MT6325

Omni-polar, Low Power AMR Switch IC

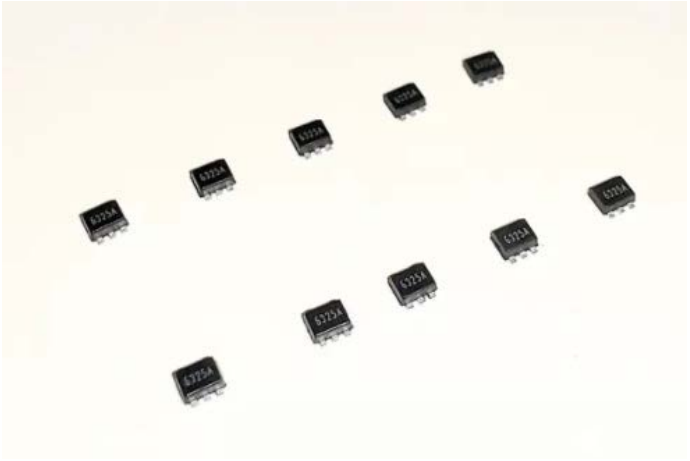
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1 Product Description

The MT6325 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 MT6325 family provides a variety of packages to customers: SOT-553 & DFN1616 for surface 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-553 / DFN1616
- Magnetic Sensitivity Option:
  B_{OP}=±17Gs, B_{RP}=±14Gs
  B_{OP} =±41Gs, B_{RP}=±34Gs
- Pull-push Output
- Low Power Consumption:
  Average Supply Current =4.1uA (Typ)
- RoHS Compliant: (EU)2015/863

3 Product Overview of MT6325

Part No.	Description
MT6325SN-L	SOT-553, tape & reel (3000pcs/bag)
MT6325SN	SOT-553, tape & reel (3000pcs/bag)
MT6325DT-1616-L	DFN1616, tape & reel (3000pcs/bag)
MT6325DT-1616	DFN1616, tape & reel

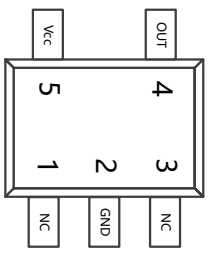
4 Applications

- Industrial
- Position Detection
- Proximity Switch
- Smart Meter
- Speed Detection

5. Pin Configuration and Functions

	Vcc	Out	GND	NC
SOT-553	5	4	2	1、3
DFN1616	5	4	2	1、3
Description	Power	Push pull	Ground	

SOT-553
Top View



DFN1616
Top View

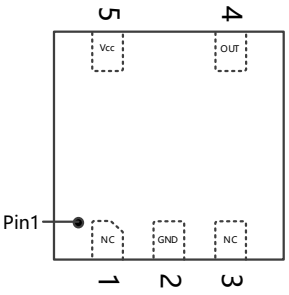


Figure.1 Pin Configuration & Functions

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Reversion History

1	4.1 Version	Update format Remove MT6325ET
2	5.0 Version	Add MT6325SN-L
3	5.1 Version	Update the Logo of MagnTek
4	6.0 Version	Add MT6325DT-1616 & MT6325DT-1616-L
5	6.1 Version	Update the Magnetic Characteristics of MT6325-L
6	6.2 Version	Update the Magnetic Characteristics of MT6325-L

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6 Definition of Switching Function

