1CH Bi-Directional Motor Drive IC S8082

SOP-8

Description

The S8082 is a monolithic integrated circuit designed for driving bi-directional DC motor with braking mode and speed control mode, and it is suitable for the loading motor driver of VCR, CDP, and TOY systems. The speed control can be achieved by adjusting the external voltage of the speed control pin. It was two pins of logic inputs for controlling the forward/reverse and braking.

Application

◈ VCR

　Low current DC motor such as audio or video equipment.

◈ CD-Player

　Compact disk player (CDP) tray or changer

◈ TOY Systems

◈ General DC motor

ORDERING INFORMATION

| Product Name	Marking	Package Name
S8082	S8082	SOP8

▲ **Marking Information**

S8082(①)

AUK YYWW(②)

① Device Code

② Year & Week Code

Features and Benefits

◈ Built-in brake function for stable brake characteristics.

◈ Built-in element to absorb a surge current derived
　from changing motor direction and braking motor drive.

◈ Motor speed direction change.

◈ Stable motor direction change.

◈ Interfaces with CMOS devices.

◈ Built-in the thermal shut down circuit (175℃)

◈ Low standby current (6.5mA)

◈ Wide operating supply voltage range (4.3V ~ 13.2V)

◈ Internal Block Diagram & Pin Assignment
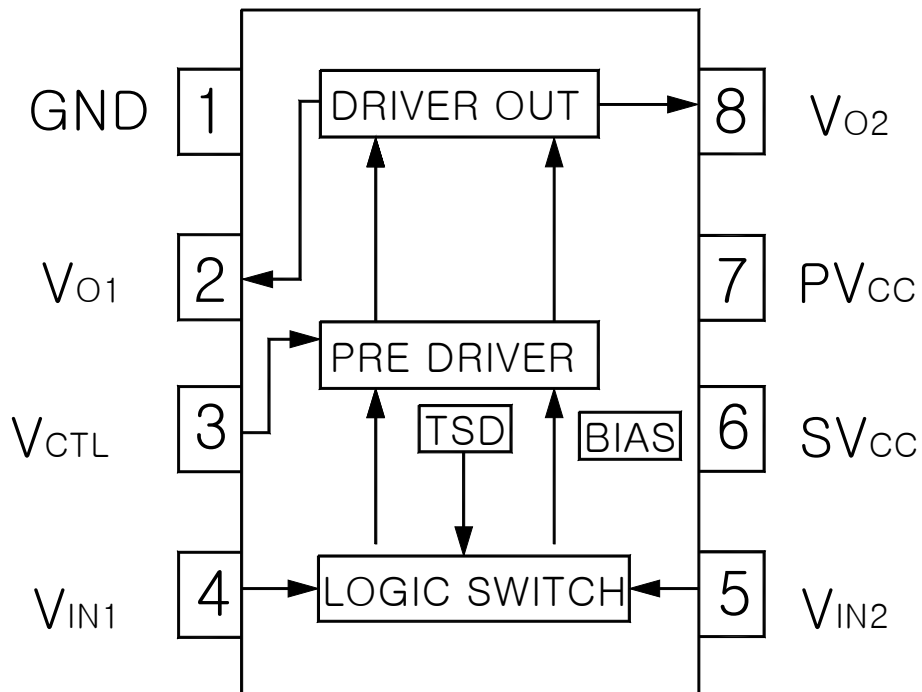
◈ Pin Description

NO	SYMBOL	I/O	DESCRIPTION
1	GND	-	Ground
2	V_{O1}	O	Output 1
3	VCTL	I	Motor speed control
4	VIN1	I	Input 1
5	VIN2	I	Input 2
6	SV_{CC}	-	Supply voltage (Signal)
7	PV_{CC}	-	Supply voltage (Power)
8	V_{O2}	O	Output 2

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◈ Absolute Maximum Ratings (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Maximum Supply Voltage	V_{CC}	18	V
Maximum Output Current	I_O	0.8	A
Power Dissipation	P_d	600	mW
Operate Temperature Range	T_{opr}	-25 ~ +85	℃
Storage Temperature Range	T_{stg}	-55 ~ +150	℃

[P_d] When mounted on a 70mm×70mm×1.6mm glass epoxy board.
   Reduced by 4.84mW for each increase in T_a of 1℃.
[I_O] Duty 1 / 100, pulse width 500us.
[T_{stg}] Should not exceed Pd or SOA and T_j=150℃ values.

