MT6343

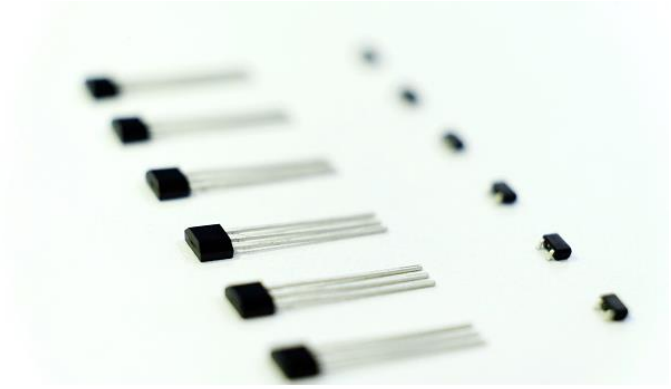
Omni-polar, Low Power AMR Switch IC

1 Product Description

The MT6343 family is produced with monolithic technology. Which built AMR sensor & ASIC on one chip. The IC internally includes a Wheatstone bridge with magnetic film, a voltage regulator for operating with supply voltage from 1.8V to 5.5V, a sleep/awake logic for low power consumption requirement, small signal amplifier and Schmitt trigger comparator with dynamic offset cancellation, and an output driver with push-pull output.

When combined with a magnet, it becomes a non-contact switch with low power consumption, high sensitivity and high reliability. A horizontal magnetic field parallel to the electrode of the package can be detected by an arbitrary polarity.

The MT6343 family provides a variety of packages to customers: SOT-23 for surface mount and flat TO-92 for through-hole mount. All packages are RoHS compliant.



2 Features

- Monolithic Technology
- AMR (Anisotropic Magneto Resistance)
- Omni-polar Switch
- 1.8～5.5V Operating Vcc Range
- -40℃~125℃ Operating Temperature
- Package Option:
  SOT-23
  Flat TO-92
- Magnetic Sensitivity Option:
  B_{OP}=±18Gs, B_{RP}=±15Gs
- Pull-push Output
- Low Power Consumption:
  Average Supply Current =1.3uA (Typ)
- RoHS Compliant: (EU)2015/863

3 Product Overview of MT6343

Part No.	Description
MT6343A	Flat TO-92, bulk packaging (1000pcs/bag)
MT6343AT-1	SOT-23, tape & reel (3000pcs/bag)

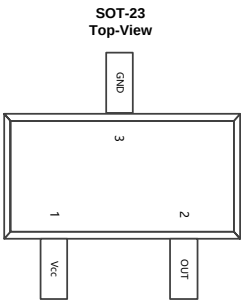
Note: The chip mark of MT6343AT-1 is C431+Date Code, C431 represents the product name

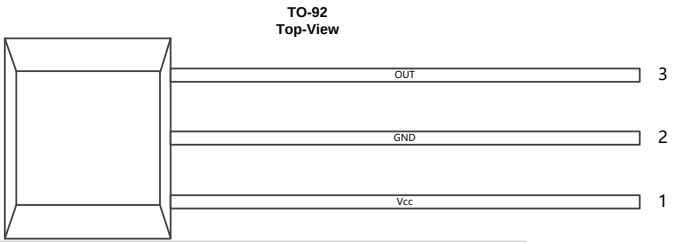
4 Application

- Home appliances, Industrial
- Position Detection
- Proximity Switch
- Smart Meter
- Speed Detection
- Handheld Device
- Consumer Device

5. Pin Configuration and Functions

	Vcc	Out	GND
SOT-23	1	2	3
Flat TO-92	1	3	2
Description	Power	Output Push-Pull	Ground





