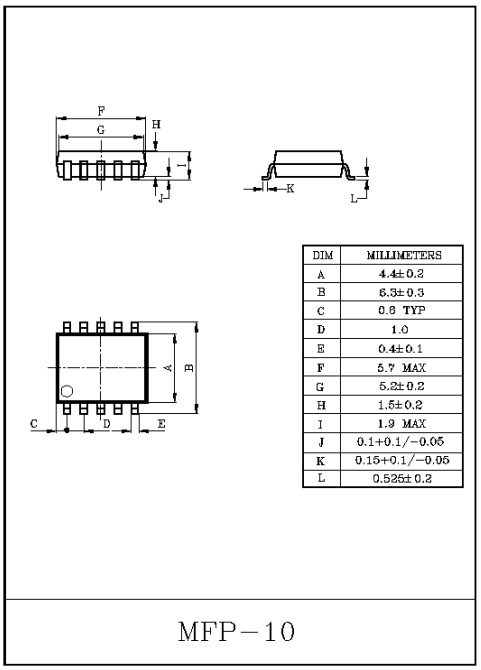
Bi-Directional DC Motor Driver

KIA8409S and KIA8409F are bridge driver with output voltage control.



DIM	MILLIMETERS
A	4.4±0.2
B	6.3±0.3
C	0.8 TYP
D	1.0
E	0.4±0.1
F	5.7 MAX
G	5.2±0.2
H	1.5±0.2
I	1.9 MAX
J	0.1+0.1/−0.05
K	0.15+0.1/−0.05
L	0.525±0.2

MFP−10

FEATURES

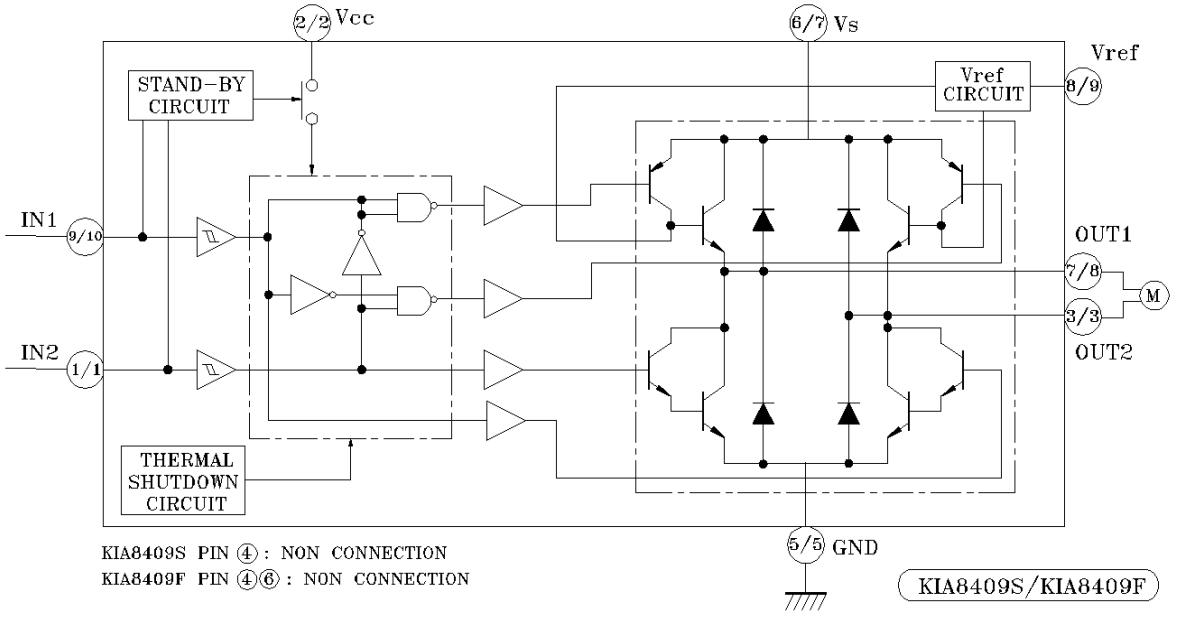
- Modes Available (CW/CCW/STOP/BRAKE)
- Output Current Up to 4.0A(AVE.) and 1.0A(PEAK)
- Wide Range of Operating Voltage : $V_{CC(opr)}$=4.5～20V
  : $V_{S(opr)}$=0～20V
  : $V_{ref(opr)}$=0～20V
- Build in Thermal Shutdown.
- Standby mode available (STOP MODE).
- Hysteresis for all inputs.

