

**MX0111 Reinforced ESD/Latchup Protected Ultra-Low-Power Omnipolar Hall-Effect Sensor with Push-Pull Output**

**1. General Description**

- The omnipolar detection hall IC is magnetic switch that can operate with both South and North pole, when the applied magnetic flux density exceeds the Bop threshold, the device outputs a low voltage
- This Hall IC product can be in tablets, smart phones, and other applications in order to detect open and close of the cover
- The device operates from a supply range of 1.65 V to 5.5 V, and is packaged in a standard SOT-23 or TO-92

**2. Features and Benefits**

- Omnipolar Detection
- Industrial-leading low-power consumption
- Very high sensitivity
- Operation down to 1.65V
- Robust Hysteresis over temperature and supply voltage
- Reinforced ESD/Latch-up protection

**3. Applications**

- Solid State Magnetic Switch
- Handheld Wireless Handset Awake Switch
- Lid close sensors for battery powered devices
- Magnetic proximity sensor in low/medium duty cycle applications
- Energy metering

**4. Key Specifications**

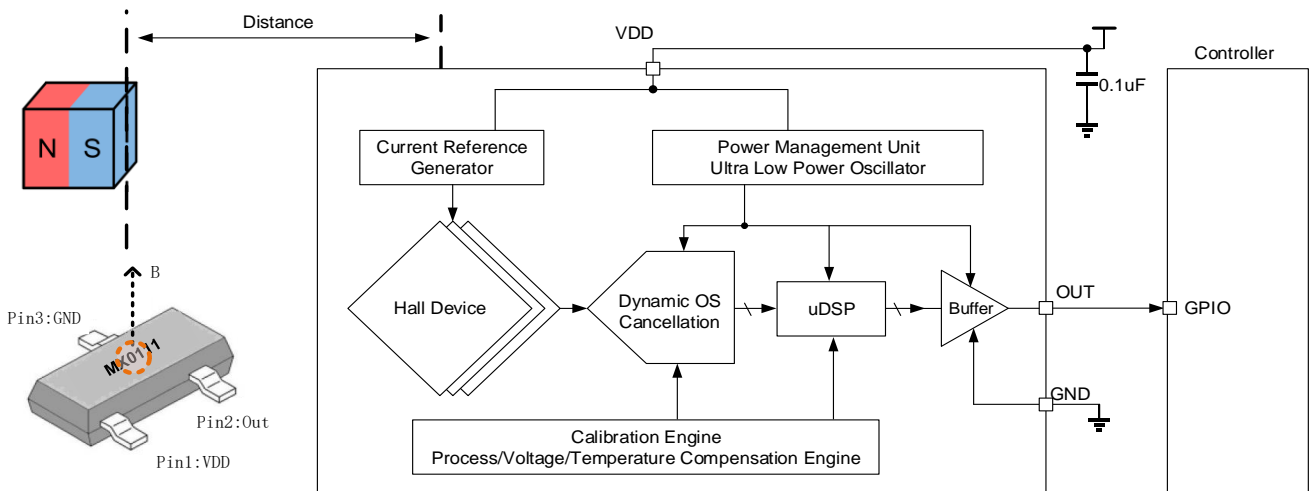
- Wide VDD supply range: 1.65V to 5.5V
- Operation point:  $\pm 22\text{GS}$
- Release point:  $\pm 12\text{GS}$
- Sampling Period: 100mS/10Hz
- Supply Current(Averaged): 0.75uA(VDD=3.3V), 0.45uA(VDD=1.8V)
- Reinforced ESD up to 8KV HBM
- Reinforced Latch-up immunity
- Operating Temperature Range:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$

**5. Device Information**

PART NUMBER	PACKAGE	BODY SIZE
MX0111	SOT23(3)	2.92mmx1.30mm

\*Refer to the Ordering Information for more

**6. Typical Schematics and Circuit Diagram**



## 7. Electrical and Magnetic Characteristics

### 7.1 Absolute maximum ratings

Over operating free-air temperature range

Symbol	Parameters	Min	Max	Units	
$V_S$	Supply Voltage	-	5.5	V	
$V_{RCC}$	Reverse Battery Voltage	-	-0.5	V	
$V_{OUT}$	Output Voltage	-	5.5	V	
$I_{OUT}$	Continuous output current	-	10	mA	
$T_A$	Operating Ambient Temperature	-40	125	°C	
$T_S$	Storage temperature	-50	150	°C	
$T_J$	Junction temperature	-	150	°C	
B	Magnetic flux	No Limit			Gauss

