STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT Voltage Detector IC built in Delay Circuit

TYPE **BD45XXXG Series**

FEATURES
- Detection voltage line up : 2.3~4.8V
- High precision detection voltage : ±1.0%

○ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

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 ER		V_{ER}	GND-0.3 to V_{DD}+0.3	V
Power Dissipation ※2		Pd	540	mW
Operating Temperature ※1		Topr	-40 to +105	°C
Storage Temperature Range		Tstg	-55 to +125	°C
Junction Temperature		Tjmax	125	°C

※1 Do not exceed Pd.

※2 Mounted on 70mm × 70mm × 1.6mm Glass Epoxy PCB, Pd derated at 5.4mW/°C for tempearture 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.

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

Parameter	Symbol	Condition		Limit Min.	Limit Typ.	Limit Max.	Unit
Detection Voltage	V_{DET}	V_{DD}=H→L, R_L=470kΩ ※2		$V_{DET(T)}$ ×0.99	$V_{DET(T)}$	$V_{DET(T)}$ ×1.01	V
Detection Voltage Temperature coefficient	V_{DET}/ ΔT	-40°C～+105°C		-	±100	±360	ppm /°C
Hysteresis Voltage	ΔVDET	V_{DD}=L→H→L, R_L=470kΩ		$V_{DET(T)}$ ×0.03	$V_{DET(T)}$ ×0.05	$V_{DET(T)}$ ×0.08	V
'High' Output Delay time	tPLH	C_L=100pF, R_L=100kΩ ※2, ※3	BD45XX5G	45	50	55	msec
			BD45XX1G	90	100	110	
			BD45XX2G	180	200	220	
Circuit Current when ON	IDD1	V_{DD}=V_{DET}-0.2V, V_{ER}=0V V_{DET}=2.3V～3.1V ※2		-	0.70	2.10	μA
		V_{DD}=V_{DET}-0.2V, V_{ER}=0V V_{DET}=2.3V～3.1V		-	0.70	2.85	
		V_{DD}=V_{DET}-0.2V, V_{ER}=0V V_{DET}=3.2V～4.2V ※2		-	0.75	2.25	
		V_{DD}=V_{DET}-0.2V, V_{ER}=0V V_{DET}=3.2V～4.2V		-	0.75	3.00	
		V_{DD}=V_{DET}-0.2V, V_{ER}=0V V_{DET}=4.3V～4.8V ※2		-	0.80	2.40	
		V_{DD}=V_{DET}-0.2V, V_{ER}=0V V_{DET}=4.3V～4.8V		-	0.80	3.15	
Circuit Current when OFF	IDD2	V_{DD}=V_{DET}+0.2V, V_{ER}=0V V_{DET}=2.3V～3.1V ※2		-	0.75	2.25	μA
		V_{DD}=V_{DET}+0.2V, V_{ER}=0V V_{DET}=2.3V～3.1V		-	0.75	4.28	
		V_{DD}=V_{DET}+0.2V, V_{ER}=0V V_{DET}=3.2V～4.2V ※2		-	0.80	2.40	
		V_{DD}=V_{DET}+0.2V, V_{ER}=0V V_{DET}=3.2V～4.2V		-	0.80	4.50	
		V_{DD}=V_{DET}+0.2V, V_{ER}=0V V_{DET}=4.3V～4.8V ※2		-	0.85	2.55	
		V_{DD}=V_{DET}+0.2V, V_{ER}=0V V_{DET}=4.3V～4.8V		-	0.85	4.73	
Operating Voltage Range	V_{OPL}	V_{OL}≦0.4V, R_L=470kΩ, Ta=-25～-105°C		0.95	-	-	V
		V_{OL}≦0.4V, R_L=470kΩ, Ta=-40～-25°C		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 V_{DET}=2.7V～4.8V		2.0	5.0	-	
Leak Current when OFF	Ileak	V_{DD}=V_{DS}=10V ※2		-	-	0.1	μA
ER Pin 'H' Voltage	VEH	※2		2.0	-	-	V
ER Pin 'L' Voltage	VEL	※2		-	-	0.8	V
ER Pin Input Current	IEL			-	1	10	μA

$V_{DET(T)}$: Standard Detection Voltage (2.3V to 4.8V, 0.1V step)

