Ordering number : ENA1550

SANYO Semiconductors
DATA SHEET

Bi-CMOS LSI

LV8081GQ — Two channels Constant-current H-bridge Driver

Overview

The LV8081GQ is a two-channel constant-current driver that supports low-voltage operation. It is optimal for constant-current drive of stepping motors (AF and zoom) in portable equipment such as camera cell phones.

Features

- Two channels constant-current H-bridge driver
- Built-in position detection comparator, SW for the photo reflector (independent control)
- Supports both 2 phase excitation drive and 1-2 phase excitation drive.
- Implemented in a low-power MOS IC process.
- Ultraminiature easy to solder UCT16 package (2.6 × 2.6 × 0.6mm)
- Built-in thermal shutdown circuit and Low voltage shutdown circuit.
- 1.8V input interface with battery supply.
- OUT1-3 short , OUT2-4 short and REG1-2 is short-circuited, and it is possible to correspond as 1ch driver.

Specifications

Absolute Maximum Ratings at Ta = -30 to 85°C(It becomes a design certification excluding 25℃.)

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC}, VM max		6.5	V
Output voltage	V_{OUT} max	OUT1, OUT2, OUT3, OUT4	6.5	V
Input voltage	V_{IN} max	CONT, IN	-0.3 to +6.5	V
Ground pin source current	IGND	Per channel	400	mA
Allowable power dissipation	Pd max	Mounted on a circuit board.*	700	mW
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-40 to +150	°C

* Specified circuit board : 40×50×0.8mm^3 : 4-layer (2S2P) glass epoxy printed circuit board

Allowable Operating Ratings at Ta = -30 to 85°C(It becomes a design certification excluding 25℃.)

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		2.5 to 6.0	V
Renge of fixed corrent setting	I_O	100mA or more is the design certification.	70 to 250	mA
High-level input voltage	V_{IH}	CONT, IN	1.25 to V_{CC}	V
Low-level input voltage	V_{IL}		-0.3 to 0.5	V

Electrical Characteristics at V_{CC} = 3.0V ,Ta = -30 to 85°C(It becomes a design certification excluding 25℃.)

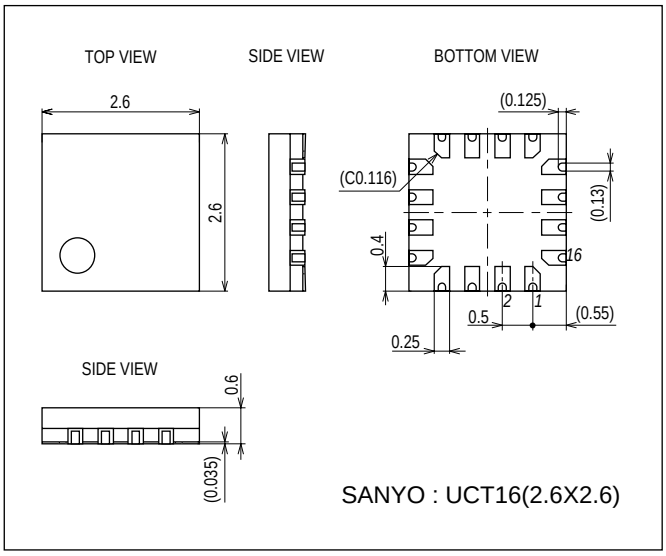
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I_{CCO}	IN = 0V		0.1	1	μA
	$I_{CCO}1$	IN = 3V		0.7	1	mA
	$I_{CCO}2$	V_{CC} = 6.5V, IN = 6.5V		0.85	1.1	mA
Output on resistance	Ron1	V_{CC} = 3.0V (High and low side total) EN = 3.0V, I_{OUT} = 100mA		2.0	3.0	Ω
	Ron2	V_{CC} = 5.0V (High and low side total) EN = 5.0V, I_{OUT} = 100mA		1.50	2.0	Ω
Constant-current output	$I_{OUT}1$	Between RFG and ground : 1Ω	94	100	106	mA
	$I_{OUT}2$	Between RFG and ground : 0.5Ω (Design specification)	188	200	212	mA
Output turn-on time	Trise	With RFG1 and RFG2 shorted to ground		1.3	3	μs
Output turn-off time	Tfall	With RFG1 and RFG2 shorted to ground		0.25	0.7	μs
Position detection voltage (high level)	V_H			1.0	1.06	V
Position detection voltage (low level)	V_L		0.74	0.8		V
Detection voltage hysteresis	HYS		0.165	0.18	0.195	V
Comparator input current value	I_{COMPIN}	V_{COMPIN} = 0V		0.15	0.3	μA
Comparator output saturation voltage	$V_O$comp	I_O = 0.5mA		0.12	0.21	V
PI/PR pin resistance	RonPIPR	I_O = 10mA		17	32	Ω
PI/PR pin current	$I_{PI/PR}$				20	mA
Input current	$I_{IN}1$	V_{IN} = 3V		50	85	μA
	$I_{IN}2$	V_{IN} = 6.5V		120	155	μA

