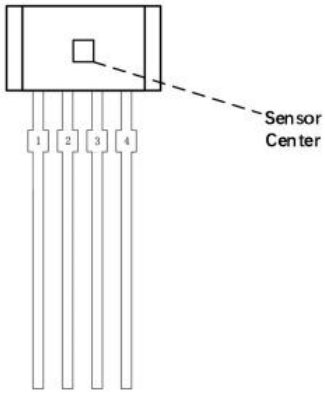
ITE6902
Linear Hall Effect Sensor

Features
- High operating bandwidth: DC to 350 kHz
- Background dynamic offset compensation and factory-programmed temperature compensation provides ±15mV offset and 1.5% sensitivity drift
- High performance sensor frontend guarantees low noise and high resolution
- Wide temperature range: -40°C to 150°C
- High ESD performance output of ±8 kV (HBM)

Applications
- Current sensing in high frequency inverters and DC/DC converters
- Brush-less DC motors
- Position sensing

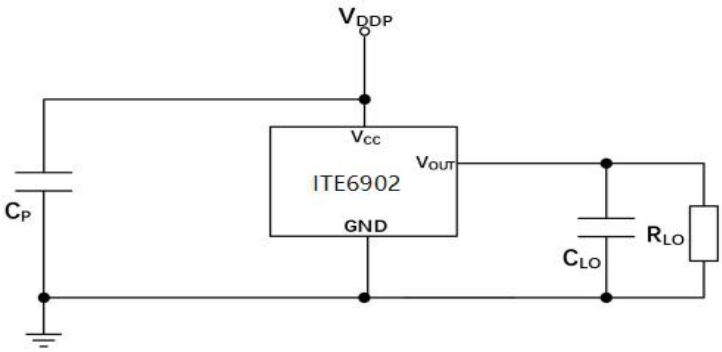
Description
The ITE6902 is a programmable linear Hall-effect sensor IC with on-chip Hall and temperature sensors. It features with temperature-stable Hall signal conditioning chains with background dynamic offset and package stress compensation. The sensor offers a high bandwidth up to 350 kHz and a fast response time of 1μs. The sensitivity and offset drift are 1.5% and 15mV over a wide temperature range from -40°C to 150°C.

The on-chip Hall sensor converts the magnetic flux through the chip to Hall signal voltage. The internal signal conditioning chain amplifies the voltage with the predefined gain. The undervoltage detection, overvoltage detection, power-on reset, output clamps and built-in diagnostic test make it suitable for safety-critical automotive applications.



