KA7406

Camera Motor Driver and Control IC

Features

- Output current up to 0.8A (Each channel).
- 4 function mode (CW, CCW, STOP and BRAKE) are controlled by 2 logic signals fed into 2 input terminals.
- Operating voltage range: V_{CC}=2.5 ~ 7V. (Exception battery check function)
- Built-in spark arrester diode.
- Low saturation voltage (1.5V max at 600mA).

Description

The KA7406 is a monolithic integrated circuit, suitable for the zoom and reel motor driver for camera, tape deck, any other consumer and industrial applications. The KA7406 has the functions which drive buffer for flash & battery check and auto-focus magnetic control.

48-QFP-1010E

Typical Applications

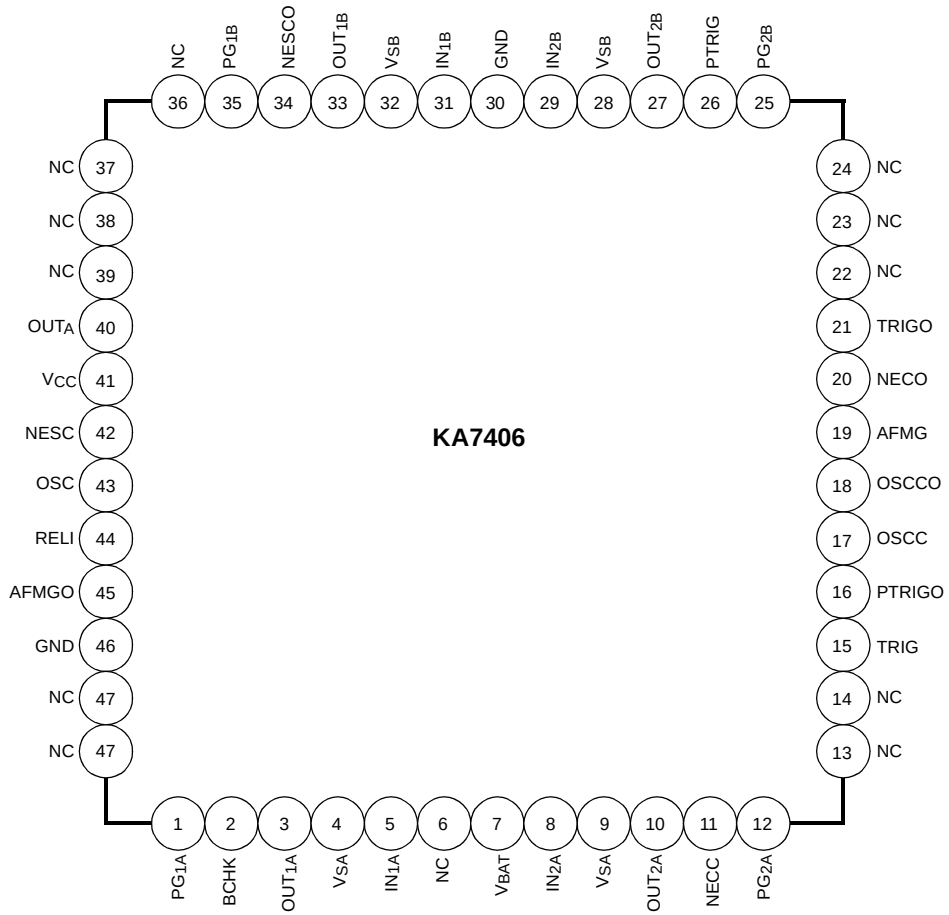
- Camera system

Ordering Information

Device	Package	Operating Temp.
KA7406	48-QFP-1010E	–25°C to +75°C

Rev. 1.0.0
February. 2000.