MAXIMUM RATINGS (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	25	V
Moter 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}	-30～75	℃
Storage Temperature		T_{stg}	-55～150	℃

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

BLOCK DIAGRAM



KIA8409S PIN ④ : NON CONNECTION
KIA8409F PIN ④⑥ : NON CONNECTION

KIA8409S/KIA8409F

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

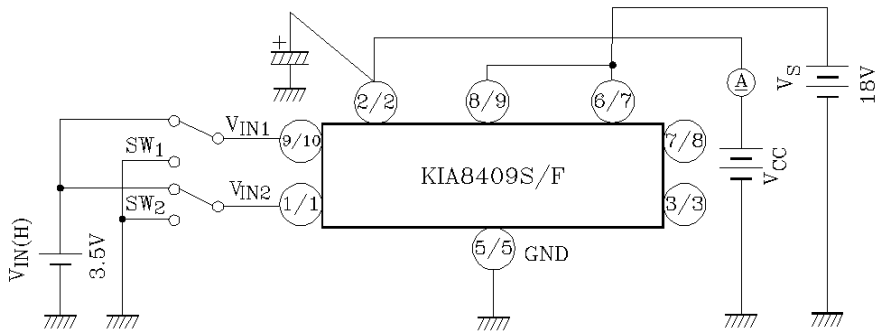
∞ : High Impedance

(Note) Inputs are all high active type.

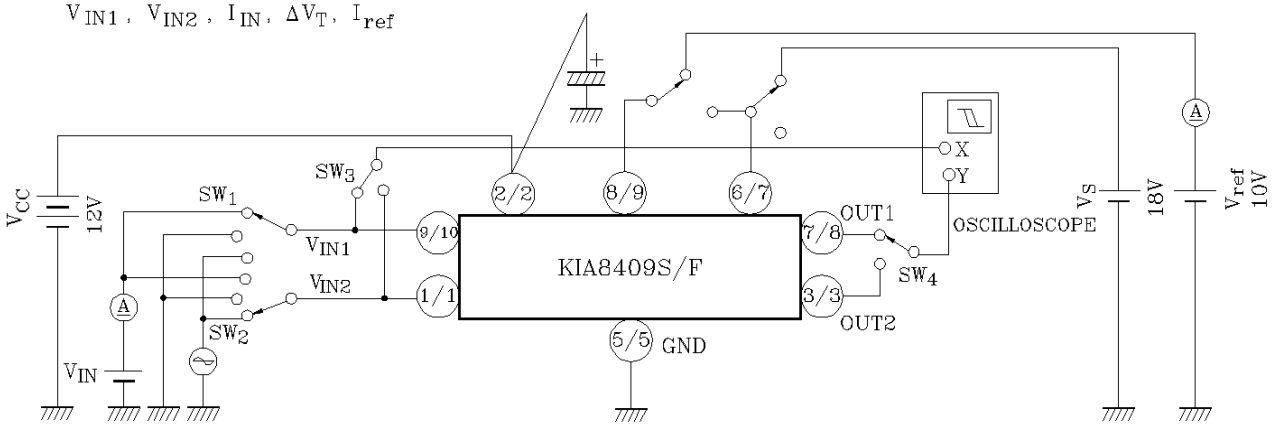
ELECTRICAL CHARACTERISTICS
(Unless otherwise specified, V_{CC}=12V, V_S=18V, Ta=25℃)

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℃ IN1,2	3.5	-	5.5	V
	2 (Low)	V_{IN2}	2	T_j=25℃ 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

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



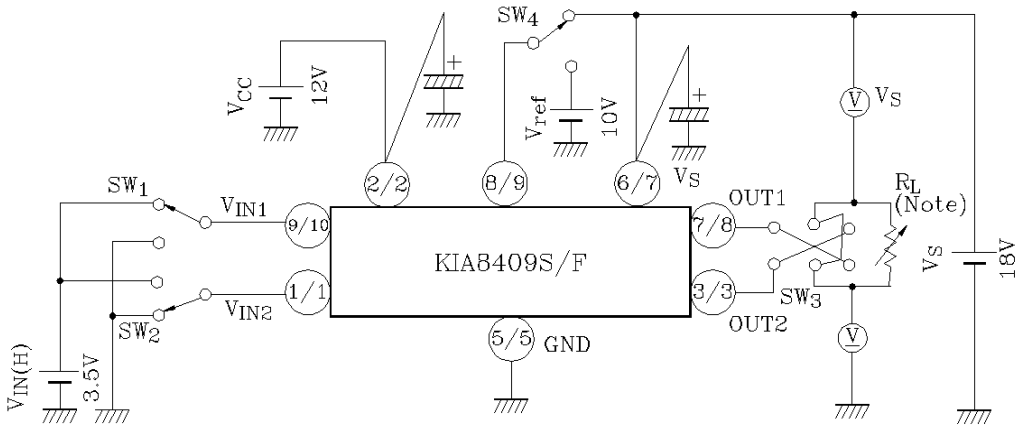
TEST CIRCUIT 2
V_{IN1}, V_{IN2}, I_{IN}, ΔV_T, I_{ref}



