MH365 is the integrated Hall sensor with bi-direction drivers designed for electrical commutation of Notebook PC cooling fan application. The device included as follows: on-chip Hall voltage generator for magnetic sensing; the amplifier that amplifies the Hall voltage; a comparator is to provide switching hysteresis for noise rejection; the bi-direction drivers for sinking and driving large current load. It also has Lock shutdown and auto-restart, soft-switch driver, PWM control speed, FG or RD output function.

If a magnetic flux density larger than threshold B_{OP}, DO is turned to sink and DOB is turned to drive. The output state is held until a magnetic flux density reversal falls below B_{RP} causing DO to be turned to drive and DOB turned to sink. Unless the magnetic flux density keeps too long, the IC will be into auto-restart protection.

MH365 is rated for operation over-temperature range from -20 °C to 125 °C, also the thermal shut-down function is included, and voltage range from 1.8V to 6V. The device is packaged by DFN2*2-6L and SOT-26L (include PWM, FG/RD function).

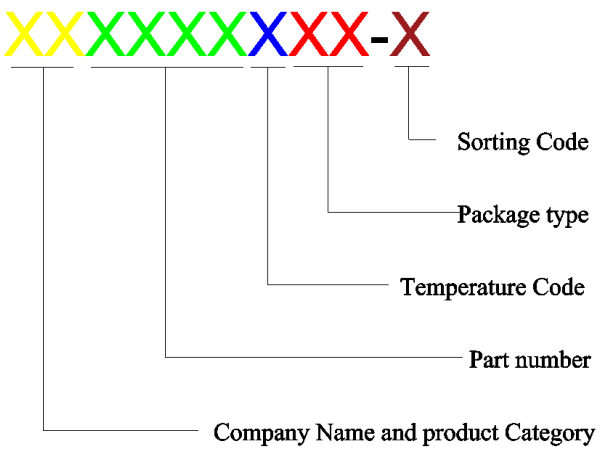
Features and Benefits

- Wide operating Voltage 1.8V~5.5V.
- bi-direction drivers for single coil.
- Soft-switching driver.
- Low Output Switching Current Noise.
- Rotor-locked shutdown and auto-restart function.
- Thermal Shutdown and Reverse voltage protection.
- Rotator speed signal output(FG) /Rotator running detection output(RD).
- Directly PWM/ Voltage control speed function.
- Optional variety ultra-small package
- RoHS compliant 2011/65/EU and Halogen Free

Applications

- 3V / 5V BLDC Motor/ Fan.
- Single-coil BLDC Motor.
- Single-coil BLDC Fan
- Notebook BLDC Fan

Ordering Information



Company Name and Product Category

MH:MST Hall Effect/MP:MST Power MOSFET

Part number

181,182,183,184,185,248,249,276,477,381,381F,381R,382…..

If part # is just 3 digits, the forth digit will be omitted.

Temperature range

E: 85 °C, I: 105 °C, K: 125 °C, L: 150 °C

Package type

UA:TO-92S,VK:TO-92S(4pin),VF:TO-92S(5pin),SO:SOT-23,

SQ:QFN-3,ST:TSOT-23,SN:SOT-553,SF:SOT-89(5pin),

SD:DFN2*2-6L,SR:SOT-26L,SM:DFN1.6*1.6-6L

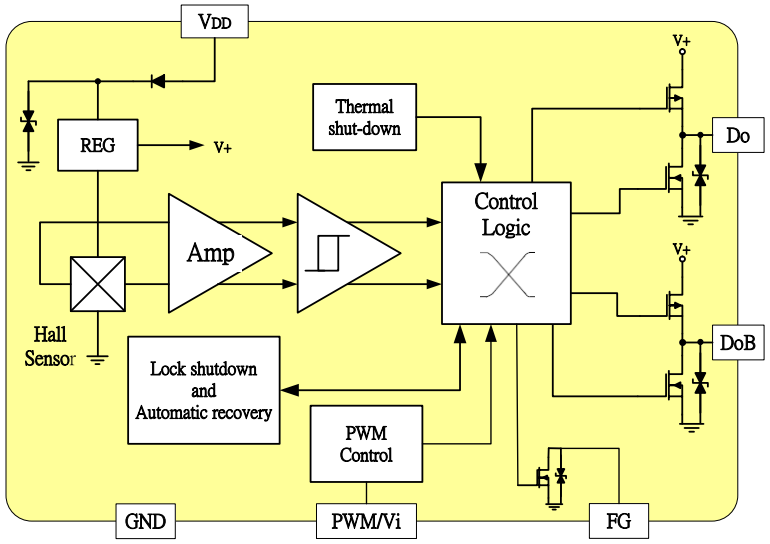
Sorting

α,β,Blank…..

