

# KA7405D

## 2-Channel DC Motor Drive IC

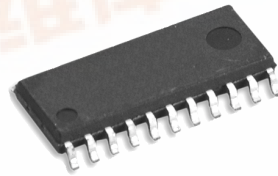
### Features

- Output current up to 1.5A (Each channel).
- 4-function modes (CW, CCW, stop and brake) are controlled by 2-logic circuits.
- Operating voltage range:  $V_{CC} = 2.5 \sim 6.0V$ .
- Built-in spike killer diode.
- Low saturation voltage.

### Description

The KA7405D is a monolithic integrated circuit, and suitable for the zoom and reel motor driver for camera, tape deck, any other consumer and industrial applications.

22-SOP-300



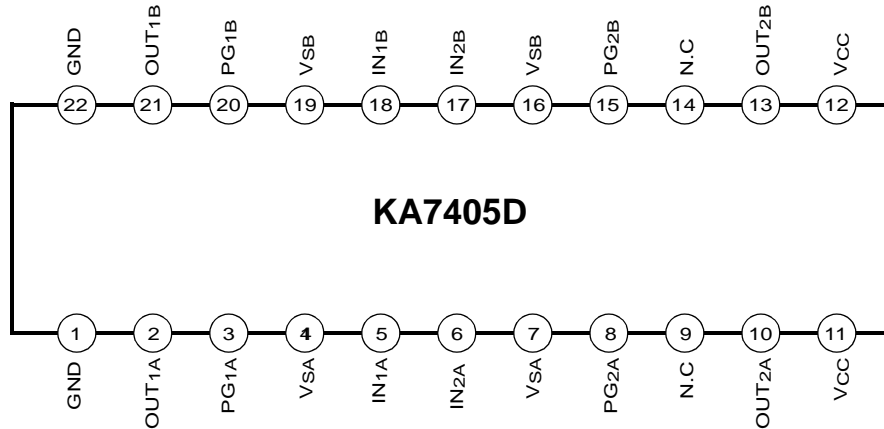
### Typical Applications

- Camera zoom and film motors
- General DC motor

### Ordering Information

Device	Package	Operating Temp.
KA7405D	22-SOP-300	-25°C to +75°C

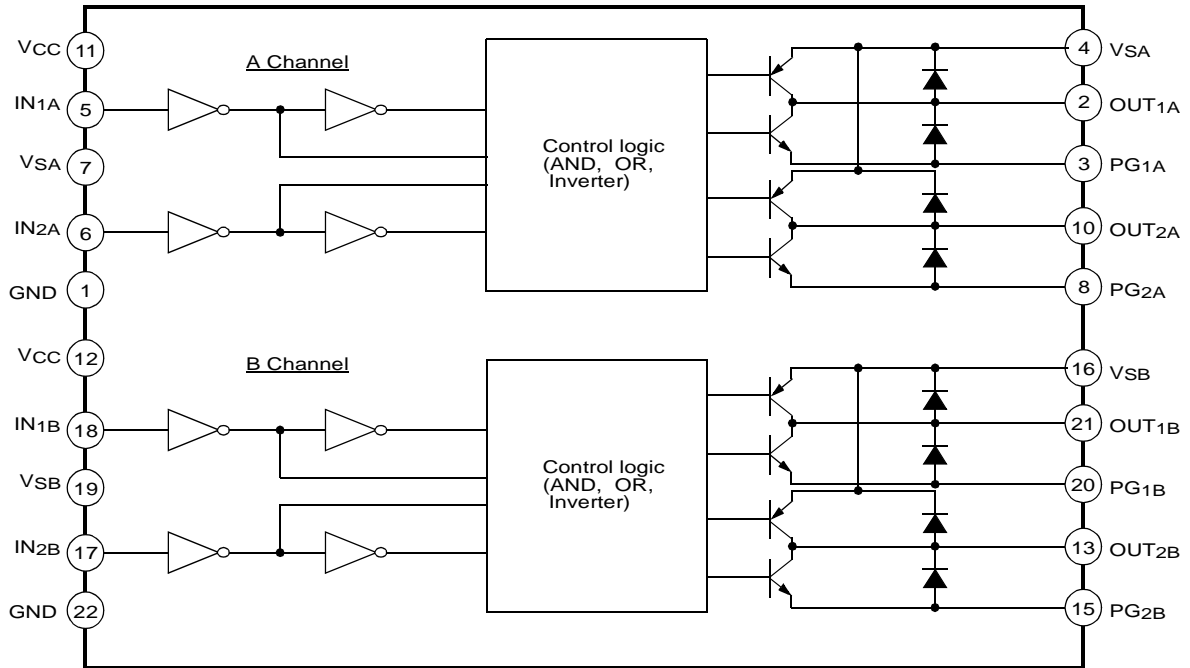
## Pin Assignments



## Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description	Remark
1	GND	-	Signal ground	-
2	OUT1A	O	Output 1	Channel A