Figure.2 shows the device functionality and hysteresis

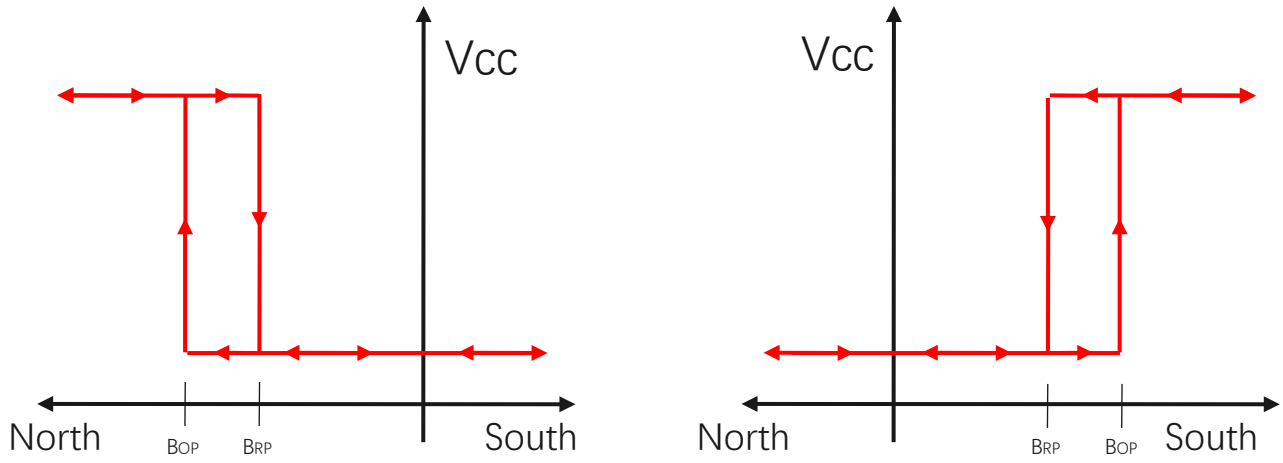


Figure.2 Omni-polar Switching Function

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}=High)

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

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

8 Feature Description

The MT6325 device is sensitive to the magnetic field that is parallel to the package

