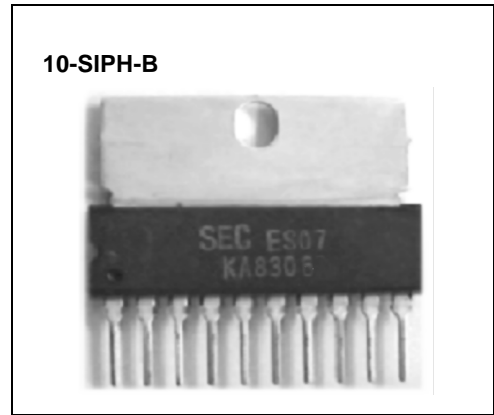


### BI-DIRECTIONAL DC MOTOR DRIVER

The KA8306 is a monolithic integrated circuit designed for driving bi-directional DC motor with a dual bridge driver, and it is suitable for the cassette and loading motor driver of VCR systems.

### FEATURES

- 4 modes available (CW/CCW/STOP/BRAKE)
- Output current up to 1.0A (AVE.) and 1.5A (PEAK)
- Wide range of operating voltage
  - $V_{CC} = 4.5 \sim 18V$
  - $V_S = 0 \sim 18V$
  - $V_{REF} = 0 \sim 18V$
- Build in thermal shutdown, over current protector and punch through current restriction circuit.



