Fan Motor Driver
Monolithic IC MM1784XF

Outline

This IC is a motor driver IC for 5~12V fan.
The single-phase full-wave drive switching noise is small, efficient motor drive is possible.
This IC has a built-in Lock protection, FG output,TSD is suitablel driver for fan motor.

Features

1. Supply voltage range	2.8~14V
2. Output current	0.8A
3. Operating temperature range	−40~90°C
4. Consumption current (Drive)	5mA typ.
5. Output put Vsat voltage (Upper + lower Vsat voltage)	1.1V typ, Io=200mA
6. Hall Bias voltage (VHB=1.5V)	Built-in
7. Lock-Protection	Built-in
8. Auto Restart	Built-in
9. Thermal Shut Down circuit	Built-in

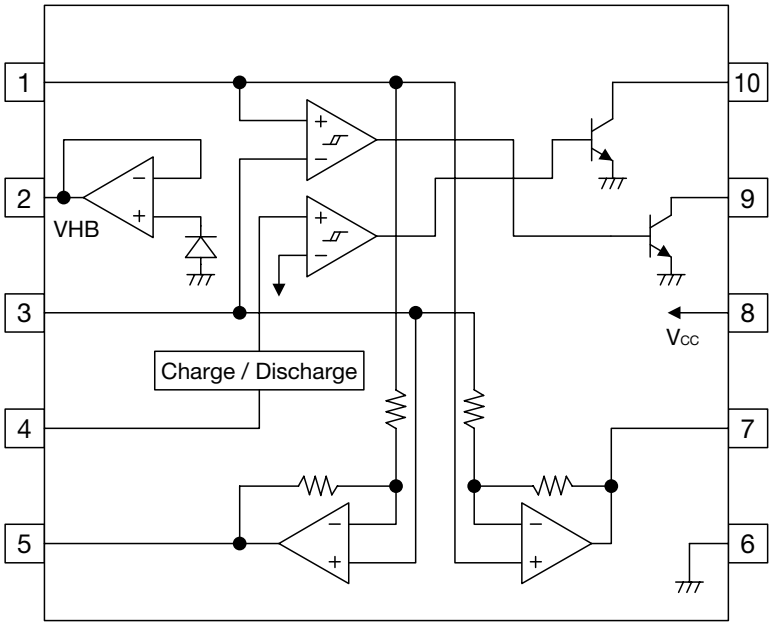
Package

SOP-10A

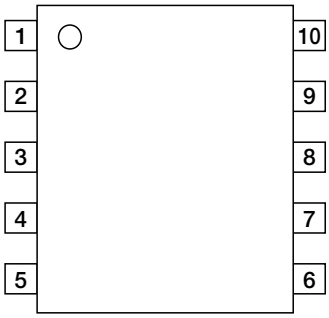
Applications

1. Cooling fan

Block Diagram



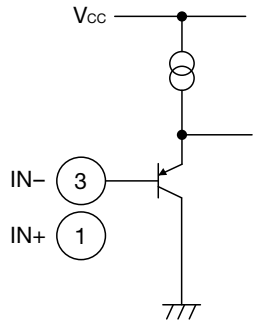
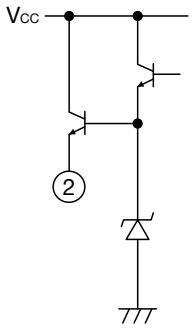
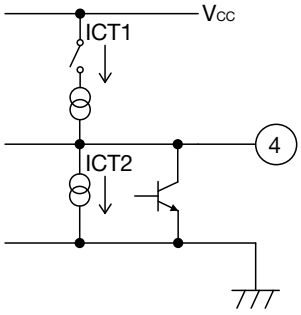
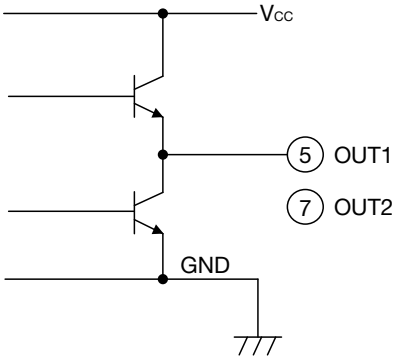
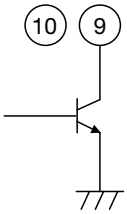
Pin Assignment



