KA7405D

2-Channel DC Motor Drive IC

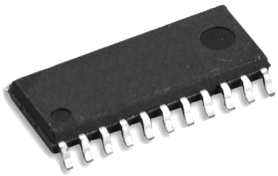
Features

- 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 ~ 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

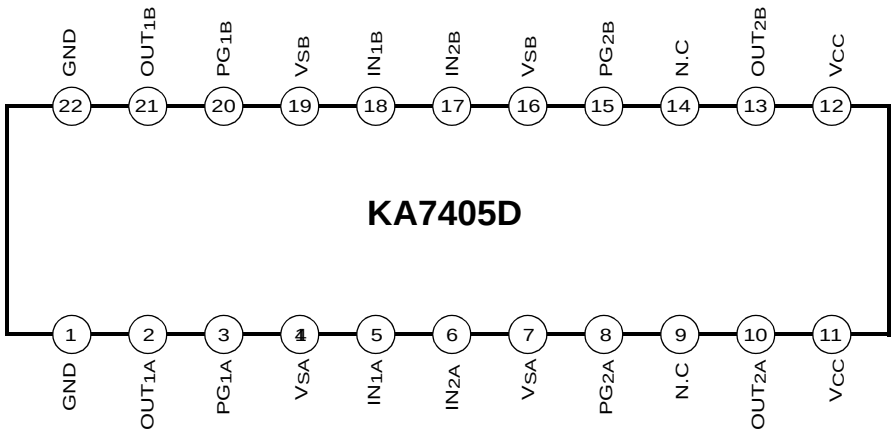
- Camera zoom and film motors
- General DC motor

Ordering Information

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

Rev. 1.0.1
February. 2000.

