

### Bi-Directional DC Motor Driver (2 Motor)

The KIA7288P is a bridge driver that is ideal for normal/reverse switching.

This circuit offers four modes : normal rotation, reverse rotation, stop, and brake.

The output current is 1.0A(AVE.) and 2.0A(PEAK). KIA7288P has an ideal circuit configuration for VCR front tape loading and offers two types of power supply pins. One is for output side uses to control the motor voltage facilitates motor voltage adjustment. The IC requires little input current, enabling direct connection with CMOS.

### FEATURES

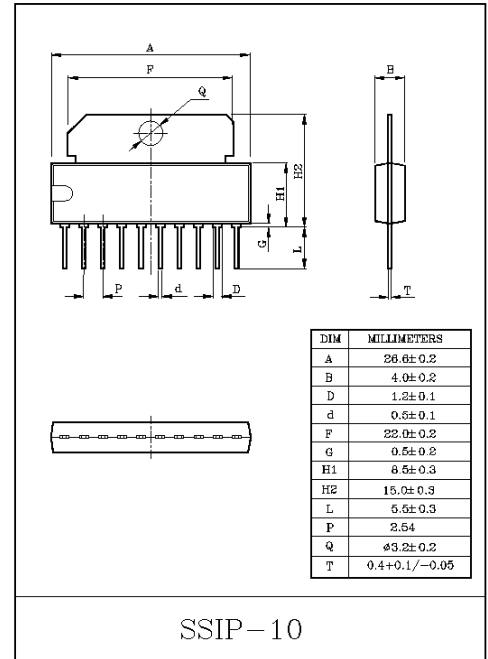
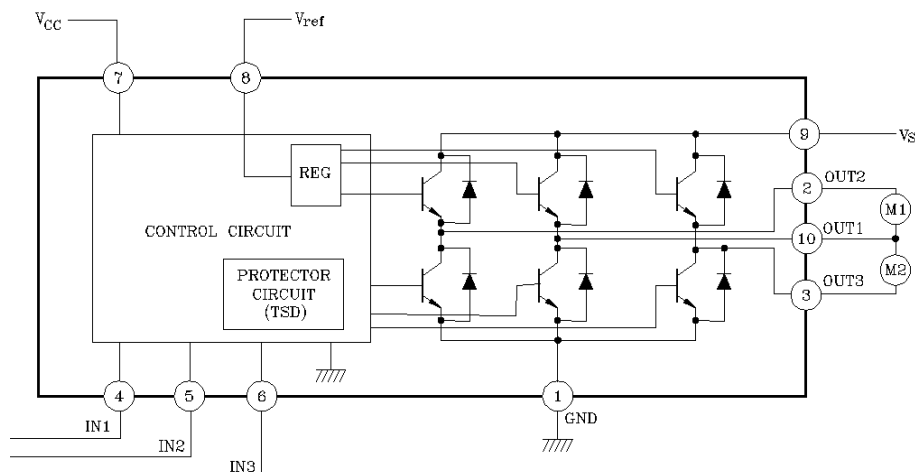
- 4 Modes Available (CW/CCW/STOP/BRAKE)
- Output Current Up to 1.0A(AVE.) and 2.0A(PEAK)
- Wide Range of Operating Voltage :  $V_{CC(opr)}=4.5\sim 18V$   
 $V_{S(opr)}=0\sim 18V$   
 $V_{ref(opr)}=0\sim 18V$
- Build in Thermal Shutdown, Over Current Protector and Punch-Through Current Restriction Circuit.
- Hysteresis for All Inputs.

### MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		$V_{CC}$	25	V
Moter Drive Voltage		$V_S$	25	V
Reference Voltage		$V_{ref}$	25	V
Output Current	PEAK	$I_{O(PEAK)}$	2.0 (Note1)	A
	AVE.	$I_{O(AVE.)}$	1.0	
Power Dissipation		$P_D$	12.5 (Note2)	W
Operating Temperature		$T_{opr}$	-30~75	°C
Storage Temperature		$T_{stg}$	-55~150	°C

Note 1. Duty 1/10, 100ms, Note 2.  $T_c=25^\circ C$

### BLOCK DIAGRAM



# KIA7288P

## PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	GND	GND terminal
2	OUT2	Output terminal
3	OUT3	Output terminal
4	IN1	Input terminal
5	IN2	Input terminal
6	IN3	Input terminal
7	V <sub>CC</sub>	Supply voltage terminal for Logic
8	V <sub>ref</sub>	Supply voltage terminal for control
9	V <sub>S</sub>	Supply voltage terminal for Motor drive
10	OUT1	Output terminal

