

## Features and Benefits

- **Single Current Sinking or Current Sourcing Output**
- **Ratiometric Rail to Rail Linear Output**
- **Precise Sensitivity and Temperature Compensation**
- **Wide Operating Voltage Range:**  
Supply Voltage 3.0~15V
- **Sensitivity:**  
2.3mV/Gauss (MT4505)  
3.4mV/Gauss (MT4506)  
4.7mV/Gauss (MT4507)
- **Specified Operating Temperature Range:**  
From -40°C~150°C
- **Lead Free Package**  
Flat TO-92, SOT-89B
- **High ESD Protection**
- **RoHS Compliant**  
2011/65/EU

## Applications

- Automotive, Home appliances, Industrial
- Speed Detection
- Position Detection
- Magnetic Encoder
- Solid-State Switch
- Ferrous metal sensing
- Vibration sensing
- Weight sensing

## Family Members

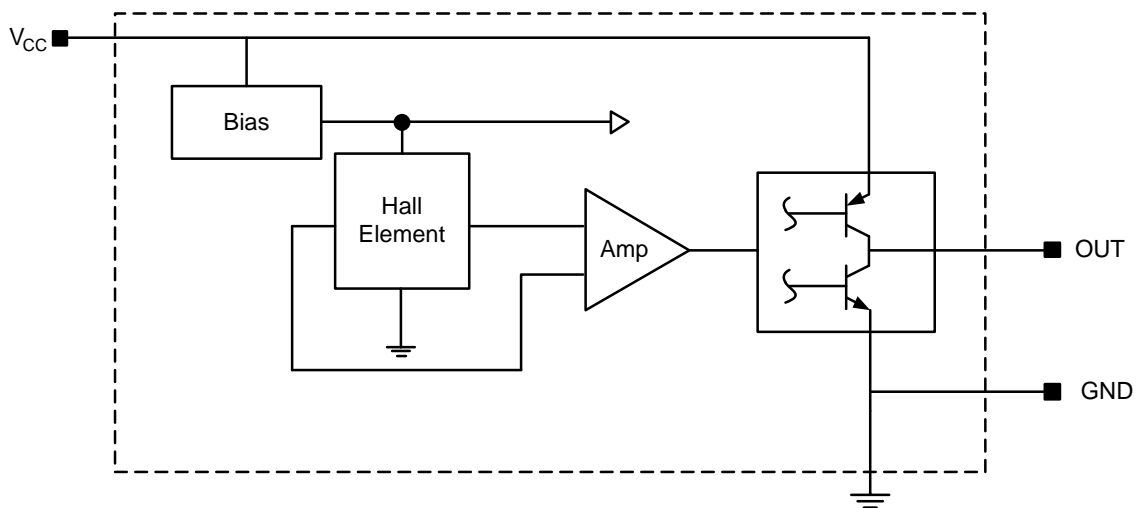
Part number	Description
MT4505A	Flat TO-92 package, bulk packaging (1000pcs/bag)
MT4506A	Flat TO-92 package, bulk packaging (1000pcs/bag)
MT4506BT	SOT-89B package, tape and reel packaging (1000pcs/bag)
MT4507A	Flat TO-92 package, bulk packaging (1000pcs/bag)

### General Description

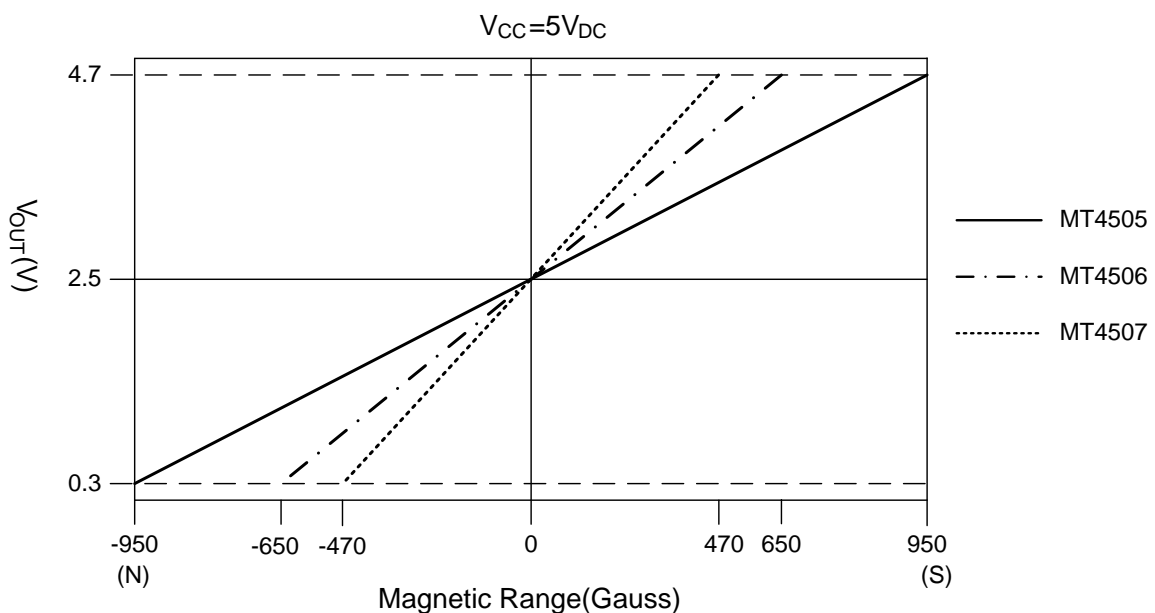
The MT450X family, produced with Bipolar technology, it is high performance small versatile linear Hall-effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratiometric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. The MT450X family has a quiescent output voltage that is 50% of the supply voltage.