SOP-10A
(TOP VIEW)

1	IN+
2	HB
3	IN–
4	CT
5	OUT1
6	GND
7	OUT2
8	Vcc
9	FG
10	LD

Pin Description

Pin No.	Pin name	Functions	Internal equivalent circuit diagram
1 3	IN+ IN–	Hall input positive (+) Hall input negative (–)	
2	HB	Hall element bias	
4	CT	Capacitor Time	
5 6 7 8	OUT1 GND OUT2 Vcc	Driver output positive (+) GND Driver output negative (–) Vcc	
9 10	FG LD	Frequency generator Lock detection	

Absolute Maximum Ratings (Except where noted otherwise Ta=25°C)

Item	Symbol	Ratings	Units
Vcc supply voltage	V_{CC}	−0.5~15	V
Output current	I_O	0.8	A
Output voltage	V_O	15	V
LD/FG output voltage	V_{RD}/V_{FG}	15	V
LD/FG output current	I_{RD}/I_{FG}	5	mA
HB output current	I_{HB}	10	mA
Power dissipation	Pd	0.8(Note1)	W
Operating temperature range	T_{OPR}	−40~+90	°C
Storage temperature range	T_{STG}	−55~+150	°C

Note1 : Use base condition 114.3mm×76.2mm, t=1.5mm Copper leaf 50% more than, Material=Glass Epoxy

Recommended Operating Conditions (Except where noted otherwise Ta=25°C)

Item	Symbol	Min.	Typ.	Max.	Units
Vcc supply voltage	V_{CC}	2.8	12	14	V

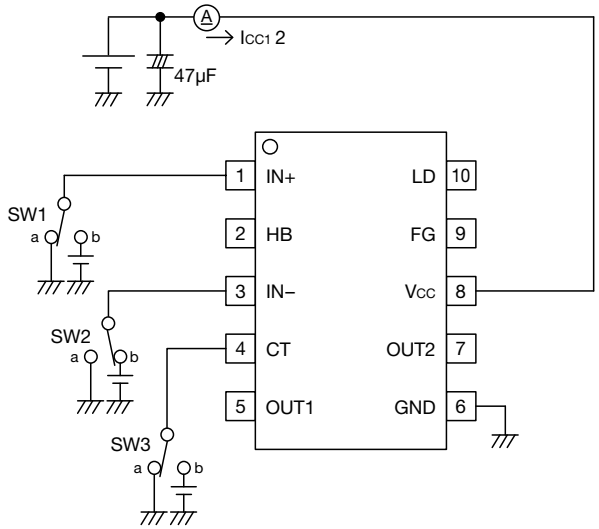
Electrical Characteristics (Except where noted otherwise V_{CC}=12V, Ta=25°C)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Supply Current						
Supply current1	I_{CC1}	Operation (CT=L)		5	7.5	mA
Supply current2	I_{CC2}	Lock protection (CT=H)		3	4.5	mA
Motor driver circuit						
Gain	G_V	(Note2)	45	48	51	dB
Output "L" voltage	V_{OL}	Io=200mA		0.2	0.3	V
Output "H" voltage	V_{OH}	Io=200mA		0.9	1.2	V
Offset voltage of hall input	V_{OFF}			7	15	mV
Input voltage range of hall input	V_{CM}		0		Vcc-1.5	V
Lock circuit						
Charge current	I_{CTC}		2.0	2.8	3.5	µA
Discharge current	I_{CTD}		0.15	0.23	0.30	µA
charge/discharge current ratio	R_{CT}	$R_{CT}=I_{CTC}/I_{CTD}$	10.2	12	13.8	
CT charge voltage	V_{CT1}		1.6	1.7	1.8	V
CT discharge voltage	V_{CT2}		0.6	0.7	0.8	V
Output circuit						
LD output "L" voltage	V_{LD}	IRD=5mA		0.1	0.2	V
FG output "L" voltage	V_{FG}	IFG=5mA		0.1	0.2	V
LD output leak current	I_{LD}	VRD=15V		1	30	µA
FG output leak current	I_{FG}	VFG=15V		1	30	µA
Hall bias circuit						
Hall output voltage	V_{HB}	IHB=5mA	1.3	1.5	1.7	V
Thermal shut down circuit						
Thermal shut down temperature	T_{SD}	(Note2)		175		°C
Thermal shut down reset temperature	$T_{hys(SD)}$	(Note2)		150		°C

