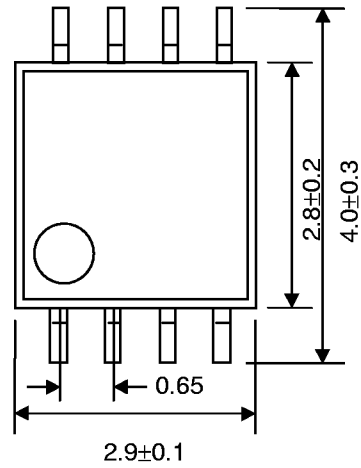


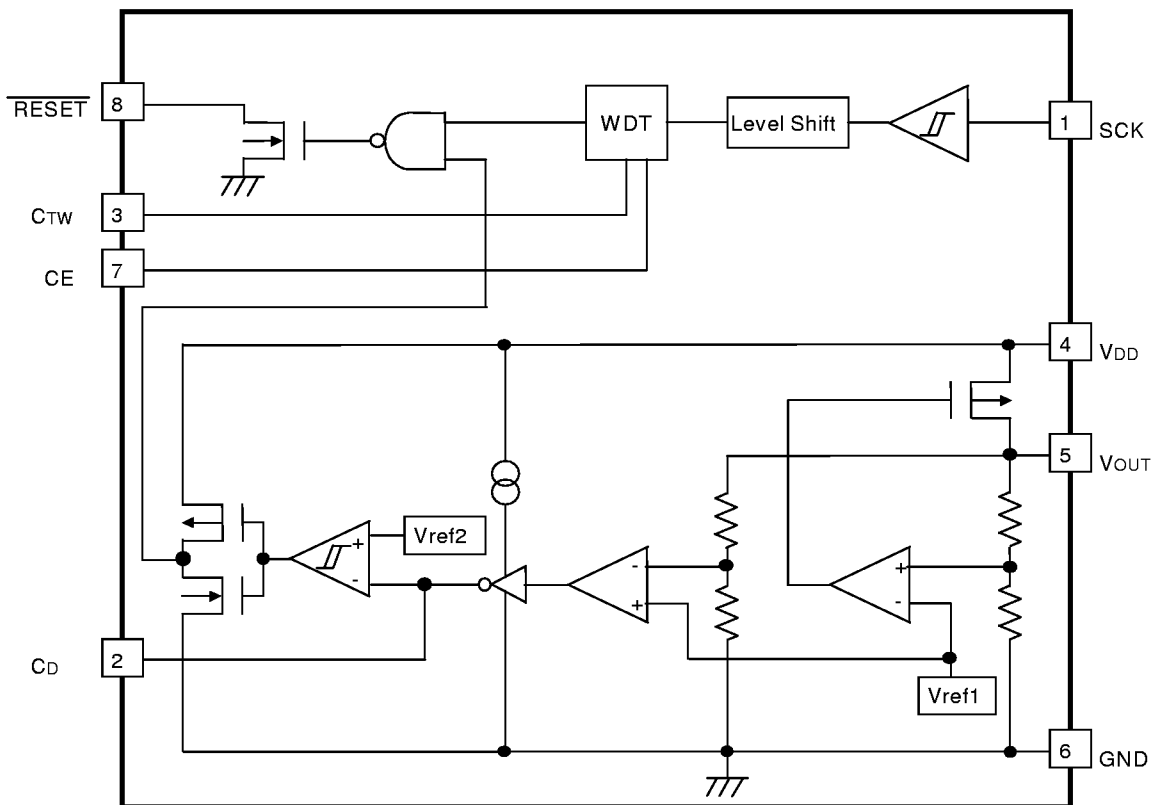
■ PACKAGE DIMENSIONS

SSOP8G



Unit : mm

■ BLOCK DIAGRAMS



■ PIN DESCRIPTION

Pin No.	Symbol	Description
1	SCK	Clock Input Pin from Microprocessor
2	CD	External Capacitor Pin for Setting Delay Time of Voltage Detector
3	CTW	External Capacitor Pin for Setting Monitoring Time and Reset Time of Watchdog timer
4	VDD	Power supply Pin
5	VOUT	Output Pin for Voltage Regulator
6	GND	Ground Pin
7	CE	Control Switch Pin for Watchdog timer ("H" active, "L" inactive)
8	$\overline{\text{RESET}}$	Output Pin for Reset signal of Watchdog timer and Voltage Detector.(Output Type is Nch Open Drain, Output "L" at detecting Detector Threshold and Watchdog Timer Reset.)

■ ABSOLUTE MAXIMUM RATINGS

$T_{opt}=25^{\circ}\text{C}$, $V_{ss}=0\text{V}$

Symbol	Item	Rating	Unit	
VDD	Supply Voltage	-0.3~12	V	
VCD	Output Voltage	Voltage of CD Pin	$V_{ss}-0.3\sim V_{DD}+0.3$	V
VCTW		Voltage of CTW Pin	$V_{ss}-0.3\sim V_{DD}+0.3$	V
VOUT		Voltage of VOUT Pin	$V_{ss}-0.3\sim V_{DD}+0.3$	V
VRESET		Voltage of RESET Pin	$V_{ss}-0.3\sim 12$	V
VCE	Input Voltage	Voltage of CE Pin	$V_{ss}-0.3\sim V_{DD}+0.3$	V
V_SCK		Voltage of SCK Pin	$V_{ss}-0.3\sim V_{DD}+0.3$	V
IOUT	Output Current	Current of VOUT Pin	150	mA
IRESET		Current of RESET Pin	10	mA
P _D	Power Dissipation	300	mW	
T _{opt}	Operating Temperature Range	-40~+85	°C	
T _{stg}	Storage Temperature Range	-55~+125	°C	

■ ELECTRICAL CHARACTERISTICS

●R5101G001A

T_{opt}=25°C

Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit
V _{DD}	Operating Voltage				10	V
I _{ss-On}	Supply Current (WDT active)	V _{DD} =CE=5.0V		5	15	μA
I _{ss-Off}	Supply Current (WDT inactive)	V _{DD} =5.0V, CE=GND		6	18	μA
V _{OUT}	Output Voltage	V _{DD} =5.0V, I _{OUT} =10mA	2.925	3.000	3.075	V
I _{OUT}	Output Current	V _{DD} =5.0V	100			mA
V _{DIF}	Dropout Voltage	I _{OUT} =30mA	150	500	850	mV
ΔV _{OUT} / ΔI _{OUT}	Load Regulation	V _{DD} =5.0V 1mA≤I _{OUT} ≤50mA		50	100	mV
ΔV _{OUT} / ΔV _{DD}	Line Regulation	I _{OUT} =10mA V _{OUT} +0.5V≤V _{DD} ≤10V		0.1	0.2	%/V
I _{lim}	Current Limit (Short mode)	V _{OUT} =0V	10	50	100	mA
ΔV _{OUT} / ΔT _{opt}	Output Voltage Temperature Coefficient	I _{OUT} =10mA -40°C≤T _{opt} ≤85°C		±100		ppm/ °C
-V _{DET}	Detector Threshold		2.633	2.700	2.767	V
V _{HYS}	Hysteresis Range		0.081	0.135	0.189	V
V _{DETMGN}	Regulator Voltage Margin against Released Voltage	V _{OUT} -((-V _{DET})+V _{HYS}), I _{OUT} =10mA	0.02			V
Δ-V _{DET} / ΔT _{opt}	Detector Threshold Temperature Coefficient	-40°C≤T _{opt} ≤85°C		±100		ppm/ °C
t _{pr}	Reset Delay Time	V _{DD} =5.0V, C _D =0.001μF	7	14	21	ms
t _{wd}	Watch Time of WDT	V _{DD} =5.0V, C _W =0.01μF	50	100	150	ms
t _{wr}	Reset Hold Time of WDT	V _{DD} =5.0V, C _W =0.01μF	5	10	15	ms
V _{IHSCK}	SCK Input Voltage " H "	V _{DD} =5.0V	0.8×V _{OUT}		V _{DD}	V
V _{ILSCK}	SCK Input Voltage " L "	V _{DD} =5.0V	0		0.2×V _{OUT}	V
V _{IHCE}	CE Input Voltage " H "		1.2		V _{DD}	V
V _{ILCE}	CE Input Voltage " L "		0		0.2	V
I _{IHSCK}	SCK Input Current " H "	V _{DD} =SCK=5.0V	-1		1	μA
I _{ILSCK}	SCK Input Current " L "	V _{DD} =5.0V, SCK=GND	-1		1	μA
R _{pu}	CE Pull-up Resistance		2	4	10	MΩ
I _{CD}	CD Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{CTW}	CTW Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{RESET}	RESET Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{leak}	RESET Pin Leakage Current	V _{DD} =10.0V, CE=GND, V _{DS} =12.0V	-1		1	μA
t _{sckw}	SCK Input Pulse Width	V _{DD} =5.0V, C _W =0.01μF	500			ns
V _{start}	Minimum Operating Voltage of Voltage Detector			0.9	1.3	V

