

SD139X微功耗 可休眠 低压线性霍尔

说明:

SD139X 系列线性霍尔效应传感器提供直接与所适用磁场成比例的电压输出。

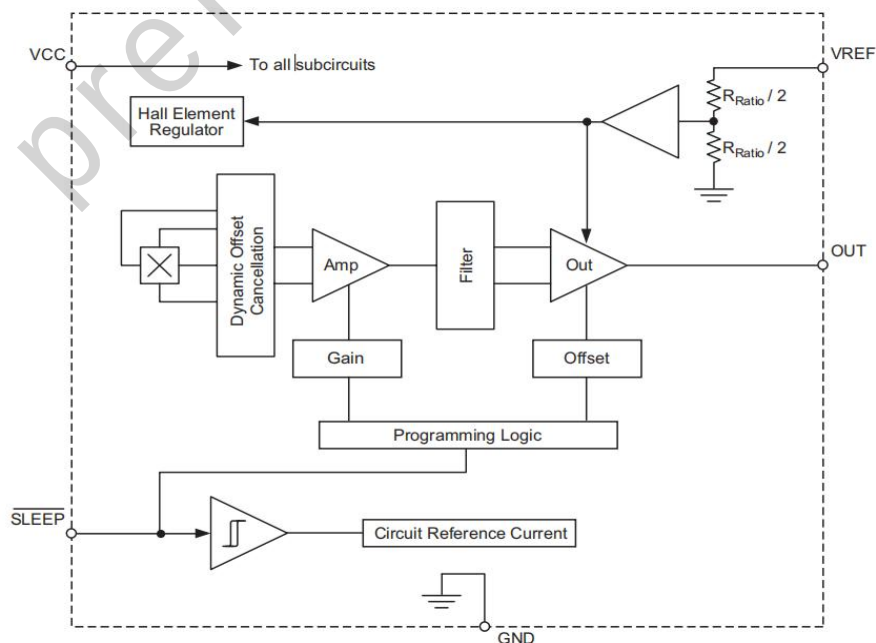
用户通过添加可选的休眠方式将电流消耗减少至不超过 25 μA 。这就使这些器件更适合于电池供电型应用，如：移动电话、震动牙刷的伺服系统、液位检测、白色家电等。最终用户可以通过将逻辑电平信号施加于SLEEP引脚来控制

SD1392的电流消耗。器件输出在休眠模式中是无效的（高阻抗模式）。SD1392的输出基于VREF引脚，在无磁场输入情况下， $V_{\text{OUT}}=V_{\text{REF}}/2$

特性

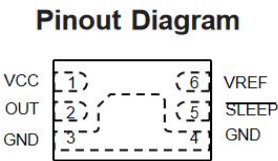
- 休眠方式中的高阻抗输出
- 兼容 1.65V至 3.5 V 电源
- 客户可自选休眠模式
- 微型 DFN6封装
- 与电源参考电压（VREF 引脚）成比例输出
- 较宽的环境温度范围：-20°C 到 85°C
- ESD 保护超过 3 kV
- 高可靠性
- 出厂时可预设灵敏度和偏移

简易框图



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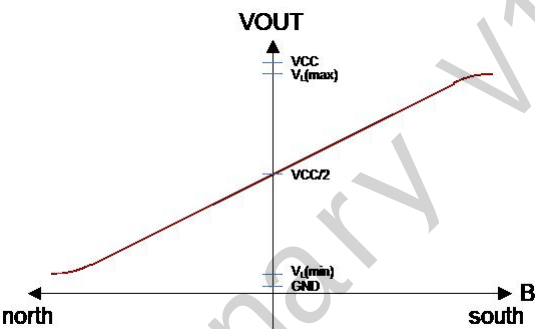
管脚定义