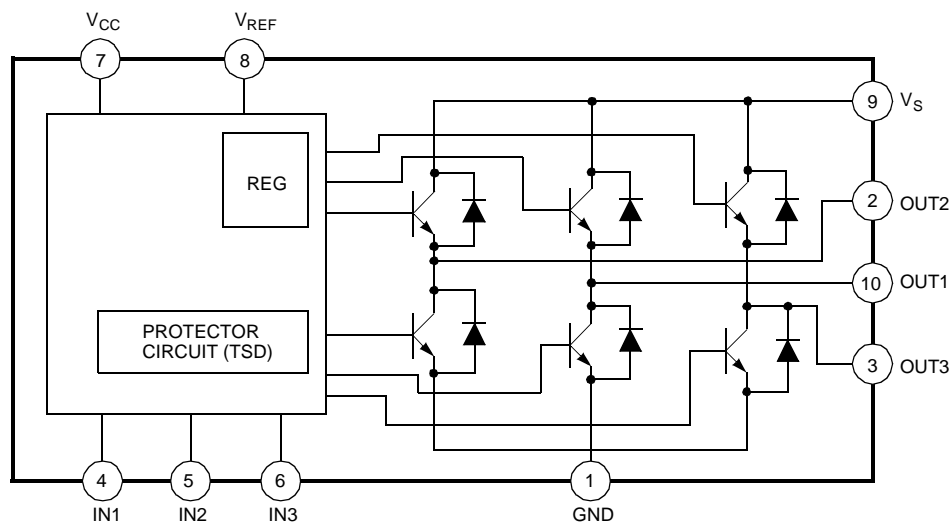
### ORDERING INFORMATION

Device	Package	Operating Temperature
KA8306	10-SIPH-B	-25°C ~ +75°C

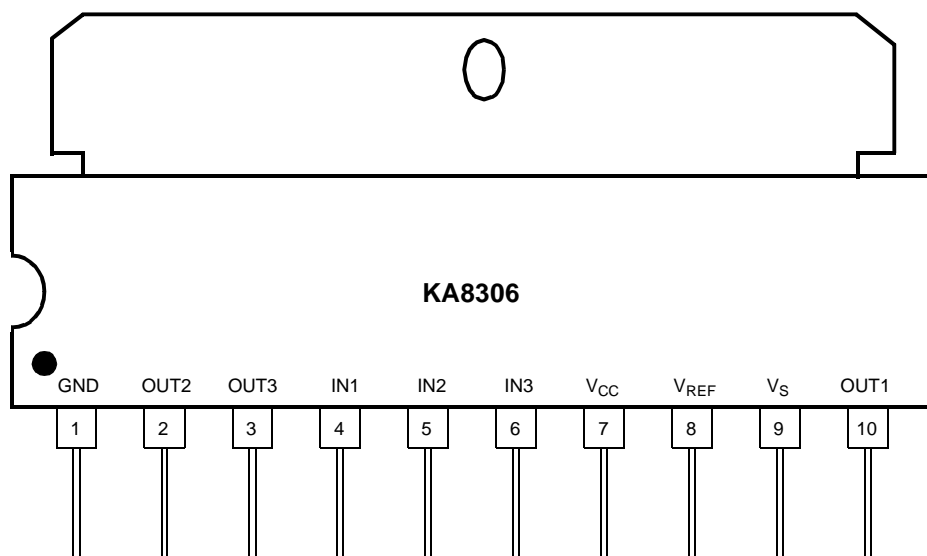
### TARGET APPLICATION

- VCR
- Low current DC motor such audio equipment

### BLOCK DIAGRAM



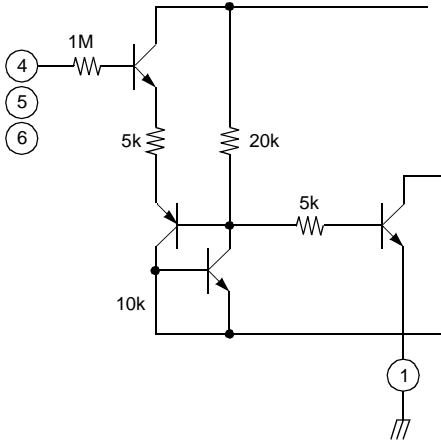
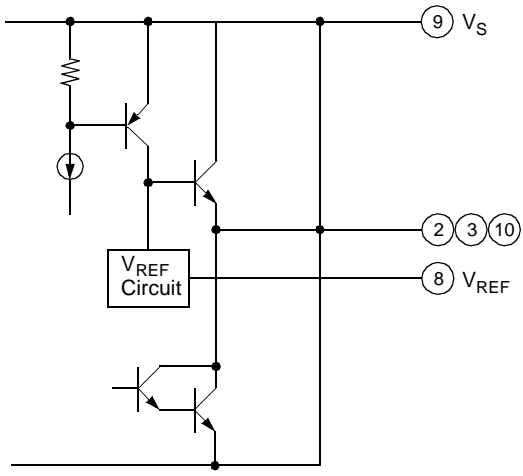
## PIN CONFIGURATIONS



## PIN DESCRIPTION

Pin No.	Symbol	I/O	Description	Pin No.	Symbol	I/O	Description
1	GND	–	Ground	6	IN3	I	Input 3
2	OUT2	O	Output 2	7	V <sub>CC</sub>	–	Supply voltage (Signal)
3	OUT3	O	Output 3	8	V <sub>REF</sub>	I	Motor speed control
4	IN1	I	Input 1	9	V <sub>S</sub>	I	Supply voltage (Power)
5	IN2	I	Input 2	10	OUT1	O	Output 1

INTERNAL CIRCUIT

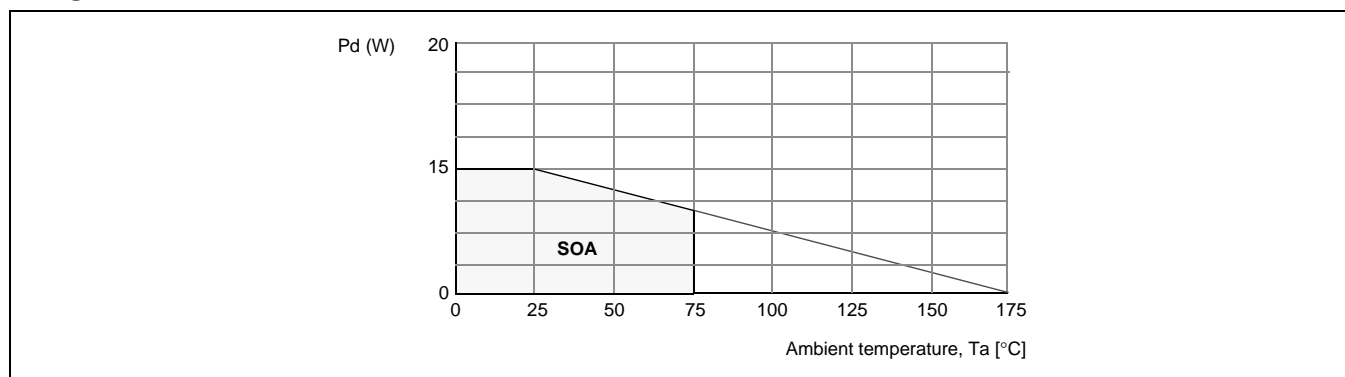
Description	Pin No.	Internal circuit
Input	4, 5, 6	 <p data-bbox="673 840 1421 892">Input terminals of pins 4, 5 and 6 are all high active type and have a hysteresis of 0.7V type 5μA type of source mode input current is required.</p>
Output	2, 3, 10	 <p data-bbox="771 1491 1323 1606">Output voltage is controlled by <math>V_{REF}</math> voltage relationship between <math>V_{OUT}</math> and <math>V_{REF}</math> is <math>V_{OUT} = V_{BE}(=0.7) + V_{REF}</math>  <math>V_{REF}</math> terminal required to connect to <math>V_S</math> terminal for stable operation in case of no requirement of <math>V_{OUT}</math> control.</p>

