

High-accuracy detection voltage
Low current consumption
CMOS RESET IC

BD48XXG/FVE series BD49XXG/FVE series

●Description

BD48XXG/FVE, BD49XXG/FVE are series of high-accuracy detection voltage and low current consumption RESET ICs adopting CMOS process. Total 152 types of RESET ICs including BD48XXG/FVE series (Nch output drain output) and BD49XXG/FVE series (CMOS output), each of which has 38 kinds in every 0.1V step (2.3~6.0V) have developed.

●Features

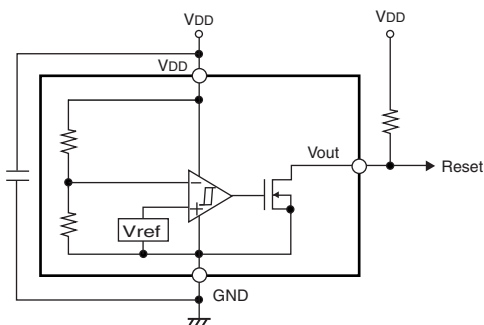
- 1) Detection voltage: 0.1V step line-up 2.3~6.0V (Typ.)
- 2) High-accuracy detection voltage: $\pm 1.5\%$ Max.
- 3) Ultra low current consumption: 0.8 μ A typ.
- 4) Nch open drain output (BD48XXG/FVE series),
CMOS output (BD49XXG/FVE series)
- 5) Small EMP5, SMP5C2 package

●Applications

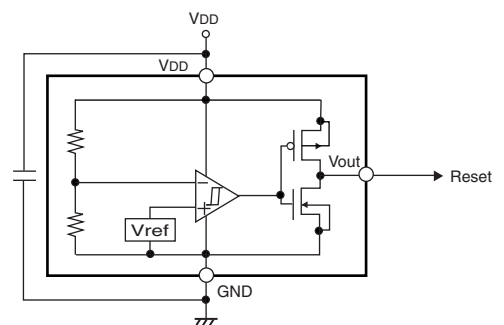
Every kind of appliances with microcontroller and logic circuit

●Application Circuit

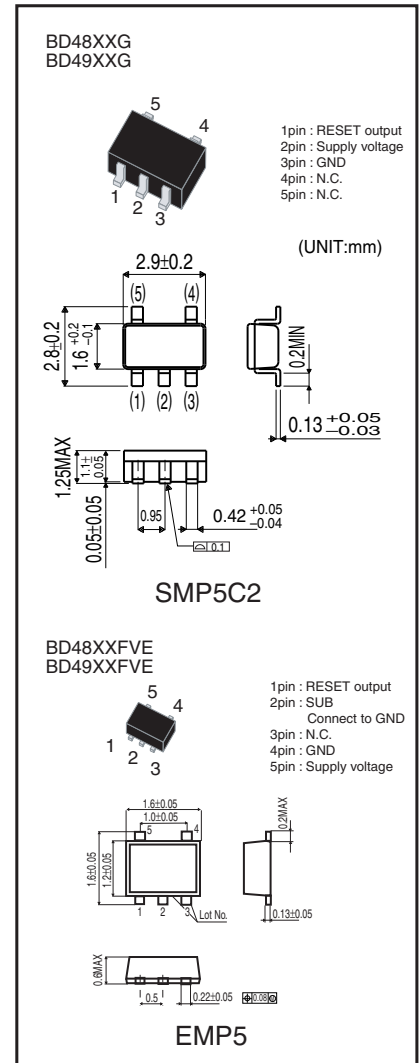
BD48XXG/FVE



BD49XXG/FVE



Pin No.	1	2	3	4	5
SMP5C2	Vout	V _{DD}	GND	NC.	NC.
EMP5	Vout	SUB	NC.	GND	V _{DD}



● Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Power supply voltage		VDD – GND	– 0.3 ~ + 10	V
Output voltage	Nch open drain output	VOUT	GND – 0.3 ~ + 10	V
	CMOS output		GND – 0.3 ~ VDD + 0.3	
Power dissipation (SMP5C2) *1		Pd	150	mW
Power dissipation (EMP5) *2		Pd	100	mW
Operating temperature range		Topr	– 40 ~ + 85	°C
Storage temperature range		Tstg	– 55 ~ + 125	°C

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

*2 Derating: 1.0mW/°C for operation above Ta=25°C.

