TMR1341

TMR Omnipolar Switch

General Description

TMR1341 is a digital omnipolar magnetic switch that integrates TMR and CMOS technology in order to provide a magnetically triggered digital switch with high sensitivity, high speed, and ultra-low power consumption. It is designed for use in applications that are both power-critical and performance-demanding. It contains a push-pull half-bridge TMR magnetic sensor and CMOS signal processing circuitry within the same package, including an on-chip TMR voltage generator for precise magnetic sensing, a TMR voltage amplifier and comparator plus a Schmitt trigger to provide switching hysteresis for noise rejection, and CMOS push-pull output. An internal band gap regulator is used to provide a temperature compensated supply voltage for internal circuits, permitting a wide range of supply voltages. The TMR1341 draws only 1.5μA resulting in ultra-low power operation. It has fast response, accurate switching points, excellent thermal stability, and immunity to stray field interference. It is available in the LGA2x1.5x0.63 -3L package.

Features and Benefits

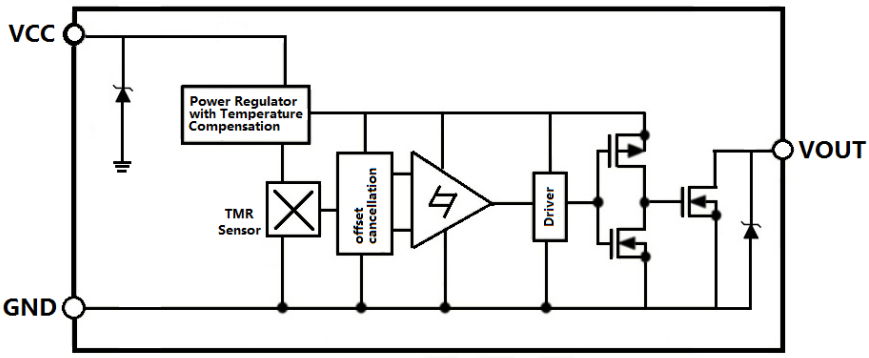
- Tunneling Magnetoresistance (TMR) Technology
- Ultra Low Power Consumption at 1.5uA
- High Frequency Response > 1kHz
- Operation with North or South Pole
- Low Switching Points for High Sensitivity
- Compatible with a Wide Range of Supply Voltages
- Excellent Thermal Stability
- High Tolerance to External Magnetic Field Interference
- Super small size package LGA2x1.5x0.63 -3L

TMR1341

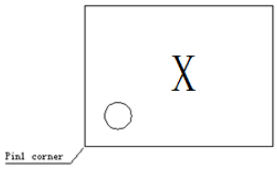
Applications

- Utility Meters including Water, Gas, and Heat Meters
- Proximity Switches
- Position and Speed Sensing
- Motor and Fan Control

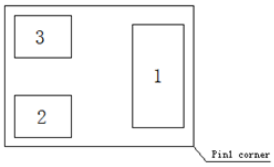
Block Diagram



Pin Configuration



Top view



Bottom view

Pin Name	Pin No.	Pin Function
	LGA2X1.5-3L	
GND	1	Ground
V_{OUT}	2	Output
V_{CC}	3	Supply Voltage

Absolute Maximum Ratings

Parameter	Symbol	Limit	Unit
Supply Voltage	V_{CC}	7	V
Reverse Supply Voltage	V_{RCC}	0.3	V
Output Current	$I_{OUTSINK}$	20	mA
Magnetic Flux Density	B	2800	G
ESD level(HBM)	V_{ESD}	2	kV
Operating Ambient Temperature	T_A	-40 ~125	°C
Storage Temperature	T_{stg}	-50 ~ 150	°C

Electrical Characteristics (V_{CC}=3.0V, T_A=25°C)

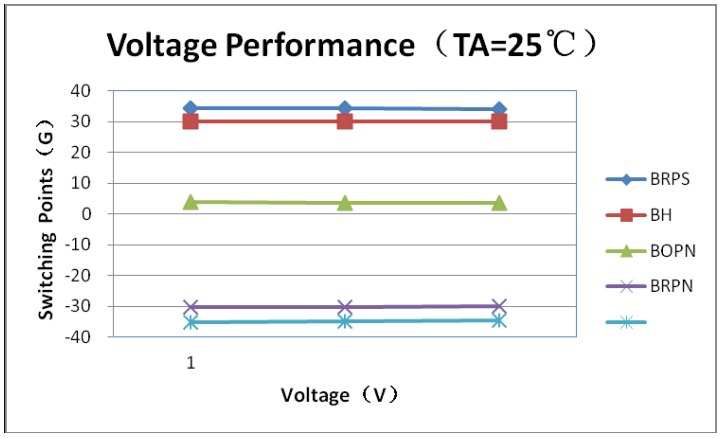
Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Supply Voltage	V_{CC}	Operating	1.5	1.8	5.5	V
Output Stress Voltage	V_{stress}				5.5	V
Output leak Current	I_{leak}	OUT=H, V_{CC}=3V, V_{out}=3V			1	uA
Output Resistance of Turnoff	R_{off}	OUT=H		10		MΩ
Output Low Voltage	VOL	OUT=L, V_{CC}=3V, I_{sink}=10mA	0		0.1	V
Output Resistance of Turn on	R_{on}	OUT=L			10	Ω
Supply Current	I_{CC}	Output Open		1.5		uA
Response Frequency	F			1000		Hz

Note: a 1kOhm pull-up resistor is connected between V_{CC} and V_{OUT}, a 100nF capacitor is connected between V_{CC} and GND during all tests in the above table.