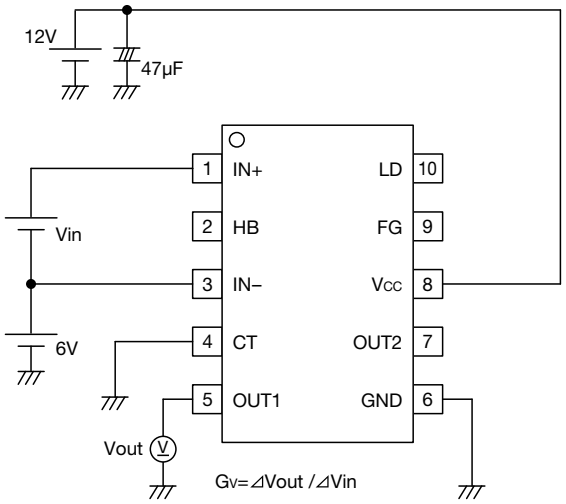
Note2 : The parameter is guaranteed by design.

Measuring Circuit

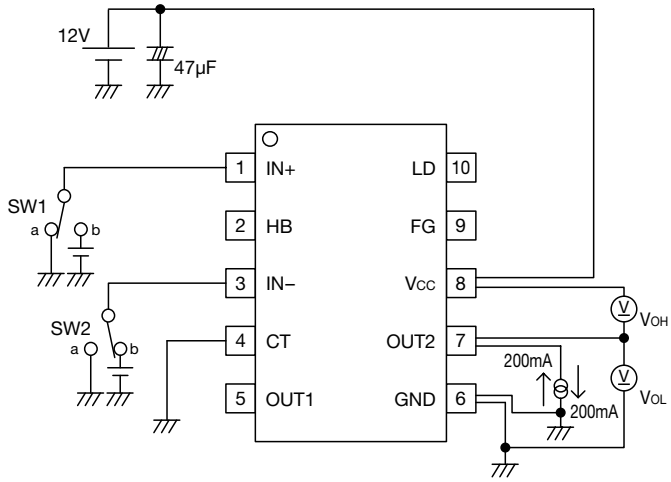
Supply current 1, 2



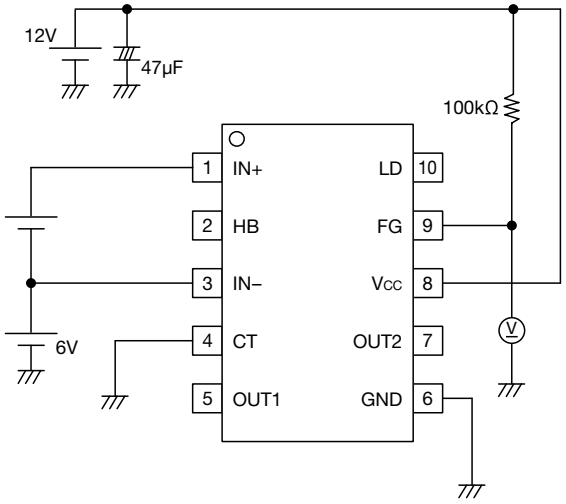
Gain



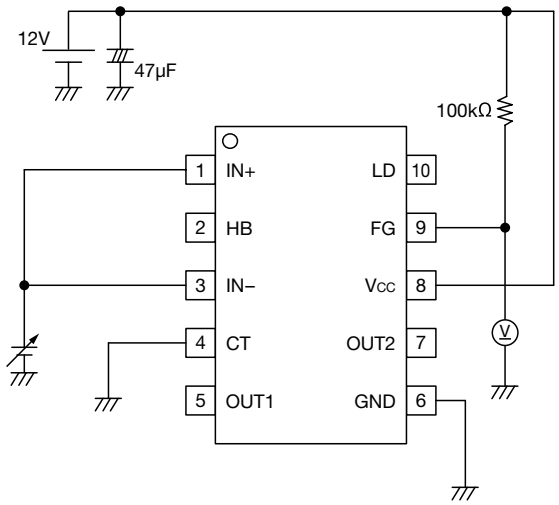