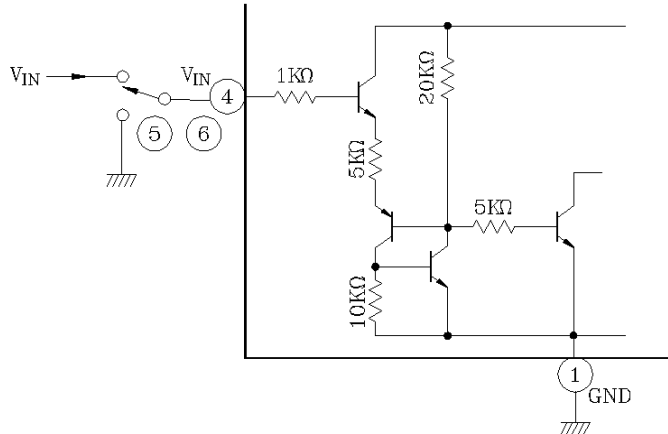
## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V<sub>CC</sub>=12V, V<sub>S</sub>=18V, T<sub>a</sub>=25°C)

CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I <sub>CC1</sub>	1	Output OFF CW/CCW mode	-	17	30	mA
		I <sub>CC2</sub>	1	Output OFF Brake mode	-	13	25	
Input Voltage	1 (High)	V <sub>INH</sub>	2	T <sub>j</sub> =25°C pin④, ⑤, ⑥	3.5	-	5.5	V
	2 (Low)	V <sub>INL</sub>	2	T <sub>j</sub> =25°C pin④, ⑤, ⑥	GND	-	0.8	
Input Current		I <sub>IN</sub>	2	V <sub>IN</sub> =3.5V, Sink mode	-	5	20	μA
Input Hysteresis Voltage		ΔV <sub>T</sub>	2	-	-	0.7	-	V
Saturation Voltage	Upper	V <sub>SAT U-1</sub>	3	V <sub>ref</sub> =V <sub>S</sub> , V <sub>S</sub> -V <sub>out</sub> , I <sub>O</sub> =0.2A	-	0.9	1.2	V
	Lower	V <sub>SAT L-1</sub>	3	V <sub>ref</sub> =V <sub>S</sub> , V <sub>out</sub> -GND, I <sub>O</sub> =0.2A	-	1.0	1.3	V
	Upper	V <sub>SAT U-2</sub>	3	V <sub>ref</sub> =V <sub>S</sub> , V <sub>S</sub> -V <sub>out</sub> , I <sub>O</sub> =1.0A	-	1.3	1.6	V
	Lower	V <sub>SAT L-2</sub>	3	V <sub>ref</sub> =V <sub>S</sub> , V <sub>out</sub> -GND, I <sub>O</sub> =1.0A	-	1.8	2.5	V
Output Voltage		V <sub>SAT U-1</sub>	3	V <sub>ref</sub> =10V, V <sub>out</sub> -GND, I <sub>O</sub> =0.5A	10.7	11.0	11.8	V
		V <sub>SAT U-2</sub>	3	V <sub>ref</sub> =10V, V <sub>out</sub> -GND, I <sub>O</sub> =1.0A	10.4	10.7	11.5	V
Leakage Current	Upper	I <sub>LU</sub>	-	V <sub>S</sub> =25V	-	-	50	μA
	Lower	I <sub>LL</sub>	-	V <sub>S</sub> =25V	-	-	50	
Diode Forward Voltage	Upper	I <sub>FU</sub>	4	I <sub>F</sub> =1A	-	2.2	-	V
	Lower	I <sub>FL</sub>	4	I <sub>F</sub> =1A	-	1.4	-	
Reference Current		I <sub>ref</sub>	2	V <sub>ref</sub> =10V, Source mode	-	5	30	μA

