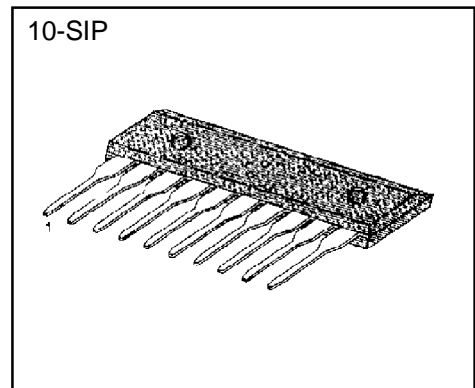


BI-DIRECTIONAL DC MOTOR DRIVER

The KA3082 is a monolithic integrated circuit designed for driving bi-directional DC motor with braking and speed control, 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 has two pins of logic inputs for controlling the direction as forward, reverse and braking.



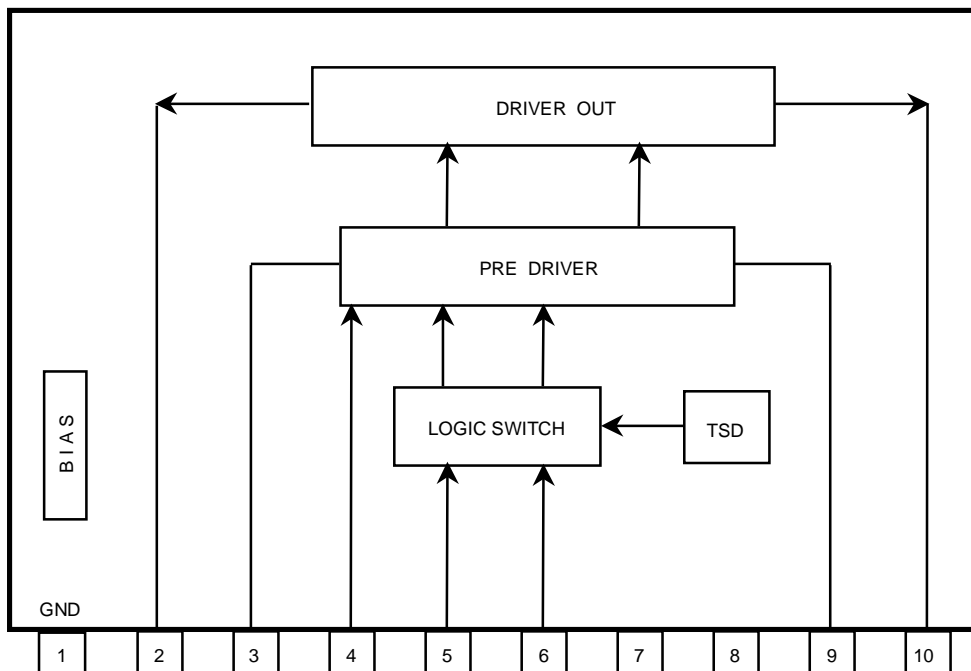
FEATURES

- Built-in brake function for stable brake characteristics.
- Built-in element to absorb a dash current derived from changing motor direction and braking motor drive.
- Motor speed control by an external voltage.
- Stable motor direction change.
- Interfaces with CMOS devices.
- Built-in thermal shut down circuit.(165°C)
- Low stand-by current.(6.5mA)