◈ Recommended Operating Conditions (Ta = 25℃)

Parameter	Symbol	Limits	Unit
Supply Voltage	SV_{CC}	4.3 ~ 13.2	V
	PV_{CC}	4.3 ~ SV_{CC}	V

VCTL Pin is connected to the VCC line with 2×Vbe + 1Vcesat [approximately 1.7V].

So, Vcc should be supplied more than Vzener+1.7V for using stable area of zener diode.

## ◈ Power Dissipation Curve [Pd]

◈ 70mm×70mm×1.6mm glass epoxy board .

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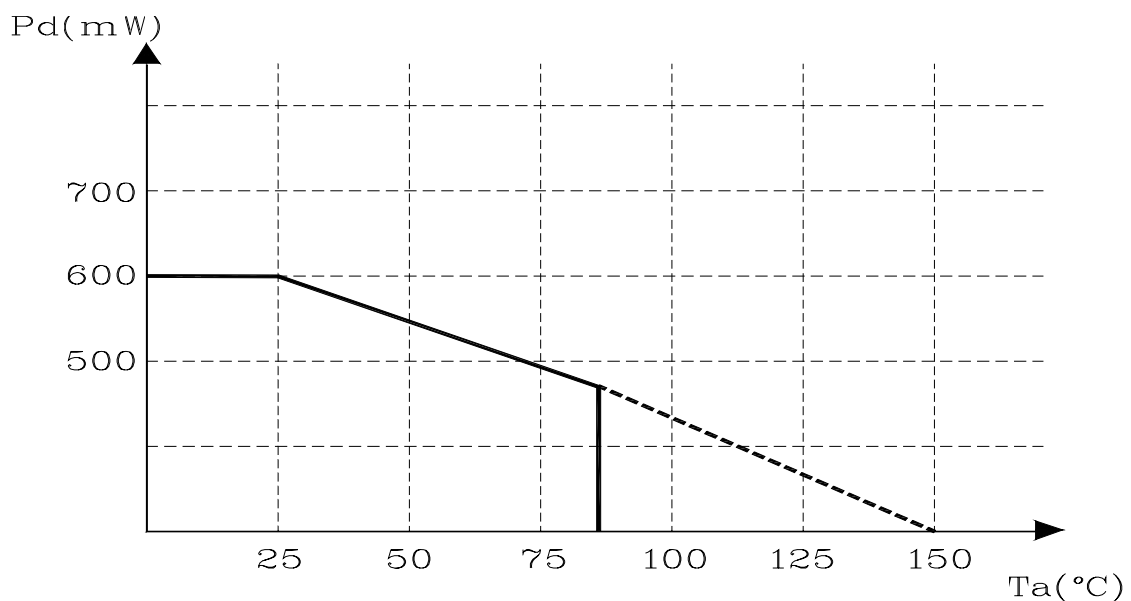
◈ **Electrical characteristics**

(Unless otherwise specified Ta=25℃, $PV_{CC}=SV_{CC}=12V$)

NO	Characteristics	Symbol	Condition	Specification			Unit
				MIN.	TYP.	MAX.	
1	Quiescent circuit current	I_{CC}	Pin4, Pin5 = GND, RL = Open	4	6.5	9.5	mA
2	Minimum input on current 1	I_{MIN1}	Pin4 = I_{IN1}, Pin5 = L, RL= Open	-	10	30	uA
3	Minimum input on current 2	I_{MIN2}	Pin4 = L, Pin5 = I_{IN2}, RL= Open	-	10	30	uA
4	Input threshold voltage 1	V_{ITH1}	Pin4 = V_{IN1}, Pin5 = L, RL= Open	1	1.3	1.6	V
5	Input threshold voltage 2	V_{ITH2}	Pin4 = L, Pin5 = V_{IN2}, RL= Open	1	1.3	1.6	V
6	Output leakage current 1	I_{OL1}	Pin4 = Pin5 = GND, RL = Open	-	0.01	1	mA
7	Output leakage current 2	I_{OL2}	Pin4 = Pin5 = GND, RL = Open	-	0.01	1	mA
8	Zener Current 1	I_{Z1}	Pin4 = H, Pin5 = L, RL = Open	-	0.85	1.5	mA
9	Zener Current 2	I_{Z2}	Pin4 = L, Pin5 = H, RL = Open	-	0.85	1.5	mA
10	Output voltage 1	V_{O1}	Pin4 = H, Pin5 = L, RL = 60Ω	6.6	7.2	7.4	V
11	Output voltage 2	V_{O2}	Pin4 = L, Pin5 = H, RL = 60Ω	6.6	7.2	7.4	V
12	Saturation voltage 1(Upper)	V_{SAT1}	I_O = 300mA	-	1.9	2.3	V
13	Saturation voltage 2(Upper)	V_{SAT2}	I_O = 500mA	-	1.9	2.3	V
14	Saturation voltage 1(Lower)	V_{SAT3}	I_O = 300mA	-	0.25	0.5	V
15	Saturation voltage 2(Lower)	V_{SAT4}	I_O = 500mA	-	0.4	0.6	V