**ABSOLUTE MAXIMUM RATING (Ta=25°C)**

Characteristics	Symbol	Value	Unit
Supply voltage	$V_{CCmax}$	25	V
Motor drive voltage	$V_{Smax}$	25	V
Reference voltage	$V_{REFmax}$	25	V
Maximum output current	$I_{Omax(PEAK)}$	1.5 <sup>note1</sup>	A
	$I_{Omax(AVE)}$	1.0	A
Power dissipation	$P_d$	15 <sup>note2</sup>	W
Operating temperature	$T_{OPR}$	-25 ~ +75	°C
Storage temperature	$T_{STG}$	-55 ~ +150	°C

**NOTES:**

- Duty 1/100, pulse width 500 $\mu$ s
- When mounted on glass epoxy PCB (76.2 × 114 × 1.57mm)
  - Power dissipation reduces 103.4mW / °C for using above Ta=25°C
  - Do not exceed Pd and SOA.

**PD GRAPH****RECOMMENED OPERATING CONDITIONS (Ta=25°C)**

Characteristics	Symbol	Value	Unit
Operating supply voltage	$V_{CC}$	4.5 ~ 18	V

## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,  $T_a=25^\circ\text{C}$ ,  $V_{CC}=8\text{V}$ ,  $R_L=8\Omega$ ,  $f=1\text{kHz}$ )

Characteristics		Symbol	Test circuit	Test conditions	Spec.			Unit
					Min.	Typ.	max.	
Supply current		$I_{CC1}$	1	Output off CW/CCW mode	–	17	30	mA
		$I_{CC2}$	1	Output off, stop mode	–	13	25	mA
Input operating voltage	H	$V_{IN-H}$	2	$T_J=25^\circ\text{C}$	3.5	–	5.5	V
	L	$V_{IN-L}$	2	$T_J=25^\circ\text{C}$	0	–	0.8	V
Input current		$I_{IN}$	2	$V_{IN}=3.5\text{V}$ , Sink mode	–	5	20	$\mu\text{A}$
Input hysteresis voltage		$V_{HYS}$	2	–	–	0.7	–	V
Saturation voltage	Upper	$V_{SAT-1U}$	3	$V_{REF}=V_S$ , $I_O=0.2\text{A}$	–	1.2	1.5	V
	Lower	$V_{SAT-1L}$	3	$V_{REF}=V_S$ , $I_O=0.2\text{A}$	–	1.1	1.4	V
	Upper	$V_{SAT-2U}$	3	$V_{REF}=V_S$ , $I_O=1.0\text{A}$	–	2.7	3.1	V
	Lower	$V_{SAT-2L}$	3	$V_{REF}=V_S$ , $I_O=1.0\text{A}$	–	2.5	3.0	V
Output voltage		$V_{O-1}$	3	$V_{REF}=10\text{V}$ , $I_O=0.5\text{A}$ Output measure	10.3	10.7	11.5	V
		$V_{O-2}$	3	$V_{REF}=10\text{V}$ , $I_O=0.5\text{A}$ Output measure	10.1	10.5	11.3	V
Leakage current	Upper	$I_{L-U}$	–	$V_S=25\text{V}$	–	0	50	$\mu\text{A}$
	Lower	$I_{L-L}$	–	$V_S=25\text{V}$	–	0	50	$\mu\text{A}$
Diode forward voltage	Upper	$V_{F-U}$	4	$I_F=1.0\text{A}$	–	2.2	–	V
	Lower	$V_{F-L}$	4	$I_F=1.0\text{A}$	–	1.4	–	V
Reference current		$I_{REF}$	2	$V_{REF}=10\text{V}$ , Source mode	–	20	30	$\mu\text{A}$