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Reversion History

1	3.1Version	Update format Update the marking spec of SOT-23

6 Definition of Switching Function

Figure.2 shows the device functionality and hysteresis

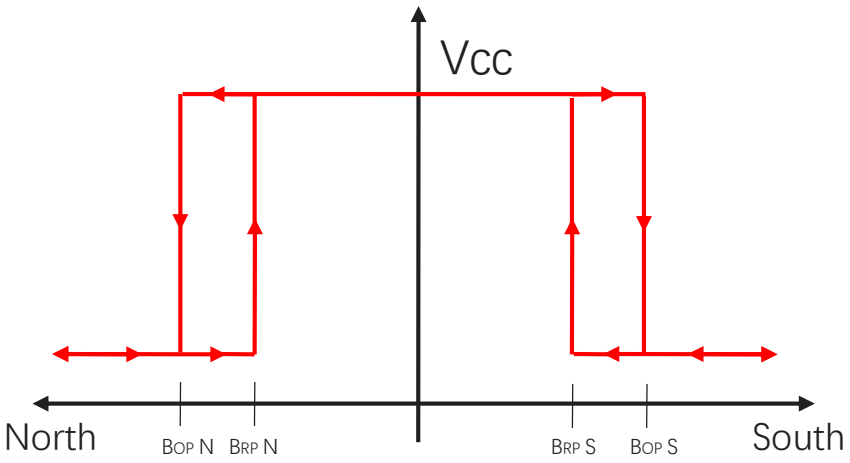


Figure.2 Omni-polar Switching Function

7 Function Description

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

B_{RP}: Releasing Point, Magnetic flux density applied on the branded side of the package which turns the output driver OFF (V_{OUT}=High)

B_{HYST}: Hysteresis Window, $|B_{OP} - B_{RP}|$

8 Feature Description

The MT6343 device is sensitive to the magnetic field that is parallel to the package