### 7.2 ESD Rating

Symbol	Parameters		Units
VESD-HBM	Human Body Model, per ANSI/ESDA/JEDEC JS-001	± 8000	V
VESD-CDM	Charged Device Model, per JEDEC specification JESD22-C101	± 1000	V

### 7.3 Thermal Information

Symbol	Parameters		Units
$R_{\theta JA}$	Junction to ambient thermal resistance	356	°C/W
$R_{\theta JB}$	Junction to board thermal resistance	94	°C/W

### 7.4 Electrical Characteristics

At  $T_A = -40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ ,  $V_S = 1.65\text{V}$  to  $5.5\text{V}$  (unless otherwise specified)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
$V_S$	Supply Voltage	Operating	1.65	-	5.5	V
$I_{S(AVG)}$	Supply Current	$B < B_{RP}$ , $V_S = 3.3\text{V}$	-	0.75	0.85	µA
		$B < B_{RP}$ , $V_S = 1.8\text{V}$		0.3	0.4	µA
$I_{S(EN)}$		Chip awake, $B < B_{RP}$ , $V_S = 3.3\text{V}$	-	1.6	2	mA
$I_{S(DIS)}$		Chip asleep, $B < B_{RP}$ , $V_S = 3.3\text{V}$	-	0.4	0.5	µA
$V_{SON}$	Output Saturation Voltage	$B > B_{OP}$	-	-	0.4	V
$I_{OFF}$	Output Leakage Current	$B < B_{RP}$ , $V_{OUT} = 5\text{V}$	-	-	0.1	µA
$T_{AW}$	Awake Time	$V_S = 3.3\text{V}$	11	12.5	13	µs
$T_{SL}$	Sleep Time	$V_S = 3.3\text{V}$	95	100	105	ms
D.C.	Duty Cycle		-	0.12	-	%
$B_{OP}$	Magnetic Operating Point	At $T_A = 25^{\circ}\text{C}$	+/-18	+/-22	+/-26	Gauss
$B_{RP}$	Magnetic Release Point	At $T_A = 25^{\circ}\text{C}$	+/-8	+/-12	+/-16	Gauss
$B_{HYST}$	Hysteresis Window	At $T_A = 25^{\circ}\text{C}$ , $ABS(B_{OP} - B_{RP})$	5	10	15	Gauss

## 8. Ordering Information

### 8.1 Device ordering code table

Product Code	Temperature Code	Package Code	Option Code	Packing Form
MX0111PUAST-000-RE	A	ST	PU 000	RE
MX0111PUAFT-000-BP	A	FT	PU 000	BP
MX0111PUAFTS-000-BP	A	FTS	PU 000	BP
MX0111PUAFTR-000-BP	A	FTR	PU 000	BP
MX0111PUAFTSR-000-BP	A	FTRS	PU 000	BP
MX0111NDAST-000-RE	A	ST	ND 000	RE
MX0111NDAFT-000-BP	A	FT	ND 000	BP
MX0111NDAFTS-000-BP	A	FTS	ND 000	BP
MX0111NDAFTR-000-BP	A	FTR	ND 000	BP
MX0111NDAFTSR-000-BP	A	FTRS	ND 000	BP

Notes1:

Temperature Code Definition: A for -40°C to 85°C; B for -40°C to 125°C; C for -40°C to 150°C

Package Code Definition: ST for sot23; FT for flat TO-92; FTS for flat TO-92, short leg; FTR for flat TO-92, radial lead; FTRS for flat TO-92, short leg, radial lead

Option Code Definition: PP for push pull; PU for pull up resistor; ND for NMOS open drain output

Package Form Definition: RE for tape and reel; BP for bulk packaging