

High-accuracy  
Low current consumption

General-purpose  
**RESET IC**

# BD47XXG series

## ● Description

BD47XXG is a series of RESET ICs developed to prevent system error at transient state when the power of CPU and logic circuit switches ON/OFF or shutdown. These ICs consist of Power, GND, and reset output to detect power supply voltage of various systems and to output reset signal. These ICs are more practical for portable products because of their ultra-small package and low current consumption.

## ● Features

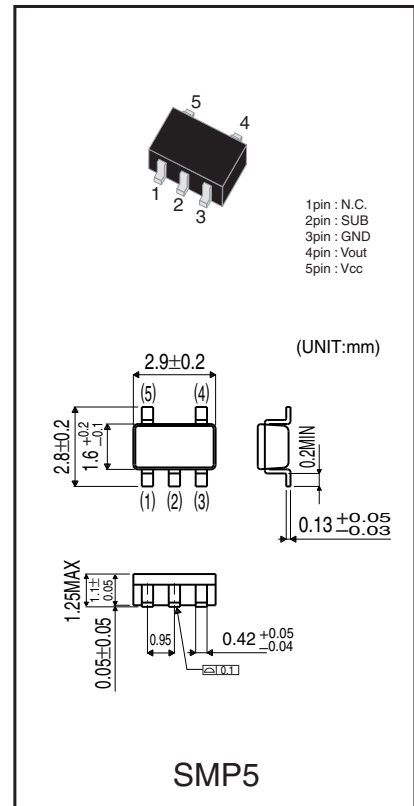
- 1) Detection voltage: 0.1V step line up 1.9~4.6V(Typ.)
- 2) High-accuracy voltage detection  $V_s \pm 2\%$ (Max.)
- 3) Low current consumption
- 4) "L" reset output of open collector
- 5) Small SMP5 package

## ● Applications

Portable products, Equipments with CPU and logic circuit

## ● Series characteristics

| Part No. | Detection voltage $V_s$ (V) |       |       | Consumption current ( $\mu\text{A}$ Typ.) |           | Hysteresis voltage (mV) | Operating output current (mA) | Package |
|----------|-----------------------------|-------|-------|---|-----------|-------------------------|-------------------------------|---------|
|          | Min                         | Typ.  | Max.  | $I_{CCL}$                                 | $I_{CCH}$ |                         |                               |         |
| BD4746G  | 4.508                       | 4.600 | 4.692 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4745G  | 4.410                       | 4.500 | 4.590 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4744G  | 4.312                       | 4.400 | 4.488 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4743G  | 4.214                       | 4.300 | 4.386 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4742G  | 4.116                       | 4.200 | 4.284 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4741G  | 4.018                       | 4.100 | 4.182 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4740G  | 3.920                       | 4.000 | 4.080 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4739G  | 3.822                       | 3.900 | 3.978 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4738G  | 3.724                       | 3.800 | 3.876 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4737G  | 3.626                       | 3.700 | 3.774 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4736G  | 3.528                       | 3.600 | 3.672 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4735G  | 3.430                       | 3.500 | 3.570 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4734G  | 3.332                       | 3.400 | 3.468 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4733G  | 3.234                       | 3.300 | 3.366 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4732G  | 3.136                       | 3.200 | 3.264 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4731G  | 3.038                       | 3.100 | 3.162 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4730G  | 2.940                       | 3.000 | 3.060 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4729G  | 2.842                       | 2.900 | 2.958 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4728G  | 2.744                       | 2.800 | 2.856 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4727G  | 2.646                       | 2.700 | 2.754 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4726G  | 2.548                       | 2.600 | 2.652 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4725G  | 2.450                       | 2.500 | 2.550 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4724G  | 2.352                       | 2.400 | 2.448 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4723G  | 2.254                       | 2.300 | 2.346 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4722G  | 2.156                       | 2.200 | 2.244 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4721G  | 2.058                       | 2.100 | 2.142 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4720G  | 1.960                       | 2.000 | 2.040 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |
| BD4719G  | 1.862                       | 1.900 | 1.938 | 1.5                                       | 1.6       | 50                      | 15                            | SMP5    |



● Absolute Maximum Ratings(Ta=25°C)

| Parameter                   | Symbol | Limits     | Unit |
|-----------------------------|--------|------------|------|
| Power supply voltage        | Vcc    | -0.3 ~ +10 | V    |
| Output voltage              | Po     | -0.3 ~ +10 | V    |
| Power dissipation (SMP5)    | Pd     | 150 *      | mW   |
| Operating temperature range | Topr   | -20 ~ +75  | °C   |
| Storage temperature range   | Tstg   | -40 ~ +125 | °C   |

Note) The ratings shown above indicate breakdown limit of the pin and should not be regarded as the values that guarantee the operation.