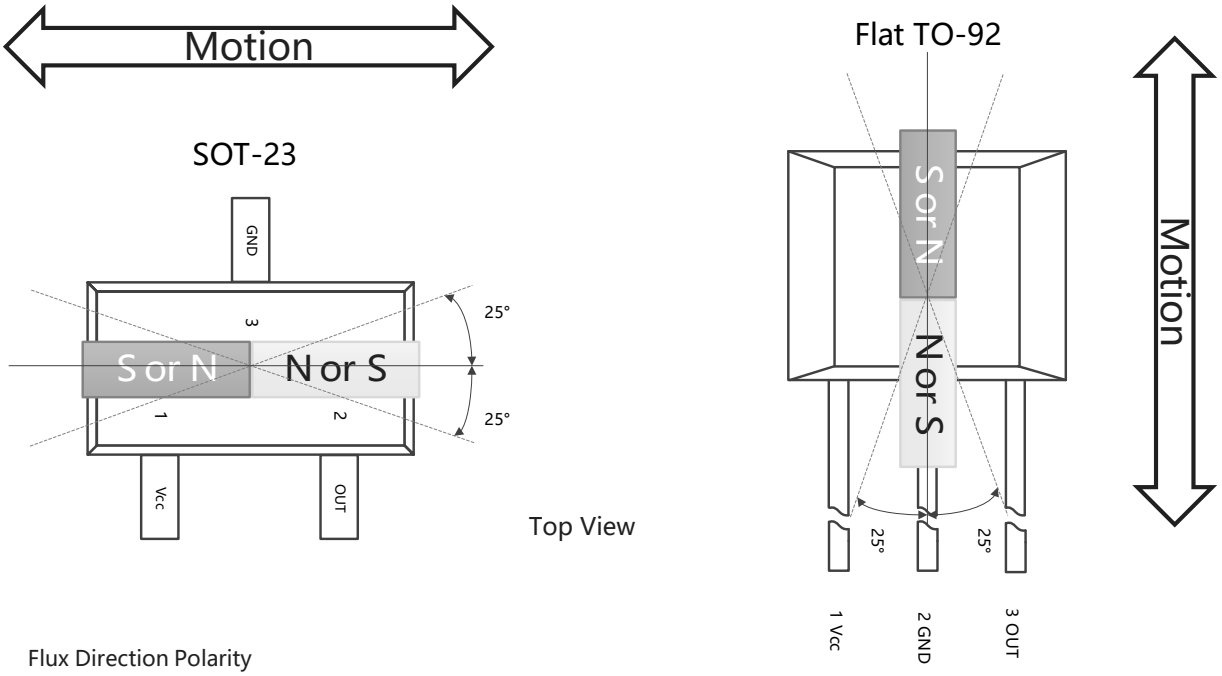


Figure.3 Flux Direction Polarity

9 Functional Block Diagram

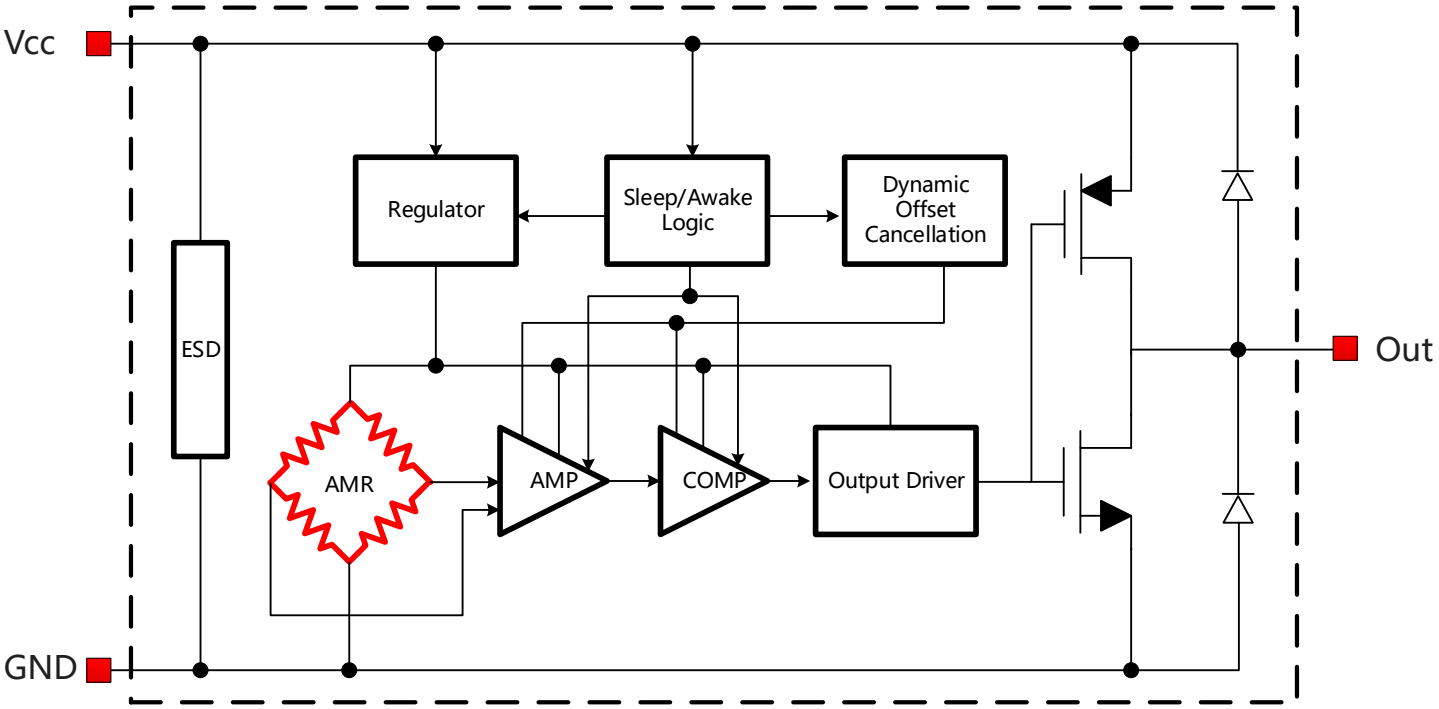


Figure.4 Functional Block Diagram

10 Electrical and Magnetic Characteristics

10.1 Absolute Maximum Ratings

Absolute maximum ratings are limited 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.

Symbol	Parameters	Min	Max	Units
V_{CC}	Supply Voltage	-	7	V
V_{RCC}	Reverse Battery Voltage	-0.5	-	V
V_{OUT}	Output Voltage	-0.5	7	V
I_{OUT}	Continuous Output Current	-	10	mA
T_A	Operating Ambient Temperature	-40	125	℃
T_S	Storage Temperature	-50	150	℃
T_J	Junction Temperature	-	165	℃
B	Magnetic Flux Density	3000		Gs

10.2 Electrical Specifications

