

GENERAL DESCRIPTION

The VCS2395 is an ultra-low power magnetic switch sensor IC. The device integrates Anisotropic Magneto-Resistive (AMR) sensor and CMOS signal conditioning circuitry in a small package. CMOS signal conditioning circuitry provides precise control of the Bop/Brp offset voltage compensation circuit and open-drain output within industrial operating temperature range (-40°C to $+125^{\circ}\text{C}$), and also provides a wide voltage operating range (2.0V to 5.5V) with low power consumption of Nanoampere level. The low power switch is designed for use in level metering, handheld devices or battery powered applications. The two-dimensional magnetic switch can detect the magnetic field of 360 degrees in any direction in the chip plane. Without the magnet being installed in a specific direction, it can greatly simplify the installation requirements and improve the system redundancy. Taking advantage of the high sensitivity of AMR, this switch combines low power consumption, small size, and excellent temperature characteristics, making it the first choice for low power, high-performance applications.

The VCS2395 is available in a Green SOT-23-3 package.

FEATURES

- **Wide Voltage Range:** 2.0V to 5.5V
- **Anisotropic Magneto-Resistive (AMR) Technology**
- **Two-Dimensional 360 Degree Magnetic Field Induction**
- **Omni-Polar Switch**
- **Ultra-Low Power Consumption (0.45 μA)**
- **Sampling Frequency (60Hz)**
- **High Sensitivity, Bop = $\pm 15\text{Gs}$, Brp = $\pm 11\text{Gs}$**
- **-40°C to $+125^{\circ}\text{C}$ Operating Temperature Range**
- **Available in a Green SOT-23-3 Package**

APPLICATIONS

Position Detection: Smart Door Locks, etc.

Liquid Level Meter: Industrial Level Gauges, etc.

Non-Contact Switch: Smoke Detectors, Electronic Price Tags, etc.

TYPICAL APPLICATION

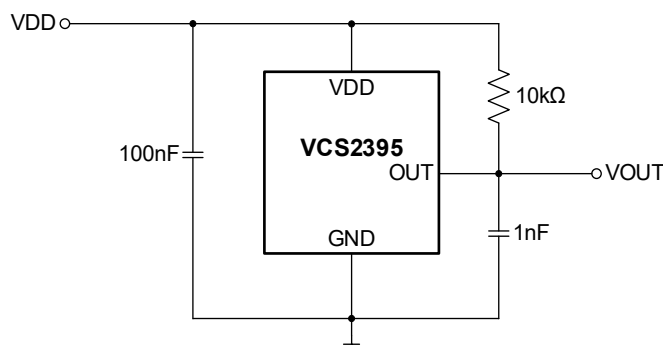


Figure 1. Typical Application Circuit

VCS2395 AMR Low Power 360 Degree Omni-Polar Switch Sensor

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
VCS2395	SOT-23-3	-40°C to +125°C	VCS2395S	2395S XXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXX = Date Code.

XXXX

____ Date Code - Week

____ Date Code - Year

Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{DD}	6V
Reverse Supply Voltage, V_{RDD}	0.3V
Output Current, $I_{OUTSINK}$	20mA
Junction Temperature	+150°C
Storage Temperature Range	-50°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility ^{(1) (2)}	
HBM	±4000V
CDM	±2000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Operating Temperature Range	-40°C to +125°C
-----------------------------	-----------------

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

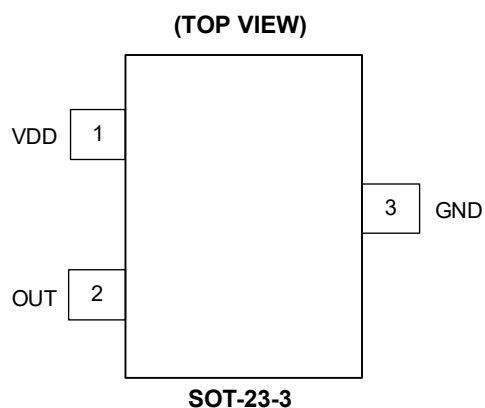
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATION



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	VDD	Supply.
2	OUT	Output.
3	GND	Ground.