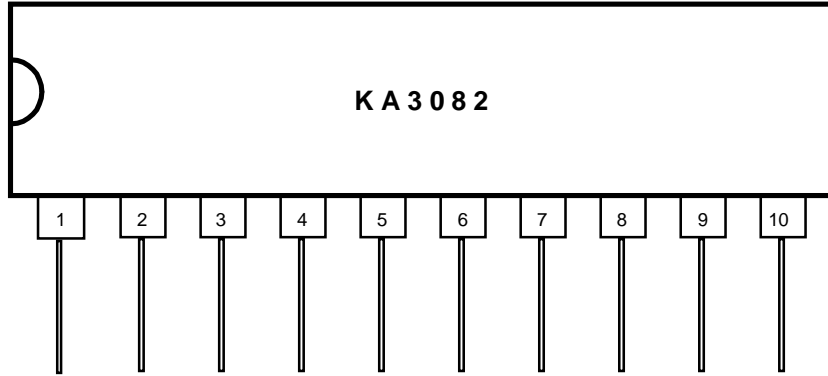
ORDERING INFORMATION

Device	Package	Operating Temperature
KA3082	10-SIP	- 20°C ~ + 75°C

BLOCK DIAGRAM



PIN CONFIGURATIONS

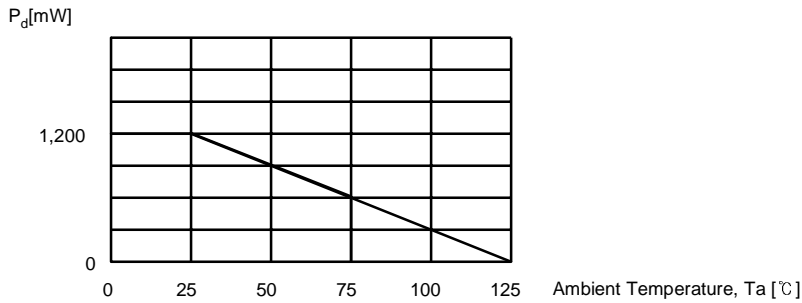


PIN DESCRIPTIONS

Pin no.	Symbol	I/O	Description	Pin no.	Symbol	I/O	Description
1	GND	-	Ground	6	V _{IN2}	I	Input 2
2	V _{O1}	O	Output 1	7	V _{CC1}	-	Supply Voltage (Signal)
3	V _{Z1}	-	Phase Compensation 1	8	V _{CC2}	-	Supply Voltage (Power)
4	V _{CTL}	I	Motor speed control	9	V _{Z2}	-	Phase Compensation 2
5	V _{IN1}	I	Input 1	10	V _{O2}	O	Output 2

ABSOLUTE MAXIMUM RATING (Ta=25°C)

Characteristics	Symbol	Value	Unit	Remark
Supply Voltage	V _{CC}	18	V	
Output Current	I _{OUT}	1.6	A	Pulse Width = 500us, Duty = 1%
Power Dissipation	P _d	1.2	W	
Operating Temperature	T _{OPR}	- 20 ~ +75	°C	
Storage Temperature	T _{STG}	- 55 ~ + 125	°C	



RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

Characteristics	Symbol	Operating Voltage Range	Unit
Operating Supply Voltage	V _{CC}	7 ~ 18	V

Caution 1) $V_{CC2} \leq V_{CC1}$

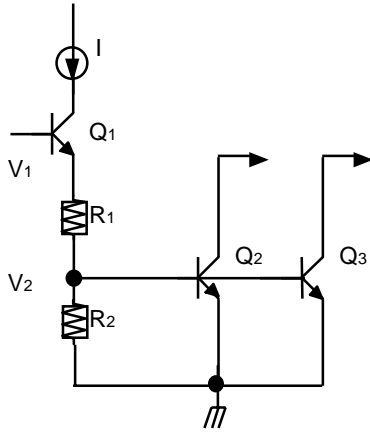
Caution 2) When V_{CC} is above 16V, The V_{CTL} must be opened or $8.5V \leq V_{CTL} \leq V_{CC2}$.

