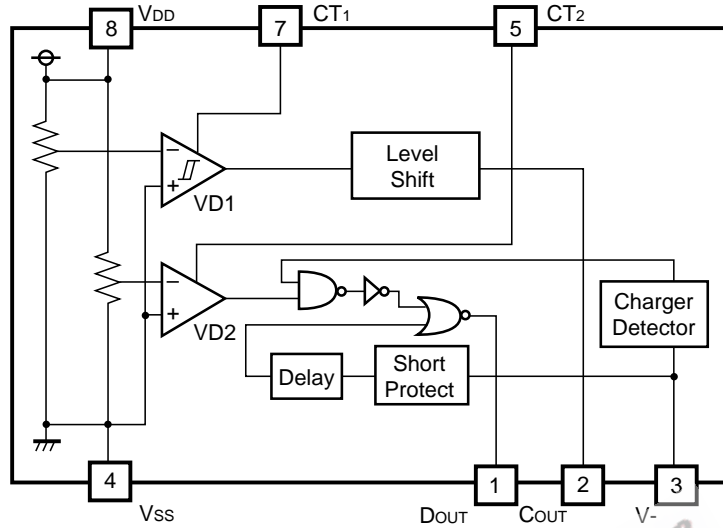




## BLOCK DIAGRAM



## 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

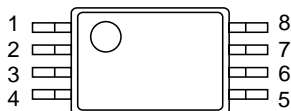
| Code | Contents  |
|------|---|
| a    | Development serial number for overcharging/excessive discharge detector threshold, hysteresis ranges, and short-circuit detector threshold.   |
| b    | Designation of release conditions of voltage detector.<br>C : VD1 (After over-charge detection).....when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

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## 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

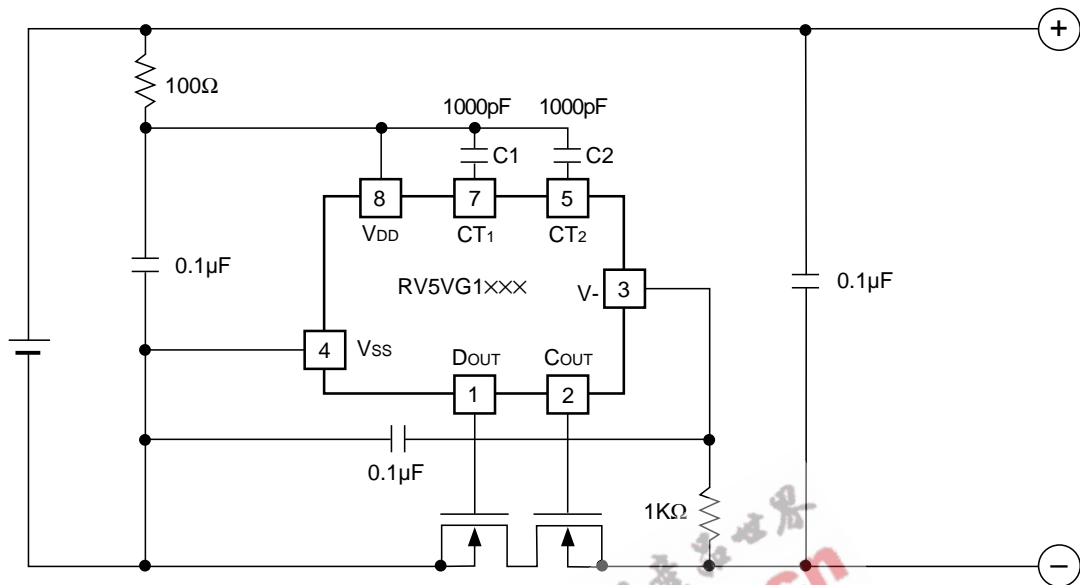
| Symbol               | Item                                    | Conditions                                     | MIN.  | TYP. | MAX.  | Unit. |
|----------------------|---|--|-------|------|-------|-------|
| V <sub>DD1</sub>     | Operating Input Voltage                 | V <sub>DD</sub> to V <sub>SS</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

