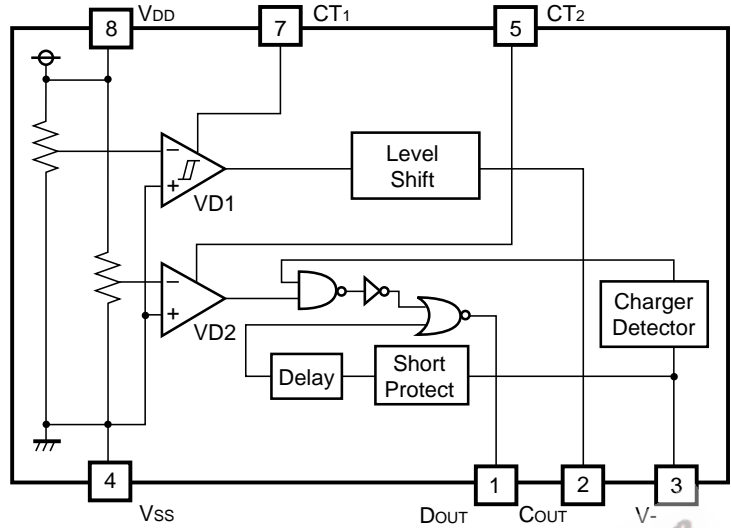




## BLOCK DIAGRAM



## SELECTION GUIDE

In the RV5VG1 series, the overcharge/excessive discharge detector threshold, respective hysteresis ranges, short-circuit detector threshold and taping type can be selected at the user's request.

The selection can be made by designating the part number as shown belows.

RV5VG1-  -  -   Part Number  
           ↑  ↑  ↑  
           a  b  c

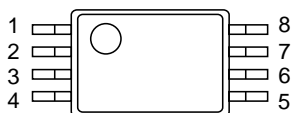
Code	Contents
a	Development serial number for overcharging/excessive discharge detector threshold, hysteresis ranges, and short-circuit detector threshold.
b	Designation of release conditions of voltage detector. C : VD1 (After over-charge detection).....when battery voltage falls below $V_{DET1}-V_{HYS1}$ or a load resistance is applied. VD2 (After excessive-discharge detection).....when a charger is connected. D : VD1 (After over-charge detection).....when battery voltage falls below $V_{DET1}-V_{HYS1}$ . VD2 (After excessive-discharge detection) .....when battery voltage rises above $V_{DET2}+V_{HYS2}$ or a charger is connected.
c	Designation of Taping Type: EX. 8pin SSOP: E1, E2 (refer Taping Specifications) "E2" is prescribed as a standard.

---

---

## PIN CONFIGURATION

• 8pin SSOP (0.65mm pitch)



## PIN DESCRIPTION

Pin No.	Symbol	Pin Description
1	DOUT	Output Pin of over-discharge detection, CMOS output
2	COUT	Output Pin of over-charge detection, CMOS output
3	V-	Pin for charger negative input
4	VSS	Ground Pin
5	CT2	Pin for external capacitor for setting output delay of VD2
6	NC	No connection
7	CT1	Pin for external capacitor for setting output delay of VD1
8	VDD	Power supply Pin

## ABSOLUTE MAXIMUM RATINGS

 $T_{opt}=25^{\circ}\text{C}$ ,  $V_{SS}=0\text{V}$ 

Symbol	Item		Ratings	Unit
$V_{DD}$	Supply Voltage		-0.3 to +12	V
V-	Input Voltage	V-pin	$V_{DD}-12$ to $V_{DD}+0.3$	V
$V_{CT1}$ , $V_{CT2}$		CT1, CT2 pin	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
$V_{COUT}$	Output Voltage	COUT pin	$V_{DD}-12$ to $V_{DD}+0.3$	V
$V_{DOUT}$		DOUT pin	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
$P_D$	Power Dissipation		300	mW
$T_{opt}$	Operating Temperature Range		-30 to +80	$^{\circ}\text{C}$
$T_{stg}$	Storage Temperature Range		-55 to +125	$^{\circ}\text{C}$
$T_{solder}$	Lead Temperature (Soldering)		$260^{\circ}\text{C}$ , 10s	

### ABSOLUTE MAXIMUM RATINGS

Absolute Maximum ratings are threshold limit values that must not be exceeded even for an instant under any conditions. Moreover, such values for any two items must not be reached simultaneously. Operation above these absolute maximum ratings may cause degradation or permanent damage to the device. These are stress ratings only and do not necessarily imply functional operation below these limits.

