XtremeSense™ 2D TMR Angle Sensor

FEATURES AND BENEFITS

- High precision TMR
- Contactless 0° to 360° angle sensor IC with differential analog sine and cosine outputs.
- Dual full-bridge TMR network (TSSOP-8).
- ASIL-Compliant: ASIL D safety element out-of-context (SEooC) developed in accordance with ISO 26262,when used as specified in the safety manual and once assessment is completed
- Supply voltage: 1.0 to 5.5 V.
- Operating magnetic field: 200 to 900 G.
- Operating temperature: –40°C to 150°C
- AEC-Q100 Grade 0

A2 SiL **ISO 26262 ASIL Compliant**

APPLICATIONS

- Angular measurements
- Rotary and angular sensors
- BLDC motors

PACKAGE: 8-LEAD TSSOP (SUFFIX LE)

Not to scale

DESCRIPTION

The A33203 is a 2D angle sensor with a dual full-bridge configuration using XtremeSense™ 2D tunnel magneto-resistance (TMR) technology. The operating magnetic field for this 2D sensor is 200 G to 900 G with an extended range up to 1200 G. The sensitive axes of the TMR elements are orthogonal to each other, providing a 90° phase separation between the sine and cosine outputs. This phase separation is inherently independent of magnet pole spacing and air gap.

The A33203 was developed in accordance with ISO 26262 as a hardware safety element out of context with ASIL D capability (pending assessment) for use in automotive safety-related systems when integrated and used in the manner prescribed in the applicable safety manual and datasheet.

The A33203 is available as a dual full bridge in an 8-lead TSSOP package. This package is lead (Pb) free with 100% matte-tin lead frame plating. The A33203 is AEC-Q100 grade 0 qualified.
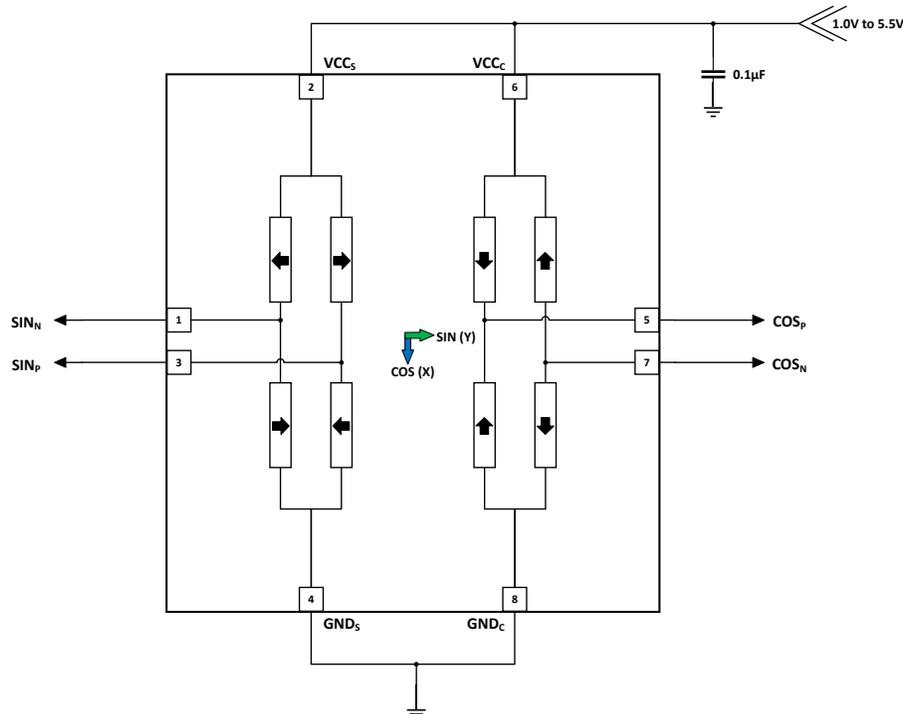

Figure 1: A33203 Typical Application Diagram

A33203-SF, Rev. 1
MCO-0002058

Short-Form Datasheet • Content has been removed.
For the complete datasheet, contact Allegro.