The integrated circuitry provides increased temperature stability and sensitivity. The MT450X provide high accuracy and temperature compensation. The linear hall sensors have an operating temperature range from -40 to +150°C, appropriate for home appliances, industrial and automotive environments. They respond to either South or North pole.

### Functional Block Diagram



### Transfer Characteristics

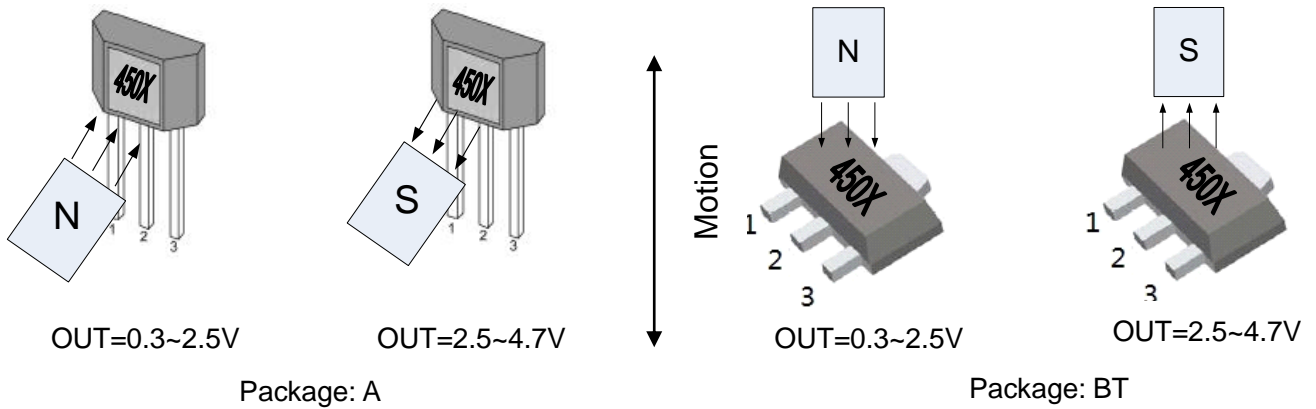


# MT450X Series

High Performance Ratiometric Linear Hall Effect Sensor



**Application Note:** Condition:  $V_{CC}=5V$



## Pin Description

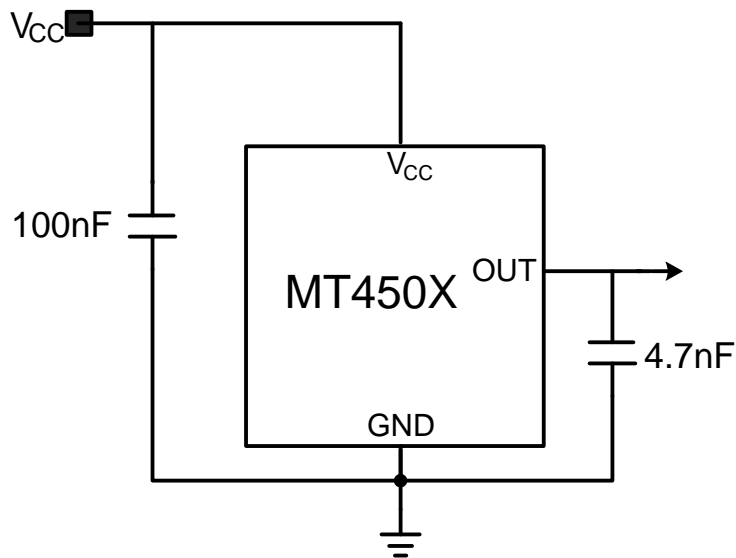
**MT450XA**

Name	Number	Description
$V_{CC}$	1	Power
GND	2	Ground
OUT	3	Output

**MT450XBT**

Name	Number	Description
$V_{CC}$	1	Power
GND	2	Ground
OUT	3	Output

## Typical Application Circuit



### Electrical and Magnetic Characteristics

#### Absolute Maximum Ratings

Absolute maximum ratings are limiting values to be applied individually, and beyond which the serviceability of the circuit may be impaired. Functional operability is not necessarily implied. Exposure to absolute maximum rating conditions for an extended period of time may affect device reliability.

Absolute maximum ratings: all voltages listed are referenced to GND.

Symbol	Parameters	Notes	Rating	Units
V <sub>CC</sub>	Supply Voltage	Additional Current draw and linearity distortion may be observed at voltages above the maximum voltage	20	V