ELECTRICAL CHARACTERISTICS

($V_{DD} = 2.0V$ to $5.5V$, $T_A = -40^{\circ}C$ to $+125^{\circ}C$, typical values are measured at $T_A = +25^{\circ}C$, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Specifications						
Supply Voltage	V_{DD}		2.0	3.3	5.5	V
Average Current	I_W	$V_{DD} = 3.3V$		0.45	1.0	μA
Operating Frequency	f_W	$V_{DD} = 2.0V$ to $5.5V$		60		Hz
Low-Level Output Voltage	V_{OL}	Load current = 10mA, $V_{DD} = 3.3V$	0		0.1	V
Setup Time	t_{PO}			3.5		ms
Sleep Time	t_{SLP}			16.7		ms
Magnetic Properties ($T_A = +25^{\circ}C$, $V_{DD} = 2.0V$ to $5.5V$)						
Operating Point	Bop		± 5	± 15	± 35	Gs
Release Point	Brp		± 2	± 11	± 25	Gs
Hysteresis	Bhys		1	4	15	Gs

FUNCTIONAL BLOCK DIAGRAM

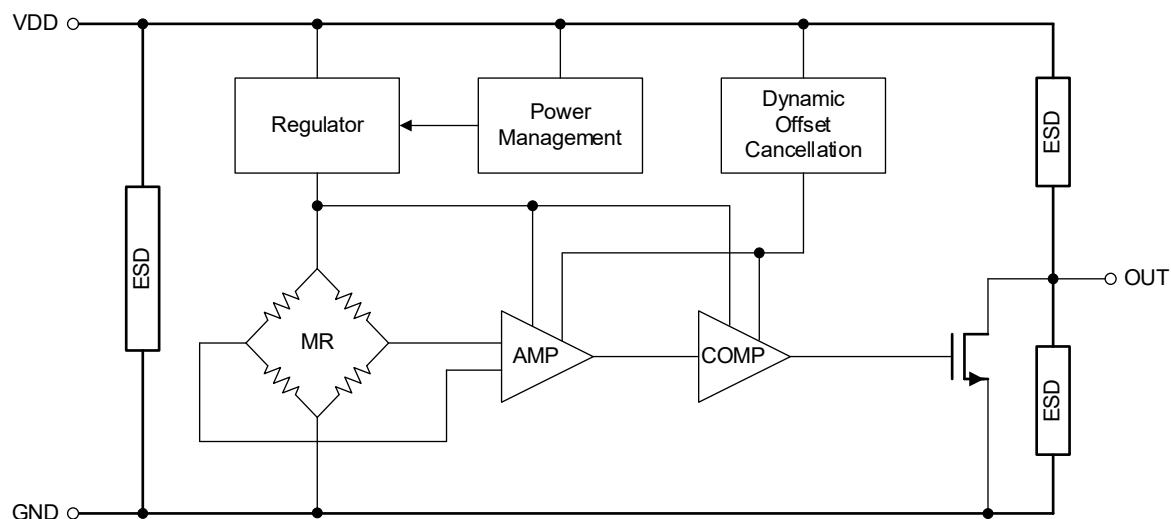


Figure 2. Circuit Block Diagram

DETAILED DESCRIPTION

Sensing Direction

The VCS2395 is a two-dimensional magnetic field sensing switch, which can sense 360 degrees of magnetic field in any direction in the chip plane.

