

KA7405D

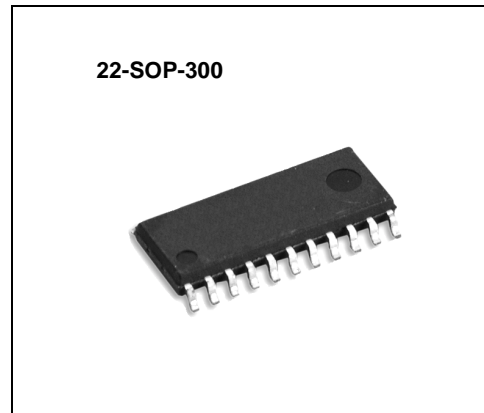
2-Channel DC Motor Drive IC

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.



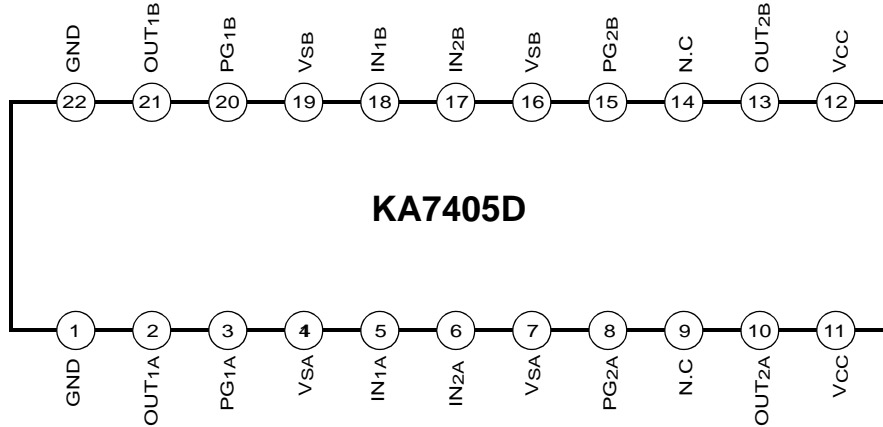
Typical Applications

- Camera zoom and film motors
- General DC motor

Ordering Information

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

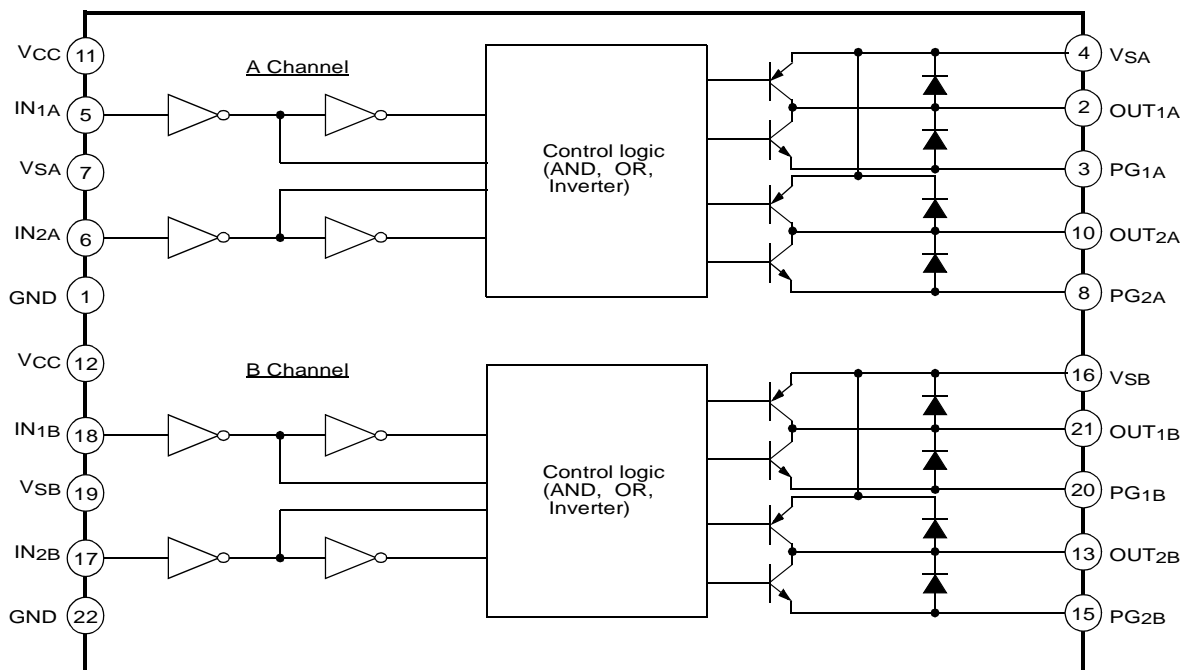
Pin Assignments



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



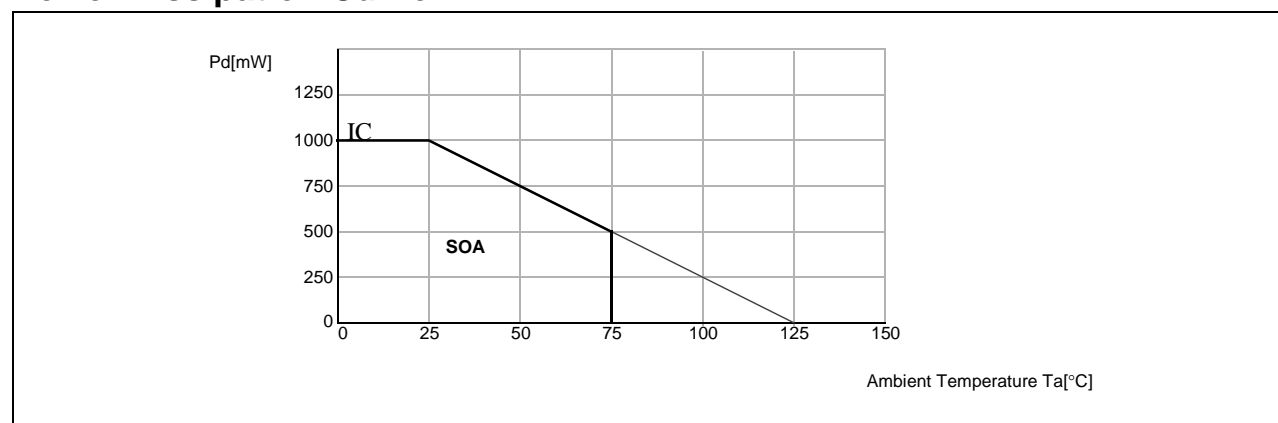
Equivalent Circuits

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	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

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply current 1	ICC1	V _{IN(all)} = 0V, V _{CC} =5V	-	0.1	10	μA
Supply current 2	ICC2	V _{IN1} =3V, V _{CC} =5V	-	15	30	mA
Supply current 3	ICC3	V _{IN2} =3V, V _{CC} =5V	-	15	30	mA
Supply current 4	ICC4	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 _O A=300mA, V _{IN1A} =3V	-	0.45	0.70	V
Output saturation voltage (1B)	V _{O1B}	I _O B=300mA, V _{IN1B} =3V	-	0.45	0.70	V
Output saturation voltage (2A)	V _{O2A}	I _O A=600mA, V _{IN1A} =3V	-	1.0	1.5	V
Output saturation voltage (2B)	V _{O2B}	I _O B=600mA, V _{IN1B} =3V	-	1.0	1.5	V
Output saturation voltage (3A)	V _{O3A}	I _O A=300mA, V _{IN2A} =3V	-	0.45	0.70	V
Output saturation voltage (3B)	V _{O3B}	I _O B=300mA, V _{IN2B} =3V	-	0.45	0.70	V
Output saturation voltage (4A)	V _{O4A}	I _O A=600mA, V _{IN2A} =3V	-	1.0	1.5	V
Output saturation voltage (4B)	V _{O4B}	I _O B=600mA, V _{IN2B} =3V	-	1.0	1.5	V
Output saturation voltage 5	V _{O5}	I _O B=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 _O A=400mA	-	0.45	0.90	V
Output saturation low voltage B ^{note}	V _{OLB}	V _{CC} =1.9V, I _O 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