ELECTRICAL CHARACTERISTICS ($T_a=25^\circ\text{C}$, $V_{CC}=SV_{CC}=PV_{CC}=12\text{V}$)

Characteristics	Symbol	Min	Typ	Max	Units	Conditions
Quiescent Current	I_{CC}	4	6.5	9.5	mA	pin 5 & 6 : GND, $R_L=\infty$
Min. Input On Current 1	I_{IN1}	—	10	30	μA	$R_L=\infty$, pin 5= I_{IN} , pin 6=L
Min. Input On Current 2	I_{IN2}	—	10	30	μA	$R_L=\infty$, pin 5=L, pin 6= I_{IN}
Input Threshold Voltage 1	V_{ITH1}	1.0	1.3	1.6	V	$R_L=\infty$, pin 5= V_{IN} , pin 6=L
Input Threshold Voltage 2	V_{ITH2}	1.0	1.3	1.6	V	$R_L=\infty$, pin 5=L, pin 6= V_{IN}
Output Leakage Current 1	I_{OL1}	-	0.01	1	mA	$R_L=\infty$, pin 5 & 6=GND
Output Leakage Current 2	I_{OL2}	-	0.01	1	mA	$R_L=\infty$, pin 5 & 6=GND
Zener Current 1	I_{Z1}	-	0.85	1.5	mA	$R_L=\infty$, pin 5=H, pin 6=L
Zener Current 2	I_{Z2}	-	0.85	1.5	mA	$R_L=\infty$, pin 5=L, pin 6=H
Output Voltage 1	V_{O1}	6.6	7.2	7.4	V	$R_L=60\Omega$, pin 5=H, pin 6=L
Output Voltage 2	V_{O2}	6.6	7.2	7.4	V	$R_L=60\Omega$, pin 5=L, pin 6=H
Saturation Voltage 1(Upper)	V_{SAT1}	-	1.9	2.2	V	$I_o=300\text{mA}$
Saturation Voltage 2(Upper)	V_{SAT2}	-	1.9	2.3	V	$I_o=500\text{mA}$
Saturation Voltage 1(Lower)	V_{SAT3}	-	0.25	0.5	V	$I_o=300\text{mA}$
Saturation Voltage 2(Lower)	V_{SAT4}	-	0.4	0.65	V	$I_o=500\text{mA}$

APPLICATION INFORMATION

1. Thermal Shut Down Circuit



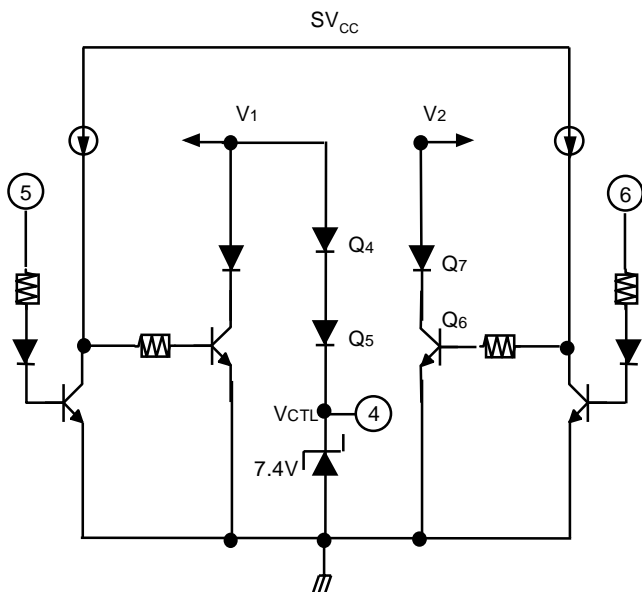
$V_1 = I * (R_1 + R_2)$
 $V_2 = R_2 / (R_1 + R_2) * V_1 = 0.37V$
 When $T_a = 25^\circ C$, Q_2 & Q_3 are Turn-Off. (because $V_2 = 0.37V$)
 $0.73V - 0.37V = 360mV$ (When Q_2 & Q_3 are Turn-On, $V_{beQ2} = V_{beQ3} = 0.73V$)
 And temperature coefficient of $Q_2 = Q_3 = -2mV/^\circ C$
 $\therefore T.S.D : 360mV / 2mV = 180^\circ C$
 When Temperature of TR is $180^\circ C$, Q_2 & Q_3 become Turn-On and make the BIAS voltage of output stage saturate.