●R5101G002A

Topt=25°C

Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit
V _{DD}	Operating Voltage				10	V
I _{SS-On}	Supply Current (WDT active)	V _{DD} =CE5.3V		5	15	μA
I _{SS-Off}	Supply Current (WDT inactive)	V _{DD} =5.3V, CE=GND		6	18	μA
V _{OUT}	Output Voltage	V _{DD} =5.3V, I _{OUT} =10mA	3.218	3.300	3.382	V
I _{OUT}	Output Current	V _{DD} =5.3V	50			mA
V _{DIF}	Dropout Voltage	I _{OUT} =30mA	100	500	650	mV
ΔV _{OUT} / ΔI _{OUT}	Load Regulation	V _{DD} =5.3V 1mA≤I _{OUT} ≤50mA		50	100	mV
ΔV _{OUT} / ΔV _{DD}	Line Regulation	I _{OUT} =10mA V _{OUT} +0.5V≤V _{DD} ≤10V		0.1	0.2	%/V
I _{lim}	Current Limit (Short mode)	V _{OUT} =0V	10	50	100	mA
ΔV _{OUT} / ΔT _{opt}	Output Voltage Temperature Coefficient	I _{OUT} =10mA -40°C≤T _{opt} ≤85°C		±100		ppm/ °C
-V _{DET}	Detector Threshold		2.925	3.000	3.075	V
V _{HYS}	Hysteresis Range		0.090	0.150	0.210	V
V _{DETMGN}	Regulator Voltage Margin against Released Voltage	V _{OUT} -((-V _{DET})+V _{HYS}), I _{OUT} =10mA	0.02			V
Δ-V _{DET} / ΔT _{opt}	Detector Threshold Temperature Coefficient	-40°C≤T _{opt} ≤85°C		±100		ppm/ °C
t _{pr}	Reset Delay Time	V _{DD} =5.3V, C _D =0.001μF	7	14	21	ms
t _{wd}	Watch Time of WDT	V _{DD} =5.3V, C _W =0.01μF	50	100	150	ms
t _{wr}	Reset Hold Time of WDT	V _{DD} =5.3V, C _W =0.01μF	5	10	15	ms
V _{IHSCK}	SCK Input Voltage " H "	V _{DD} =5.3V	0.8×V _{OUT}		V _{DD}	V
V _{ILSCK}	SCK Input Voltage " L "	V _{DD} =5.3V	0		0.2×V _{OUT}	V
V _{IHCE}	CE Input Voltage " H "		1.2		V _{DD}	V
V _{ILCE}	CE Input Voltage " L "		0		0.2	V
I _{IHSCK}	SCK Input Current " H "	V _{DD} =SCK=5.3V	-1		1	μA
I _{ILSCK}	SCK Input Current " L "	V _{DD} =5.3V, SCK=GND	-1		1	μA
R _{pu}	CE Pull-up Resistance			4		MΩ
I _{CD}	CD Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{CTW}	CTW Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{RESET}	RESET Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{leak}	RESET Pin Leakage Current	V _{DD} =10.0V, CE=GND, V _{DS} =12.0V	-1		1	μA
t _{skw}	SCK Input Pulse Width	V _{DD} =5.3V, SCK=GND	500			ns
V _{start}	Minimum Operating Voltage of Voltage Detector			0.9	1.3	V

●R5101G003A

T_{opt}=25°C

Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit
V _{DD}	Operating Voltage				10	V
I _{ss-On}	Supply Current (WDT active)	V _{DD} =CE=7.0V		7	20	μA
I _{ss-Off}	Supply Current (WDT inactive)	V _{DD} =7.0V, CE=GND		8	24	μA
V _{OUT}	Output Voltage	V _{DD} =7.0V, I _{OUT} =10mA	4.875	5.000	5.125	V
I _{OUT}	Output Current	V _{DD} =7.0V	50			mA
V _{DIF}	Dropout Voltage	I _{OUT} =30mA	100	350	600	mV
ΔV _{OUT} / ΔI _{OUT}	Load Regulation	V _{DD} =7.0V 1mA≤I _{OUT} ≤50mA		50	100	mV
ΔV _{OUT} / ΔV _{DD}	Line Regulation	I _{OUT} =10mA V _{OUT} +0.5V≤V _{DD} ≤10V		0.1	0.2	%/V
I _{lim}	Current Limit (Short mode)	V _{OUT} =0V	10	50	100	mA
ΔV _{OUT} / ΔT _{opt}	Output Voltage Temperature Coefficient	I _{OUT} =10mA -40°C≤T _{opt} ≤85°C		±100		ppm/ °C
-V _{DET}	Detector Threshold		4.388	4.500	4.590	V
V _{HYS}	Hysteresis Range		0.135	0.225	0.315	V
V _{DETMGN}	Regulator Voltage Margin against Released Voltage	V _{OUT} -((-V _{DET})+V _{HYS}), I _{OUT} =10mA	0.02			V
Δ-V _{DET} / ΔT _{opt}	Detector Threshold Temperature Coefficient	-40°C≤T _{opt} ≤85°C		±100		ppm/ °C
t _{pr}	Reset Delay Time	V _{DD} =7.0V, C _D =0.001μF	7	14	21	ms
t _{wd}	Watch Time of WDT	V _{DD} =7.0V, C _W =0.01μF	50	100	150	ms
t _{wr}	Reset Hold Time of WDT	V _{DD} =7.0V, C _W =0.01μF	5	10	15	ms
V _{IHSCK}	SCK Input Voltage " H "	V _{DD} =7.0V	0.8×V _{OUT}		V _{DD}	V
V _{ILSCK}	SCK Input Voltage " L "	V _{DD} =7.0V	0		0.2×V _{OUT}	V
V _{IHCE}	CE Input Voltage " H "		1.2		V _{DD}	V
V _{ILCE}	CE Input Voltage " L "		0		0.2	V
I _{IHSCK}	SCK Input Current " H "	V _{DD} =SCK=7.0V	-1		1	μA
I _{ILSCK}	SCK Input Current " L "	V _{DD} =7.0V, SCK=GND	-1		1	μA
R _{pu}	CE Pull-up Resistance		2	4	10	MΩ
I _{CD}	CD Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{CTW}	CTW Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{RESET}	RESET Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{leak}	RESET Pin Leakage Current	V _{DD} =10.0V, CE=GND, V _{DS} =12.0V	-1		1	μA
t _{sckw}	SCK Input Pulse Width	V _{DD} =7.0V, SCK=GND	500			ns
V _{start}	Minimum Operating Voltage of Voltage Detector			0.9	1.3	V