## APPLICATION INFORMATIONS

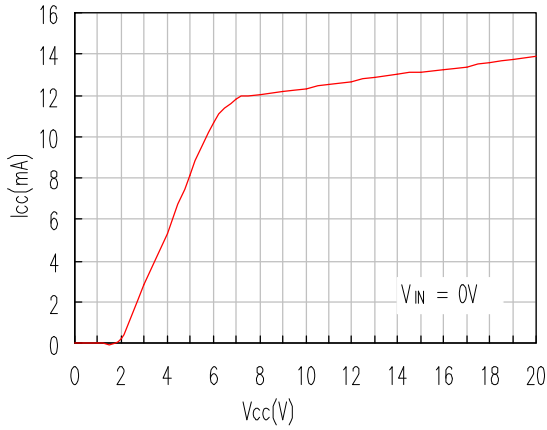
## LOGIC INPUT &amp; OUTPUT TABLE

Input <sup>note1</sup>			Output			Motor	
IN <sub>1</sub>	IN <sub>2</sub>	IN <sub>3</sub>	OUT <sub>1</sub>	OUT <sub>2</sub>	OUT <sub>3</sub>	M <sub>1</sub>	M <sub>2</sub>
0	0	1/0	L	L	L	Brake	Brake
1	0	0	H	L	note2	Pin10→2	Stop
1	0	1	L	H	note2	Pin10→10	Stop
0	1	0	H	note2	L	Stop	Pin10→3
0	1	1	L	note2	H	Stop	Pin3→10
1	1	1/0	L	L	L	Brake	Brake