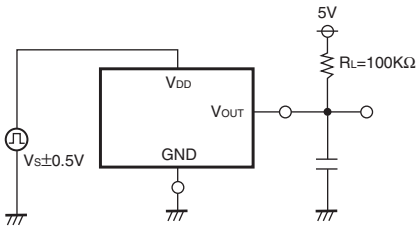
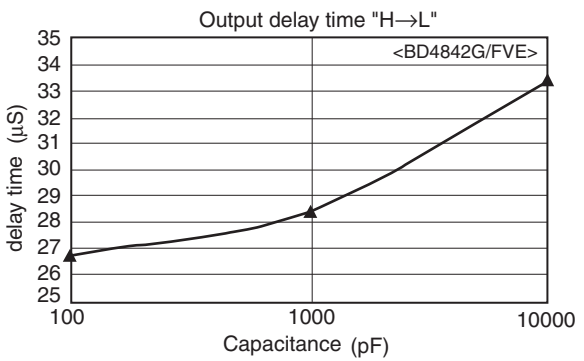
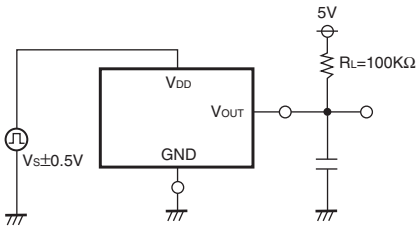
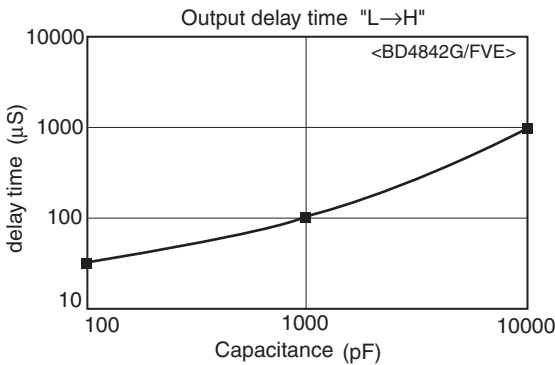
● Electrical characteristics (Unless otherwise noted; Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Detection voltage temperature coefficient	Vs/ΔT	—	±0.01	—	% / °C	(–40°C ≤ Ta ≤ 85°C) *1
Hysteresis voltage	ΔVs	3.0	5.0	8.0	%	RL=470KΩ, VDD=L→H→L
"H" propagation delay time	TPLH	—	—	100	μS	CL=100pF, RL=100KΩ *2 Vout=GND→50%
Circuit current when ON	Icc1	—	0.51	1.53	μA	VDD=Vs–0.2V
		—	0.56	1.68		
		—	0.60	1.80		
		—	0.66	1.98		
Circuit current when OFF	Icc2	—	0.75	2.25	μA	VDD=Vs+2V
		—	0.80	2.40		
		—	0.85	2.55		
		—	0.90	2.70		
Min. operating voltage	VOPL	0.95	—	—	V	RL=470KΩ, VOL ≤ 0.4V
"L" output current	IOL	0.4	1	—	mA	VDS=0.5V, VDD=1.2V
		2.0	4	—		VDS=0.5V, VDD=2.4V (Vs ≤ 2.7V)
"H" output current	IOH	0.7	1.4	—	mA	VDS=0.5V, VDD=4.8V Vs=2.3~4.2V
		0.9	1.8	—		VDS=0.5V, VDD=6.0V Vs=4.3~5.2V
		1.1	2.2	—		VDS=0.5V, VDD=8.0V Vs=5.3~6.0V
Output leak current	Ileak	—	—	0.1	μA	VDD=VDS=10V

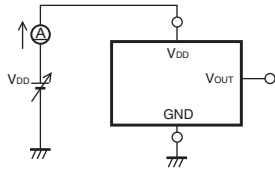
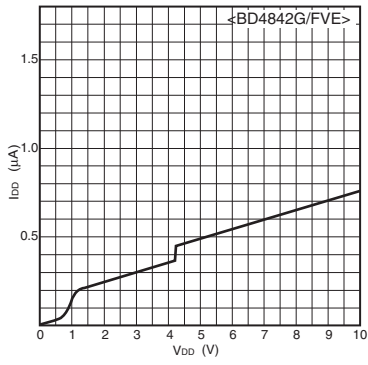
*1 Since products are not screened by high and low temperatures, the specification for this temperature range is guaranteed by design, not production tested.