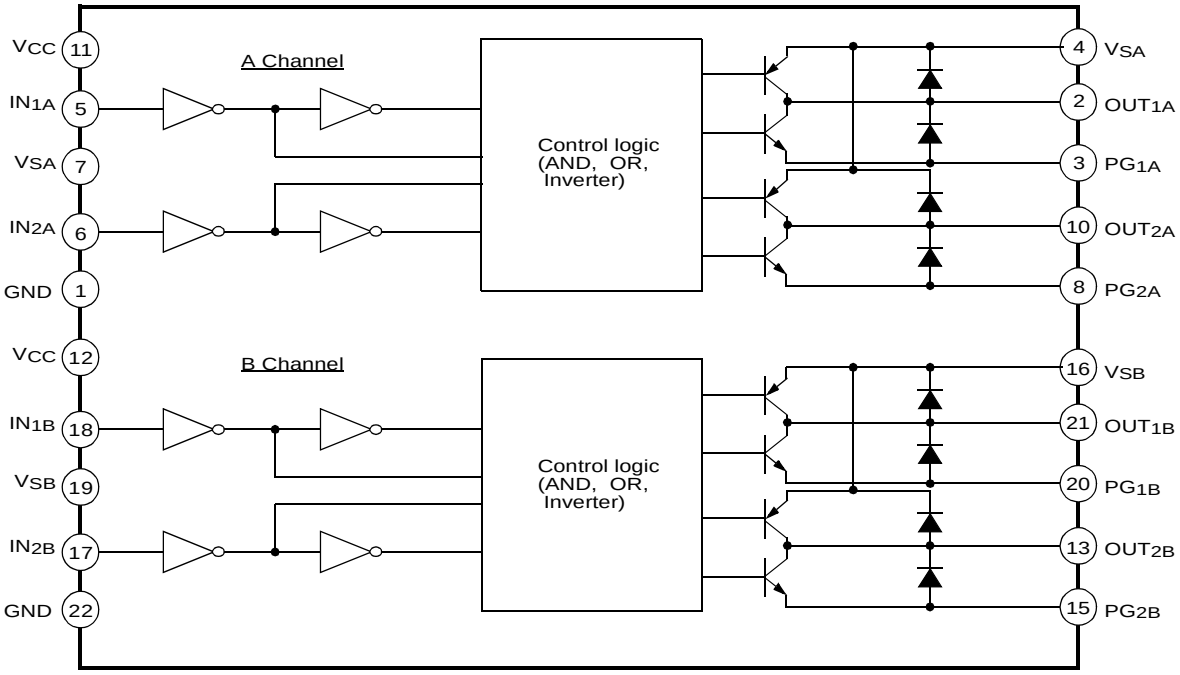
Pin Assignments



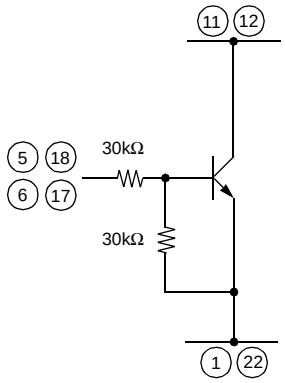
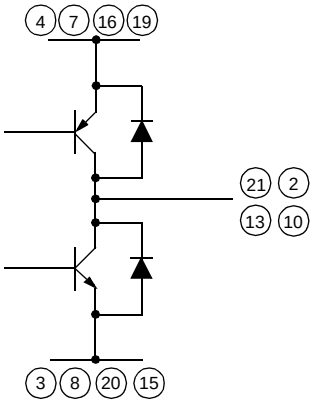
Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description	Remark
1	GND	-	Signal ground	-
2	OUT_{1A}	O	Output 1	Channel A
3	PG_{1A}	-	Power ground 1	Channel A
4	V_{SA}	-	Output supply voltage	Channel A
5	IN_{1A}	I	Input 1	Channel A
6	IN_{2A}	I	Input 2	Channel A
7	V_{SA}	-	Output supply voltage	Channel A
8	PG_{2A}	-	Power ground 2	Channel A
9	NC	-	No connection	-
10	OUT_{2A}	O	Output 2	-
11	V_{CC}	-	Supply voltage	-
12	V_{CC}	-	Supply voltage	-
13	OUT_{2B}	O	Output 2	Channel B
14	NC	-	No connection	-
15	PG_{2B}	-	Power ground 2	Channel B
16	V_{SB}	-	Output supply voltage	Channel B
17	IN_{2B}	I	Input 2	Channel B
18	IN_{1B}	I	Input 1	Channel B
19	V_{SB}	-	Output supply voltage	Channel B
20	PG_{1B}	-	Power ground 1	Channel B
21	OUT_{1B}	O	Output 1	Channel B
22	GND	-	Signal ground	-

Internal Block Diagram



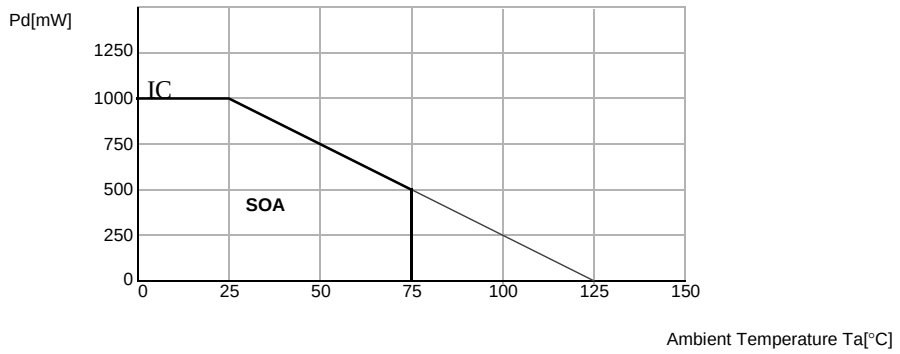
Equivalent Circuits

Description	Pin No.	Internal Circuit
Control Input		
IN_{1A}	5	
IN_{2A}	6	
IN_{1B}	18	
IN_{2B}	17	
V_{CC}	11, 12	
GND	1, 22	
Motor Output		
OUT_{1A}	2	
OUT_{2A}	10	
OUT_{1B}	21	
OUT_{2B}	13	
V_{SA}	4, 7	
V_{SB}	16, 19	
PG_{1A}	3	
PG_{2A}	8	
PG_{1B}	20	
PG_{2B}	15	

Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Value	Unit
Power supply voltage	V_{CCMAX}	6.0	V
Channel supply voltage	V_{SMAX}	6.0	V
Power dissipation	P_D	1000	mW
Operating temperature	T_{OPR}	–25 ~ +75	°C
Storage temperature	T_{STG}	–40 ~ +125	°C
Output current	I_{OMAX}	1.5	A

Power Dissipation Curve



Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating supply voltage	V_{CC}	2.5	-	6.0	V

