

High sensitivity micro power Omnipolar Hall Switch IC

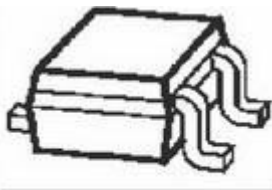
Description:

WH13S is designed by CMOS technology with built-in hall effect sensor, timer, latch circuit and output driver. It use specified clock to sense magnetic field in a short period time and lock this signal in latch circuit when system is in standby mode(most of time). In this sample and hold technique, the whole chip can operate in very low average power and is suitable for battery-operation, hand-held equipment (such as cellular phone, electronic dictionary etc..)

WH13S output “low” when sensing magnetic flux density (either South or North) larger than operating point Bop and output “High” when magnetic field is removed or magnetic flux density is lower than release point Brp. It can sense magnetic flux either from top or bottom side.

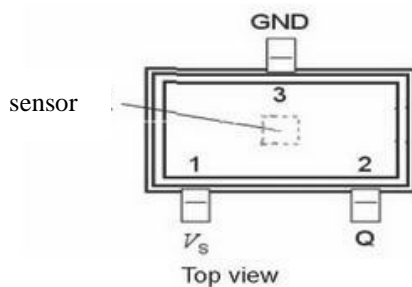
Features:

- 2.4V – 5.5V operating voltage
- Operation with either South or North magnetic flux density
- Micro power Operation
- SOT-23 package



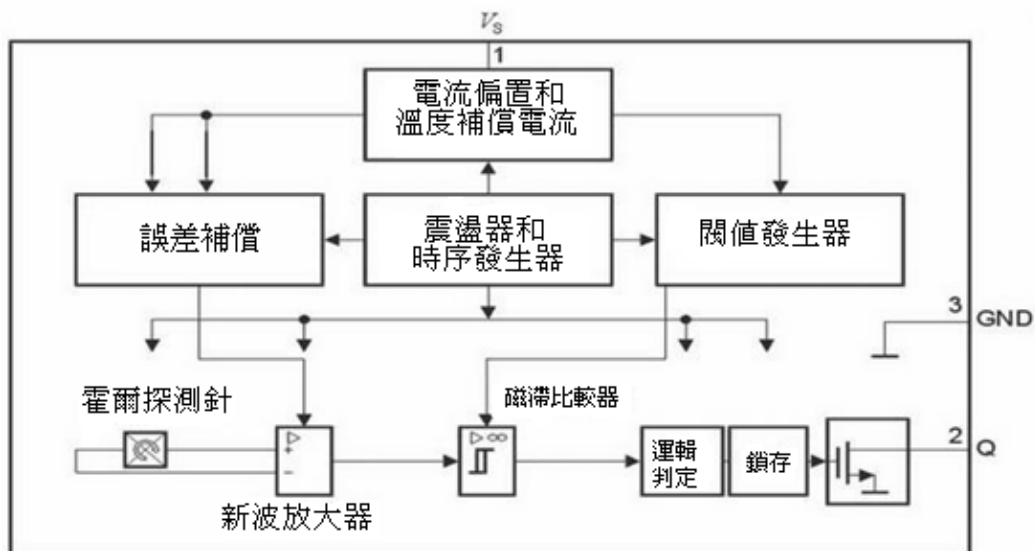
SOT-23

Pin description:



Pin No.	Symbol	Description
1	V _s	Vdd power supply
2	Q	Output
3	GND	Ground

Function Block:



Maximum Electrical Charateristics:

Charateristic	Sumbol	Min.	Max.	Unit
Power supply	V_s	-0.3	5.5	V
Supply current	I_s	-1	2.5	mA
Output voltage	V_Q	-0.3	5.5	V
Output current	I_Q	-1	2	mA
Junction Temp.	T_j	-40	150	°C
Storage Temp.	T_s	-40	150	°C
Magnetic flux	B	---	unlimited	mT
Thermal resistance	$R_{th JA}$	---	35	K/W

ESD Protection

Characteristic	Symbol	Min.	Max.	Unit	Remark
ESD Voltage	V_{ESD}	---	± 4	kV	R=1.5KΩ C=100PF T=25°C

Operating Range

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply	V_S	2.4	2.7	5.5	V	*1
Output Voltage	V_Q	-0.3	2.7	5.5	V	
Ambient Temp.	T_A	-40	25	85	°C	

