

Voltage Detector ICs



Voltage Detector Circuit Collection

(Circuit Applications)

BD48□□G Series, BD48□□FVE Series, BD49□□G Series, BD49□□FVE Series
 BD52□□G Series, BD52□□FVE Series, BD53□□G Series, BD53□□FVE Series
 BD45□□□G Series, BD46□□□G Series
 BU48□□G Series, BU48□□F Series, BU48□□FVE Series,
 BU49□□G Series, BU49□□F Series, BU49□□FVE Series
 BU42□□G Series, BU42□□F Series, BU42□□FVE Series,
 BU43□□G Series, BU43□□F Series, BU43□□FVE Series
 BD47□□G Series

No.11006EAY01

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●BD48□□G/FVE Series, BD49□□G/FVE Series

1) Examples of a common power supply detection reset circuit.

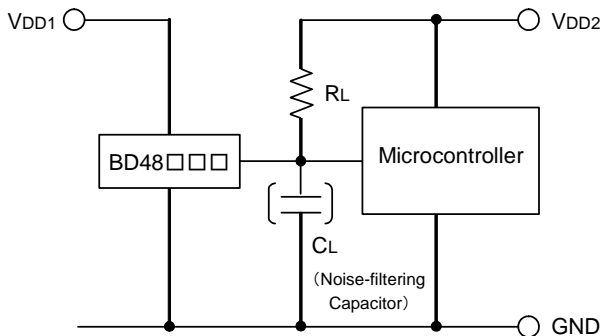


Fig.1 Open Collector Output Type

Application examples of BD48□□G/FVE series (Open Drain output type) and BD49□□G/FVE series (CMOS output type) are shown below.

CASE1:

The power supply of the microcontroller (VDD2) differs from the power supply of the reset detection (VDD1). Use the open drain output type (BD48□□G/FVE) attached a load resistance (RL) between the output and VDD2. (As shown Fig.1)

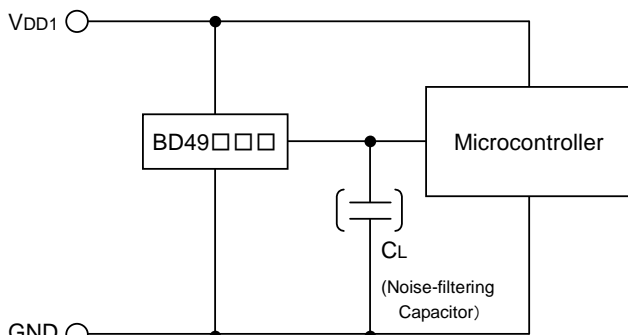


Fig.2 CMOS Output Type

CASE2:

The power supply of the microcontroller (VDD1) is same as the power supply of the reset detection (VDD1). Use CMOS output type (BD49□□G/FVE) or open drain output type (BD48□□G/FVE) attached a load resistance (RL) between the output and VDD1. (As shown Fig.2)

When a capacitance CL for noise filtering is connected to the VOUT pin (the reset signal input terminal of the microcontroller), please take into account the waveform of the rise and fall of the output voltage (VOUT).

2) The following is an example of a circuit application in which an OR connection between two types of detection voltages resets the microcontroller.

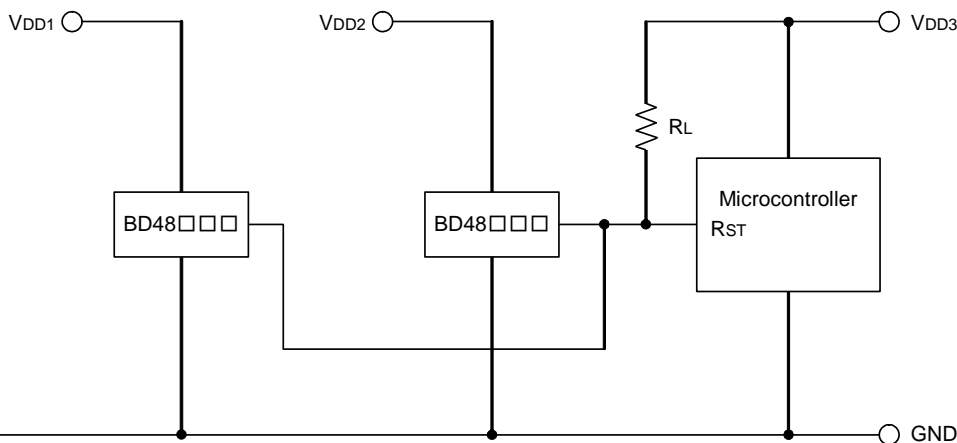


Fig.3

When there are many power supplies of the system, power supplies VDD1 and VDD2 are being monitored separately, and it is necessary to reset the microcomputer, it is possible to use an OR connection on the open drain output type BD48□□G/FVE series to pull-up to the desired voltage (VDD3) as shown in Fig.3 and make the output "High" voltage matches the power supply voltage VDD3 of the microcontroller.

3) Examples of the power supply with resistor dividers

In applications where the power supply input terminal (VDD) of an IC with resistor dividers, it is possible that a through current will momentarily flow into the circuit when the output logic switches, resulting in malfunctions (such as output oscillatory state).

(Through-current is a current that momentarily flows from the power supply (VDD) to ground (GND) when the output level switches from "High" to "Low" or vice versa.)