3	PG1A	-	Power ground 1	Channel A
4	VSA	-	Output supply voltage	Channel A
5	IN1A	I	Input 1	Channel A
6	IN2A	I	Input 2	Channel A
7	VSA	-	Output supply voltage	Channel A
8	PG2A	-	Power ground 2	Channel A
9	NC	-	No connection	-
10	OUT2A	O	Output 2	-
11	VCC	-	Supply voltage	-
12	VCC	-	Supply voltage	-
13	OUT2B	O	Output 2	Channel B
14	NC	-	No connection	-
15	PG2B	-	Power ground 2	Channel B
16	VSB	-	Output supply voltage	Channel B
17	IN2B	I	Input 2	Channel B
18	IN1B	I	Input 1	Channel B
19	VSB	-	Output supply voltage	Channel B
20	PG1B	-	Power ground 1	Channel B
21	OUT1B	O	Output 1	Channel B
22	GND	-	Signal ground	-

## Internal Block Diagram



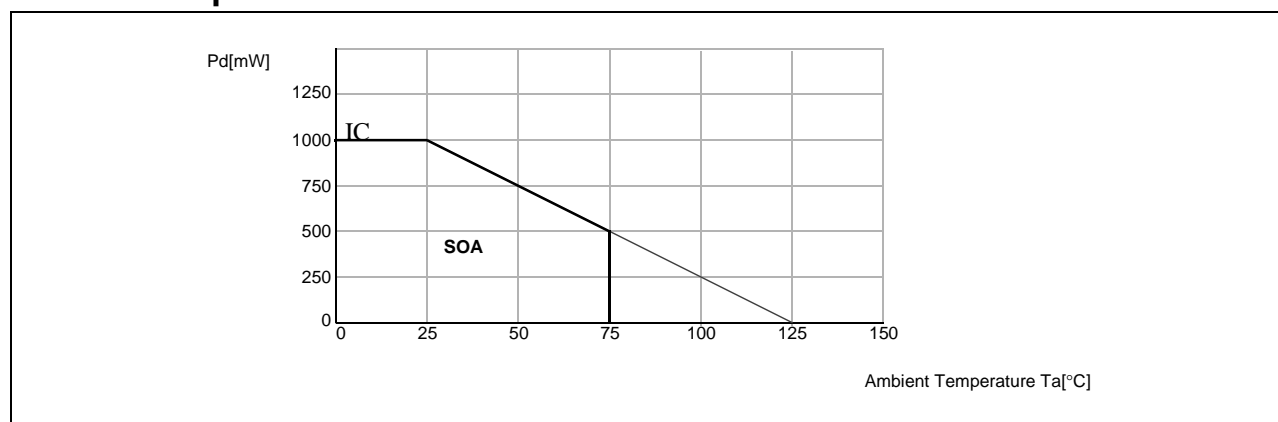
## Equivalent Circuits

Description	Pin No.	Internal Circuit
Control Input		
IN1A	5	
IN2A	6	
IN1B	18	
IN2B	17	
VCC	11, 12	
GND	1, 22	
Motor Output		
OUT1A	2	
OUT2A	10	
OUT1B	21	
OUT2B	13	
VSA	4, 7	
VSB	16, 19	
PG1A	3	
PG2A	8	
PG1B	20	
PG2B	15	

## Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Value	Unit
Power supply voltage	VCCMAX	6.0	V
Channel supply voltage	VSMAX	6.0	V
Power dissipation	PD	1000	mW
Operating temperature	TOPR	-25 ~ +75	°C
Storage temperature	TSTG	-40 ~ +125	°C
Output current	IOMAX	1.5	A

## Power Dissipation Curve



## Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating supply voltage	VCC	2.5	-	6.0	V

## Electrical Characteristics

(VCC=3V, Ta=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply current 1	ICC1	V <sub>IN(all)</sub> = 0V, V <sub>CC</sub> =5V	-	0.1	10	μA
Supply current 2	ICC2	V <sub>IN1</sub> =3V, V <sub>CC</sub> =5V	-	15	30	mA
Supply current 3	ICC3	V <sub>IN2</sub> =3V, V <sub>CC</sub> =5V	-	15	30	mA
Supply current 4	ICC4	V <sub>IN</sub> =3V	-	30	50	mA
Input current	I <sub>IN</sub>	V <sub>CC</sub> =6V, V <sub>IN</sub> =2V	-	45	80	μA
Leakage current	I <sub>IK</sub>	V <sub>CC</sub> =5V	-	0.1	10	μA
Upper spark diode forward voltage	V <sub>SF1</sub>	I <sub>O</sub> =500mA	-	1.0	1.7	V
Lower spark diode forward voltage	V <sub>SF2</sub>	I <sub>O</sub> =500mA	-	1.0	1.7	V
Output saturation voltage (1A)	V <sub>O1A</sub>	I <sub>O</sub> A=300mA, V <sub>IN1A</sub> =3V	-	0.45	0.70	V
Output saturation voltage (1B)	V <sub>O1B</sub>	I <sub>O</sub> B=300mA, V <sub>IN1B</sub> =3V	-	0.45	0.70	V
Output saturation voltage (2A)	V <sub>O2A</sub>	I <sub>O</sub> A=600mA, V <sub>IN1A</sub> =3V	-	1.0	1.5	V
Output saturation voltage (2B)	V <sub>O2B</sub>	I <sub>O</sub> B=600mA, V <sub>IN1B</sub> =3V	-	1.0	1.5	V
Output saturation voltage (3A)	V <sub>O3A</sub>	I <sub>O</sub> A=300mA, V <sub>IN2A</sub> =3V	-	0.45	0.70	V
Output saturation voltage (3B)	V <sub>O3B</sub>	I <sub>O</sub> B=300mA, V <sub>IN2B</sub> =3V	-	0.45	0.70	V
Output saturation voltage (4A)	V <sub>O4A</sub>	I <sub>O</sub> A=600mA, V <sub>IN2A</sub> =3V	-	1.0	1.5	V
Output saturation voltage (4B)	V <sub>O4B</sub>	I <sub>O</sub> B=600mA, V <sub>IN2B</sub> =3V	-	1.0	1.5	V
Output saturation voltage 5	V <sub>O5</sub>	I <sub>O</sub> B=600mA, V <sub>IN1</sub> =3V	-	0.6	0.8	V
Output saturation voltage 6	V <sub>O6</sub>	I <sub>O</sub> =600mA, V <sub>IN2</sub> =3V	-	0.6	0.8	V
Output saturation voltage 7	V <sub>O7</sub>	I <sub>O</sub> =1200mA, V <sub>IN1</sub> =3V	-	1.2	1.6	V
Output saturation voltage 8	V <sub>O8</sub>	I <sub>O</sub> =1200mA, V <sub>IN2</sub> =3V	-	1.2	1.6	V
Output sustain voltage	V <sub>SUS</sub>	I <sub>O</sub> =200mA	10	15	-	V
Output saturation low voltage A <sup>note</sup>	V <sub>OLA</sub>	V <sub>CC</sub> =1.9V, I <sub>O</sub> A=400mA	-	0.45	0.90	V
Output saturation low voltage B <sup>note</sup>	V <sub>OLB</sub>	V <sub>CC</sub> =1.9V, I <sub>O</sub> B=400mA	-	0.45	0.90	V

### Notes:

User's option.