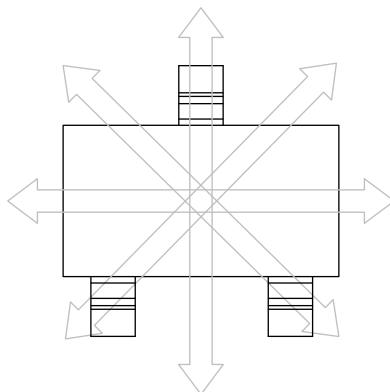


Figure 3. Sensing Direction

Switch Characteristics

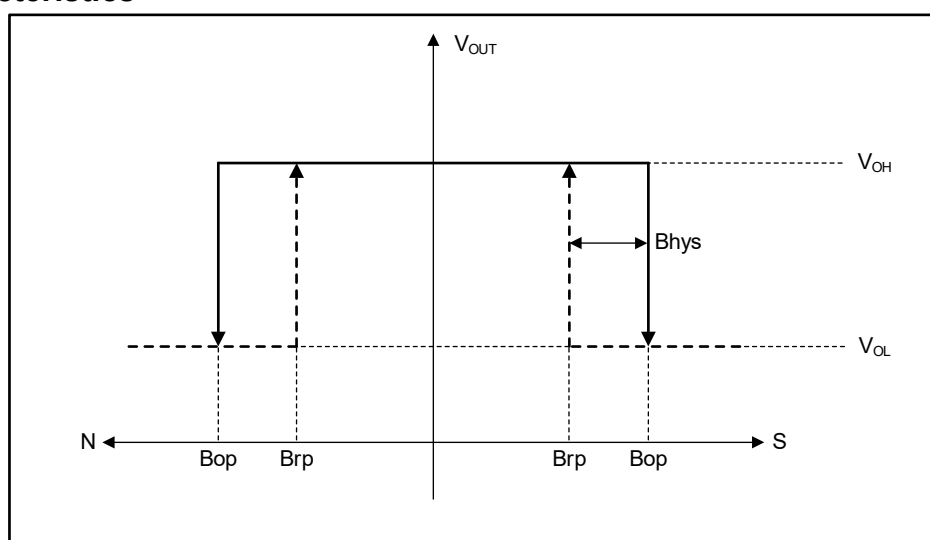


Figure 4. Switch Characteristics

REVISION HISTORY

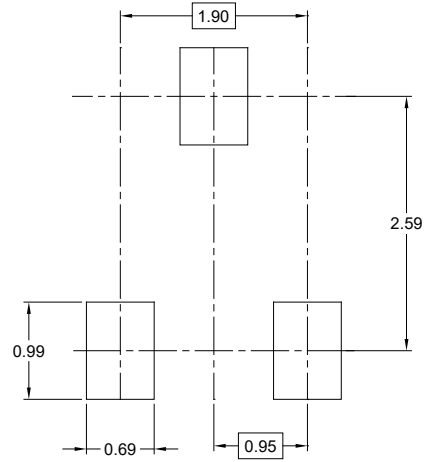
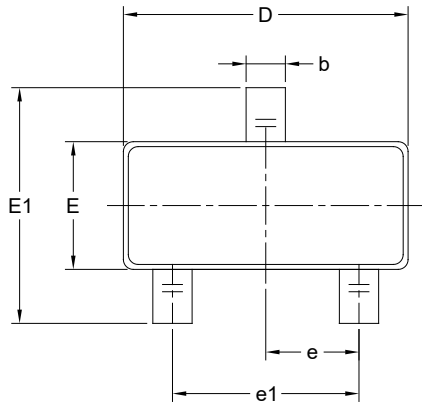
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original to REV.A (SEPTEMBER 2025)

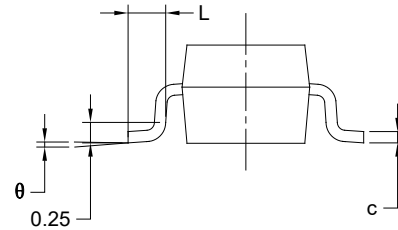
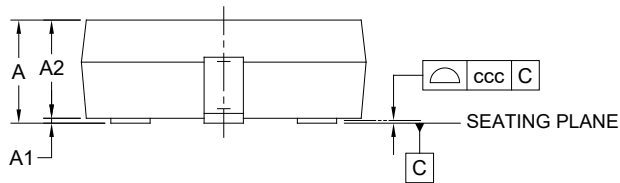
	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

