MT1451 Series

Dual Channel Quadrature Switch Hall Sensor

Features and Benefits

- **1.65mm Hall Element Spacing**
- **Magnetic Type: Bipolar switch**
- **Operating Voltage Range:**
  Supply Voltage 2.8 ~18V
- **Specified Operating Temperature Range:**
  From –40℃~150℃
- **High Magnetic Sensitivity**
  Bop=18Gauss, Brp=-18Gauss (Typical)
- **Lead Free Package**
  SIP-4, SOT-89B
- **High ESD Rating**
- **RoHS Compliant**
  2011/65/EU

Applications

- Magnetic encoder
- Speed detection
- Direction detection

Family Members

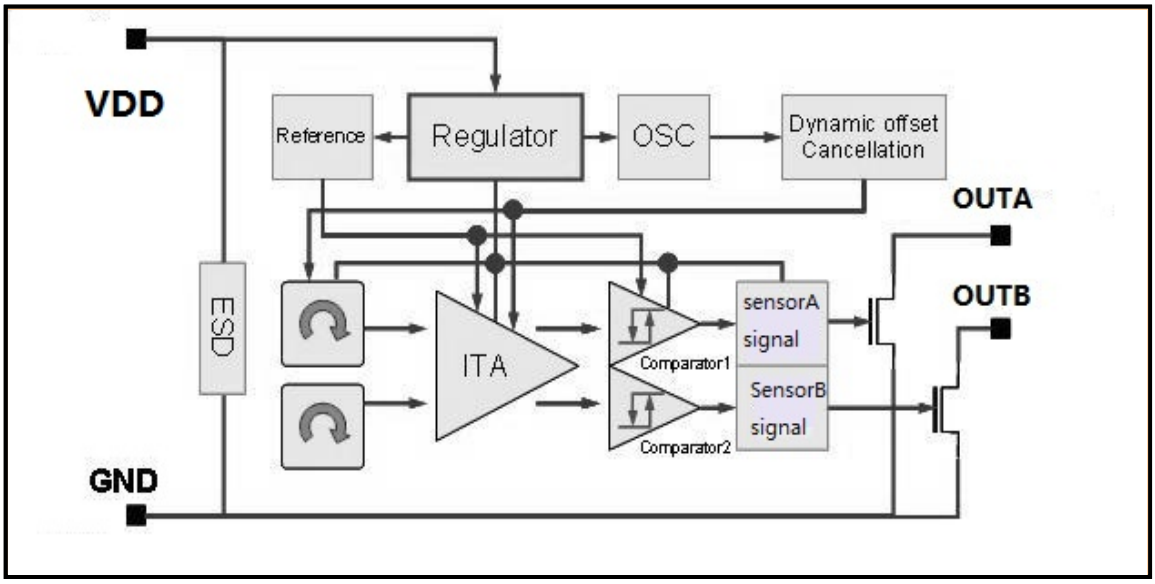
Part number	Description
MT1451A	Flat SIP-4 package, bulk packaging (1000pcs/bag)
MT1451BT	SOT-89B package, tape and reel packaging (1000pcs/bag)

General Description

The MT1451 is a dual channel switch hall sensor with two hall sensing elements , it output two digital signal for speed and direction processing.

The MT1451 internally include two hall sensing elements located 1.65mm apart, an on-chip hall voltage generator, voltage regulator for operation with supply voltages of 2.8 to18V, temperature compensation circuitry, small-signal amplifier. Hall sensor with dynamic offset cancellation system, schmitt trigger and open-drain output. It is easy processing of speed and direction signals.

The MT1451 family provides a variety of packages to customers: TO-92 flat(SIP4) for through-hole mount and SOT-89B for surface mount. All packages are RoHs compliant.

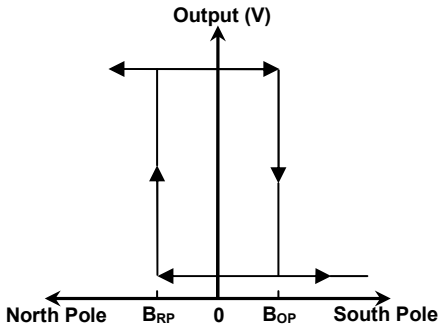


Functional Block Diagram

Definition of Magnetic Parameters

BOP: Operating Point:Magnetic flux density applied on the branded side of the package which turns the output driver ON (V_{OUT} = Low)

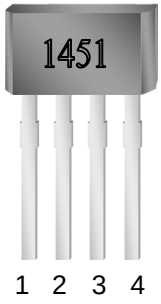
BRP: Release Point: Magnetic flux density applied on the branded side of the package which turns the output driver OFF (V_{OUT} = high)



Pin Description

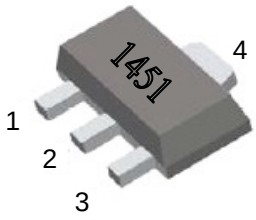
1451A

Name	Number	Description
Vs	1	Power supply
OUTA	2	Output signal A
OUTB	3	Output signal B
GND	4	Ground



1451BT

Name	Number	Description
Vs	1	Power supply
OUTA	2	Output signal A
OUTB	3	Output signal B
GND	4	Ground



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.