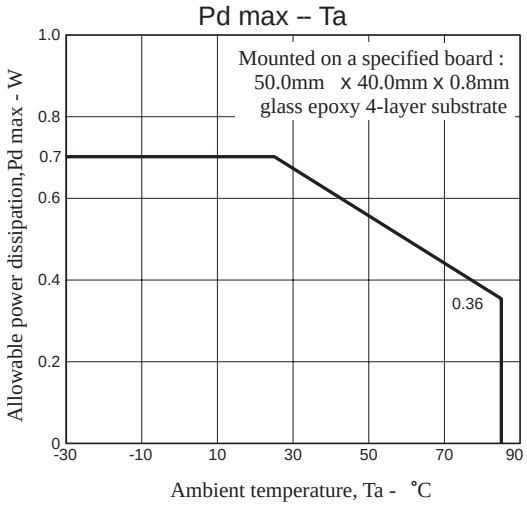
Note : The design specification items are design guarantees and are not measured.

Package Dimensions

unit : mm (typ)

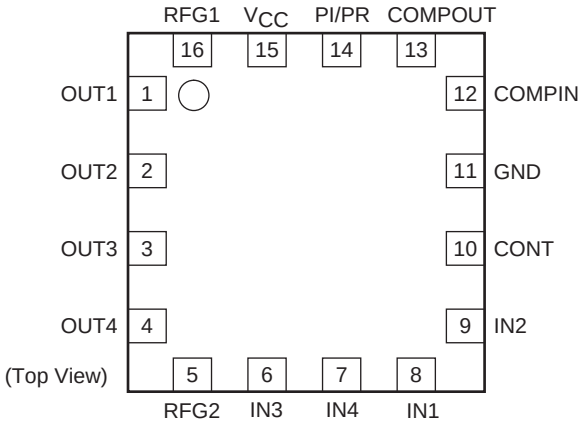
3341



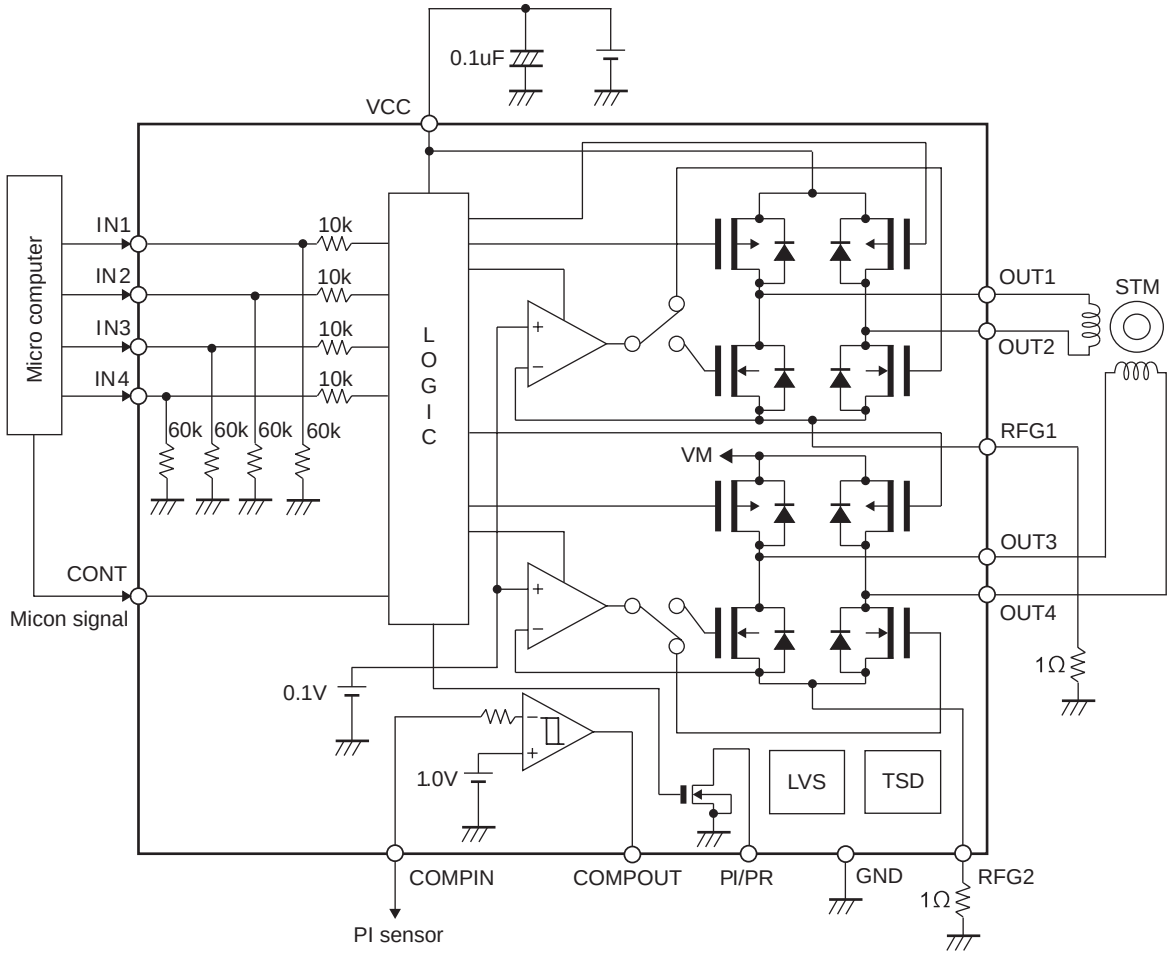


Pin Assignment

(UCT16)



Block Diagram



Constant-current calculation : I_{OUT} = 0.1 ÷ RF Example : When an I_{OUT} of 100mA is required, RF must be 1Ω.