Part No.	Temperature Suffix	Package Type
MH365FKSR	K (-40℃ to +125℃)	SR (SOT-26L)
MH365FESR	E(-40℃ to +85℃)	SR (SOT-26L)
MH365RKSR	K (-40℃ to +125℃)	SR (SOT-26L)
MH365RESR	E (-40℃ to +85℃)	SR (SOT-26L)
MH365FKSD	K (-40℃ to +125℃)	SD (DFN2*2-6L)
MH365FESD	E(-40℃ to +85℃)	SD (DFN2*2-6L)
MH365RKSD	K (-40℃ to +125℃)	SD (DFN2*2-6L)
MH365RESD	E (-40℃ to +85℃)	SD (DFN2*2-6L)
MH365FKSM	K (-40℃ to +125℃)	SM (DFN1.6*1.6-6L)
MH365FESM	E(-40℃ to +85℃)	SM (DFN1.6*1.6--6L)
MH365RKSM	K (-40℃ to +125℃)	SM (DFN1.6*1.6--6L)
MH365RESM	E (-40℃ to +85℃)	SM (DFN1.6*1.6--6L)

K spec is using in industrial and automotive application. Special Hot Testing is utilized.

Functional Diagram



Absolute Maximum Ratings *At (Ta=25℃)*

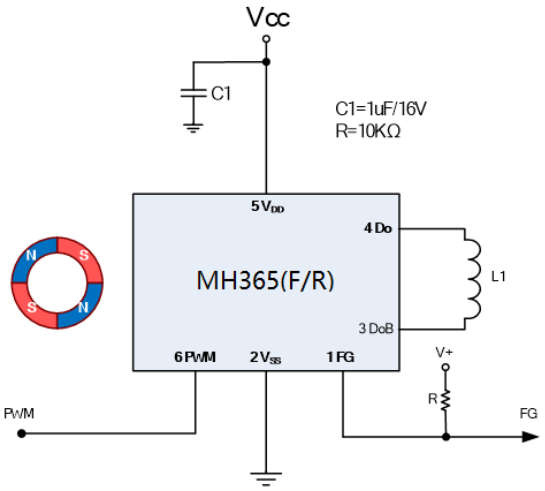
Characteristics		Values	Unit
Supply Voltage, (***VDD***)		7.0	V
Reverse Voltage, (***VDD***)		-7.0	V
Output ”on” current, (***IO***)		500(Average)	mA
		1000(Peak)	mA
Operating Temperature Range, (***TA***)		-40 ~ +125	℃
Storage temperature Range, (***TS***)		-55 ~ +150	℃
Maximum Junction Temp, (***TJ***)		150	℃
Thermal Resistance	(θ_{JA})SR/SD/SM	192/160/250	℃/w
	(θ_{JC})SR/SD/SM	40/35/50	℃/w
Package Power Dissipation, (P_D)	SR/SD/SM	650/780/500	mW

Electrical Specifications

DC Operating Parameters ： T_A=+25℃, V_{DD}=5.0V

Parameters	Test Conditions		Min	Typ	Max	Units
Supply Voltage,(V_{DD})	Operating		1.8		5.5	V
Supply Current,(I_{DD})	No Load 5V			3.6	5.0	mA
Output Saturation Voltage, (V_{DSON})	Iout=400mA	(Sink)		160	280	mV
		(Drive)	VDD-0.28	VDD-0.16		V
Output Switching Slope Duration, (T_{SW})	5V			160		uS
FG Output Low Voltage, (V_{FG})(V_{RD})	5V,5mA			0.3	0.5	V
PWM Input Frequency,(F_{PWM})			0.2		30	KHz
Locked Protection on,(T_{ON})			0.35	0.45	0.55	S
Locked Protection off,(T_{OFF})			2.4	2.7	3.0	S
Thermal shut-down Temp			150	155		℃
Thermal release temperature				125		℃
Thermal shut-down Hysteresis				30		℃
Electro-Static Discharge	HBM		4			KV
Operate Point,*(Bop)*			5	20	40	Gauss
Release Point,*(Brp)*			-40	-20	-5	Gauss
Hysteresis,*(B_{HYS})*				40		Gauss

