SIEMENS

Special Economic Hall-Effect IC for Low-Cost Magnetic Field Applications

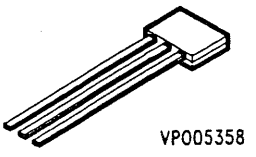
TLE 4905
TLE 4935

Preliminary Data

Bipolar-IC

Features

- Low price
- Digital output signal
- For unipolar and alternating magnetic fields
- Large temperature range
- Protection against reversed polarity
- Output protection against electrical disturbances



P-SSO-3-2

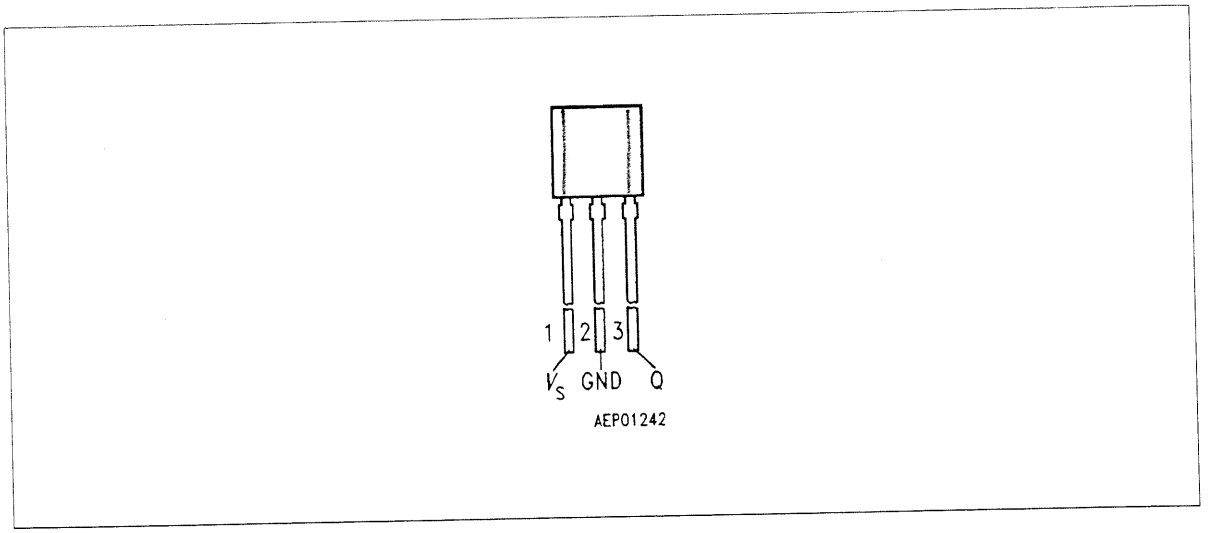
	Type	Ordering Code	Package
▼	TLE 4905 L	Q67006-A9120	P-SSO-3-2
▼	TLE 4935 L/LS	Q67006-A9112	P-SSO-3-2/3-3

▼ = New type

TLE 4904 F (Unipolar/Bipolar Magnetic Fields Switches) have been designed specifically for low cost automotive and industrial applications which do not require overvoltage protection. reverse polarity protection is included on-chip as is output protection against negative voltage transients.

These devices are ideal for systems where low cost and high reliability are the key factors.

Typical applications are position/proximity indicators, brushless DC motor commutation, rotational indexing etc.



Pin Configuration

Pin Definitions and Funtions

Pin	Symbol	Function
1	V_S	Supply voltage
2	GND	Ground
3	Q	Output

Circuit Description

The circuit includes Hall generator, amplifier and Schmitt-Trigger on one chip. The internal reference provides the supply voltage for the components. A magnetic field perpendicular to the chip surface induces a voltage at the hall probe. This voltage is amplified and switches a Schmitt-trigger with open-collector output. A protection diode against reverse power supply is integrated. The output is protected against electrical disturbances.