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

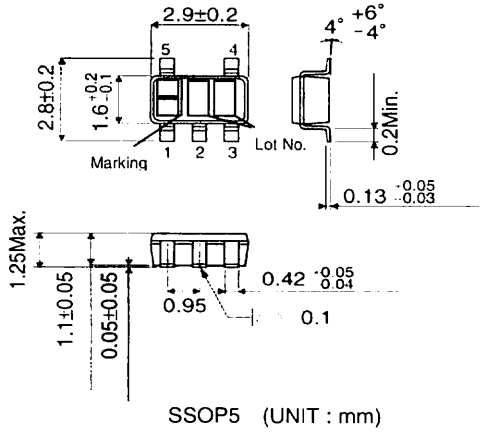
C_L : Capacitor to be connected between V_{OUT} and GND.

※2 Guarantee is Ta=25°C.

※3 tPLH: V_{DD}=($V_{DET(T)}$-0.5V)→($V_{DET(T)}$+0.5V)

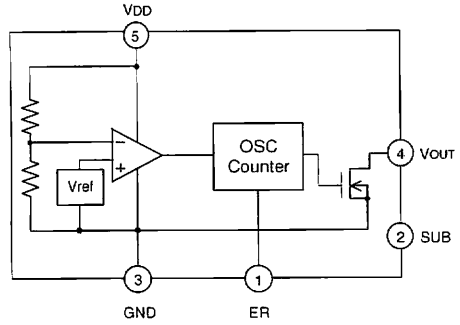
Attention: Please connect the GND when you don't use 'ER'

○PHYSICAL DIMENSIONS, MARKING



SSOP5 (UNIT : mm)

OBLOCK DIAGRAM



OPIN NO. , PIN NAME

Pin No.	Pin Name
1	ER
2	SUB
3	GND
4	VOUT
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

BD45XXXG Series

	BD45XX5G		BD45XX1G		BD45XX2G	
VDET	Product	Marking	Product	Marking	Product	Marking
4.8V	BD45485G	T0	BD45481G	TS	BD45482G	UJ
4.7V	BD45475G	T1	BD45471G	TT	BD45472G	UK
4.6V	BD45465G	T2	BD45461G	TU	BD45462G	UL
4.5v	BD45455G	T3	BD45451G	TV	BD45452G	UM
4.4V	BD45445G	T4	BD45441G	TW	BD45442G	UN
4.3V	BD45435G	T5	BD45431G	TX	BD45432G	UP
4.2V	BD45425G	T6	BD45421G	TY	BD45422G	UQ
4.1V	BD45415G	T7	BD45411G	TZ	BD45412G	UR
4.0V	BD45405G	T8	BD45401G	U0	BD45402G	US
3.9V	BD45395G	T9	BD45391G	U1	BD45392G	UT
3.8V	BD45385G	TA	BD45381G	U2	BD45382G	UU
3.7V	BD45375G	TB	BD45371G	U3	BD45372G	UV
3.6V	BD45365G	TC	BD45361G	U4	BD45362G	UW
3.5V	BD45355G	TD	BD45351G	U5	BD45352G	UX
3.4V	BD45345G	TE	BD45341G	U6	BD45342G	UY
3.3V	BD45335G	TF	BD45331G	U7	BD45332G	UZ
3.2V	BD45325G	TG	BD45321G	U8	BD45322G	V0
3.1V	BD45315G	TH	BD45311G	U9	BD45312G	V1
3.0V	BD45305G	TJ	BD45301G	UA	BD45302G	V2
2.9V	BD45295G	TK	BD45291G	UB	BD45292G	V3
2.8V	BD45285G	TL	BD45281G	UC	BD45282G	V4
2.7V	BD45275G	TM	BD45271G	UD	BD45272G	V5
2.6V	BD45265G	TN	BD45261G	UE	BD45262G	V6
2.5V	BD45255G	TP	BD45251G	UF	BD45252G	V7
2.4V	BD45245G	TQ	BD45241G	UG	BD45242G	V8
2.3V	BD45235G	TR	BD45231G	UH	BD45232G	V9

○NOTES 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 . Lower than the mininum input voltage makes the V_{OUT} high impedance, and it must be V_{DD} in pull up (V_{DD}) condition.

10. BD45XXXG 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 1MΩ leakage is assumed between the ER terminal and the GND terminal, 100kΩ connection between the ER terminal and the VDD terminal would be recommended. 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 50kΩ～1MΩ. 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 Vcc rise up time.
Please verify the actual operation.

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