Usage Notes

The constant current is set by the resource RF connected between RFG and ground according to the formula shown above.

In the electrostatic destruction diode, the terminal PIPR, and the terminal COMP, other terminals are the upper and lower diode specifications only in a lower diode.

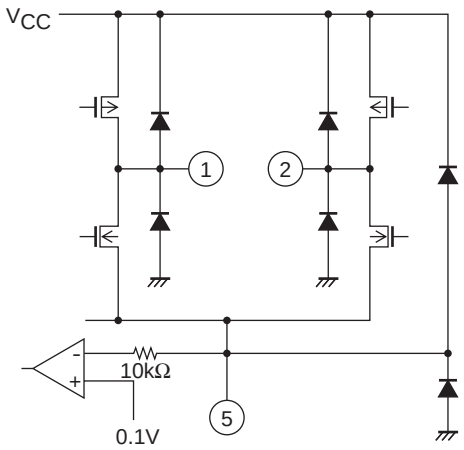
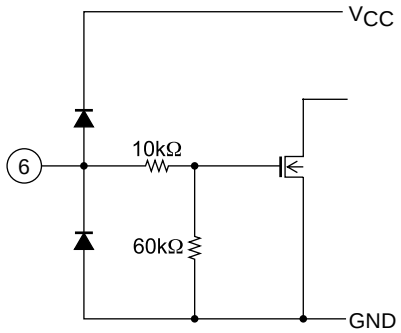
Truth Table