Typical application circuit

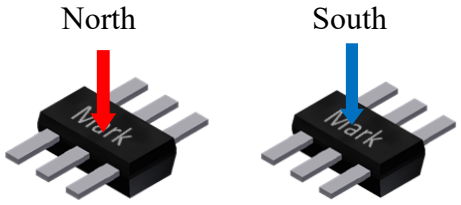


Output Behavior versus Magnetic Pole

DC Operating Parameters：Ta = -40 to 125℃, VCC = 1.8 to 5.5V (unless otherwise specified)

Parameter	*Test condition*	*Do (SR/SD/SM)*	*DoB (SR/SD/SM)*
South pole	B>Bop	High	Low
North pole	B<Brp	Low	High

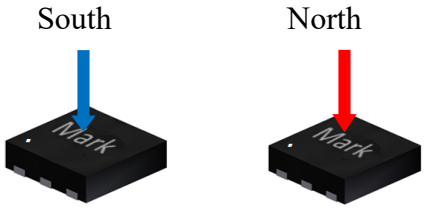
SR Package



Do= low
DoB=High

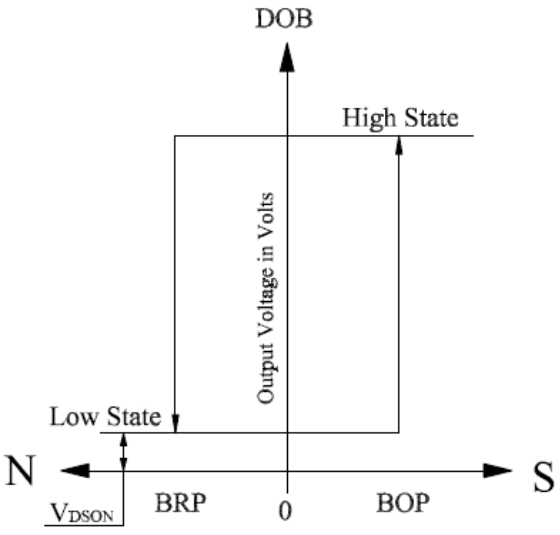
Do=High
DoB=Low

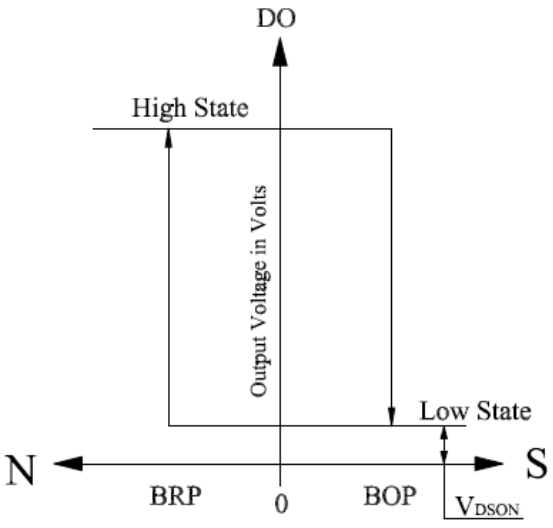
SD/SM Package



Do= low
DoB=High

Do=High
DoB=Low

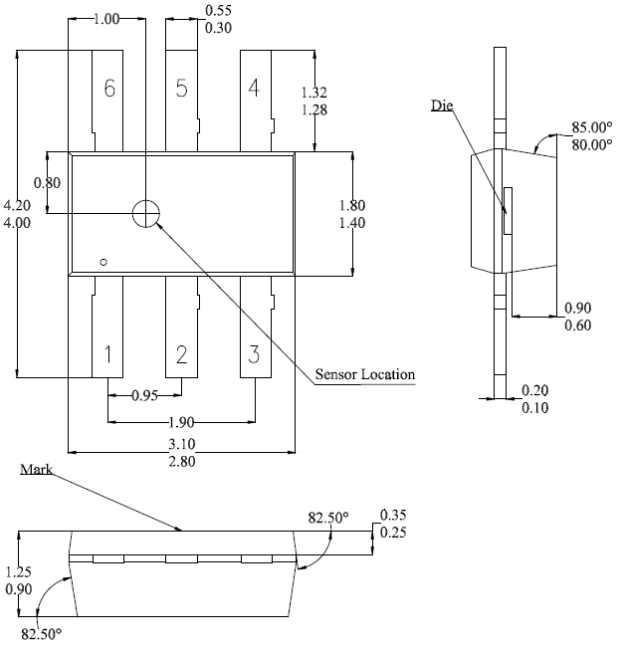




Sensor Location, Package Dimension and Marking

SR Package

(Top View)