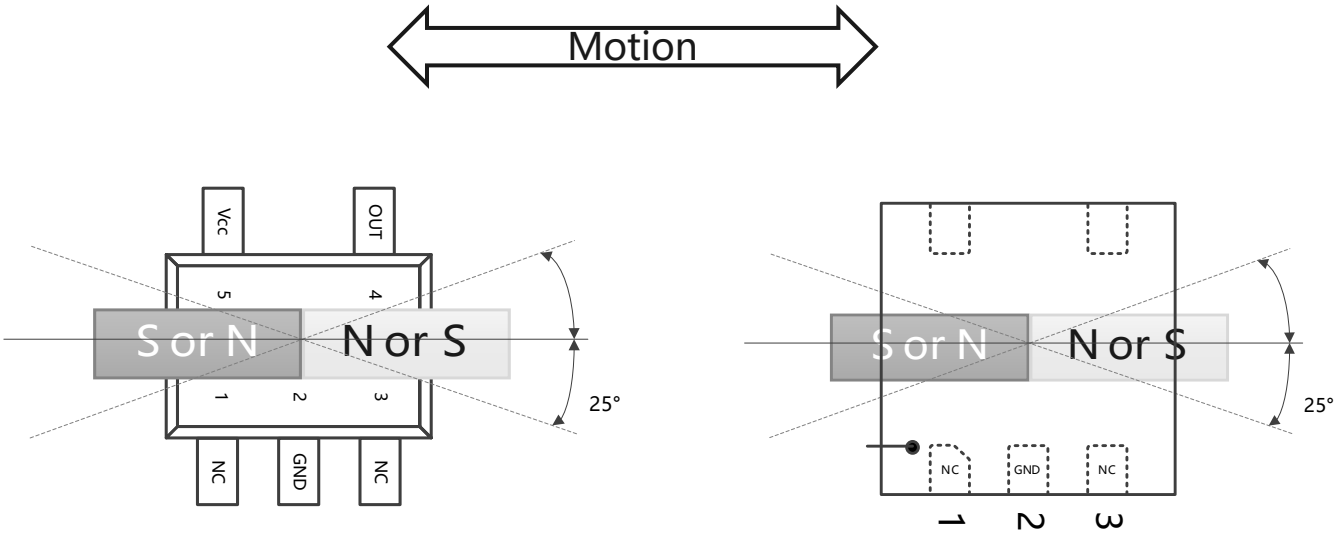


Figure.3 Flux Direction Polarity

9 Functional Block Diagram

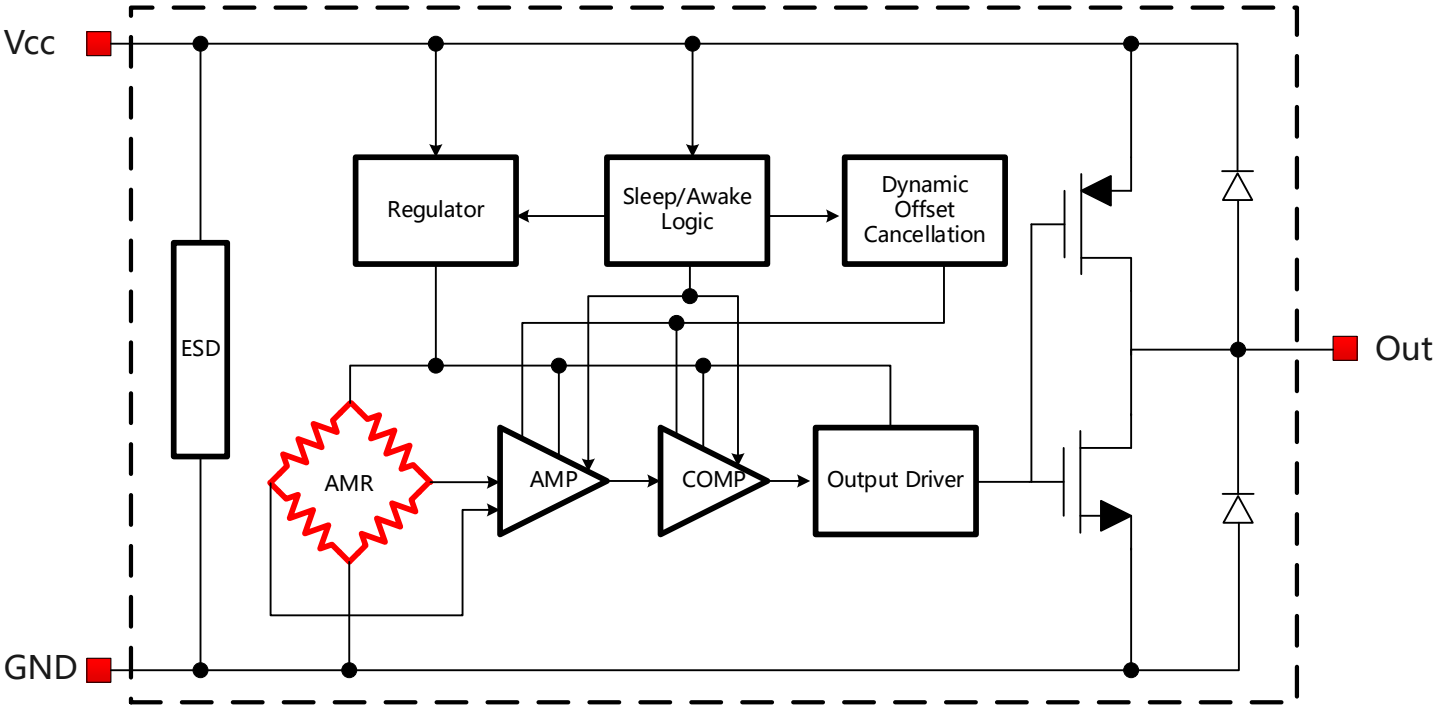


Figure.4 Functional Block Diagram

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	-	4.1	7.0	uA
V_{OL}	Output Low Voltage	Vcc=3.6V, I_{OUT}=5mA, |B|<|B_{RP}|	-	-	0.2	V
V_{OH}	Output High Voltage	Vcc=3.6V, I_{OUT}=5mA, |B|>|B_{OP}|	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	-	900	-	Hz
T_{AW}	Awake Time	V_{CC}=3.6V	-	12	-	Us
T_{SL}	Sleep Time	V_{CC}=3.6V	-	1.11	-	ms
D.C.	Duty Cycle	V_{CC}=3.6V	-	1.1	-	%
R_{TH}	Thermal Resistance of SOT-553		-	301	-	℃/W
	Thermal Resistance of DFN1616		-	301	-	℃/W

10.3 Magnetic Characteristics

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

Part No.	Symbol	Min	Typ	Max	Unit
MT6325 Series	B_{OP}, T_A =25℃	±7	±17	±27	Gs
	B_{RP}, T_A =25℃	±4	±14	±24	Gs
	B_{HYST}, T_A =25℃	1	3	6	Gs
MT6325-L Series	B_{OP}, T_A =25℃	±26	±40	±54	Gs
	B_{RP}, T_A =25℃	±19	±33	±47	Gs
	B_{HYST}, T_A =25℃	2	7	12	Gs

10.4 ESD Ratings

Symbol		Reference	Values	Unit
V_{ESD}	Human-body model (HBM)	AEC-Q100-002	±5000	V
	Charged-device model (CDM)	AEC-Q100-011	±1000	V

