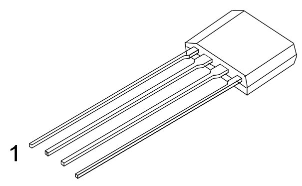
UNISONIC TECHNOLOGIES CO., LTD

DYNAMIC DIFFERENTIAL HALL EFFECT SENSOR IC WITH DIGITAL SIGNAL OUTPUT



■ DESCRIPTION

The differential Hall Effect sensor UTC **UH4921** provides a superior stability and a high sensitivity over temperature and symmetrical thresholds in order to achieve a stable duty cycle. The integrated circuit provides a digital signal output with frequency proportional to the speed of rotation. Unlike other rotational sensors differential Hall ICs are not influenced by radial vibration within the effective airgap of the sensor and require no external signal processing.

UTC **UH4921** is particularly suitable for rotational speed detection and timing applications of ferromagnetic toothed wheels such as anti-lock braking systems, transmissions, crankshafts, etc.

■ FEATURES

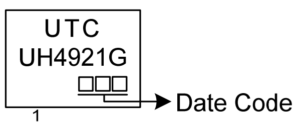
* Digital output signal
* Low cut-off frequency
* High sensitivity
* Symmetrical thresholds
* Reduced power consumption
* AC coupled
* Output protection against electrical disturbances
* Large temperature range
* Large airgap
* Protection against overvoltage
* Protection against reversed polarity
* Two-wire and three-wire configuration possible
* Advanced performance
* South and north pole pre-induction possible
* High piezo resistivity

■ ORDERING INFORMATION

Ordering Number	Package	Packing
UH4921G-G04-K	SIP-4	Bulk

UH4921G-G04-K (1)Packing Type (2)Package Type (3)Green Package	(1) K: Bulk (2) G04: SIP-4 (3) G: Halogen Free and Lead Free

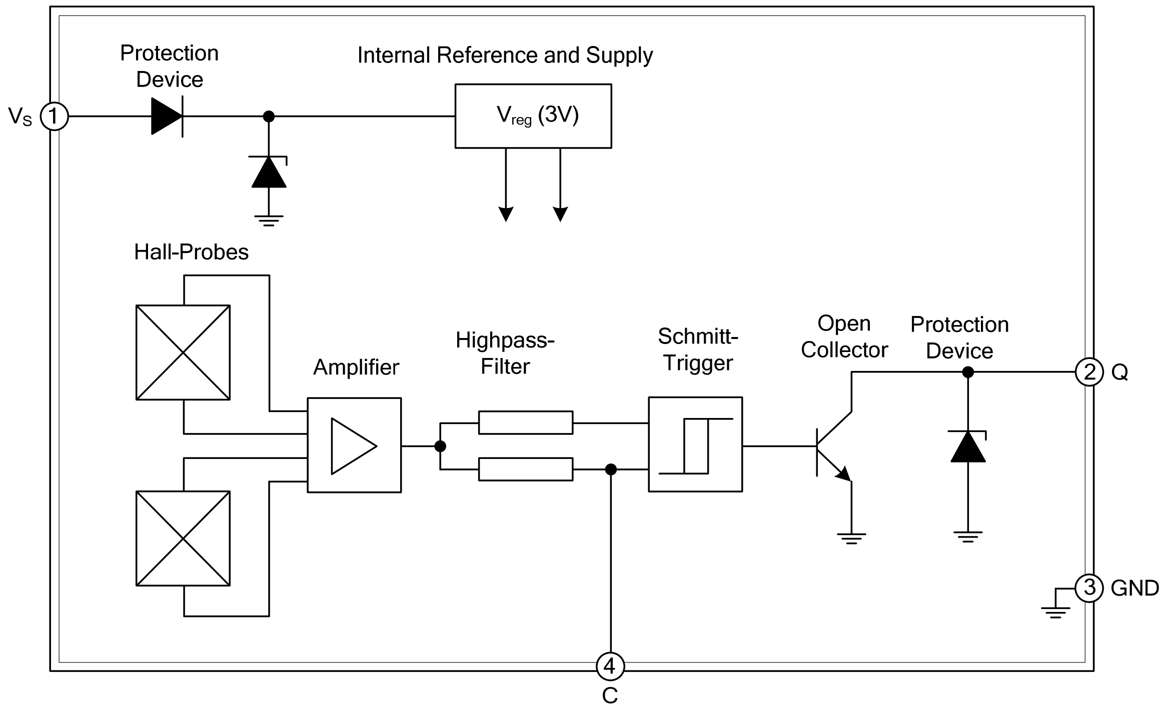
■ MARKING



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V_S	Supply voltage
2	Q	Output
3	GND	Ground
4	C	Capacitor

