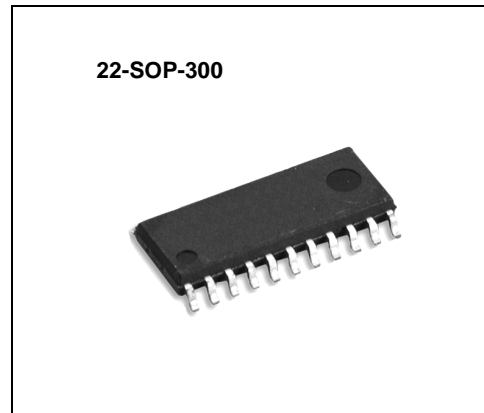# KA7405D
2-Channel DC Motor Drive IC

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.
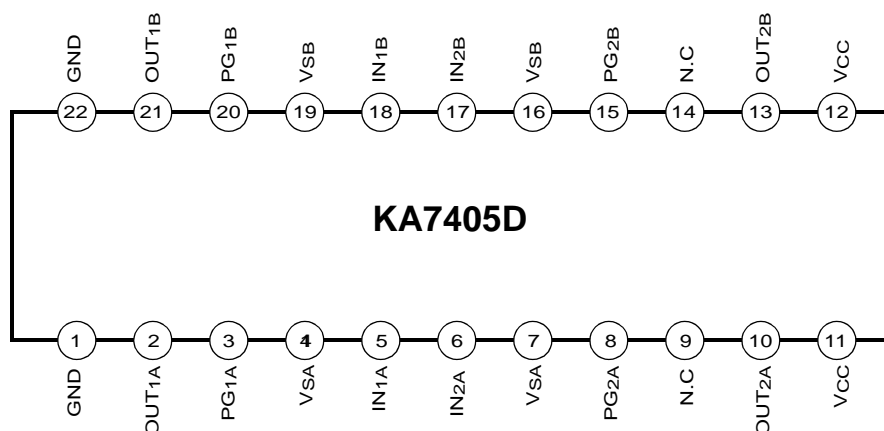
22-SOP-300

Typical Applications

- Camera zoom and film motors
- General DC motor

Ordering Information

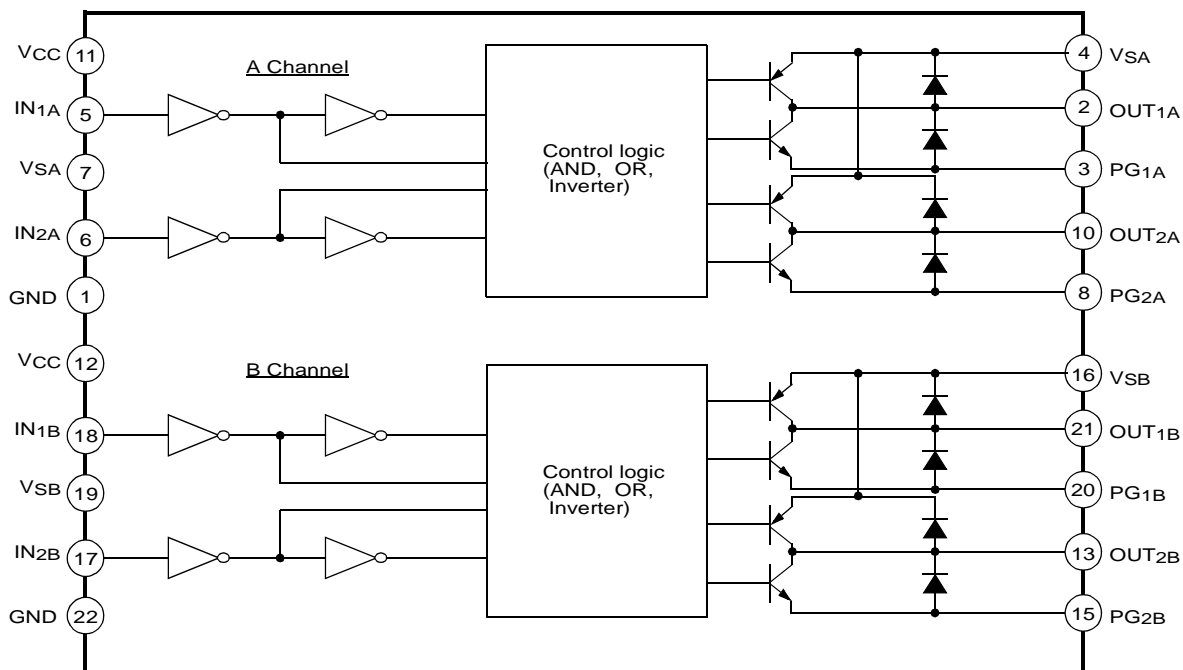| Device	Package	Operating Temp.
KA7405D	22-SOP-300	−25°C to +75°C

Rev. 1.0.1
February. 2000.