Input					Output				COMP & PIPR	Mode
IN1	IN2	IN3	IN4	CONT	OUT1	OUT2	OUT3	OUT4		
Low	Low	Low	Low	Low	Off	Off	Off	Off	OFF	Standby mode
Low	High	-	-	High	Low	High	Off	Off	ON	Channel 1, reverse
High	Low				High	Low				Channel 1, forward
High	High				Low	Low				Channel 1, brake mode
-	-	Low	High		Off	Off	Low	High		Channel 2, reverse
		High	Low				High	Low		Channel 2, forward
		High	High				Low	Low		Channel 2, brake mode

Note : The "-" input unstable state. When off, a high-impedance state.

- The ENA goes to the standby state with a low-level input, and to the operating state with a high-level input.
- The control input switches the forward/reverse mode.
- The comparator and PIPR can independently control the terminal CONT. It is irrelevant to the state of IN4 from IN1.

Pin Description

Pin No.	Pin Name	Description	Equivalent Circuit
1 2 3 4 5 16	OUT1 OUT2 OUT3 OUT4 RFG2 RFG1	1-4 : Output pins H-bridge type output pins Pins 1 and 2 are paired and pins 3 and 4 are paired. 5, 16 : Current sensing resistor connection pins Connect the current sensing resistor between these pins and ground to detect the output currents for constant current control. Pin 16 corresponds to the output from pins 1 and 2 and pin 5 to the output from pins 1 and 2.	
6 7 8 9 10	IN3 IN4 IN1 IN2 CONT	Logic input pins	
11	GND	Ground	

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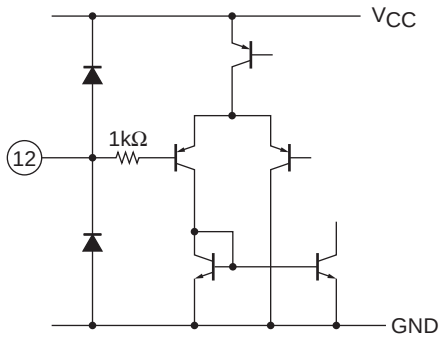
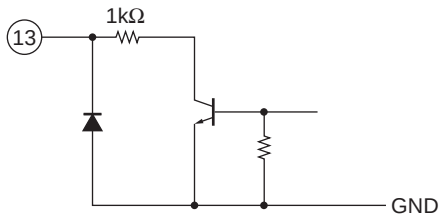
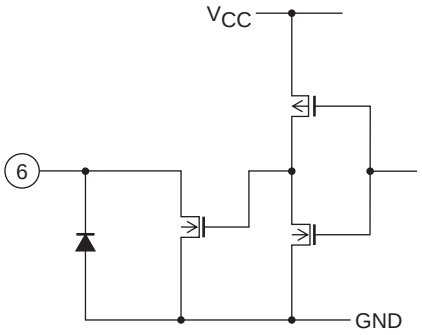
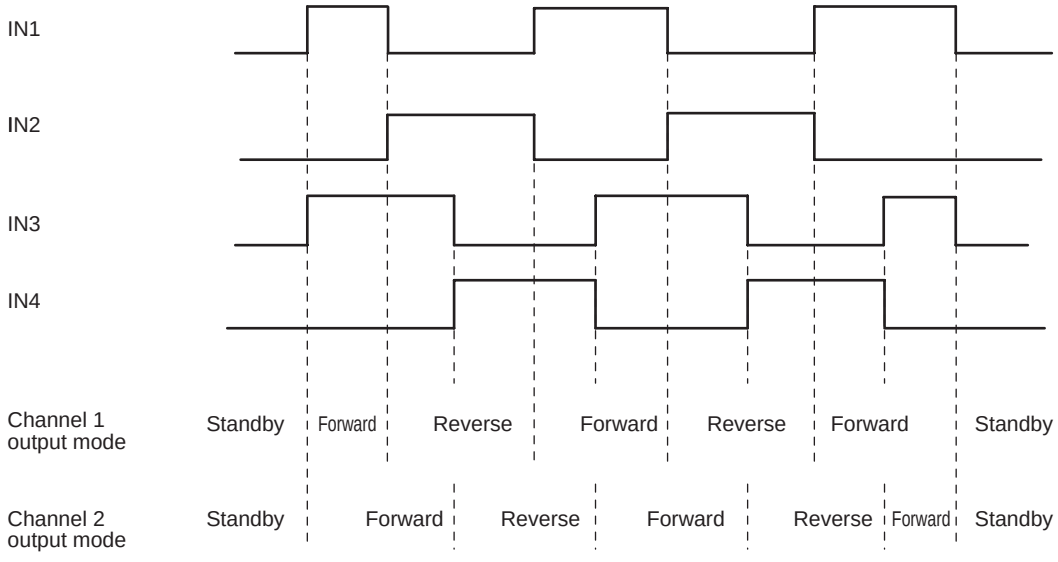
Pin No.	Pin Name	Description	Equivalent Circuit
12	COMPIN	Photo reflector position sensing comparator input	
13	COMPOUT	Photo reflector position sensing comparator output This pin serves as an open-collector output of the NPN transistor.	
14	PI/PR	A switch, with NMOS open-drain output, used to turn on/off the power supply of the position sensor unit. When using this switch, connect the position sensor unit between this pin and the V_{CC} pin. On/off control of this switch is accomplished by CONT pin. Setting the CONT pin high turns on the switch.	
15	V_{CC}	Power supply pin	