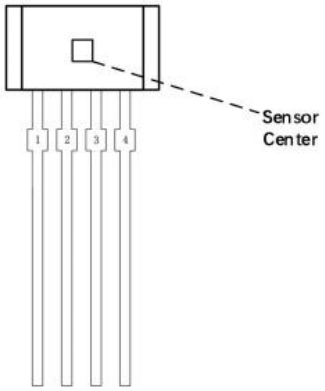
Package Type: SIP4

Typical Application



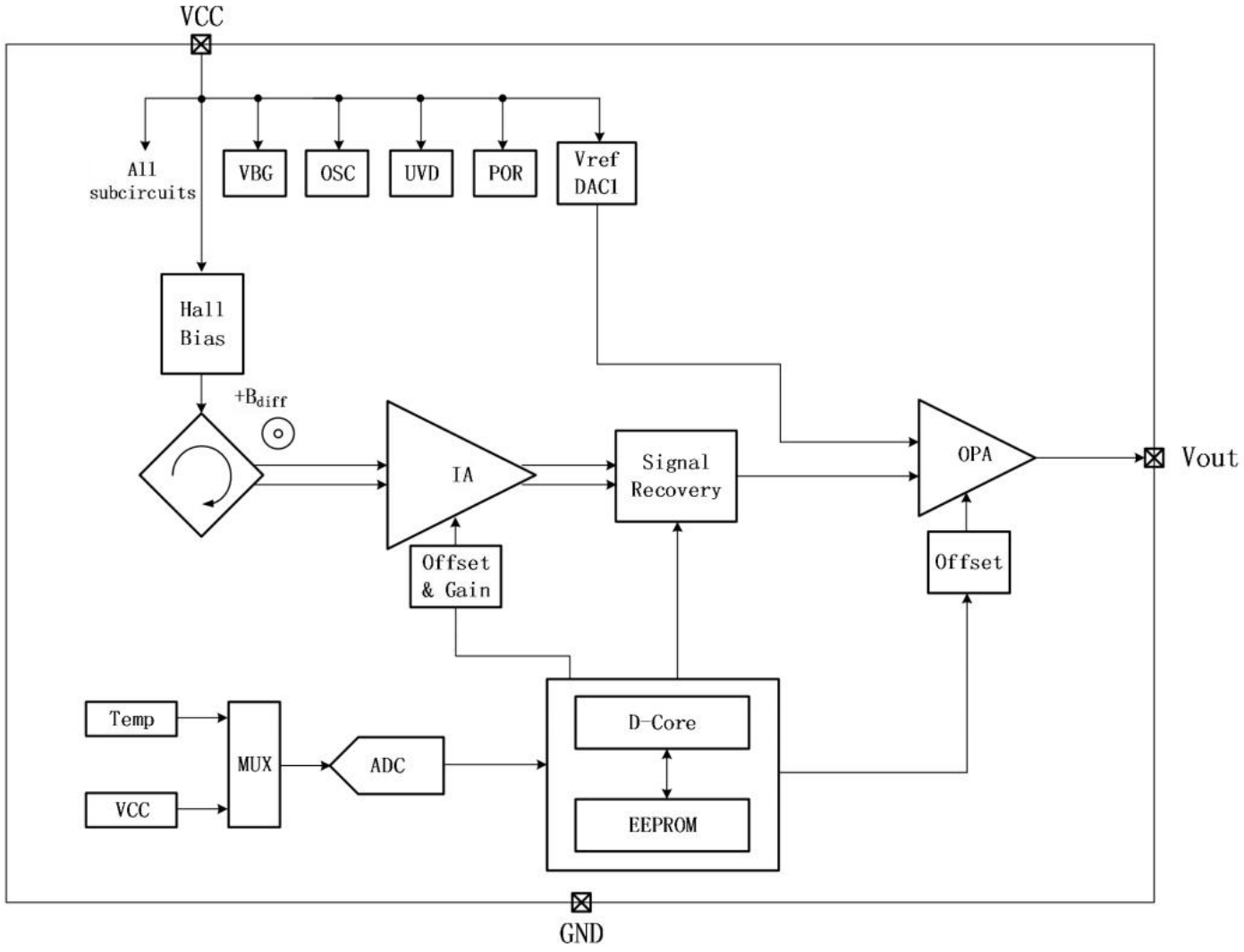
*For hash applications with supply disturbance, a Cp placed close to the IC is recommended (see Fig.3), C_P= 100nF, R_{LO}= 10kΩ, and C_{LO}= 1nF.

Pin Description



PIN NO.	NAME	DESCRIPTION
1	VCC	Supply voltage
2	OUT	Output voltage
3	NC	Not connect
4	GND	Ground

Functional Block Diagram



Absolute Maximum Ratings

SYMBOL	PARAMETER	MIN	MAX	UNIT	NOTE
V_{CC}	Supply Voltage		18	V	t<96h
V_{RCC}	Reverse Supply Voltage		-0.5	V	
V_{OUT}	Output Voltage		16	V	t<96h
V_{ROUT}	Output Reverse Voltage		-0.5	V	
I_O	Output Current	-	10	mA	
T_A	Junction Temperature Range	-40	190	°C	t<96h
R_{THJA}	Thermal Resistance Junction Ambient	-	300	K/W	
R_{THJL}	Thermal Resistance Junction Lead	-	100	K/W	
N_{CYCLE}	EEPROM Endurance		1000		

Recommended Operating Conditions (Note 4)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT	NOTE
V_{CC}	Supply Voltage	4.5	5	5.5	V	
I_O	Output Current	-	12	-	mA	Sink or source
T_J	Junction Temperature Range	-40	-	170	°C	T<1000h

ESD And Latch-up

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT	NOTE
I_{latch}	Latch-up Current	-200	-	200	mA	125°C
V_{HBM_VCC}	VCC ESD	-8	-	8	kV	25°C
V_{HBM_VOUT}	VOUT ESD	-8	-	8	kV	25°C
V_{CDM}	CDM	-2		2	kV	25°C