V <sub>OUT</sub>	Output Voltage	--	20	V
V <sub>rcc</sub>	Reverse Supply Voltage	--	-0.2	V
V <sub>rouT</sub>	Reverse Output Voltage	--	-0.2	V
I <sub>OUT</sub>	Output Current	--	5	mA
T <sub>A</sub>	Operating Ambient Temperature	--	-40~150	°C
T <sub>J</sub>	Maximum Junction Temperature	--	160	°C
T <sub>STG</sub>	Storage Temperature	--	-40~150	°C

### MT450X Series Specifications

#### Electrical Characteristics

V<sub>CC</sub>=5V, unless otherwise noted

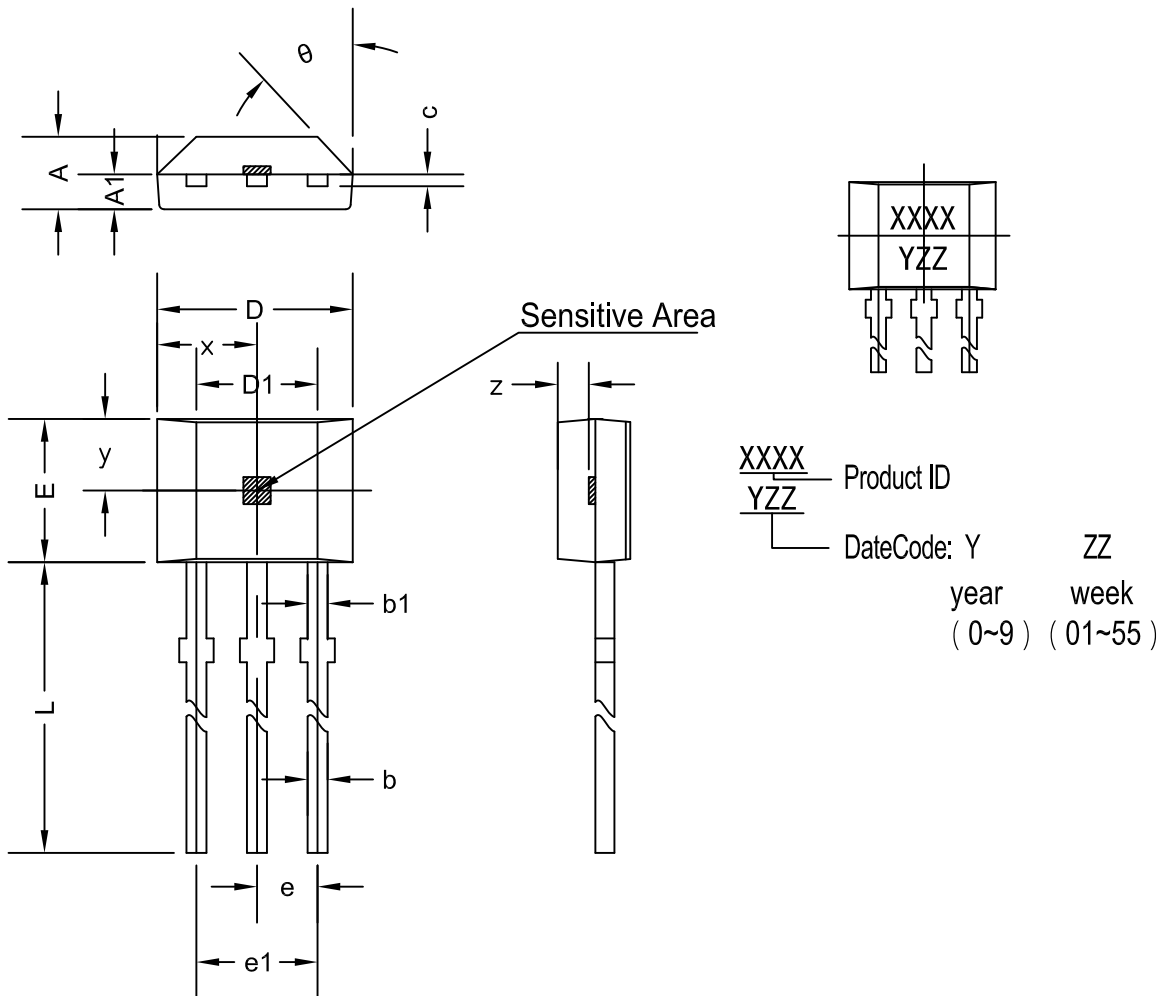
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V <sub>CC</sub>	Supply Voltage	T <sub>J</sub> <165°C	3.0	5.0	15	V
I <sub>CC</sub>	Supply Current	B=0	--	3.0	10	mA
V <sub>H</sub>	Output Voltage	B=+1000 Gs, I <sub>Load</sub> <2.0mA	4.7	--	--	V
V <sub>L</sub>		B=-1000 Gs, I <sub>Load</sub> <1.2mA	--	--	0.3	V
V <sub>NULL</sub>	Quiescent Voltage	B=0, T <sub>A</sub> =25°C	2.425	2.5	2.575	V
I <sub>SINK</sub>	Sink Current	V <sub>CC</sub> =3V, T <sub>A</sub> =25°C, OUT =V <sub>L</sub> ~V <sub>H</sub>	-0.8	--	--	mA
		V <sub>CC</sub> =5V, T <sub>A</sub> =25°C, OUT=V <sub>L</sub> ~V <sub>H</sub>	-1.2	--	--	mA
I <sub>SOURCE</sub>	Source Current	V <sub>CC</sub> =3V, T <sub>A</sub> =25°C, OUT=V <sub>L</sub> ~V <sub>H</sub>	--	--	1.5	mA
		V <sub>CC</sub> =5V, T <sub>A</sub> =25°C, OUT=V <sub>L</sub> ~V <sub>H</sub>	--	--	2.0	mA