Output "L", "H" voltage



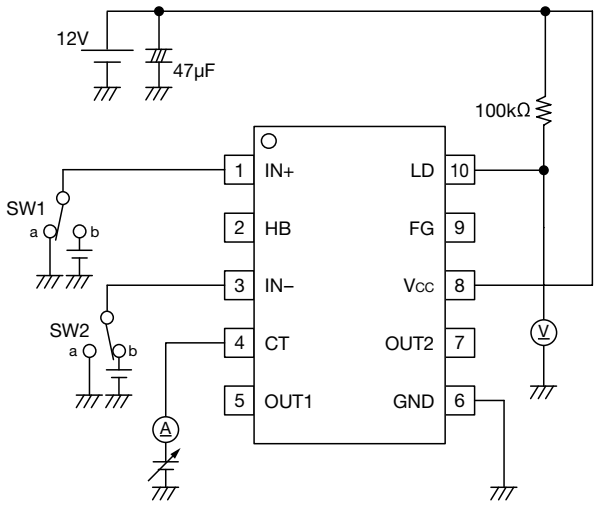
Offset voltage of hall input



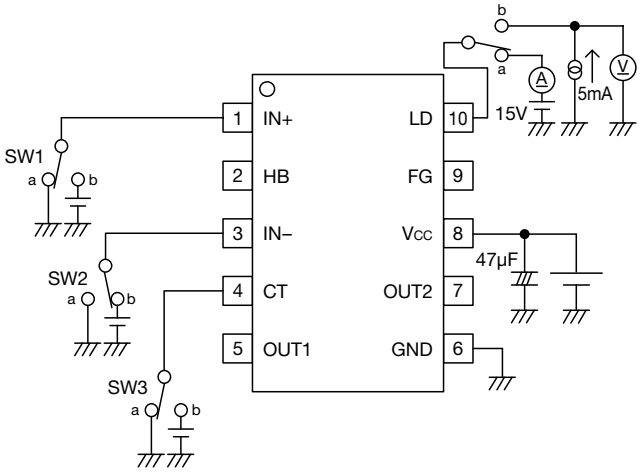
Input voltage range of hall input



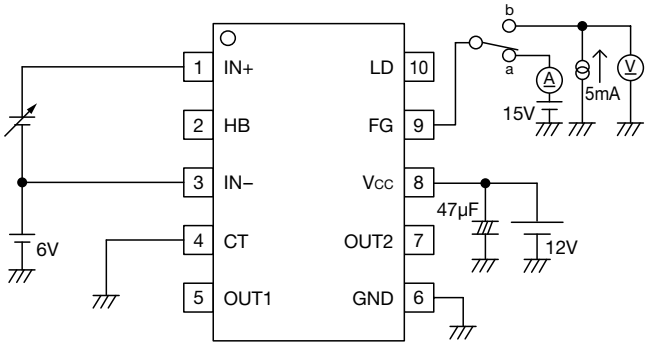
Charge, Discharge current CT charge, discharge voltage