March 26, 2026

SPECIFICATIONS

SELECTION GUIDE

Part Number	Number of Full-Bridges	Number of Analog Outputs	Automotive Grade	Target ASIL Rating [1]	Package [2]	Packing
A33203LLEATR	2	4	Grade 0	ASIL D	8-lead TSSOP	4000 pieces per 13 inch reel

[1] Pending Assessment.
[2] Contact Allegro for other package or output polarity options.
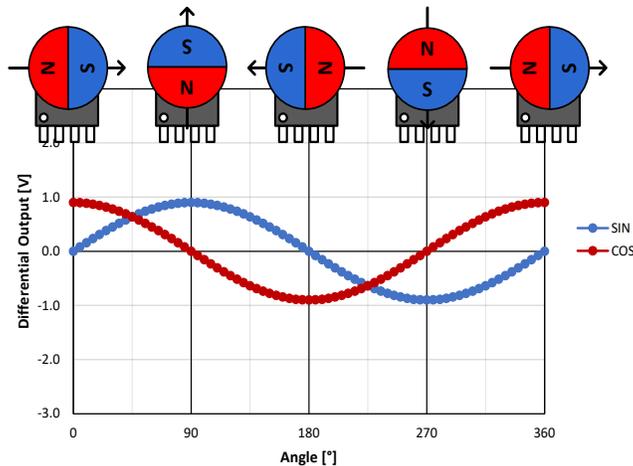
DIFFERENTIAL OUTPUT SIGNAL

Figure 2: Nominal A33203 Differential Output (shown after external processing) versus Position, V_{CC} = 3 V
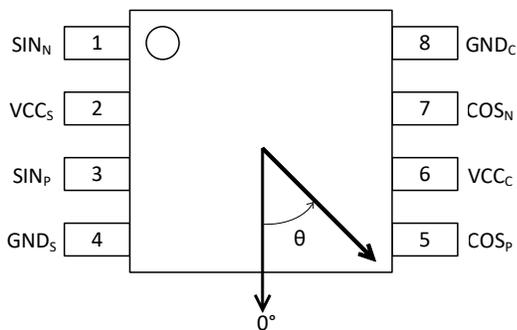
PINOUT DIAGRAM AND TERMINAL LIST

Figure 3:TSSOP-8 Top-Down View

Terminal List Table

Number	Name	Function
1	SIN_N [1]	Negative Sine Output
2	VCC_S	Supply Voltage, Sine Bridge
3	SIN_P [1]	Positive Sine Output
4	GND	Ground, Sine Bridge
5	COS_P [2]	Positive Cosine Output
6	VCC_C	Supply Voltage, Cosine Bridge
7	COS_N [2]	Negative Cosine Output
8	GND_C	Ground, Cosine Bridge