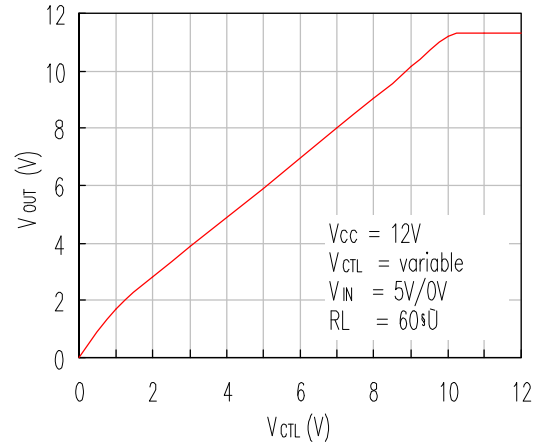
**NOTES:**

1. Inputs are all high active type
2. High impedance

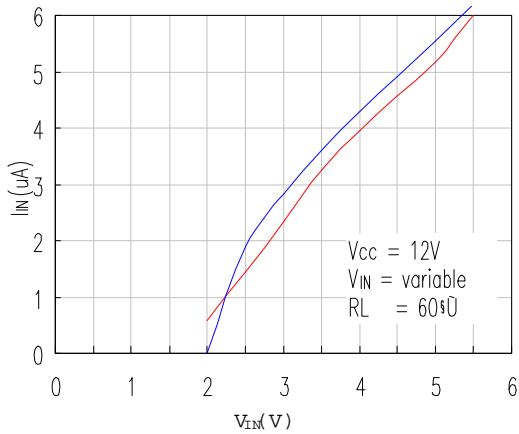
CHARACTERISTIC GRAPHS



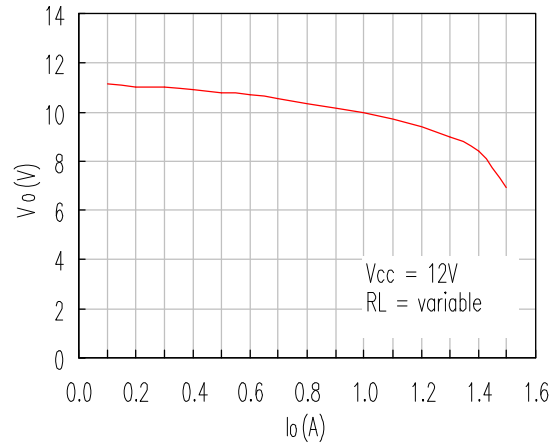
1.  $V_{CC}$  vs  $I_{CC}$



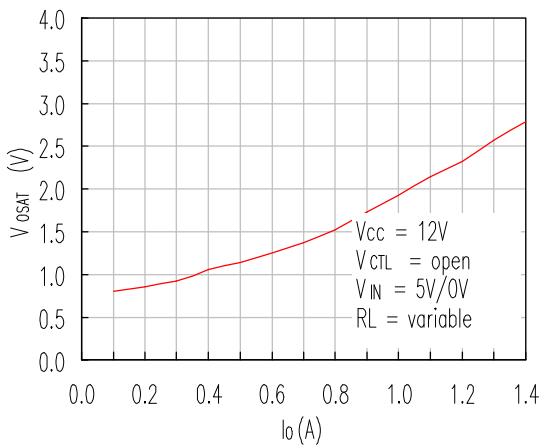
2.  $V_{CTL}$  vs  $V_O$



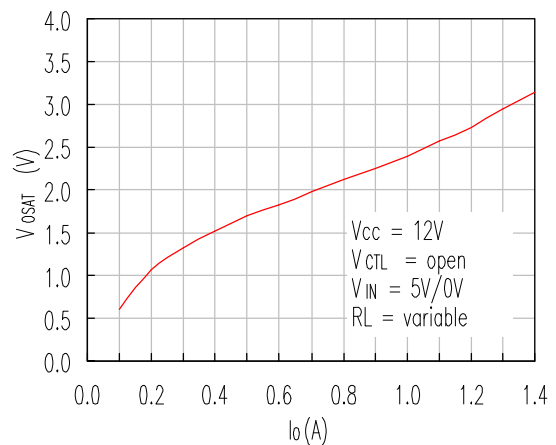
3.  $V_{IN}$  vs  $I_{IN}$



4.  $I_O$  vs  $V_O$

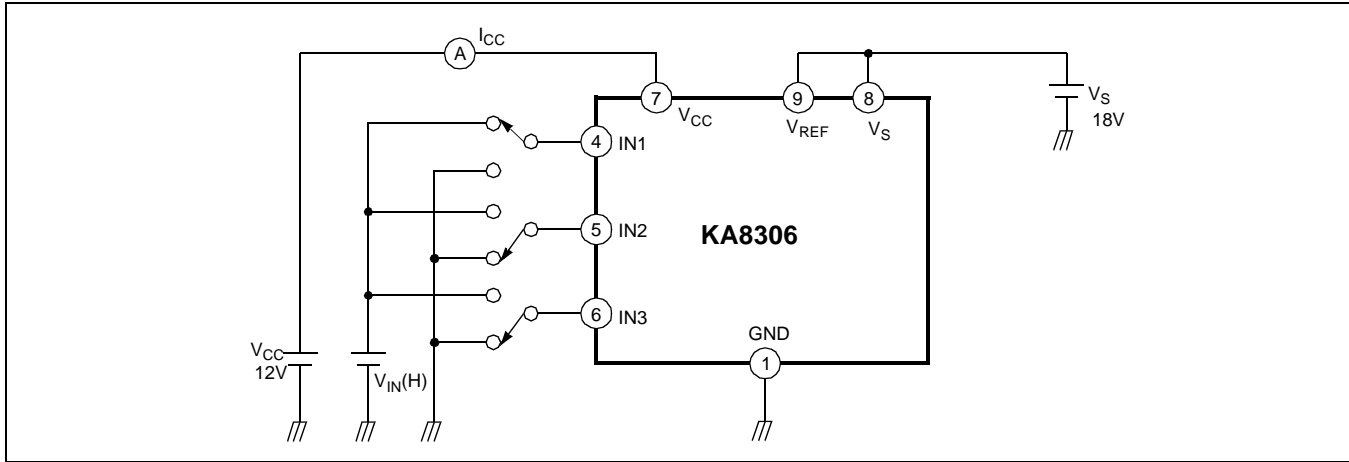


5.  $I_O$  vs  $V_{SAT}$  (Upper)

