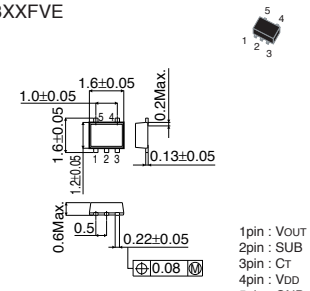
Low voltage·High-accuracy detection

CMOS VOLTAGE DETECTOR IC with delay time circuit

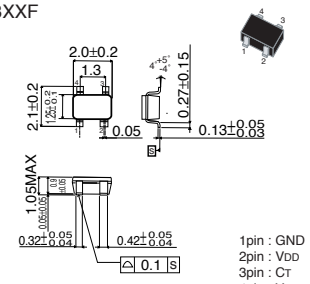
BU42XXFVE/F/G series
BU43XXFVE/F/G series

BU42XXFVE
BU43XXFVE



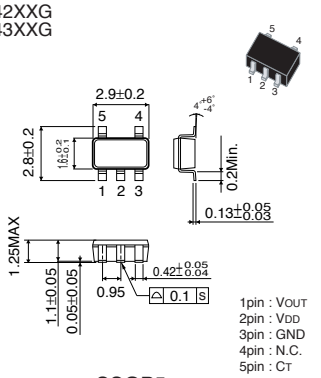
VSOF5

BU42XXF
BU43XXF



SOP4

BU42XXG
BU43XXG



SSOP5

●Description

ROHM's BU42XXFVE/F/G and BU43XXFVE/F/G series are low voltage and high-accuracy detection type of VOLTAGE DETECTOR ICs with built-in delay time circuit adopting CMOS process.
Low voltage of 0.9V detection can be realized. Adoption of high-resistance process enable to reduce current consumption and to set delay time by small capacitor.

●Features

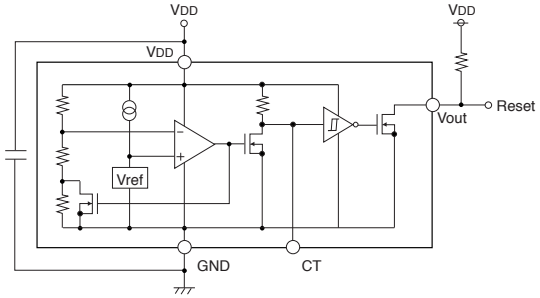
1) Detection voltage: 0.1V step line-up 0.9~4.8V (Typ.)
2) High-accuracy detection voltage: ±1.0% (Max.)
3) Low current consumption: 0.55μA typ. (Typ.) (VDET=4.8V, VDD=6.8V)
4) Excellent detection voltage temperature characteristic: ±30ppm/˚C
5) Delay time can be set by capacitor. (100msec: CT=0.015μF)
6) Open drain output (BU42XXseries), CMOS output (BU43XXseries)
7) Various package lineup
   VSOF5 : (BU42XXFVE, BU43XXFVE)
   SOP4 : (BU42XXF, BU43XXF)
   SSOP5 : (BU42XXG, BU43XXG)

●Application

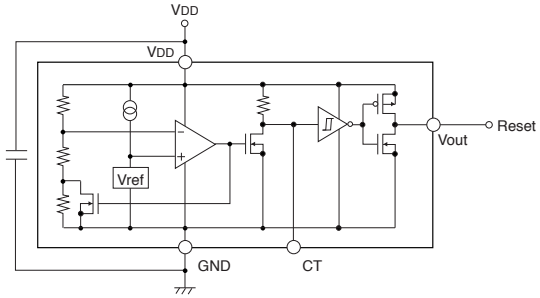
Portable appliances with microcontroller and logic circuit

● Application Circuit

(BU42XXFVE/F/G)



BU43XXFVE/F/G



Pin name	Pin number			Pin explanation
	BU42XXF BU43XXF	BU42XXFVE BU43XXFVE	BU42XXG BU43XXG	
Package	SOP4	VSOF5	SSOP5	
GND	1	5	3	GND
VDD	2	4	2	Supply voltage
CT	3	3	5	Capacitor connect pin for output delay time setting
VOUT	4	1	1	Reset output
N.C.	–	–	4	Non connection pin
SUB	–	2	–	Sub straight (Connect to VDD)

●Absolute Maximum Ratings (Ta=25˚C)