[1] SIN = SIN_P – SIN_N
[2] COS = COS_P – COS_N

PACKAGE OUTLINE DRAWING

For Reference Only – Not for Tooling Use

(Reference Allegro DWG-0000381, Rev. 1 and JEDED MO-153AA)
Dimensions in millimeters - NOT TO SCALE
Dimensions exclusive of mold flash, gate burrs, and dambar protrusions
Exact case and lead configuration at supplier discretion within limits shown
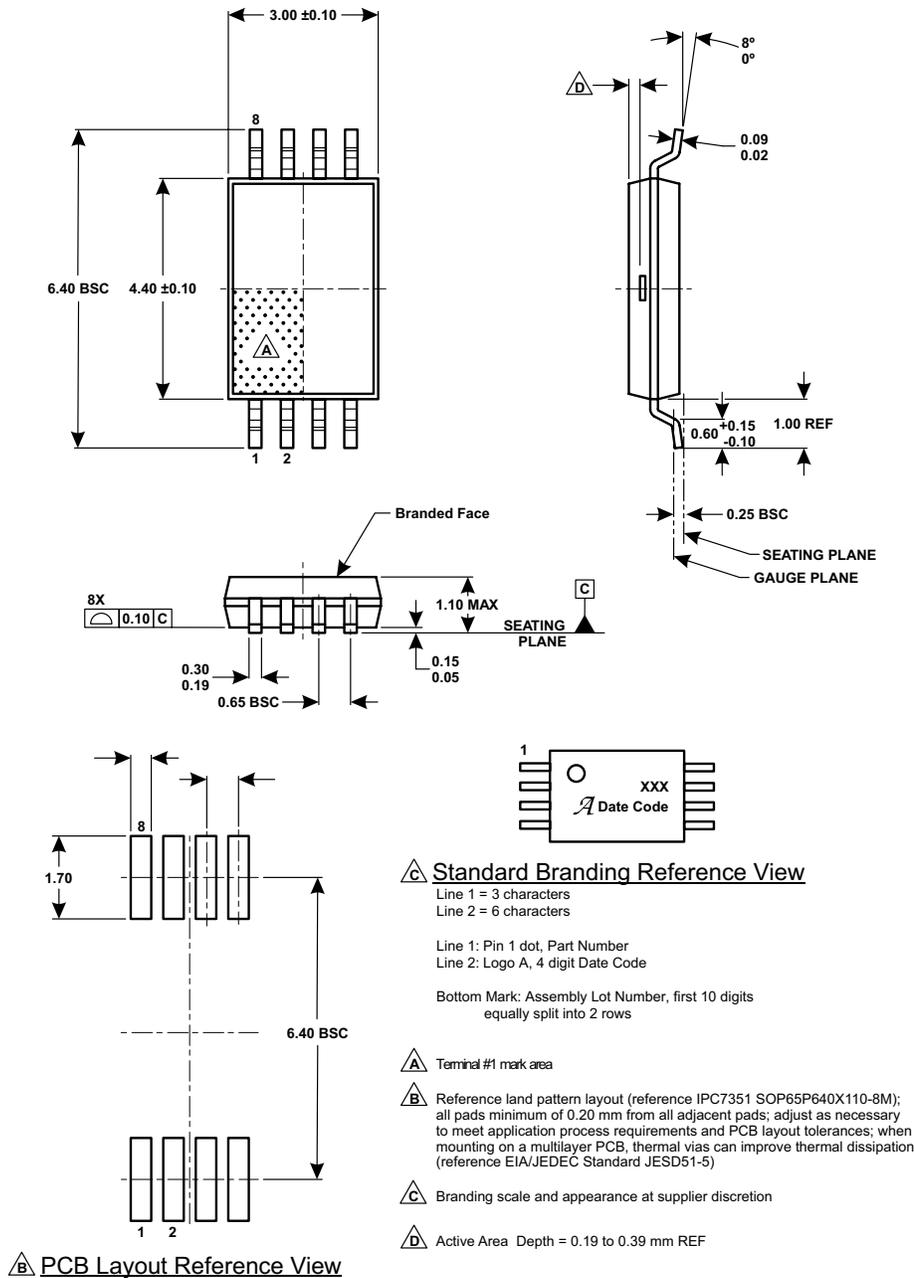
3.00 ±0.10

8°
0°

D

0.09
0.02

8

6.40 BSC   4.40 ±0.10

A

1   2

0.60 +0.15 -0.10   1.00 REF

0.25 BSC

SEATING PLANE

GAUGE PLANE

Branded Face

8X

0.10 C

1.10 MAX

SEATING PLANE

C

0.30
0.19

0.15
0.05

0.65 BSC

8

1.70

6.40 BSC

1   2

1

XXX

A Date Code

△C Standard Branding Reference View

Line 1 = 3 characters
Line 2 = 6 characters

Line 1: Pin 1 dot, Part Number
Line 2: Logo A, 4 digit Date Code

Bottom Mark: Assembly Lot Number, first 10 digits
equally split into 2 rows

△A Terminal #1 mark area

△B Reference land pattern layout (reference IPC7351 SOP65P640X110-8M);
all pads minimum of 0.20 mm from all adjacent pads; adjust as necessary
to meet application process requirements and PCB layout tolerances; when
mounting on a multilayer PCB, thermal vias can improve thermal dissipation
(reference EIA/JEDEC Standard JESD51-5)

△C Branding scale and appearance at supplier discretion

△D Active Area Depth = 0.19 to 0.39 mm REF

△B PCB Layout Reference View

Figure 4: TSSOP-8 Package (Suffix LE)

REVISION HISTORY

Number	Date	Description
–	March 25, 2026	Initial release
1	March 26, 2026	Initial release to Allegro website

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