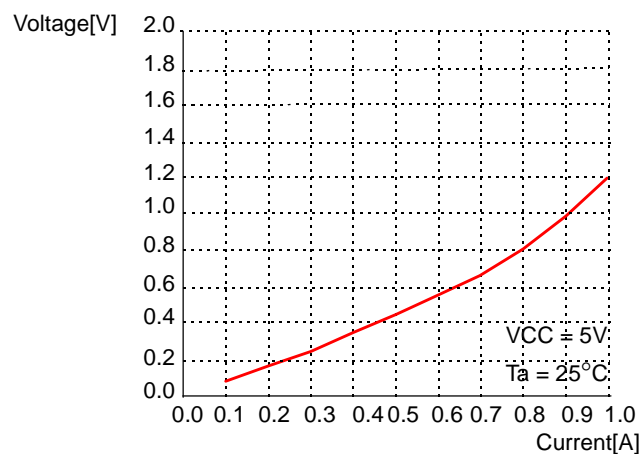


Figure 1. PNP Saturation Voltage

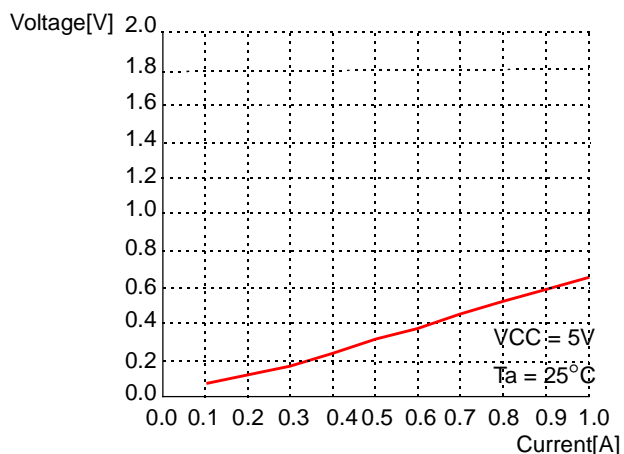
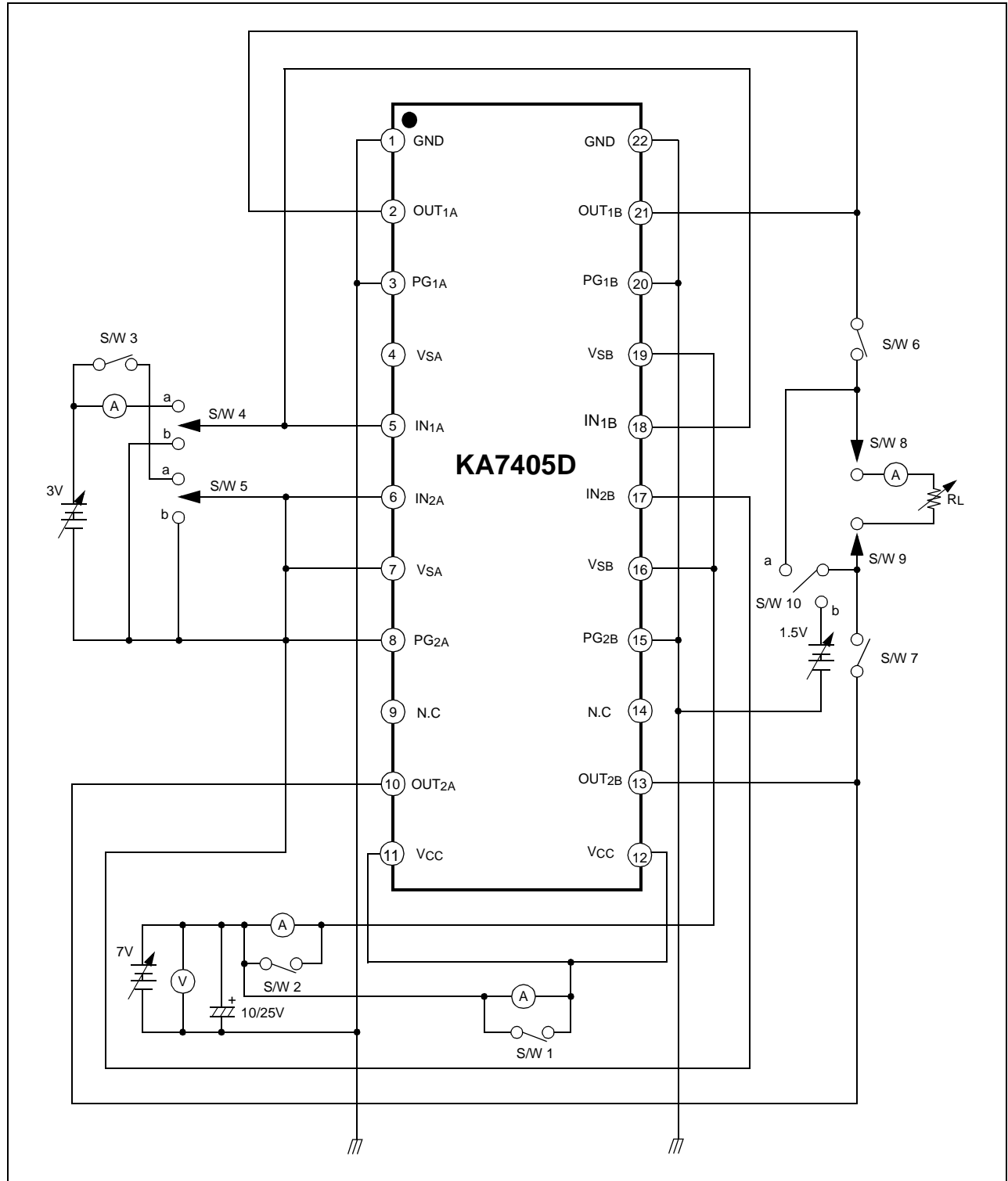