At T_A=-40~125℃, V_{CC}=1.8V~5.5V (unless otherwise specified)

Symbol	Parameters	Test Condition	Min	Typ	Max	Unit
V_{CC}	Supply Voltage	Operating	1.8	-	5.5	V
I_{CC}	Supply Current	V_{CC}=3.6V	-	1.3	2.0	uA
V_{OL}	Output Low Voltage	Vcc=3.6V, I_{OUT}=15mA, |B|>|B_{OP}|	-	-	0.2	V
V_{OH}	Output High Voltage	Vcc=3.6V, I_{OUT}=15mA, |B|<|B_{RP}|	Vcc-0.3	-	-	V
I_{OFF}	Output Leakage Current	V_{OUT}=5.5V, |B|<|B_{RP}|	-	-	1	uA
T_{PO}	Power on Time	dVcc/dt>3.6V/us, B>B_{OP}(MAX)	-	-	100	us
F_{SW}	Switching Frequency	V_{CC}=3.6V	-	20	-	Hz
T_{AW}	Awake Time	V_{CC}=3.6V	-	12	-	Us
T_{SL}	Sleep Time	V_{CC}=3.6V	-	50	-	ms
D.C.	Duty Cycle	V_{CC}=3.6V	-	0.02	-	%
R_{TH}	Thermal Resistance of SOT-23		-	301	-	℃/W
	Thermal Resistance of Flat TO-92		-	230	-	℃/W

