

STRUCTURE                      Silicon Monolithic Integrated Circuit

PRODUCT SERIES              Low Voltage Detector IC

TYPE                              **BU48XXF Series**

FEATURES                      •Detection voltage lineup : 0.9V~4.8V  
                                          •High precision detection voltage :  $\pm 1\%$

#### ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| Parameter                               | Symbol    | Limit         | Unit |
|-----------------------------------------|-----------|---------------|------|
| Supply Voltage ※1                       | VDD – GND | -0.3 to +7    | V    |
| Output Voltage ※1 Nch Open Drain Output | VOUT      | GND-0.3 to +7 | V    |
| Power Dissipation ※2                    | Pd        | 400           | mW   |
| Operating Temperature ※1                | Topr      | -40 to +125   | °C   |
| Storage Temperature Range               | Tstg      | -55 to +125   | °C   |
| Junction Temperature                    | Tjmax     | 125           | °C   |

※1 Do not exceed Pd.

※2 Mounted on 70mm × 70mm × 1.6mm Glass Epoxy PCB, Pd derated at 4.0mW/°C for temperature above Ta=25°C

NOTE : The product described in this specification is a strategic product (and/or service) subject to COCOM regulations. It should not be exported without authorization from the appropriate government.

NOTE : This product is not designed for protection against radioactive rays.

#### Status of this document

The Japanese 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.

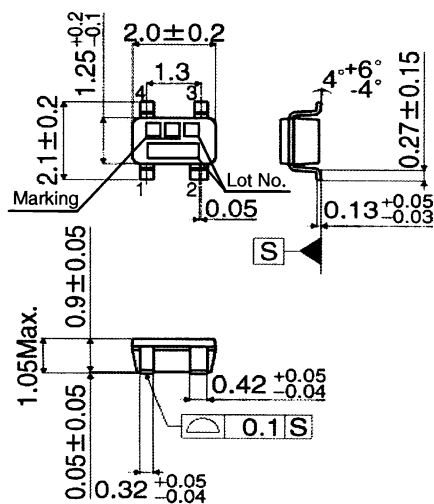
**OELECTRICAL CHARACTERISTICS** (Unless Otherwise Specified Ta=-25 to 125°C)