For critical applications requiring higher switching accuracy, fully protected Hall ICs the Siemens TLE 4904 (switch) and TLE 4934/44 (latch/switch) are recommended.

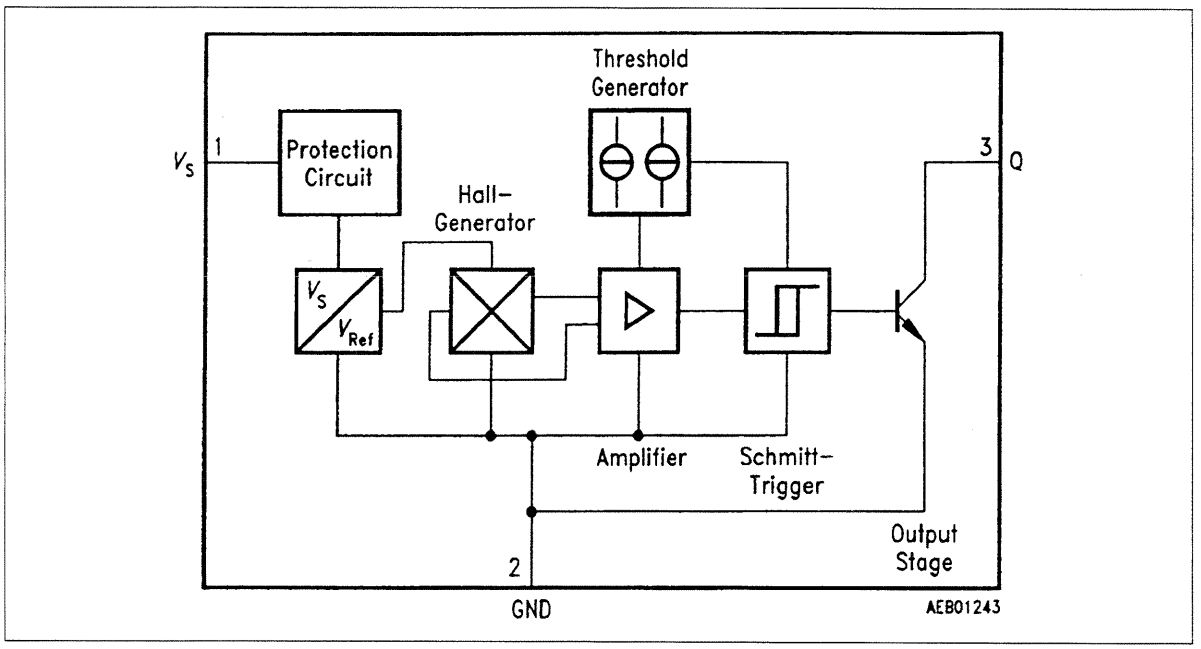


Figure 1
Block Diagram

Absolute Maximum Ratings

T_A = – 40 to 125 °C

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Supply voltage	V_S	– 40	28	V	–
Output voltage	V_Q	–	28	V	–
Output current	I_Q	–	50	mA	–
Output reverse current	$-I_Q$	–	50	mA	–
Junction temperature	T_j	– 40	150	°C	–
Junction temperature	T_j	–	170	°C	1000 h
Junction temperature	T_j	–	210	°C	40 h
Storage temperature	T_{stg}	– 50	150	°C	–
Thermal resistance	$R_{th\ JA}$	–	240	K/W	–