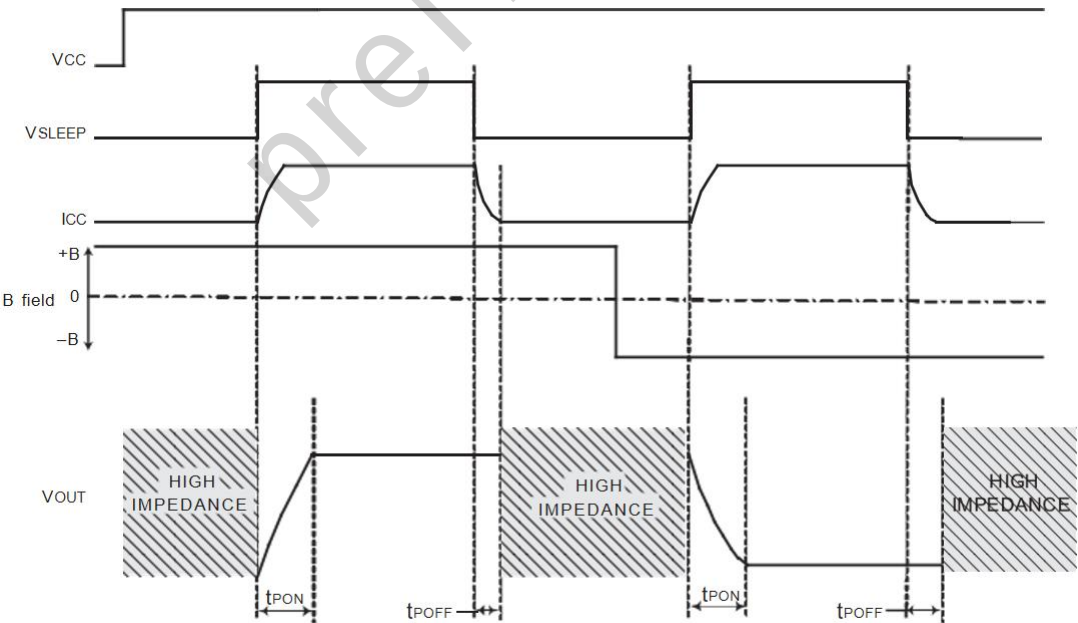
Terminal List Table

Pin	Name	Function
1	VCC	Supply
2	OUT	Output
3	GND	Ground
4	GND	Ground
5	SLEEP	Toggle sleep mode
6	VREF	Supply for ratiometric reference

输出特性



工作时序



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推荐工作参数:

Characteristic	Symbol	Test Conditions	Min.	Typ. [1]	Max.	Units
Supply Voltage	V _{CC}		1.65	—	3.5	V
Nominal Supply Voltage	V _{CCN}		—	3.0	—	V
Supply Zener Clamp Voltage	V _{CCZ}	I _{CC} = 7 mA, T _A = 25°C	6	8.3	—	V
Ratiometric Reference Voltage[2]	V _{REF}		2.5	—	V _{CC}	V
Ratiometric Reference Zener Clamp Voltage	V _{REFZ}	I _{VREF} = 3 mA, T _A = 25°C	6	8.3	—	V
SLEEP Input Voltage			−0.1	—	V _{CC} + 0.5	V
SLEEP Input Threshold	V _{INH}	For active mode	—	0.45 × V _{CC}	—	V
	V _{INL}	For sleep mode	—	0.20 × V _{CC}	—	V
Ratiometric Reference Input Resistance	R _{REF}	V _{SLEEP} > V _{INH} , V _{CC} = V _{CCN} , T _A = 25°C	250	—	—	kΩ
		V _{SLEEP} < V _{INL} , V _{CC} = V _{CCN} , T _A = 25°C	—	5	—	MΩ
Chopper Stabilization Chopping Frequency	f _c	V _{CC} = V _{CCN} , T _A = 25°C	—	200	—	kHz
SLEEP Input Current	I _{SLEEP}	V _{SLEEP} = 3 V, V _{CC} = V _{CCN}	—	1	—	μA
Supply Current	I _{CC}	V _{SLEEP} < V _{INL} , V _{CC} = V _{CCN} , T _A = 25°C	—	0.025	—	mA
		V _{SLEEP} > V _{INH} , V _{CC} = V _{CCN} , T _A = 25°C	—	3.2	—	mA
Quiescent Output Power Supply Rejection[4]	PSR _{VOQ}	f _{AC} < 1 kHz	—	−60	—	dB

极限参数

Characteristic	Symbol	Notes	Rating	Unit
Supply Voltage	V _{CC}		6	V
Reverse-Supply Voltage	V _{RCC}		−0.1	V
Ratiometric Supply Reference Voltage	V _{REF}		7	V
Reverse-Ratiometric Supply Reference Voltage	V _{RREF}		−0.1	V
Logic Supply Voltage	V _{SLEEP}	(V _{CC} > 2.5 V)	32	V
Reverse-Logic Supply Voltage	V _{RSLEEP}		−0.1	V
Output Voltage	V _{OUT}		V _{CC} + 0.1	V
Reverse-Output Voltage	V _{ROUT}		−0.1	V
Operating Ambient Temperature	T _A	RangeS	−20 to 85	°C
Junction Temperature	T _J (MAX)		150	°C
Storage Temperature	T _{stg}		−40 to 150	°C