Electrical Characteristics

(V_{CC}=3V, Ta=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply current 1	I_{CC1}	V_{IN}(all) = 0V,Vcc=5V	-	0.1	10	μA
Supply current 2	I_{CC2}	V_{IN1}=3V,Vcc=5V	-	15	30	mA
Supply current 3	I_{CC3}	V_{IN2}=3V,Vcc=5V	-	15	30	mA
Supply current 4	I_{CC4}	V_{IN}=3V	-	30	50	mA
Input current	I_{IN}	V_{CC}=6V, V_{IN}=2V	-	45	80	μA
Leakage current	I_{IK}	V_{CC}=5V	-	0.1	10	μA
Upper spark diode forward voltage	V_{SF1}	I_O=500mA	-	1.0	1.7	V
Lower spark diode forward voltage	V_{SF2}	I_O=500mA	-	1.0	1.7	V
Output saturation voltage (1A)	V_{O1A}	I_{OA}=300mA,V_{IN1A}=3V	-	0.45	0.70	V
Output saturation voltage (1B)	V_{O1B}	I_{OB}=300mA,V_{IN1B}=3V	-	0.45	0.70	V
Output saturation voltage (2A)	V_{O2A}	I_{OA}=600mA,V_{IN1A}=3V	-	1.0	1.5	V
Output saturation voltage (2B)	V_{O2B}	I_{OB}=600mA,V_{IN1B}=3V	-	1.0	1.5	V
Output saturation voltage (3A)	V_{O3A}	I_{OA}=300mA,V_{IN2A}=3V	-	0.45	0.70	V
Output saturation voltage (3B)	V_{O3B}	I_{OB}=300mA,V_{IN2B}=3V	-	0.45	0.70	V
Output saturation voltage (4A)	V_{O4A}	I_{OA}=600mA,V_{IN2A}=3V	-	1.0	1.5	V
Output saturation voltage (4B)	V_{O4B}	I_{OB}=600mA,V_{IN2B}=3V	-	1.0	1.5	V
Output saturation voltage 5	V_{O5}	I_{OB}=600mA,V_{IN1}=3V	-	0.6	0.8	V
Output saturation voltage 6	V_{O6}	I_O=600mA,V_{IN2}=3V	-	0.6	0.8	V
Output saturation voltage 7	V_{O7}	I_O=1200mA,V_{IN1}=3V	-	1.2	1.6	V
Output saturation voltage 8	V_{O8}	I_O=1200mA,V_{IN2}=3V	-	1.2	1.6	V
Output sustain voltage	V_{SUS}	I_O=200mA	10	15	-	V
Output saturation low voltage A note	V_{OLA}	V_{CC}=1.9V, I_{OA}=400mA	-	0.45	0.90	V
Output saturation low voltage B note	V_{OLB}	V_{CC}=1.9V, I_{OB}=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 Perfomance Characteristics