\* Derating : 1.5mW/°C for operation above Ta=25°C

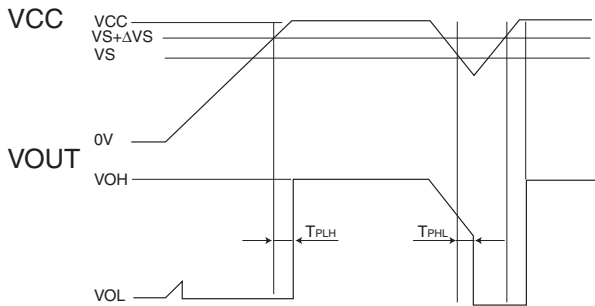
● Electrical characteristics(Unless otherwise noted; Ta=25°C)

| Parameter                                 | Symbol | Min. | Typ.    | Max. | Unit | Conditions                 |
|---|--------|------|---------|------|------|----------------------------|
| Detection voltage                         | Vs     | -2%  | 1.9~4.6 | +2%  | V    | RL=4.7kΩ, Vcc=HÆL          |
| Detection voltage temperature coefficient | Vs/ΔT  | —    | ±0.01   | —    | %/°C | RL=4.7KΩ, Ta=-20~+75°C     |
| Hysteresis voltage                        | ΔVs    | 30   | 50      | 100  | mV   | RL=4.7KΩ, Vcc=LÆHÆL        |
| "H" transfer delay time                   | TPLH   | —    | 20      | 50   | μS   | CL=100PF, RL=4.7KΩ *1      |
| "L" transfer delay time                   | TPHL   | —    | 60      | 120  | μS   | CL=100PF, RL=4.7KΩ *2      |
| "L" output voltage                        | VOL    | —    | 0.1     | 0.4  | V    | Vcc=VsMIN.-0.05V, RL=4.7KΩ |
| Circuit current (At ON mode)              | Icc1   | —    | 1.5     | 3.0  | μA   | Vcc=VsMIN.-0.05V, RL=∞     |
| Circuit current (At OFF mode)             | Icc2   | —    | 1.6     | 3.2  | μA   | Vcc=VsTYP./0.85V, RL=∞     |
| Operating limit voltage                   | VOPL   | —    | 0.65    | 0.85 | V    | RL=4.7KΩ, VOL≥0.4V         |
| Output leak current                       | IL     | —    | —       | 0.1  | μA   | Vcc=Vout=10V               |
| "L" output current                        | IOL    | 3.0  | 15.0    | —    | mA   | Vo=0.4V, Vcc=VsMIN.-0.05V  |

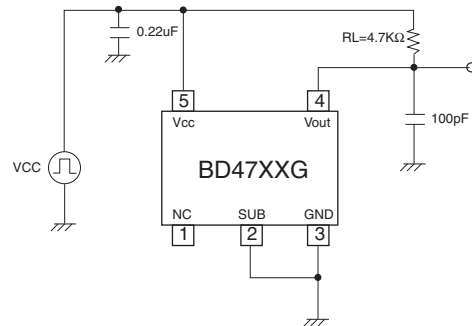
\*1 TPLH : Vcc=(Vs typ.-0.4V)Æ(Vs typ.+0.4V)

\*2 TPHL : Vcc=(Vs typ.+0.4V)Æ(Vs typ.-0.4V)