10.5 Characteristic Performance

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

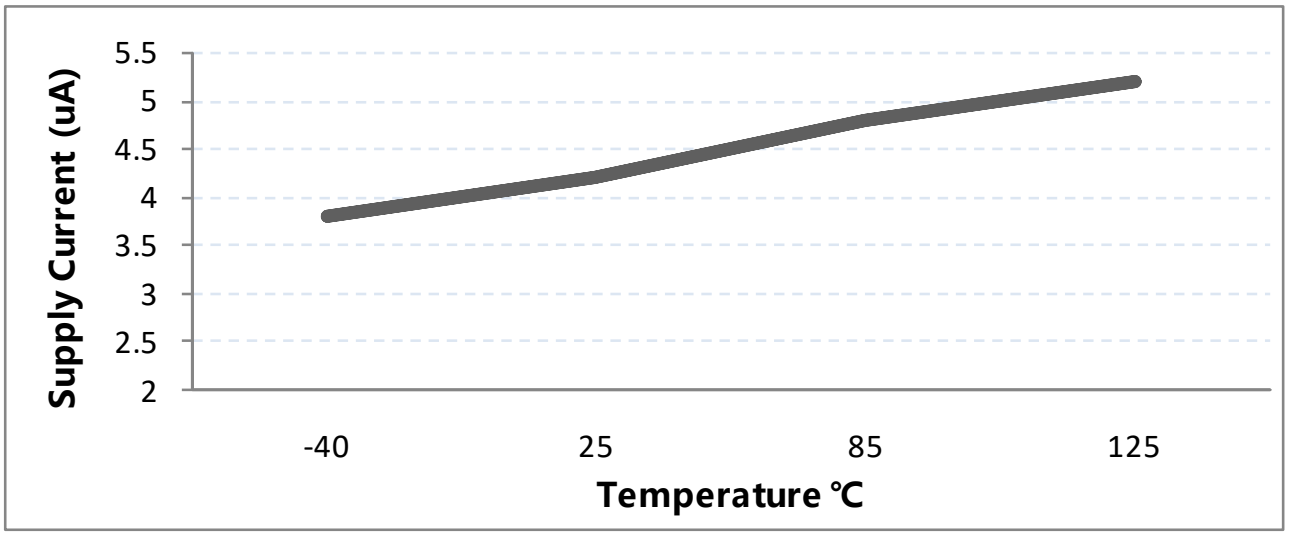
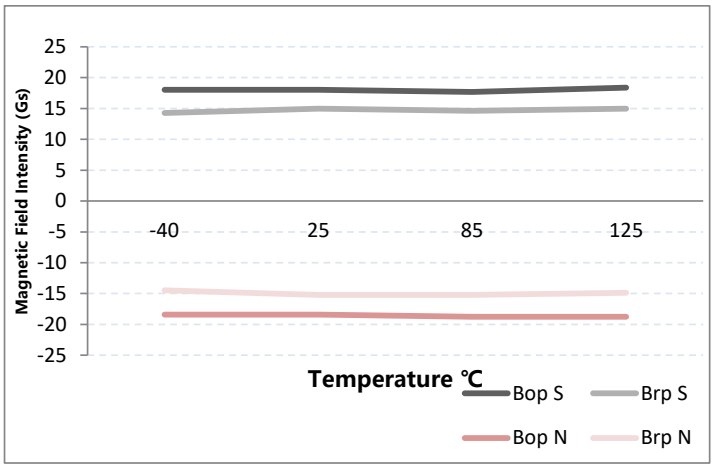
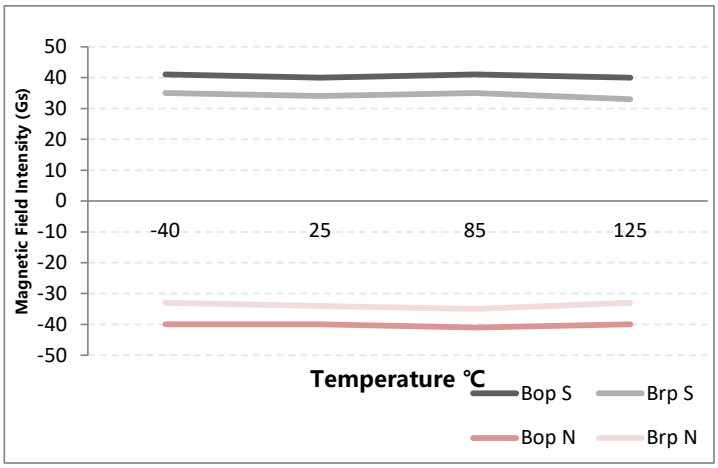


