STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT SERIES Low Voltage Detector IC with Adjustable Output Delay

TYPE **BU42XXG Series**

FEATURE
- Detection voltage lineup : 0.9V～4.8V
- High precision detection voltage : ±1%

○ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

Parameter		Symbol	Limit	Unit
Supply Voltage ※1		$V_{DD}-GND$	-0.3 to +7	V
Output Voltage ※1	Nch Open Drain Output	V_{OUT}	GND-0.3 to +7	V
Input Voltage of CT		V_{CT}	GND-0.3 to V_{DD}+0.3	V
Power Dissipation ※2		Pd	540	mW
Operating Temperature ※1		Topr	-40 to +125	℃
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 5.4mW/℃ 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.

OELECTRICAL CHARACTERISTICS (Unless Otherwise Specified Ta=-25 to 125°C)

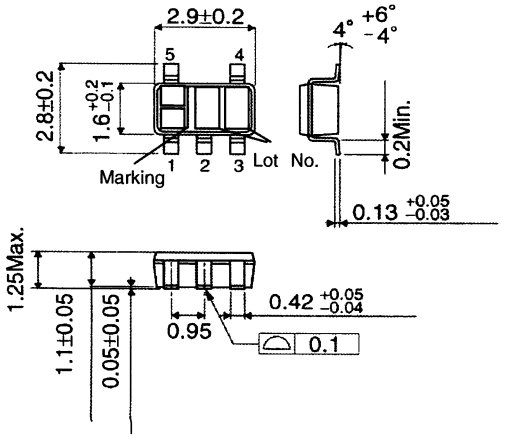
Parameter	Symbol	Condition		Limit Min.	Limit Typ.	Limit Max.	Unit
Detection Voltage	VDET	VDD=H→L Ta=25°C RL=470kΩ		VDET(T) ×0.99	VDET(T)	VDET(T) ×1.01	V
Circuit Current when ON	IDD1	VDD=VDET−0.2V,	VDET=0.9-1.3V	-	0.15	0.88	μA
			VDET=1.4-2.1V	-	0.20	1.05	
			VDET=2.2-2.7V	-	0.25	1.23	
			VDET=2.8-3.3V	-	0.30	1.40	
			VDET=3.4-4.2V	-	0.35	1.58	
			VDET=4.3-4.8V	-	0.40	1.75	
Circuit Current when OFF	IDD2	VDD=VDET+2.0V,	VDET=0.9-1.3V	-	0.30	1.40	μA
			VDET=1.4-2.1V	-	0.35	1.58	
			VDET=2.2-2.7V	-	0.40	1.75	
			VDET=2.8-3.3V	-	0.45	1.93	
			VDET=3.4-4.2V	-	0.50	2.10	
			VDET=4.3-4.8V	-	0.55	2.28	
Operating Voltage Range	VOPL	VOL≦0.4V, RL=470kΩ Ta=25°C～125°C		0.70	-	-	V
		VOL≦0.4V, RL=470kΩ Ta=-25°C～25°C		0.90	-	-	
'Low' Output Current (Nch)	IOL	VDS=0.05V, VDD=0.85V		20	100	-	μA
		VDS=0.5V, VDD=1.5V, VDET=1.7-4.8V		1.0	3.3	-	mA
		VDS=0.5V, VDD=2.4V, VDET=2.7-4.8V		3.6	6.5	-	
Leak Current when OFF	Ileak	VDD=VDS=7V Ta=-40°C～85°C		-	0	0.1	μA
		VDD=VDS=7V Ta=85°C～125°C		-	0	1	
CT pin Threshold Voltage	VCTH	VDD=VDET×1.1 Ta=25°C	RL=470kΩ VDET=0.9V-2.5V	VDD× 0.35	VDD× 0.45	VDD× 0.55	V
		VDD=VDET×1.1 Ta=25°C	RL=470kΩ VDET=2.6V-4.8V	VDD× 0.40	VDD× 0.50	VDD× 0.60	
Output Delay Resistance	RCT	VDD=VDET×1.1 Ta=25°C	VCT=0.5V	9.0	10.0	11.0	MΩ
CT pin Output Current	ICT	VCT =0.1V VDD=0.85V		5	40	-	μA
		VCT=0.5V VDD=1.5V, VDET=1.7V-4.8V		200	400	-	
Detection Voltage Temperature coefficient	VDET/ΔT	Ta=-40°C～125°C (Designed Gurantee)		-	±30	-	ppm/°C
Hysteresis Voltage	ΔVDET	RL=470kΩ, VDD=L→H→L Ta=-40°C～125°C	VDET≦1.0V	VDET× 0.03	VDET× 0.05	VDET× 0.08	V
			VDET≧1.1V	VDET× 0.03	VDET× 0.05	VDET× 0.07	

VDET(T) : Standard Detection Voltage (0.9V to 4.8V、0.1V step)

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

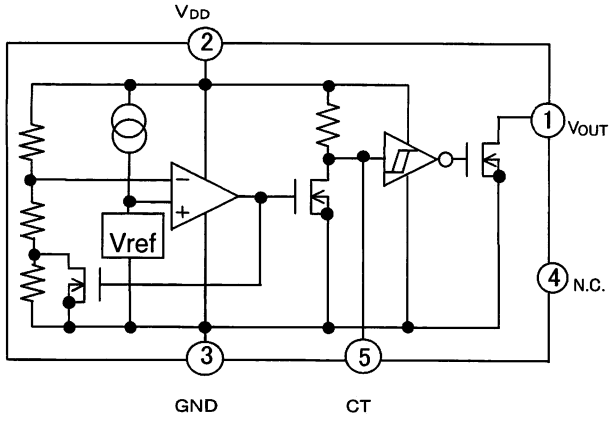
Designed Guarantee.(Outgoing inspection is not done on all products.)