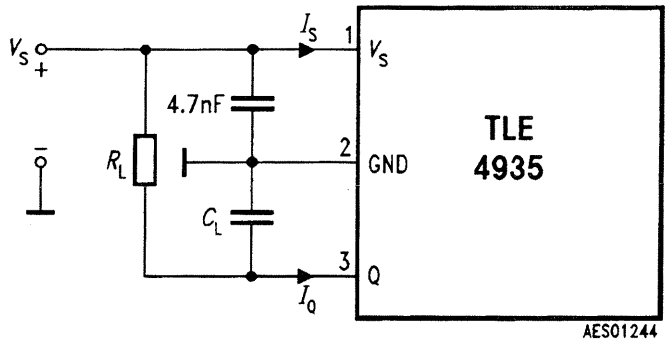
Operating Range

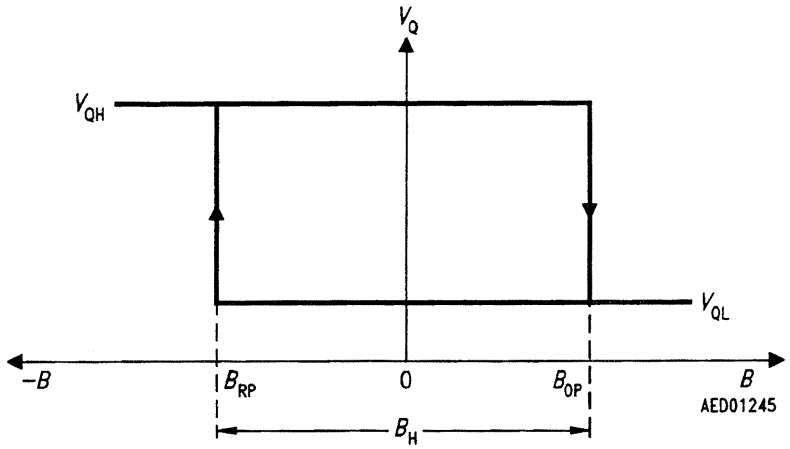
Supply voltage	V_S	3.5	24	V	–
Junction temperature	T_j	– 40	150	°C	–
Junction temperature	T_j	– 40	170	°C	1000 h
Junction temperature	T_j	– 40	210	°C	40 h