Parameter		Symbol	Limits	Unit
Supply voltage		VDD – GND	– 0.3 ~ + 7	V
Output voltage	Nch open drain output	VOUT	GND – 0.3 ~ + 7	V
	CMOS output		GND – 0.3 ~ VDD + 0.3	
CT pin input voltage		VCT	GND – 0.3 ~ VDD + 0.3	V
Power dissipation: VSOF5	*1	Pd	210	mW
Power dissipation: SOP4	*2	Pd	400	mW
Power dissipation: SSOP5	*3	Pd	540	mW
Operating temperature range		Topr	– 40 ~ + 125	˚C
Storage temperature range		Tstg	– 55 ~ + 125	˚C

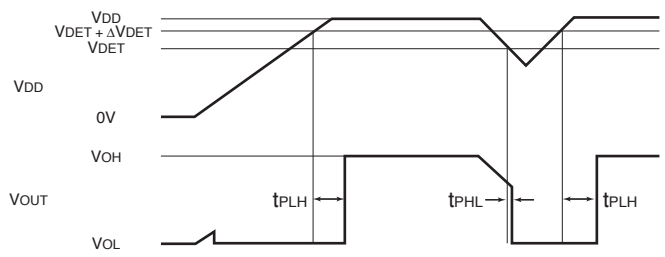
*1 Derating : 2.1mW/˚C for operation above Ta=25˚C PCB (70mmx70mm, t=1.6mm) glass epoxy mounting.
*2 Derating : 4.0mW/˚C for operation above Ta=25˚C PCB (70mmx70mm, t=1.6mm) glass epoxy mounting.
*3 Derating : 5.4mW/˚C for operation above Ta=25˚C PCB (70mmx70mm, t=1.6mm) glass epoxy mounting.

●Electrical characteristics (Unless otherwise noted; Ta=−25°C～+125°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Temperature coefficient of detection voltage *4	VDET/ΔT	—	±30	—	ppm/˚C	
Hysteresis voltage	ΔVDET	VDET×0.03	VDET×0.05	VDET×0.08	V	VDET≦1.0V, RL=470kΩ, VDD=L→H→L, Ta=-40°C ～ +125°C
		VDET×0.03	VDET×0.05	VDET×0.07		VDET≧1.1V, RL=470kΩ, VDD=L→H→L, Ta=-40°C ～ +125°C
Circuit current ON	IDD1	—	0.15	0.88	μA	VDD=VDET-0.2V, VDET=0.9~1.3V
		—	0.20	1.05		VDET=1.4~2.1V
		—	0.25	1.23		VDET=2.2~2.7V
		—	0.30	1.40		VDET=2.8~3.3V
		—	0.35	1.58		VDET=3.4~4.2V
		—	0.40	1.75		VDET=4.3~4.8V
Circuit current OFF	IDD2	—	0.30	1.40	μA	VDD=VDET+2.0V, VDET=0.9~1.3V
		—	0.35	1.58		VDET=1.4~2.1V
		—	0.40	1.75		VDET=2.2~2.7V
		—	0.45	1.93		VDET=2.8~3.3V
		—	0.50	2.10		VDET=3.4~4.2V
		—	0.55	2.28		VDET=4.3~4.8V
Operating voltage range	VOPL	0.7	—	—	V	VOL≦0.4V, Ta=25°C～125°C
		0.9	—	—		VOL≦0.4V, Ta=-25°C～+25°C
"L" output current (Nch)	IOL	20	100	—	μA	VDS=0.05V, VDD=0.85V
		1.0	3.3	—	mA	VDS=0.5V, VDD=1.5V, VDET=1.7V~4.8V
		4.0	7.2	—		VDS=0.5V, VDD=2.4V, VDET=2.7V~4.8V
"H" output current (Pch) (BU43XX series only)	IOH	1.7	3.4	—	mA	VDS=0.5V, VDD=4.8V, VDET=0.9V~3.9V
		2.0	4.0	—		VDS=0.5V, VDD=6.0V, VDET=4.0V~4.8V
Output leak current (BU42XX series only)	Ileak	—	0	0.1	μA	VDD=VDS=7V, Ta=-40°C～+85°C
		—	0	1		VDD=VDS=7V, Ta=+85°C～+125°C
CT pin threshold voltage	VCTH	VDD×0.35	VDD×0.45	VDD×0.55	V	VDD=VDET×1.1, RL=470kΩ, Ta=25°C, VDET=0.9V~2.5V
		VDD×0.40	VDD×0.50	VDD×0.60		VDD=VDET×1.1, RL=470kΩ, Ta=25°C, VDET=2.6V~4.8V
Output delay resistance *4	RCT	9.0	10.0	11.0	MΩ	VDD=VDET×1.1, VCT=0.5V, Ta=25°C
CT pin output current	ICT	5	40	—	μA	VCT=0.1V, VDD=0.85V
		200	400	—		VCT=0.5V, VDD=1.5V, VDET=1.7V~4.8V