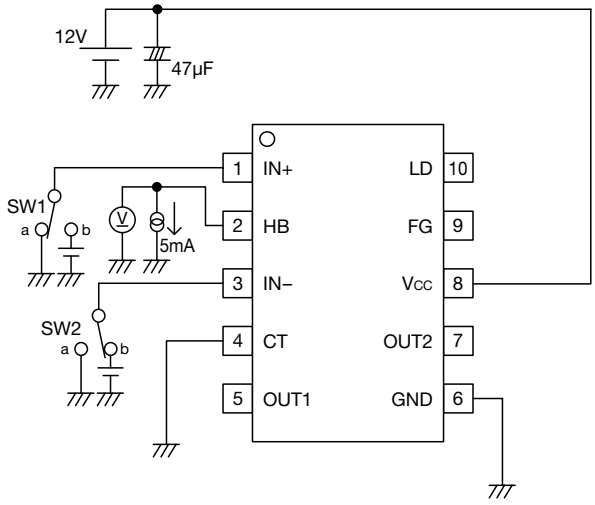
LD output "L" voltage, leak current



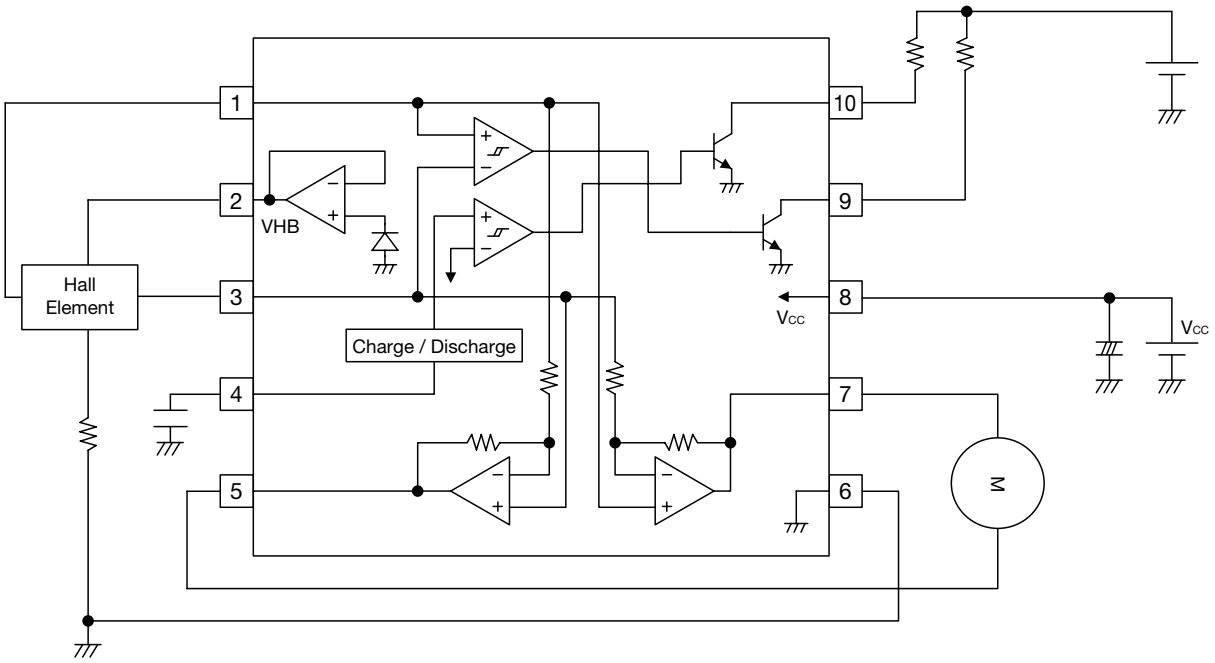
FG output "L" voltage, leak current



Hall output voltage



Typical Application Circuit



Truth Table

IN−	IN+	CT	OUT1	OUT2	FG	LD	Mode
H	L	L	H	L	L	L	Operation
L	H		L	H	H		
		H	OFF	OFF		H	Lock protection