

Bipolar Hall-effect Sensor

PRODUCT DESCRIPTION

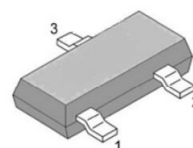
The MS40/MS40S is bipolar hall switch circuit, which has fast response speed and high sensitivity. The MS40/MS40S is also featured by wide operating temperature range, high reliability and reverse voltage protection. DC operating voltage ranges from 4.5V to 24V. The MS40/MS40S integrates hall unit and consists of voltage regulator, hysteresis comparator and output-stage circuit. The MS40/MS40S is especially suitable for rotation detection and motor control.



TO-92S

FEATURES

- Small Outline Package
- Bipolar Magnetic Field Sensing, High Sensitivity, Specially Suitable for Speed Sensing and Rotation Detection Applications
- Integrated Reverse Voltage Protection
- Current Sink Output Mode
- Wide Temperature Range: -40°C to 120°C
- Frequency Range: 0Hz to 100kHz



TSOT23-3

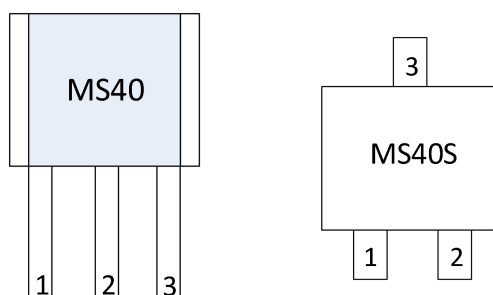
APPLICATIONS

- DC Brushless Motor
(Electromobile, Air-conditioner, Washing Machine and so on)
- Motor and Fan Control
- Speed and Rotation Sensing
- Flow Rate Detection

PRODUCT SPECIFICATION

Part Number	Package	Marking
MS40	TO-92S	MS40
MS40S	TSOT23-3	40

PIN CONFIGURATION



PIN DESCRIPTION

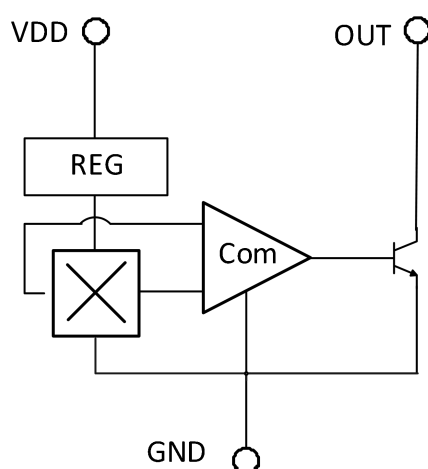
MS40

Pin	Name	Type	Description
1	VDD	-	Power Supply
2	GND	-	Ground
3	OUT	O	Output

MS40S

Pin	Name	Type	Description
1	VDD	-	Power Supply
2	OUT	O	Output
3	GND	-	Ground

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Symbol	Range	Unit
Power Supply	VDD	-0.5 ~ +60	V
Output Voltage	VO	-0.5 ~ +60	V
Operating Temperature	Topr	-40 ~ +120	°C
Storage Temperature	Tstg	-40 ~ +150	°C
Output Driving Current	IOUT	30	mA

RECOMMENDED OPERATING CONDITIONS**Operating Power Supply**

Parameter	Symbol	Range			Unit
		Min	Norm	Max	
Power Supply	VDD	4.5		24	V

ELECTRICAL CHARACTERISTICS

Unless otherwise noted, $T_a = 25^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

Current Consumption

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Power Supply Current	ICC			7.7	10	mA

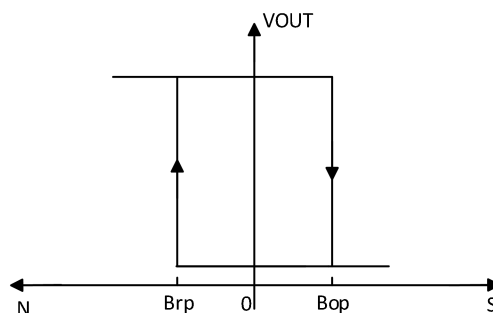
Output Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Output Current	I _{out}				20	mA
Output Leakage Current	I _{leak}	Gauss < Brp			1	μA
Output Saturation Voltage Drop @15mA	I _{sat}	I _{out} =15mA, Gauss > Bop			0.4	V
Rise Time	T _r			0.1	0.3	us
Fall Time	T _d			0.2	0.4	us
Response Time	T _{res}			4.0	5.0	us

Magnetic Field Characteristic

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating Point	B _{op}			40	110	Gauss
Release Point	Brp			-40	-110	Gauss
Magnetic Field Hysteresis	B _{hys}			80		Gauss

Characteristic Curve



Classification Information

A Classification:

$$15\text{G} \leq B_{op} \leq 65\text{G} \text{ and } (-65\text{G}) \leq B_{rp} \leq (-15\text{G})$$