### Magnetic Characteristics

$V_{CC}=5V$ , over operating temperature range, unless otherwise noted

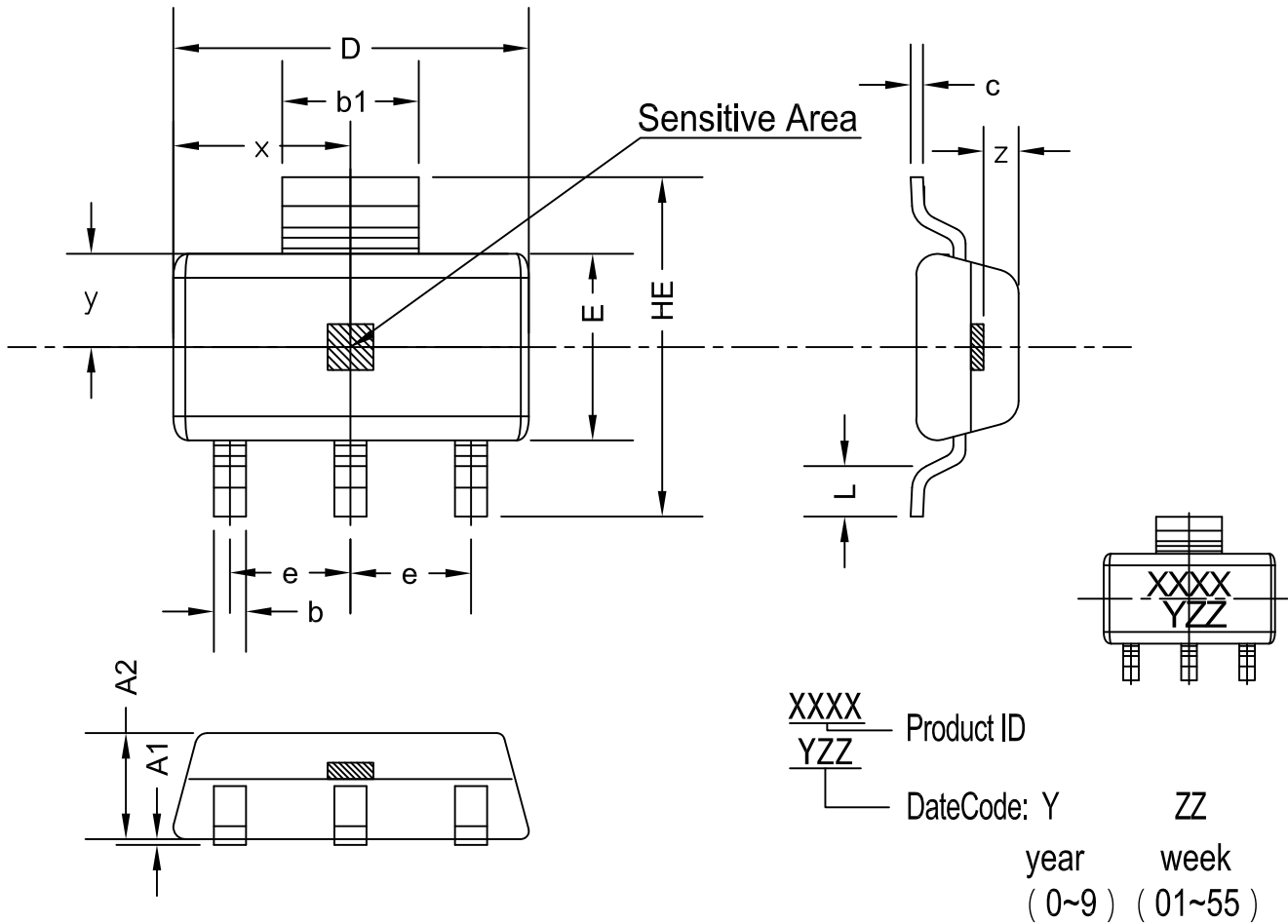
Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$L_{IN}$	Linearity	--	--	--	$\pm 5$	%
$V_{NULL}(T)$	Delta Vnull as temperature	--	--	--	$\pm 5$	%
$V_{NULL}(V)$	Ratiometry, Vnull	--	--	--	$\pm 5$	%
$S_{ENS}(T)$	Delta Sens as temperature	--	--	--	$\pm 30$	%
	Output Type	Ratiometric				
$S_{ENS}$	Sensitivity(MT4505)	$T_A=25^\circ C$	2.0	2.3	2.6	mV/Gs
$S_{ENS}$	Sensitivity(MT4506)		3.1	3.4	3.7	mV/Gs
$S_{ENS}$	Sensitivity(MT4507)		4.4	4.7	5.0	mV/Gs
B+	Magnetic Range(MT4505)	$T_A=25^\circ C$	--	950	--	Gauss
B-		$T_A=25^\circ C$	--	-950	--	Gauss
B+	Magnetic Range(MT4506)	$T_A=25^\circ C$	--	650	--	Gauss
B-		$T_A=25^\circ C$	--	-650	--	Gauss
B+	Magnetic Range(MT4507)	$T_A=25^\circ C$	--	470	--	Gauss
B-		$T_A=25^\circ C$	--	-470	--	Gauss