*2 TPLH : VDD=(Vs typ.–0.5V)→(Vs typ.+0.5V).
Note) RL is not necessary for CMOS output type.

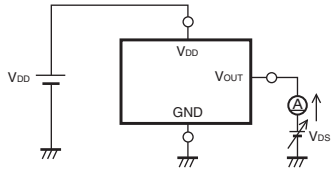
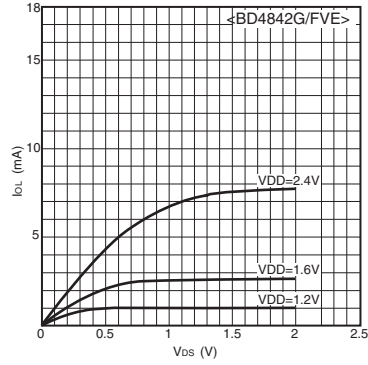
● Characteristic diagram and Measurement circuit



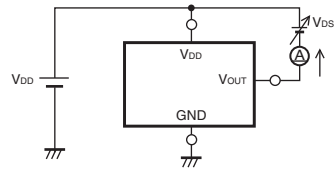
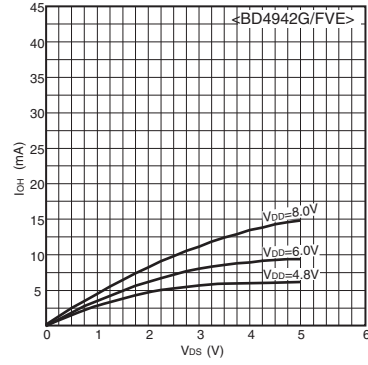
Circuit current



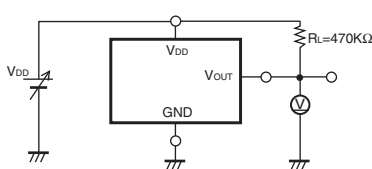
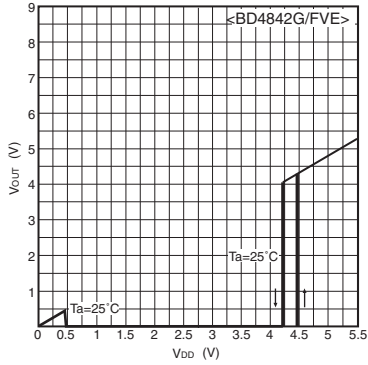
"L" output current



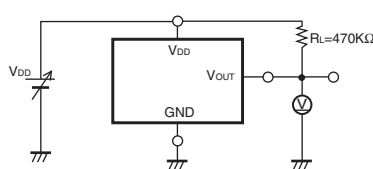
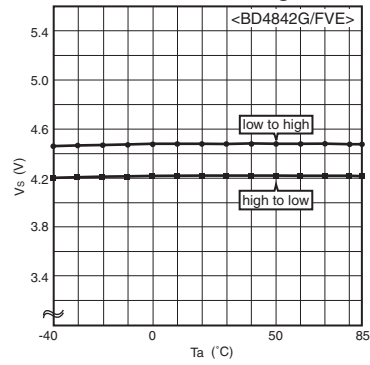
"H" output current