## ELECTRICAL CHARACTERISTICS

## • RV5VG101C

T<sub>opt</sub>=25°C

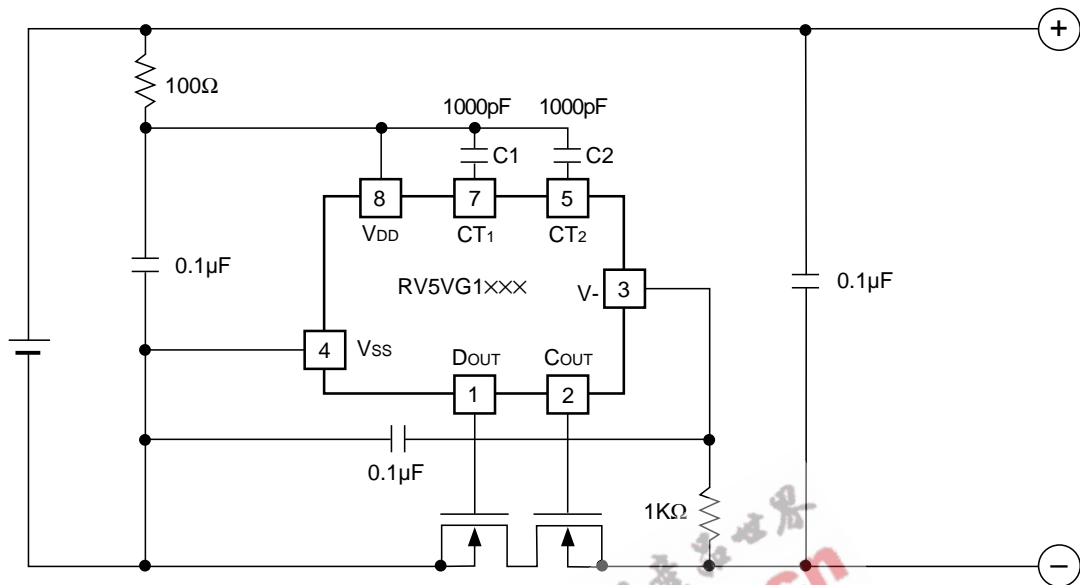
Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit.
V <sub>DD1</sub>	Operating Input Voltage	V <sub>DD</sub> to V <sub>SS</sub>	1.2		5	V
V <sub>DD2</sub>		V <sub>DD</sub> to V <sub>-</sub>	1.2		10	V
V <sub>DET1</sub>	Over-charge Detector Threshold	Voltage rising edge detection	4.20	4.25	4.30	V
V <sub>HYS1</sub>	Over-charge Detector Hysteresis Range		0.15	0.20	0.25	V
t <sub>VDET1</sub>	V <sub>DET1</sub> Output Delay Time	C1=1000pF, V <sub>DD</sub> =3.6V-4.3V	22	43	86	ms
V <sub>DET2</sub>	Over-discharge Detector Threshold	Voltage falling edge detection	2.437	2.50	2.563	V
t <sub>VDET2</sub>	V <sub>DET2</sub> Output Delay Time	C2=1000pF, V <sub>DD</sub> =3.6V-2.4V	12	24	48	ms
V <sub>short</sub>	Short protection Voltage	V <sub>DD</sub> =3.9V	0.17	0.2	0.23	V
t <sub>short1</sub>	Short protection Delay Time	V <sub>DD</sub> =3.0V, V <sub>-</sub> =0V-1V	2.4	4.8	9.6	ms
t <sub>short2</sub>		V <sub>DD</sub> =2.0V, V <sub>-</sub> =0V-1V	1.4	2.8	5.6	
V <sub>OL1</sub>	C <sub>OUT</sub> Nch Tr. ON Voltage	I <sub>OL</sub> =100μA, V <sub>DD</sub> =4.4V		0.17	0.5	V
V <sub>OH1</sub>	C <sub>OUT</sub> Pch Tr. ON Voltage	I <sub>OH</sub> =-100μA, V <sub>DD</sub> =3.9V	3.4	3.73		V
V <sub>OL2</sub>	D <sub>OUT</sub> Nch Tr. ON Voltage	I <sub>OL</sub> =100μA, V <sub>DD</sub> =2.4V		0.17	0.5	V
V <sub>OH2</sub>	D <sub>OUT</sub> Pch Tr. ON Voltage	I <sub>OH</sub> =-100μA, V <sub>DD</sub> =3.9V	3.4	3.73		V
I <sub>DD</sub>	Supply Current	V <sub>DD</sub> =3.9V, V <sub>-</sub> =0V		2.3	5.0	μA
I <sub>standby</sub>	Standby Current	V <sub>DD</sub> =2.4V, V <sub>-</sub> =2.4V		0.2	2.5	μA
V <sub>chg</sub>	Charger Sense Minimum Voltage	V <sub>DD</sub> =3.3V		0.13	0.2	V
R <sub>short</sub>	V <sub>-</sub> pin pull down resistance	V <sub>DD</sub> =3.9V, V <sub>-</sub> =1.0V	65	130	260	kΩ

