

= Product Brief =

CQ-36xx

Digital Output Coreless Current Sensor

1. General Description

CQ-36xx is an open-type current sensor using Hall sensors. It has a Sigma Delta modulator producing a 1-bit data stream whose density is proportional to an AC current / a DC current. Ultra-low noise property is realized by III-V compound semiconductor Hall elements. Coreless ultra-small surface mount package realizes the space-saving. In addition, the low primary conductor resistance suppresses heat generation to achieve the 60A_{rms} continuous current. These features contribute to miniaturize your substrate and system size.

The CQ-36xx series also has isolation performance as defined by safety standard of UL 61800-5-1, which is an excellent fit for robotics, AC servo motors, and so on.

2. Features

- Σ - Δ modulator (Same interface as isolated ADC)
- Ultra-low noise
- Small-sized surface mount package (12.7mm×10.9mm×2.25mm)
- Maximum primary current : 60A_{rms}
- Quite small primary conductor resistance : 0.27m Ω Typ.
- No need of isolated power supply
- Stray magnetic field reduction function
- Isolation performance as defined by safety standard of UL61800-5-1
- Certified with safety standard of UL-1577 and IEC/UL62368-1.
- Same Isolation Voltage as isolated ADC



3. Applications

- Robotics
- AC Servo motors

CQ-36xx is suitable for other applications which are required isolation with small size and suppressing the heating. (For example, Shunt + Isolated ADC replacement)

4. CQ-36xx Series

Table 1. CQ-36xx Series

Part Number	I _{NS} (A)	Sensitivity (%/A)
CQ-36x1	±10.5	4.00
CQ-36x2	±21	2.00
CQ-36x3	±42	1.00
CQ-36x4	±60	0.700
CQ-36x5	±84	0.500
CQ-36x6	±168	0.250

For inquiries about x, please contact us through our [website](#).