*1 Recommend put 100nf capacitor between V_S and GND

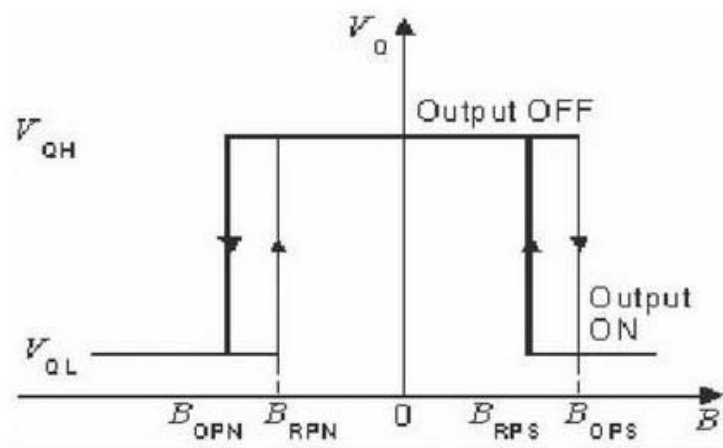
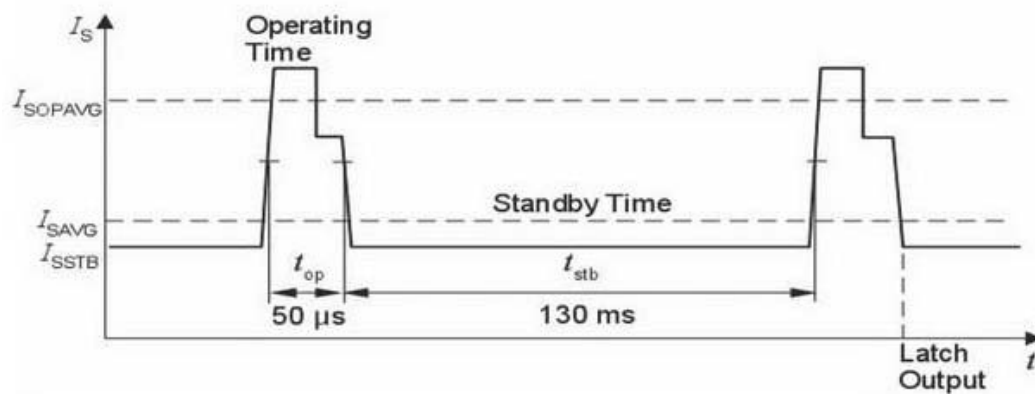
AC/DC Characteristic (25°C ; 2.7V)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Remark
Average Current	I_{SAVG}	1	3	10	uA	
Operating Avg. Current	I_{SOPAVG}	0.5	2.0	3.5	mA	
Operating Peak Current	I_{SOPT}	-	-	4.5	mA	
Standby Current	I_{SSTB}	1	1.9	8	uA	
Output saturation voltage	V_{QSAT}	-	0.13	0.4	V	$I_Q=1mA$
Output leakage current	I_{QLEAK}	-	0.01	1	uA	
Output rising time	t_f	-	0.5	1	us	$R_L=2.7K\Omega$ $C_L=10PF$
Output falling time	t_f	-	0.1	1	us	$R_L=2.7K\Omega$ $C_L=10PF$
Operating clock period	t_{op}	25	100	160	us	
Standby clock period	t_{stb}	60	140	240	ms	
Operation/standby ratio	t_{op} / t_{stb}	-	0.071	-	%	
Setup up time	t_{stu}	-	12	20	us	

Magnetic flux specification:

Symbol	Min.	Typ.	Max.	Unit
B_{OPS}	2	3.5	5	mT
B_{OPN}	-5	-3.0	-2	mT
B_{RPS}	1.2	2.7	4.2	mT
B_{RPN}	-4.2	-2.6	-1.2	mT
B_{HYS}	0.2	0.8	1.6	mT*