2. Logic Input & Output Table

INPUT		OUTPUT		MOTOR
PIN #5	PIN #6	PIN #2	PIN #10	
LOW	LOW	LOW	LOW	STOP
HIGH	LOW	HIGH	LOW	FORWARD
LOW	HIGH	LOW	HIGH	REVERSE
HIGH	HIGH	LOW	LOW	BREAK

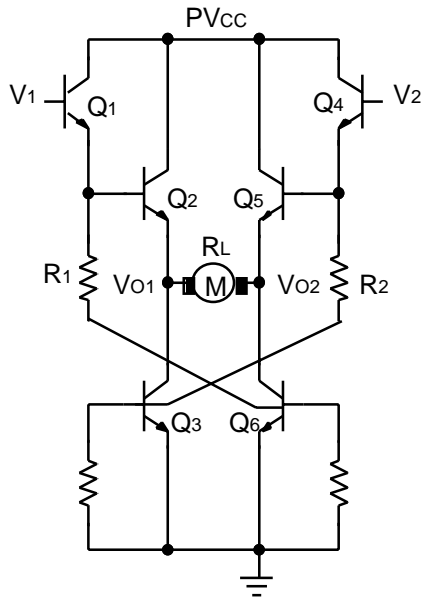
HIGH is above 2.0V.
 LOW is below 0.7V.

3. Logic Switch Circuit



- This circuit define reference voltage of output.
- When PIN #5 is High and PIN #6 is Low,
 - $V_1 = V_{zd} + V_{beQ4} + V_{beQ5} \doteq 8.9V$
 - $V_2 = V_{beQ7} + V_{satQ6} \doteq 0.87V$
- V_1 and V_2 are concerned with output voltage of motor and changed according to the voltage of PIN #4 (V_{CTL}).

