

Bi-Directional DC Motor Driver

KIA8409S and KIA8409F are bridge driver with output voltage control.

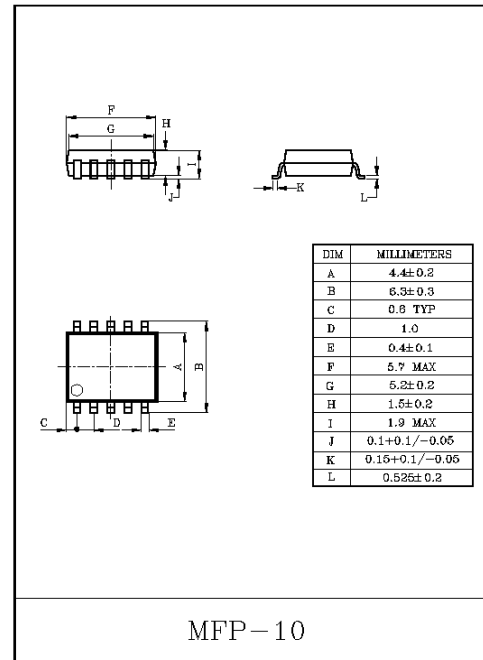
FEATURES

- Modes Available (CW/CCW/STOP/BRAKE)
- Output Current Up to 4.0A(AVE.) and 1.0A(PEAK)
- Wide Range of Operating Voltage : $V_{CC(opr)}=4.5\sim 20V$
 $V_{S(opr)}=0\sim 20V$
 $V_{ref(opr)}=0\sim 20V$
- Build in Thermal Shutdown.
- Standby mode available (STOP MODE).
- Hysteresis for all inputs.

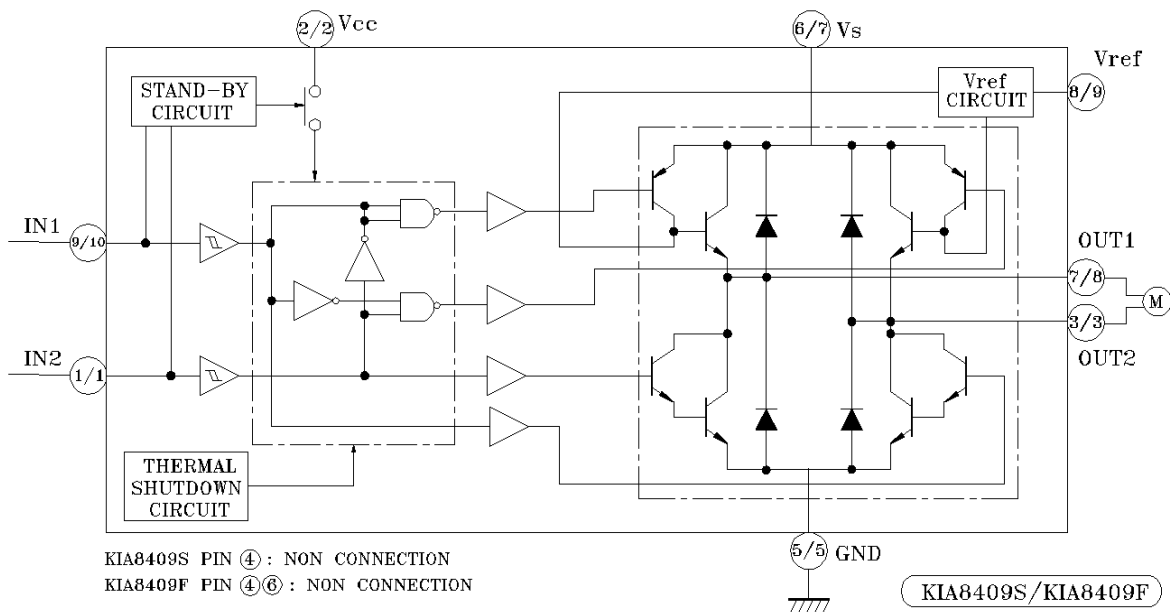
MAXIMUM RATINGS ($T_a=25^{\circ}C$)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	25	V
Motor Drive Voltage		V_S	25	V
Reference Voltage		V_{ref}	25	V
Output Current	PEAK	$I_{O(PEAK)}$	1.0	A
	AVE.	$I_{O(AVE.)}$	0.4	
Power Dissipation	KIA8409F	P_D	0.735 (Note)	W
	KIA8409S		0.95	
Operating Temperature		T_{opr}	$-30\sim 75$	$^{\circ}C$
Storage Temperature		T_{stg}	$-55\sim 150$	$^{\circ}C$

Note) This rating is obtained by mounting on $50\times 50\times 1.6mm$ PCB that occupied above 30% of copper area.