●R5101G004A

T_{opt}=25°C

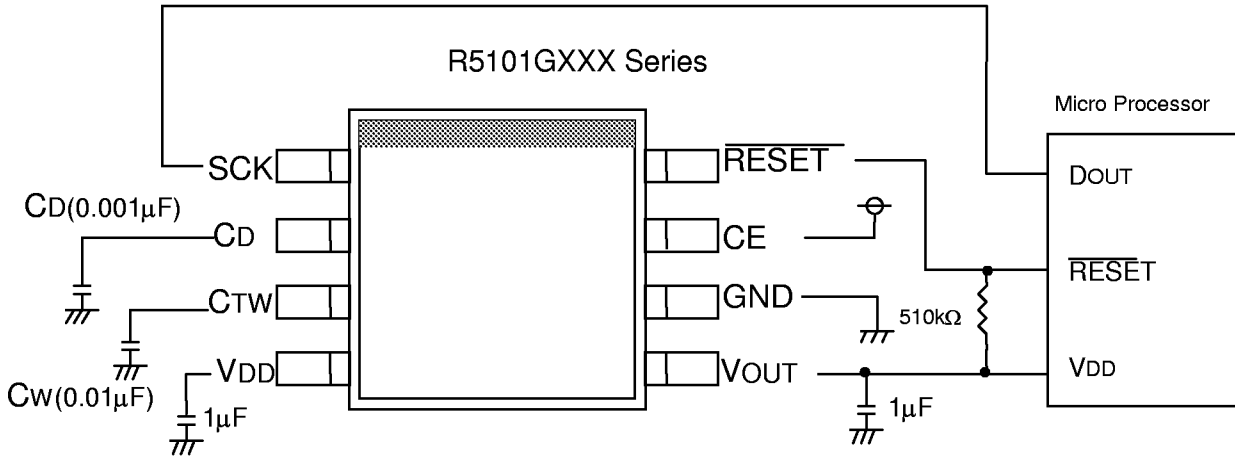
Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit
V _{DD}	Operating Voltage				10	V
I _{ss-On}	Supply Current (WDT active)	V _{DD} =CE=7.0V		7	20	μA
I _{ss-Off}	Supply Current (WDT inactive)	V _{DD} =7.0V, CE=GND		8	24	μA
V _{OUT}	Output Voltage	V _{DD} =7.0V, I _{OUT} =10mA	4.875	5.000	5.125	V
I _{OUT}	Output Current	V _{DD} =7.0V	50			mA
V _{DIF}	Dropout Voltage	I _{OUT} =30mA	100	350	650	mV
ΔV _{OUT} / ΔI _{OUT}	Load Regulation	V _{DD} =7.0V 1mA ≤ I _{OUT} ≤ 50mA		50	100	mV
ΔV _{OUT} / ΔV _{DD}	Line Regulation	I _{OUT} =10mA V _{OUT} +0.5V ≤ V _{DD} ≤ 10V		0.1	0.2	%/V
I _{lim}	Current Limit (Short mode)	V _{OUT} =0V	10	50	100	mA
ΔV _{OUT} / ΔT _{opt}	Output Voltage Temperature Coefficient	I _{OUT} =10mA -40°C ≤ T _{opt} ≤ 85°C		±100		ppm/ °C
-V _{DET}	Detector Threshold		2.145	2.200	2.255	V
V _{HYS}	Hysteresis Range		0.066	0.110	0.154	V
V _{DETMGN}	Regulator Voltage Margin against Released Voltage	V _{OUT} -((-V _{DET})+V _{HYS}), I _{OUT} =10mA	0.02			V
Δ-V _{DET} / ΔT _{opt}	Detector Threshold Temperature Coefficient	-40°C ≤ T _{opt} ≤ 85°C		±100		ppm/ °C
t _{pr}	Reset Delay Time	V _{DD} =7.0V, C _D =0.001μF	7	14	21	ms
t _{wd}	Watch Time of WDT	V _{DD} =7.0V, C _W =0.01μF	50	100	150	ms
t _{wr}	Reset Hold Time of WDT	V _{DD} =7.0V, C _W =0.01μF	5	10	15	ms
V _{IHSCK}	SCK Input Voltage " H "	V _{DD} =7.0V	0.8×V _{OUT}		V _{DD}	V
V _{ILSCK}	SCK Input Voltage " L "	V _{DD} =7.0V	0		0.2×V _{OUT}	V
V _{IHCE}	CE Input Voltage " H "		1.2		V _{DD}	V
V _{ILCE}	CE Input Voltage " L "		0		0.2	V
I _{IHSCK}	SCK Input Current " H "	V _{DD} =SCK=7.0V	-1		1	μA
I _{ILSCK}	SCK Input Current " L "	V _{DD} =7.0V, SCK=GND	-1		1	μA
R _{pu}	CE Pull-up Resistance		2	4	10	MΩ
I _{CD}	CD Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{CTW}	CTW Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{RESET}	RESET Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{leak}	RESET Pin Leakage Current	V _{DD} =10.0V, CE=GND, V _{DS} =12.0V	-1		1	μA
t _{sckw}	SCK Input Pulse Width	V _{DD} =7.0V, SCK=GND	500			ns
V _{start}	Minimum Operating Voltage of Voltage Detector			0.9	1.3	V

●R5101G005A

T_{opt}=25°C

Symbol	Item	Conditions	MIN.	TYP.	MAX.	Unit
V _{DD}	Operating Voltage				10	V
I _{ss-On}	Supply Current (WDT active)	V _{DD} =CE=4.8V		5	15	μA
I _{ss-Off}	Supply Current (WDT inactive)	V _{DD} =4.8V, CE=GND		6	18	μA
V _{OUT}	Output Voltage	V _{DD} =4.8V, I _{OUT} =10mA	2.730	2.800	2.870	V
I _{OUT}	Output Current	V _{DD} =4.8V, I _{OUT} =10mA	50			mA
V _{DIF}	Dropout Voltage	I _{OUT} =10mA	100	350	650	mV
ΔV _{OUT} / ΔI _{OUT}	Load Regulation	V _{DD} =4.8V 1mA≤I _{OUT} ≤50mA		50	100	mV
ΔV _{OUT} / ΔV _{DD}	Line Regulation	I _{OUT} =10mA V _{OUT} +0.5V≤V _{DD} ≤10V		0.1	0.2	%/V
I _{lim}	Current Limit (Short mode)	V _{OUT} =0V	10	50	100	mA
ΔV _{OUT} / ΔT _{opt}	Output Voltage Temperature Coefficient	I _{OUT} =10mA -40°C≤T _{opt} ≤85°C		±100		ppm/ °C
-V _{DET}	Detector Threshold		2.340	2.400	2.460	V
V _{HYS}	Hysteresis Range		0.072	0.120	0.168	V
V _{DETMGN}	Regulator Voltage Margin against Released Voltage	V _{OUT} -((-V _{DET})+V _{HYS}), I _{OUT} =10mA	0.02			V
Δ-V _{DET} / ΔT _{opt}	Detector Threshold Temperature Coefficient	-40°C≤T _{opt} ≤85°C		±100		ppm/ °C
t _{pr}	Reset Delay Time	V _{DD} =4.8V, C _D =0.001μF	7	14	21	ms
t _{wd}	Watch Time of WDT	V _{DD} =4.8V, C _W =0.01μF	50	100	150	ms
t _{wr}	Reset Hold Time of WDT	V _{DD} =4.8V, C _W =0.01μF	5	10	15	ms
V _{IHSCK}	SCK Input Voltage " H "	V _{DD} =4.8V	0.8×V _{OUT}		V _{DD}	V
V _{ILSCK}	SCK Input Voltage " L "	V _{DD} =4.8V	0		0.1×V _{OUT}	V
V _{IHCE}	CE Input Voltage " H "		1.2		V _{DD}	V
V _{ILCE}	CE Input Voltage " L "		0		0.2	V
I _{IHSCK}	SCK Input Current " H "	V _{DD} =SCK=4.8V	-1		1	μA
I _{ILSCK}	SCK Input Current " L "	V _{DD} =4.8V, SCK=GND	-1		1	μA
R _{pu}	CE Pull-up Resistance			4		MΩ
I _{CD}	CD Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{CTW}	CTW Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{RESET}	RESET Pin Output Current	V _{DD} =1.3V, V _{DS} =0.5V	1	2		mA
I _{leak}	RESET Pin Leakage Current	V _{DD} =10.0V, CE=GND, V _{DS} =12.0V	-1		1	μA
t _{sckw}	SCK Input Pulse Width	V _{DD} =4.8V, SCK=GND	500			ns
V _{start}	Minimum Operating Voltage of Voltage Detector			0.9	1.3	V