5. Block Diagram and Functions

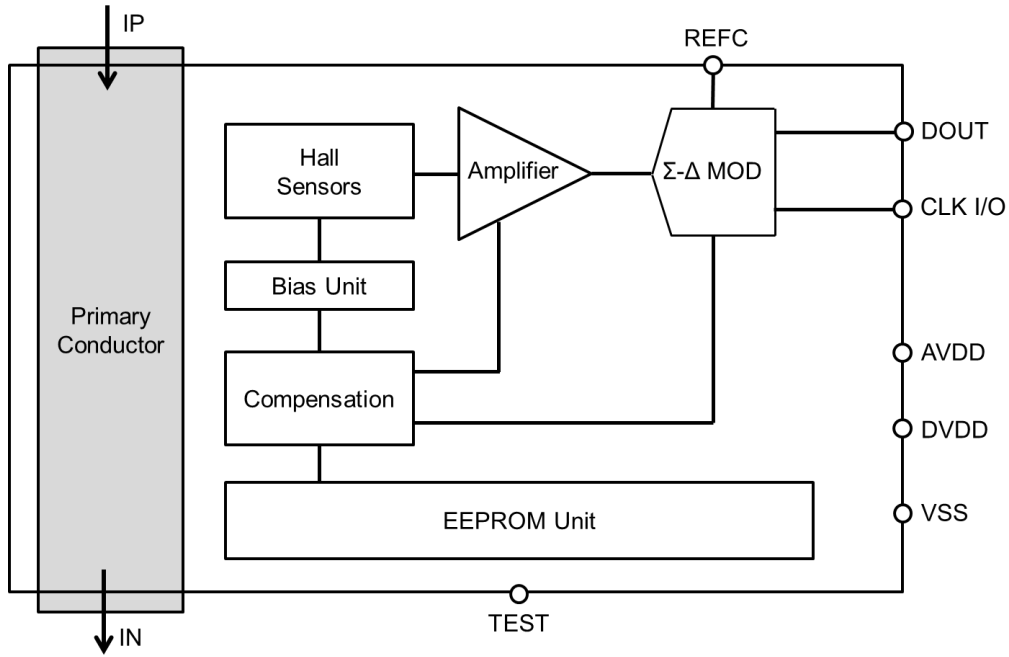


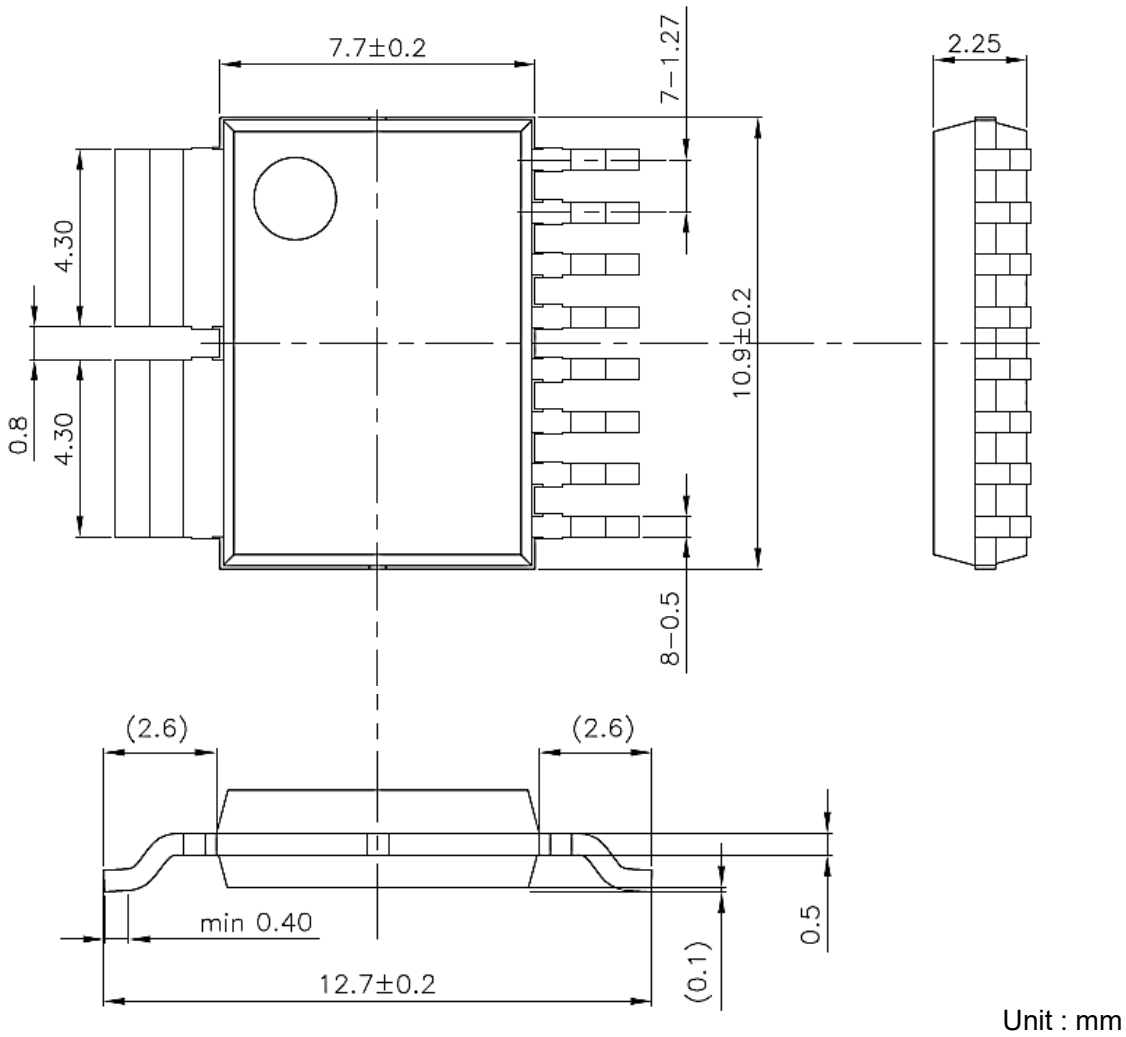
Figure 1. Block diagram of CQ-36xx

Table 2. Explanation of circuit blocks

Circuit Block	Function
Primary Conductor	A device has the primary conductor built-in.
Hall Sensors	Hall elements which detect magnetic flux density generated from the measured current.
Amplifier	Amplifier of Hall elements' output.
Σ-Δ MOD	Σ-Δ modulator. C-MOS data output type. Operated by input or output clock.
Compensation	Compensation circuit which adjusts the temperature drifts of sensitivity and zero-current voltage.
Bias Unit	Drive circuit for Hall elements.
EEPROM Unit	Non-volatile memory for setting adjustment parameters.

6. Package

6.1. Outline Dimensions



The tolerances of dimensions without any mention are ± 0.1 mm.

() is a reference values.