Figure.5 Supply Current vs. Temperature

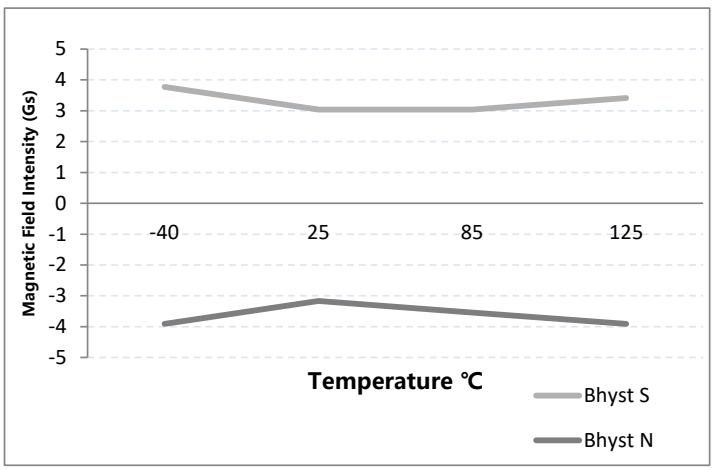


MT6325

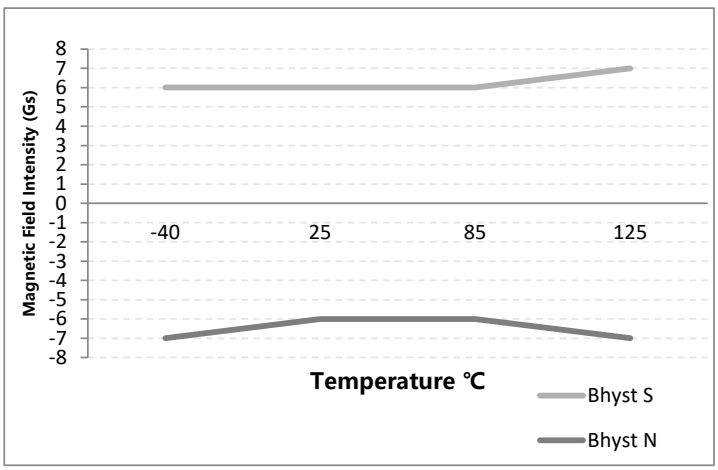


MT6325-L

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



MT6325



MT6325-L

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

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10.6 Typical Output Waveform