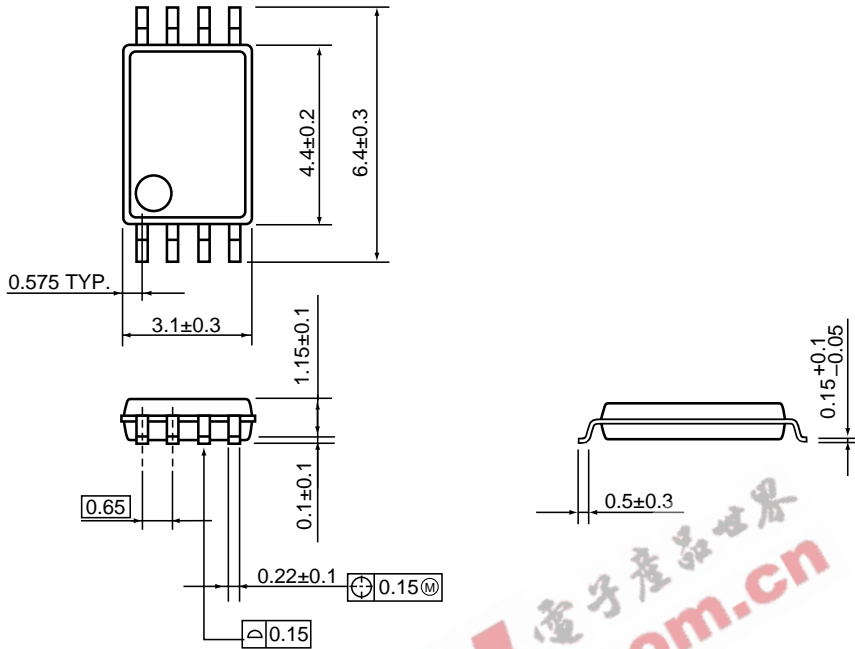
| Symbol               | Item                                     | Conditions                                     | MIN.  | TYP. | MAX.  | Unit. |
|----------------------|--|--|-------|------|-------|-------|
| V <sub>DD1</sub>     | Operating Input Voltage                  | V <sub>DD</sub> to V <sub>SS</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



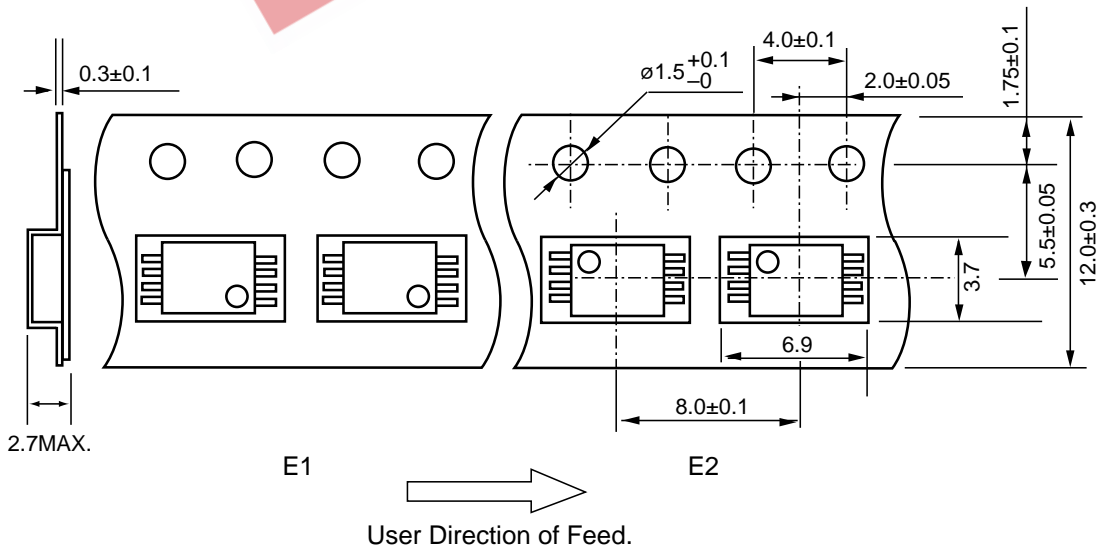
**PACKAGE DIMENSIONS** (Unit: mm)

• 8pin SSOP (0.65mm pitch)



**TAPING SPECIFICATION** (Unit: mm)

• 8pin SSOP (0.65mm pitch)



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1995 June

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