BLOCK DIAGRAM



KIA8409S/F

PIN FUNCTION (KIA8409S)

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	IN2	Input terminal
2	V _{CC}	Supply voltage terminal for Logic
3	OUT2	Output terminal
4	NC	Non connection
5	GND	GND terminal
6	V _S	Supply voltage terminal for Motor drive
7	OUT1	Output terminal
8	V _{ref}	Reference voltage terminal for control circuit
9	IN1	Input terminal

(KIA8409F)

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1	IN2	Input terminal
2	V _{CC}	Supply voltage terminal for Logic
3	OUT2	Output terminal
4	NC	Non connection
5	GND	GND terminal
6	NC	Non connection
7	V _S	Supply voltage terminal for motor driver
8	OUT1	Output terminal
9	V _{ref}	Reference voltage terminal for control circuit
10	IN1	Input terminal

FUNCTION

INPUT		OUTPUT		MODE
IN1	IN2	OUT1	OUT2	MOTOR
0	0	∞	∞	STOP
1	0	H	L	CW/CCW
0	1	L	H	CCW/CW
1	1	L	L	BRAKE

∞ : High Impedance

(Note) Inputs are all high active type.

KIA8409S/F

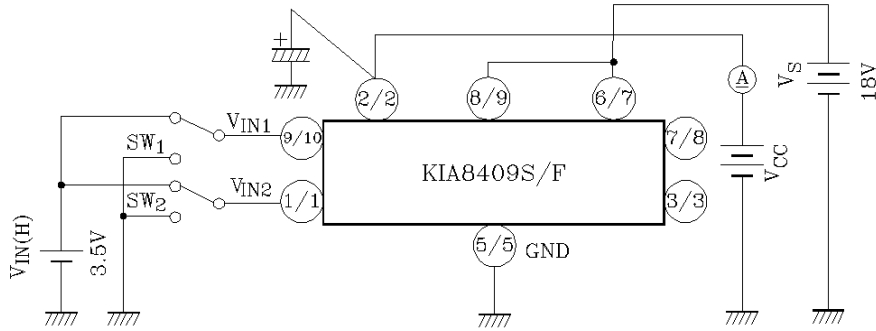
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_{CC}=12V$, $V_S=18V$, $T_a=25^\circ C$)