1ch Bi-directional Motor Driver

Application Information

1. Thermal Shut Down Circuit
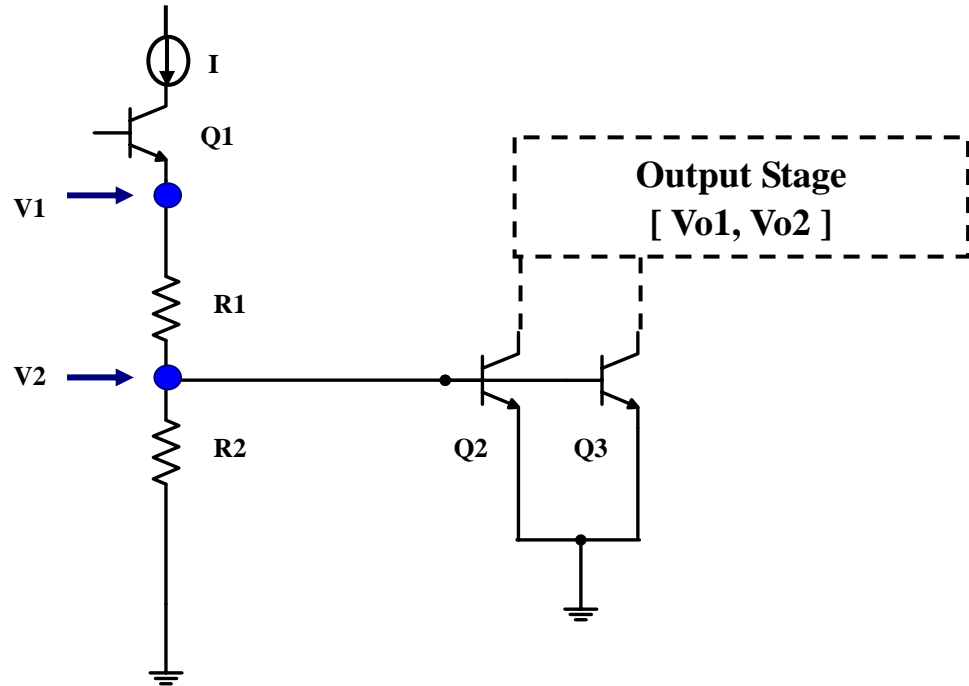
The built-in thermal shutdown circuit mutes the output current when the chip temperature reaches 175℃ (typ.). The hysteresis is set to 25℃ (typ.) by IHys, so the circuit will start up again when the chip temperature falling down to 150℃ (typ.)