4. Drive Output Circuit



$$V_1 = 8.9V$$

$$V_2 = 0.87V$$

$$V_{O1} = V_{Q6SAT}$$

$$V_{O2} = V_1 - V_{BEQ1} - V_{BEQ2}$$

$$I_{RL} = (V_{O1} - V_{O2}) / R_L = 118mA$$

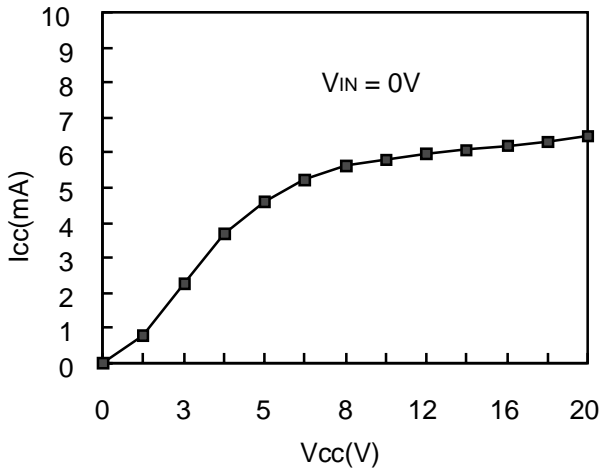
$$I_{R1} = V_{O2} / R_1 = 26mA$$

Therefore

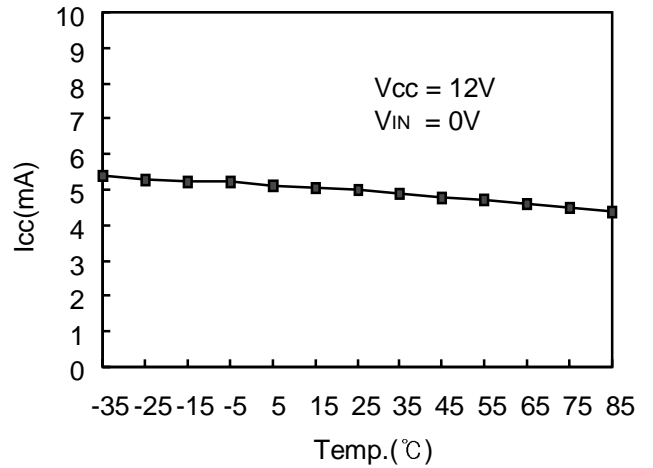
$$I_o = I_{RL} + I_{R1} = 144mA$$

CHARACTERISTIC GRAPHS

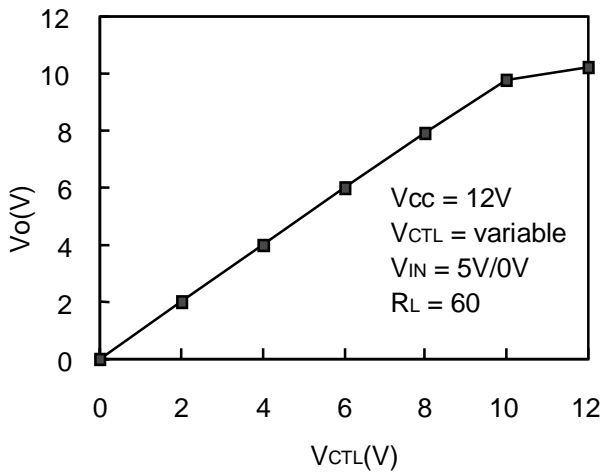
1. V_{CC} vs I_{CC}



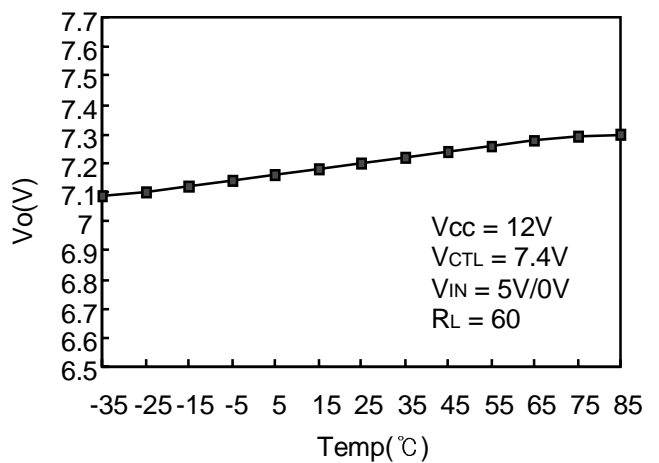
2. Temperature vs I_{CC}



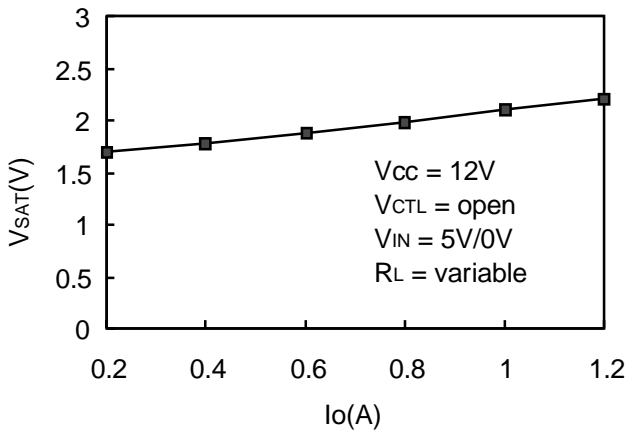