| Parameter                                 | Symbol               | Condition                                                                | Limit                          |                            |                                | Unit   |
|-------------------------------------------|----------------------|--------------------------------------------------------------------------|--------------------------------|----------------------------|--------------------------------|--------|
|                                           |                      |                                                                          | Min.                           | Typ.                       | Max.                           |        |
| Detection Voltage                         | V <sub>DET</sub>     | V <sub>DD</sub> =H→L Ta=25°C<br>R <sub>L</sub> =470kΩ                    | V <sub>DET</sub> (T)<br>× 0.99 | V <sub>DET</sub> (T)       | V <sub>DET</sub> (T)<br>× 1.01 | V      |
| Circuit Current when ON                   | I <sub>DD1</sub>     | V <sub>DD</sub> =V <sub>DET</sub> -0.2V, V <sub>DET</sub> =0.9-1.3V      | -                              | 0.15                       | 0.88                           | μA     |
|                                           |                      | V <sub>DET</sub> =1.4-2.1V                                               | -                              | 0.20                       | 1.05                           |        |
|                                           |                      | V <sub>DET</sub> =2.2-2.7V                                               | -                              | 0.25                       | 1.23                           |        |
|                                           |                      | V <sub>DET</sub> =2.8-3.3V                                               | -                              | 0.30                       | 1.40                           |        |
|                                           |                      | V <sub>DET</sub> =3.4-4.2V                                               | -                              | 0.35                       | 1.58                           |        |
|                                           |                      | V <sub>DET</sub> =4.3-4.8V                                               | -                              | 0.40                       | 1.75                           |        |
| Circuit Current when OFF                  | I <sub>DD2</sub>     | V <sub>DD</sub> =V <sub>DET</sub> +2.0V, V <sub>DET</sub> =0.9-1.3V      | -                              | 0.30                       | 1.40                           | μA     |
|                                           |                      | V <sub>DET</sub> =1.4-2.1V                                               | -                              | 0.35                       | 1.58                           |        |
|                                           |                      | V <sub>DET</sub> =2.2-2.7V                                               | -                              | 0.40                       | 1.75                           |        |
|                                           |                      | V <sub>DET</sub> =2.8-3.3V                                               | -                              | 0.45                       | 1.93                           |        |
|                                           |                      | V <sub>DET</sub> =3.4-4.2V                                               | -                              | 0.50                       | 2.10                           |        |
|                                           |                      | V <sub>DET</sub> =4.3-4.8V                                               | -                              | 0.55                       | 2.28                           |        |
| Operating Voltage Range                   | V <sub>OPL</sub>     | V <sub>OL</sub> ≤0.4V, R <sub>L</sub> =470kΩ<br>Ta=25°C~125°C            | 0.70                           | -                          | -                              | V      |
|                                           |                      | V <sub>OL</sub> ≤0.4V, R <sub>L</sub> =470kΩ<br>Ta=-25°C~25°C            | 0.90                           | -                          | -                              |        |
| 'Low' Output Current (Nch)                | I <sub>OL</sub>      | V <sub>DS</sub> =0.05V, V <sub>DD</sub> =0.85V                           | 20                             | 100                        | -                              | μA     |
|                                           |                      | V <sub>DS</sub> =0.5V, V <sub>DD</sub> =1.5V, V <sub>DET</sub> =1.7-4.8V | 1.0                            | 3.3                        | -                              | mA     |
|                                           |                      | V <sub>DS</sub> =0.5V, V <sub>DD</sub> =2.4V, V <sub>DET</sub> =2.7-4.8V | 3.6                            | 6.5                        | -                              |        |
| Output Leak Current when OFF              | I <sub>leak</sub>    | V <sub>DD</sub> =V <sub>DS</sub> =7V<br>Ta=-40°C~85°C                    | -                              | 0                          | 0.1                            | μA     |
|                                           |                      | V <sub>DD</sub> =V <sub>DS</sub> =7V<br>Ta=85°C~125°C                    | -                              | 0                          | 1                              |        |
| Detection Voltage Temperature Coefficient | V <sub>DET</sub> /ΔT | Ta=-40°C~125°C (Designed Guarantee)                                      | -                              | ±30                        | -                              | ppm/°C |
| Hysteresis Voltage                        | ΔV <sub>DET</sub>    | R <sub>L</sub> =470kΩ,<br>V <sub>DD</sub> =L→H→L<br>Ta=-40°C~125°C       | V <sub>DET</sub> ≤1.0V         | V <sub>DET</sub> ×<br>0.03 | V <sub>DET</sub> ×<br>0.05     | V      |
|                                           |                      |                                                                          | V <sub>DET</sub> ≥1.1V         | V <sub>DET</sub> ×<br>0.03 | V <sub>DET</sub> ×<br>0.05     |        |

V<sub>DET</sub>(T) : Standard Detection Voltage(0.9V to 4.8V, 0.1V step)

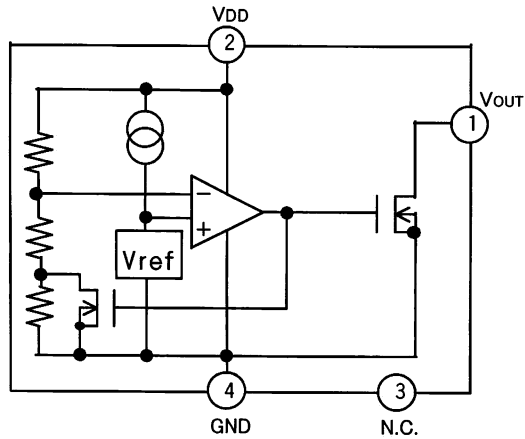
R<sub>L</sub> : Pull-up resistor to be connected between V<sub>OUT</sub> and power supply.

Designed Guarantee.(Outgoing inspection is not done on all products.)

**OPHYSICAL DIMENSIONS, MARKING**


SOP4 (UNIT:mm)

## OBLOCK DIAGRAM



## OPIN NO. , PIN NAME

| Pin Number | Pin Name |
|------------|----------|
| 1          | VOUT     |
| 2          | VDD      |
| 3          | N.C.     |
| 4          | GND      |

※ Please refer to technical note concerning application circuit, and etc.