KIA8409S/KIA8409F

TEST CIRCUIT 3

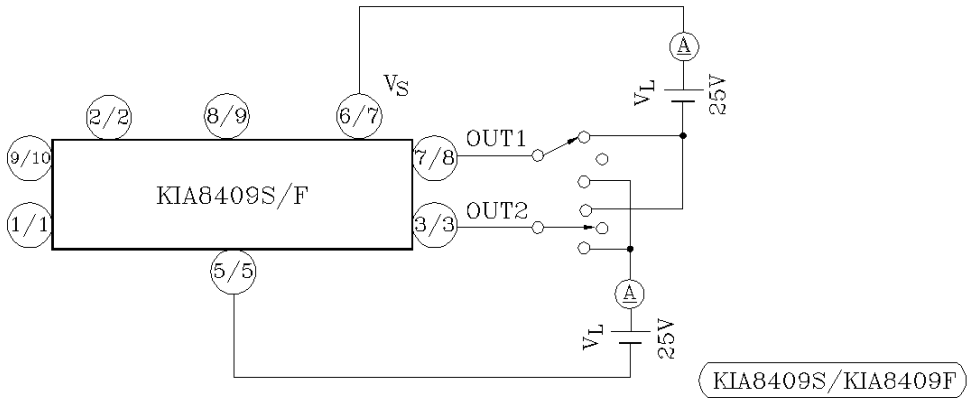
$V_{SAT\ U-1}$, $V_{SAT\ L-1,\ 2}$, $V_{SAT\ U-1',\ 2'}$