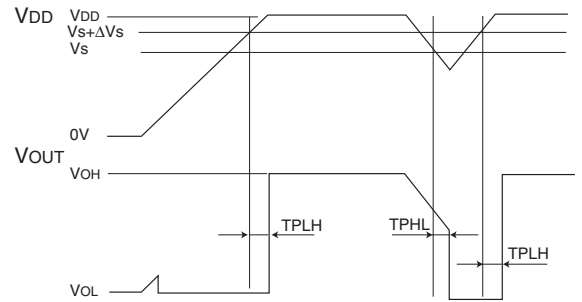
I/O characteristic



Detection voltage



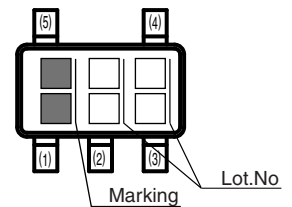
Timing waveform



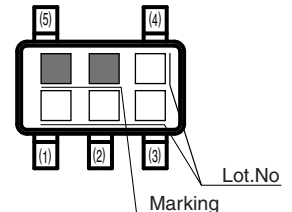
Part number and Marking of samples

Marking	Voltage	Part No.	Marking	Voltage	Part No.	Marking	Voltage	Part No.	Marking	Voltage	Part No.
EW	6.0V	BD4860	EB	4.1V	BD4841	GW	6.0V	BD4960	GB	4.1V	BD4941
EV	5.9V	BD4859	EA	4.0V	BD4840	GV	5.9V	BD4959	GA	4.0V	BD4940
EU	5.8V	BD4858	DV	3.9V	BD4839	GU	5.8V	BD4958	FV	3.9V	BD4939
ET	5.7V	BD4857	DU	3.8V	BD4838	GT	5.7V	BD4957	FU	3.8V	BD4938
ES	5.6V	BD4856	DT	3.7V	BD4837	GS	5.6V	BD4956	FT	3.7V	BD4937
ER	5.5V	BD4855	DS	3.6V	BD4836	GR	5.5V	BD4955	FS	3.6V	BD4936
EQ	5.4V	BD4854	DR	3.5V	BD4835	GQ	5.4V	BD4954	FR	3.5V	BD4935
EP	5.3V	BD4853	DQ	3.4V	BD4834	GP	5.3V	BD4953	FQ	3.4V	BD4934
EN	5.2V	BD4852	DP	3.3V	BD4833	GN	5.2V	BD4952	FP	3.3V	BD4933
EM	5.1V	BD4851	DN	3.2V	BD4832	GM	5.1V	BD4951	FN	3.2V	BD4932
EL	5.0V	BD4850	DM	3.1V	BD4831	GL	5.0V	BD4950	FM	3.1V	BD4931
EK	4.9V	BD4849	DL	3.0V	BD4830	GK	4.9V	BD4949	FL	3.0V	BD4930
EJ	4.8V	BD4848	DK	2.9V	BD4829	GJ	4.8V	BD4948	FK	2.9V	BD4929
EH	4.7V	BD4847	DJ	2.8V	BD4828	GH	4.7V	BD4947	FJ	2.8V	BD4928
EG	4.6V	BD4846	DH	2.7V	BD4827	GG	4.6V	BD4946	FH	2.7V	BD4927
EF	4.5V	BD4845	DG	2.6V	BD4826	GF	4.5V	BD4945	FG	2.6V	BD4926
EE	4.4V	BD4844	DF	2.5V	BD4825	GE	4.4V	BD4944	FF	2.5V	BD4925
ED	4.3V	BD4843	DE	2.4V	BD4824	GD	4.3V	BD4943	FE	2.4V	BD4924
EC	4.2V	BD4842	DD	2.3V	BD4823	GC	4.2V	BD4942	FD	2.3V	BD4923

BD48XXG/BD49XXG (SMP5C2)



BD48XXFVE/BD49XXFVE (EMP5)