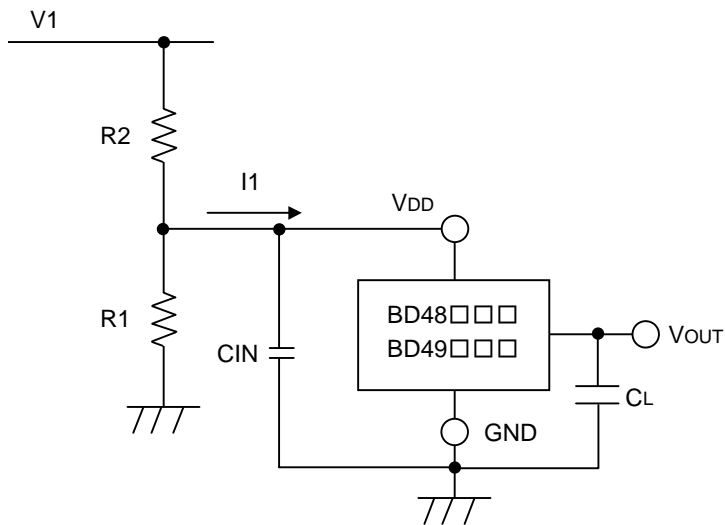


Fig.4

A voltage drop of [the through-current (I1)] × [input resistor (R2)] is caused by the through current, and the input voltage to descends, when the output switches from "Low" to "High". When the input voltage decreases and falls below the detection voltage, the output voltage switches from "High" to "Low". At this time, the through-current stops flowing through output "Low", and the voltage drop is eliminated. As a result, the output switches from "Low" to "High", which again causes the through current to flow and the voltage drop. This process is repeated, resulting in oscillation.

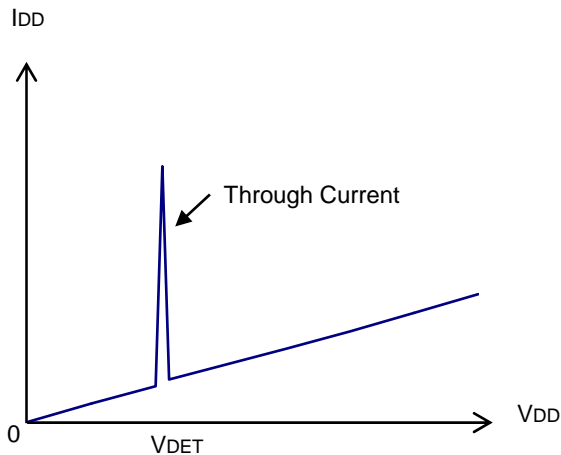


Fig.5 Current Consumption vs. Power Supply Voltage

●BD52□□G/FVE Series, BD53□□G/FVE Series

1) Examples of a common power supply detection reset circuit

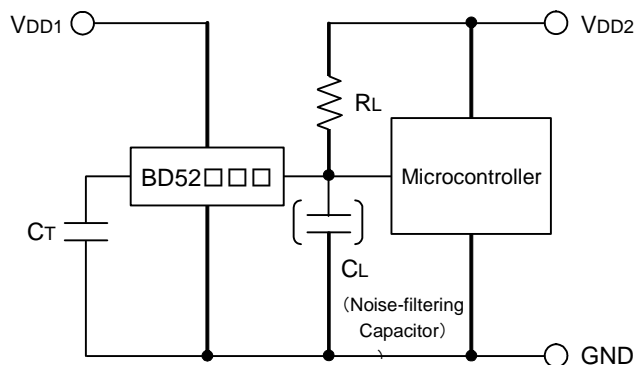


Fig.6 Open Collector Output Type

Application examples of BD52□□G/FVE series (Open Drain output type) and BD53□□G/FVE series (CMOS output type) are shown below.

CASE1:

The power supply of the microcontroller (VDD2) differs from the power supply of the reset detection (VDD1). Use the open drain output type (BD52□□G/FVE) attached a load resistance (RL) between the output and VDD2. (As shown Fig.6)

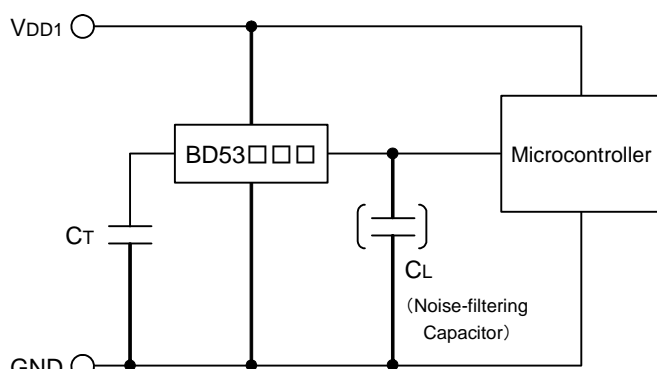


Fig.7 CMOS Output Type

CASE2:

The power supply of the microcontroller (VDD1) is same as the power supply of the reset detection (VDD1). Use CMOS output type (BD53□□G/FVE) or open drain output type (BD52□□G/FVE) attached a load resistance (RL) between the output and VDD1. (As shown Fig.7)

When a capacitance CL for noise filtering is connected to the VOUT pin (the reset signal input terminal of the microcontroller), please take into account the waveform of the rise and fall of the output voltage (VOUT).

2) The following is an example of a circuit application in which an OR connection between two types of detection voltages resets the microcontroller.