## • RV5VG101D

T<sub>opt</sub>=25°C

Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit.
V <sub>DD1</sub>	Operating Input Voltage	V <sub>DD</sub> to V <sub>SS</sub>	1.2		5	V
V <sub>DD2</sub>		V <sub>DD</sub> to V-	1.2		10	V
V <sub>DET1</sub>	Over-charge Detector Threshold	Voltage rising edge detection	4.20	4.25	4.30	V
V <sub>HYS1</sub>	Over-charge Detector Hysteresis Range		0.15	0.2	0.25	V
t <sub>VDET1</sub>	V <sub>DET1</sub> Output Delay Time	C1=1000pF, V <sub>DD</sub> =3.6V-4.3V	22	43	86	ms
V <sub>DET2</sub>	Over-discharge Detector Threshold	Voltage falling edge detection	2.437	2.50	2.563	V
V <sub>HYS2</sub>	Over-discharge Detector Hysteresis Range		0.50	0.60	0.70	V
t <sub>VDET2</sub>	V <sub>DET2</sub> Output Delay Time	C2=1000pF, V <sub>DD</sub> =3.6V-2.4V	12	24	48	ms
V <sub>short</sub>	Short protection Voltage	V <sub>DD</sub> =3.9V	0.17	0.2	0.23	V
t <sub>short1</sub>	Short protection Delay Time	V <sub>DD</sub> =3.0V, V <sub>-</sub> =0V-4V	2.4	4.8	9.6	ms
t <sub>short2</sub>		V <sub>DD</sub> =2.0V, V <sub>-</sub> =0V-4V	1.4	2.8	5.6	
V <sub>OL1</sub>	C <sub>OUT</sub> Nch Tr. ON Voltage	I <sub>OL</sub> =100μA, V <sub>DD</sub> =4.4V		0.17	0.5	V
V <sub>OH1</sub>	C <sub>OUT</sub> Pch Tr. ON Voltage	I <sub>OH</sub> =-100μA, V <sub>DD</sub> =3.9V	3.4	3.73		V
V <sub>OL2</sub>	D <sub>OUT</sub> Nch Tr. ON Voltage	I <sub>OL</sub> =100μA, V <sub>DD</sub> =2.4V		0.17	0.5	V
V <sub>OH2</sub>	D <sub>OUT</sub> Pch Tr. ON Voltage	I <sub>OH</sub> =-100μA, V <sub>DD</sub> =3.9V	3.4	3.73		V
I <sub>DD</sub>	Supply Current	V <sub>DD</sub> =3.9V, V <sub>-</sub> =0V		2.3	5.0	μA
I <sub>standby</sub>	Standby Current	V <sub>DD</sub> =2.4V, V <sub>-</sub> =2.4V		1.0	2.5	μA
V <sub>chg</sub>	Charger Sense Minimum Voltage	V <sub>DD</sub> =2.9V		0.1	0.2	V
R <sub>short</sub>	V- pin pull down resistance	V <sub>DD</sub> =3.9V, V <sub>-</sub> =1.0V	65	130	260	kΩ

## TYPICAL APPLICATION







## NOTICE

---

1. The products and the product specifications described in this document are subject to change or discontinuation of production without notice for reasons such as improvement. Therefore, before deciding to use the products, please refer to Ricoh sales representatives for the latest information thereon.
2. This document may not be copied or otherwise reproduced in whole or in part without prior written consent of Ricoh.
3. Please be sure to take any necessary formalities under relevant laws or regulations before exporting or otherwise taking out of your country the products or the technical information described herein.
4. The technical information described in this document shows typical characteristics of and example application circuits for the products. The release of such information is not to be construed as a warranty of or a grant of license under Ricoh's or any third party's intellectual property rights or any other rights.
5. The products listed in this document are intended and designed for use as general electronic components in standard applications (office equipment, computer equipment, measuring instruments, consumer electronic products, amusement equipment etc.). Those customers intending to use a product in an application requiring extreme quality and reliability, for example, in a highly specific application where the failure or misoperation of the product could result in human injury or death (aircraft, spacevehicle, nuclear reactor control system, traffic control system, automotive and transportation equipment, combustion equipment, safety devices, life support system etc.) should first contact us.
6. We are making our continuous effort to improve the quality and reliability of our products, but semiconductor products are likely to fail with certain probability. In order prevent any injury to persons or damages to property resulting from such failure, customers should be careful enough to incorporate safety measures in their design, such as redundancy feature, fire-containment feature and fail-safe feature. We do not assume any liability or responsibility for any loss or damage arising from misuse or inappropriate use of the products.
7. Anti-radiation design is not implemented in the products described in this document.
8. Please contact Ricoh sales representatives should you have any questions or comments concerning the products or the technical information.

1995 June

---

**RICOH COMPANY, LTD.**  
**ELECTRONIC DEVICES DIVISION**

**HEADQUARTERS**

13-1, Himemuro-cho, Ikeda City, Osaka 563-8501, JAPAN  
Phone 81-727-53-1111 Fax 81-727-53-6011

**YOKOHAMA OFFICE** (International Sales)

3-2-3, Shin-Yokohama, Kohoku-ku, Yokohama City, Kanagawa 222-8530,  
JAPAN  
Phone 81-45-477-1697 Fax 81-45-477-1694 · 1695  
<http://www.ricoh.co.jp/LSI/english/>

**RICOH CORPORATION**  
**ELECTRONIC DEVICES DIVISION**

**SAN JOSE OFFICE**

3001 Orchard Parkway, San Jose, CA 95134-2088, U.S.A.  
Phone 1-408-432-8800 Fax 1-408-432-8375