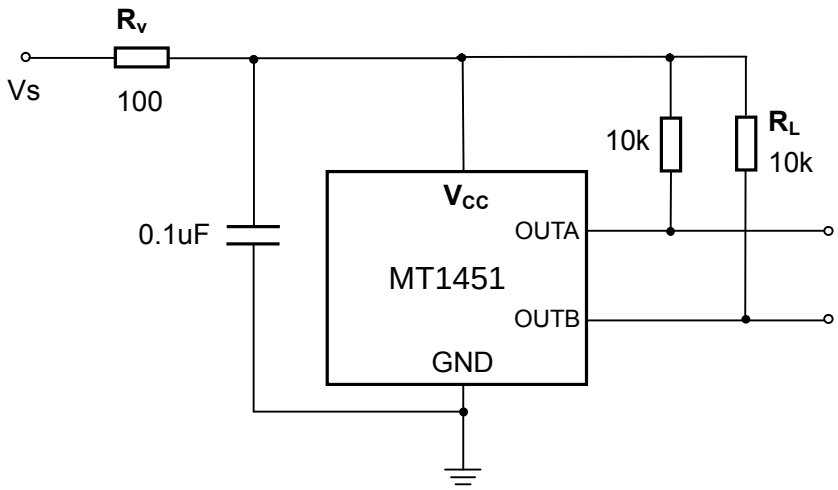
Symbol	Parameters	Min	Max	Units
V_S	Supply Voltage	-	18	V
V_{RCC}	Reverse Battery Voltage	-	-0.5	V
V_{OUT}	Output Voltage	-	18	V
I_{OUT}	Continuous output current	-	50	mA
T_A	Operating Ambient Temperature	-40	125	℃
T_s	Storage temperature	-50	150	℃
T_J	Junction temperature	-	150	℃
B	Magnetic flux	No Limit		Gauss