Magnetic Characteristics (V_{CC} = 3.0V, T_A = 25°C)

Parameters	Symbol	Min	Typ.	Max	Units
Operate Point	B_{OPS}		34		G
	B_{OPN}		-34		G
Release Point	B_{RPS}		30		G
	B_{RPN}		-30		G
Hysteresis	B_H		4		G

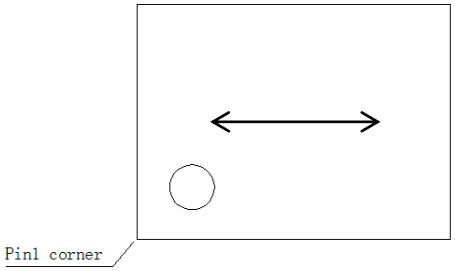
Voltage Characteristics



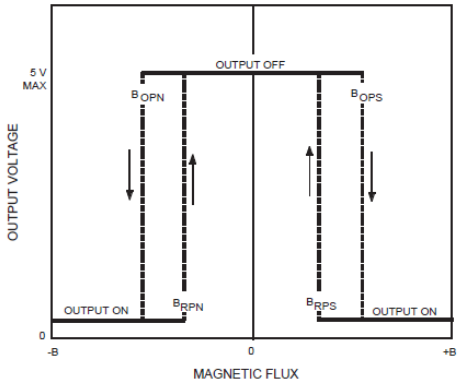
Output Behavior vs. Magnetic Pole

Parameter	Test Conditions	Output
South Pole	$B > B_{OPS}$	Low (On)
	$0 < B < B_{RPS}$	High (Off)
North Pole	$B < B_{OPN}$	Low (On)
	$0 > B > B_{RPN}$	High (Off)

Note: when power is turned on under zero magnetic field, the output is “High”.



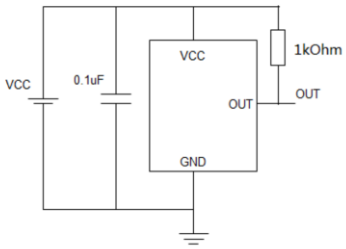
Sensing Direction of Magnetic Field



Magnetic Flux

Application Information

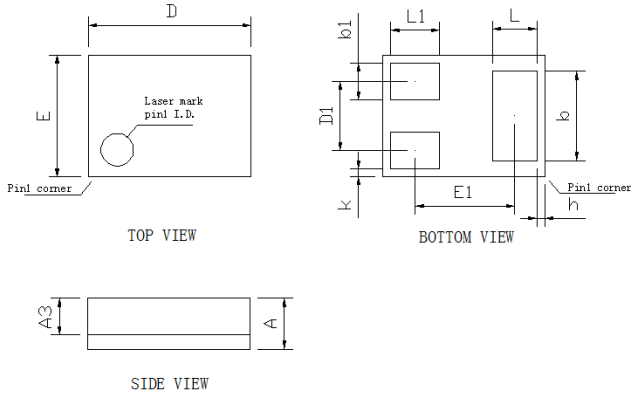
The output of the TMR1341 switches low (turns on) when a magnetic field to the sensing axis exceeds the operate point threshold, B_{OP}. When the magnetic field is reduced below the release point, B_{RP}, the device output switches high (turns off). The difference between the B_{OP} and B_{RP} is the hysteresis B_H of the device.



It is strongly recommended that an external bypass capacitor be connected in close proximity to the device between the supply and ground pins to reduce noise. The recommended value for the external bypass capacitor is 0.1μF.

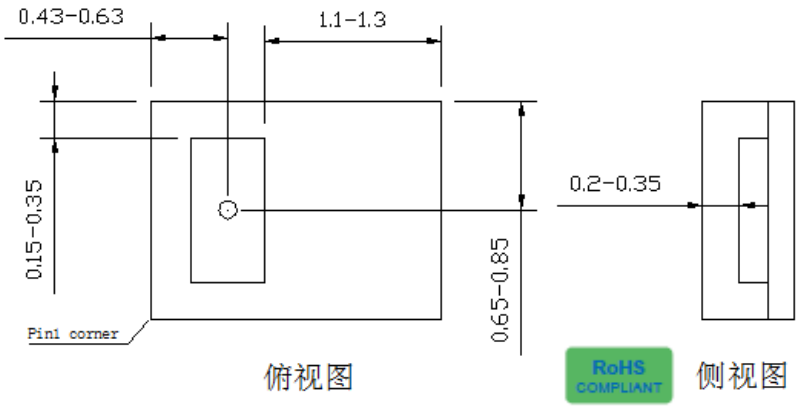
Package Information

LGA2x1.5 -3Lpackage drawing



Symbol	Dimensions In Millmeters			Dimensions In Inches		
	Min	Nom	Max	Min	Nom	Max
A	-	0.63	0.70	-	0.025	0.028
A3		0.45 BSC			0.018REF	
D	1.90	2.00	2.10	0.075	0.079	0.083
D1		0.85 BSC			0.033REF	
E	1.40	1.50	1.60	0.055	0.059	0.063
E1		1.23 BSC			0.048REF	
L		0.55 BSC			0.022REF	
L1		0.60 BSC			0.024REF	
b		1.10 BSC			0.043REF	
b1		0.45 BSC			0.018REF	
h		0.10 REF			0.004REF	
k		0.10 REF			0.004REF	

TMR Sensor Position



Top view and side view (unit: mm)

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