*4 All shipment is not inspected for design guarantee.
Note) This product is not designed for protection against radioactive rays.

●Timing chart and delay time setting



* Delay time setting (t_{PLH})

$t_{PLH} = \tau \times R_{CT} \times C_{CT}$(Sec)

τ : Time constant
$R_{CT(\Omega)}$: Designed to 10MΩ(Typ.) by resistance of the built-in IC
$C_{CT(F)}$: Capacitance of external capacitor
Capacitance of recommended CT capacitor is 100pF or more

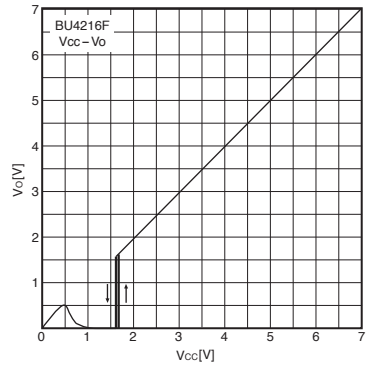
−Reference−
($\tau \times R_{CT}$) :

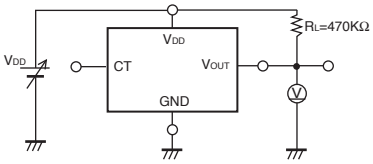
VDET = 0.9V ~ 2.5V
Ta = 25°C (min : 5.1E6, typ. : 6.0E6, max. : 6.9E6)
Ta = −25°C ~ 125°C (min : 3.3E6, typ. : 6.0E6, max. : 8.7E6)

VDET = 2.6V ~ 4.8V
Ta = 25°C (min : 5.9E6, typ. : 6.9E6, max. : 7.9E6)
Ta = −25°C ~ 125°C (min : 3.8E6, typ. : 6.9E6, max. : 10.0E6)

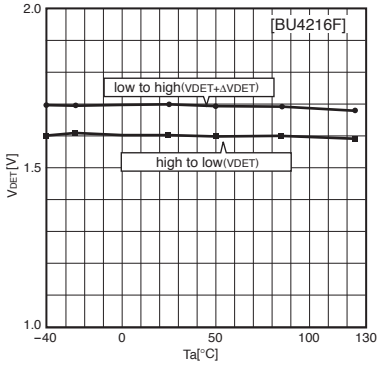
● Characteristic chart and measurement circuit