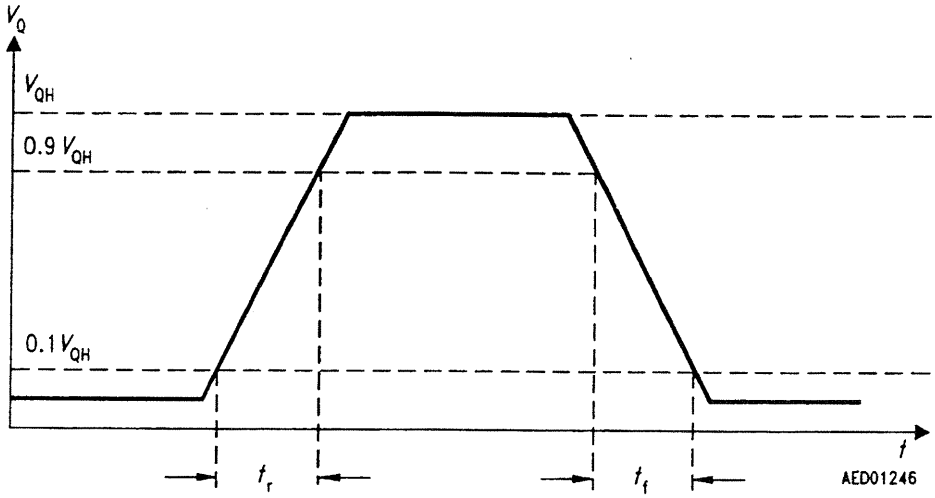
AC/DC Characteristics

3.5 V ≤ V_S ≤ 24 V; – 40 °C ≤ T_j ≤ 150 °C

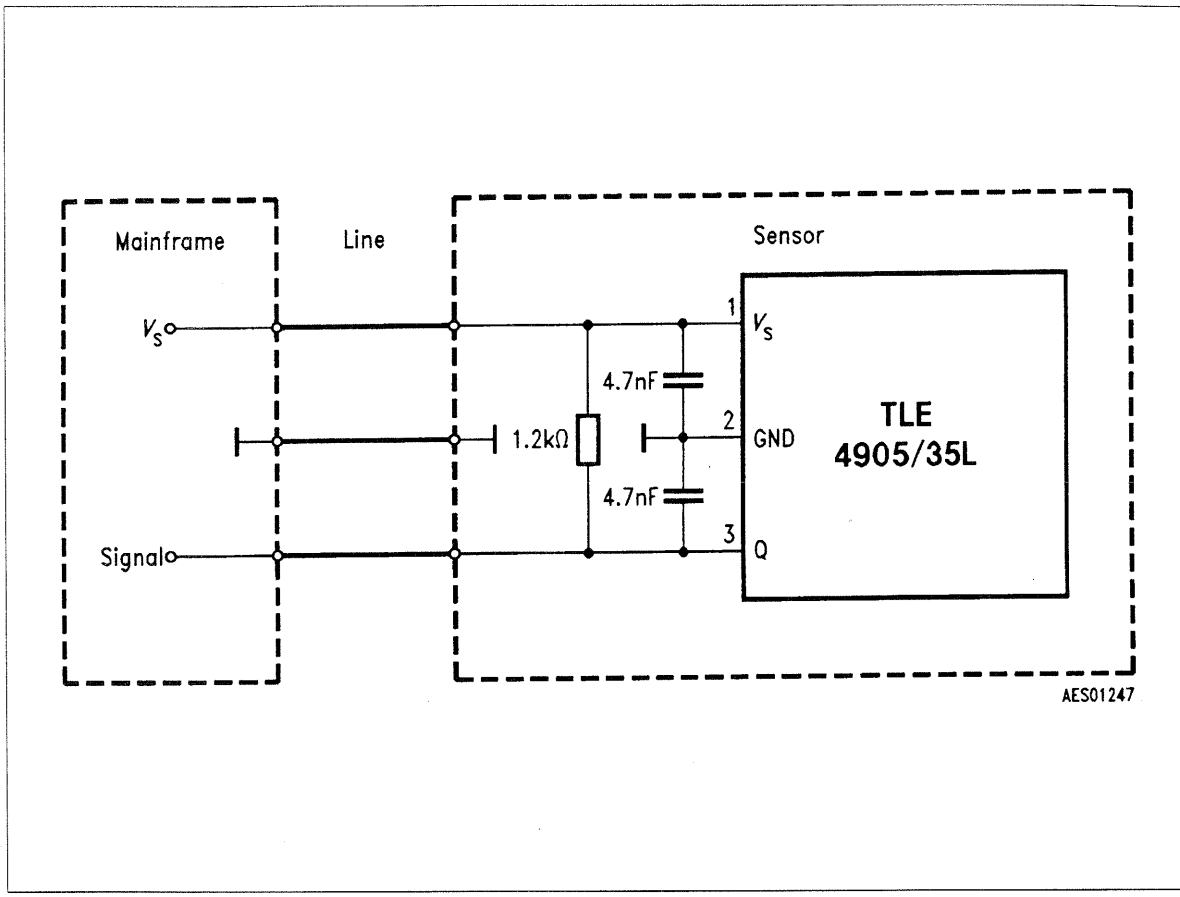
Parameter	Symbol	Limit Values			Unit	Test Condition	Test Circuit
		min.	typ.	max.			
Supply current	I_{SHigh}	–	3	7	mA	B < B_{RP}	1
	I_{SLow}	–	4	8	mA	B > B_{OP}	1
Output saturation voltage	V_{QSat}	–	0.25	0.5	V	I_Q = 40 mA	1
Output leakage current	I_{QL}	–	–	10	µA	V_Q = 24 V	1
Rise/fall time	t_r/t_f	–	–	1	µs	R_L = 1,2 kΩ C_L ≤ 33 pF	1
Magnetic Parameters							
TLE 4905 L							
Turn-ON induction	B_{OP}	–	–	20	mT	–	1
Turn-OFF induction	B_{RP}	5	–	–	mT	–	1
Hysteresis (B_{OP}-B_{RP})	ΔB_{Hy}	2	3	–	mT	–	1
TLE 4935 L							
Turn-ON induction	B_{OP}	10	–	20	mT	–	1
Turn-OFF induction	B_{RP}	– 20	–	– 10	mT	–	1
Hysteresis (B_{OP}-B_{RP})	ΔB_{Hy}	20	30	–	mT	–	1