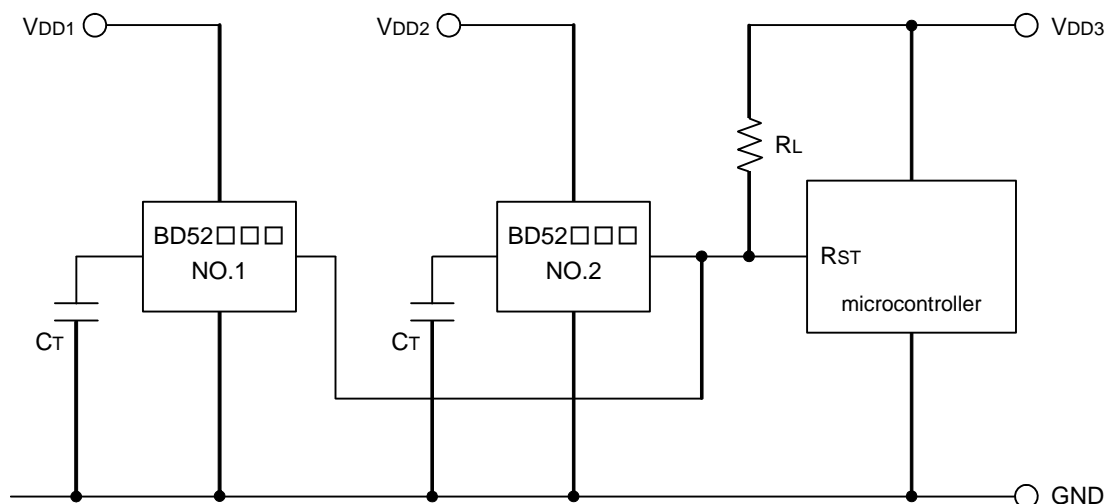


Fig.8

When there are many power supplies of the system, power supplies VDD1 and VDD2 are being monitored separately, and it is necessary to reset the microcomputer, it is possible to use an OR connection on the open drain output type BD52□□G/FVE series to pull-up to the desired voltage (VDD3) as shown in Fig.8 and make the output "High" voltage matches the power supply voltage VDD3 of the microcontroller.

3) Examples of the power supply with resistor dividers

In applications where the power supply input terminal (VDD) of an IC with resistor dividers, it is possible that a through current will momentarily flow into the circuit when the output logic switches, resulting in malfunctions (such as output oscillatory state).

(Through-current is a current that momentarily flows from the power supply (VDD) to ground (GND) when the output level switches from "High" to "Low" or vice versa.)

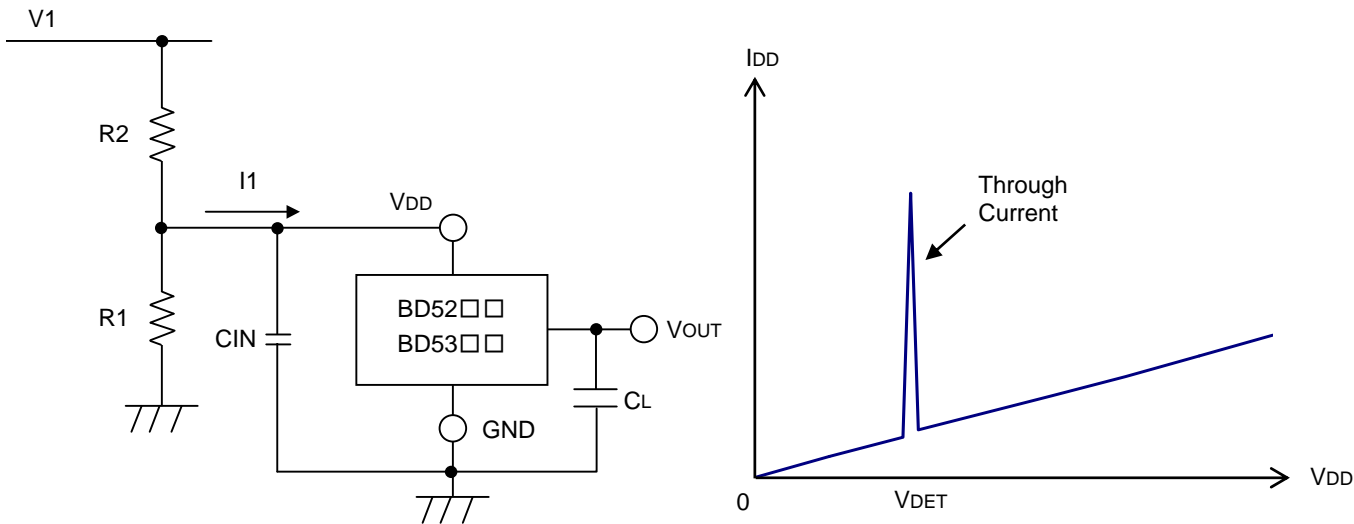


Fig.9

A voltage drop of $[\text{the through-current (I1)}] \times [\text{input resistor (R2)}]$ is caused by the through current, and the input voltage to descends, when the output switches from "Low" to "High". When the input voltage decreases and falls below the detection voltage, the output voltage switches from "High" to "Low". At this time, the through-current stops flowing through output "Low", and the voltage drop is eliminated. As a result, the output switches from "Low" to "High", which again causes the through current to flow and the voltage drop. This process is repeated, resulting in oscillation.