Figure 2. Outline dimensions of CQ-36xx

Terminals : Cu

Plating for Terminals : Sn-Bi

Package material : RoHS compliant, halogen-free

Table 3. Isolation characteristics of CQ-36xx

Parameter	Symbol	Min.	Typ.	Max.	Units
Creepage distance	Cr	8.0			mm
Clearance distance	Cl	8.0			mm

*Flammability standard is V0. (According to UL94)

*Comparative tracking index (CTI) is 400V. Material Group is II.

6.2. Recommended Pad Dimensions

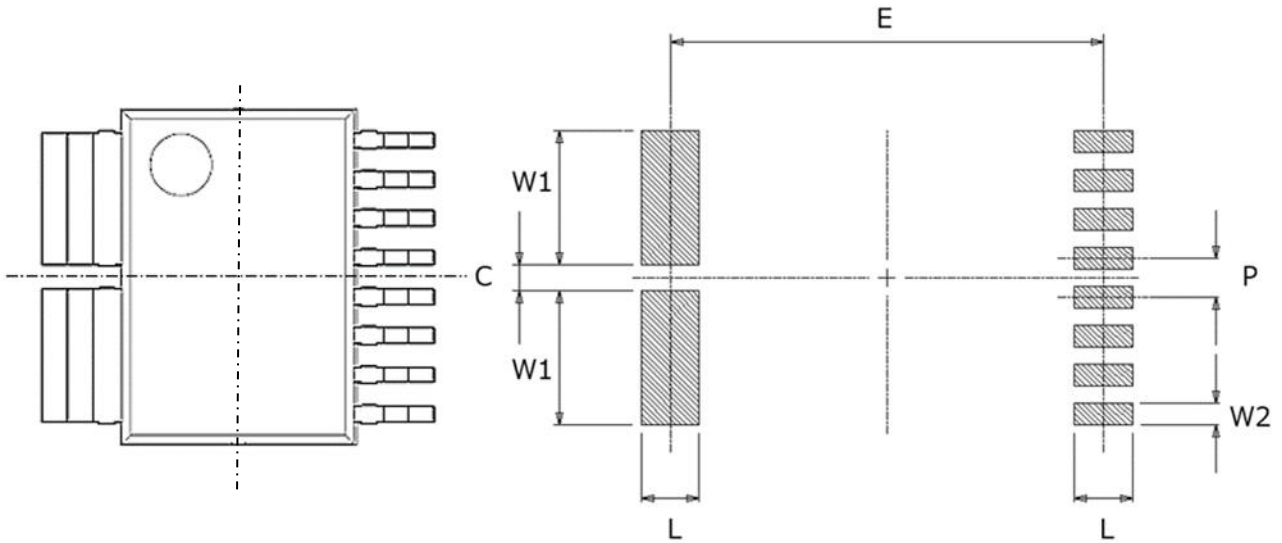


Figure 3. Recommended pad pattern

Table 4. Recommended pad dimensions

L	1.59
E	11.79
W1	4.44
W2	0.64
C	0.66
P	1.27

Unit:mm

If two or more trace layers are used as the current paths, please make enough number of through-holes to flow current between the trace layers. In order to make heat dissipation better, it is recommended that Pad on Via should be provided on the pad of the primary conductor.

