Low Power Linear Hall Sensor XL47T

Features

- Wide Operating Voltage Range：2.7V~8V
- Low Operation Current：1.4mA
- Linearity ± 4%
- Sensitivity：2.35mV/Gs @ V_{DD}=3.3V
- Low noise output without external capacitor filtering
- Temperature Grade 2：−40℃ to 105℃ Ambient Operating Temperature Range
- Device HBM ESD Classification Level Class2
- TO92S−3 package

Applications

- Speed control turnbuckles
- Game Handle
- Magnetic Axis Keyboards
- Liquid Level Detection

General Description

The XL47T is a linear Hall−effect sensor specifically engineered for speed control turnbuckles, featuring low power consumption, wide operating voltage, and extended temperature range，with an output voltage that varies proportionally to the supply voltage, and proportional to the strength of the magnetic field it senses. The XL47T's output voltage without magnetic field defaults to half of the supply voltage, the chip's typical operating voltage is 3.3V，with low operation current. The operating temperature range sup−ports −40℃~105℃.

The XL47T integrates high precision current source, temperature compensation module, Hall array, amplifier, driver module and other circuit modules, which provides high linearity and strong immunity to electromagnetic interference over the full voltage range and full temperature range.

Typical application schematic

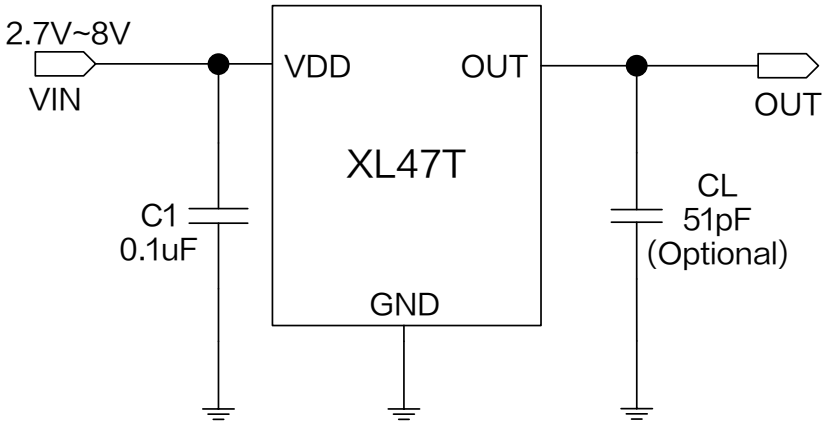


Figure1. XL47T Typical application schematic

Pin Configurations

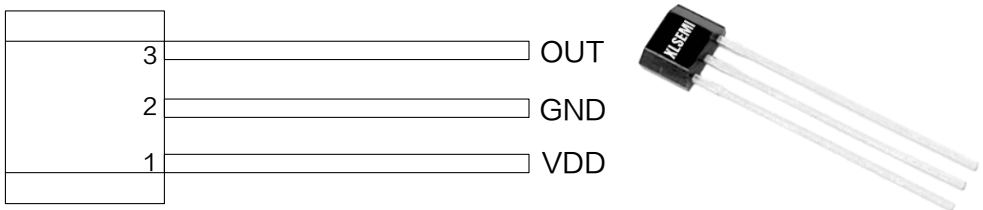


Figure2. Pin Configuration of XL47T

Table1.Pin Description

Pin Name	Description
VDD	Supply Voltage Input Pin，XL47T operates from 2.7V to 8V DC voltage.
GND	Ground Pin.
OUT	Output Pin.

Ordering Information

Order Information	Marking ID	Package Type	Eco Plan	Packing Type Supplied As
XL47T	XL47T	TO92S-3	RoHS & HF	1000 Units Per Bag