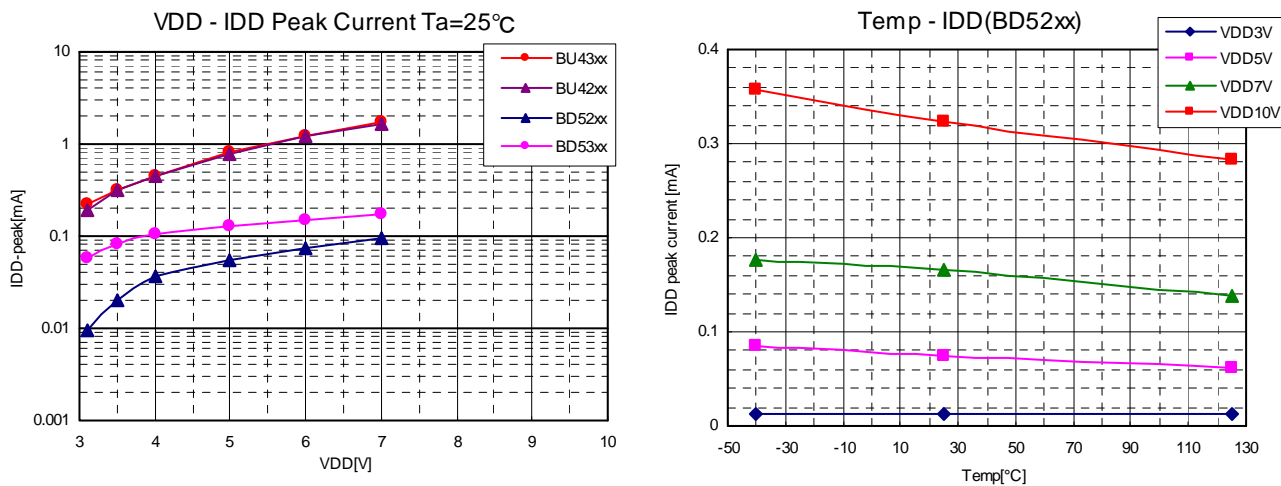


Fig.10 Current Consumption vs. Power Supply Voltage

* This data is for reference only.

The figures will vary with the application, so please confirm actual operating conditions before use.

●BD45□□□G Series, BD46□□□G Series

1) Examples of a common power supply detection reset circuit.

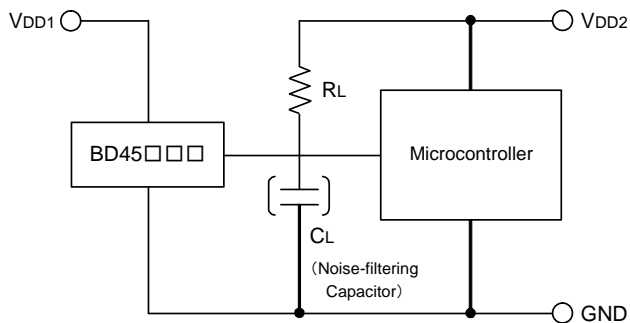


Fig.11 Open Collector Output Type

Application examples of BD45□□□G series (Open Drain output type) and BD46□□□G series (CMOS output type) are shown below.

CASE1:

The power supply of the microcontroller (VDD2) differs from the power supply of the reset detection (VDD1). Use the open drain output type (BD45□□□G) attached a load resistance (RL) between the output and VDD2. (As shown Fig.11)

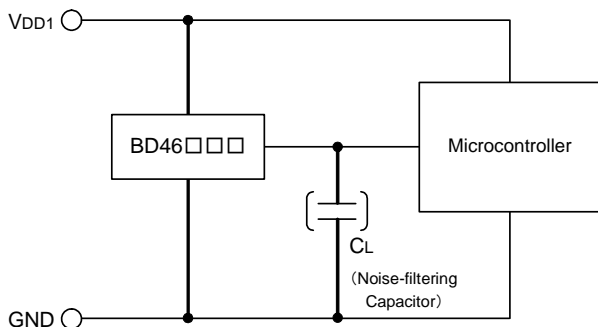


Fig.12 CMOS Output Type

CASE2:

The power supply of the microcontroller (VDD1) is same as the power supply of the reset detection (VDD1). Use CMOS output type (BD46□□□G) or open drain output type (BD45□□□G) attached a load resistance (RL) between the output and VDD1. (As shown Fig.12)

When a capacitance CL for noise filtering is connected to the VOUT pin (the reset signal input terminal of the microcontroller), please take into account the waveform of the rise and fall of the output voltage (VOUT).

2) The following is an example of a circuit application in which an OR connection between two types of detection voltages resets the microcontroller.