Pin Assignments



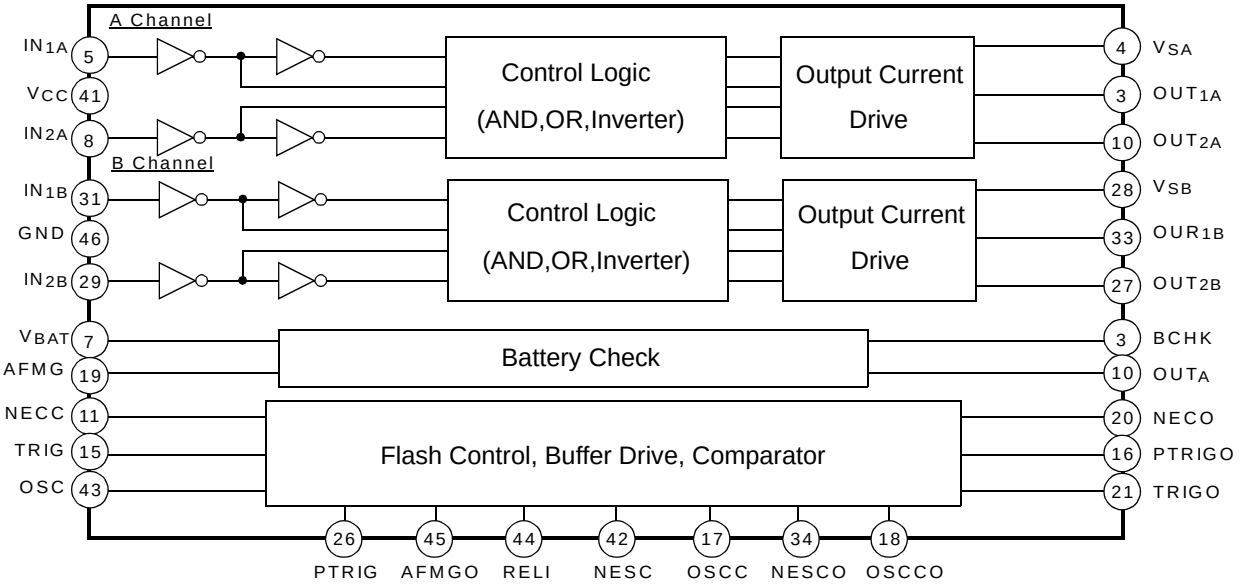
Pin Definitions

Pin Number	Pin Name	I/O	Pin Function Description	Remark
1	PG_{1A}	-	Power ground 1	Channel A
2	BCHK	O	Battery check output	-
3	OUT_{1A}	O	Output 1	Channel A
4	V_{SA}	-	Output supply voltage	Channel A
5	IN_{1A}	I	Input 1	Channel A
6	NC	-	No connection	-
7	V_{BAT}	-	Power supply voltage	Channel A
8	IN_{2A}	I	Input 2	Channel A
9	V_{SA}	-	Output supply voltage	Channel A
10	OUT_{2A}	O	Output 2	-
11	NECC	I	Flash charge control input	-
12	PG_{2A}	-	Power ground 2	-
13	NC	-	No connection	-
14	NC	-	No connection	-
15	TRIG	I	Flash trigger input	-
16	PTRIGO	O	Pretrigger output	-
17	OSCC	I	Flash charge control input	-
18	OSCCO	O	Flash charge control output	-
19	AFMG	I	Auto focus magnetic control input	-
20	NECO	I	Flash charge control input	-
21	TRIGO	O	Flash trigger output	-
22	NC	-	No connection	-
23	NC	-	No connection	-
24	NC	-	No connection	-
25	PG_{2B}	-	Power ground 2	Channel B
26	PTRIG	I	Flash control input	-
27	OUT_{2B}	O	Output 2	Channel B
28	V_{SB}	-	Output supply voltage	Channel B
29	IN_{2B}	I	Input 2	Channel B
30	GND	-	Signal ground	-
31	IN_{1B}	I	Input 2	Channel B
32	V_{SB}	-	Output supply voltage	Channel B

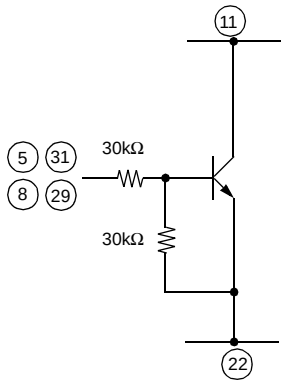
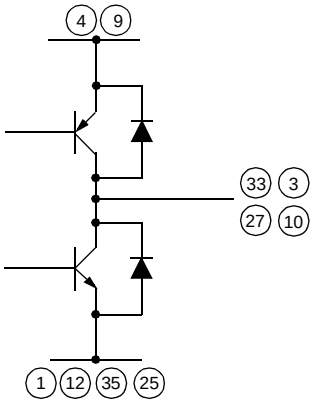
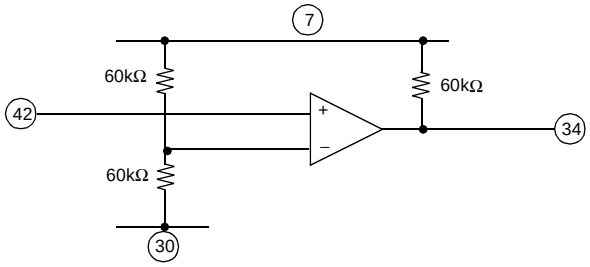
Pin Definitions (Continued)