MT6325SN as example

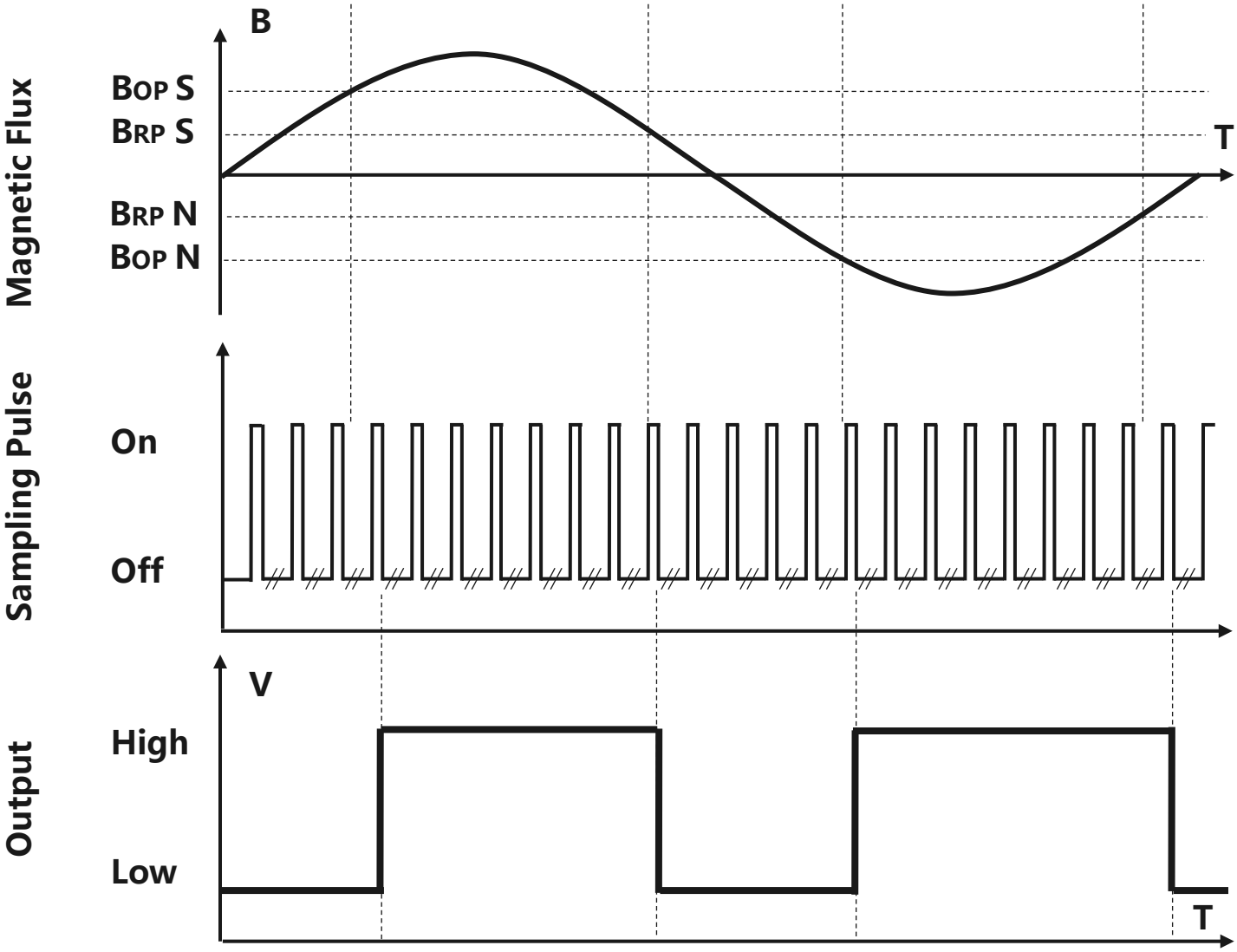


Figure.8 Digital Output vs. Magnetic Flux Density & Sampling Pulse

11 Typical Application Circuit

MT6325SN as example

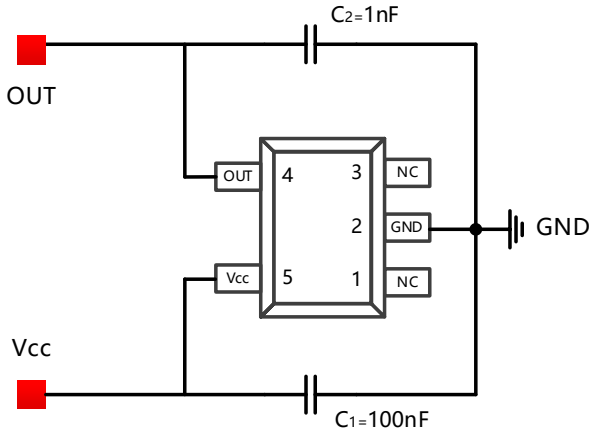


Figure.9 Typical Application Circuit

12 Power on Output Waveform

Vcc rise time < 1us, Tpo is the time from the stable point of Vcc to the valid point of output