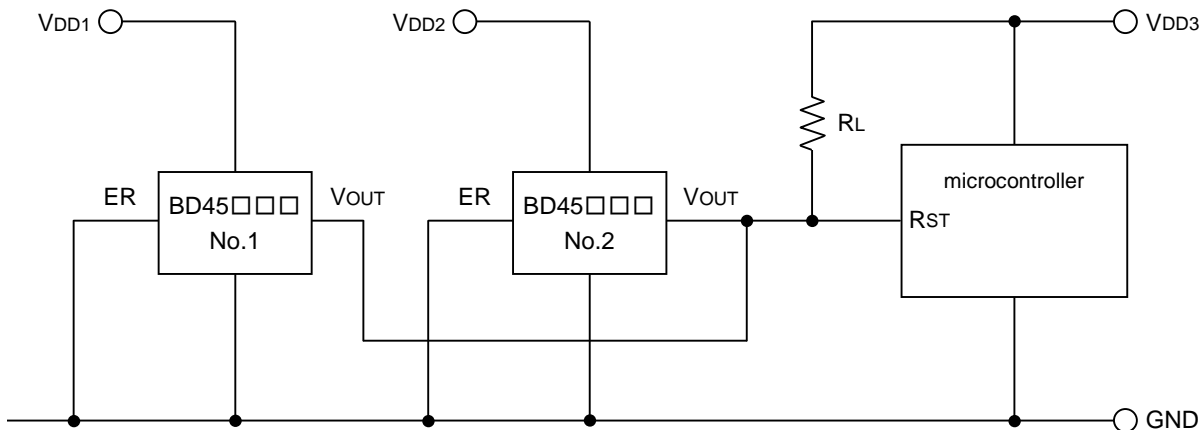


Fig.13

When there are many power supplies of the system, power supplies VDD1 and VDD2 are being monitored separately, and it is necessary to reset the microcomputer, it is possible to use an OR connection on the open drain output type BD45□□□G series to pull-up to the desired voltage (VDD3) as shown in Fig.13 and make the output "High" voltage matches the power supply voltage VDD3 of the microcontroller.

3) Examples of the power supply with resistor dividers

In applications where the power supply input terminal (VDD) of an IC with resistor dividers, it is possible that a through current will momentarily flow into the circuit when the output logic switches, resulting in malfunctions (such as output oscillatory state).

(Through-current is a current that momentarily flows from the power supply (VDD) to ground (GND) when the output level switches from “High” to “Low” or vice versa.)

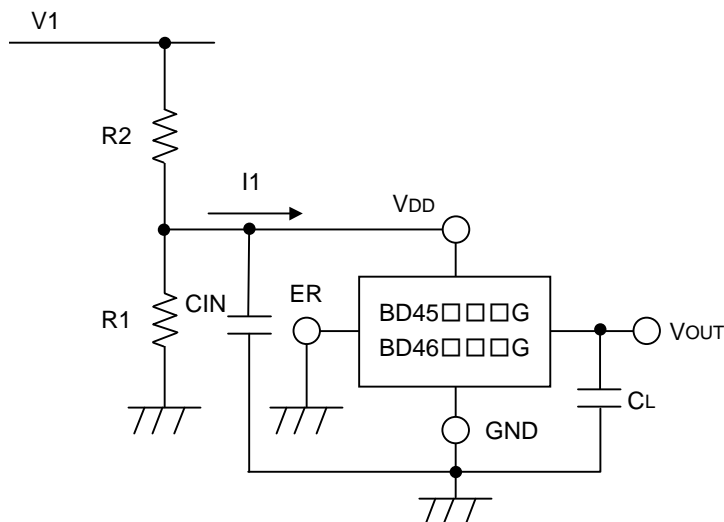


Fig.14

A voltage drop of [the through-current (I1)] × [input resistor (R2)] is caused by the through current, and the input voltage to descends, when the output switches from “Low” to “High”. When the input voltage decreases and falls below the detection voltage, the output voltage switches from “High” to “Low”. At this time, the through-current stops flowing through output “Low”, and the voltage drop is eliminated. As a result, the output switches from “Low” to “High”, which again causes the through current to flow and the voltage drop. This process is repeated, resulting in oscillation.