Pin Number	Pin Name	I/O	Pin Function Description	Remark
33	OUT_{1B}	O	Output 1	Channel B
34	NESCO	I	Battery check output	-
35	PG_{1B}	-	Power supply voltage ground	Channel B
36	NC	-	No connection	-
37	NC	-	No connection	-
38	NC	-	No connection	-
39	NC	-	No connection	-
40	OUT_A	O	Battery check TR driving signal	-
41	V_{CC}	-	Regulator output voltage	Effective RELI=Low Channel
42	NESC	I	Battery check input	-
43	OSC	I	Oscillator input	-
44	RELI	I	Battery check input	-
45	AFMGO	O	Auto focus magnetic control output	-
46	GND	-	AFMG control TR ground	-
47	NC	-	No connection	-
48	NC	-	No connection	-

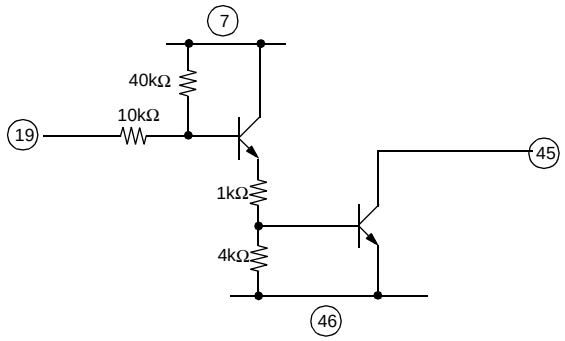
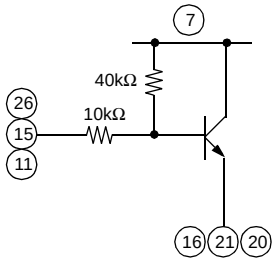
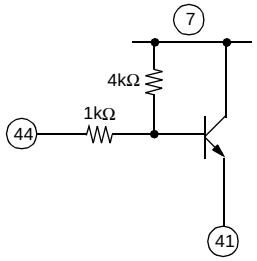
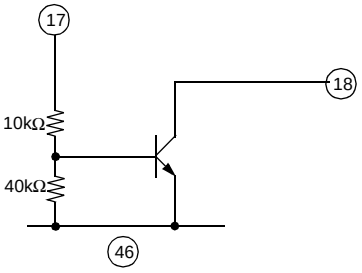
Internal Block Diagram



Equivalent Circuits

Description	Pin No.	Internal Circuit
DC Motor Control Input		
IN_{1A}	5	
IN_{2A}	8	
IN_{1B}	31	
IN_{2B}	29	
V_{CC}	41	
GND	30	
DC Motor Output		
OUT_{1A}	3	
OUT_{2A}	10	
OUT_{1B}	33	
OUT_{2B}	27	
V_{SA}	4, 9	
V_{SB}	28, 32	
PG_{1A}	1	
PG_{2A}	12	
PG_{1B}	35	
PG_{2B}	25	
Comparator		
NESC	42	
NESCO	34	
V_{BAT}	7	
	30	

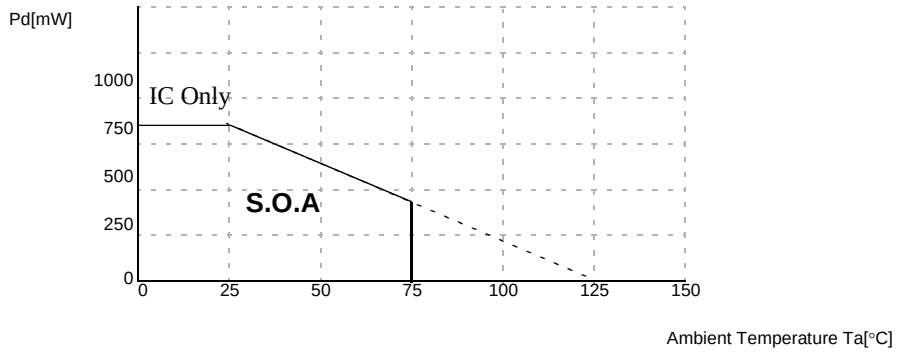
Equivalent Circuits (Continued)