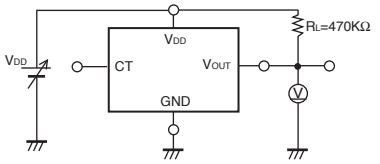
I/O characteristic



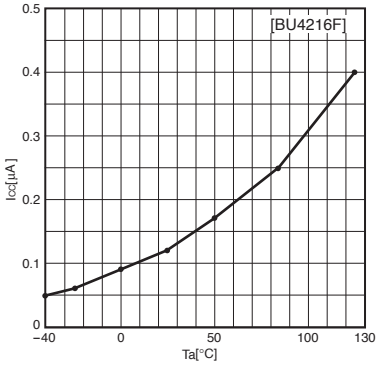


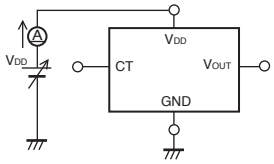
Detection voltage/Release voltage



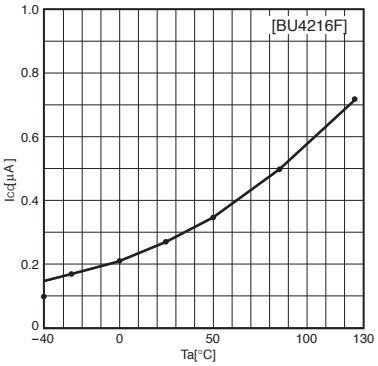


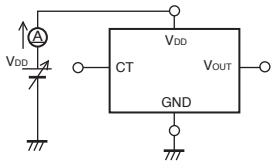
Circuit current when ON



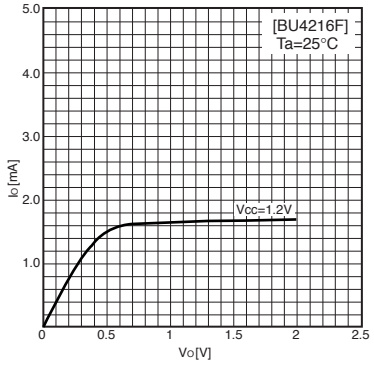


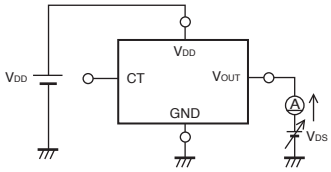
Circuit current when OFF



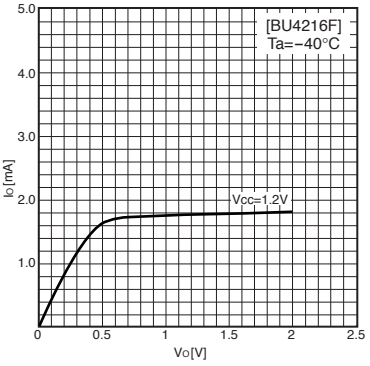


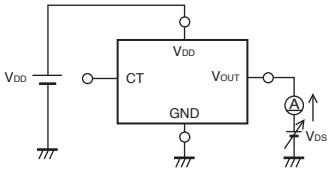
"L" output current [Ta=25°C]



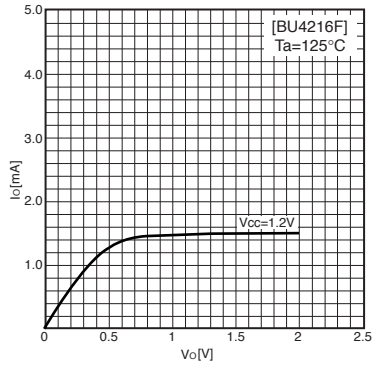


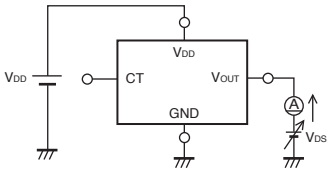
"L" output current [Ta=-40°C]



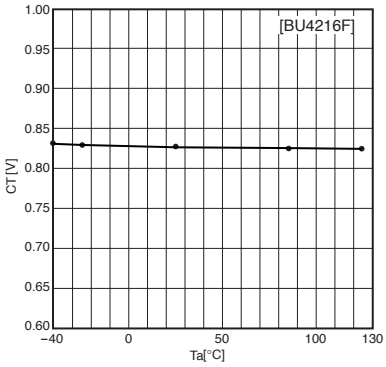


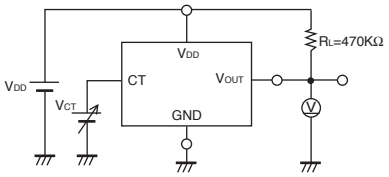
"L" output current [Ta=125°C]



