STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT SERIES Voltage Detector IC with Adjustable Output Delay

TYPE **BD52XXFVE Series**

FEATURES
- Detection voltage lineup : 2.3～6.0V
- High precision detection voltage : ±1.0%

○ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Parameter		Symbol	Limit	Unit
Supply Voltage ※1		$V_{DD}-GND$	-0.3 to +10	V
Output Voltage ※1	Nch Open Drain Output	V_{OUT}	GND-0.3 to +10	V
Input Voltage of CT		V_{CT}	GND-0.3 to V_{DD}+0.3	V
Power Dissipation ※2		Pd	210	mW
Operating Temperature ※1		Topr	-40 to +105	℃
Storage Temperature Range		Tstg	-55 to +125	℃
Junction Temperature		Tjmax	125	℃

※1 Do not exceed Pd.

※2 Mounted on 70mm × 70mm × 1.6mm Glass Epoxy PCB, Pd derated at 2.1mW/℃ for tempearture above Ta=25℃

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.

○ELECTRICAL CHARACTERISTICS (Unless Otherwise Specified Ta=-40 to 105℃)

Parameter	Symbol	Condition	Limit Min.	Limit Typ.	Limit Max.	Unit
Detection Voltage	V_{DET}	V_{DD}=H→L, R_L=470kΩ ※3	$V_{DET(T)}$ ×0.99	$V_{DET(T)}$	$V_{DET(T)}$ ×1.01	V
Circuit Current when ON	I_{DD1}	V_{DD}=V_{DET}−0.2V, V_{DET}=2.3-3.1V	-	0.80	2.40	μA
		V_{DET}=3.2-4.2V	-	0.85	2.55	
		V_{DET}=4.3-5.2V	-	0.90	2.70	
		V_{DET}=5.3-6.0V	-	0.95	2.85	
Circuit Current when OFF	I_{DD2}	V_{DD}=V_{DET}+2.0V, V_{DET}=2.3-3.1V	-	0.75	2.25	μA
		V_{DET}=3.2-4.2V	-	0.80	2.40	
		V_{DET}=4.3-5.2V	-	0.85	2.55	
		V_{DET}=5.3-6.0V	-	0.90	2.70	
Operating Voltage Range	V_{OPL}	V_{OL}≦0.4V, R_L=470kΩ, Ta=-25～105℃	0.95	-	-	V
		V_{OL}≦0.4V, R_L=470kΩ, Ta=-40～-25℃	1.20	-	-	
'Low' Output Current (Nch)	I_{OL}	V_{DS}=0.5V V_{DD}=1.2V	0.4	1.2	-	mA
		V_{DS}=0.5V V_{DD}=2.4V	2.0	5.0	-	
Leak Current when OFF	Ileak	V_{DD}=V_{DS}=10V ※3	-	-	0.1	μA
CT pin Threshold Voltage	V_{CTH}	V_{DD}=V_{DET}×1.1, R_L=470kΩ, V_{DET}=2.3-2.6V	V_{DD}×0.30	V_{DD}×0.40	V_{DD}×0.60	V
		V_{DD}=V_{DET}×1.1, R_L=470kΩ, V_{DET}=2.7-4.2V	V_{DD}×0.30	V_{DD}×0.45	V_{DD}×0.60	
		V_{DD}=V_{DET}×1.1, R_L=470kΩ, V_{DET}=4.3-5.2V	V_{DD}×0.35	V_{DD}×0.50	V_{DD}×0.60	
		V_{DD}=V_{DET}×1.1, R_L=470kΩ, V_{DET}=5.3-6.0V	V_{DD}×0.40	V_{DD}×0.50	V_{DD}×0.60	
Output Delay Resistance	R_{CT}	V_{DD}=V_{DET}×1.1 V_{CT}=0.5V ※3	5.5	9	12.5	MΩ
CT pin Output Current	I_{CT}	V_{CT}=0.1V V_{DD}=0.95V ※3	15	40	-	μA
		V_{CT}=0.5V V_{DD}=1.5V	150	240	-	
Detection Voltage Temperature coefficient	$V_{DET}/\Delta T$	Ta=-40℃ to 105℃	-	±100	±360	ppm/℃
Hysteresis Voltage	ΔV_{DET}	R_L=470kΩ, V_{DD}=L→H→L	V_{DET}×0.03	V_{DET}×0.05	V_{DET}×0.08	V