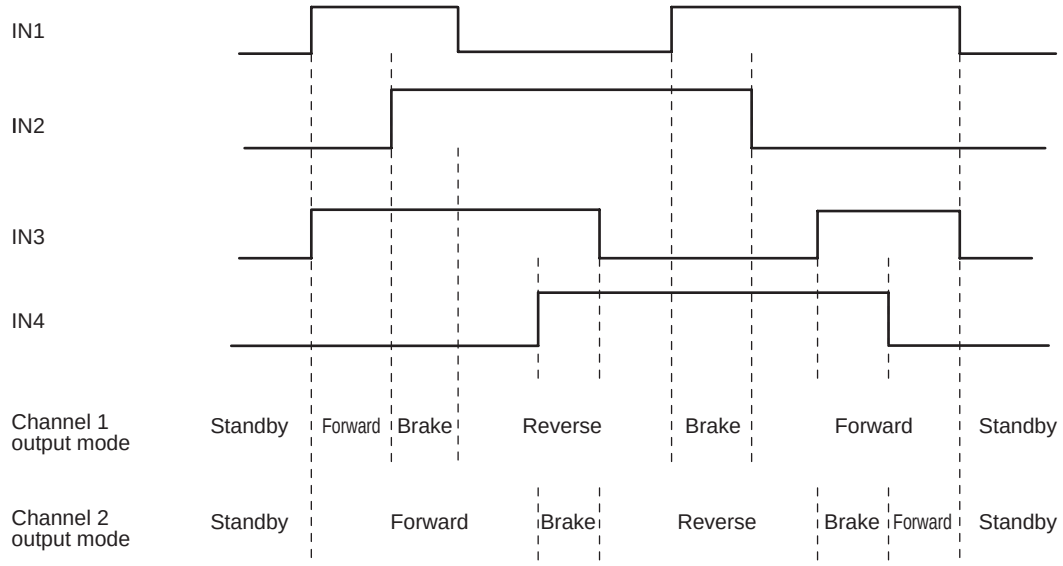
Timing Chart

(1) Stepper motor timing chart

Timing chart for 2-phase drive

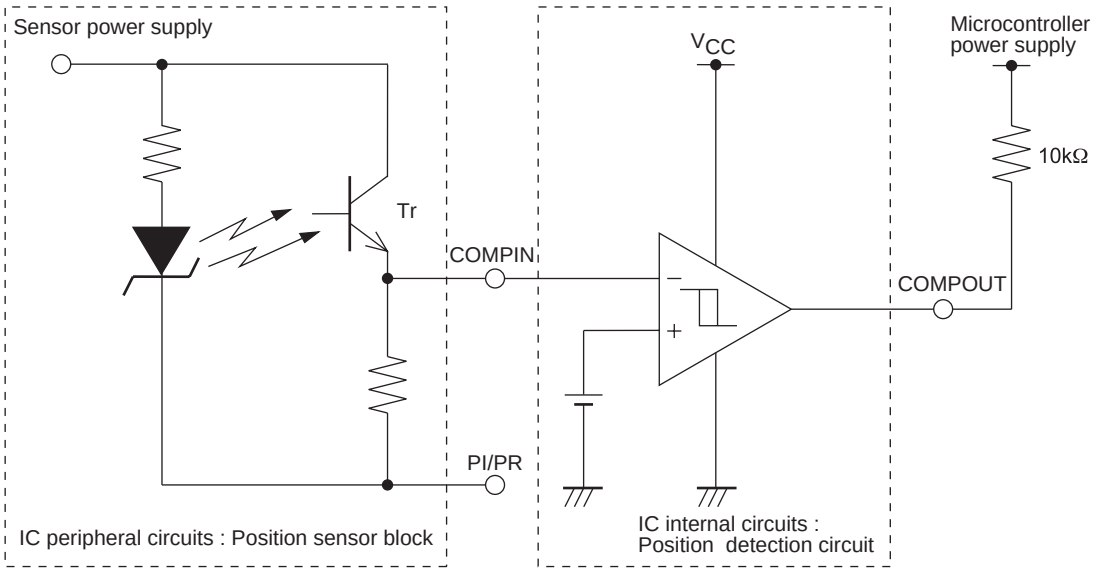


(2) Timing chart for 1-2 phase drive (Slow decay mode)

