

- STRUCTURE                      Silicon Monolithic Integrated Circuit
- PRODUCT SERIES                Voltage Detector IC
- TYPE                                **BD48XXFVE Series**
- FEATURES                        • Detection voltage lineup :2.3V~6.0V
- High precision detection voltage: ±1.0%

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

Parameter	Symbol	Limit	Unit
Supply Voltage ※1	V <sub>DD</sub> -GND	-0.3 to +10	V
Output Voltage ※1   Nch Open Drain Output	V <sub>OUT</sub>	GND-0.3 to +10	V
Power Dissipation ※2	P <sub>d</sub>	210	mW
Operating Temperature Range ※1	T <sub>opr</sub>	-40 to +105	°C
Storage Temperature Range	T <sub>stg</sub>	-55 to +125	°C

※1 Do not exceed P<sub>d</sub>.

※2 Mounted on 70mm × 70mm × 1.6mm Glass Epoxy PCB, P<sub>d</sub> derated at 2.1mW/°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=-40 to 105°C)

Parameter	Symbol	Condition	Limit			Unit	
			Min.	Typ.	Max.		
Detection Voltage	Vs	RL=470kΩ, VDD=H→L ※3	Vs(T) × 0.99	Vs(T)	Vs(T) × 1.01	V	
Output Delay Time "L→H"	tPLH	CL=100pF RL=100kΩ ※4 Vout=GND→50%	-	-	100	μ sec	
Circuit Current when ON	Icc1	VDD=Vs-0.2V, ※3	Vs=2.3-3.1V	-	0.51	1.53	μ A
			Vs=3.2-4.2V	-	0.56	1.68	
			Vs=4.3-5.2V	-	0.60	1.80	
			Vs=5.3-6.0V	-	0.66	1.98	
Circuit Current when OFF	Icc2	VDD=Vs+2.0V, ※3	Vs=2.3-3.1V	-	0.75	2.25	μ A
			Vs=3.2-4.2V	-	0.80	2.40	
			Vs=4.3-5.2V	-	0.85	2.55	
			Vs=5.3-6.0V	-	0.90	2.70	
Minimum Operating Voltage	VOPL	VOL≤0.4V, RL=470kΩ, Ta=-25~-105°C	0.95	-	-	V	
		VOL≤0.4V, RL=470kΩ, Ta=-40~-25°C	1.20	-	-		
'Low'Output Current (Nch)	IoL	VDS=0.5V, VDD=1.5V, VS=2.3-6.0V	0.4	1.0	-	mA	
		VDS=0.5V, VDD=2.4V, VS=2.7-6.0V	2.0	4.0	-		
Leak Current when OFF	Ileak	VDD=VDS=10V ※3	-	-	0.1	μ A	
Detection Voltage Temperature coefficient	Vs/ΔT	Ta=-40°C to 105°C (Designed Guarantee)	-	±100	±360	ppm/°C	
Hysteresis Voltage	ΔVs	VDD=L→H→L	Vs × 0.03	Vs × 0.05	Vs × 0.08	V	

Vs(T) : Standard Detection Voltage (2.3V to 6.0V, 0.1V step)

RL: Pull-up resistor to be connected between VOUT and power supply.

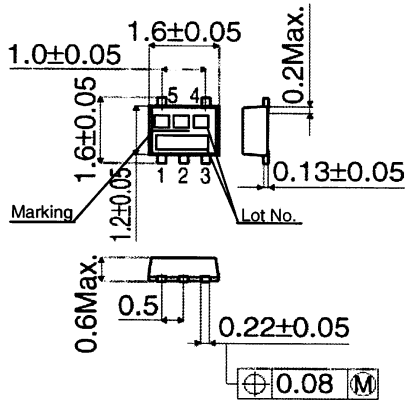
CL: Capacitor to be connected between VOUT and GND.

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

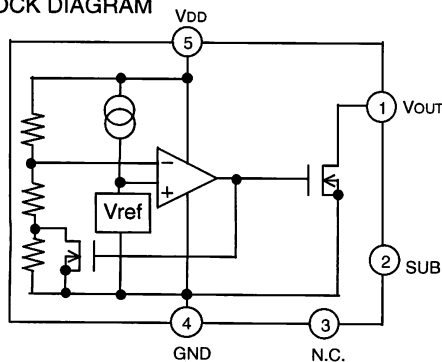
※3 Guarantee is Ta=25°C.

※4 tPLH: VDD=(Vs typ.-0.5V)→(Vs typ.+0.5V)

**OPHYSICAL DIMENSIONS, MARKING**



**OBLOCK DIAGRAM**



**OPIN NO. , PIN NAME**

Pin Number	Pin Name
1	VOUT
2	SUB
3	N.C.
4	GND
5	VDD

NOTE : Substrate Pin should be connected with 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
BD4860	6.000	EW	BD4841	4.100	EB
BD4859	5.900	EV	BD4840	4.000	EA
BD4858	5.800	EU	BD4839	3.900	DV
BD4857	5.700	ET	BD4838	3.800	DU
BD4856	5.600	ES	BD4837	3.700	DT
BD4855	5.500	ER	BD4836	3.600	DS
BD4854	5.400	EQ	BD4835	3.500	DR
BD4853	5.300	EP	BD4834	3.400	DQ
BD4852	5.200	EN	BD4833	3.300	DP
BD4851	5.100	EM	BD4832	3.200	DN
BD4850	5.000	EL	BD4831	3.100	DM
BD4849	4.900	EK	BD4830	3.000	DL
BD4848	4.800	EJ	BD4829	2.900	DK
BD4847	4.700	EH	BD4828	2.800	DJ
BD4846	4.600	EG	BD4827	2.700	DH
BD4845	4.500	EF	BD4826	2.600	DG
BD4844	4.400	EE	BD4825	2.500	DF
BD4843	4.300	ED	BD4824	2.400	DE
BD4842	4.200	EC	BD4823	2.300	DD

## 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 capacitor 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 Terminals 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 . When using high VDD pin impedance, the through current may cause oscillation.
- 8 . When using high VDD pin impedance, set capacitor between VDD-GND.
- 9 . When VDD drops and goes below the minimum operating voltage, output is uncertain; when the output is pulled up, output becomes the voltage is the same as VDD.
10. BD48XFVE 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. Also, 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.
11. External parameters  
The recommended parameter range for  $R_L$  is  $50k\ \Omega \sim 1M\ \Omega$ . When attempting to operate beyond these parameters, be sure to verify the actual operation before continuing use.
12. Power on reset operation  
Please note that the power on reset output varies with the  $V_{cc}$  rise up time.  
Please verify the actual operation.

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Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.

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