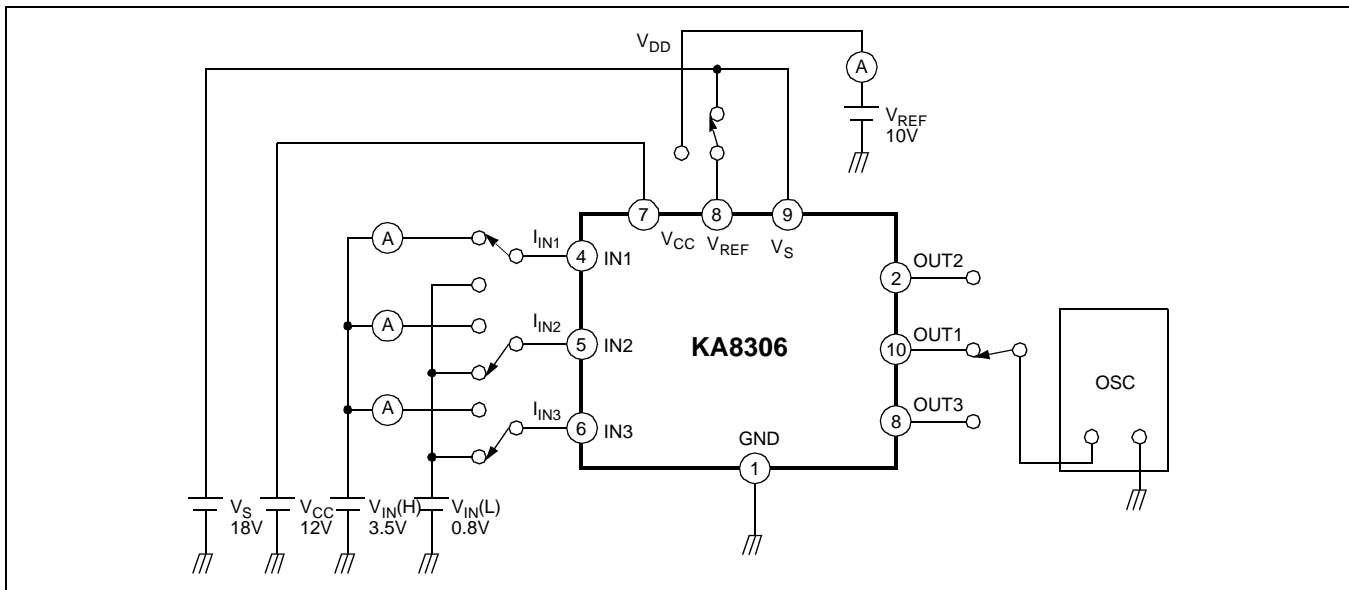


6.  $I_O$  vs  $V_{SAT}$  (Lower)