### PACKAGE DESIGNATOR (MT450XA) Flat TO-92



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.420	1.670	0.056	0.066
A1	0.660	0.860	0.026	0.034
b	0.350	0.560	0.014	0.022
b1	0.400	0.550	0.016	0.022
C	0.360	0.510	0.014	0.020
D	3.900	4.200	0.154	0.165
D1	2.970	3.270	0.117	0.129
E	2.900	3.280	0.114	0.129
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	13.500	15.500	0.531	0.610
x	2.025TYP		0.080TYP	
y	1.545TYP		0.061TYP	
z	0.500TYP		0.020TYP	
θ	45°TYP		45°TYP	

### PACKAGE DESIGNATOR (MT450XBT) SOT-89B



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A1	0.000	0.100	0.000	0.004
A2	1.220	1.420	0.048	0.056
b	0.300	0.500	0.012	0.020
b1	1.600	1.800	0.063	0.070
D	4.400	4.600	0.173	0.181
c	1.152 REF		0.045 REF	
E	2.400	2.600	0.094	0.102
HE	4.000	4.400	0.157	0.173
e	1.500 TYP		0.060 TYP	
L	0.350	0.550	0.014	0.022
x	2.250TYP		0.089TYP	
y	1.250TYP		0.049TYP	
z	0.300TYP		0.012TYP	