

Complementary Output Hall Effect Fan Driver

❖ GENERAL DESCRIPTION

MA7610F(FG)/R(RD) are integrated Hall sensors with output drivers, mainly designed for electronic commutation of brush-less DC Fan. This IC is using HV BCD process internally includes the regulator, protecting diode, Hall plate, amplifier, comparator, and a pair of complementary open-Drain outputs (DO, DOB).

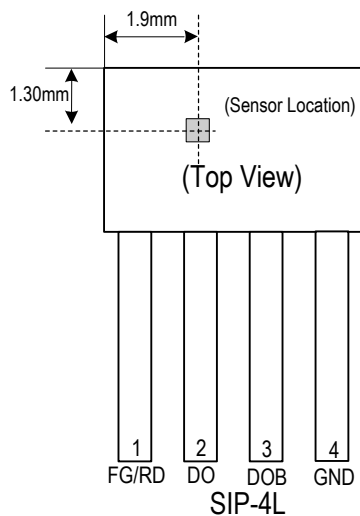
To avoid coil burning, rotor-lock shutdown detection circuit shut down the output driver if the rotor is blocked and then the automatic recovery circuit will try to restart the motor. This function repeats while rotor is blocked. Until the blocking is removed, the motor recovers running normally.

❖ FEATURES

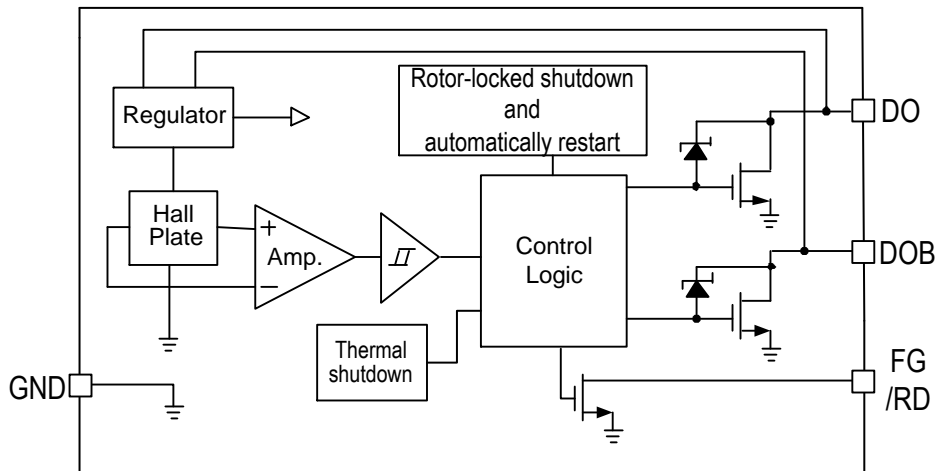
- Wide operating voltage range: 4V~20V
- Output sink current up to 0.6A
- On-Chip High sensitivity Hall-effect Sensor
- Thermal Shutdown Protection
- -40°C to 85°C Operating Temperature
- Rotor-locked shutdown and automatically restart function
- For 5V and 12V DC motor / FAN systems
- Low Profile SIP-4L Package

❖ PIN ASSIGNMENT

The package of MA7610F/R is SIP-4L; the pin assignment is given by:



Name	Description
FG/RD	Frequency Generator/ Rotation Detection Output
DO	Output 1
DOB	Output 2
GND	Ground.

❖ BLOCK DIAGRAM

❖ ORDER / MARKING INFORMATION

Order Information	Top Marking
<p>MA7610X P4 X</p> <p>Function Type: F: FG, R: RD Packing: Blank: BAG</p>	<p>7610X → F:FG / R:RD Y Y W W X → ID code:internal → WW:01~52 → Year:16=2016</p>

❖ ABSOLUTE MAXIMUM RATINGS (at T_A=25°C)

Characteristics	Symbol	Rating	Unit
Fan Supply Voltage	V _{CC}	20	V
FG/RD Voltage	V _{FG}	20	V
FG/RD Sink Current	I _{FG}	20	mA
Magnetic Flux Density	B	Unlimited	Gauss
Output Current	I _O	Continuous	600
		Hold	900
		Peak (start up)	1200
Power Dissipation	P _D	550	mW
Storage Temperature Range	T _{STG}	-65 to +150	°C
Thermal Resistance from Junction to case	θ _{JC}	49	°C/W
Thermal Resistance from Junction to ambient	θ _{JA}	227	°C/W
Junction Temperature	T _J	150	°C
Ambient Temperature	T _A	-40 to 85	°C

❖ ELECTRICAL CHARACTERISTICS

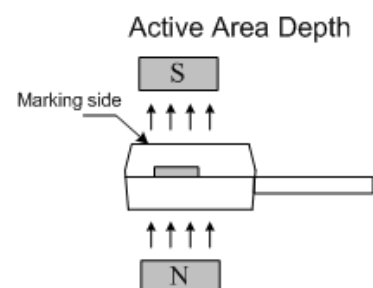
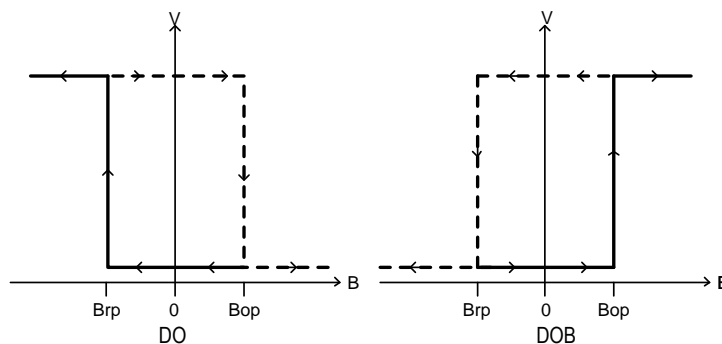
 (V_{DD} = 12V, T_A = +25°C, unless otherwise noted.)