Figure 2. PNP Saturation Voltage

Test Circuits



Test Conditions

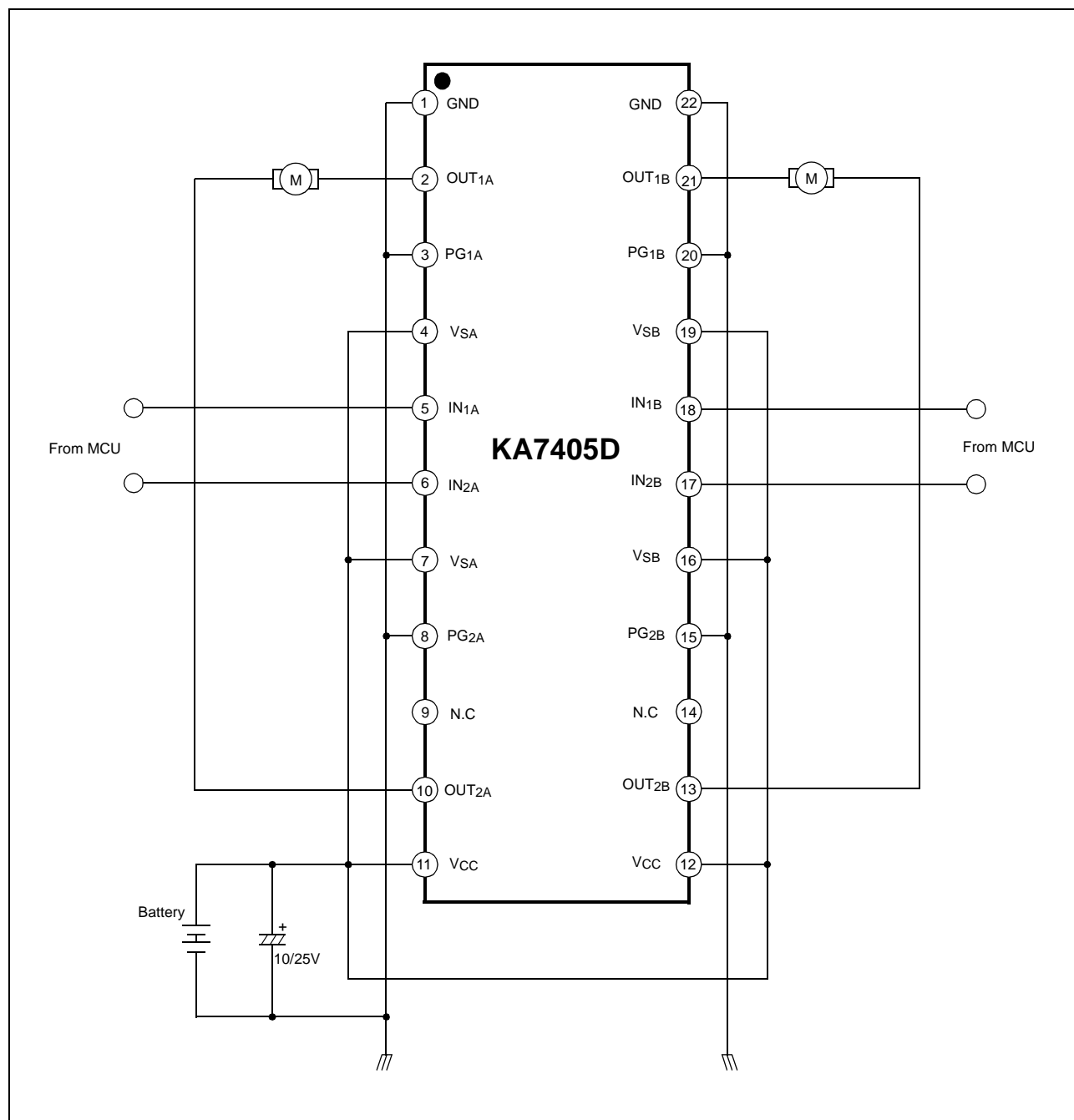
Characteristics	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Remark
ICC1	Off	Off	X	b	b	Off	Off	X	X	Off	Supply current
ICC2	Off	Off	On	a	b	Off	Off	X	X	Off	Supply current
ICC3	Off	Off	On	b	a	Off	Off	X	X	Off	Supply current
ICC4	Off	Off	On	a	a	Off	Off	X	X	Off	Supply current
IIN	On	On	On	a	a	Off	Off	X	X	Off	Input current
IIK	Off	Off	Off	b	b	Off	Off	X	X	Off	Leakage current
VSF1	On	On	On	a	b	On	On	Off	Off	a	Spark diode
VSF2	On	On	On	b	a	On	On	Off	Off	b	Spark diode
VO1A	On	On	On	a	b	On	On	On	On	Off	Single mode
VO2A	On	On	On	b	a	On	On	On	On	Off	Single mode
VO3A	On	On	On	a	b	On	On	On	On	Off	Single mode
VO4A	On	On	On	b	a	On	On	On	On	Off	Single mode
VO5	On	On	On	a	b	On	On	On	On	Off	Parallel mode
VO6	On	On	On	b	a	On	On	On	On	Off	Parallel mode
VO7	On	On	On	a	b	On	On	On	On	Off	Parallel mode
VO8	On	On	On	b	a	On	On	On	On	Off	Parallel mode
VSUS	Off	Off	X	b	b	On	On	On	On	Off	Sustain voltage

Notes:

' X ' : Don't care.