When Ta = 25℃, Q2 & Q3 are turned-off [Output Stage : Normality Operation]
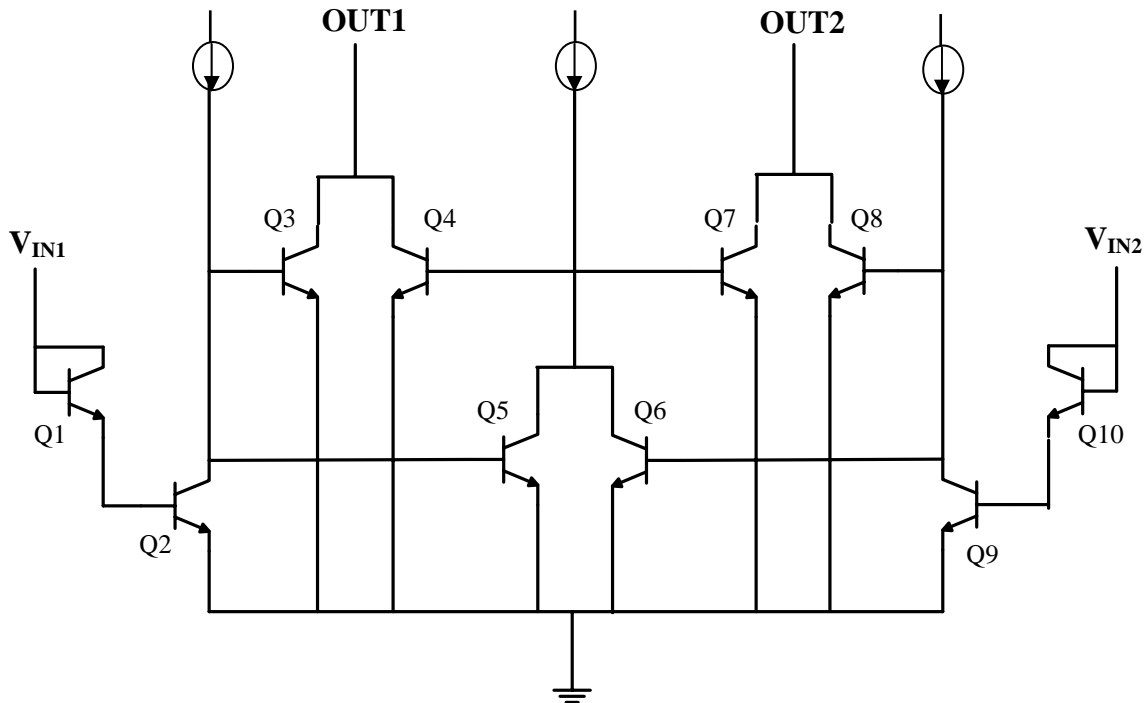$V1 = I \times (R1+R2)$
$V2 = R2 \div (R1+R2) \times V1 = 0.385V$

When Ta = 175℃ , Q2 & Q3 are turned-on [Output Stage : Shut Down]
$0.700V - 0.385V = 315mV$
[Vbe level of Q2 & Q3 : 0.700V / Temperature Coefficient of Q2 = Q3 = -1.8mV/℃]

◈ **T.S.D : 315mV÷1.8mV = 175℃**

2. Input Logic

VIN1 > 2Vbe, Q2 = On   VIN1 < 2Vbe, Q2 = Off below 1.2V (typ.), the output current is muted.

[**Logic Input to Output Table**]

Input Logic		Output Logic		Motor Status
VIN 1 (Pin 4)	**VIN 2 (Pin5)**	**Vo 1 (Pin2)**	**Vo 2(Pin8)**	
L	L	L	L	**Stand-By**
H	L	H	L	**Forward Rotation**
L	H	L	H	**Reverse Rotation**
H	H	L	L	**Brake**

* VIN1/VIN2 Recommended Conditions

[Input High is 2.0V to Vcc / Input Low is below 0.8V]