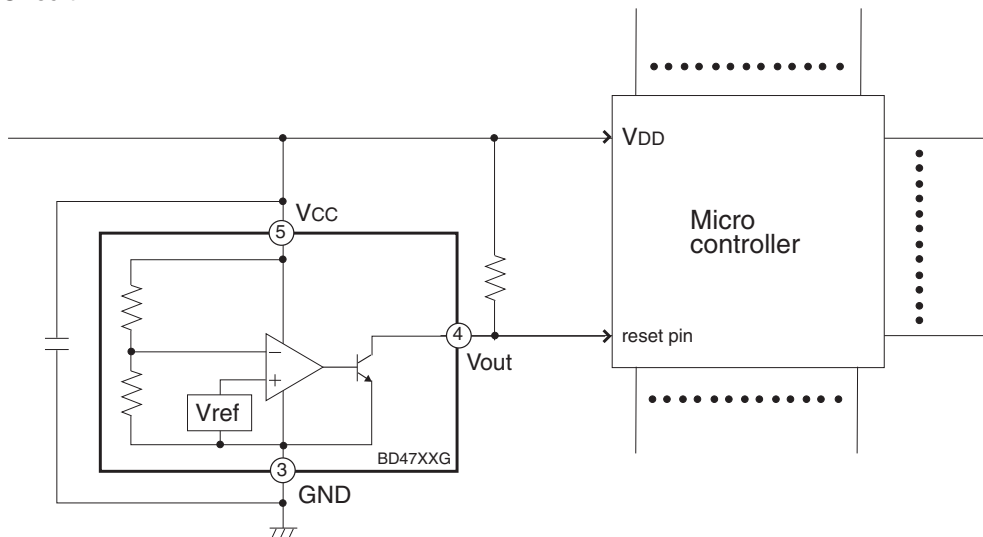
● Timing waveform



● Transfer delay time measurement circuit

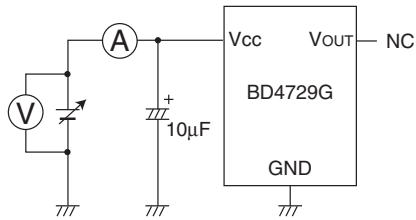
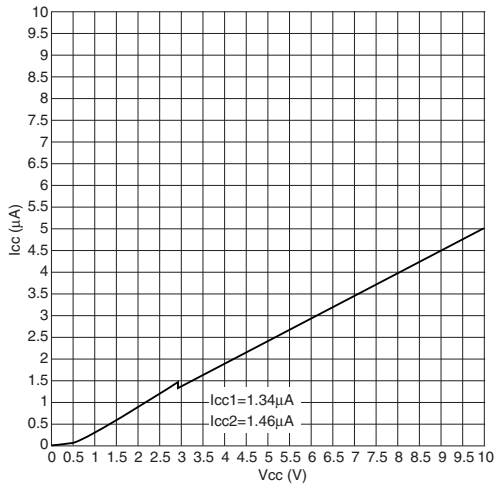


● Application Circuit

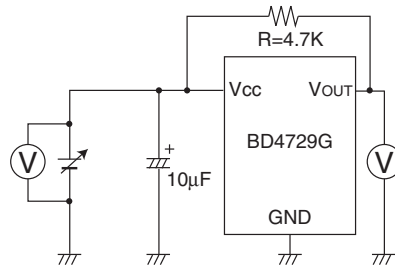
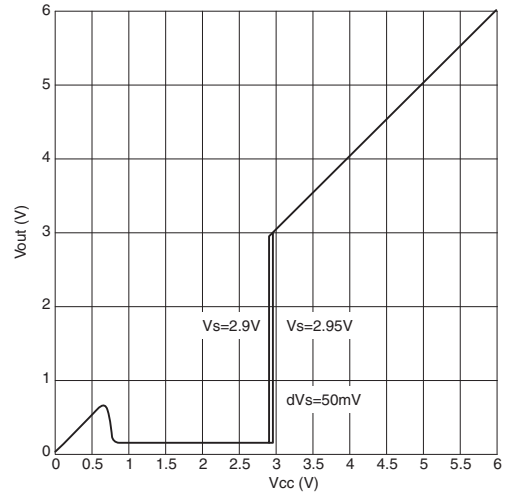


● Characteristic diagram and Measurement circuit (When BD4729G is measured.)

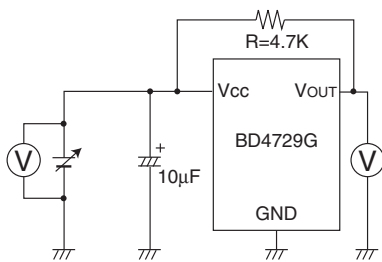
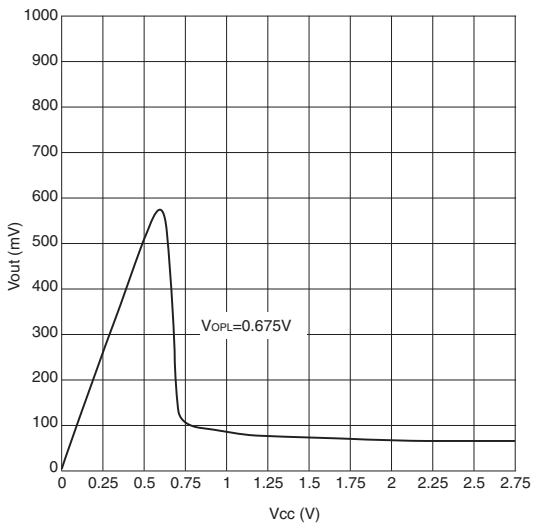
Current consumption