7. Precautions

<Storage Environment>

Products should be stored at an appropriate temperature, and at as low humidity as possible by using desiccator (5 to 35°C). It is recommended to use the products within 4 weeks since packing was opened. Keep products away from chlorine and corrosive gas. When stored in an inappropriate environment, it can affect the product properties.

<Long-term Storage>

Long-term storage may result in poor lead solderability and degraded electrical performance even under proper conditions. For those parts, which stored long-term should be checked as for solderability before it is used.

For storage longer than 1 year, it is recommended to store in nitrogen atmosphere. Oxygen of atmosphere oxidizes leads of products, and lead solderability get worse.

<Other Precautions>

- 1) This product should not be used under the environment with corrosive gas including chlorine or sulfur.
- 2) This product is lead (Pb) free. All leads are plated with Sn-Bi. Do not store this product alone in high temperature and high humidity environment. Moreover, this product should be mounted on substrate within six months after delivery.
- 3) This product is damaged when it is used on the following conditions:
 - Supply voltage is applied in the opposite way.
 - Overvoltage which is larger than the value indicated in the specification.
- 4) This product will be damaged if it is used for a long time with the current (effective current) which exceeds the current rating. Careful attention must be paid so that maximum effective current is smaller than current rating.
- 5) The characteristics can be changed by the influences of nearby current and magnetic field and electric field. Please make sure of the mounting position.

As this product contains gallium arsenide, observe the following procedures for safety.

- 1) Do not alter the form of this product into a gas, powder, liquid, through burning, crushing, or chemical processing.
- 2) Observe laws and company regulations when discarding this product.

For detailed datasheets, please contact us through our [website](#).

IMPORTANT NOTICE

0. Asahi Kasei Microdevices Corporation (“AKM”) reserves the right to make changes to the information contained in this document without notice. When you consider any use or application of AKM product stipulated in this document (“Product”), please make inquiries the sales office of AKM or authorized distributors as to current status of the Products.
1. All information included in this document are provided only to illustrate the operation and application examples of AKM Products. AKM neither makes warranties or representations with respect to the accuracy or completeness of the information contained in this document nor grants any license to any intellectual property rights or any other rights of AKM or any third party with respect to the information in this document. You are fully responsible for use of such information contained in this document in your product design or applications. **AKM ASSUMES NO LIABILITY FOR ANY LOSSES INCURRED BY YOU OR THIRD PARTIES ARISING FROM THE USE OF SUCH INFORMATION IN YOUR PRODUCT DESIGN OR APPLICATIONS.**
2. The Product is neither intended nor warranted for use in equipment or systems that require extraordinarily high levels of quality and/or reliability and/or a malfunction or failure of which may cause loss of human life, bodily injury, serious property damage or serious public impact, including but not limited to, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, devices related to electric power, and equipment used in finance-related fields. Do not use Product for the above use unless specifically agreed by AKM in writing.
3. Though AKM works continually to improve the Product’s quality and reliability, you are responsible for complying with safety standards and for providing adequate designs and safeguards for your hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of the Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption.
4. Do not use or otherwise make available the Product or related technology or any information contained in this document for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). When exporting the Products or related technology or any information contained in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. The Products and related technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
5. Please contact AKM sales representative for details as to environmental matters such as the RoHS compatibility of the Product. Please use the Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. AKM assumes no liability for damages or losses occurring as a result of noncompliance with applicable laws and regulations.
6. Resale of the Product with provisions different from the statement and/or technical features set forth in this document shall immediately void any warranty granted by AKM for the Product and shall not create or extend in any manner whatsoever, any liability of AKM.
7. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of AKM.

Rev.1