Pin Assignments

Pin Definitions

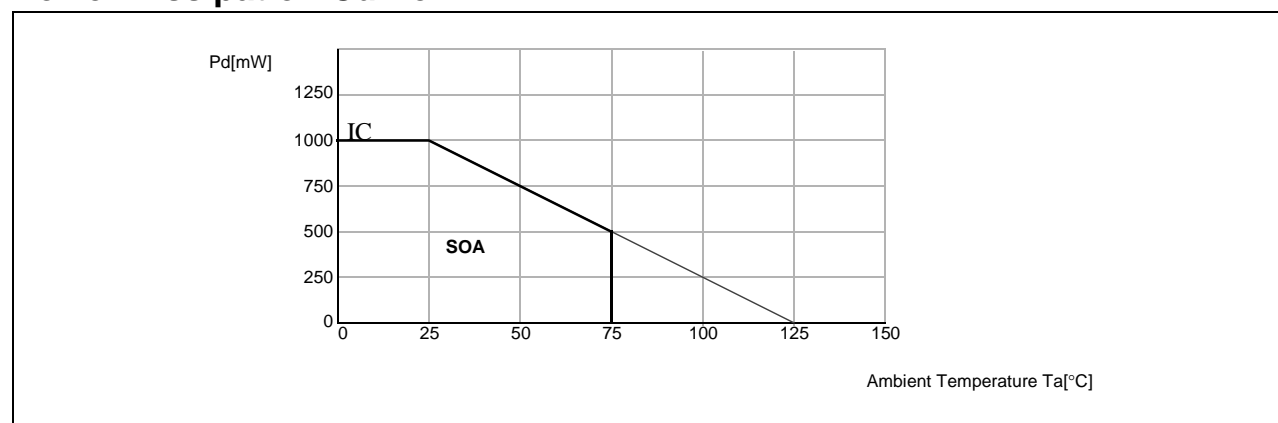| Pin Number	Pin Name	I/O	Pin Function Description	Remark
1	GND	-	Signal ground	-
2	OUT_{1A}	O	Output 1	Channel A
3	PG_{1A}	-	Power ground 1	Channel A
4	V_{SA}	-	Output supply voltage	Channel A
5	IN_{1A}	I	Input 1	Channel A
6	IN_{2A}	I	Input 2	Channel A
7	V_{SA}	-	Output supply voltage	Channel A
8	PG_{2A}	-	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}	$-25 \sim +75$	°C
Storage temperature	T_{STG}	$-40 \sim +125$	°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

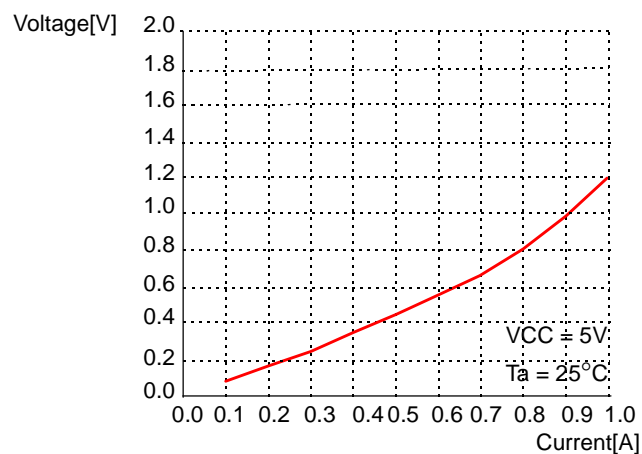| Input/Output Motor Operation	Input 1	Input 2	Output 1	Output 2	Remark
Stop	Low	Low	Off	Off	High impedance
Forward Operation	Low	High	Low	High	CW / CCW
Backward Operation	High	Low	High	Low	CCW / CW
Fast stop	High	High	Low	Low	Brake