Function Block

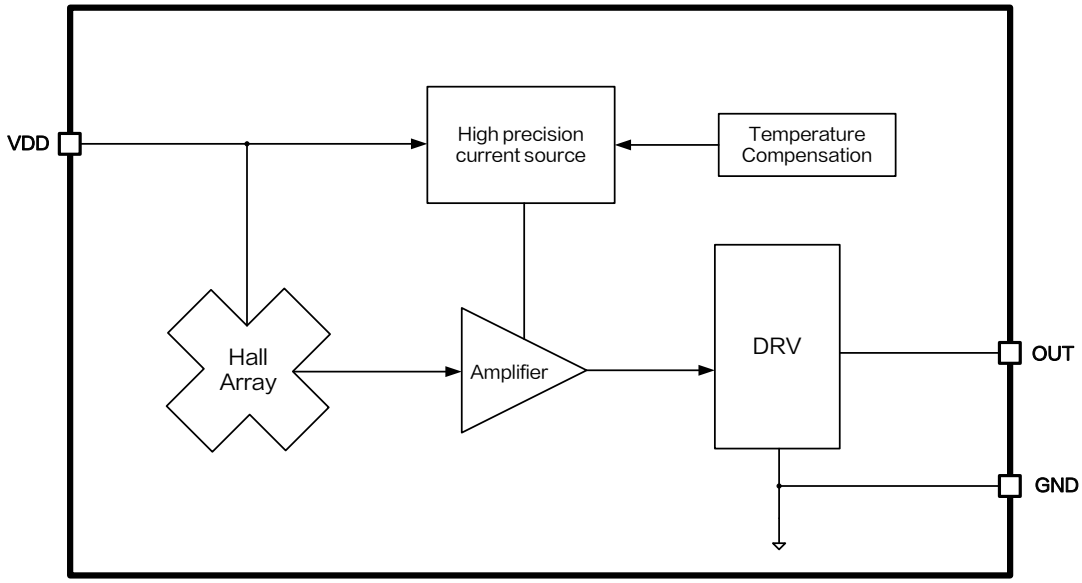


Figure3. Function Block Diagram of XL47T

Absolute Maximum Ratings（Note1）

Parameter	Symbol	Value	Unit
Input Pin Voltage	V_{DD}	−0.3～25	V
Output Pin Voltage	V_{OUT}	−0.3～25	V
Output Current	I_{OUT}	2	mA
Thermal Resistance(TO92S−3) (Junction to Ambient，No Heatsink,Free Air)	R_{JA}	160	°C/W
Operating Temperature	T_A	−40～105	°C
Operating Junction Temperature	T_J	−40～150	°C
Storage Temperature	T_{STG}	−65～150	°C
Lead Temperature(Soldering,10sec)	T_{LEAD}	260	°C
ESD(HBM)	−	≥2500	V

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability .

XL47T Electrical Characteristics（Note2）

T_A = 25℃,V_{DD}=3.3V,system parameters test circuit figure1,unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Operation Voltage	V_{DD}	–	2.7	3.3	8	V
Operation Current	I_{DD}	V_{DD}=3.3V	–	1.4	1.6	mA
Output Load Resistance	R_L	B=+1000Gs	20	–	–	kΩ
Output Voltage Range	$V_{OUT(H)}$	B=+1000Gs	2.45	2.5	–	V
	$V_{OUT(L)}$	B=−1000Gs	–	0.8	0.85	V
Static Output Voltage	$V_{OUT(Q)}$	B=0Gs	1.48	1.65	1.82	V
Linearity	Lin	–	−4	–	4	%
Power on start-up time	–	B=0Gs	–	6	–	
Response time	–	B=−1000Gs	–	0.7	–	μS
Output Noise	–	Bandwidth= 10Hz to 10kHz	–	0.8	–	mV

Note2: The power on start-up time and response time are both the time difference between the test input voltage and the time when the output voltage is stabilised.

XL47T Magnetic Characteristics（Note3）

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Sensitivity	Sens	V_{DD}=3.3V	2.07	2.35	2.63	mV/Gs

Note3: with sensitivity corresponding to output voltage in the linear range of 0.8V~ V_{DD} −0.8V as shown in the table。

Output Characteristics

T_A = 25℃ ,V_{DD} =3.3V,system parameters test circuit figure1,test methods figure4 unless otherwise specified。