3. Output Part Circuit & Speed Control
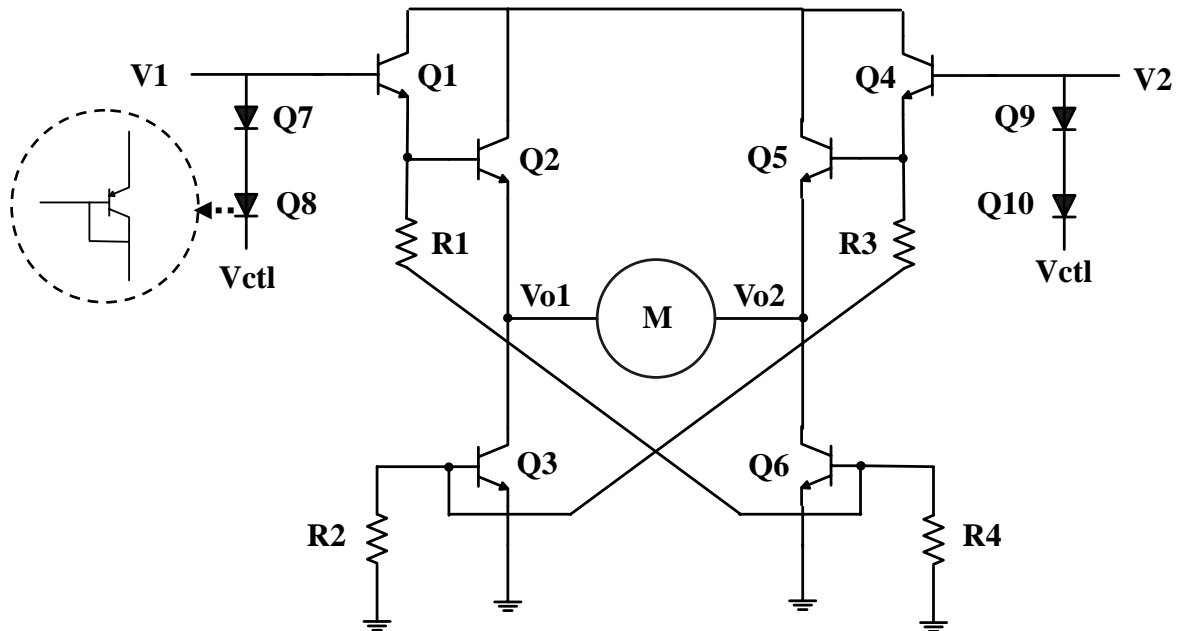
[Forward Rotation : VIN1(H), VIN2(L)]

V1 = Vctl + 2 Vbe(Q7,Q8)

Vo1 = V1 - 2Vbe(Q1,Q2) = Vctl + 2 Vbe(Q7,Q8) - 2Vbe(Q1,Q2) = Vctl

Vo2 = Vsat(Q6)

Vout = Vo1 – Vo2 = Vctl – Vsat(Q6)

[* Therefore, Vout level depends on the Vctl pin's level for Speed Control]

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Characteristic Diagrams

Fig. 1 V$_{CC}$ - I$_{CC}$
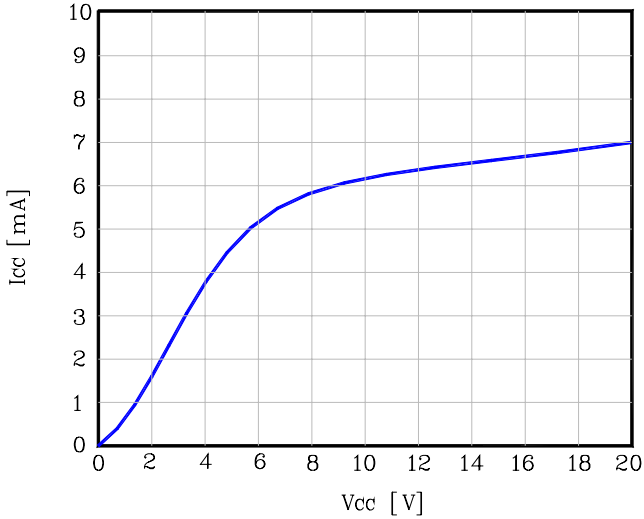
Fig. 2 Temperature - I$_{CC}$

Fig. 3 V$_{CTL}$ - V$_O$

Vcc=12V
Vctl=7.4V
Vin=5V/0V
RL=60Ω

Fig.4 Temperature - V$_O$

Vcc=12V
Vctl=7.4V
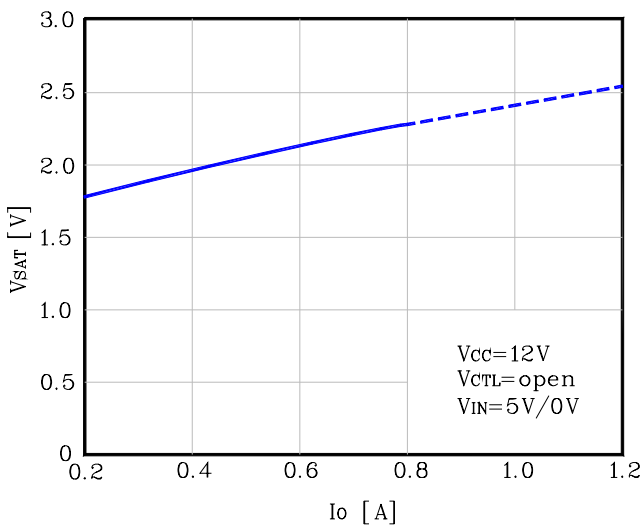Vin=5V/0V
RL=60Ω

Fig. 5 I$_O$ - V$_{SAT}$ (Upper)

Vcc=12V
Vctl=open
Vin=5V/0V

Fig.6 I$_O$ - V$_{SAT}$ (Lower)