Description	Pin No.	Internal Circuit
Autofocus Circuit		
AFMG	19	
AFMGO	45	
VBAT	7	
GND	46	
Discrete Circuit		
PTRIG	26	
TRIG	15	
NECC	11	
PTRIGO	16	
TRIGO	21	
NECO	20	
VBAT	7	
Regulator Circuit		
RELI	44	
V_{CC}	41	
VBAT	7	
Flash Charge		
OSCC	17	
OSCCO	18	
GND	46	

Absolute Maximum Rating (Ta = 25°C)

Parameter	Symbol	Value	Unit
Power supply voltage	V_{BAT}	10	V
Channel supply voltage	V_S	10	V
Power dissipation	P_D	750	mW
Operating temperature	T_{OPR}	–25 ~ +75	°C
Storage temperature	T_{STG}	–40 ~ +125	°C
Output current	I_O	1	A

Power Dissipation Curve



Recommended Operating Conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating supply voltage	V_{CC}	2.5	-	7.0	V

Electrical Characteristics

(V_{CC}=5V, Ta=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Supply current 1	I_{CC1}	V_{IN}(all) = 0V	-	0.1	10	µA
Supply current 2	I_{CC2}	V_{IN1}=3V	-	15	30	mA
Supply current 3	I_{CC3}	V_{IN2}=3V	-	15	30	mA
Supply current 4	I_{CC4}	V_{IN}=3V	-	30	50	mA
Input current	I_{IN}	V_{CC}=5V, V_{IN}=2V	-	45	80	µA
Leakage current	I_{IK}	V_{CC}=7V	-	0.1	10	µA
Upper spark diode forward voltage 1	V_{SF1}	I_O=500mA	-	1.0	1.7	V
Lower spark diode forward voltage 2	V_{SF2}	I_O=500mA	-	1.0	1.7	V
Output saturation voltage 1A	V_{O1A}	I_{OA}=200mA	-	0.45	0.70	V
Output saturation voltage 1B	V_{O1B}	I_{OB}=200mA	-	0.45	0.70	V
Output saturation voltage 2A	V_{O2A}	I_{OA}=400mA	-	1.0	1.5	V
Output saturation voltage 2B	V_{O2B}	I_{OB}=400mA	-	1.0	1.5	V
Output saturation voltage 3A	V_{O3A}	I_{OA}=200mA	-	0.45	0.70	V
Output saturation voltage 3B	V_{O3B}	I_{OB}=200mA	-	0.45	0.70	V
Output saturation voltage 4A	V_{O4A}	I_{OA}=400mA	-	1.0	1.5	V
Output saturation voltage 4B	V_{O4B}	I_{OB}=400mA	-	1.0	1.5	V
Output saturation voltage 5	V_{O5}	I_{OB}=400mA	-	0.6	0.8	V
Output saturation voltage 6	V_{O6}	I_O=400mA	-	0.6	0.8	V
Output saturation voltage 7	V_{O7}	I_O=800mA	-	1.2	1.6	V
Output saturation voltage 8	V_{O8}	I_O=800mA	-	1.2	1.6	V
OUTA terminal output current	I_{OUTA}	V_{OUTA}=0.7A	6	15	24	mA
Battery check time	T_{CHECK}	R_{OSC}=72k, C_{OSC}=0.1µF	8	10	12	ms
Battery check reference voltage	V_{CHECK}	V_{BAT}=4~5V	4.4	4.5	4.6	V
Comparator reference voltage	V_{TH}	Vnesc=1~2V	1.15	1.25	1.35	V
RELI terminal input current	I_{RELI}	V_{RELI}=0V	-	5	7	mA
V_{CC} terminal output saturation voltage	V_{VCC}	I_O=150mA	-	0.3	0.5	V
AFMG terminal input current	I_{AFMG}	V_{AFMG}=5V	-	145	190	µA
AFMGO output saturation voltage	V_{AFMGO}	I_O=100mA	-	0.3	0.5	V
PTRIG terminal input current	I_{PTRIG}	V_{PTRIG}=5V	-	145	190	µA
PTRIGO output saturation voltage	V_{PTRIGO}	I_O=10mA	-	0.3	0.5	V