MT1451 Series Specifications

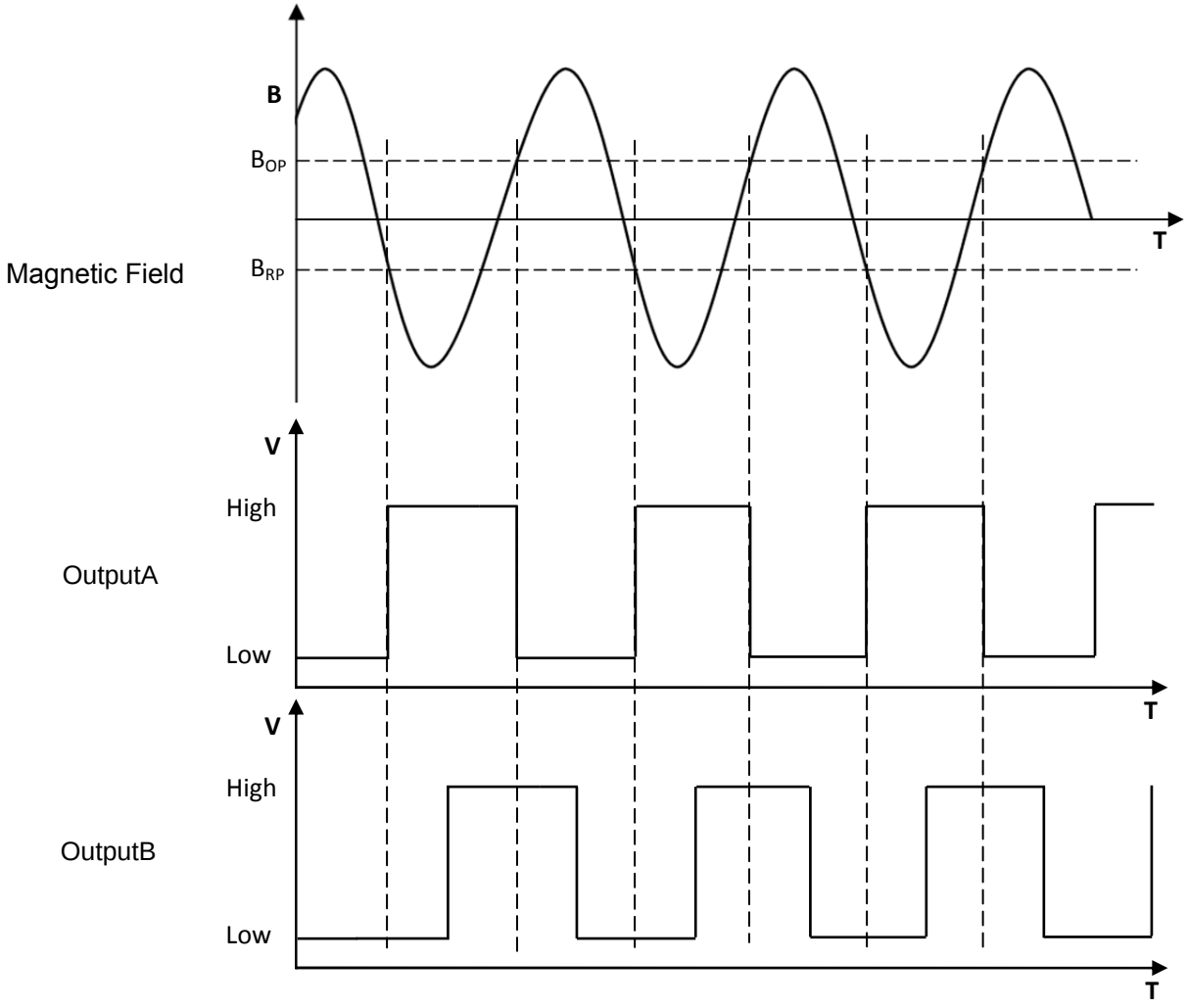
at T_A = -40℃ to 150℃, Vs = 2.8V to 18V (unless otherwise specified)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V_{DD}	Supply voltage	Operating	2.8	5	18	V
I_{DD}	Supply current	B<B_{RP}	-	5	7	mA
V_{DSON}	Output Saturation Voltage	I_{OUT}=10mA, B>B_{OP}	-	0.25	0.5	V
I_{OFF}	Output Leakage Current	B<B_{RP}, V_{OUT}=18V	-	0.1	1.0	uA
T_R	Output Rise Time	RL=10kohm, CL=20pF	-	-	1.0	uS
T_F	Output Fall Time	RL=10kohm, CL=20pF	-	-	1.0	uS
T_D	Delay Time		-	-	4	uS
B_{OP}	Magnetic Operating Point		12	18	24	Gauss
B_{RP}	Magnetic Release Point		-24	-18	-12	Gauss
B_{HYST}	Hysteresis Window	| B_{OP}-B_{RP} |	24	36	48	Gauss
B_{SYMOP}	Operate Symmetry	B_{OPA}-B_{OPB}	-5	0	5	Gauss
B_{SYMRP}	Release Symmetry	B_{RPA}-B_{RPB}	-5	0	5	Gauss
D_{IS}	Distance of Hall elements		1.64	1.65	1.66	mm
ESD	Electro-Static Discharge	HBM	-	4	-	KV