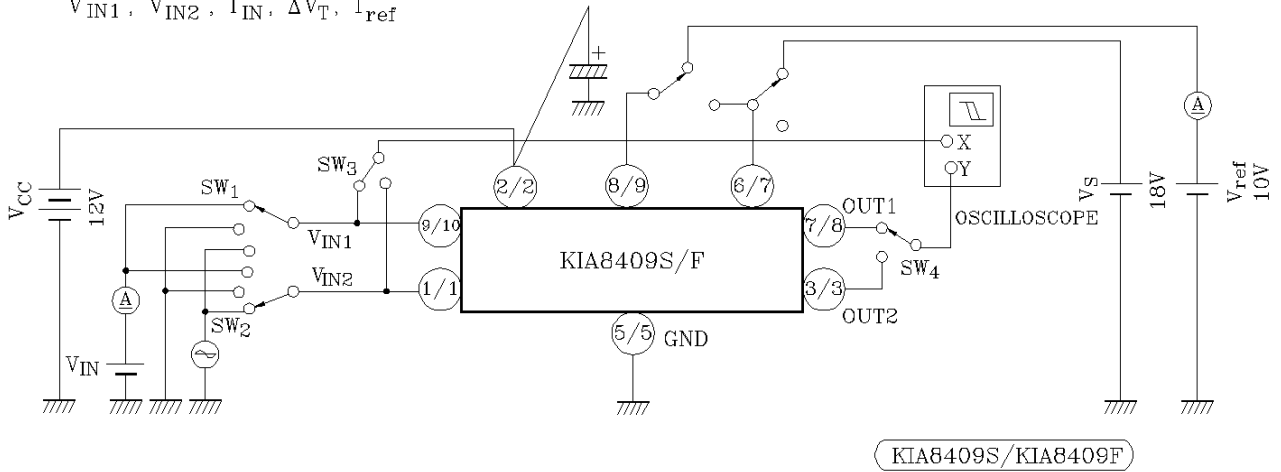
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current		I_{CC1}	1	Output OFF CW/CCW mode	-	10.0	15.0	mA
		I_{CC2}	1	Output OFF STOP mode	-	0	50	μA
		I_{CC3}	1	Output OFF BREAK mode	-	6.5	10.0	mA
Input Operating Voltage	1 (High)	V_{IN1}	2	$T_j=25^\circ C$ IN1,2	3.5	-	5.5	V
	2 (Low)	V_{IN2}	2	$T_j=25^\circ C$ IN1,2	GND	-	0.8	
Input Current		I_{IN}	2	$V_{IN}=3.5V$, Sink mode	-	3	10	μA
Input Hysteresis Voltage		ΔV_T	2	-	-	0.7	-	V
Saturation Voltage	Upper Side	$V_{SAT\ U-1}$	3	$V_{ref}=V_S$, V_S-V_{out} , $I_O=0.2A$	-	0.9	1.2	V
	Lower Side	$V_{SAT\ L-1}$	3	$V_{ref}=V_S$, $V_{out}-GND$, $I_O=0.2A$	-	0.8	1.2	
	Upper Side	$V_{SAT\ U-2}$	3	$V_{ref}=V_S$, V_S-V_{out} , $I_O=0.4A$	-	1.0	1.35	
	Lower Side	$V_{SAT\ L-2}$	3	$V_{ref}=V_S$, $V_{out}-GND$, $I_O=0.4A$	-	0.9	1.35	
Output Voltage		$V_{SAT\ U-1}$	3	$V_{ref}=10V$, $V_{out}-GND$, $I_O=0.2A$	10.4	11.2	12.2	V
		$V_{SAT\ U-2}$	3	$V_{ref}=10V$, $V_{out}-GND$, $I_O=0.4A$	-	10.9	-	
Output Transistor Leakage Current	Upper Side	I_{LU}	4	$V_L=25V$	-	-	50	μA
	Lower Side	I_{LL}	4	$V_L=25V$	-	-	50	
Diode Forward Voltage	Upper Side	I_{FU}	5	$I_F=0.4A$	-	1.5	-	V
	Lower Side	I_{FL}	5	$I_F=0.4A$	-	0.9	-	
Reference Current		I_{ref}	2	$V_{ref}=10V$, Source mode	-	20	40	μA

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TEST CIRCUIT 1
 I_{CC1} , I_{CC2} , I_{CC3}



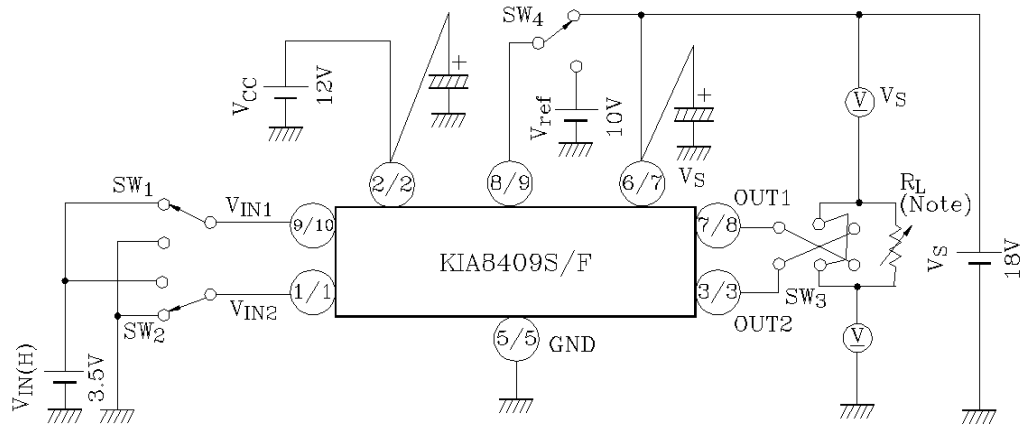
TEST CIRCUIT 2
 V_{IN1} , V_{IN2} , I_{IN} , ΔV_T , I_{ref}