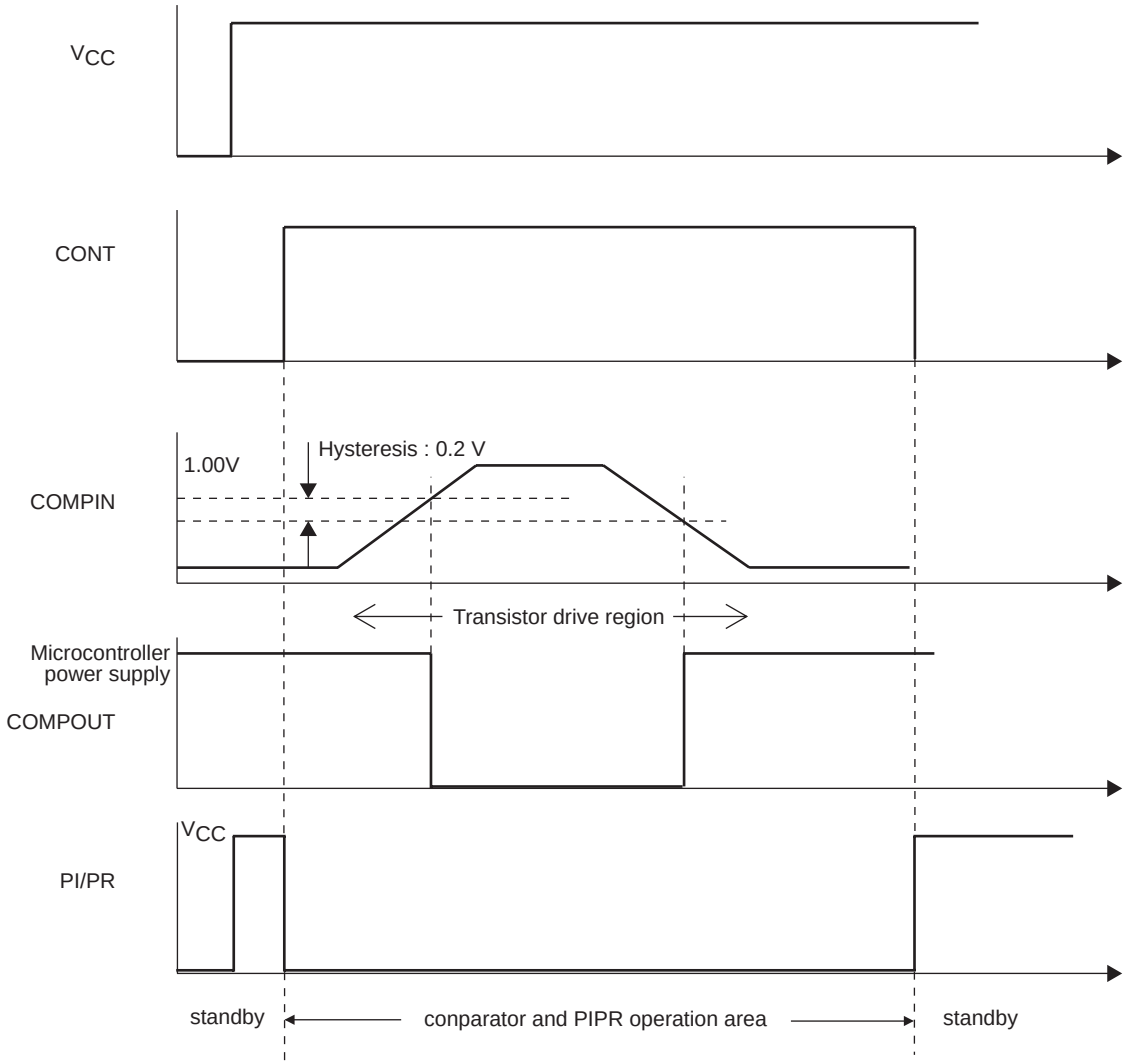


Photosensor Position Detection Application Circuit Example

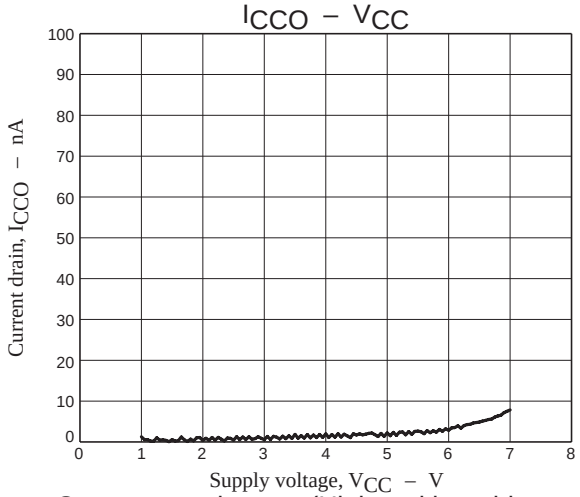
(a) Application circuit



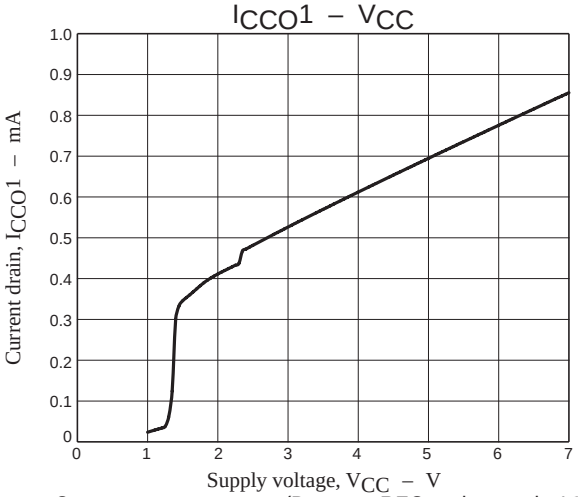