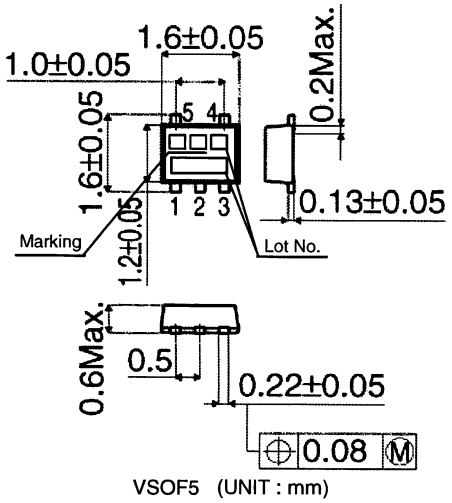
$V_{DET(T)}$: Standard Detection Voltage (2.3V to 6.0V、0.1V step)

R_L : Pull-up resistor to be connected between V_{OUT} and power supply.

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

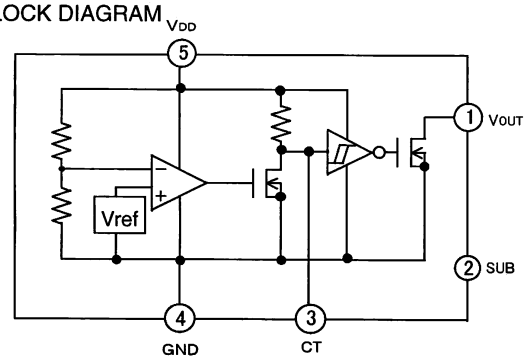
※3 Guarantee is Ta=25℃.

○PHYSICAL DIMENSIONS, MARKING



VSOF5 (UNIT : mm)

OBLOCK DIAGRAM



NOTE : Substrate Pin should be connected with GND.

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

OPIN NO. , PIN NAME

Pin Number	Pin Name
1	VOUT
2	SUB
3	CT
4	GND
5	VDD

OSTANDARD DETECTION VOLTAGE AND MARKING

BD52XXFVE Series

Type	Standard Detection Voltage [V]	Marking	Type	Standard Detection Voltage [V]	Marking
BD5260	6.000	PW	BD5241	4.100	PB
BD5259	5.900	PV	BD5240	4.000	PA
BD5258	5.800	PU	BD5239	3.900	MV
BD5257	5.700	PT	BD5238	3.800	MU
BD5256	5.600	PS	BD5237	3.700	MT
BD5255	5.500	PR	BD5236	3.600	MS
BD5254	5.400	PQ	BD5235	3.500	MR
BD5253	5.300	PP	BD5234	3.400	MQ
BD5252	5.200	PN	BD5233	3.300	MP
BD5251	5.100	PM	BD5232	3.200	MN
BD5250	5.000	PL	BD5231	3.100	MM
BD5249	4.900	PK	BD5230	3.000	ML
BD5248	4.800	PJ	BD5229	2.900	MK
BD5247	4.700	PH	BD5228	2.800	MJ
BD5246	4.600	PG	BD5227	2.700	MH
BD5245	4.500	PF	BD5226	2.600	MG
BD5244	4.400	PE	BD5225	2.500	MF
BD5243	4.300	PD	BD5224	2.400	ME
BD5242	4.200	PC	BD5223	2.300	MD

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 V_{DD} 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 V_{DD} pin, Output pin and GND pin, or V_{DD} 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 V_{DD} line inpedance might cause oscillation because of the detection current.

8 . A V_{DD} -GND capacitor (as close connection as possible) should be used in high V_{DD} line impedance condition.

9. BD52XXFVE 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 10MΩ leakage is assumed between the CT terminal and the GND terminal, 1MΩ connection between the CT terminal and the V_{DD} terminal would be recommended. Also, if the leakage is assumed between the V_{OUT} terminal and the GND terminal, the pull up resistor should be less than 1/10 of the assumed leak resistance.
The value of R_{CT} depends on the external resistor that is connected to CT terminal, so please consider the delay time that is decided by $\tau \times R_{CT} \times C_{CT}$ changes.

10. External parameters

The recommended parameter range for C_T is 10pF～0.1μF. For R_L, the recommended range is 50kΩ～1MΩ. When attempting to operate beyond these parameters, be sure to verify the actual operation before continuing use.

11. CT pin discharge

Due to the capabilities of the CT pin discharge transistor, the CT pin may not completely discharge when a short input pulse is applied, and in this case the delay time may not be controlled. Please verify the actual operation.

12. Power on reset operation

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

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