## OSTANDARD DETECTION VOLTAGE AND MARKING

| Type   | Standard Detection Voltage [V] | Marking | Type   | Standard Detection Voltage [V] | Marking |
|--------|--------------------------------|---------|--------|--------------------------------|---------|
| BU4848 | 4.800                          | JR      | BU4828 | 2.800                          | HV      |
| BU4847 | 4.700                          | JQ      | BU4827 | 2.700                          | HU      |
| BU4846 | 4.600                          | JP      | BU4826 | 2.600                          | HT      |
| BU4845 | 4.500                          | JN      | BU4825 | 2.500                          | HS      |
| BU4844 | 4.400                          | JM      | BU4824 | 2.400                          | HR      |
| BU4843 | 4.300                          | JL      | BU4823 | 2.300                          | HQ      |
| BU4842 | 4.200                          | JK      | BU4822 | 2.200                          | HP      |
| BU4841 | 4.100                          | JJ      | BU4821 | 2.100                          | HN      |
| BU4840 | 4.000                          | JH      | BU4820 | 2.000                          | HM      |
| BU4839 | 3.900                          | JG      | BU4819 | 1.900                          | HL      |
| BU4838 | 3.800                          | JF      | BU4818 | 1.800                          | HK      |
| BU4837 | 3.700                          | JE      | BU4817 | 1.700                          | HJ      |
| BU4836 | 3.600                          | JD      | BU4816 | 1.600                          | HH      |
| BU4835 | 3.500                          | JC      | BU4815 | 1.500                          | HG      |
| BU4834 | 3.400                          | JB      | BU4814 | 1.400                          | HF      |
| BU4833 | 3.300                          | JA      | BU4813 | 1.300                          | HE      |
| BU4832 | 3.200                          | HZ      | BU4812 | 1.200                          | HD      |
| BU4831 | 3.100                          | HY      | BU4811 | 1.100                          | HC      |
| BU4830 | 3.000                          | HX      | BU4810 | 1.000                          | HB      |
| BU4829 | 2.900                          | HW      | BU4809 | 0.900                          | HA      |

## ONOTES FOR USE

### 1 . Absolute maximum range

Absolute Maximum Ratings are those values beyond which the life of a device may be destroyed. We cannot be defined the failure mode, such as short mode or open mode. Therefore a physical security countermeasure, like fuse, is to be given when a specific mode to be beyond absolute maximum ratings is considered.

### 2 . GND potential

GND terminal should be a lowest voltage potential every state.

Please make sure all pins which are over ground even if include transient feature.

### 3 . Electrical Characteristics

Be sure to check the electrical characteristics, that is one the tentative specification will be changed by temperature, supply voltage, and external circuit.

### 4 . Bypass Capacitor for Noise Rejection

Please put into the to reject noise between VDD pin and GND. If extremely big capacitor is used, transient response might be late. Please confirm sufficiently for the point.

### 5 . Short Circuit between Terminal and Soldering

Don't short-circuit between Output pin and VDD pin, Output pin and GND pin, or VDD pin and GND pin. When soldering the IC on circuit board, please be unusually cautious about the orientation and the position of the IC. When the orientation is mistaken the IC may be destroyed.

### 6 . Electromagnetic Field

Mal-function may happen when the device is used in the strong electromagnetic field.

### 7 . The VDD line impedance might cause oscillation because of the detection current.

### 8 . A VDD -GND capacitor (as close connection as possible) should be used in high VDD line impedance condition.

### 9 . Lower than the minimum input voltage makes the VOUT high impedance, and it must be VDD in pull up (VDD) condition.

### 10. Recommended value of RL Resistar is over 10k $\Omega$ . (VDET $\geq$ 1.5V) over 100k $\Omega$ . (VDET $\leq$ 1.4V)

### 11. BU48XXF has extremely high impedance terminals. Small leak current due to the uncleanness of PCB surface might cause unexpected operations. Application values in these conditions should be selected carefully. If the leakage is assumed between the VOUT terminal and the GND terminal, the pull up resistor should be less than 1/10 of the assumed leak resistance.

### 12. External parameters

The recommended parameter range for RL is 10k $\Omega$  ~1M $\Omega$ . When attempting to operate beyond these parameters, be sure to verify the actual operation before continuing use.

### 13. Power on reset operation

Please note that the power on reset output varies with the Vcc rise up time.

Please verify the actual operation.

### Notes

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