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TEST CIRCUIT 3

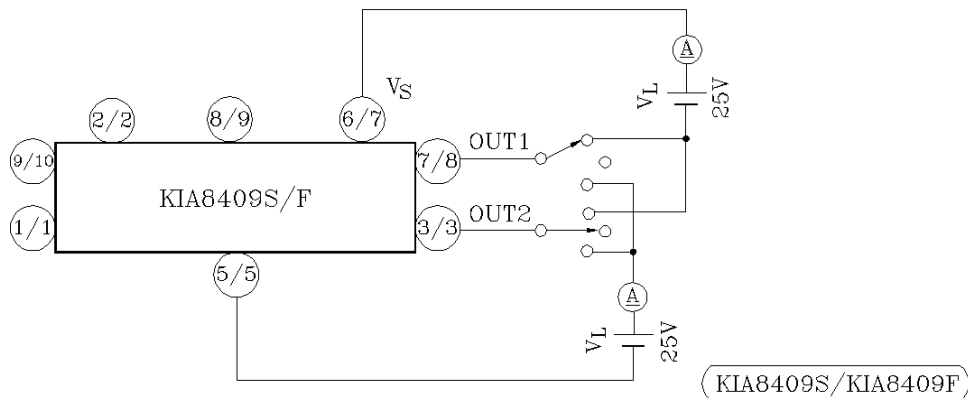
$V_{SAT\ U-1}$, $V_{SAT\ L-1, 2}$, $V_{SAT\ U-1', 2'$



(Note) Calibrate I_{OUT} to 0.2/0.4a by R_L

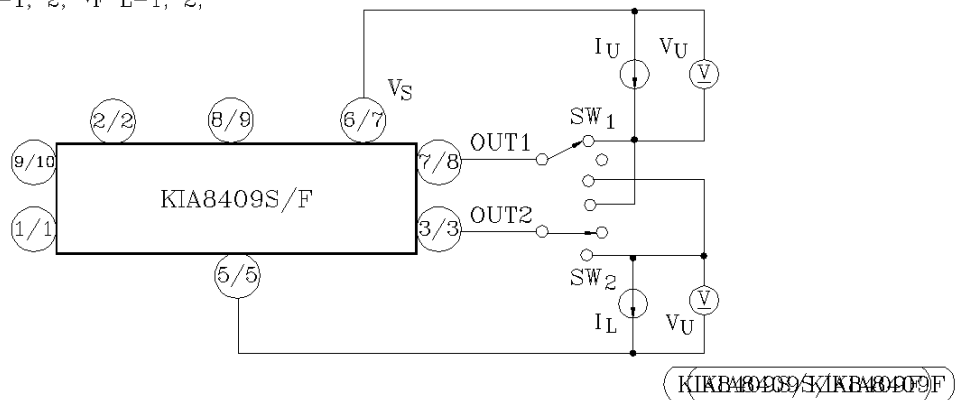
TEST CIRCUIT 4

$I_L\ U, L$



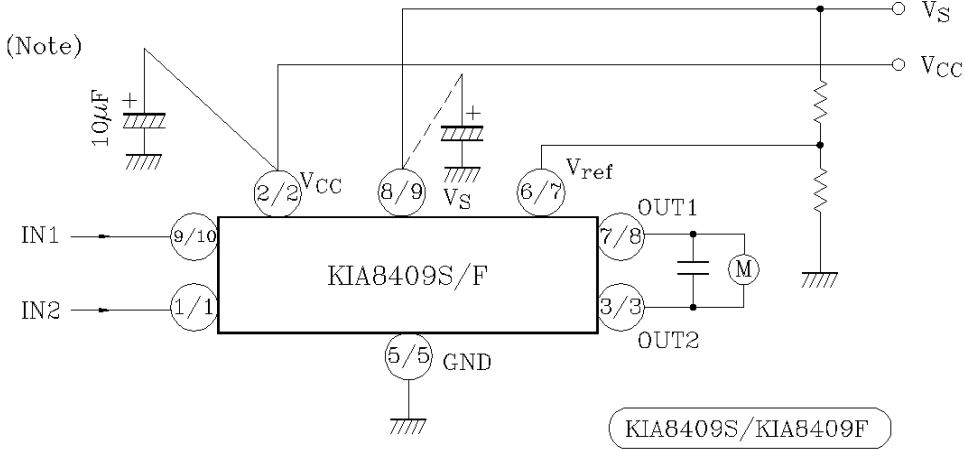
TEST CIRCUIT 5

$V_F\ U-1, 2$, $V_F\ L-1, 2$,



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APPLICATION CIRCUIT



- Note 1) Connect if required.
- Note 2) Utmost care is necessary in the design of the output line, V_S and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

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