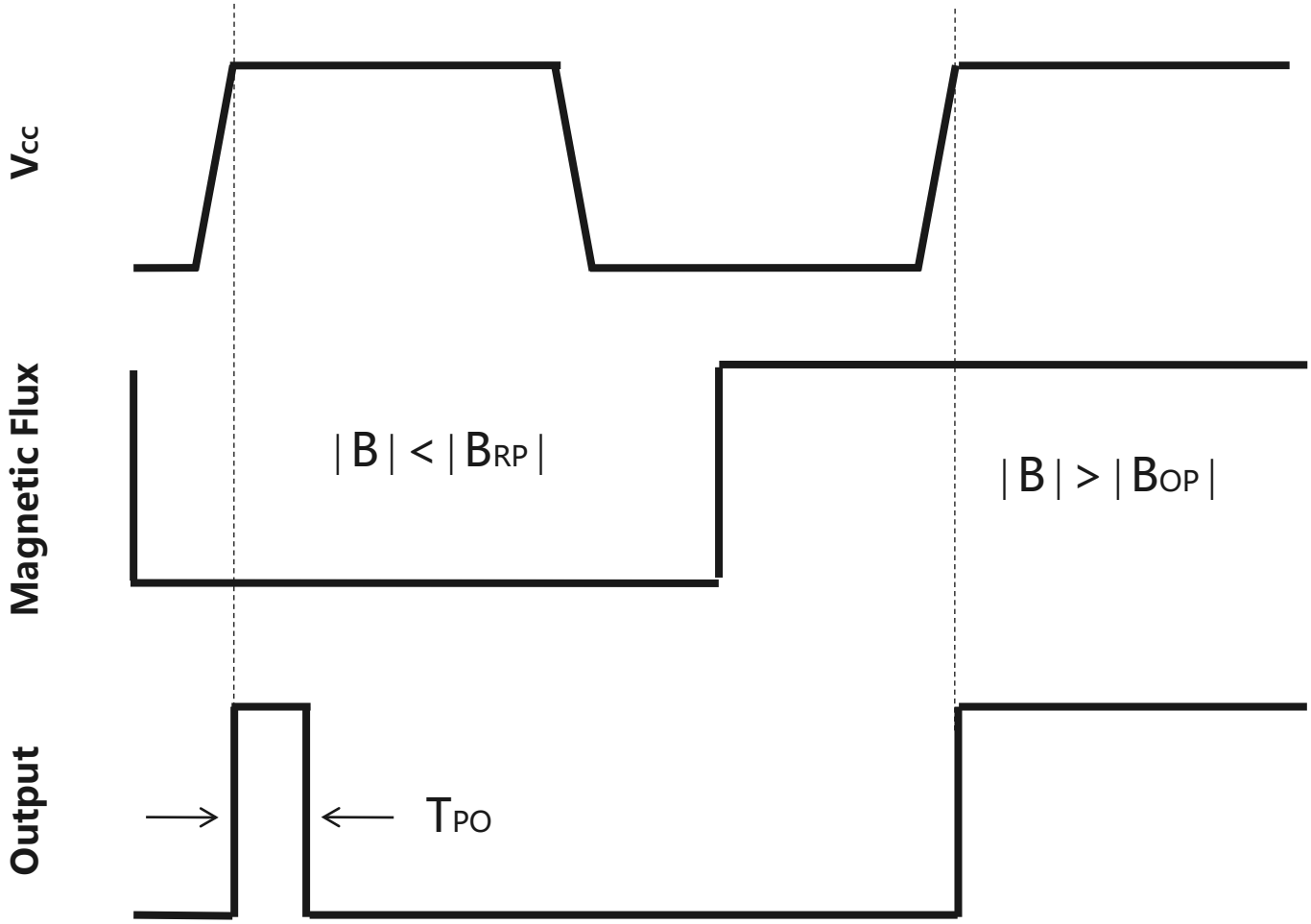


Figure.10 Power on Output Waveform

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

13.1 SOT-553 Package Information

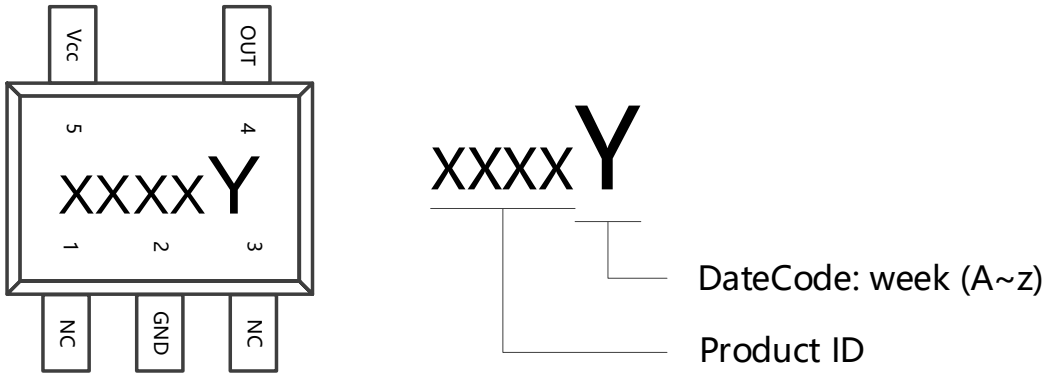


Figure.11 SOT-553 Chip Marking Spec

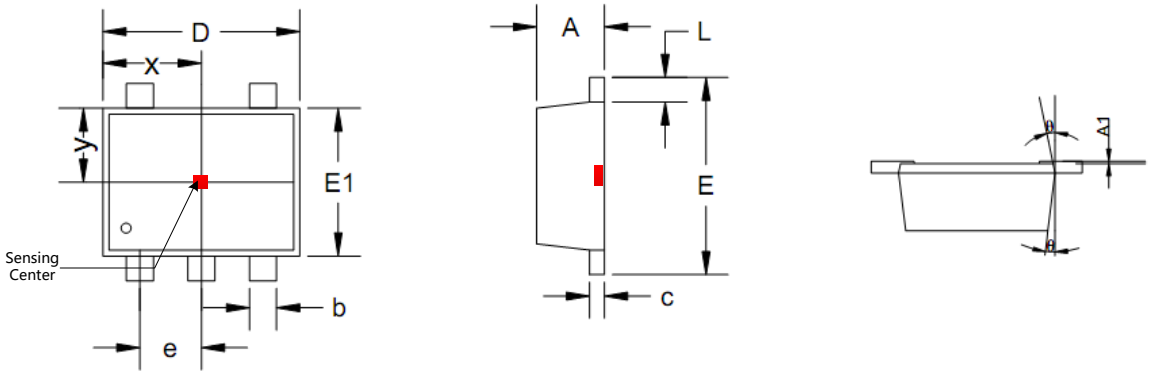


Figure.12 SOT-553 Package Drawing

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.525	0.600	0.021	0.024
A1	0.000	0.050	0.000	0.002
e	0.450	0.550	0.018	0.022
c	0.090	0.160	0.004	0.006
D	1.500	1.700	0.059	0.067
b	0.170	0.270	0.007	0.011
E1	1.100	1.300	0.043	0.051