3. V_{CTL} vs V_o



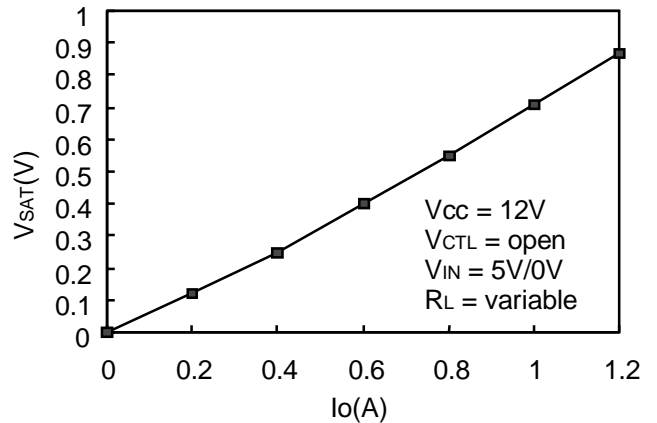
4. Temperature vs V_o



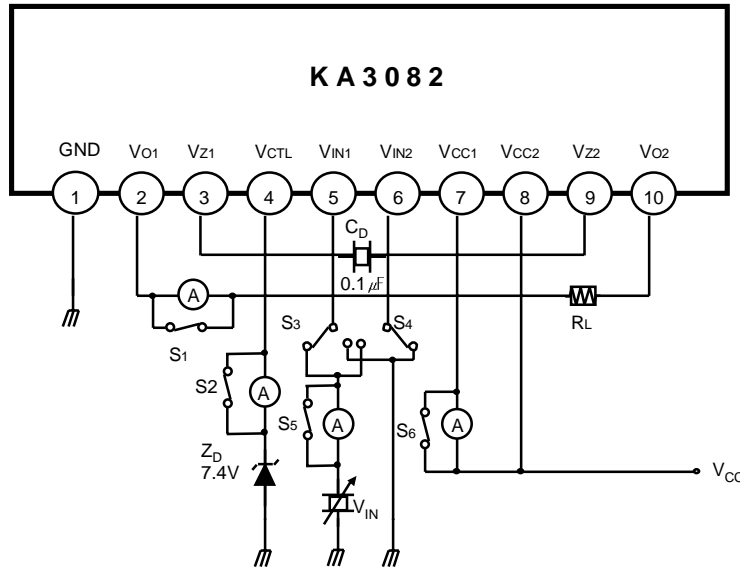
5. I_o vs V_{SAT} (UPPER)



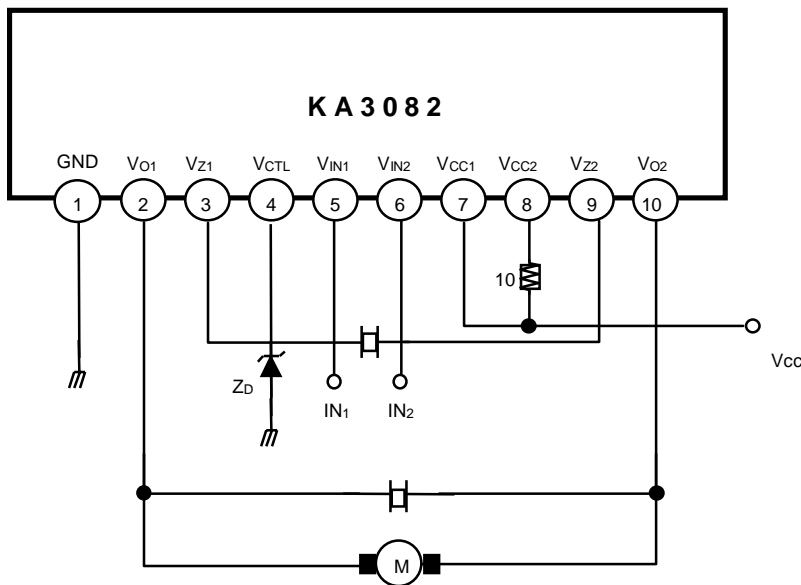
6. I_o vs V_{SAT} (LOWER)



TEST CIRCUIT



APPLICATION CIRCUIT



- ※ $V_{CC2} \leq V_{CC1}$
- ※ $7V \leq V_{CC} < 16V$
: $V_{CTL} \leq V_{CC2}$ or
The V_{CTL} must be opened.
- ※ $16V \leq V_{CC} \leq 18V$
: $8.5V \leq V_{CTL} \leq V_{CC2}$ or
The V_{CTL} must be opened.

PACKAGE DIMENSIONS (Unit : mm)

10-SIP