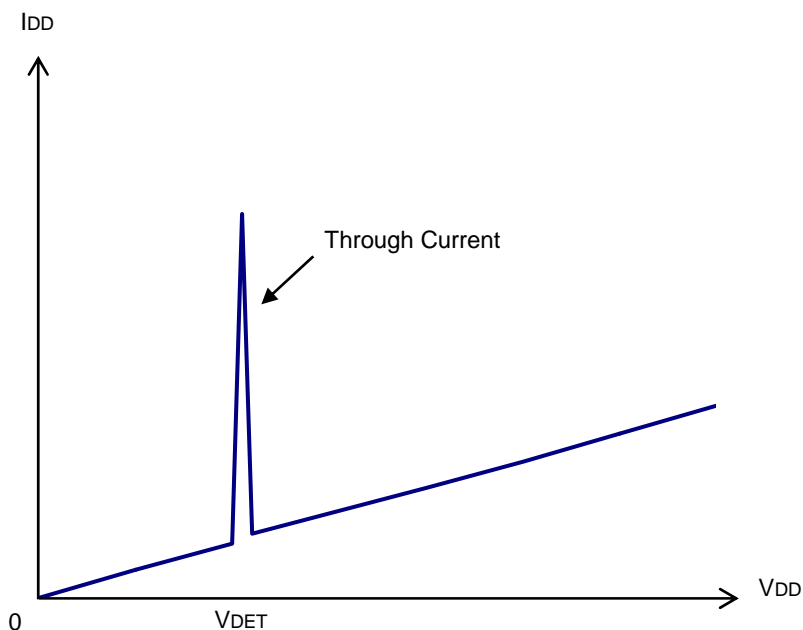


Fig.15 Current Consumption vs. Power Supply Voltage

●BU48□□G/FVE Series, BU49□□G/FVE Series

1) Examples of a common power supply detection reset circuit

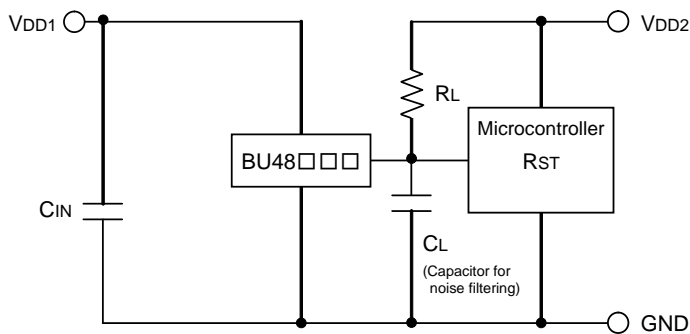


Fig.16 Open collector Output type

Application examples of BU48□□G/FVE series (Open Drain output type) and BU49□□G/FVE series (CMOS output type) are shown below.

CASE1:

The power supply of the microcontroller (VDD2) differs from the power supply of the reset detection (VDD1). Use the Open Drain Output Type (BU48□□G/FVE) attached a load resistance (RL) between the output and VDD2. (As shown Fig.16)

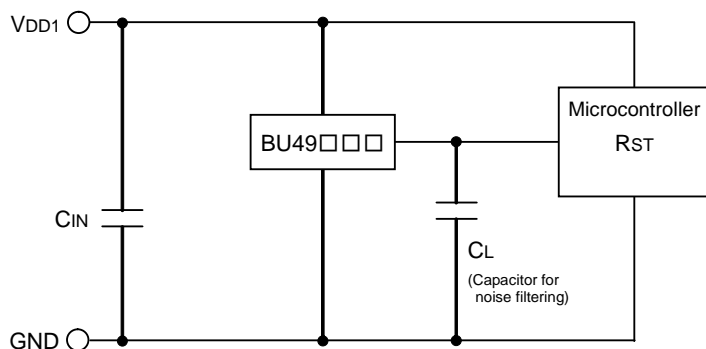


Fig.17 CMOS Output type

CASE2:

The power supply of the microcontroller (VDD1) is same as the power supply of the reset detection (VDD1). Use CMOS output type (BU43□□G/FVE) or Open Drain Output Type (BU48□□G/FVE) attached a load resistance (RL) between the output and VDD1. (As shown Fig.17)

When a capacitance CL for noise filtering or setting the output delay time is connected to the Vout pin (the reset signal input terminal of the microcontroller), please take into account the waveform of the rise and fall of the output voltage (Vout).

2) Examples of the power supply with resistor dividers

In applications where the power supply input terminal (VDD) of an IC with resistor dividers, it is possible that a through-current will momentarily flow into the circuit when the output logic switches, resulting in malfunctions (such as output oscillatory state).

(Through-current is a current that momentarily flows from the power supply (VDD) to ground (GND) when the output level switches from "High" to "Low" or vice versa.)

Consider the use of BU48□□G/FVE when the power supply input it with resistor dividers.

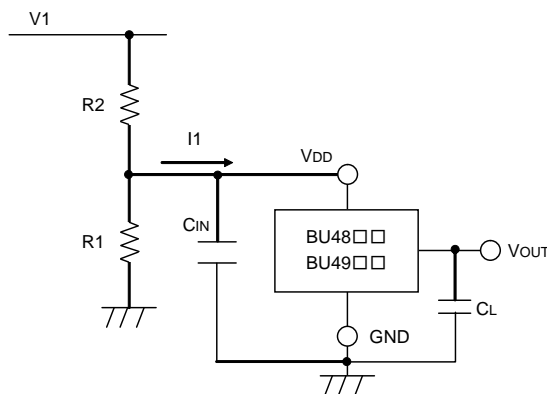


Fig.18

●BU42□□G/FVE Series, BU43□□G/FVE Series

1) Examples of a common power supply detection reset circuit

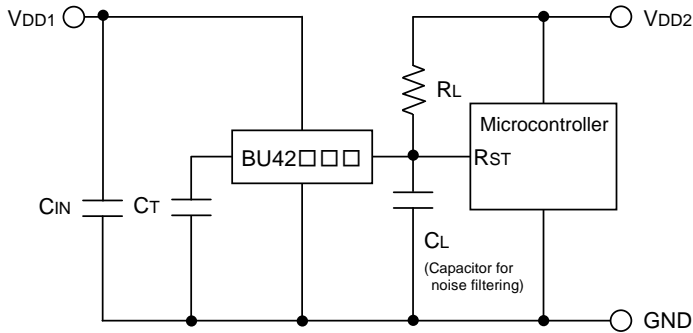


Fig.19 Open collector Output type

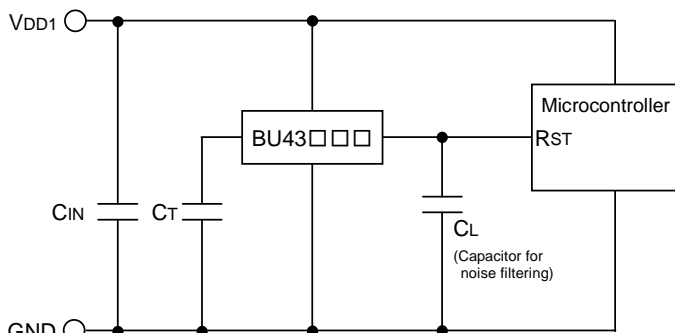


Fig.20 CMOS Output type

Application examples of BU42□□G/FVE series (Open Drain output type) and BU43□□G/FVE series (CMOS output type) are shown below.