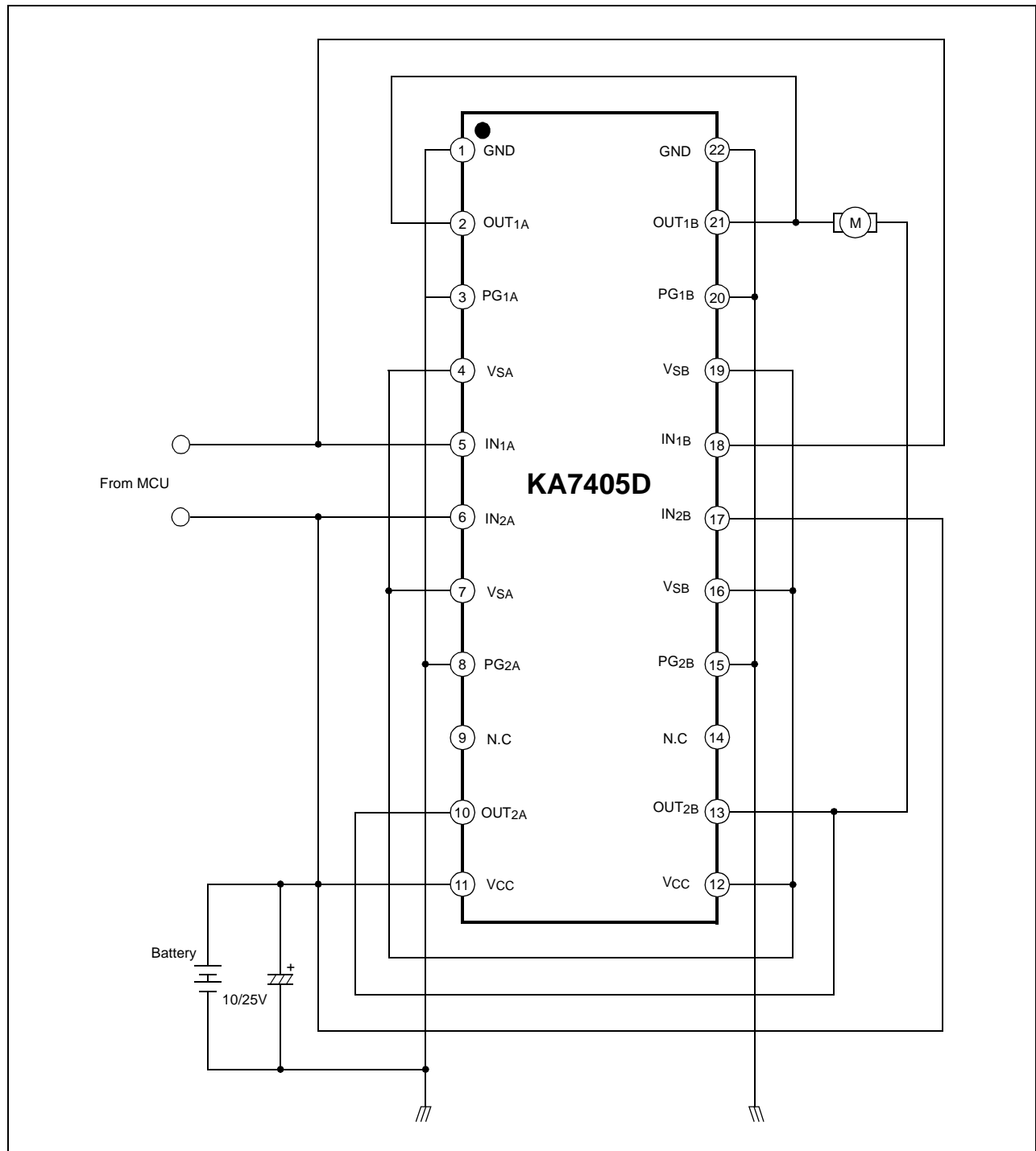
Typical Application Circuits 1

(Single drive mode)



Typical Application Circuits 2

(Parallel drive mode)



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