(b) Timing chart



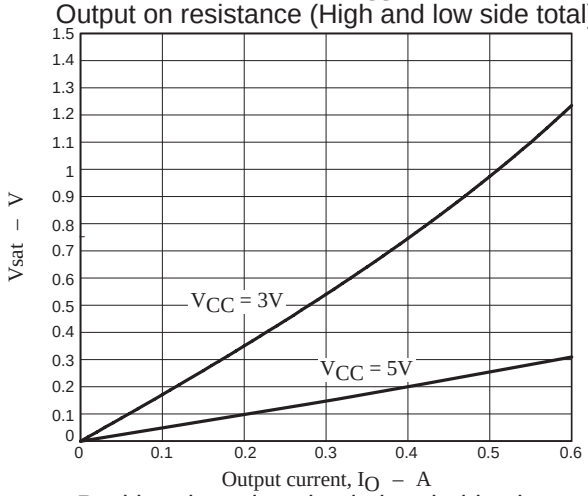
I_{CCO} – V_{CC}



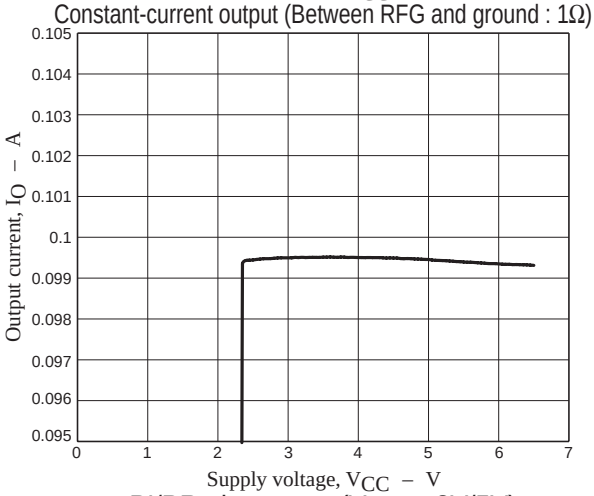
$I_{CCO}1$ – V_{CC}



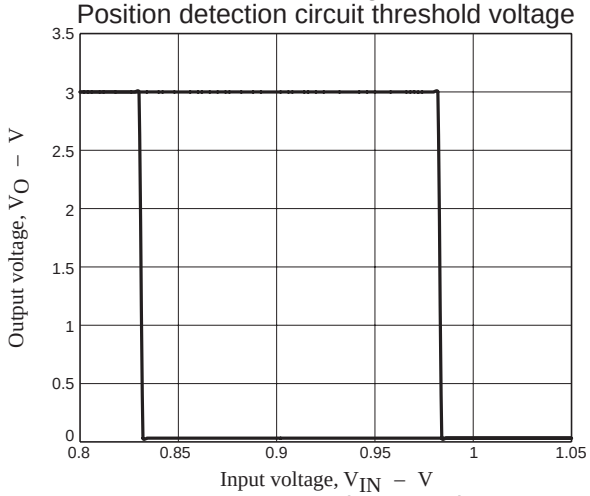
Output on resistance (High and low side total)



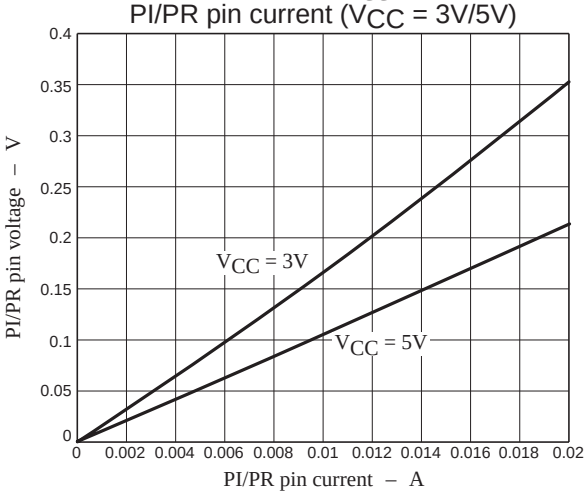
Constant-current output (Between RFG and ground : 1Ω)



Position detection circuit threshold voltage



PI/PR pin current (V_{CC} = 3V/5V)



Input current (V_{IN} = 3V)