E	1.500	1.700	0.059	0.067
L	0.100	0.300	0.004	0.012
θ	7 ° REF		7 ° REF	
x	0.800 TYP		0.032 TYP	
y	0.600 TYP		0.024 TYP	

13.2 DFN1616 Package Information

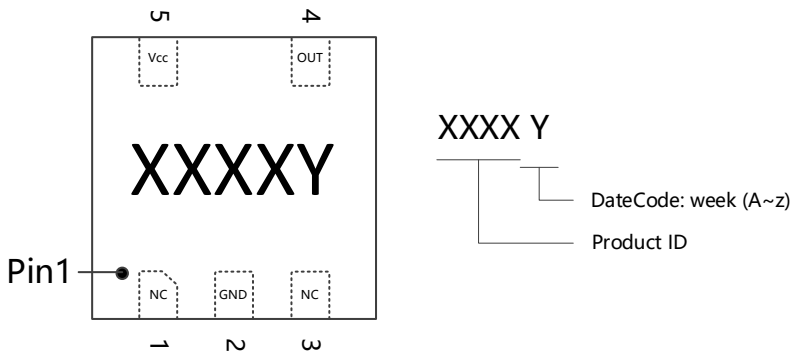


Figure.13 DFN1616 Chip Marking Spec

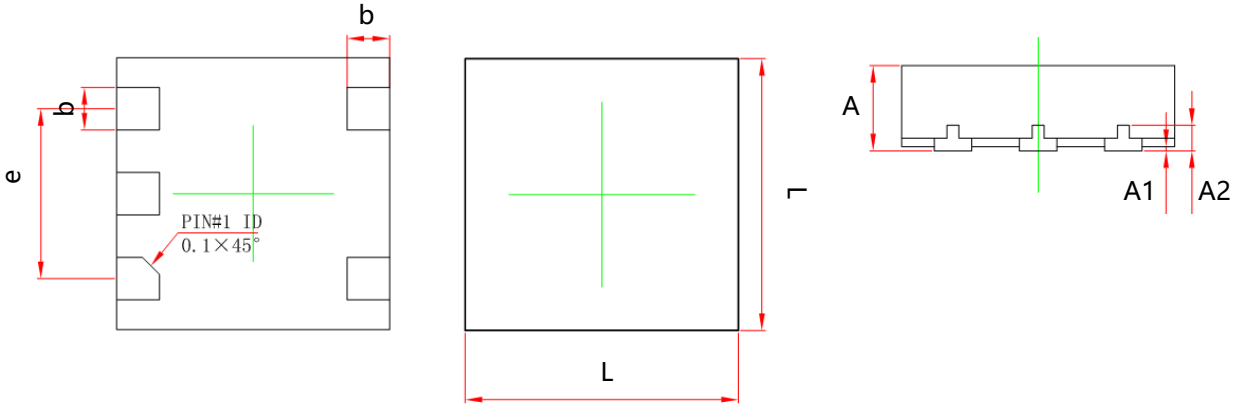


Figure.14 DFN1616 Package Drawing

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.450	0.550	0.018	0.022
A1	0.000	0.050	0.000	0.002
A2		0.150 TYP		0.006 TYP
L	1.550	1.650	0.061	0.065
b	0.200	0.300	0.008	0.012
e		1.000 TYP		0.039 TYP

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