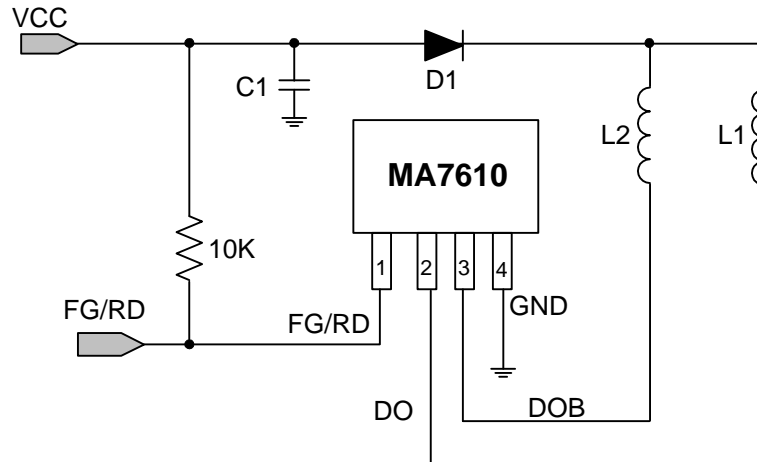
Characteristics	Symbol	Conditions	Min	Typ	Max	Units
Supply Voltage	V _{DD}	Operating	4	-	20	V
Supply current	I _{DD}	Operating	-	3.5	5	mA
Output Leakage Current	I _{OFF}	V _{OUT} =12V	-	< 0.1	10	μA
Output On resistance	R _{DS(ON)}	I _{OUT} =300mA	-	0.8	-	Ω
Output Clamping Voltage	V _Z	DO, DOB	-	32	-	V
FG/RD OFF Leakage Current			-	-	1	μA
FG/RD ON Saturation Voltage VON		10mA	-	-	0.5	V
Locked Protection On	T _{lpr-on}		-	0.45	-	Sec
Locked Protection Off	T _{lpr-off}		-	2.7	-	Sec
Thermal shutdown Temp	T _{SD}		150	-	-	°C
Thermal Shutdown Hysteresis	T _{SH}		-	30	-	°C
Magnetic			(1mT=10 Gauss)			
Operate Point	B _{OP}		5	30	50	Gauss
Release Point	B _{RP}		-50	-30	-5	Gauss
Hysteresis	B _{HYS}		-	60	-	Gauss

Driver output vs. magnetic pole

Characteristics	Test Conditions	DO	DOB
North pole	B < Brp	High	Low
South pole	B > Bop	Low	High

Note: The magnetic pole is applied facing the branded side of the package



❖ APPLICATION CIRCUIT


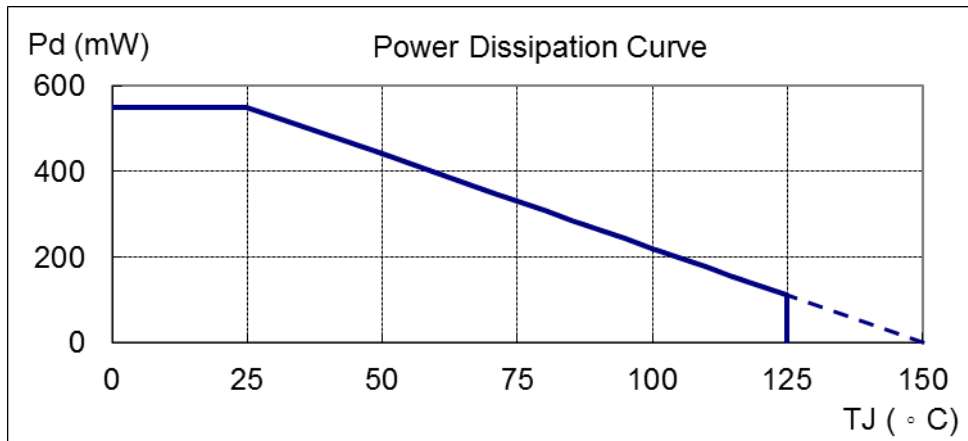
12V brush-less DC fan

Note1: C1 (Optional) is for power stabilization, Recommended E-Cap 1uF/50V

Note2: D1 (Optional) is a reverse protect diode.

❖ PERFORMANCE CHARACTERISTICS

T_A (°C)	25	50	60	70	80	85	90	95	100
Pd (mW)	550	440	396	352	308	286	264	242	220
T_A (°C)	105	110	115	120	125	130	135	140	150
Pd (mW)	198	176	154	132	110	88	66	44	0



❖ PACKAGE OUTLINES
(1) SIP-4L