Typical Perfomance Characteristics
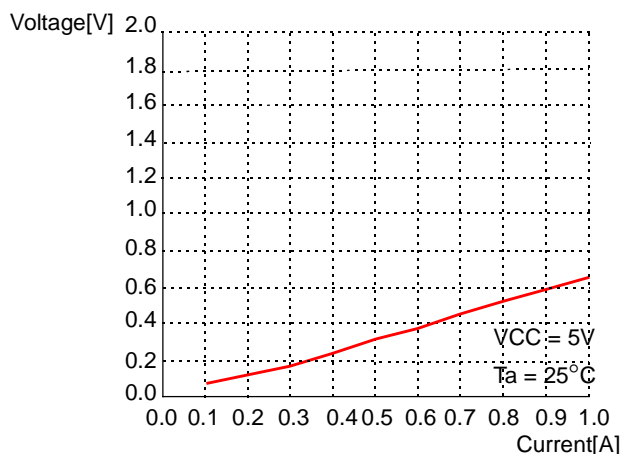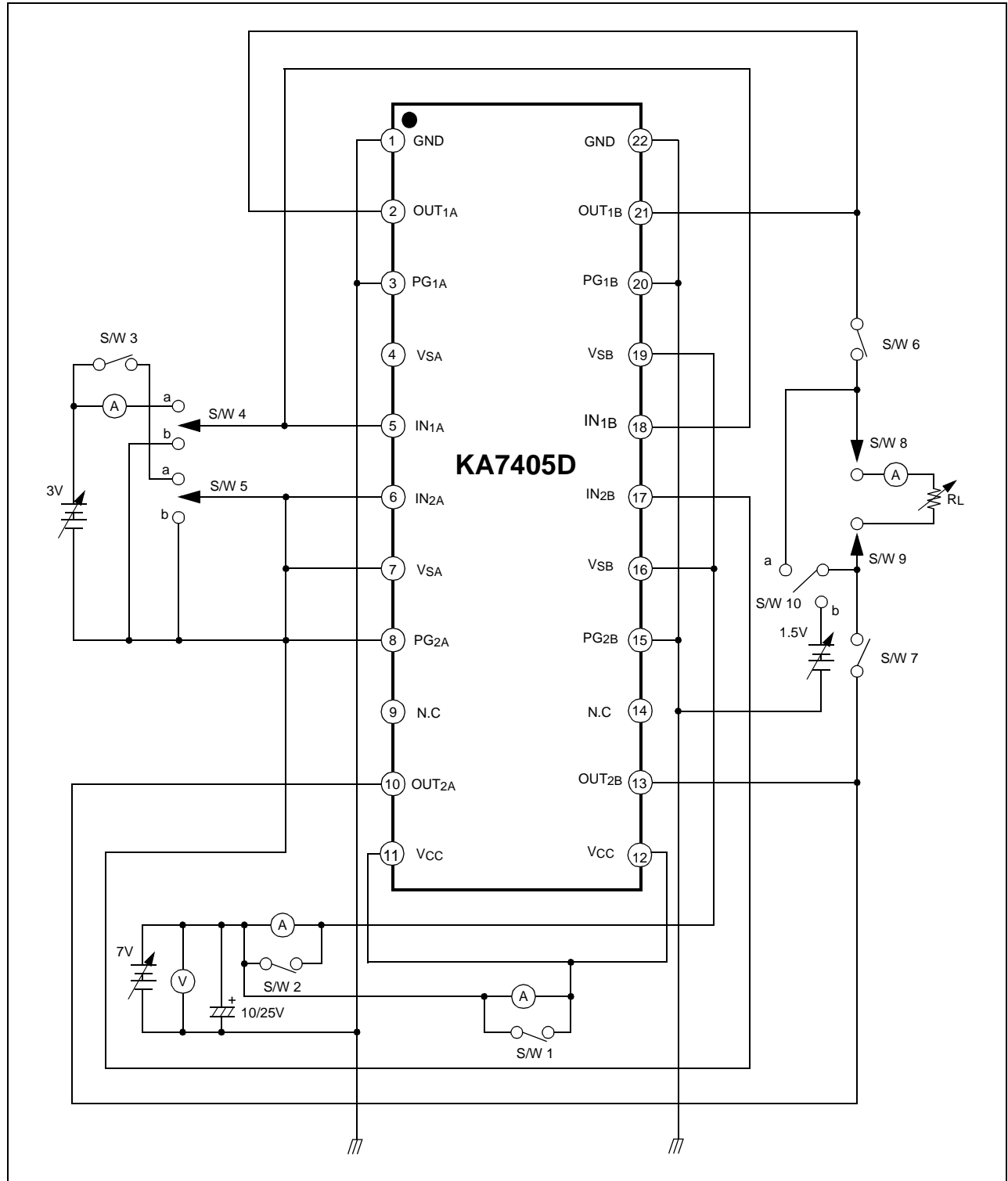