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Characteristic	Symbol	Test Conditions		Min.	Typ. [1]	Max.	Units
Linearity		$V_{CC} = V_{CCN}, V_{REF} \leq V_{CC}$		-1.5		1.5	%
Maximum Voltage Applied to Output	V_{OUTMAX}	$V_{SLEEP} < V_{INL}$		—	—	$V_{CC} + 0.1$	V
Sensitivity	Sens	SD139 1	$T_A = 25^{\circ}\text{C}, V_{CC} = V_{REF} = V_{CCN}$	—	1.25	—	mV/G
		SD139 2	$T_A = 25^{\circ}\text{C}, V_{CC} = V_{REF} = V_{CCN}$	—	2.00	—	mV/G
		SD139 3	$T_A = 25^{\circ}\text{C}, V_{CC} = V_{REF} = V_{CCN}$	—	?	—	mV/G
Quiescent Output	V_{OUTQ}	$T_A = 25^{\circ}\text{C}, B = 0\text{ G}$		—	$0.500 \times V_{REF}$	—	V
Output Resistance[3]	R_{OUT}	$f_{out} = 1\text{ kHz}, V_{SLEEP} > V_{INH}$, active mode		—	20	—	Ω
		$f_{out} = 1\text{ kHz}, V_{SLEEP} < V_{INL}$, sleep mode		—	4M	—	Ω
Output Load Resistance	R_L	Output to ground		15	—	—	k Ω
Output Load Capacitance	C_L	Output to ground		—	—	10	nF
Output Bandwidth	BW	-3 dB point, $V_{OUT} = 1\text{ V}_{pp}$ sinusoidal, $V_{CC} = V_{CCN}$		—	10	—	kHz

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电压比例：SD1392霍尔具有比率输出功能。静态电压输出和灵敏度与比率电源参考电压成比例。

静态电压输出的比率变化百分比定义为：

$$\Delta V_{OUTQ(\Delta V)} = \frac{\Delta V_{OUTQ(V_{REF})} \div \Delta V_{OUTQ(3V)}}{V_{REF} \div 3V} \times 100\%$$

灵敏度的比率变化百分比定义为：

$$\Delta Sens_{(\Delta V)} = \frac{\Delta Sens_{(V_{REF})} \div \Delta Sens_{(3V)}}{V_{REF} \div 3V} \times 100\%$$

线性度：SD1392 设计用于提供具有VCCN的最大电源电压的线性输出。尽管施加非常高的磁场不会损坏这些器件，但它会迫使输出进入非线性区域。以百分比为单位的线性度被测量并定义为：

$$Lin+ = \frac{V_{OUT(+B)} - V_{OUTQ}}{2(V_{OUT(+B/2)} - V_{OUTQ})} \times 100\%$$