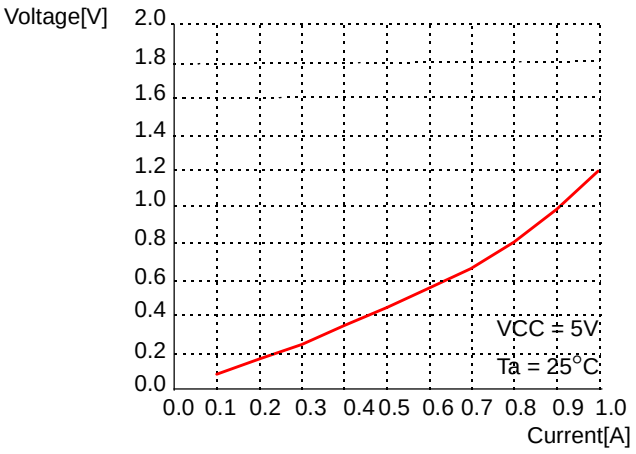


Figure 1. PNP Saturation Voltage

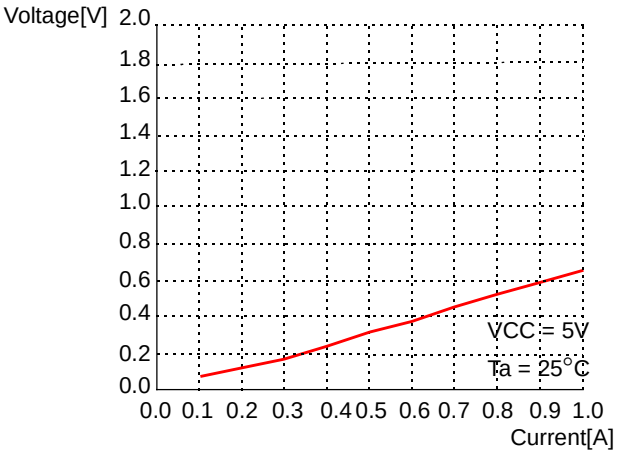
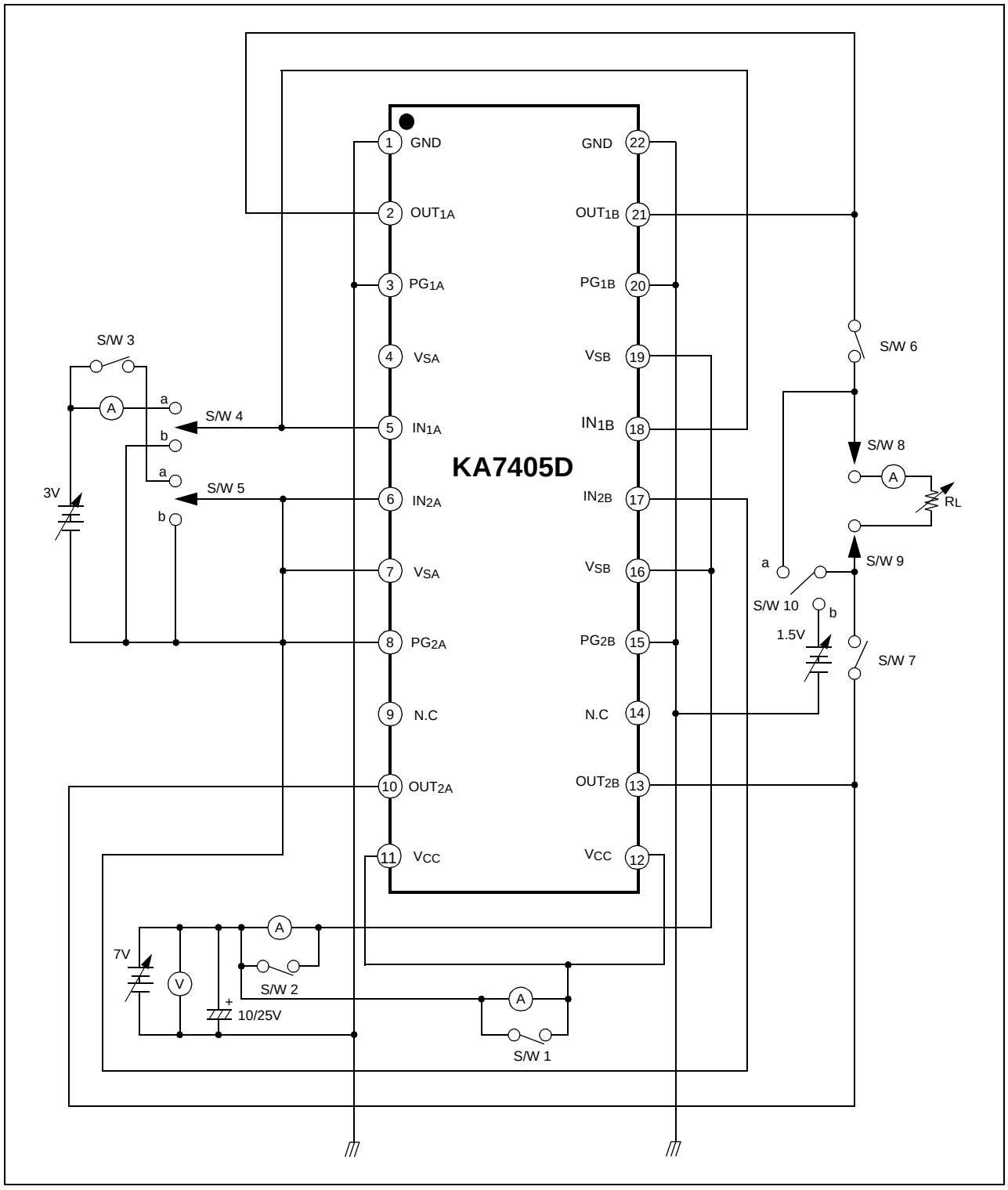