CASE1:

The power supply of the microcontroller (Vdd2) differs from the power supply of the reset detection (Vdd1). Use the Open Drain Output Type (BU42□□G/FVE) attached a load resistance (RL) between the output and Vdd2. (As shown Fig.19)

CASE2:

The power supply of the microcontroller (Vdd1) is same as the power supply of the reset detection (Vdd1). Use CMOS output type (BU43□□G/FVE) or Open Drain Output Type (BU42□□G/FVE) attached a load resistance (RL) between the output and Vdd1. (As shown Fig.20)

When a capacitance CL for noise filtering is connected to the Vout pin (the reset signal input terminal of the microcontroller), please take into account the waveform of the rise and fall of the output voltage (Vout).

2) Examples of the power supply with resistor dividers

In applications where the power supply input terminal (VDD) of an IC with resistor dividers, it is possible that a through current will momentarily flow into the circuit when the output logic switches, resulting in malfunctions (such as output oscillatory state).

(Through-current is a current that momentarily flows from the power supply (VDD) to ground (GND) when the output level switches from "High" to "Low" or vice versa.)

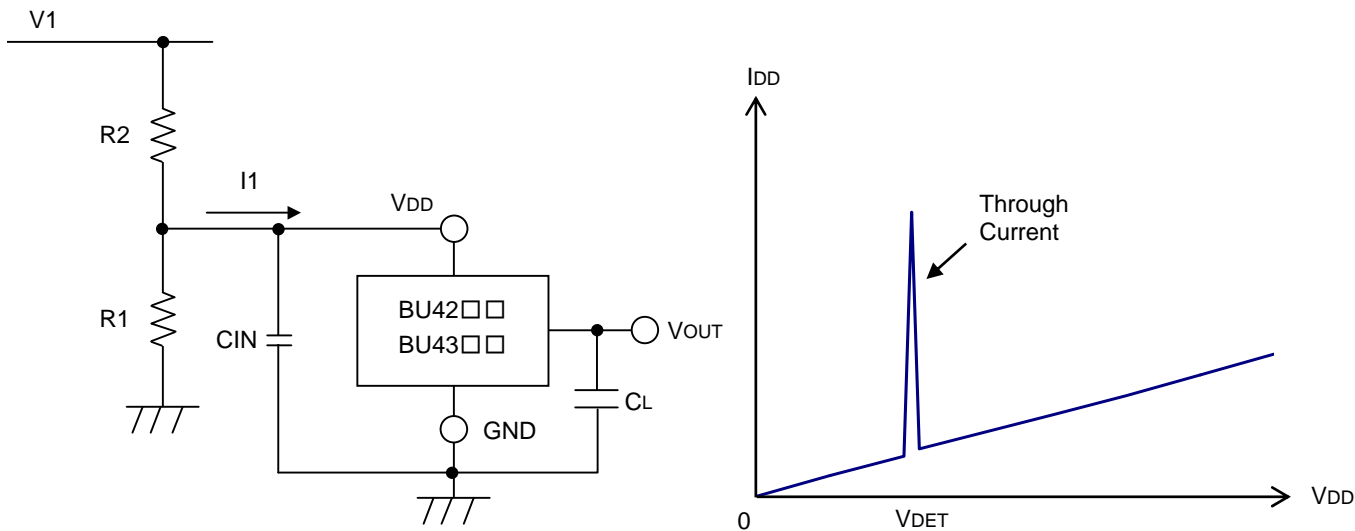


Fig.21

A voltage drop of [the through-current (I1)] × [input resistor (R2)] is caused by the through current, and the input voltage to descends, when the output switches from "Low" to "High". When the input voltage decreases and falls below the detection voltage, the output voltage switches from "High" to "Low". At this time, the through-current stops flowing through output "Low", and the voltage drop is eliminated. As a result, the output switches from "Low" to "High", which again causes the through current to flow and the voltage drop. This process is repeated, resulting in oscillation.

Consider the use of BU42□□ when the power supply input it with resistor dividers.