## Operation Truth Table

Input/Output Motor Operation	Input 1	Input 2	Output 1	Output 2	Remark
Stop	Low	Low	Off	Off	High impedance
Forward Operation	Low	High	Low	High	CW / CCW
Backward Operation	High	Low	High	Low	CCW / CW
Fast stop	High	High	Low	Low	Brake

## Typical Performance Characteristics

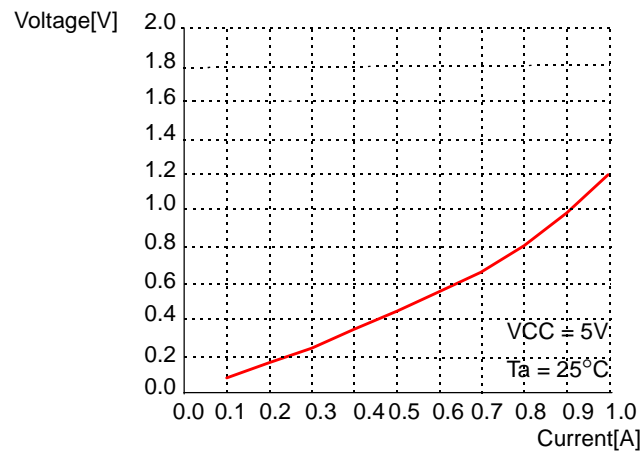


Figure 1. PNP Saturation Voltage

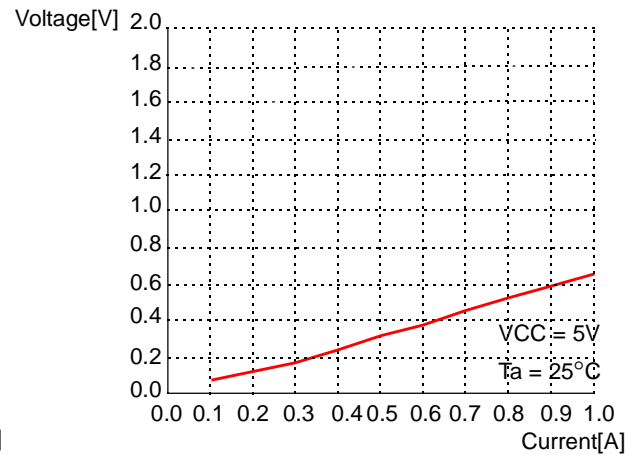
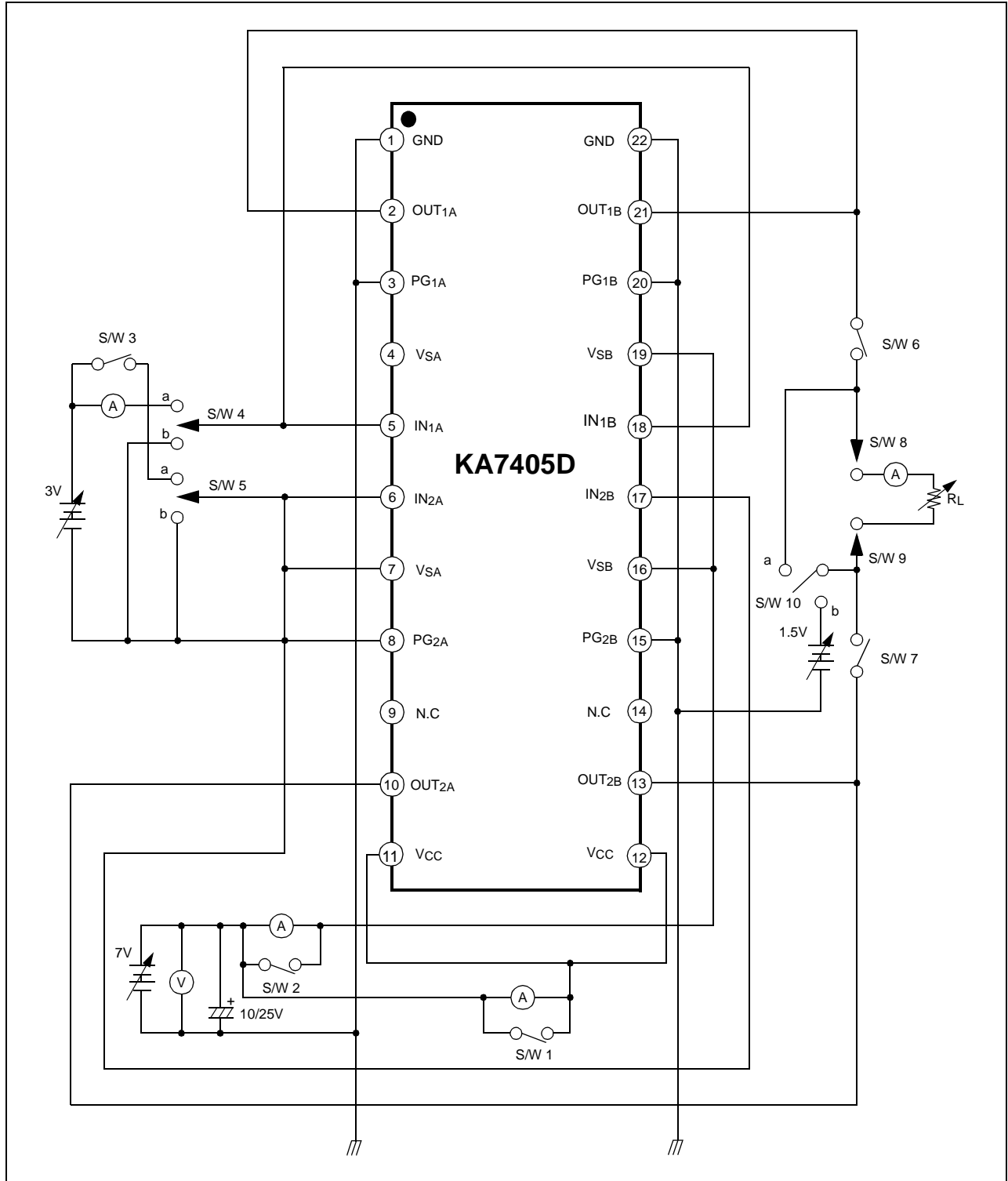