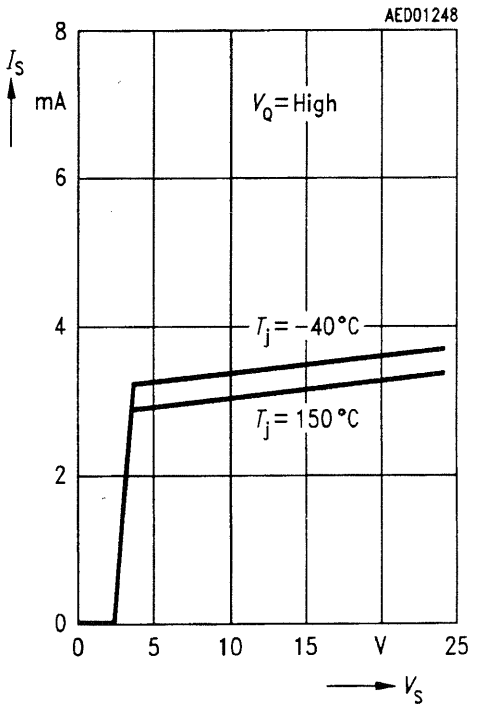


Test Circuit 1

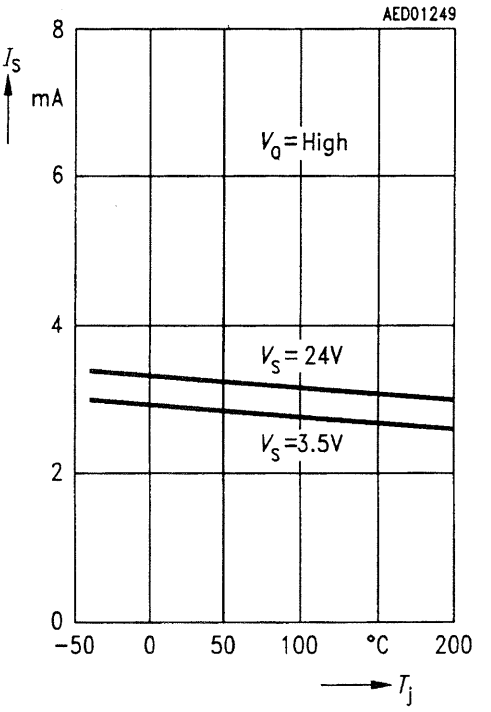


Application Circuit

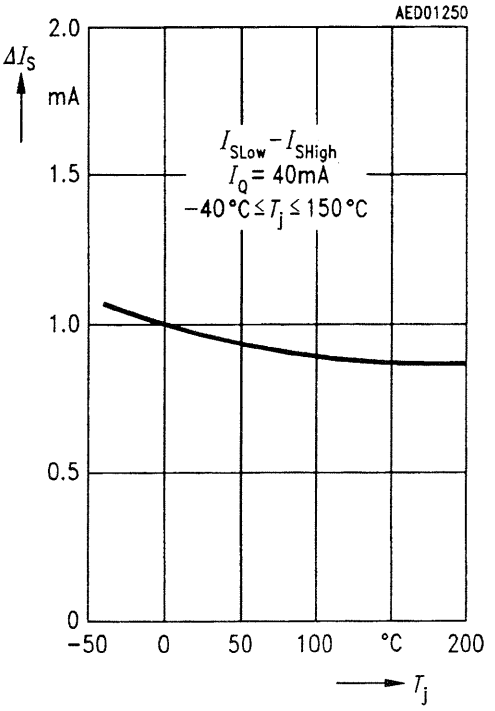
Quiescent Current versus Supply Voltage



Quiescent Current versus Junction Temperature



Quiescent Current Difference versus Temperature



Saturation Voltage versus Output Current