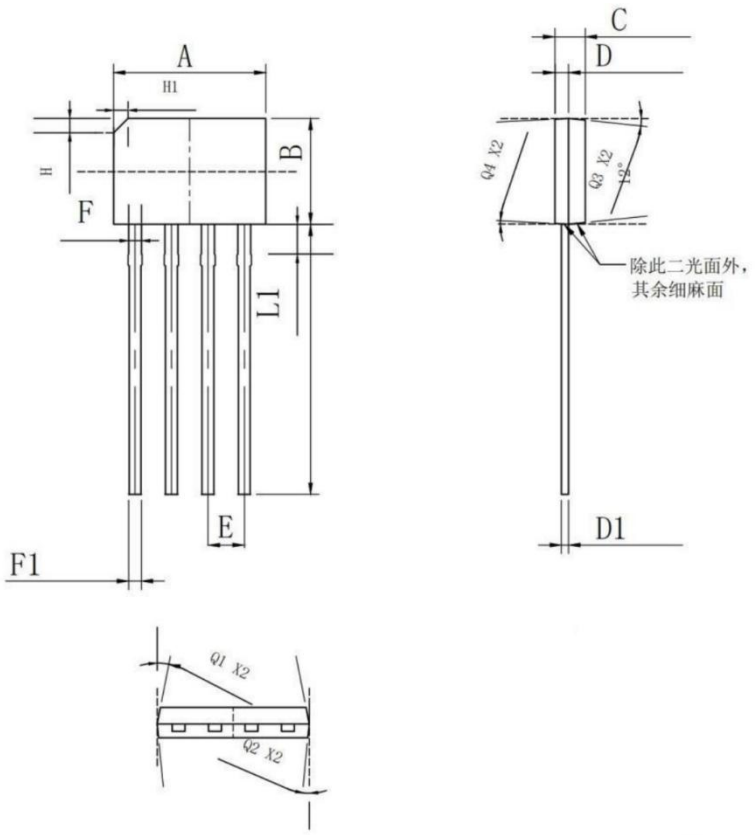
Electrical Characteristics

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage						
I_S	Supply Current		-	15	19	mA
T_{PO}	Power-on Time			80		μS
V_{UVOH}	Undervoltage Threshold	VCC Rising	-	4.2	-	V
V_{UVOL}		VCC Falling	-	3.8	-	V
V_{PORH}	Power On Reset	VCC Rising	-	3.9	-	V
V_{PORL}		VCC Falling	-	3.4	-	V
Output Voltage						
V_{CLAMP}	Output Clamp Voltage	With Clamp On	0.3	-	4.7	V
t_{RESP}	Output Response Time	B=B(max step), CL=1nF	-	1	-	μS
V_{Noise}	Output Noise	TA=25℃	-	20	-	mV_{pp}
		SNST=1 mV/G_S	-	2	-	mV_{rms}
V_{SATH}	Output Saturation Voltage	V_{OUT} to V_{CC}	-	4.8	-	V
V_{SATL}		V_{OUT} to GND	-	0.2	-	V
V_{CLPH}	Output Clamp Voltage	V_{OUT} to V_{CC}	-	4.7	-	V
V_{CLPL}		V_{OUT} to GND	-	0.3	-	V
R_{LOU}	Output Load Resistor	V_{OUT} to V_{CC}	10	-	-	kΩ
R_{LOD}		V_{OUT} to GND	10	-	-	kΩ
C_L	Output Load Capacitor			1	5	nF
E_{LIN}	Nonlinearity	B≤2000G_S	-0.5	-	0.5	%
		B≤3000G_S	-1.1	-	1.1	%
BW	Bandwidth	-3dB,CL=1nF		350		kHz
Quiescent Output						
B_{OUT_Fine}	Number Of Fine Programmable Bits For V_{OQ}		-	9	-	bit
V_{OQ}	Output Voltage		2.48	2.5	2.52	V
V_{OQ_P}	Programmable Output Voltage Range		2.2	-	2.8	V
V_{OQ_TC}	Output Voltage Temperature Drift	-40℃~150℃	-15	-	15	mV

Magnetic Characteristics

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Sensitivity						
S_{00}	Default Selection Of Coarse Sensitivity		-	1.7	-	mV/G_S
S_{01}			-	5.1	-	mV/G_S
S_{10}			-	1.7	-	mV/G_S
S_{11}			-	19.7	-	mV/G_S
S_{00_PR}	Programmable Range Of Coarse Sensitivity		0.5	-	1.8	mV/G_S
S_{01_PR}			1.8	-	5.4	mV/G_S
S_{10_PR}			5.4	-	11.4	mV/G_S
S_{11_PR}			11.4	-	21	mV/G_S
B_{COARSE}	Coarse Programming Bits		-	2	-	bit
B_{FINE}	Fine Programming Bits		-	9	-	bit
S_{ERR}	Sensitivity Error	25°C	-1.0	-	-1.0	%
S_{ERR_TC}	Sensitivity Drift	-40°C ~ 25°C	-1.5	-	-1.5	%
		-25°C ~ 150°C	-1.0	-	-1.0	%

Package Information: SIP4



SYMBOL	Millimeters		
	MIN	MID	MAX
A	5.20	5.30	5.40
B	3.59	3.69	3.79
C	1.04	1.06	1.08
D	0.47	0.48	0.49
D1	0.20	0.25	0.30
E	/	1.27	/
F	0.40	0.45	0.50
F1	0.35	0.40	0.45
L	14.2	14.5	14.8
L1	0.95	1.00	1.05
H	0.40	0.45	0.50
H1	0.40	0.45	0.50
Q1		22°	
Q2		11°	
Q3		12°	
Q4		6°	

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