Typical Application Circuit

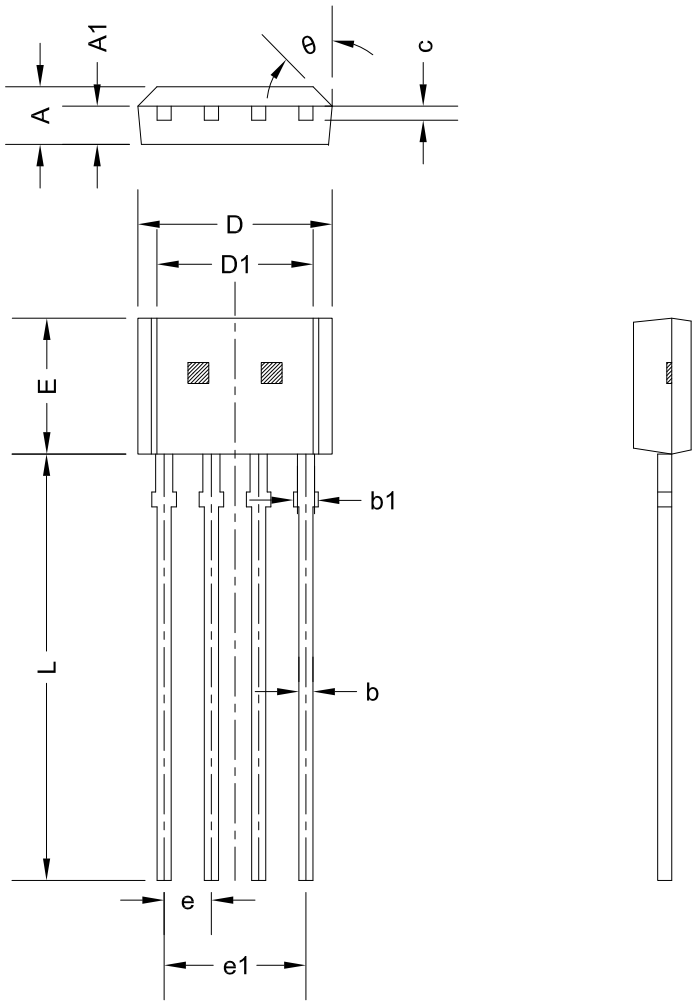


Typical Output Waveform



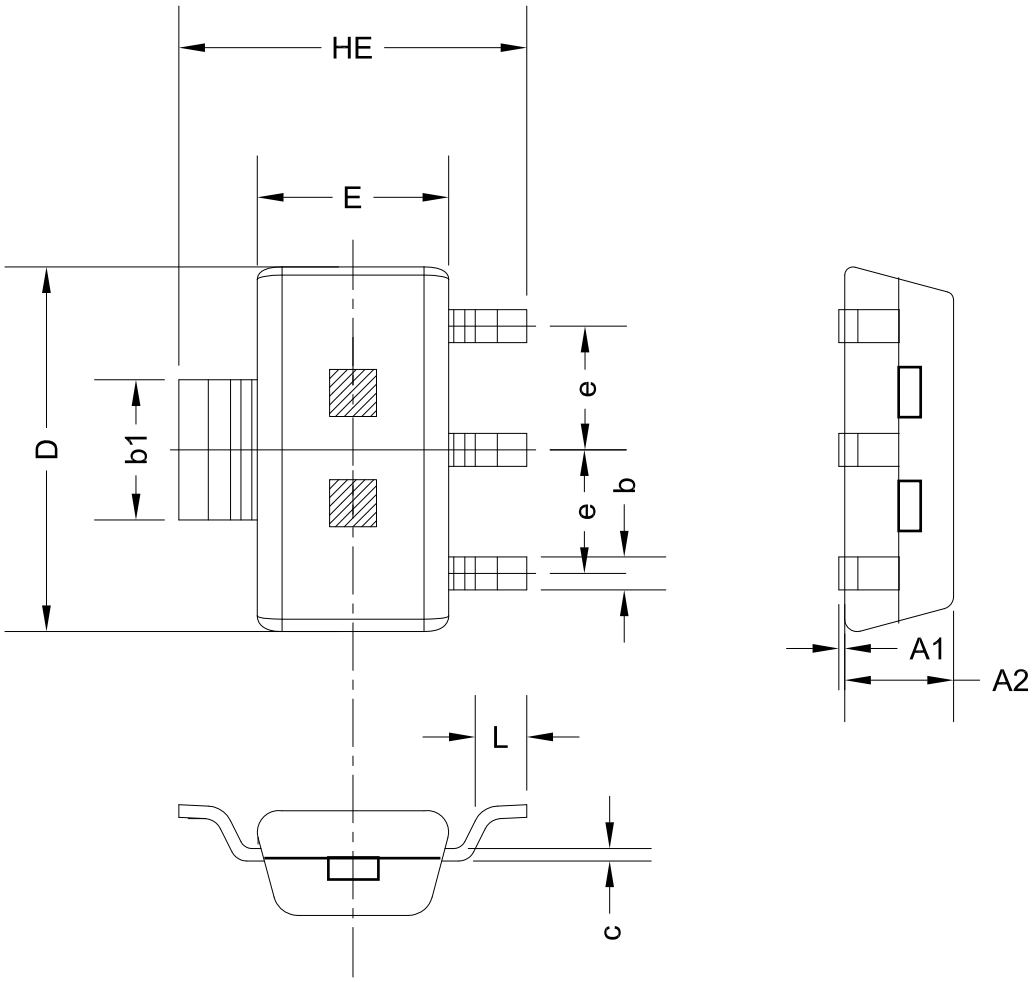
PACKAGE DESIGNATOR

(MT1451A)



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	5.100	5.300	0.201	0.208
D1	4.100	4.300	0.161	0.169
E	3.550	3.750	0.140	0.147
e	1.267	1.273	0.050	0.050
e1	3.780	3.840	0.149	0.151
L	13.600	15.500	0.535	0.610
θ	5°	7°	5°	7°

PACKAGE DESIGNATOR
(MT1451BT) 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