●Line-up

Detection voltage VS	Nch open drain output (BD48XXG/FVE)	CMOS output (BD49XXG/FVE)	Detection voltage VS (V)			Hysteresis voltage (V, Typ.)	Package
			Min.	Typ.	Max.		
6.0V	BD4860G/FVE	BD4960G/FVE	5.910	6.000	6.090	Vs X 0.05	SMP5C2/EMP5
5.9V	BD4859G/FVE	BD4959G/FVE	5.812	5.900	5.989		SMP5C2/EMP5
5.8V	BD4858G/FVE	BD4958G/FVE	5.713	5.800	5.887		SMP5C2/EMP5
5.7V	BD4857G/FVE	BD4957G/FVE	5.615	5.700	5.786		SMP5C2/EMP5
5.6V	BD4856G/FVE	BD4956G/FVE	5.516	5.600	5.684		SMP5C2/EMP5
5.5V	BD4855G/FVE	BD4955G/FVE	5.418	5.500	5.583		SMP5C2/EMP5
5.4V	BD4854G/FVE	BD4954G/FVE	5.319	5.400	5.481		SMP5C2/EMP5
5.3V	BD4853G/FVE	BD4953G/FVE	5.221	5.300	5.380		SMP5C2/EMP5
5.2V	BD4852G/FVE	BD4952G/FVE	5.122	5.200	5.278		SMP5C2/EMP5
5.1V	BD4851G/FVE	BD4951G/FVE	5.024	5.100	5.177		SMP5C2/EMP5
5.0V	BD4850G/FVE	BD4950G/FVE	4.925	5.000	5.075		SMP5C2/EMP5
4.9V	BD4849G/FVE	BD4949G/FVE	4.827	4.900	4.974		SMP5C2/EMP5
4.8V	BD4848G/FVE	BD4948G/FVE	4.728	4.800	4.872		SMP5C2/EMP5
4.7V	BD4847G/FVE	BD4947G/FVE	4.630	4.700	4.771		SMP5C2/EMP5
4.6V	BD4846G/FVE	BD4946G/FVE	4.531	4.600	4.669		SMP5C2/EMP5
4.5V	BD4845G/FVE	BD4945G/FVE	4.433	4.500	4.568		SMP5C2/EMP5
4.4V	BD4844G/FVE	BD4944G/FVE	4.334	4.400	4.466		SMP5C2/EMP5
4.3V	BD4843G/FVE	BD4943G/FVE	4.236	4.300	4.365		SMP5C2/EMP5
4.2V	BD4842G/FVE	BD4942G/FVE	4.137	4.200	4.263		SMP5C2/EMP5
4.1V	BD4841G/FVE	BD4941G/FVE	4.039	4.100	4.162		SMP5C2/EMP5
4.0V	BD4840G/FVE	BD4940G/FVE	3.940	4.000	4.060		SMP5C2/EMP5
3.9V	BD4839G/FVE	BD4939G/FVE	3.842	3.900	3.959		SMP5C2/EMP5
3.8V	BD4838G/FVE	BD4938G/FVE	3.743	3.800	3.857		SMP5C2/EMP5
3.7V	BD4837G/FVE	BD4937G/FVE	3.645	3.700	3.756		SMP5C2/EMP5
3.6V	BD4836G/FVE	BD4936G/FVE	3.546	3.600	3.654		SMP5C2/EMP5
3.5V	BD4835G/FVE	BD4935G/FVE	3.448	3.500	3.553		SMP5C2/EMP5
3.4V	BD4834G/FVE	BD4934G/FVE	3.349	3.400	3.451		SMP5C2/EMP5
3.3V	BD4833G/FVE	BD4933G/FVE	3.251	3.300	3.350		SMP5C2/EMP5
3.2V	BD4832G/FVE	BD4932G/FVE	3.152	3.200	3.248		SMP5C2/EMP5
3.1V	BD4831G/FVE	BD4931G/FVE	3.054	3.100	3.147		SMP5C2/EMP5
3.0V	BD4830G/FVE	BD4930G/FVE	2.955	3.000	3.045		SMP5C2/EMP5
2.9V	BD4829G/FVE	BD4929G/FVE	2.857	2.900	2.944		SMP5C2/EMP5
2.8V	BD4828G/FVE	BD4928G/FVE	2.758	2.800	2.842		SMP5C2/EMP5
2.7V	BD4827G/FVE	BD4927G/FVE	2.660	2.700	2.741		SMP5C2/EMP5
2.6V	BD4826G/FVE	BD4926G/FVE	2.561	2.600	2.639		SMP5C2/EMP5
2.5V	BD4825G/FVE	BD4925G/FVE	2.463	2.500	2.538		SMP5C2/EMP5
2.4V	BD4824G/FVE	BD4924G/FVE	2.364	2.400	2.436		SMP5C2/EMP5
2.3V	BD4823G/FVE	BD4923G/FVE	2.266	2.300	2.335		SMP5C2/EMP5