Figure 2. PNP Saturation Voltage

Test Circuits



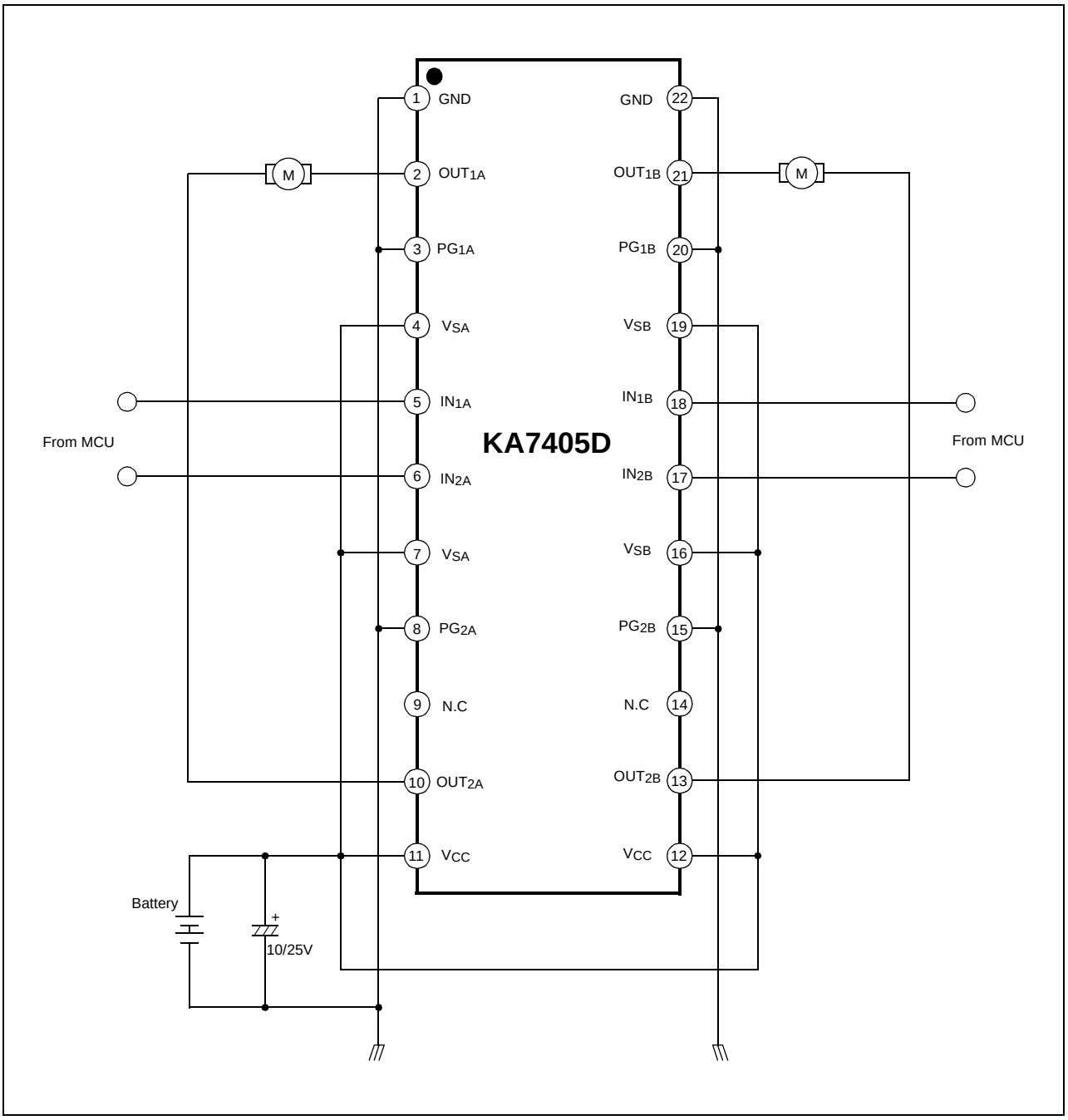
Test Conditions

Characteristics	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Remark
I_{CC1}	Off	Off	X	b	b	Off	Off	X	X	Off	Supply current
I_{CC2}	Off	Off	On	a	b	Off	Off	X	X	Off	Supply current
I_{CC3}	Off	Off	On	b	a	Off	Off	X	X	Off	Supply current
I_{CC4}	Off	Off	On	a	a	Off	Off	X	X	Off	Supply current
I_{IN}	On	On	On	a	a	Off	Off	X	X	Off	Input current
I_{IK}	Off	Off	Off	b	b	Off	Off	X	X	Off	Leakage current
V_{SF1}	On	On	On	a	b	On	On	Off	Off	a	Spark diode
V_{SF2}	On	On	On	b	a	On	On	Off	Off	b	Spark diode
V_{O1A}	On	On	On	a	b	On	On	On	On	Off	Single mode
V_{O2A}	On	On	On	b	a	On	On	On	On	Off	Single mode
V_{O3A}	On	On	On	a	b	On	On	On	On	Off	Single mode
V_{O4A}	On	On	On	b	a	On	On	On	On	Off	Single mode
V_{O5}	On	On	On	a	b	On	On	On	On	Off	Parallel mode
V_{O6}	On	On	On	b	a	On	On	On	On	Off	Parallel mode
V_{O7}	On	On	On	a	b	On	On	On	On	Off	Parallel mode
V_{O8}	On	On	On	b	a	On	On	On	On	Off	Parallel mode
V_{SUS}	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)