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage (Note 1)		V_S	30	V
Output Voltage		V_Q	-0.7 ~ 30	V
Output Current		I_Q	50	mA
Output Reverse Current		$-I_Q$	50	mA
Capacitor Voltage		V_C	-0.3 ~ 3	V
Current Through Input-Protection Device	t<2ms, v=0.1	I_{SZ}	200	mA
Current Through Output-Protection Device	t<2ms, v=0.1	I_{QZ}	200	mA
Junction Temperature		T_J	150	°C
Storage Temperature		T_{STG}	-40 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL RESISTANCES CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	190	K/W

■ OPERATING RANGE

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V_S			24	V
Pre-Induction	B_0	-500		500	mT
Differential Induction	ΔB	-80		80	mT

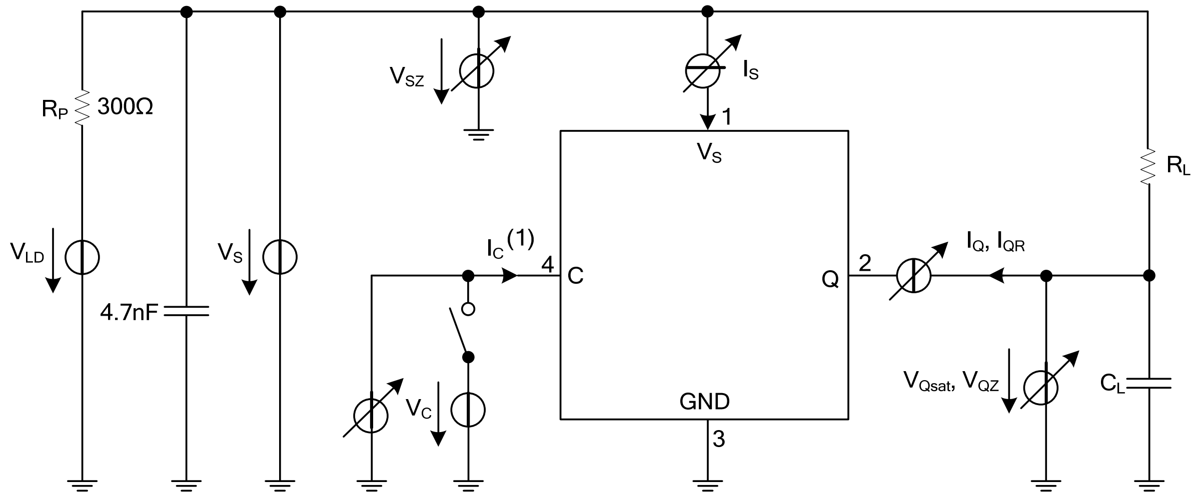
■ AC/DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current (Note 1)	I_S	V_Q=high, I_Q=0mA	3.8	11	15	mA
		V_Q=low, I_Q=40mA	4.3	12	18	mA
Output Saturation Voltage	V_{Qsat}	I_Q=40mA		0.25	0.6	V
Output Leakage Current	I_{QL}	V_Q<=24V			50	μA
Centre of Switching Points: ($\Delta B_{OP}+\Delta B_{RP}$)/2	ΔB_m	-20mT< ΔB<20mT (Note 2, 3)；f=200Hz	-2	0	2	mT
Operate Point	ΔB_{OP}	f=200Hz, ΔB=20mT			0	mT
Release Point	ΔB_{RP}	f=200Hz, ΔB=20mT	0			mT
Hysteresis	ΔB_{Hy}	f=200Hz, ΔB=20mT		1.5		mT
Output Rise Time	t_r	I_Q=40mA, C_L=10pF			0.5	μs
Output Fall Time	t_f	I_Q=40mA, C_L=10pF			0.5	μs
Delay Time	t_{dop}	f=10kHz, ΔB=5mT			25	μs
	t_{drp}				10	μs
	$t_{dop}-t_{drp}$			0	15	μs
Filter Input Resistance	R_C	25°C±2°C	35	55	62	kΩ
Filter Sensitivity to ΔB	S_C			-5		mV/mT
Filter Bias Voltage	V_C	ΔB=0	1.6	2	2.4	V