Electrical Characteristics (Continued)

(V_{CC}=5V, Ta=25°C, unless otherwise specified)

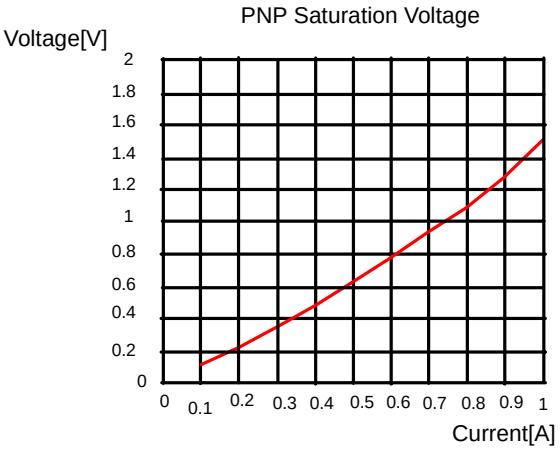
Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
TRIG terminal input current	I_{TRIG}	V_{TRIG}=5V	-	145	190	μA
TRIGO terminal voltage	V_{TRIGO}	V_{TRIG}=5V	0.84	0.94	1.04	V
NECC terminal input current	I_{NECC}	V_{NECC}=5V	-	145	190	mA
NECO terminal output current	I_{NECO}	V_{NECO}=0V	1.0	1.15	1.3	V
OSCC terminal input current	I_{OSCC}	V_{OSCC}=5V	-	500	700	μA
OSCCO output saturation voltage	I_{OSCCO}	V_{OSCCO}=10mA	-	0.3	0.5	V

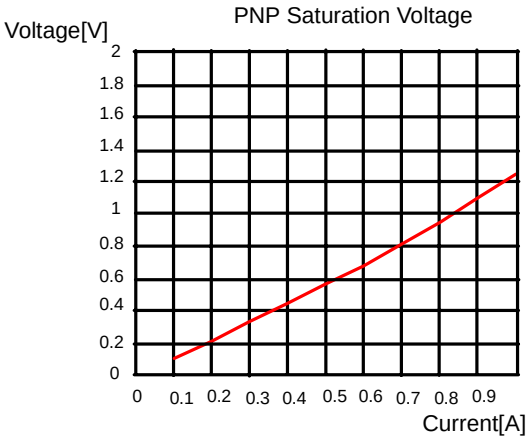
Motor Operation Truth Table

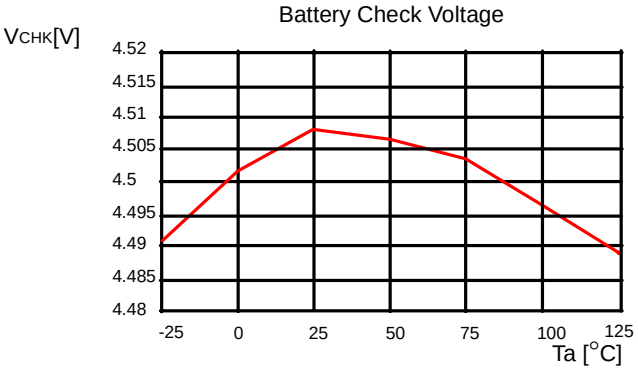
Input/Output / Motor Operation	Input 1	Input 2	Output 1	Output 2	Remark
Stop	Low	Low	Off	Off	High impedance
Forward operation	Low	High	Low	High	CW / CCW
Backward operation	High	Low	High	Low	CCW / CW
Fast stop	High	High	Low	Low	Brake