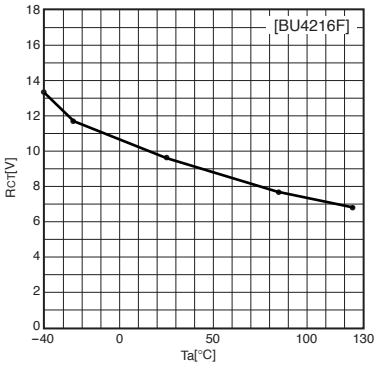


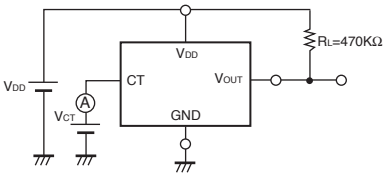
Threshold voltage





CT pin circuit resistance





●Series lineup

Part No.		Detection voltage V_{DET} (V)			Circuit current (μA Typ.)		Hysteresis voltage (V, Typ.)	"L"output current (Typ.)	Delay circuit resistance (MΩ)Typ.	Package
Open drain output	CMOS output	Min.	Typ.	Max.	ON	OFF				
BU4248G/FVE/F	**BU4348G/FVE/F**	4.752	4.800	4.848	0.40	0.55	V_{DET}x0.05	7.2mA [V_{DD}=2.4V V_{DS}=0.5V]	10.0	SSOP5 / VSOF5 / SOP4
BU4247G/FVE/F	**BU4347G/FVE/F**	4.653	4.700	4.747						
BU4246G/FVE/F	**BU4346G/FVE/F**	4.554	4.600	4.646						
BU4245G/FVE/F	**BU4345G/FVE/F**	4.455	4.500	4.545						
BU4244G/FVE/F	**BU4344G/FVE/F**	4.356	4.400	4.444						
BU4243G/FVE/F	**BU4343G/FVE/F**	4.257	4.300	4.343						
BU4242G/FVE/F	**BU4342G/FVE/F**	4.158	4.200	4.242	0.35	0.50				
BU4241G/FVE/F	**BU4341G/FVE/F**	4.059	4.100	4.141						
BU4240G/FVE/F	**BU4340G/FVE/F**	3.960	4.000	4.040						
BU4239G/FVE/F	**BU4339G/FVE/F**	3.861	3.900	3.939						
BU4238G/FVE/F	**BU4338G/FVE/F**	3.762	3.800	3.838						
BU4237G/FVE/F	**BU4337G/FVE/F**	3.663	3.700	3.737						
BU4236G/FVE/F	**BU4336G/FVE/F**	3.564	3.600	3.636						
BU4235G/FVE/F	**BU4335G/FVE/F**	3.465	3.500	3.535						
BU4234G/FVE/F	**BU4334G/FVE/F**	3.366	3.400	3.434						
BU4233G/FVE/F	**BU4333G/FVE/F**	3.267	3.300	3.333	0.30	0.45				
BU4232G/FVE/F	**BU4332G/FVE/F**	3.168	3.200	3.232						
BU4231G/FVE/F	**BU4331G/FVE/F**	3.069	3.100	3.131						
BU4230G/FVE/F	**BU4330G/FVE/F**	2.970	3.000	3.030						
BU4229G/FVE/F	**BU4329G/FVE/F**	2.871	2.900	2.929						
BU4228G/FVE/F	**BU4328G/FVE/F**	2.772	2.800	2.828						
BU4227G/FVE/F	**BU4327G/FVE/F**	2.673	2.700	2.727	0.25	0.40				
BU4226G/FVE/F	**BU4326G/FVE/F**	2.574	2.600	2.626				3.3mA [V_{DD}=1.5V V_{DS}=0.5V]		
BU4225G/FVE/F	**BU4325G/FVE/F**	2.475	2.500	2.525						
BU4224G/FVE/F	**BU4324G/FVE/F**	2.376	2.400	2.424						
BU4223G/FVE/F	**BU4323G/FVE/F**	2.277	2.300	2.323						
BU4222G/FVE/F	**BU4322G/FVE/F**	2.178	2.200	2.222						
BU4221G/FVE/F	**BU4321G/FVE/F**	2.079	2.100	2.121	0.20	0.35				
BU4220G/FVE/F	**BU4320G/FVE/F**	1.980	2.000	2.020						
BU4219G/FVE/F	**BU4319G/FVE/F**	1.881	1.900	1.919						
BU4218G/FVE/F	**BU4318G/FVE/F**	1.782	1.800	1.818						
BU4217G/FVE/F	**BU4317G/FVE/F**	1.683	1.700	1.717						
BU4216G/FVE/F	**BU4316G/FVE/F**	1.584	1.600	1.616				100μA [V_{DD}=0.85V V_{DS}=0.05V]		
BU4215G/FVE/F	**BU4315G/FVE/F**	1.485	1.500	1.515						
BU4214G/FVE/F	**BU4314G/FVE/F**	1.386	1.400	1.414						
BU4213G/FVE/F	**BU4313G/FVE/F**	1.287	1.300	1.313	0.15	0.30				
BU4212G/FVE/F	**BU4312G/FVE/F**	1.188	1.200	1.212						
BU4211G/FVE/F	**BU4311G/FVE/F**	1.089	1.100	1.111						
BU4210G/FVE/F	**BU4310G/FVE/F**	0.990	1.000	1.010						
BU4209G/FVE/F	**BU4309G/FVE/F**	0.891	0.900	0.909						

●The contents described herein are correct as of July, 2004

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