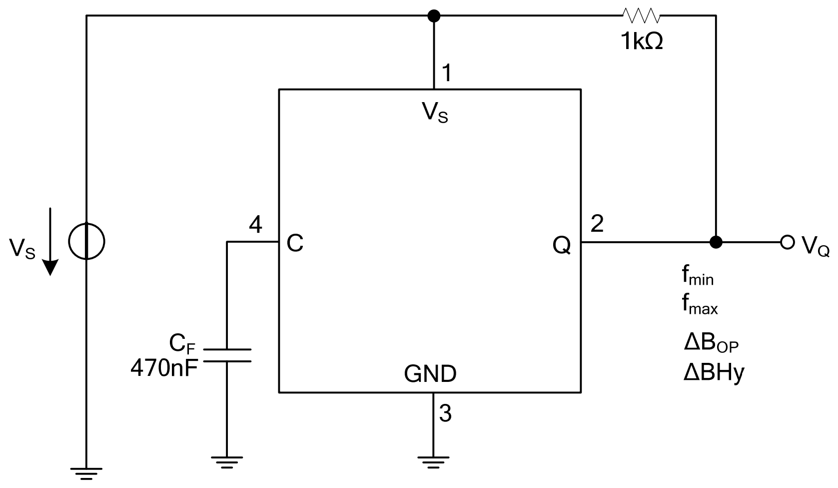
Notes: 1. Reverse current<10mA

2. The Current consumption characteristic will be different and the specified values can slightly change.
3. Leakage currents at pin 4 should be avoided. The bias shift of B_m caused by a leakage current I_L can be calculated by: $\Delta B_m=(I_L \times R_C(T))/S_C(T)$.
4. For higher ΔB the values may exceed the limits like following $|\Delta B_m| < |0.05 \times \Delta B|$

■ TEST CIRCUIT

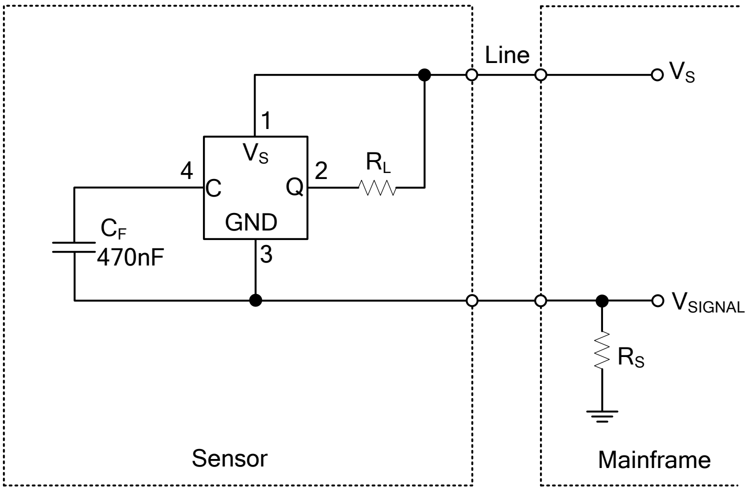


(1) $R_C=\frac{\Delta V_C}{\Delta I_C}$



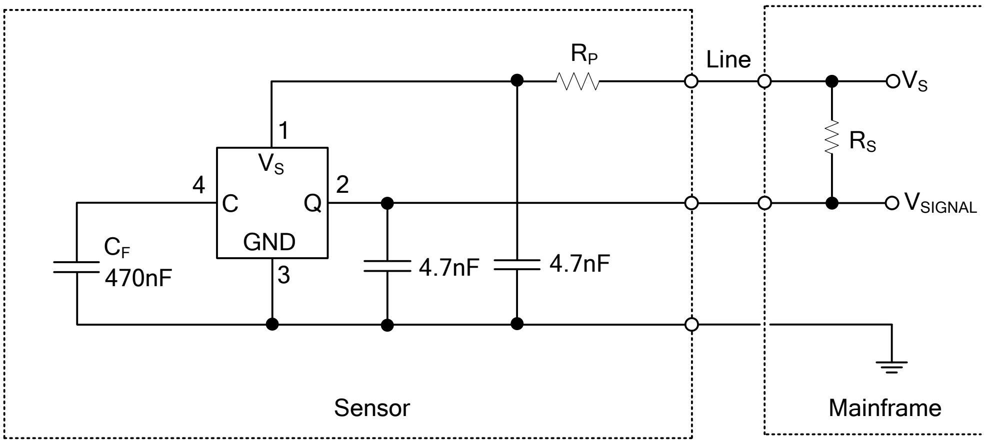
■ TYPICAL APPLICATION CIRCUIT

Two-wire-application



for example : R_L=330Ω
R_S=120Ω

Three-wire-application



for example : R_L=330Ω
R_P=0~330Ω