10.3 Magnetic Characteristics

At V_{CC}=1.8V~5.5V (unless otherwise specified)

Part No.	Symbol	Min	Typ	Max	Unit
MT6343 Series	B_{OP}, T_A =25℃	-	±18	-	Gs
	B_{RP}, T_A =25℃	-	±15	-	Gs
	B_{HYST}, T_A =25℃	-	3	-	Gs

10.4 ESD Ratings

Symbol		Reference	Values	Unit
V_{ESD}	Human-body model (HBM)	AEC-Q100-002	±8000	V
	Charged-device model (CDM)	AEC-Q100-011	±1000	V

10.5 Characteristic Performance

At V_{CC}=3.6V, B<B_{RPMIN}

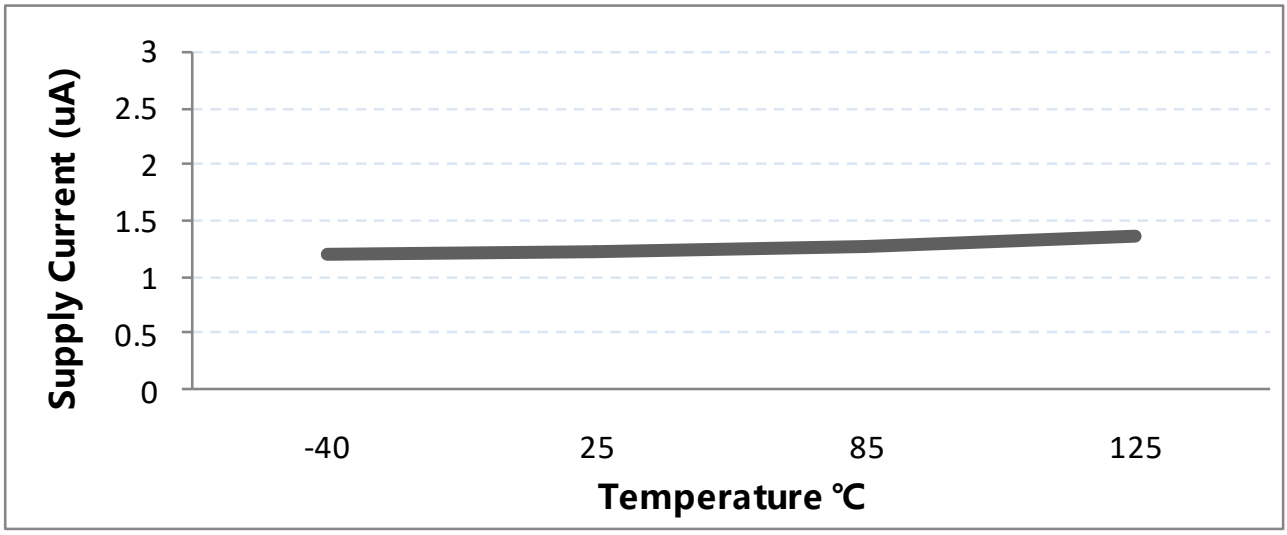


Figure.5 Supply Current vs. Temperature

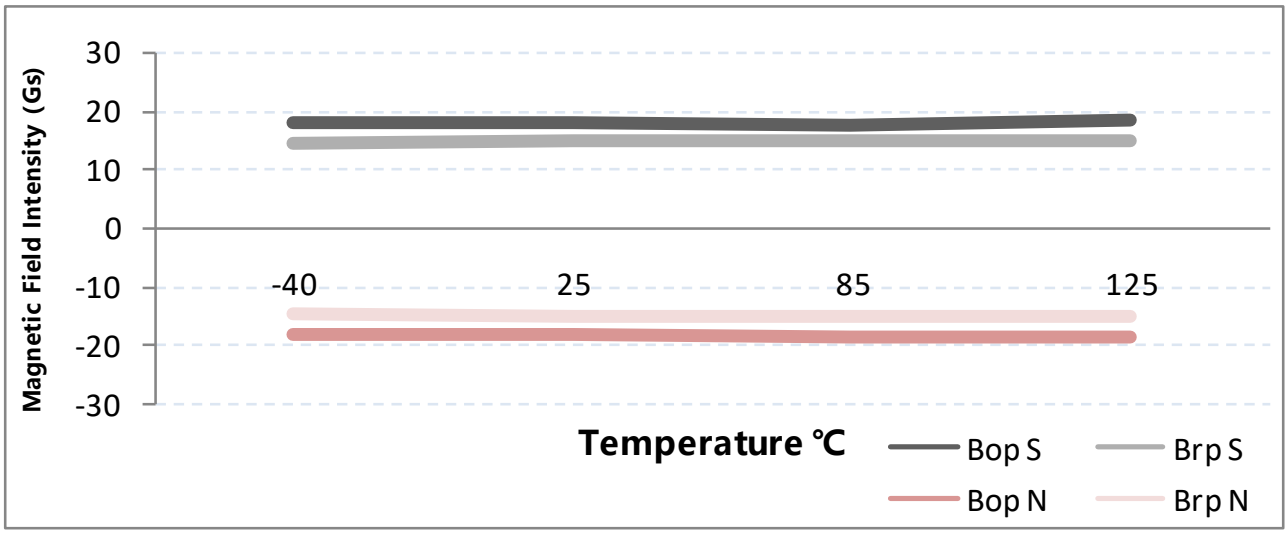


Figure.6 Magnetic Characteristics vs. Temperature (B_{OP} & B_{RP})

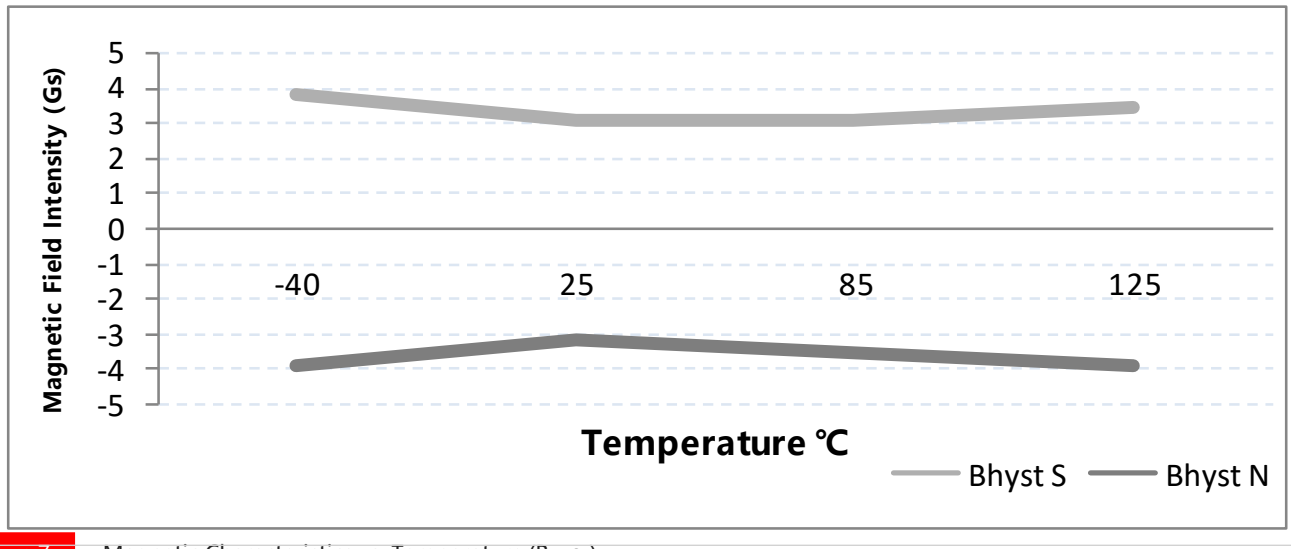


Figure.7 Magnetic Characteristics vs. Temperature (B_{HYST})

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10.6 Typical Output Waveform