Figure 1. PNP Saturation Voltage

Figure 2. PNP Saturation Voltage

Test Circuits

Test Conditions

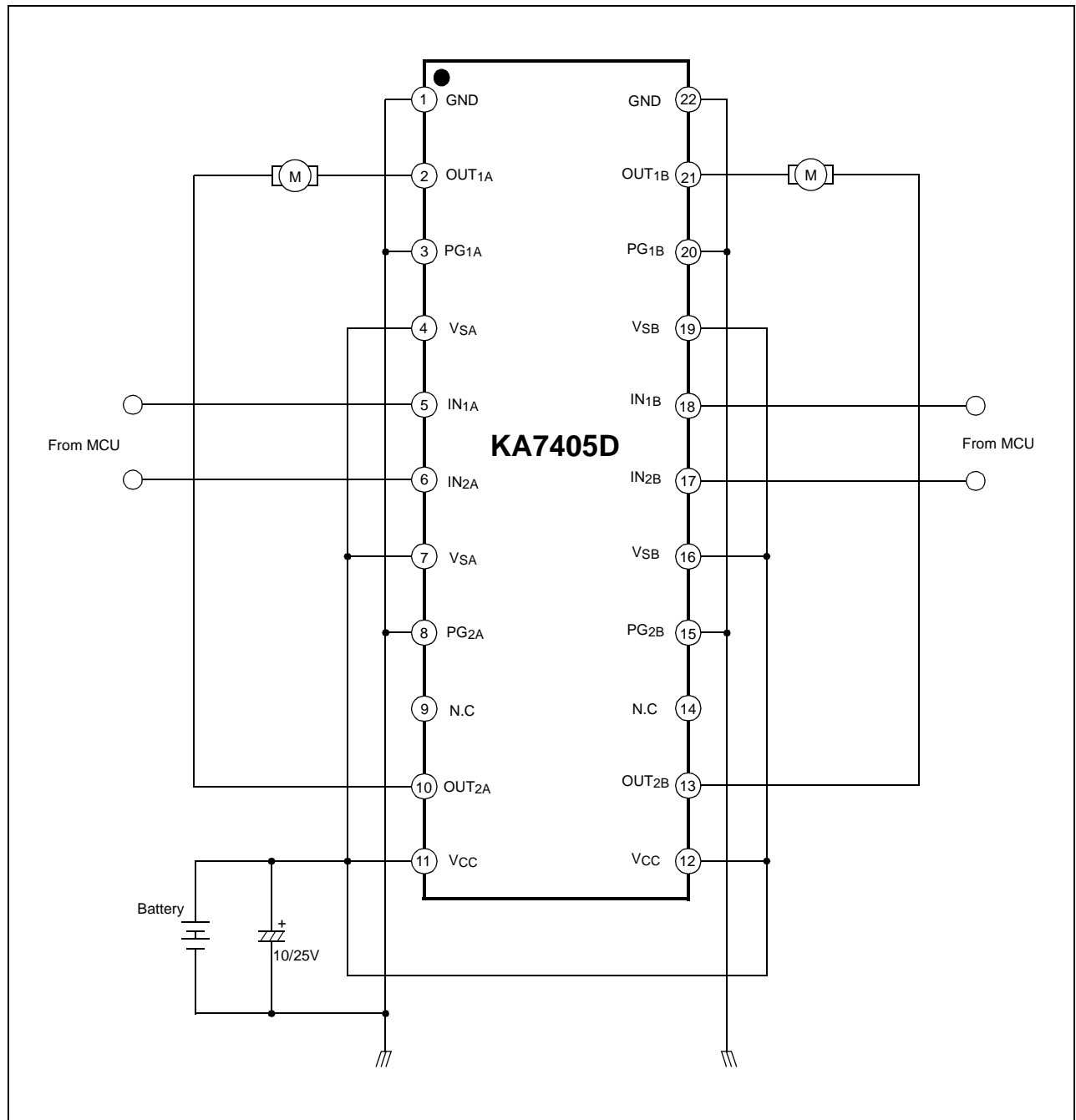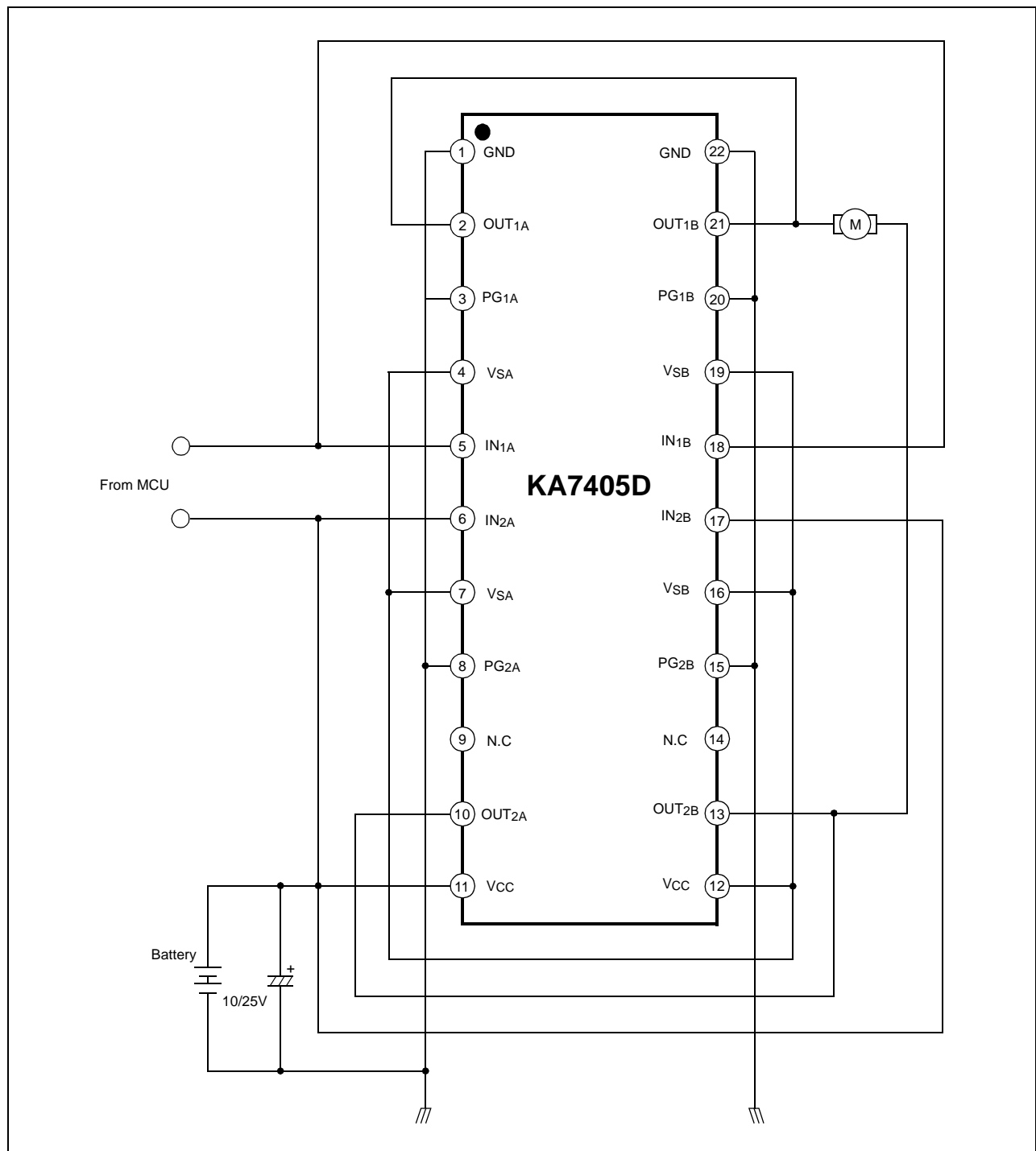| Characteristics	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Remark
I_{CC1}	Off	Off	X	b	b	Off	Off	X	X	Off	Supply current
I_{CC2}	Off	Off	On	a	b	Off	Off	X	X	Off	Supply current
I_{CC3}	Off	Off	On	b	a	Off	Off	X	X	Off	Supply current
I_{CC4}	Off	Off	On	a	a	Off	Off	X	X	Off	Supply current
I_{IN}	On	On	On	a	a	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)

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KA7405D
DC Motor Driver

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General description

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

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- Operating voltage range: V_{CC} = 2.5 ~ 6.0V.
- Built-in spike killer diode.
- Low saturation voltage.

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Applications

- Camera zoom and film motors
- General DC motor

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