OPHYSICAL DIMENSIONS, MARKING



SSOP5 (UNIT:mm)

OBLOCK DIAGRAM



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

OPIN NO. , PIN NAME

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

OSTANDARD DETECTION VOLTAGE AND MARKING

Type	Standard Detection Voltage[V]	Marking	Type	Standard Detection Voltage[V]	Marking
BU4248	4.800	ZR	BU4228	2.800	YV
BU4247	4.700	ZQ	BU4227	2.700	YU
BU4246	4.600	ZP	BU4226	2.600	YT
BU4245	4.500	ZN	BU4225	2.500	YS
BU4244	4.400	ZM	BU4224	2.400	YR
BU4243	4.300	ZL	BU4223	2.300	YQ
BU4242	4.200	ZK	BU4222	2.200	YP
BU4241	4.100	ZJ	BU4221	2.100	YN
BU4240	4.000	ZH	BU4220	2.000	YM
BU4239	3.900	ZG	BU4219	1.900	YL
BU4238	3.800	ZF	BU4218	1.800	YK
BU4237	3.700	ZE	BU4217	1.700	YJ
BU4236	3.600	ZD	BU4216	1.600	YH
BU4235	3.500	ZC	BU4215	1.500	YG
BU4234	3.400	ZB	BU4214	1.400	YF
BU4233	3.300	ZA	BU4213	1.300	YE
BU4232	3.200	YZ	BU4212	1.200	YD
BU4231	3.100	YY	BU4211	1.100	YC
BU4230	3.000	YX	BU4210	1.000	YB
BU4229	2.900	YW	BU4209	0.900	YA

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 . 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. Case of needless Delay time, recommended to insert more 470kΩ resister between V_{DD} and CT.

11. Recommended value of RL Resistar is over 10kΩ. ($V_{DET} \geqq 1.5V$)
over 100kΩ. ($V_{DET} \leqq 1.4V$)

12. BU42XXG 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.

13. Delay time (tPLH)
$tPLH = \tau \times R_{CT} \times C_{CT}$ (sec)
τ : time constant
R_{CT} : 10MΩ (typ.) (built-in resistor)
C_{CT} : capacitor connected CT pin.
Recommended value of C_{CT} capacitor TS over 100pF.

The reference value
$(\tau \times R_{CT}) \times 10^6$

V_{DET} = 0.9 to 2.5V
Ta = 25°C (min. = 5.1×10^6 typ.= 6.0×10^6 max = 6.9×10^6)
Ta = -25 to 125°C (min. = 3.3×10^6 typ. = 6.0×10^6 max = 8.7×10^6)

V_{DET} = 2.6 to 4.8V
Ta = 25°C (min. = 5.9×10^6 typ.= 6.9×10^6 max = 7.9×10^6)
Ta = -25 to 125°C (min. = 3.8×10^6 typ.= 6.9×10^6 max = 10.0×10^6)

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

15. 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.

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

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).
Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

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.

Thank you for your accessing to ROHM product informations.

More detail product informations and catalogs are available,

please contact your nearest sales office.

Please contact our sales offices for details ;

U.S.A / San Diego	TEL : +1(858)625-3630	FAX : +1(858)625-3670
Atlanta	TEL : +1(770)754-5972	FAX : +1(770)754-0691
Dallas	TEL : +1(972)312-8818	FAX : +1(972)312-0330
Germany / Dusseldorf	TEL : +49(2154)9210	FAX : +49(2154)921400
United Kingdom / London	TEL : +44(1)908-282-666	FAX : +44(1)908-282-528
France / Paris	TEL : +33(0)1 56 97 30 60	FAX : +33(0) 1 56 97 30 80
China / Hong Kong	TEL : +852(2)740-6262	FAX : +852(2)375-8971
Shanghai	TEL : +86(21)6279-2727	FAX : +86(21)6247-2066
Dilian	TEL : +86(411)8230-8549	FAX : +86(411)8230-8537
Beijing	TEL : +86(10)8525-2483	FAX : +86(10)8525-2489
Taiwan / Taipei	TEL : +866(2)2500-6956	FAX : +866(2)2503-2869
Korea / Seoul	TEL : +82(2)8182-700	FAX : +82(2)8182-715
Singapore	TEL : +65-6332-2322	FAX : +65-6332-5662
Malaysia / Kuala Lumpur	TEL : +60(3)7958-8355	FAX : +60(3)7958-8377
Philippines / Manila	TEL : +63(2)807-6872	FAX : +63(2)809-1422
Thailand / Bangkok	TEL : +66(2)254-4890	FAX : +66(2)256-6334

Japan /
(Internal Sales)

Tokyo 2-1-1, Yaesu, Chuo-ku, Tokyo 104-0082
TEL : +81(3)5203-0321 FAX : +81(3)5203-0300

Yokohama 2-4-8, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa 222-8575
TEL : +81(45)476-2131 FAX : +81(45)476-2128

Nagoya Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya,Aichi 450-0002
TEL : +81(52)581-8521 FAX : +81(52)561-2173

Kyoto 579-32 Higashi Shiokouji-cho, Karasuma Nishi-iru, Shiokoujidori, Shimogyo-ku, Kyoto 600-8216
TEL : +81(75)311-2121 FAX : +81(75)314-6559

(Contact address for overseas customers in Japan)

Yokohama TEL : +81(45)476-9270 FAX : +81(045)476-9271

As of 18th. April 2005