Figure 2. PNP Saturation Voltage

# Test Circuits





## Test Conditions

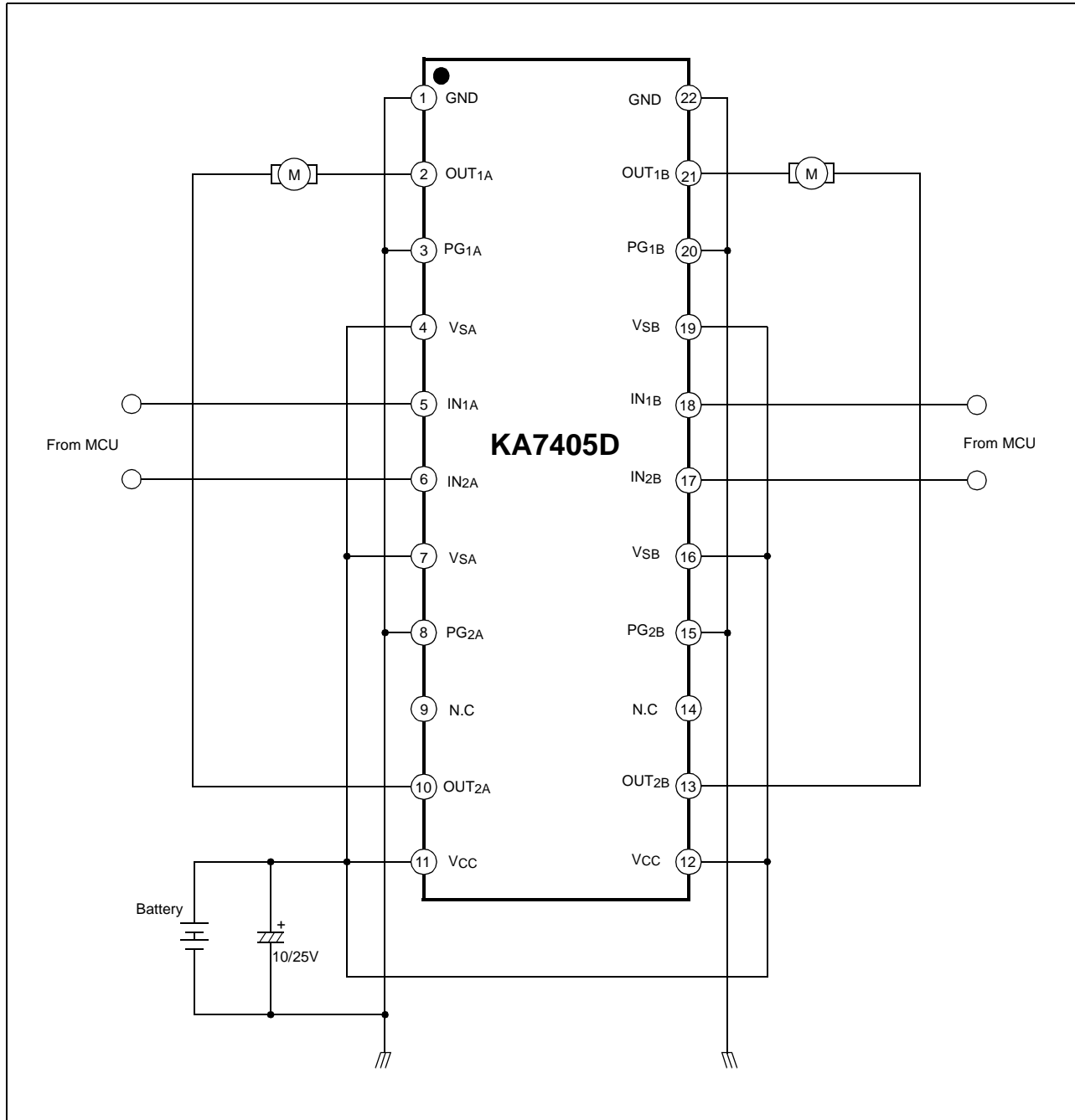
Characteristics	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Remark
ICC1	Off	Off	X	b	b	Off	Off	X	X	Off	Supply current
ICC2	Off	Off	On	a	b	Off	Off	X	X	Off	Supply current
ICC3	Off	Off	On	b	a	Off	Off	X	X	Off	Supply current
ICC4	Off	Off	On	a	a	Off	Off	X	X	Off	Supply current
IIN	On	On	On	a	a	Off	Off	X	X	Off	Input current
I <sub>IK</sub>	Off	Off	Off	b	b	Off	Off	X	X	Off	Leakage current
V <sub>SF1</sub>	On	On	On	a	b	On	On	Off	Off	a	Spark diode
V <sub>SF2</sub>	On	On	On	b	a	On	On	Off	Off	b	Spark diode
V <sub>O1A</sub>	On	On	On	a	b	On	On	On	On	Off	Single mode
V <sub>O2A</sub>	On	On	On	b	a	On	On	On	On	Off	Single mode
V <sub>O3A</sub>	On	On	On	a	b	On	On	On	On	Off	Single mode
V <sub>O4A</sub>	On	On	On	b	a	On	On	On	On	Off	Single mode
V <sub>O5</sub>	On	On	On	a	b	On	On	On	On	Off	Parallel mode
V <sub>O6</sub>	On	On	On	b	a	On	On	On	On	Off	Parallel mode
V <sub>O7</sub>	On	On	On	a	b	On	On	On	On	Off	Parallel mode
V <sub>O8</sub>	On	On	On	b	a	On	On	On	On	Off	Parallel mode
V <sub>SUS</sub>	Off	Off	X	b	b	On	On	On	On	Off	Sustain voltage

**Notes:**

' X ' : Don't care.