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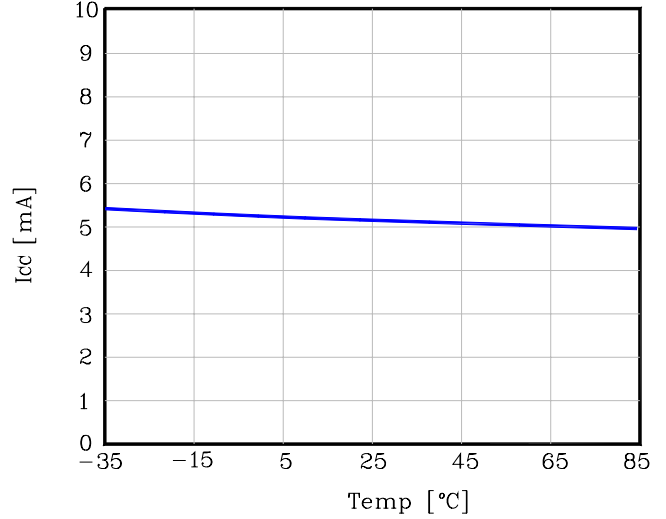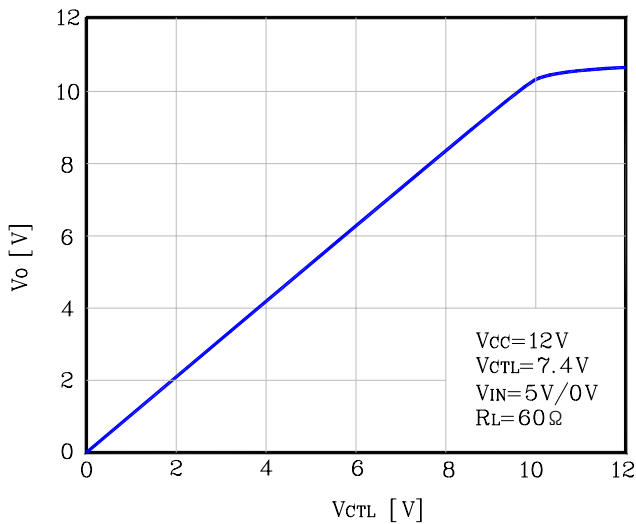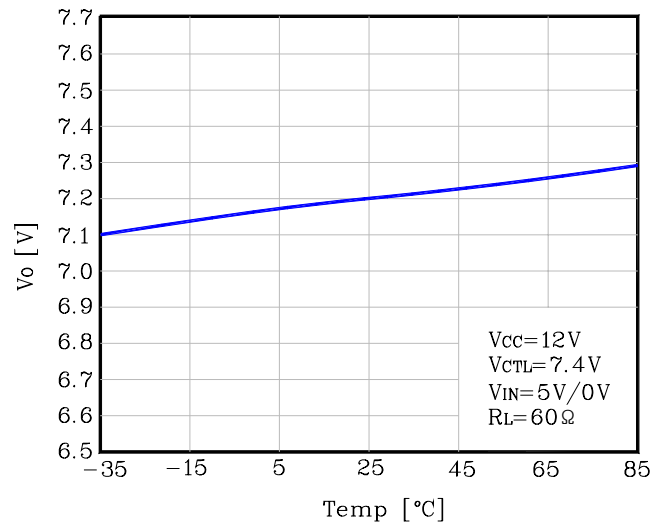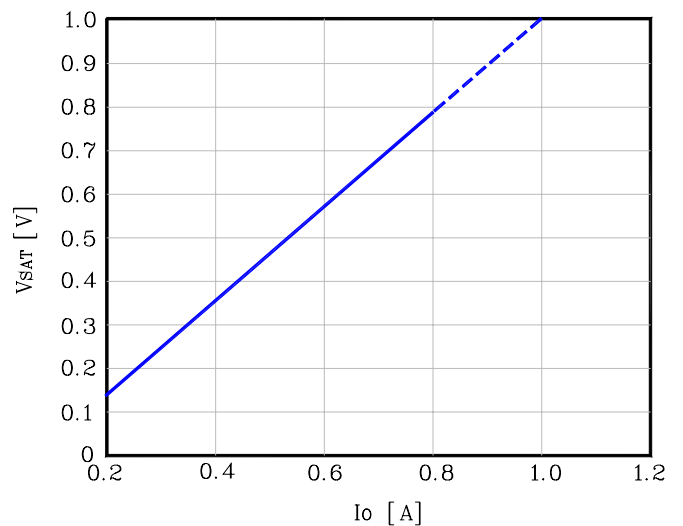
◈ **Application Circuit**

