



UH4921

Preliminary

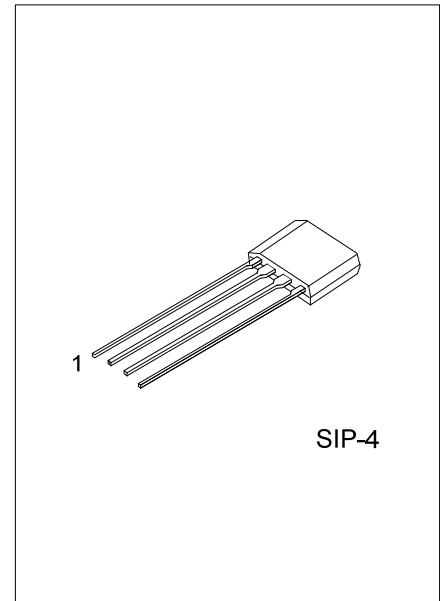
LINEAR INTEGRATED CIRCUIT

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

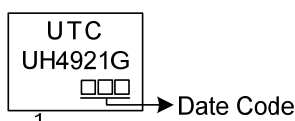
- * Digital output signal
- * Low cut-off frequency
- * High sensitivity
- * Symmetrical thresholds
- * Reduced power consumption
- * AC coupled
- * Output protection against electrical disturbances
- * Large temperature range
- * Large airgap
- * Protection against overvoltage
- * Protection against 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
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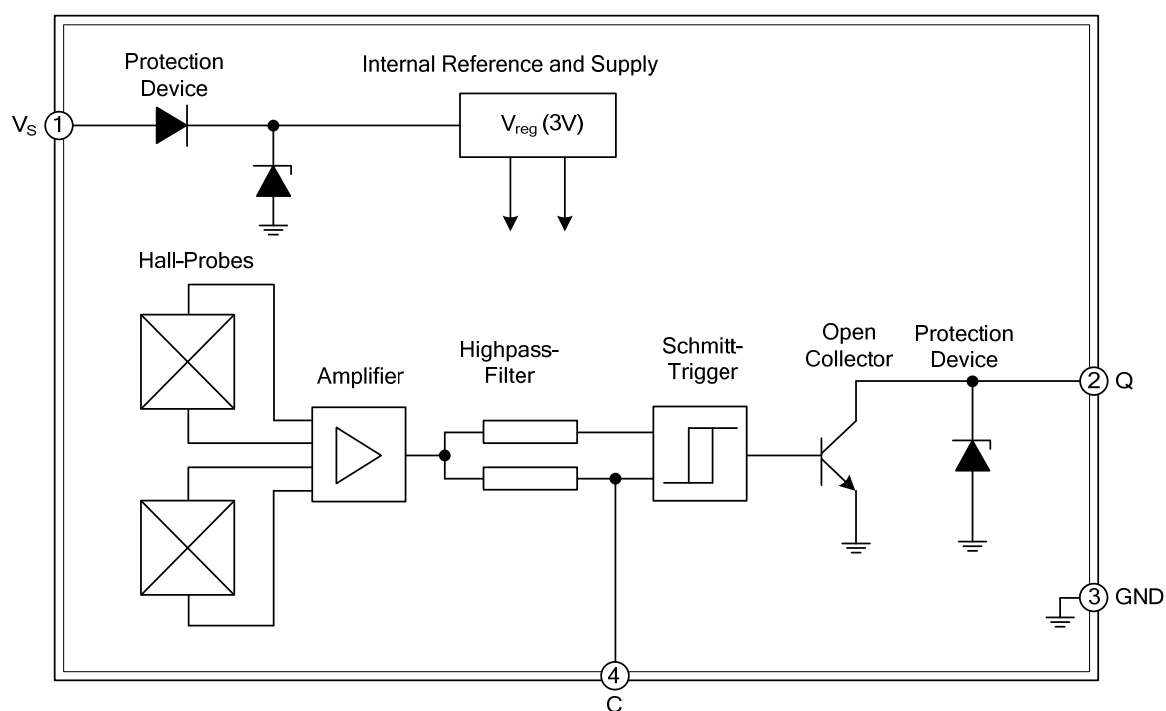
MARKING



■ 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_O	-0.7 ~ 30	V
Output Current	I_O	50	mA
Output Reverse Current	$-I_O$	50	mA
Capacitor Voltage	V_C	-0.3 ~ 3	V
Current Through Input-Protection Device	I_{SZ}	200	mA
Current Through Output-Protection Device	I_{OZ}	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