MT6343A as example

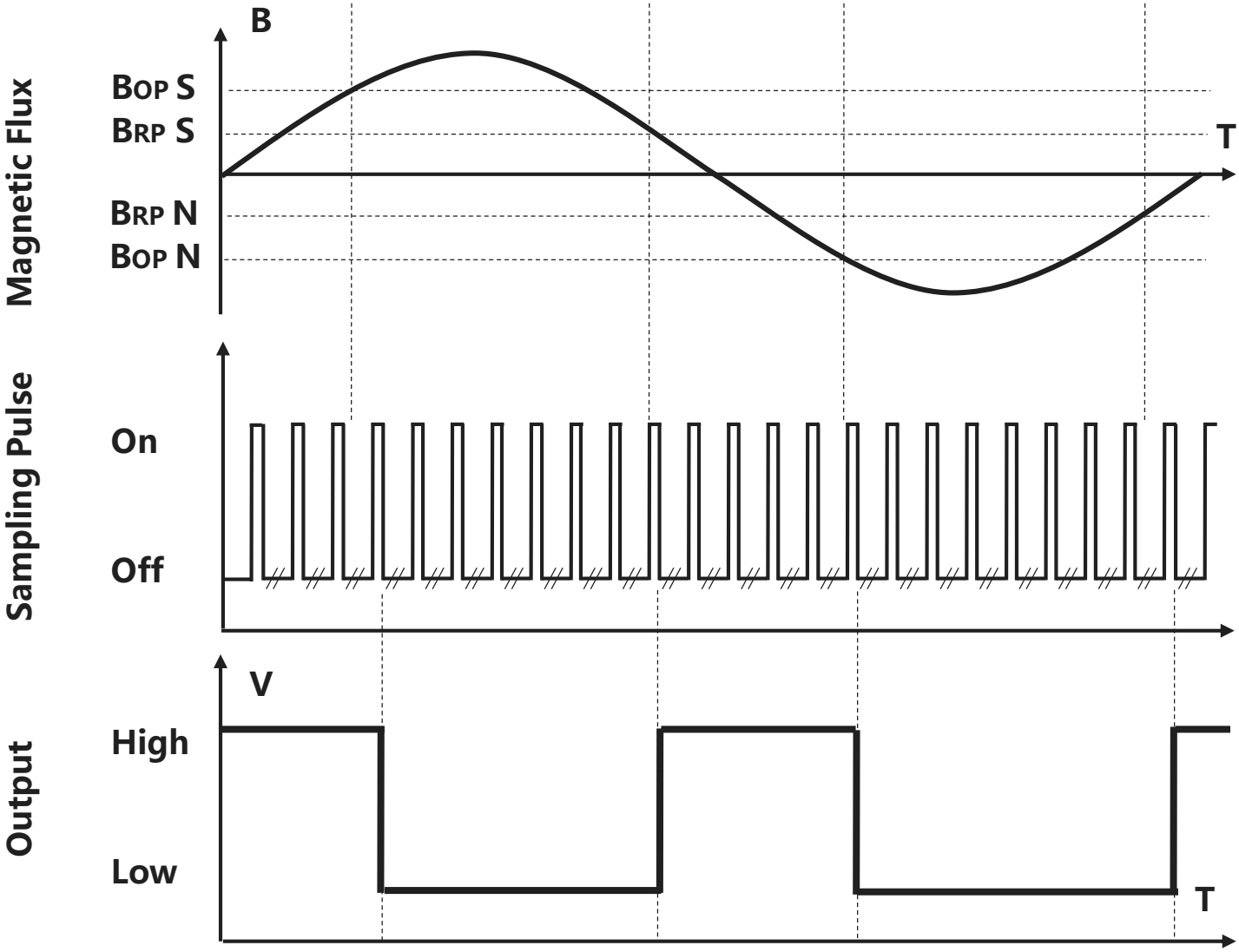


Figure.8 Digital Output vs. Magnetic Flux Density & Sampling Pulse

11 Typical Application Circuit

MT6343AT as example

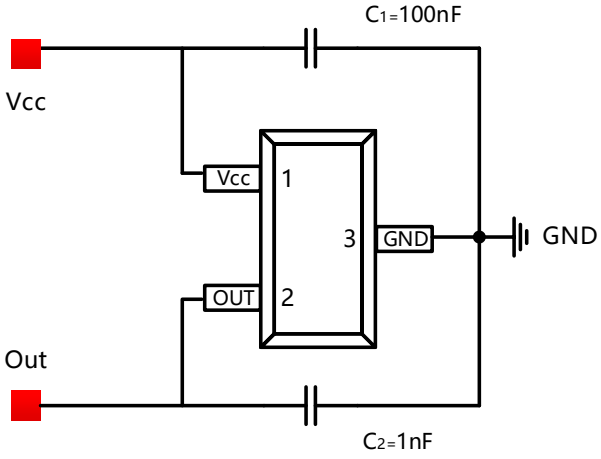


Figure.9 Typical Application Circuit

12 Power on Output Waveform

V_{CC} rise time < 1us, T_{PO} is the time from the stable point of V_{CC} to the valid point of output