Typical Perfomance Characteristics

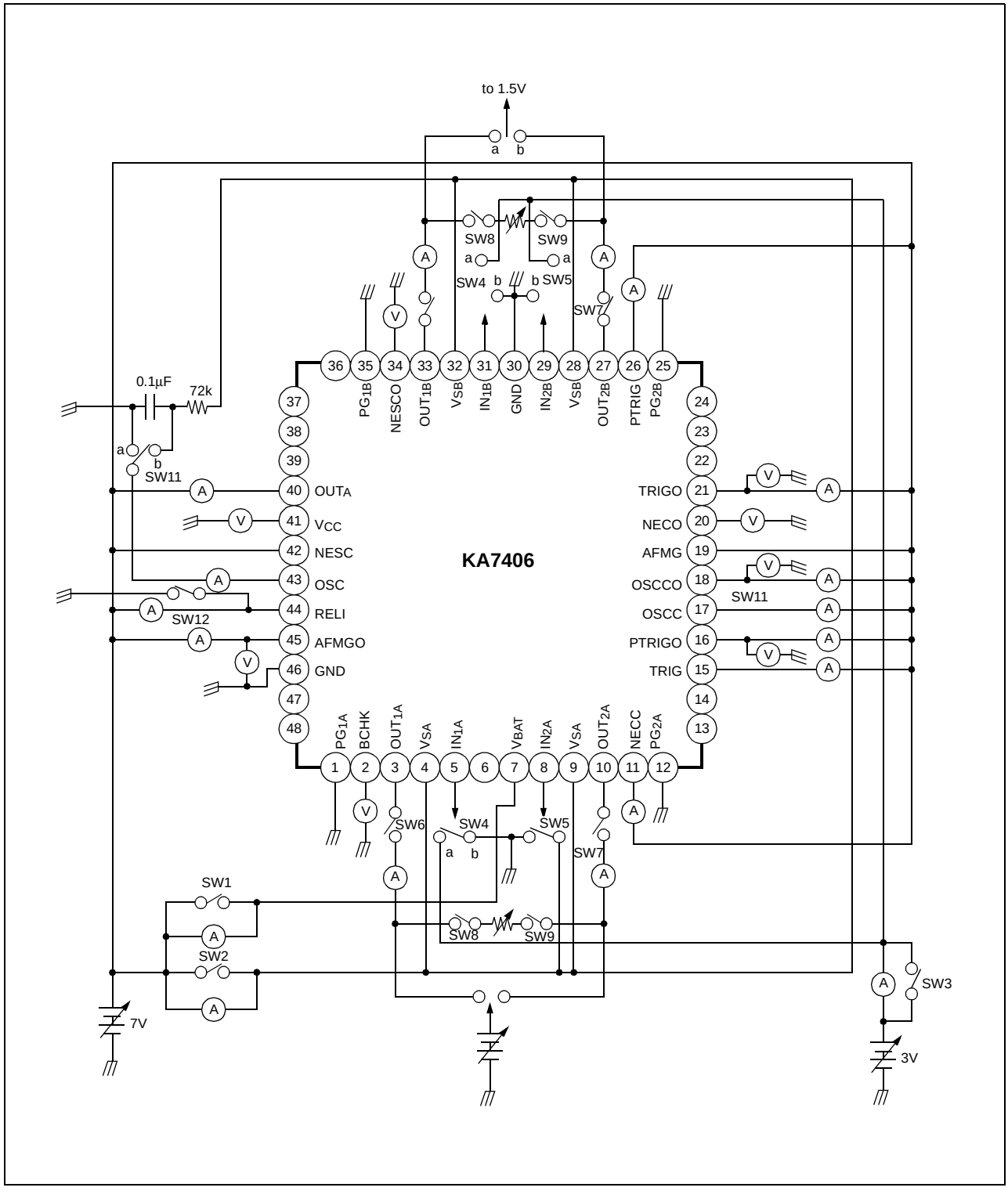
((VCC=5V, Ta=25°C, unless otherwise specified)