■ TYPICAL APPLICATION

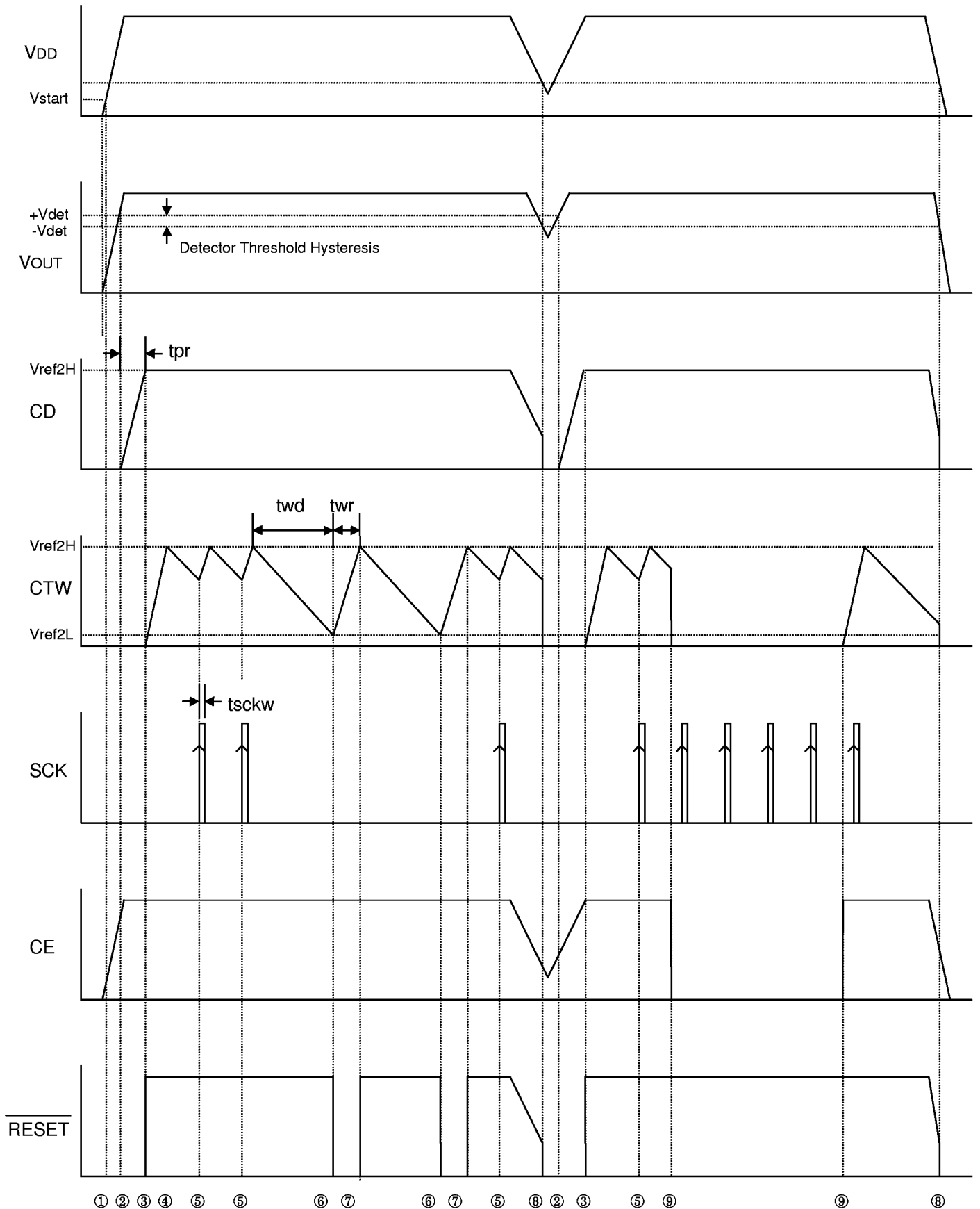


■ TECHNICAL NOTES

Use 0.01µF or more value of an external capacitor, CW for setting monitoring time of watchdog timer.

Use 1 or 2.2µF capacitor between VDD and GND, and between VOUT and GND and make its wiring as short as possible.

OPERATION DIAGRAM



■ OPERATION

① When VDD is turned on and Input Voltage reaches Vstart (nearly equal 0.8V), the output of $\overline{\text{RESET}}$ pin becomes “L” level.

② An External Capacitor starts to be charged through the CD pin when an Output Voltage of the Voltage Regulator, VOUT, crosses the Released Voltage, +VDET, from Lower to Higher. The $\overline{\text{RESET}}$ is kept “L” level until Voltage of the CD pin, VCD, reaches to the Vref2H, about 1.0V, and after that the $\overline{\text{RESET}}$ becomes to “H” level.

* tPR : Time interval between the timing of starting edge of forcing voltage to VDD pin and the timing of reverse the voltage level of $\overline{\text{RESET}}$.

tPR can be set by connecting an external capacitor to CD pin, tPR can be calculated as shown below;

$tPR \text{ (ms)} \approx 13000 \times CD \text{ (}\mu\text{F)}$; CD means a value of an external capacitor connected to CD pin.

③ When the voltage level of VCD reaches to the Vref2H, the external capacitor starts to be charged through the CTW pin and the watchdog timer begins to operate.

④ The operation mode for the external capacitor changes from charging mode to discharging mode through CTW pin when the voltage level of CTW pin, VCTW, reaches to the Vref2H.

⑤ While the CTW pin is on the discharging mode, if a clock pulse is entered (synchronous with a rising edge of the pulse), the operation mode of CTW pin changes from charging mode to discharging mode. And the external capacitor connected to CTW pin is charged until its voltage level reaches to Vref2H.

⑥ While the CTW pin is on the discharging mode, if VCTW level drops to Vref2L, about 0.2V without clock pulse to CLK pin, the voltage level of Reset pin becomes from “H” to “L”.

* Watch Time of the watchdog timer, tWD, : Discharging Time of CTW pin level from Vref2H to Vref2L

tWD can be set by connecting an external capacitor to CW pin, tWD can be calculated as shown below;

$tWD \text{ (ms)} \approx 10000 \times CW \text{ (}\mu\text{F)}$; CW means a value of an external capacitor connected to CW pin.