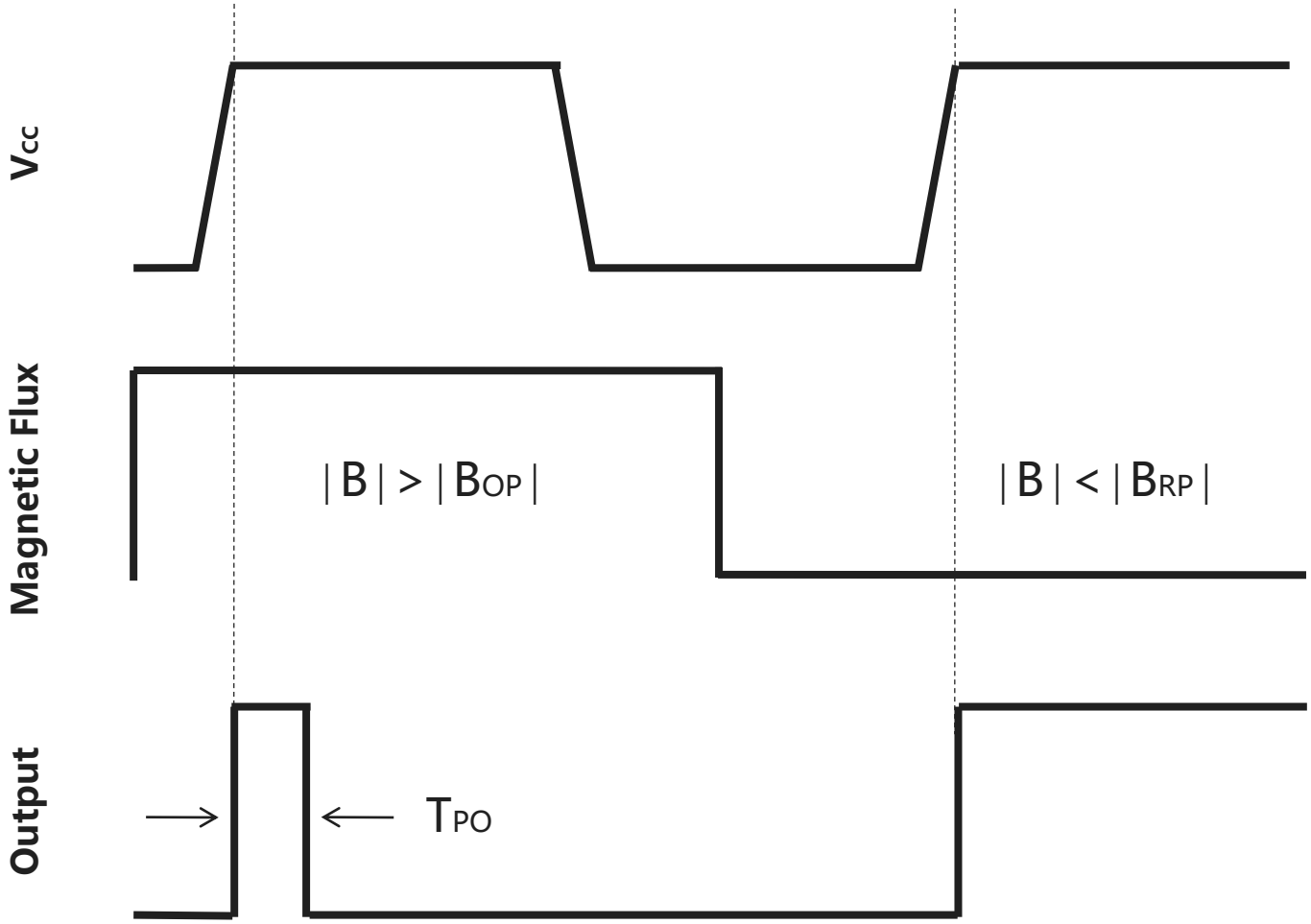


Figure.10 Power on Output Waveform

13 Package Material Information (For Reference Only – Not for Tooling Use)

13.1 SOT-23 Package Information

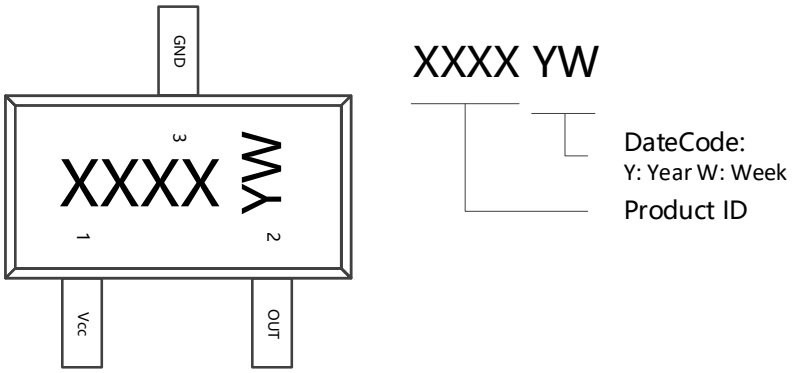


Figure.11 SOT-23 Chip Marking Spec

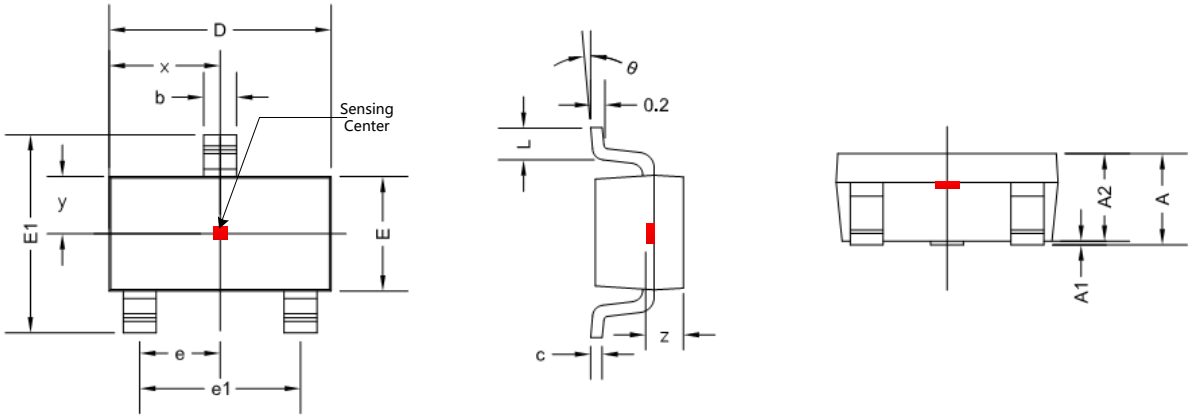


Figure.12 SOT-23 Package Drawing

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0 °	8 °	0 °	8 °
x	1.460 TYP		0.057 TYP	
y	0.800 TYP		0.032 TYP	
z	0.600 TYP		0.024 TYP	

13.2 Flat TO-92 Package Information