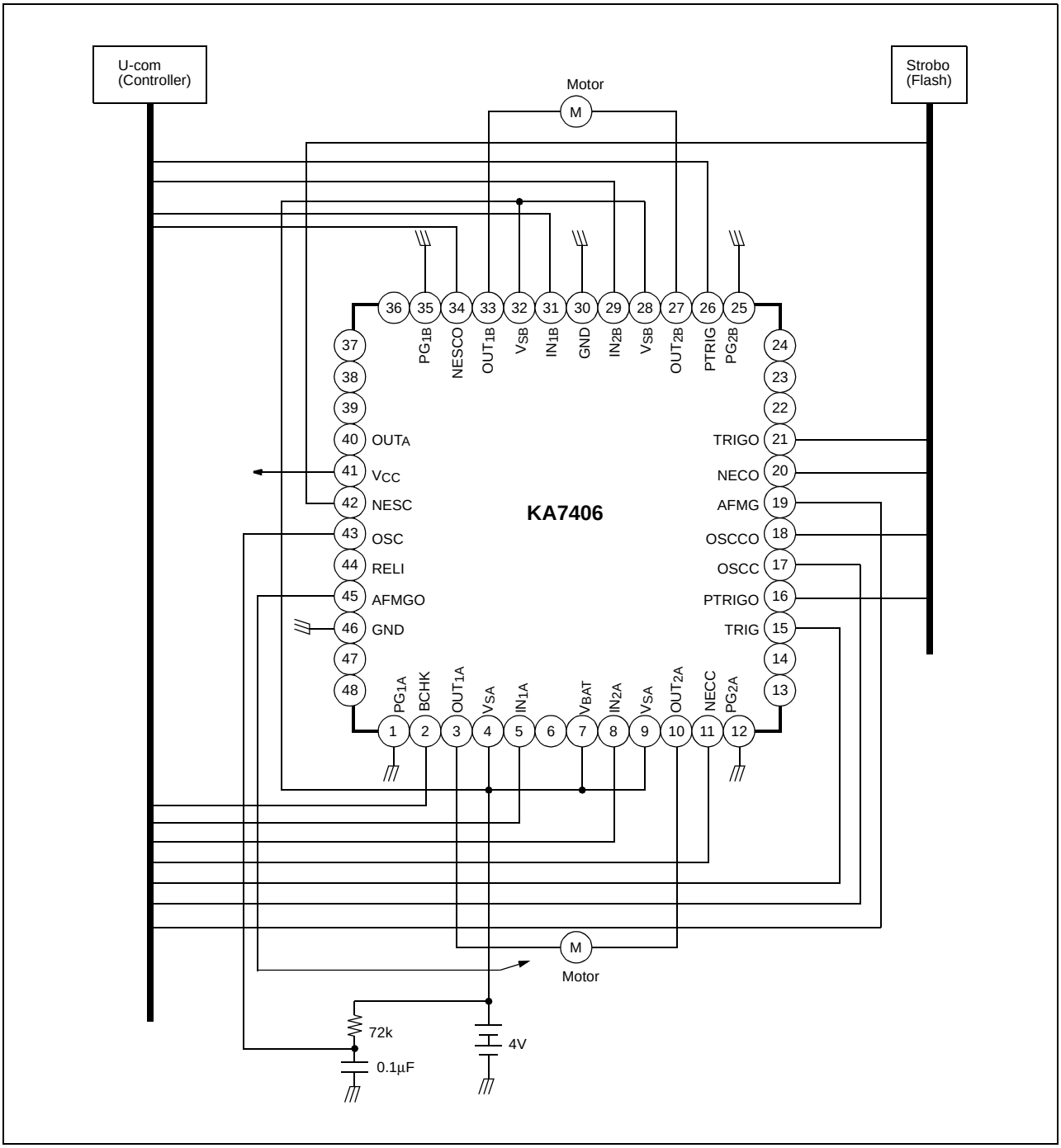
Test Circuits



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}	Off	Off	Off	a	a	Off	Off	X	X	Off	Input current
I_{LK}	Off	Off	X	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
Characteristics	**SW1**	**SW2**	**SW11**	**SW12**	**-**	**-**	**-**	**-**	**-**	**-**	**Remark**
I_{OUT}	On	On	a	On	-	-	-	-	-	-	-
T_{CHK}	On	On	b	Off	-	-	-	-	-	-	-
V_{CHK}	On	On	X	X	-	-	-	-	-	-	-
V_{TH}	On	On	X	X	-	-	-	-	-	-	-
I_{REL1}	On	On	X	X	-	-	-	-	-	-	-
V_{VCC}	On	On	X	X	-	-	-	-	-	-	-
I_{AFMGO}	On	On	X	X	-	-	-	-	-	-	-
V_{AFMGO}	On	On	X	X	-	-	-	-	-	-	-
I_{PTRG}	On	On	X	X	-	-	-	-	-	-	-
V_{PTRGO}	On	On	X	X	-	-	-	-	-	-	-
I_{TRIG}	On	On	X	X	-	-	-	-	-	-	-
V_{TRIGO}	On	On	X	X	-	-	-	-	-	-	-
I_{NECC}	On	On	X	X	-	-	-	-	-	-	-
I_{NECO}	On	On	X	X	-	-	-	-	-	-	-
I_{OSCC}	On	On	X	X	-	-	-	-	-	-	-
V_{OSCCO}	On	On	X	X	-	-	-	-	-	-	-