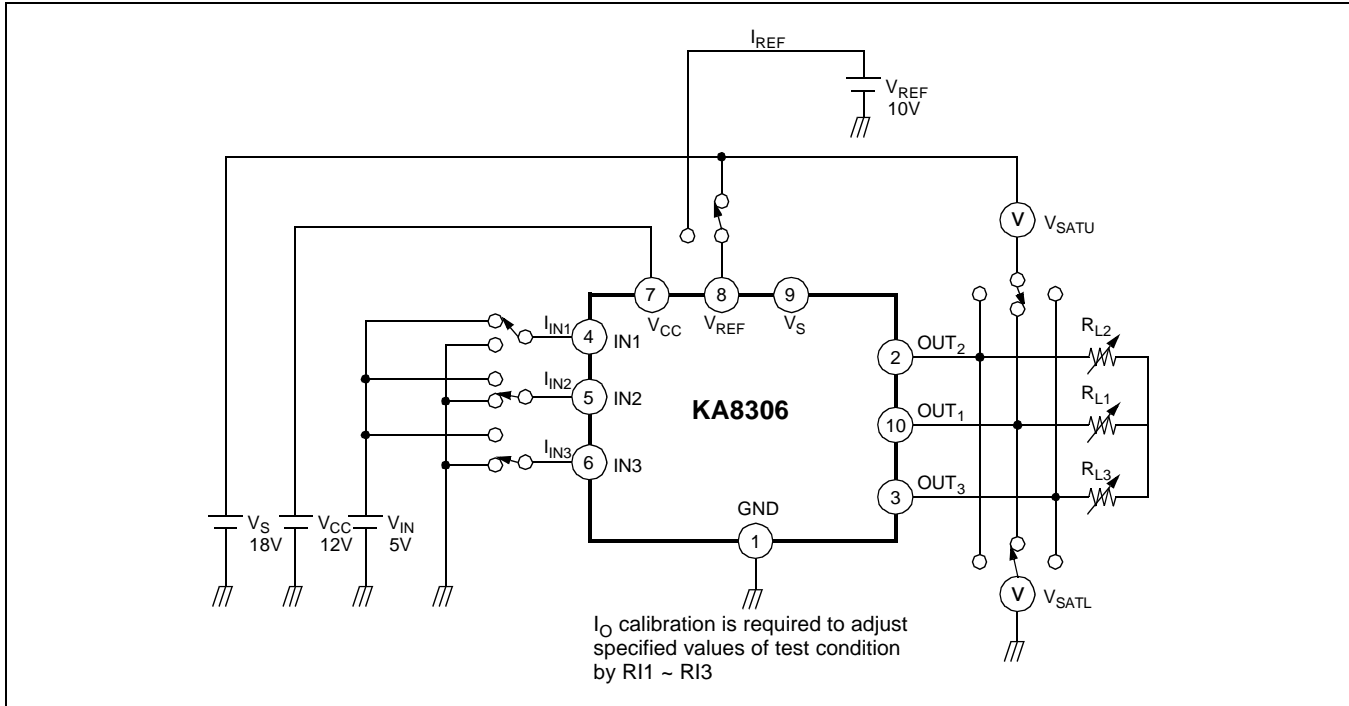
TEST CIRCUIT 1



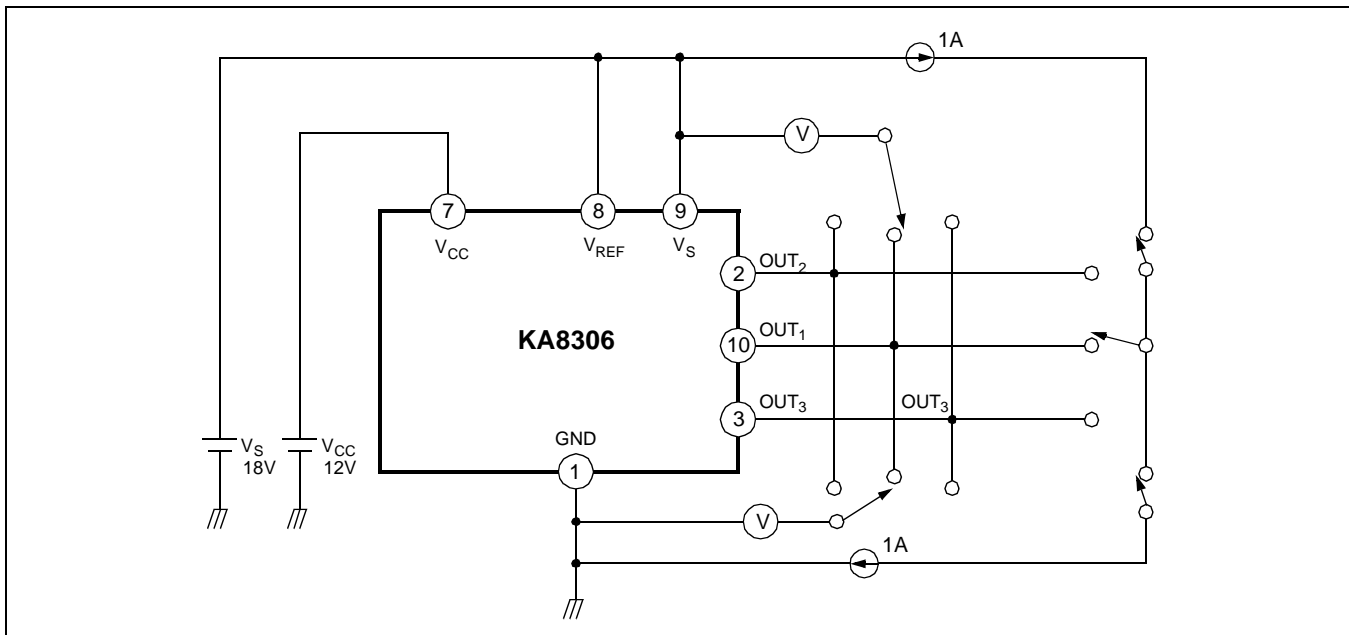
TEST CIRCUIT 2



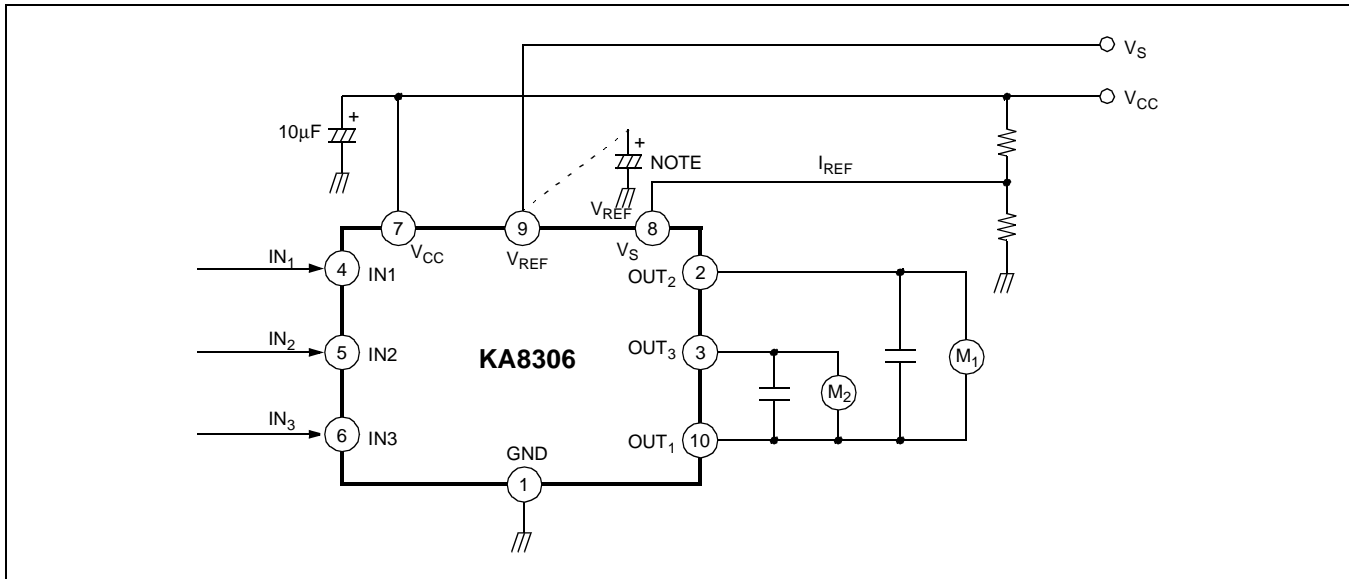
TEST CIRCUIT 3



TEST CIRCUIT 4



## APPLICATION CIRCUIT



**NOTE:** Connect if required

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FACT™	QS™
FACT Quiet Series™	Quiet Series™
FAST®	SuperSOT™-3
FASTr™	SuperSOT™-6
GTO™	SuperSOT™-8
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