⑦ CTW pin is changed to charging mode from discharging mode when the Reset signal is generated.

* Reset time of the watchdog timer, tWR, : Time interval between Charging time of the CTW pin from Vref2L to Vref2H. tWR can be calculated by the next equation as shown below;

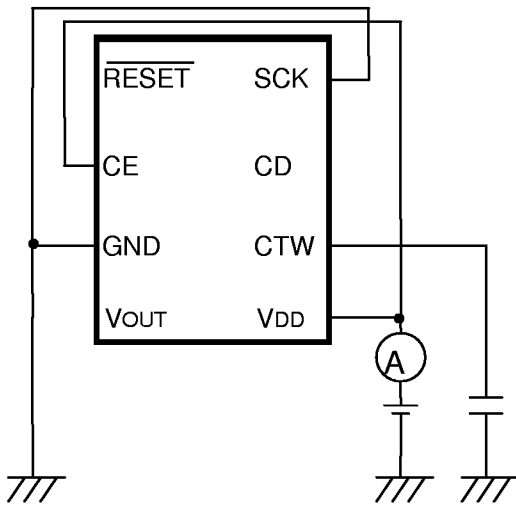
$tWR \text{ (ms)} \approx tWD/10$

⑧ The Output Voltage level of $\overline{\text{Reset}}$ pin becomes from “H” to “L”, or a Reset signal is generated when an output voltage of the Voltage Regulator drops to a level at equal or less than -Vdet.

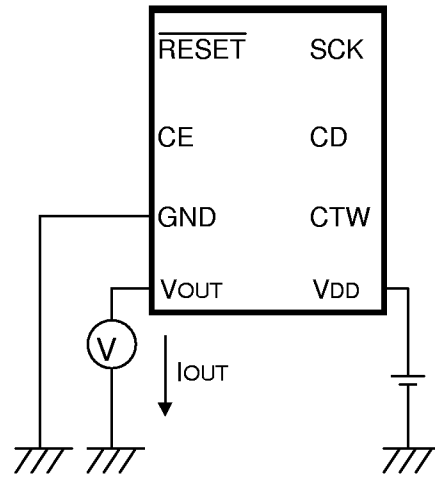
⑨ The watchdog timer will be halted when a Voltage level of CE pin becomes to “L”. In this case, only the watchdog timer is stopped and monitoring the output voltage is continued. After that, if the voltage level of CE pin becomes to “H”, CTW pin starts to be on charging mode.

■ TEST CIRCUITS

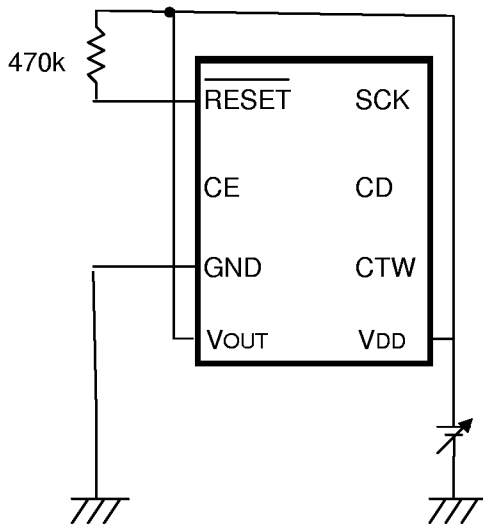
Test Circuit of Supply Current



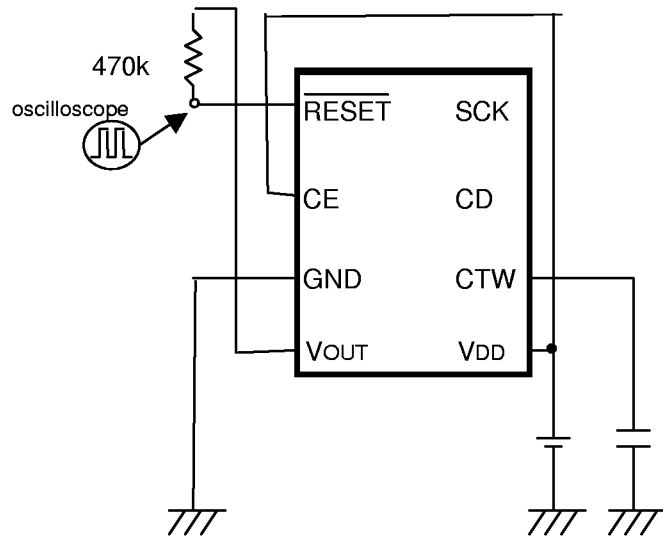
Test Circuit of Output Voltage



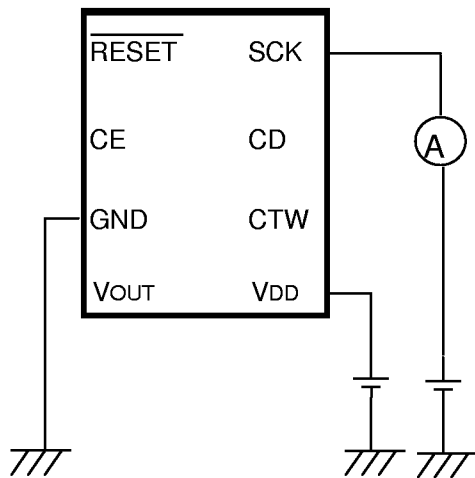
Test Circuit of Detector Threshold(VDET)



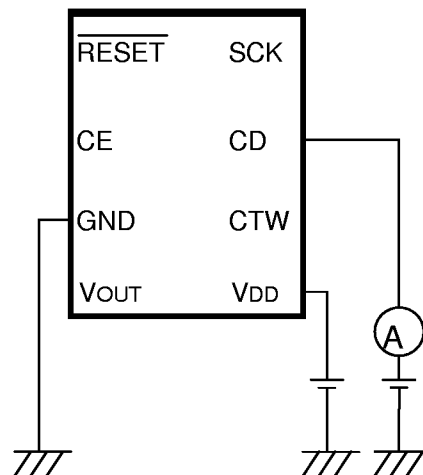
Test Circuit of Monitoring Time of WDT and RESET Time