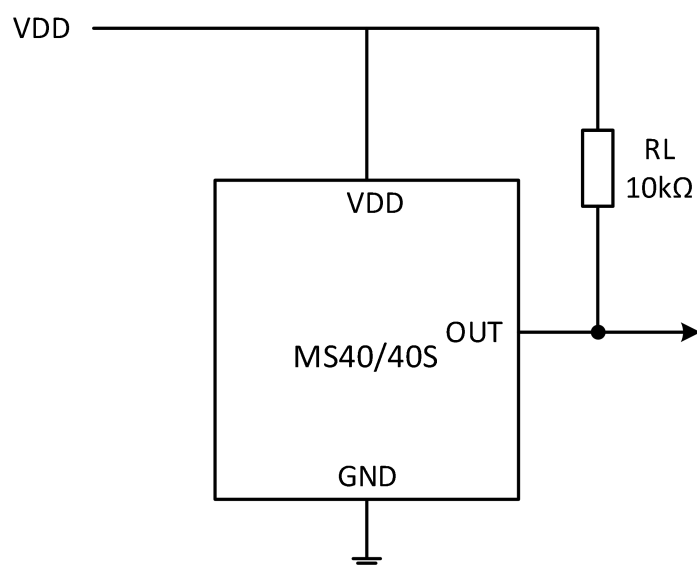
B Classification:

$$0\text{G} \leq B_{op} \leq 95\text{G} \text{ and } (-95\text{G}) \leq B_{rp} \leq (0\text{G})$$

C Classification:

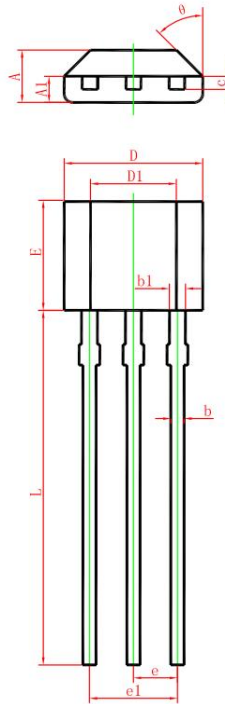
$$-110\text{G} \leq B_{op} \leq 110\text{G} \text{ and } (-110\text{G}) \leq B_{rp} \leq (110\text{G})$$

TYPICAL APPLICATION DIAGRAM



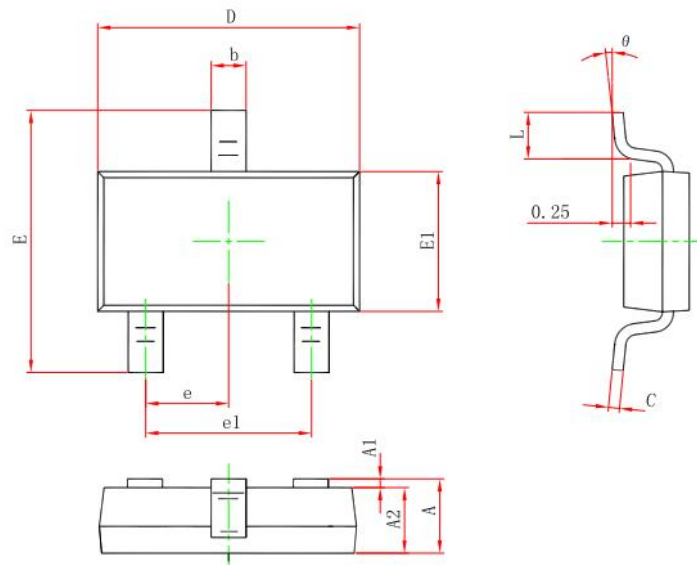
PACKAGE OUTLINE DIMENSIONS

TO-92S (4.1x1.27x0.86)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.420	1.620	0.056	0.064
A1	0.660	0.860	0.026	0.034
b	0.350	0.480	0.014	0.019
b1	0.400	0.550	0.016	0.022
c	0.360	0.510	0.014	0.020
D	3.900	4.100	0.154	0.161
D1	2.280	2.680	0.090	0.106
E	3.050	3.250	0.120	0.128
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	15.100	15.500	0.594	0.610
θ	45° TYP		45° TYP	

TSOT23-3 (3.02x1.7x0.9)



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	---	0.900	---	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b	0.350	0.500	0.014	0.020
c	0.080	0.200	0.003	0.008
D	2.820	3.020	0.111	0.119
E1	1.600	1.700	0.063	0.067
E	2.650	2.950	0.104	0.116
e	0.95(BSC)		0.037(BSC)	
e1	1.90(BSC)		0.075(BSC)	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

MARKING and PACKAGING SPECIFICATIONS**1. Marking Drawing Description**

MS40 XXXX	40 XXXX
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Product Name : MS40, 40

Product Code : XXXX

2. Marking Drawing Demand

Laser printing, contents in the middle, font type Arial.

3. Packaging Specifications

Device	Package	Piece/Bag	Bag/Box	Piece/Box	Box/Carton	Piece/Carton
MS40	TO-92S	1000	10	10000	10	100000
MS40S	TSOT23-3	3000	10	30000	4	120000

STATEMENT

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**MOS CIRCUIT OPERATION PRECAUTIONS**

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.



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