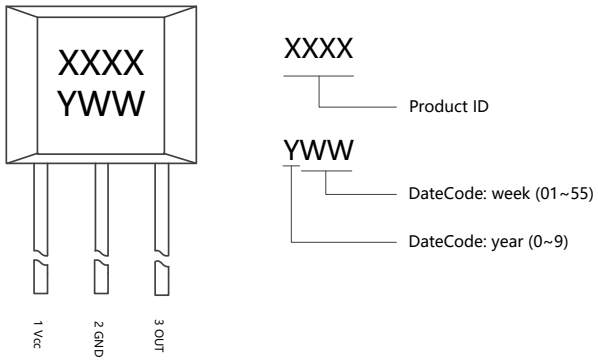


Figure.13 Flat TO-92 Chip Marking Spec

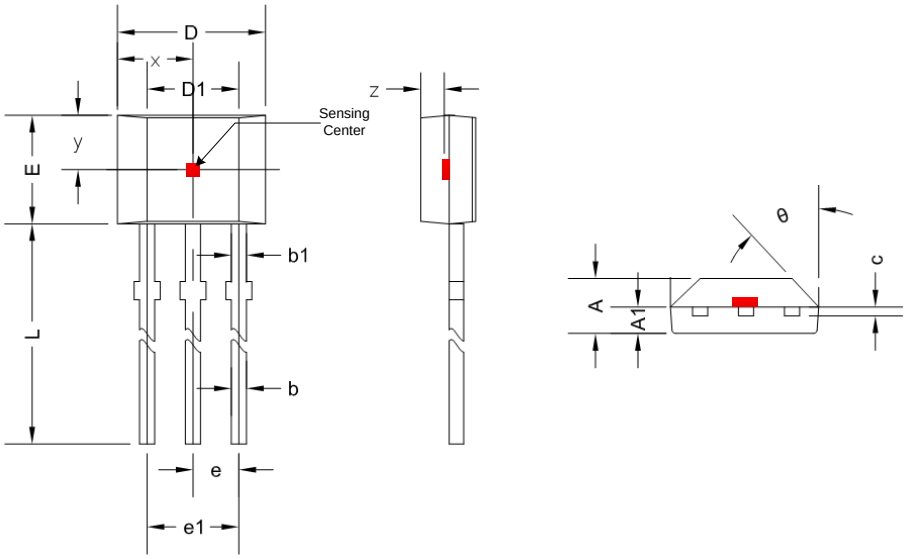


Figure.14 Flat TO-92 Package Drawing

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	0.013	0.019
b1	0.400	0.510	0.016	0.020
c	0.330	0.510	0.013	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	14.350	14.750	0.565	0.581
θ	45 ° TYP		45 ° TYP	
x	2.025 TYP		0.080 TYP	
y	1.545 TYP		0.061 TYP	
z	0.500 TYP		0.020 TYP	

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