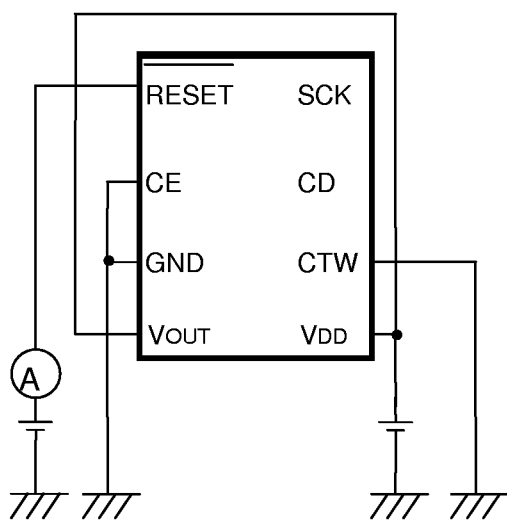
Test Circuit of SCK Input Current



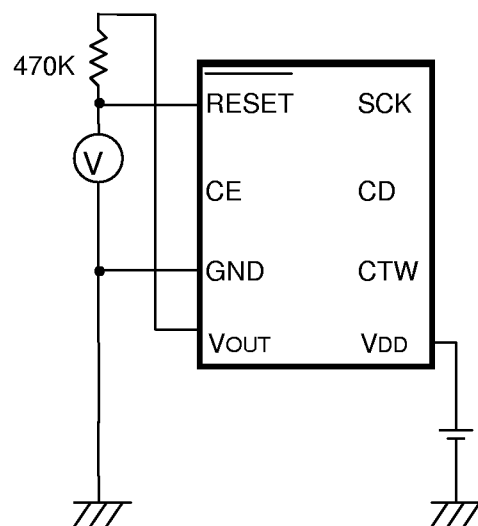
Test Circuit of Output Current



Test Circuit of RESET Output leakage Current

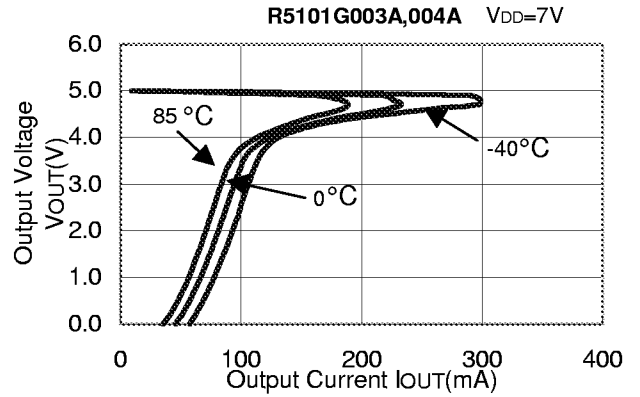
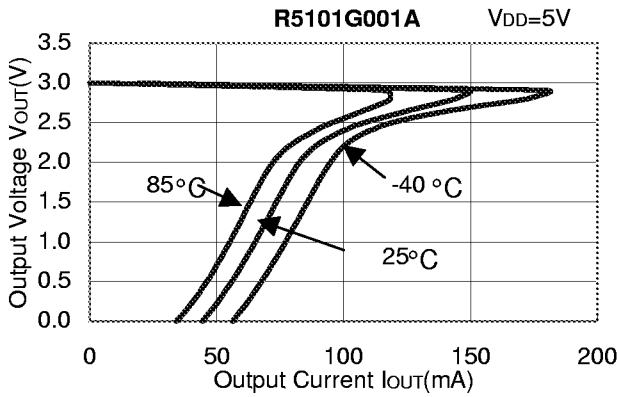


Test Circuit of Minimum Input Voltage for RESET Output

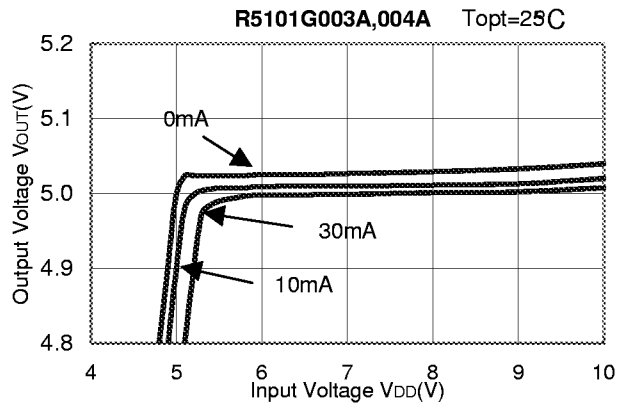
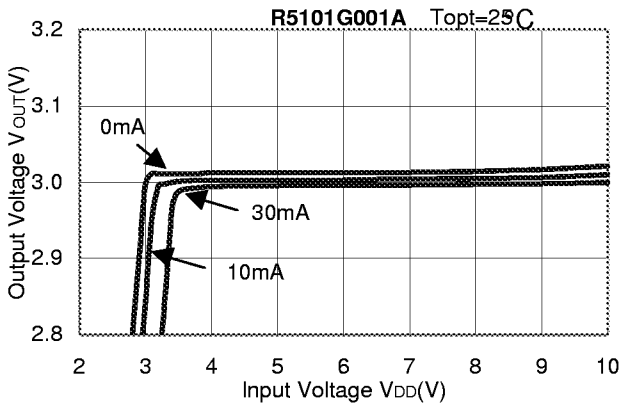


■ TYPICAL CHARACTERISTICS

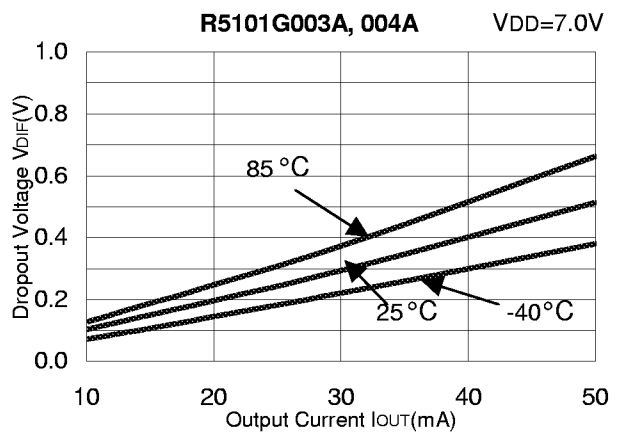
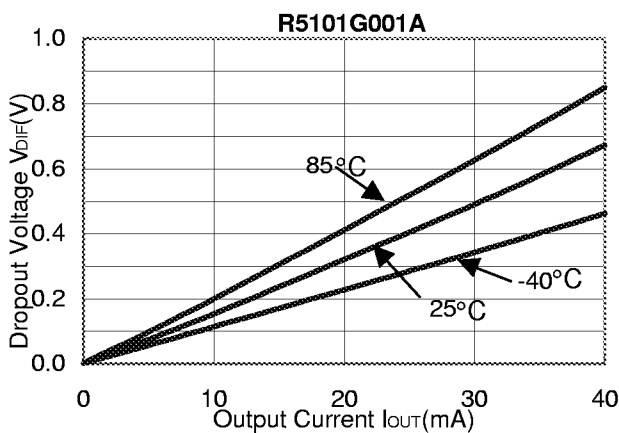
1) Output Voltage vs. Output Current



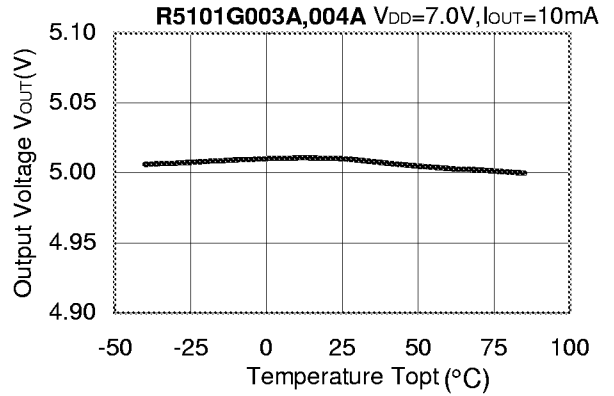
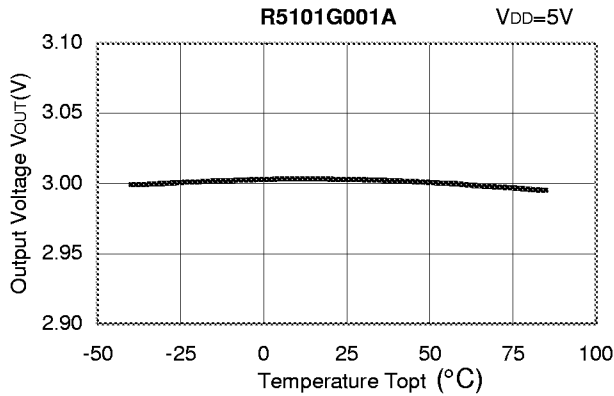
2) Output Voltage vs. Input Voltage