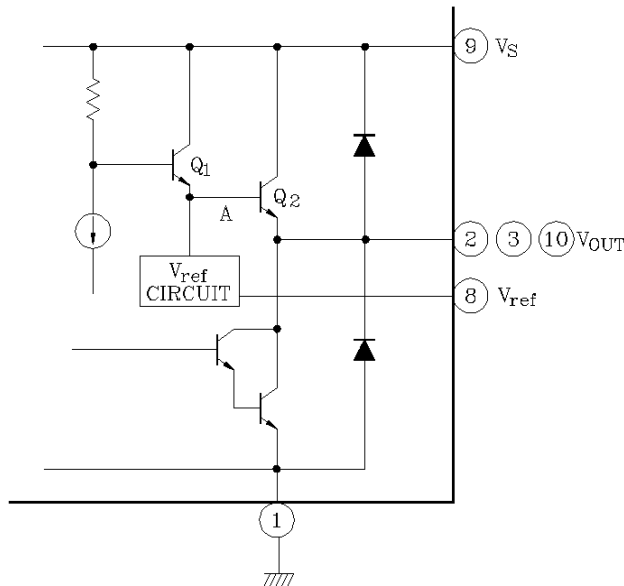
# KIA7288P

## INPUT CIRCUIT



Input terminals of pin (4), (5) and pin (6) are all high active type and have a hysteresis of 0.7V (Typ.)  $5\mu\text{A}$  type of source mode input current is required.

## OUTPUT CIRCUIT



Output voltage is controlled by  $V_{\text{ref}}$  voltage. Relationship between  $V_{\text{OUT}}$  and  $V_{\text{ref}}$  is

$$V_{\text{OUT}} = V_{\text{BE}} (\approx 0.7) + V_{\text{ref}}$$

$V_{\text{ref}}$  terminal required to connect to  $V_{\text{S}}$  terminal for stable operation in case of no requirement of  $V_{\text{OUT}}$  control.

## FUNCTION

INPUT			OUTPUT			MODE	
IN1	IN2	IN3	OUT1	OUT2	OUT3	M1	M2
0	0	1/0	L	L	L	BRAKE	BRAKE
1	0	0	H	L	$\infty$	CW/CCW	STOP
1	0	1	L	H	$\infty$	CCW/CW	STOP
0	1	0	H	$\infty$	L	STOP	CW/CCW
0	1	1	L	$\infty$	H	STOP	CCW/CW
1	1	1/0	L	L	L	BRAKE	BRAKE

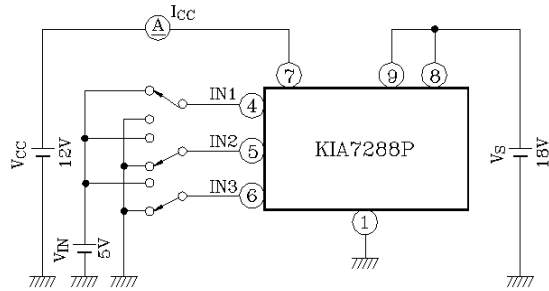
$\infty$  : High Impedance

(Note) Inputs are all high active type.

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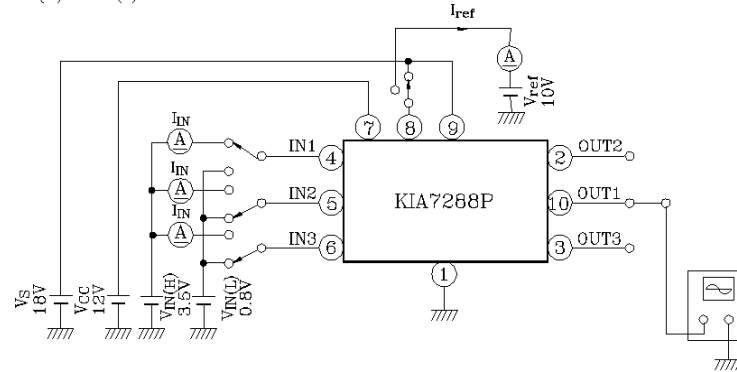
## TEST CIRCUIT 1