�◈ **Test Circuit**

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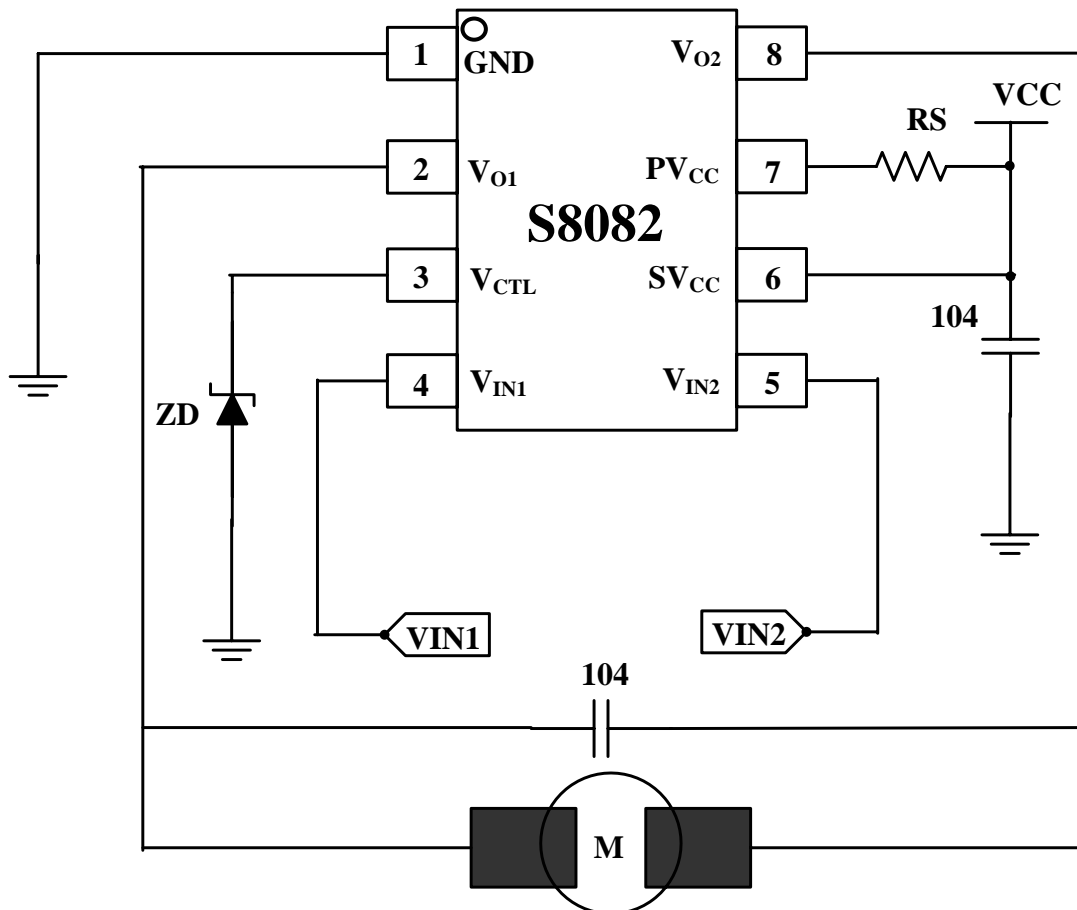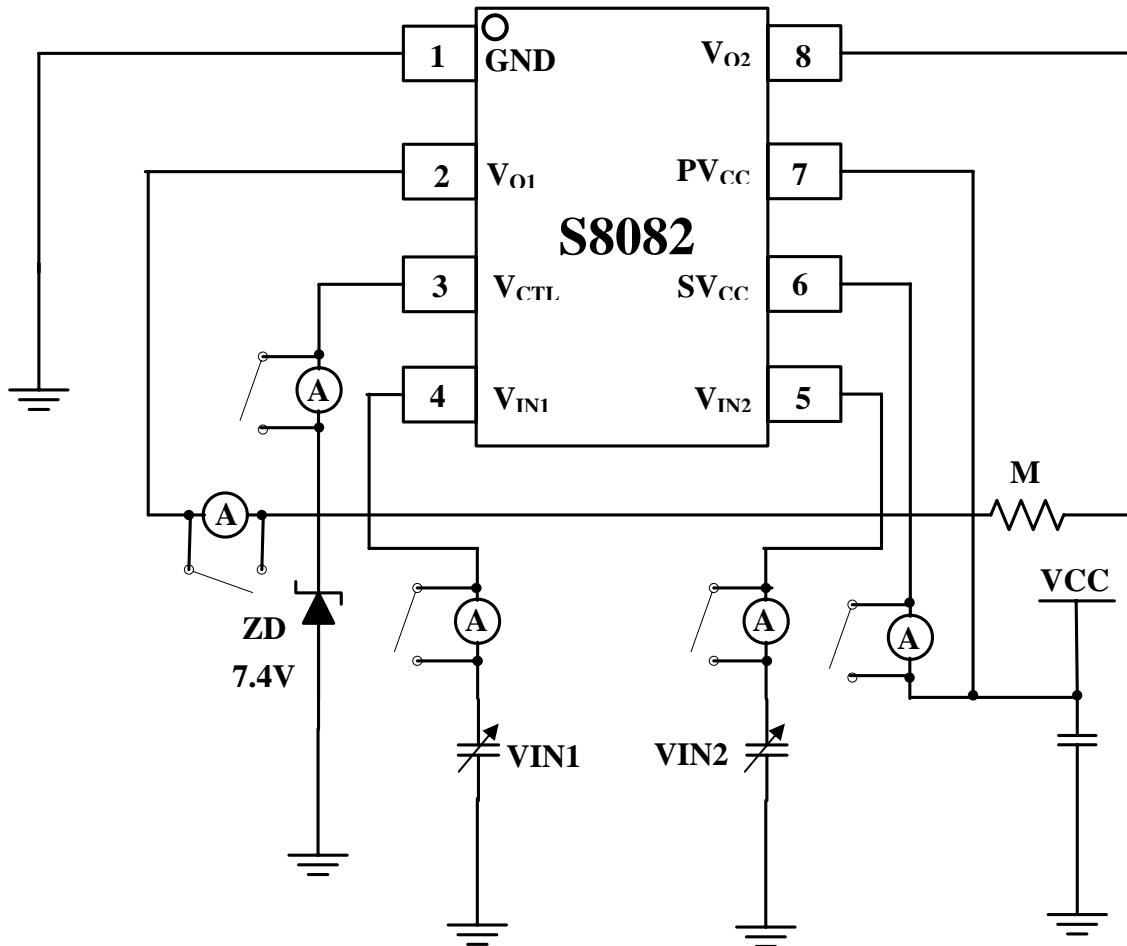
Outline Dimension
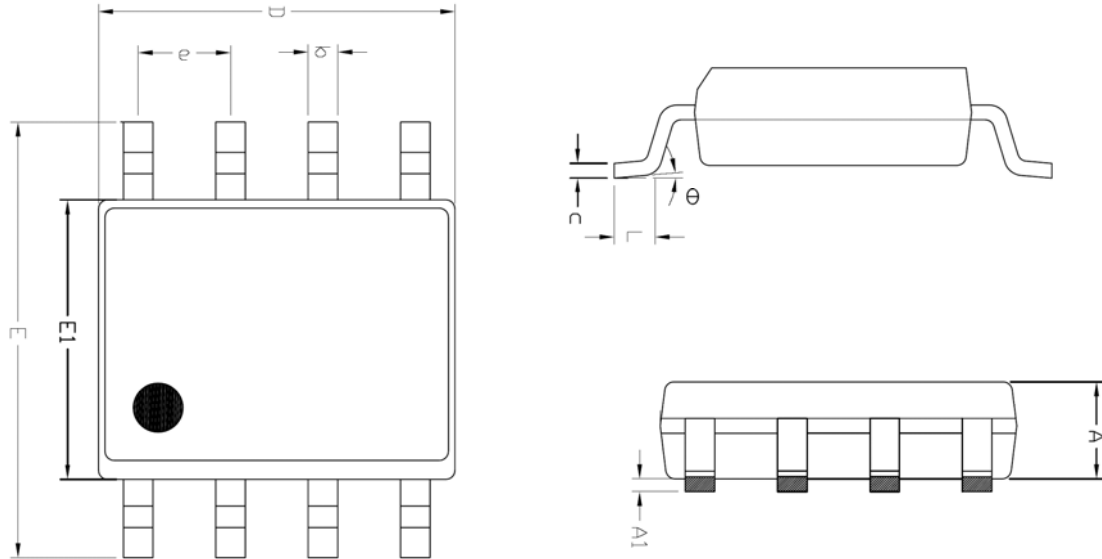
SYMBOL	MILLIMETER(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.245	—	1.445	
A1	0.125	0.175	0.275	
b	0.320	0.420	0.520	
c	0.170	0.220	0.270	
D	4.802	4.902	5.002	
E	5.870	6.020	6.170	
E1	3.761	3.861	3.961	
e	1.270 BSC			
L	0.462	0.562	0.662	
θ	0 °	—	8 °	

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