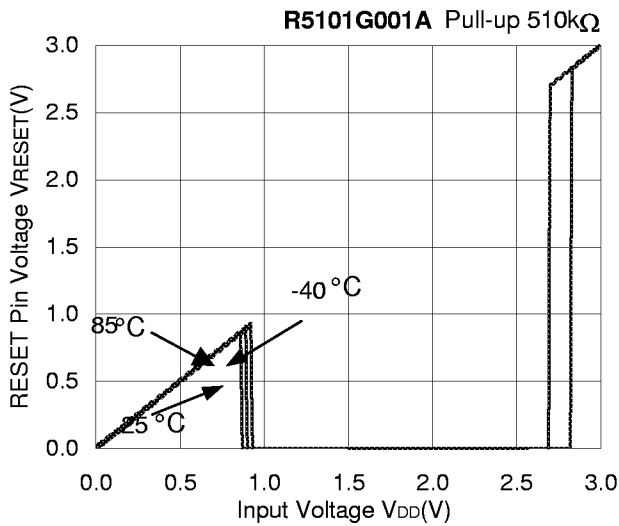
3) Dropout Voltage vs. Output Current



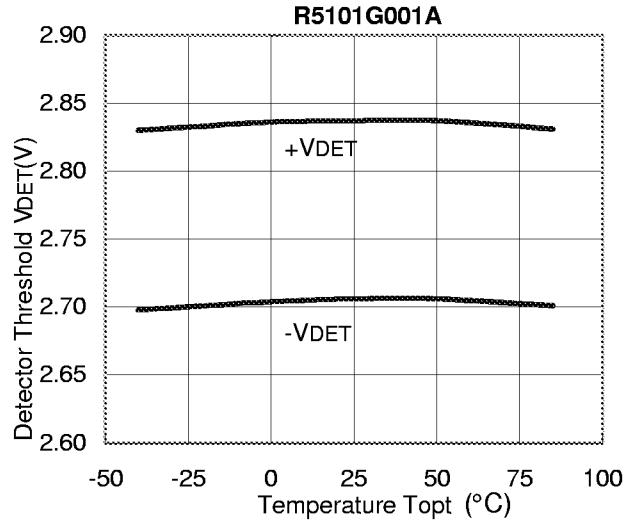
4) Output Voltage vs. Temperature



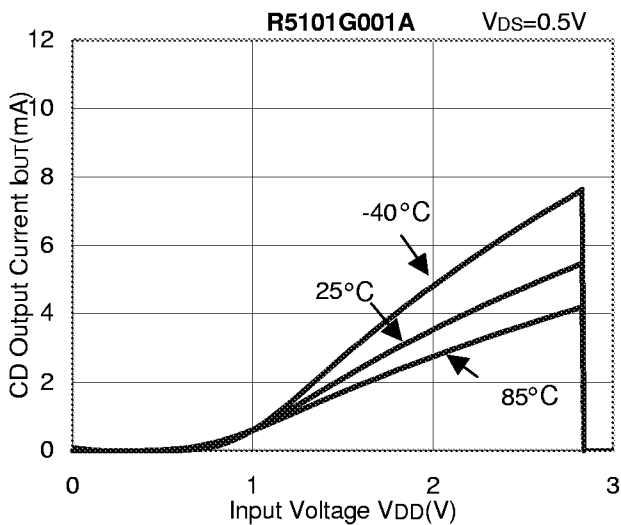
5) RESET Pin Voltage vs. Input Voltage



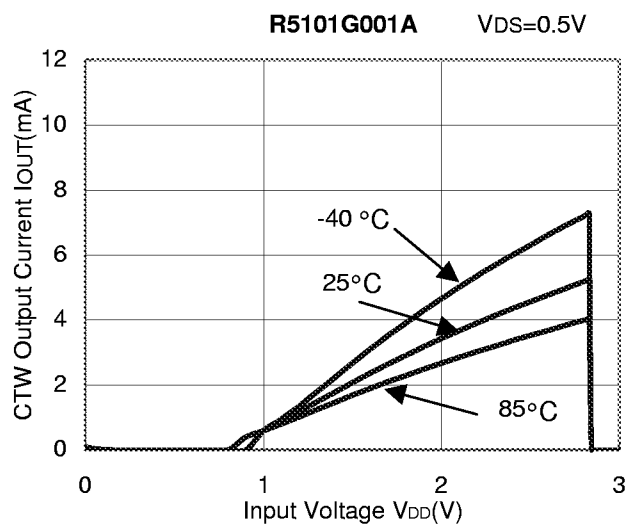
6) Detector Threshold vs. Temperature



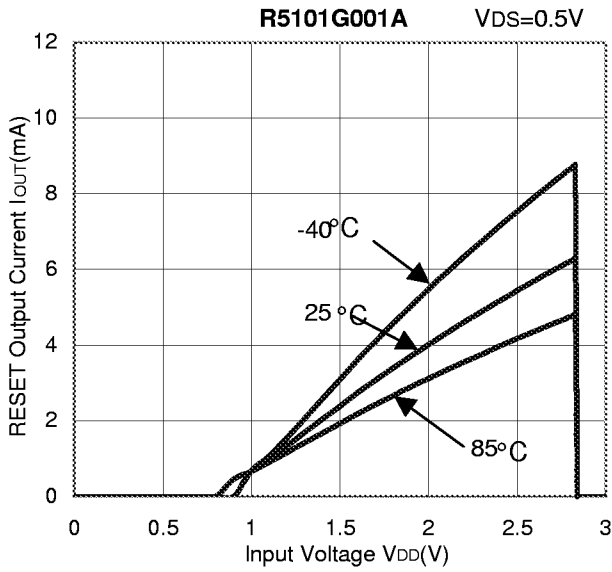
7) CD Pin Output Current vs. Input Voltage



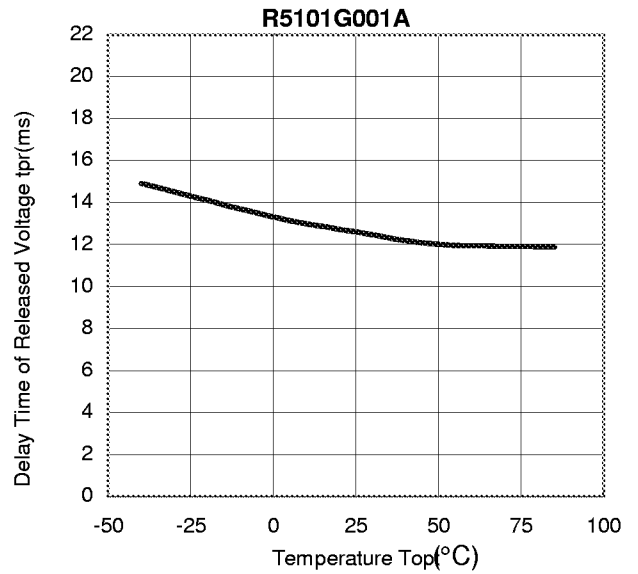
8) CTW Pin Output Current vs. Input Voltage