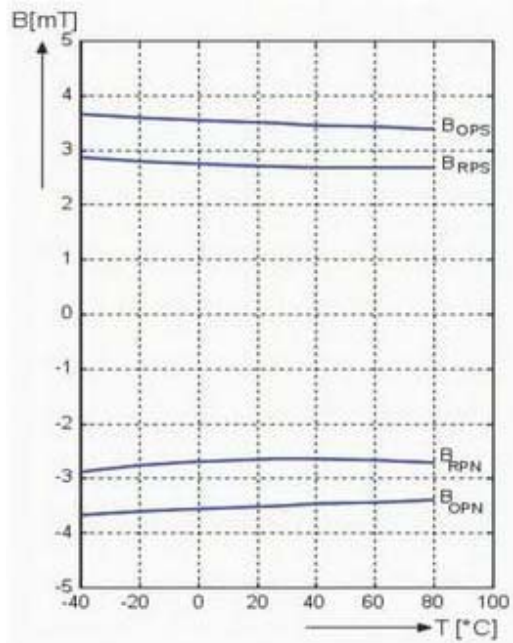
* 1 mT=10 Gauss



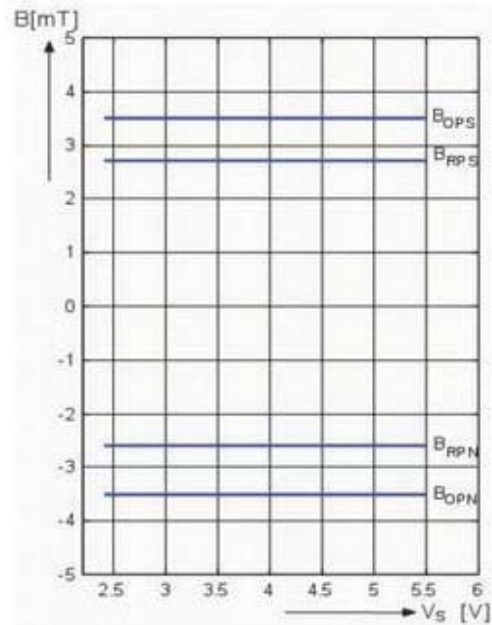
Output vs. Magnetic flux

IV Curve:

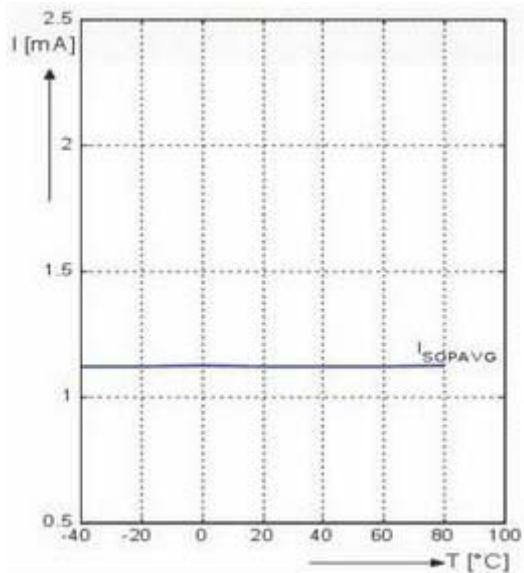
$V_S=2.7V$ vs. T_A



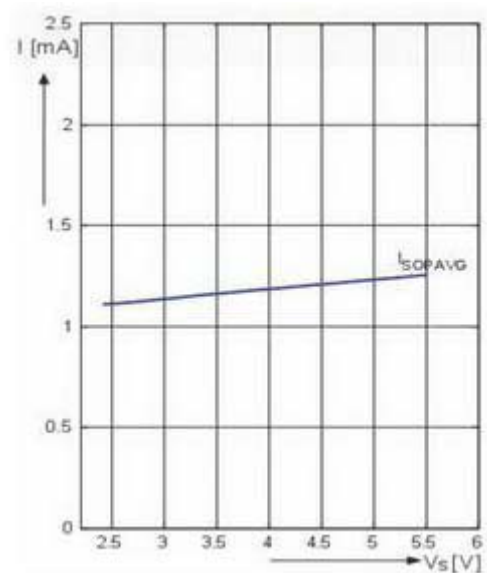
$T_A=20^\circ C$, B vs. V_S



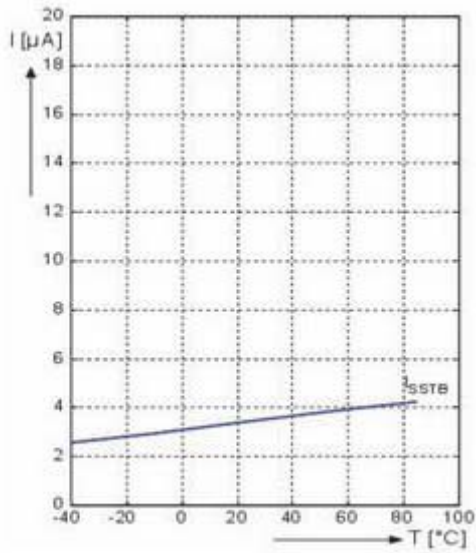
$V_S=2.7V$, I_{SOPAVG} vs. T_A



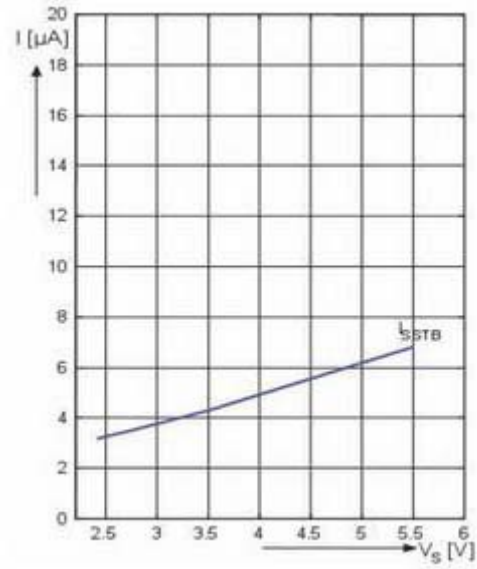
$T_A=20^\circ C$, I_{SOPAVG} vs. V_S



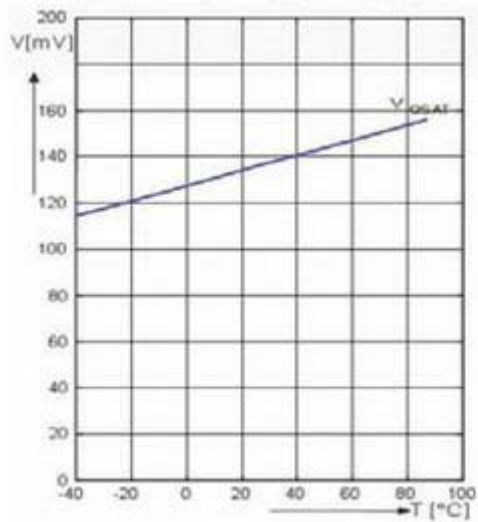
$V_S=2.7V$, I_{SSTB} vs. T_A



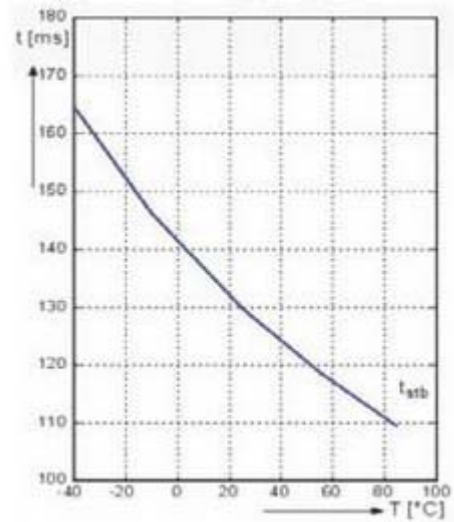
$T_A=20^{\circ}C$, I_{SSTB} vs. V_S



$I_Q=1mA$, V_{QSAT} vs. T_A

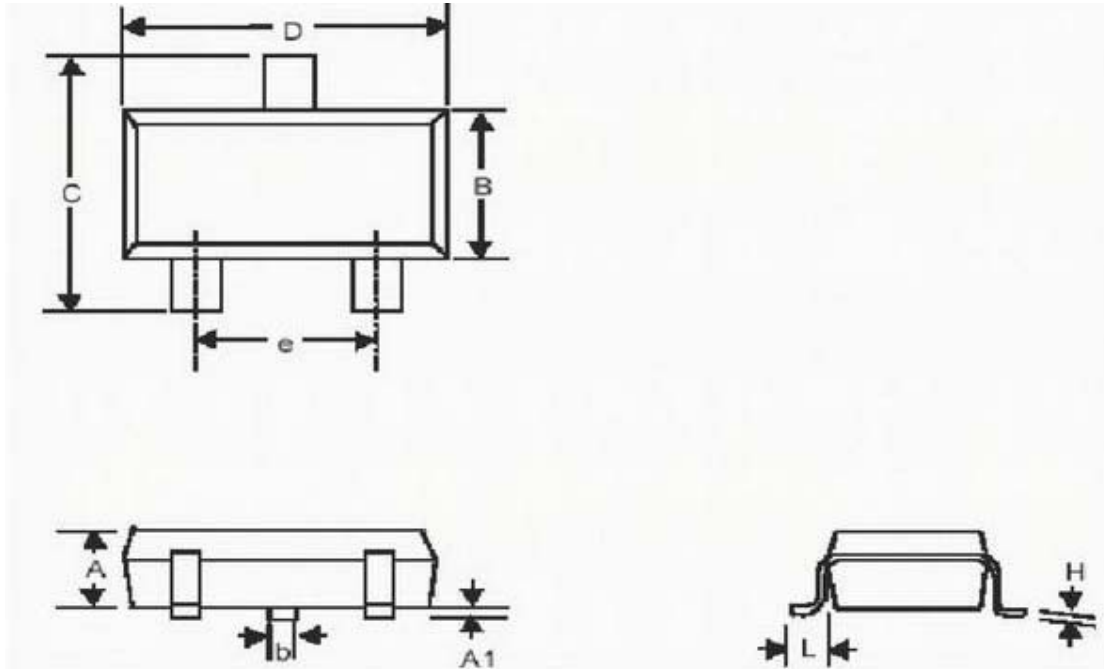


$V_S=2.7v$, t_{stb} vs. T_A



Package Dimension:

SOT23:



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
At	--	0.152	--	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.508	0.014	0.020
C	2.591	2.997	0.102	0.118
D	2.962	3.099	0.106	0.122
e	1.803	2.007	0.071	0.079
H	0.102	0.254	0.004	0.010
L	0.356	0.610	0.014	0.024