$I_{cc1, 2}$



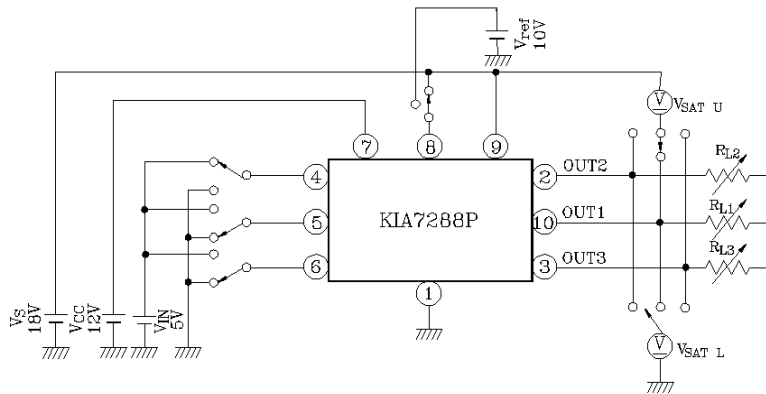
## TEST CIRCUIT 2

$V_{IN(H)}, V_{IN(L)}, I_{IN}, \Delta V_T, I_{ref}$



## TEST CIRCUIT 3

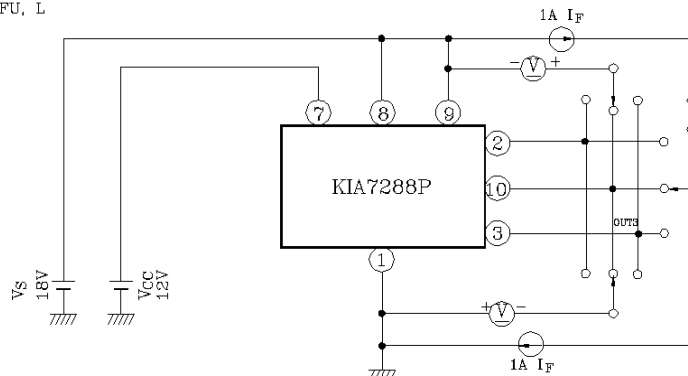
$V_{SAT U-1, L-1, U-2, L-2, U-1', U-2'}$



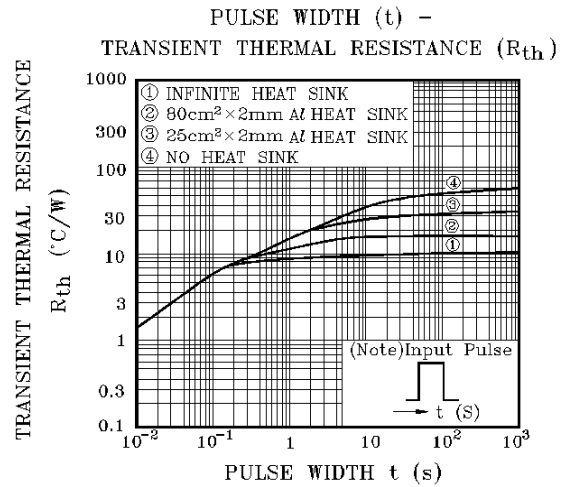
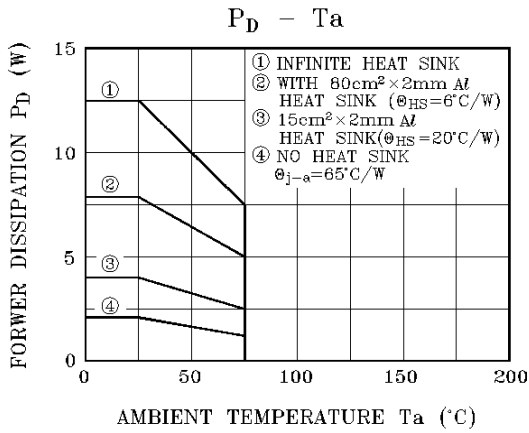
$I_O$  calibration is required to adjust specified values of test conditions by  $R_{L1} \sim R_{L3}$ .

## TEST CIRCUIT 4

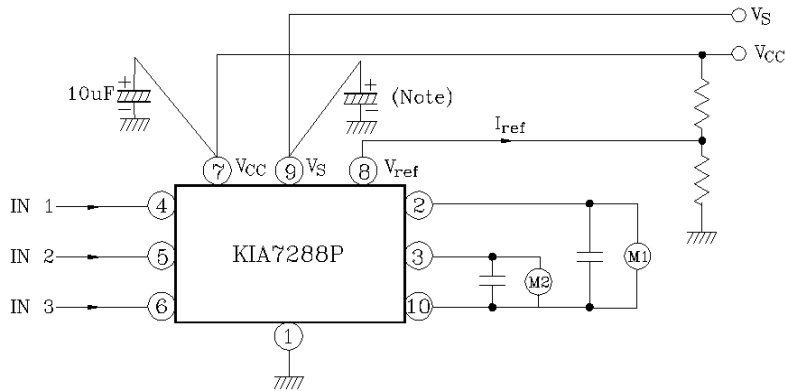
$V_{FU, L}$



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## APPLICATION CIRCUIT



Note 1) Connect if required.

Note 2) Utmost care is necessary in the design of the output line,  $V_S$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.