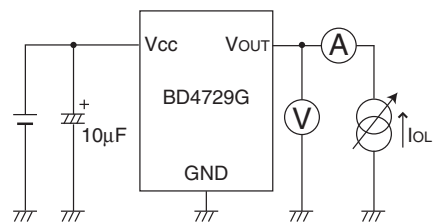
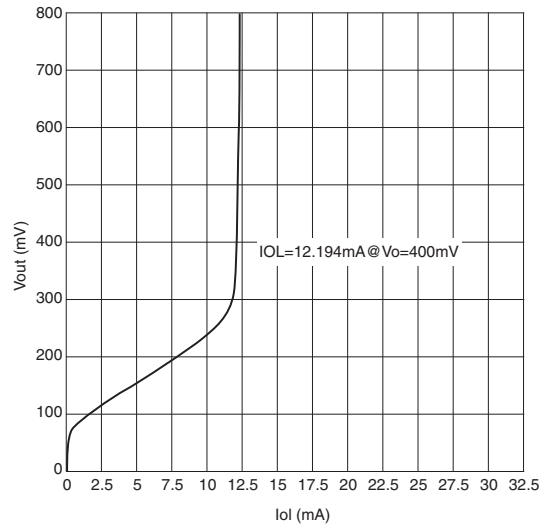
I/O characteristic



Operating limit voltage

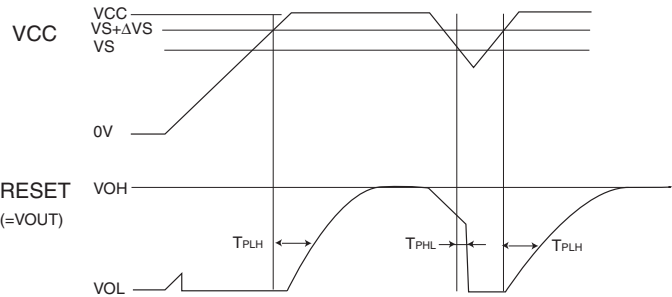
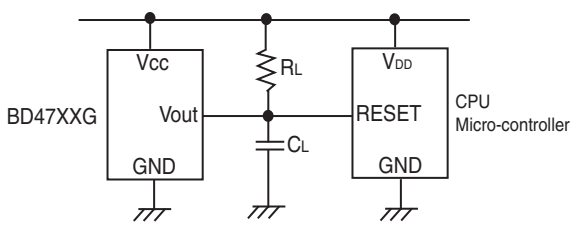


'L' output current

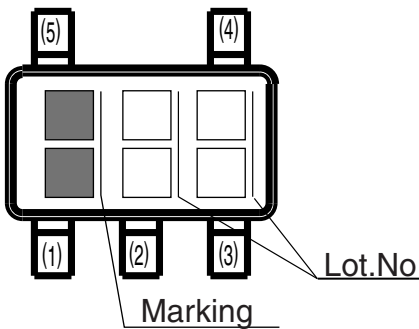


● Setting of the RESET signal delay time

Delay time can be set by capacitor  $C_L$  and resistance  $R_L$  connected to the output pin as shown below.  $C_L$  is charged by  $R_L$  when  $V_{CC}$  is rising. The delay time caused by charging is determined by the time constant of  $C_L$ ,  $R_L$  and the threshold voltage of RESET pin. RESET IC discharges  $C_L$  forcibly when  $V_{CC}$  is falling. The delay time of RESET signal is determined by adding the delay time of single RESET IC to each time.



Part number and Marking of samples



| Marking | Voltage | Part No. | Marking | Voltage | Part No. | Marking | Voltage | Part No. |
|---------|---------|----------|---------|---------|----------|---------|---------|----------|
| BA      | 1.9V    | BD4719   | BK      | 2.9V    | BD4729   | BU      | 3.9V    | BD4739   |
| BB      | 2.0V    | BD4720   | BL      | 3.0V    | BD4730   | BV      | 4.0V    | BD4740   |
| BC      | 2.1V    | BD4721   | BM      | 3.1V    | BD4731   | BW      | 4.1V    | BD4741   |
| BD      | 2.2V    | BD4722   | BN      | 3.2V    | BD4732   | BX      | 4.2V    | BD4742   |
| BE      | 2.3V    | BD4723   | B4      | 3.3V    | BD4733   | BY      | 4.3V    | BD4743   |
| BF      | 2.4V    | BD4724   | BP      | 3.4V    | BD4734   | BZ      | 4.4V    | BD4744   |
| BG      | 2.5V    | BD4725   | BQ      | 3.5V    | BD4735   | B1      | 4.5V    | BD4745   |
| BH      | 2.6V    | BD4726   | BR      | 3.6V    | BD4736   | B2      | 4.6V    | BD4746   |
| B3      | 2.7V    | BD4727   | BS      | 3.7V    | BD4737   |         |         |          |
| BJ      | 2.8V    | BD4728   | BT      | 3.8V    | BD4738   |         |         |          |