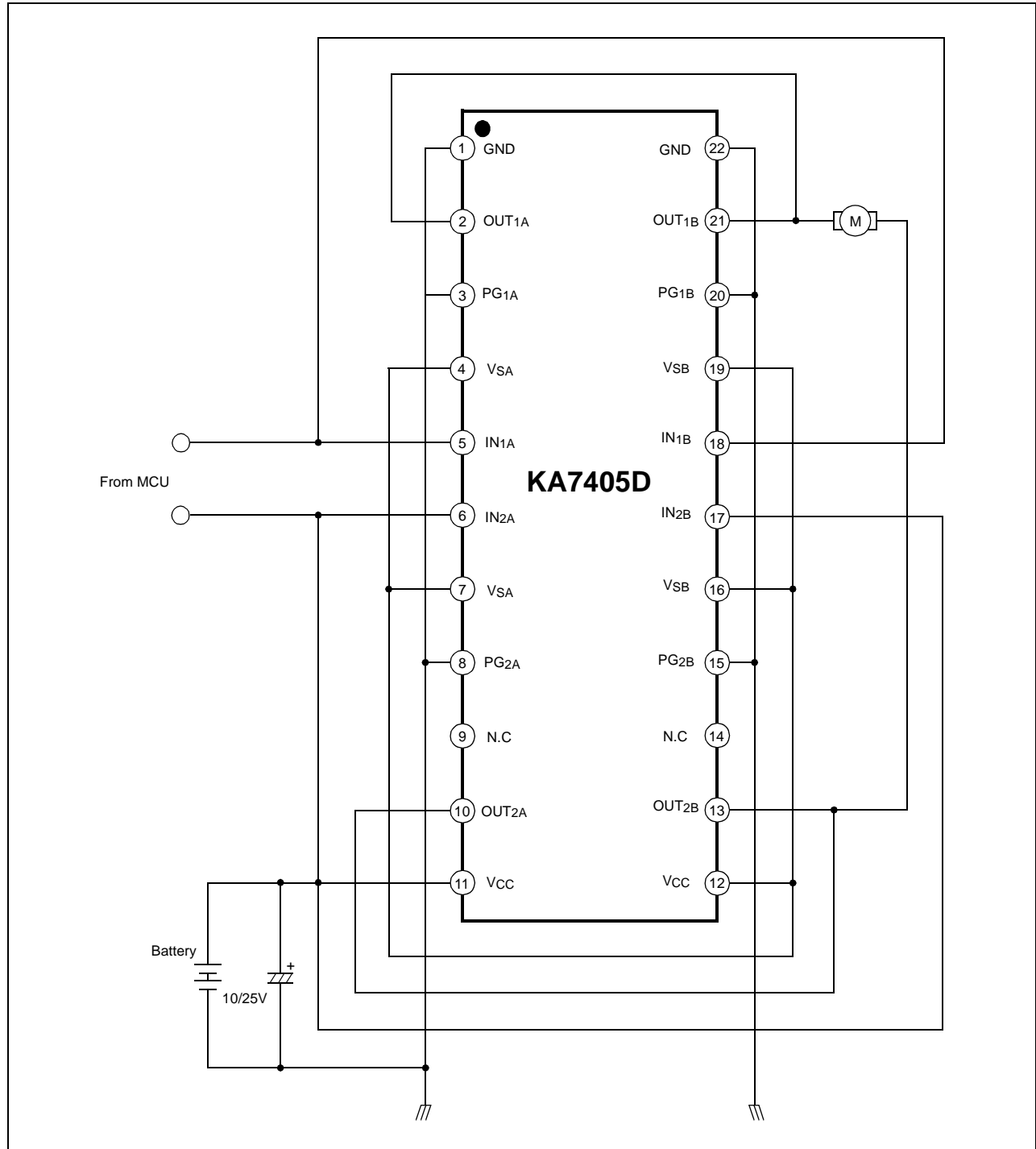
# Typical Application Circuits 1

(Single drive mode)



## Typical Application Circuits 2

(Parallel drive mode)



**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR INTERNATIONAL. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.