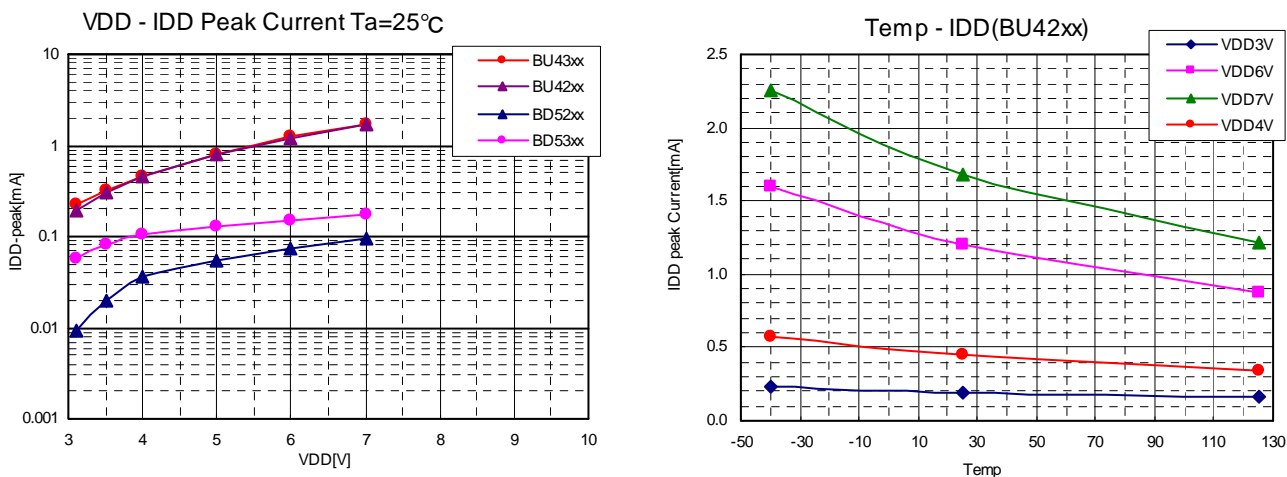


Fig.22 Current Consumption vs. Power Supply Voltage

* This data is for reference only.

The figures will vary with the application, so please confirm actual operating conditions before use.

●BD47□□G Series

1) The following is an example of an application circuit using Reset IC for normal power supply detection. BD47□□G series requires a pull up resistor on the output terminal. The pull up resistor value should be decided. As the application with enough confirmation of power supply level and output current capability. When a capacitor has been inserted into the output terminal to delay the output time or to remove noise, the output will be slower during starting or stopping. Please be careful to select the appropriate pull up resistors, output current and capacitor when inserting a bypass capacitor between input and GND. Please be aware that if an extremely large capacitor is used, the response time will become excessively slow.

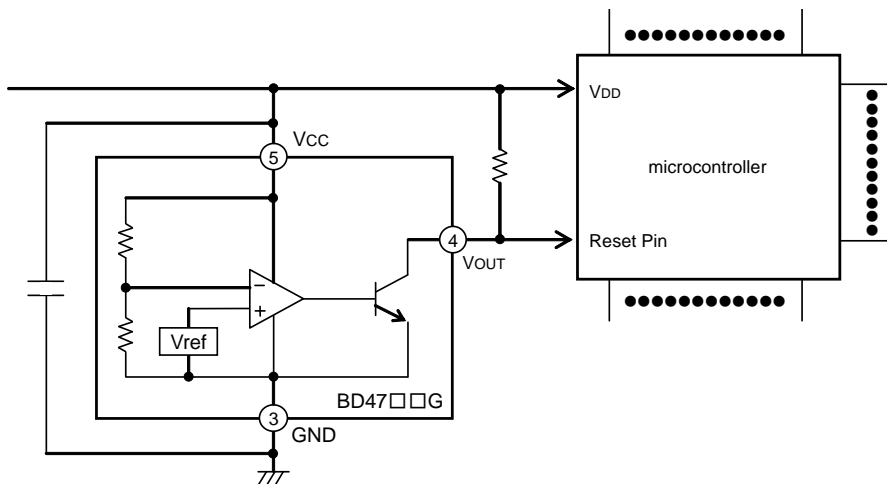


Fig.23

2) The following shows an example of adding delay time to a reset signal. It is possible to set the delay time using the capacitor CL and the resistor RL connected to the output terminal as shown below. At VCC start up, CL will be charged by RL. The CL and RL time constants and the threshold voltage of the Reset terminal determine the charge delay time. When VCC is decreased, CL is discharged through the Reset IC. The sum of the respective times plus the delay time of the IC itself becomes the reset signal delay time.

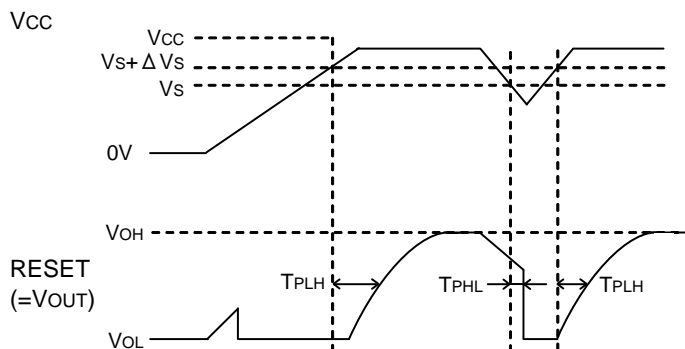
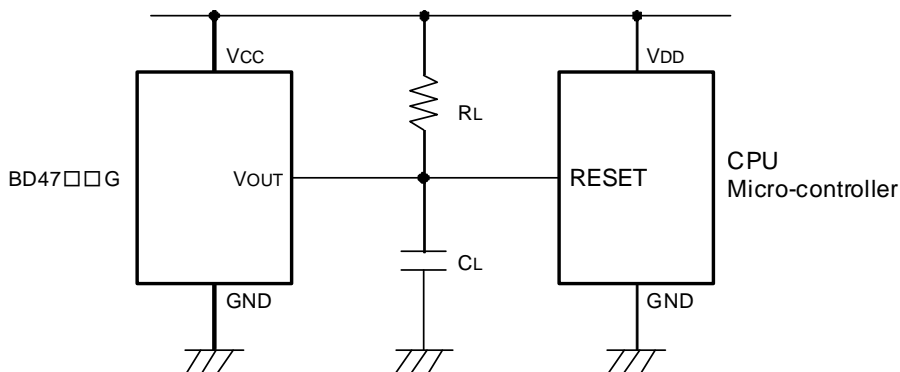


Fig.24

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