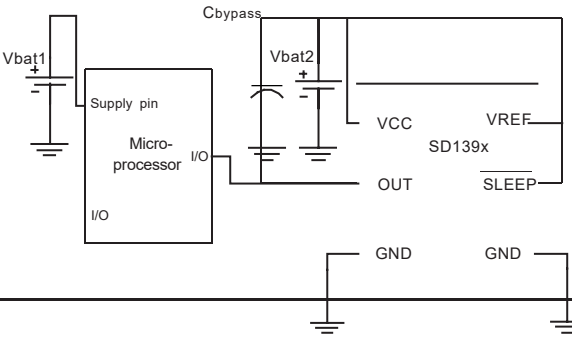
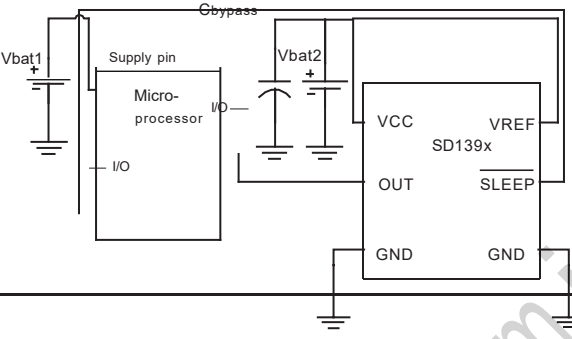
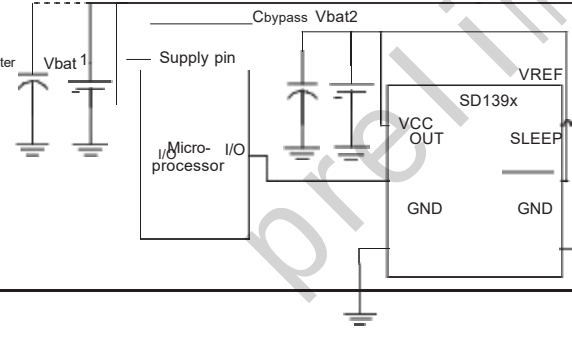
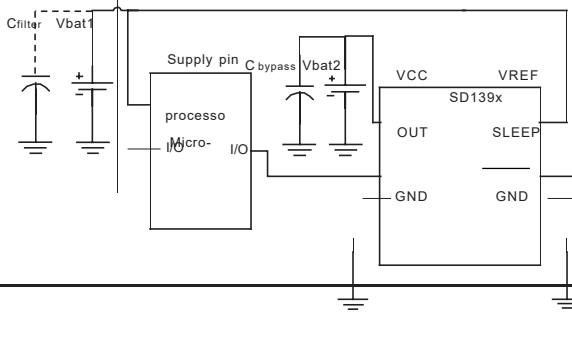
$$Lin- = \frac{V_{OUT(-B)} - V_{OUTQ}}{2(V_{OUT(-B/2)} - V_{OUTQ})} \times 100\%$$

对称性

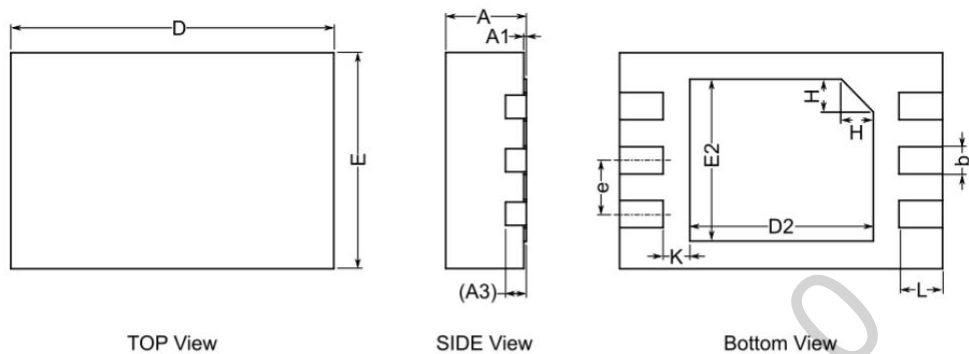
$$Sym = \frac{V_{OUT(+B)} - V_{OUTQ}}{V_{OUTQ} - V_{OUT(-B)}} \times 100\%$$

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常用应用电路推荐

Application Circuit	Device Pin Connections		Device Output
	VREF pin (Ratiometric Reference Supply)	SLEEP pin	
	Connected to SD139x device supply, VCC	Connected to SD139x device supply, VCC	Ratiometric to device supply (VCC), and always valid
	Connected to SD139x device supply, VCC	Controlled by microprocessor	Ratiometric to device supply (VCC), and controlled by the microprocessor
	Connected to microprocessor supply	Connected to SD139x device supply, VCC	Ratiometric to micro-processor supply, and always valid
	Connected to microprocessor supply	Controlled by microprocessor	Ratiometric to micro-processor supply, and controlled by the microprocessor

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参数	尺寸单位: 毫米			尺寸单位: 英寸		
	最小值	典型值	最大值	最小值	典型值	最大值
A	0.70	0.75	0.80	0.028	0.030	0.031
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.203REF			0.008REF		
b	0.20	0.25	0.30	0.008	0.010	0.012
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.90	2.00	2.10	0.075	0.079	0.083
D2	1.60	1.70	1.80	0.063	0.067	0.071
E2	1.40	1.50	1.60	0.055	0.059	0.063
e	0.40	0.50	0.60	0.016	0.020	0.024
H	0.30REF			0.012REF		
K	0.15	0.25	0.35	0.006	0.010	0.014
L	0.35	0.4	0.45	0.014	0.016	0.018