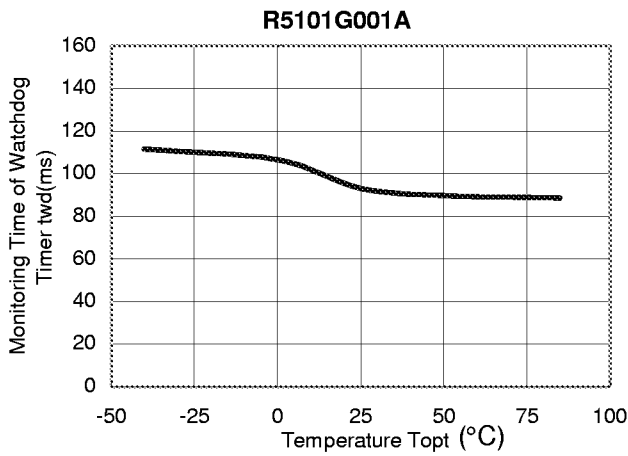
9) RESET Pin Output Current vs. Input Voltage



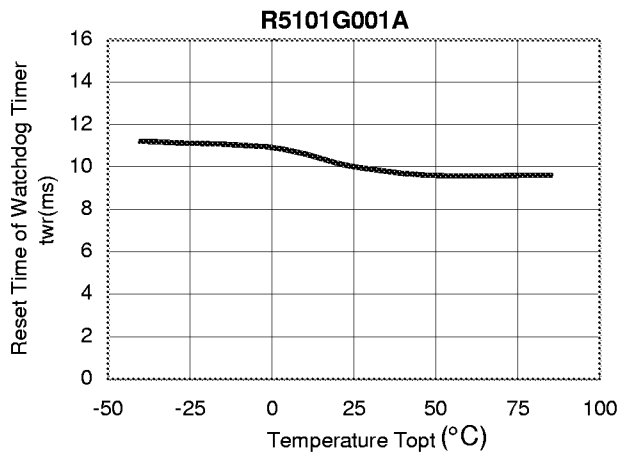
10) Delay Time of Released Voltage vs. Temperature



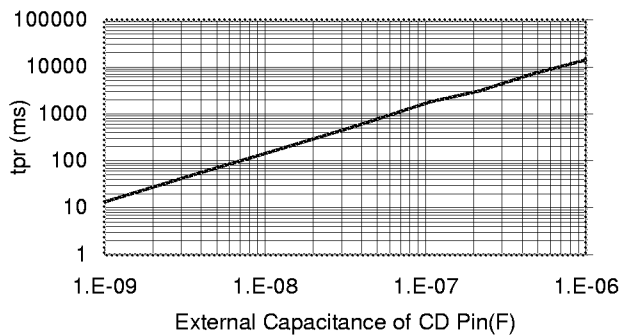
11) Monitoring Time of Watchdog Timer vs. Temperature



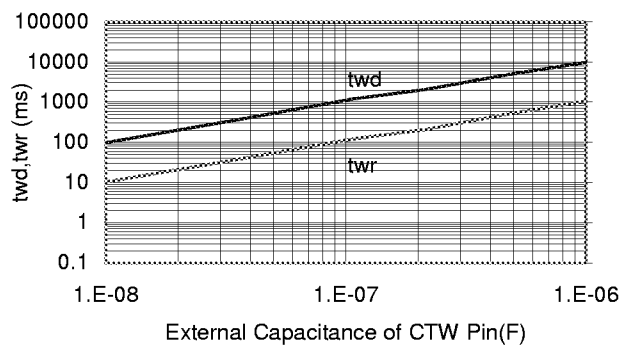
12) Reset Time of Watchdog Timer vs. Temperature



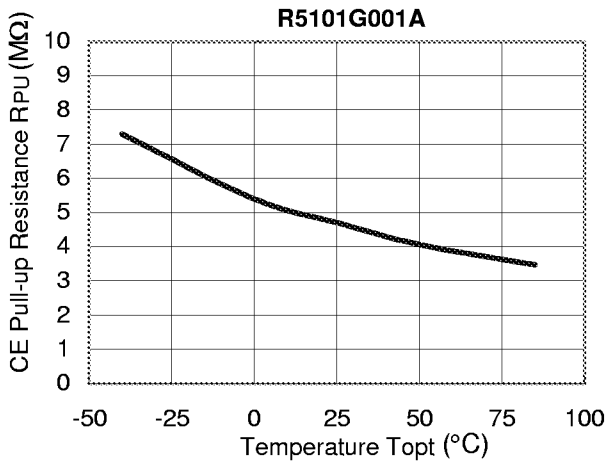
13) tpr vs. External Capacitance of Cd Pin



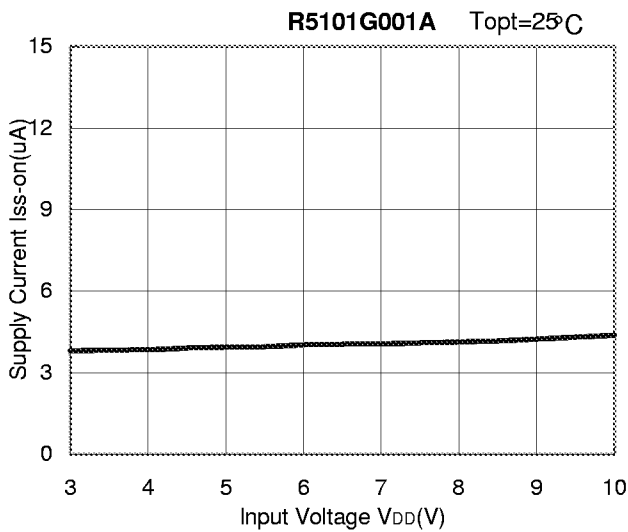
14) twd, twr vs. External Capacitance of Ctw Pin



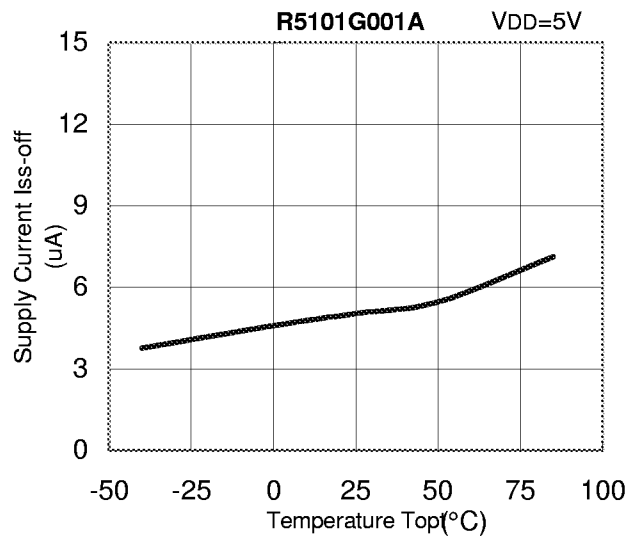
15) CE Pull-up Resistance vs. Temperature



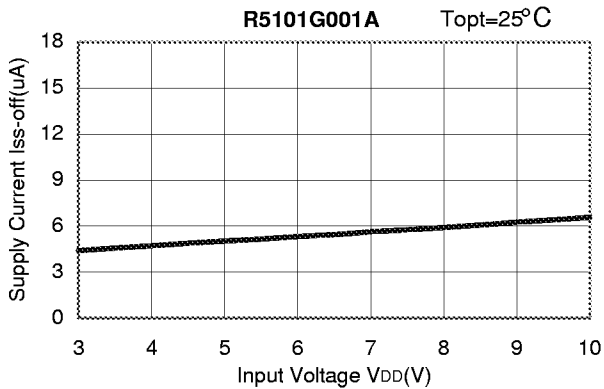
16) Supply Current vs. Input Voltage (WDT ON)



17) Supply Current vs. Temperature (WDT ON)



18) Supply Current vs. Input Voltage (WDT OFF)



19) Supply Current vs. Temperature (WDT OFF)