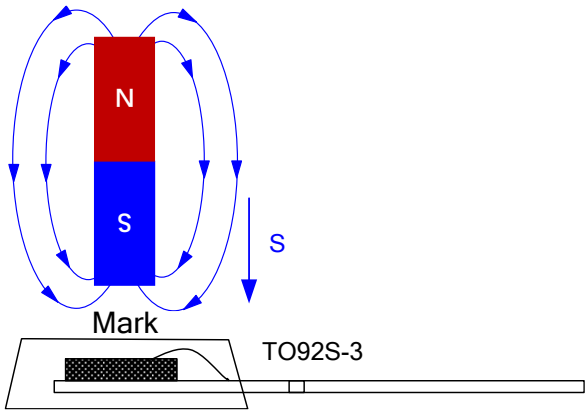


Figure4. Test Schematic of XL47T

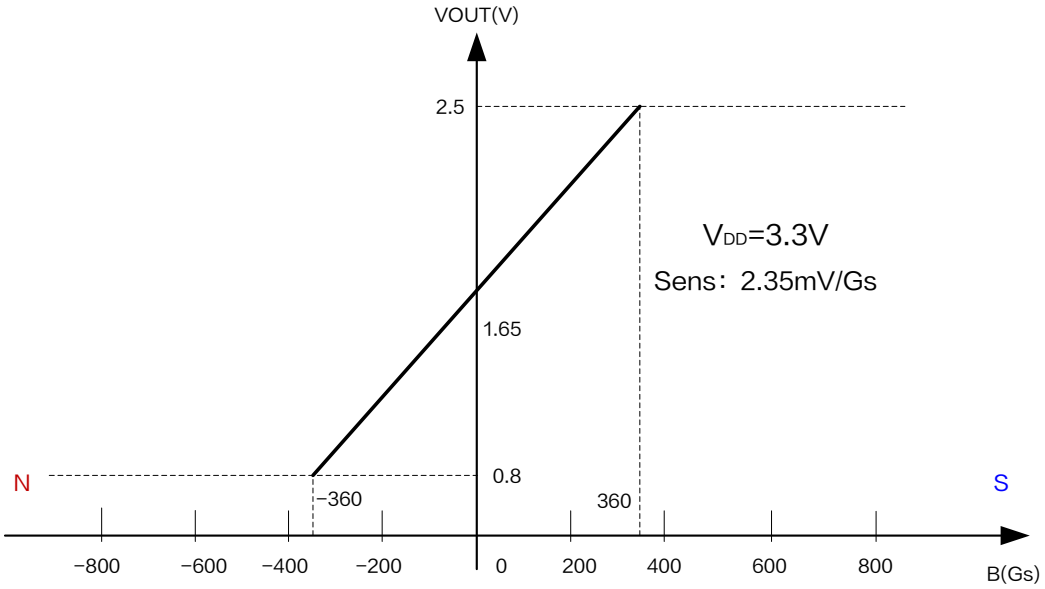
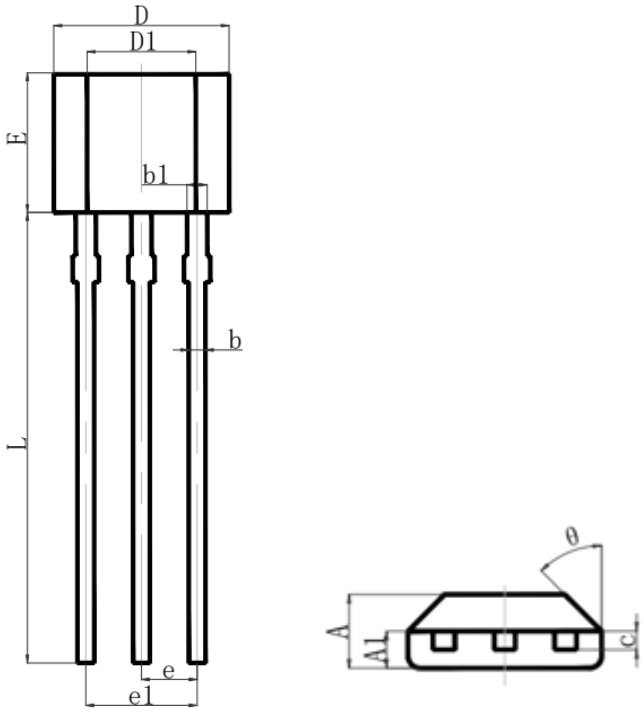


Figure5. Output Characteristic Curve of XL47T

Package Information

TO92S-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.42	1.62	0.056	0.064
A1	0.66	0.87	0.026	0.034
b	0.33	0.56	0.013	0.022
b1	0.40	0.51	0.016	0.020
c	0.33	0.51	0.013	0.020
D	3.90	4.10	0.154	0.161
D1	2.28	2.68	0.090	0.106
E	2.90	3.25	0.114	0.128
e	1.27 REF.		0.050 REF.	
e1	2.44	2.64	0.096	0.104
L	13.50	15.50	0.531	0.610
θ	45° REF.		45° REF.	

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