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

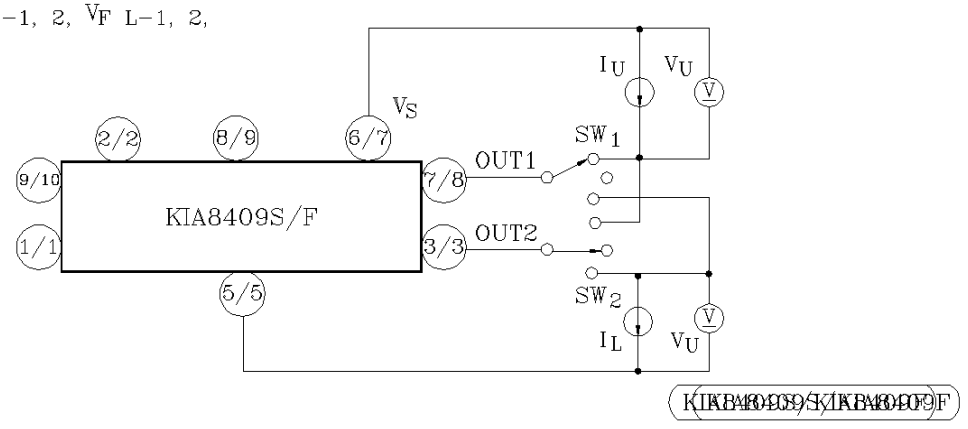
TEST CIRCUIT 4

$I_{L\ U,\ L}$

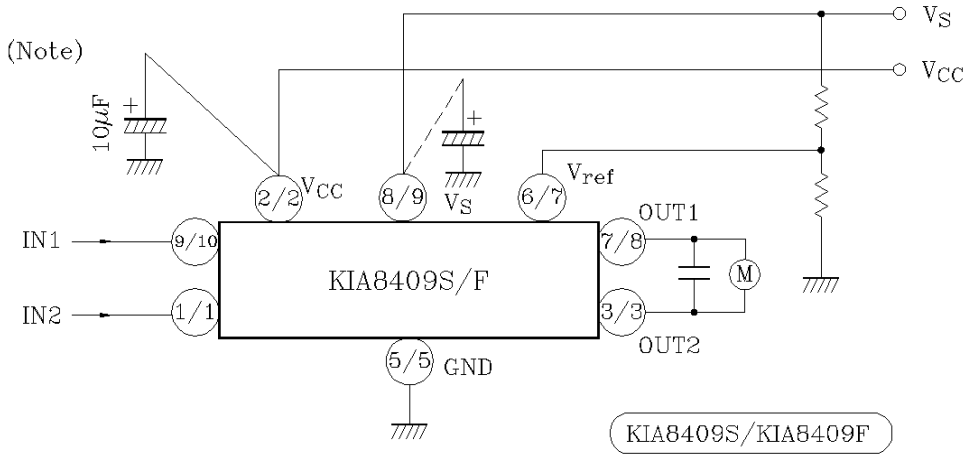


TEST CIRCUIT 5

$V_{F\ U-1,\ 2}$, $V_{F\ L-1,\ 2}$,



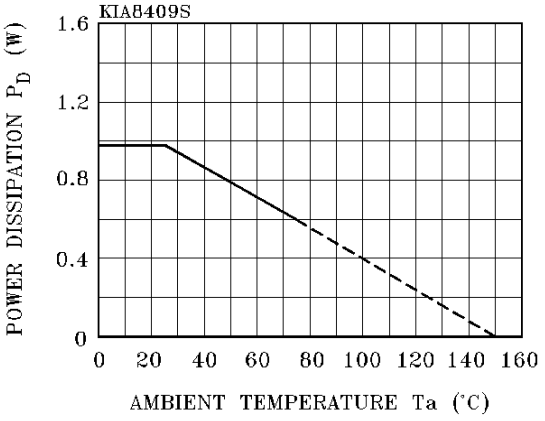
APPLICATION CIRCUIT



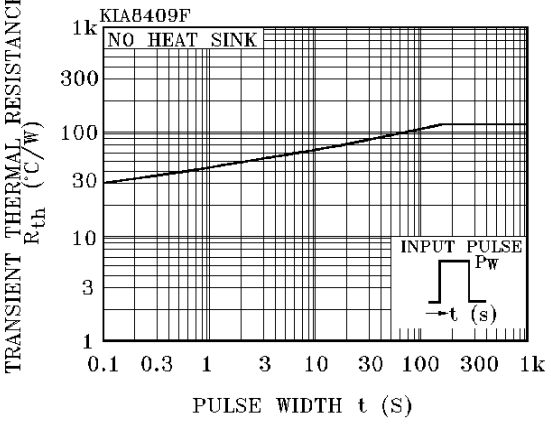
Note 1) Connect if required.

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.

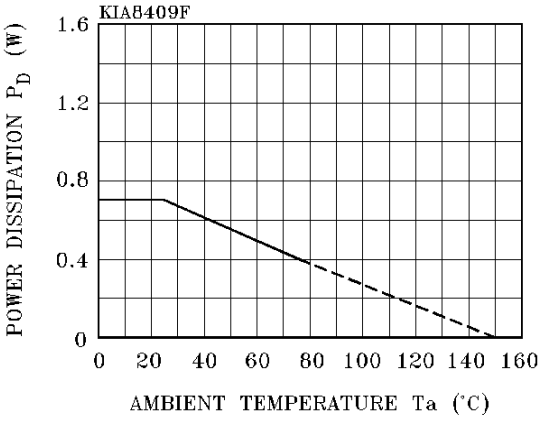
P_D – Ta



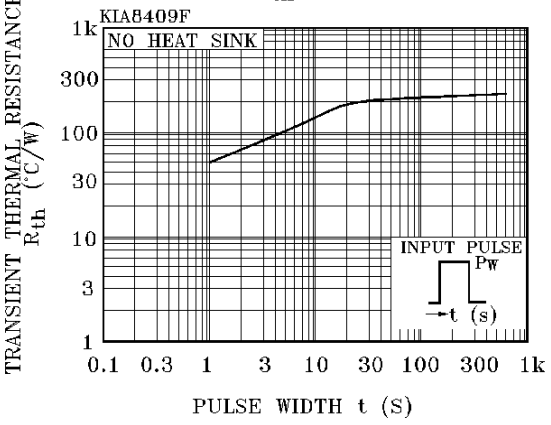
R_{th} – t



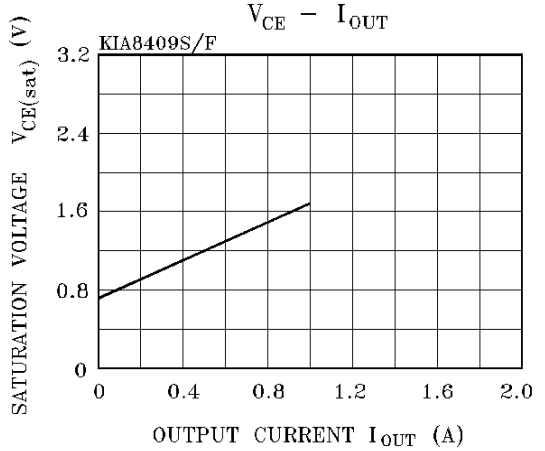
P_D – Ta



R_{th} – t



V_{CE} – I_{OUT}



V_{CE} – I_{OUT}