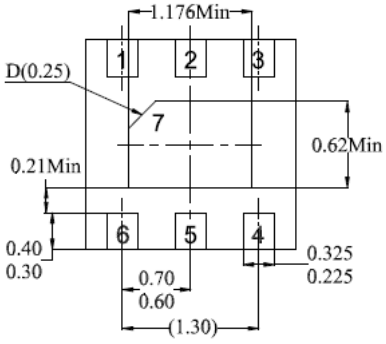
NOTES:

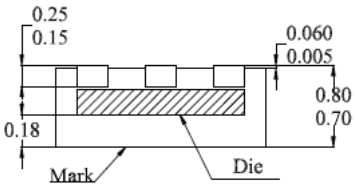
1. Controlling dimension: mm
2. Leads must be free of flash and plating voids.
3. Do not bend leads within 1 mm of lead to package interface.
4. PINOUT:

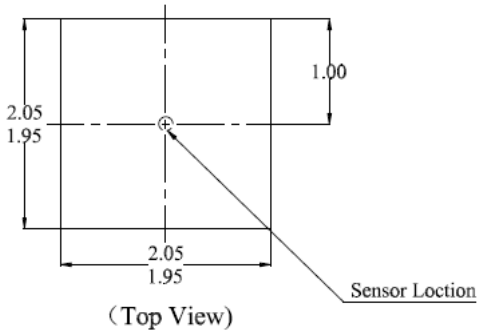
Pin No.	Pin Name
1	FG/RD
2	V_{SS}
3	DoB
4	Do
5	V_{DD}
6	PWM

SD package (DFN2*2-6L)

(Bottom View)





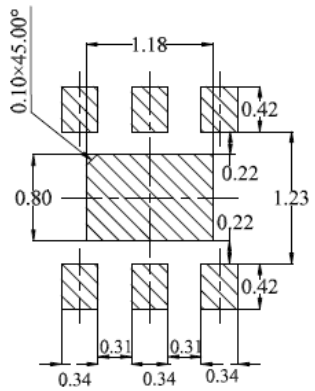


NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Lead thickness after solder plating will be 0.254mm maximum
4. PINOUT:

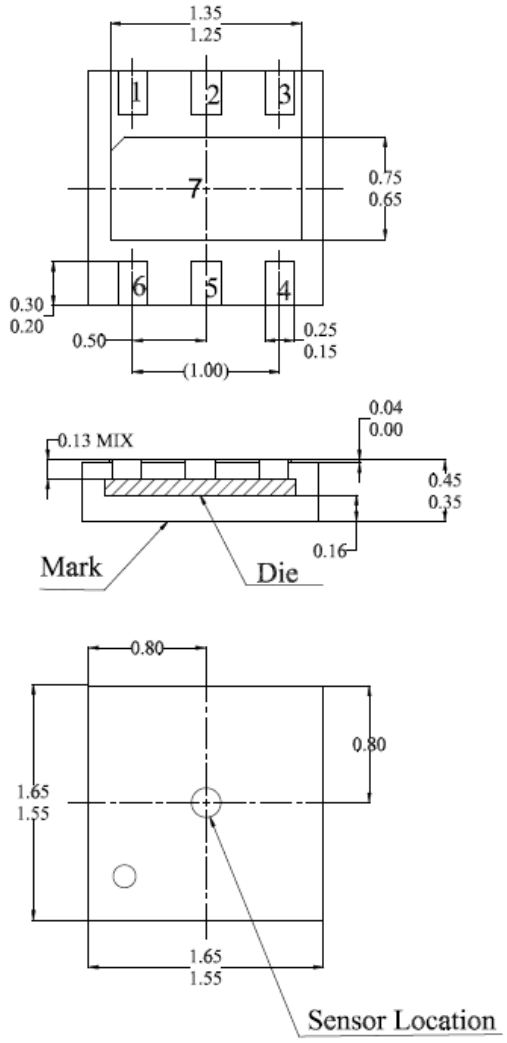
Pin No.	Pin Name	Function
1	PWM	PWM Input
2	V_{DD}	Power Supply
3	Do	Out1
4,7	V_{SS}	Ground
5	DoB	Out2
6	FG/RD	Frequency Generation /Revolution Detection

5. （For reference only）Land pattern



SM Package

(Bottom View)



(Top View)

NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash and plating voids
3. Lead thickness after solder plating will be 0.254mm maximum
4. PINOUT:

Pin No.	Pin Name	Function
1	V_{DD}	Power Supply
2	N.C	N.C
3	V_{OUT}	Output
4	N.C	N.C
5	V_{SS}	Ground
6	N.C	N.C
7	N.C	N.C

5. （For reference only）Land pattern