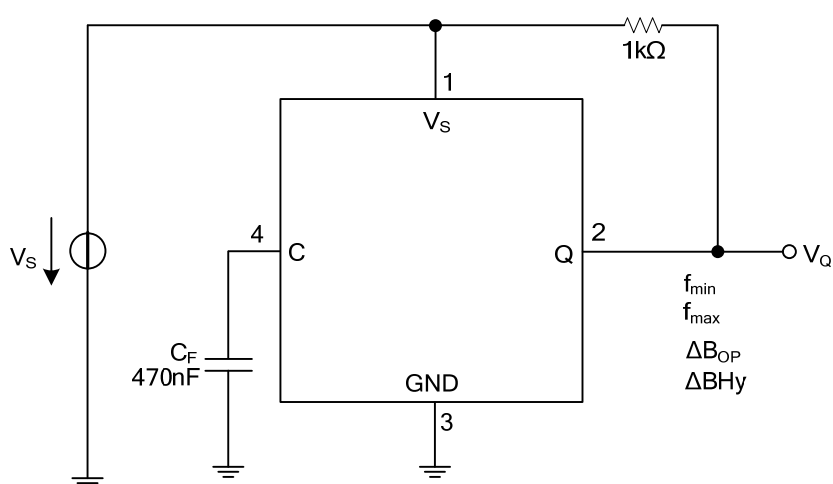
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current (Note 1)	I_S	$V_O = \text{high}, I_O = 0\text{mA}$	3.8	11	15	mA
		$V_O = \text{low}, I_O = 40\text{mA}$	4.3	12	18	mA
Output Saturation Voltage	$V_{O\text{sat}}$	$I_O = 40\text{mA}$		0.25	0.6	V
Output Leakage Current	I_{OL}	$V_O \leq 24\text{V}$			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, $\Delta B = 20\text{mT}$			0	mT
Release Point	ΔB_{RP}	f=200Hz, $\Delta B = 20\text{mT}$	0			mT
Hysteresis	ΔB_{HY}	f=200Hz, $\Delta B = 20\text{mT}$		1.5		mT
Output Rise Time	t_r	$I_O = 40\text{mA}, C_L = 10\text{pF}$			0.5	μs
Output Fall Time	t_f	$I_O = 40\text{mA}, C_L = 10\text{pF}$			0.5	μs
Delay Time	t_{dop}	f=10kHz, $\Delta B = 5\text{mT}$			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	k Ω
Filter Sensitivity to ΔB	S_C			-5		mV/mT
Filter Bias Voltage	V_C	$\Delta B = 0$	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.

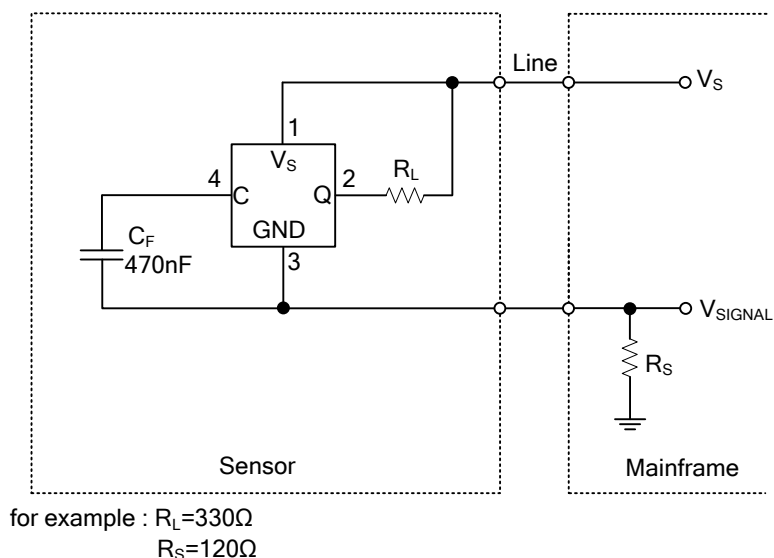
3. Leakage currents at pin 4 should be avoided. The bias shift of B_m caused by a leakage current I_L can be calculated by: $\Delta B_m = (I_L \times R_C(T)) / S_C(T)$.

4. For higher ΔB the values may exceed the limits like following $|\Delta B_m| \leq 10.05 \times \Delta B$

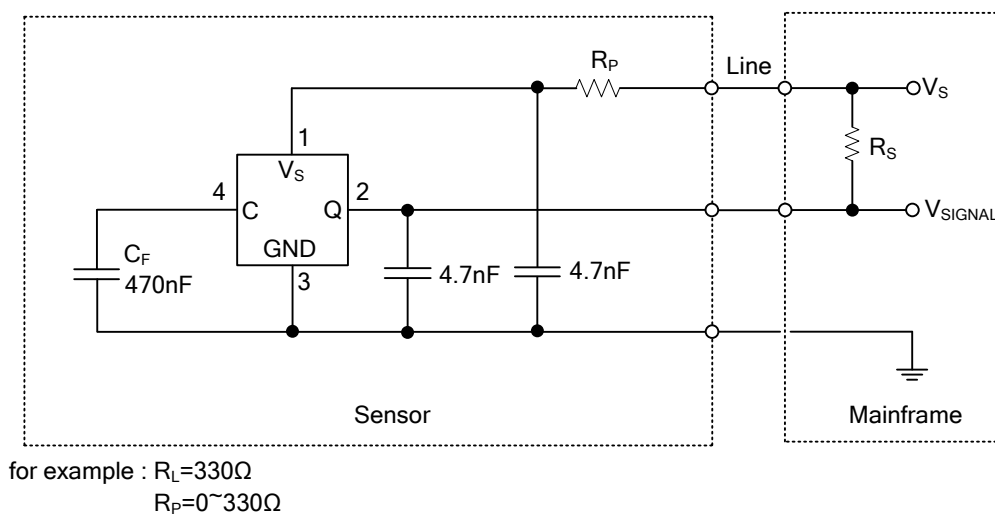


■ TYPICAL APPLICATION CIRCUIT

Two-wire-application



Three-wire-application



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