SOT-23-3



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

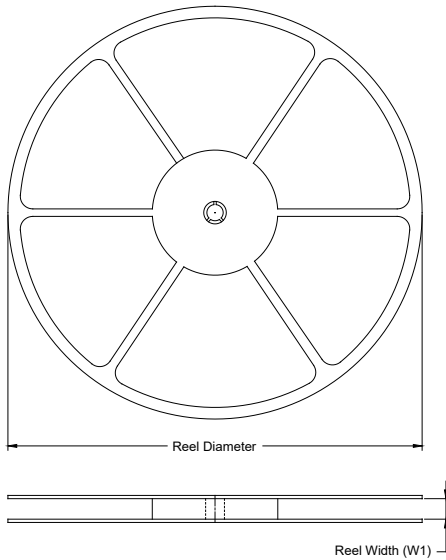
NOTES:

1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

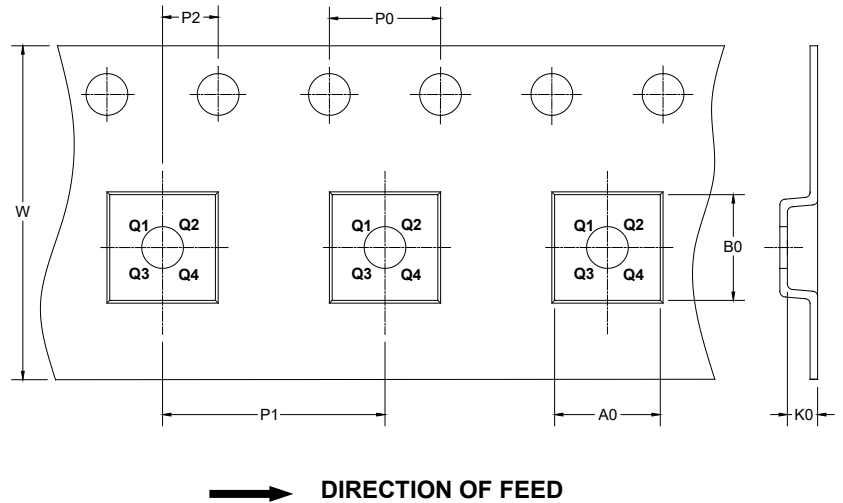
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

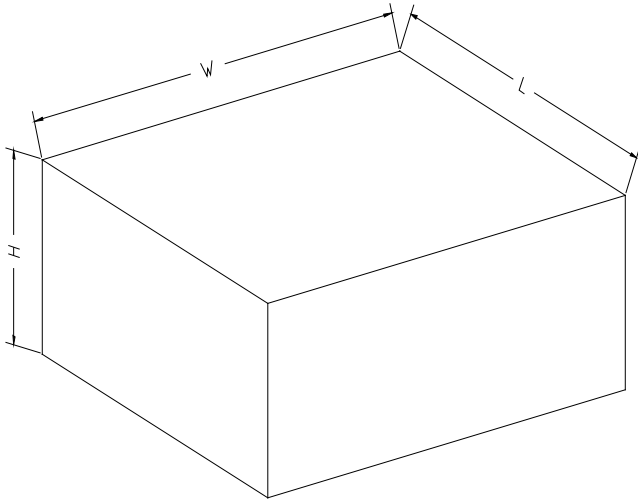
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT-23-3	7"	9.5	3.18	3.28	1.32	4.0	4.0	2.0	8.0	Q3

DD0001

PACKAGE INFORMATION

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18

DD0002