Application Circuits



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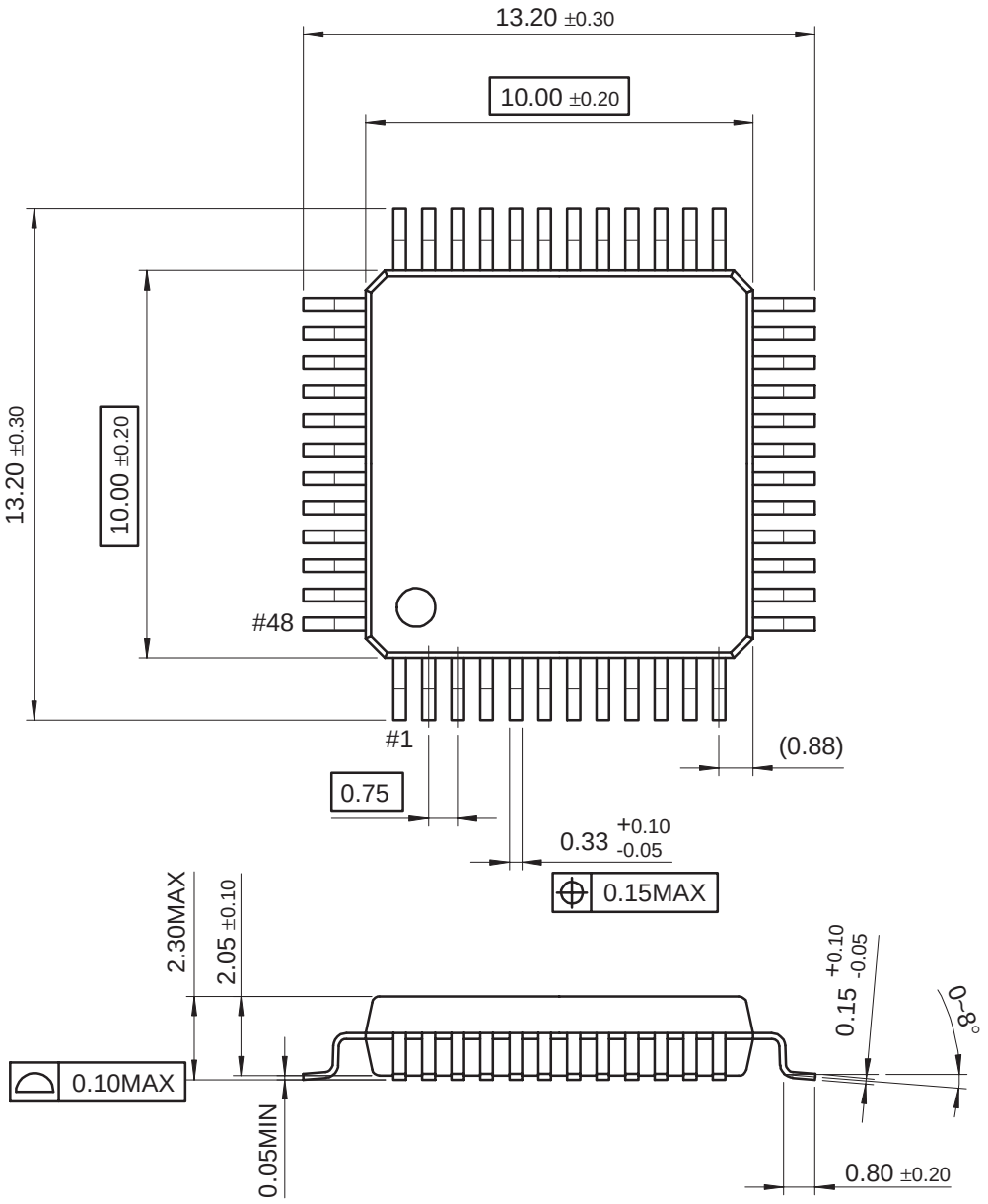
13.20 ±0.30
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13.20 ±0.30
10.00 ±0.20
#48
#1
(0.88)
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0.33 +0.10 -0.05
0.15MAX
2.30MAX
2.05 ±0.10
0.15 +0.10 -0.05
0~8°
0.10MAX
0.05MIN
0.80 ±0.20

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