

## Features

- 2.5V-5.5V power supply
- Isolation voltage is 3kV RMS
- The CMTI of common mode
- transient suppression was up to 150KV/uS
- 2.1V undervoltage protection
- Maximum signal transmission is 90Mbps
- Transmission latency is as low as 10ns
- Pulse width distortion was as low as 5ns
- Static power consumption is as low as 300uA
- The dynamic power consumption is 6mA / channel
- Operating temperature support from -40°C to +85°C

## Application

- Industrial control signal transmission
- Grid relay protection device
- Isolated power control
- Replace Optocoupler
- Industrial motor control
- Solar inverter

## Description

The CBBuD120X series is a high-speed 2-channel digital isolator. Integrated high-performance capacitive isolation technology. The maximum signal transmission rate is up to 90Mbps, with small pulse width distortion. The device can withstand a high isolation voltage and meets the conventional one Test Specifications (UL Standards). No requirements for the external electromagnetic field environment.

## Catalog

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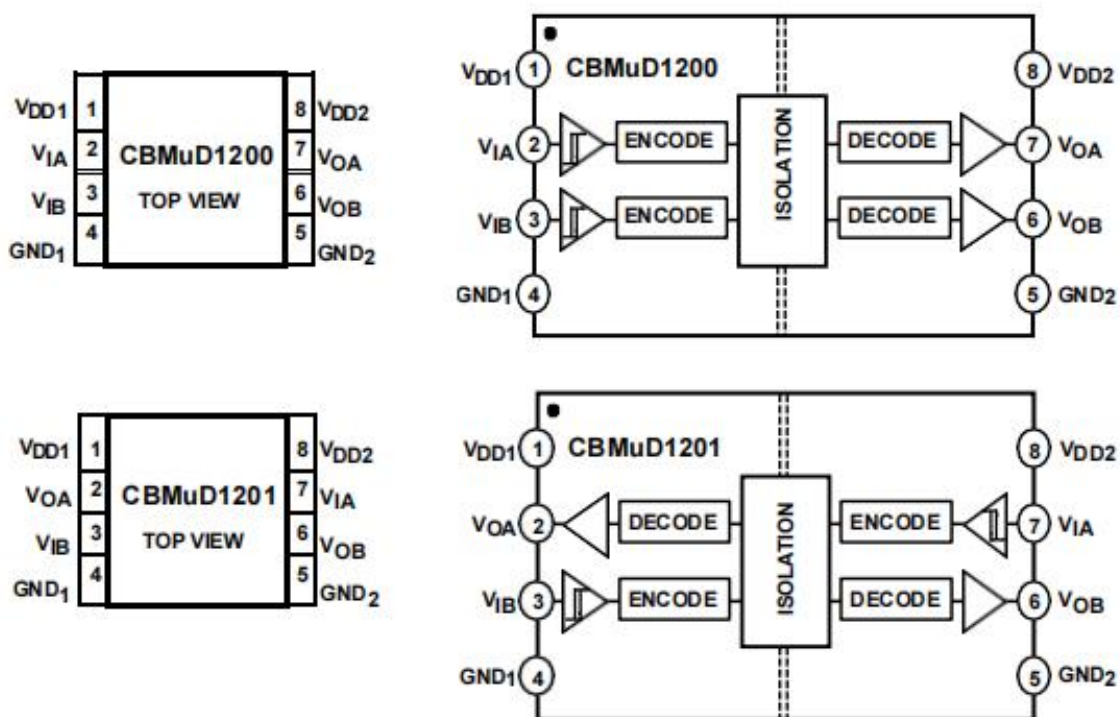
## Revision Log

| Version | Revision date | Change content                                          | Reason for Change | Modified by | Reviewed By | Note |
|---------|---------------|---------------------------------------------------------|-------------------|-------------|-------------|------|
| V1.0    | 2024.12.25    | Adjust the lower limit of the product's IDD parameters. | Regular update    | WW          | LYL         |      |
| V1.1    | 2025.5.6      | Increase the product's static parameters.               | Regular update    | WW          | LYL         |      |

## Product selection, pin assignment and block diagram

| Product model | Function definition | Default output             |
|---------------|---------------------|----------------------------|
| CBMuD1201L    | Two-way             | The default output is low  |
| CBMuD1201H    | Two-way             | The default output is high |
| CBMuD1200L    | One-way             | The default output is low  |
| CBMuD1200H    | One-way             | The default output is high |

Product selection



pin assignment and block diagram

## Truth Table

CBMuD1200H, CBMuD1201H Truth Table

| VIA Input | VIB Input | VDD1 Status    | VDD2 Status    | VOA Output | VOB Output |
|-----------|-----------|----------------|----------------|------------|------------|
| H         | H         | Power on       | Power on       | H          | H          |
| L         | L         | Power on       | Power on       | L          | L          |
| H         | L         | Power on       | Power on       | H          | L          |
| L         | H         | Power on       | Power on       | L          | H          |
| X         | X         | Not powered on | Power on       | H          | H          |
| X         | X         | Power on       | Not powered on | X          | X          |

CBMuD1200L, CBMuD1201L Truth Table

| VIA Input | VIB Input | VDD1 Status    | VDD2 Status    | VOA Output | VOB Output |
|-----------|-----------|----------------|----------------|------------|------------|
| H         | H         | Power on       | Power on       | H          | H          |
| L         | L         | Power on       | Power on       | L          | L          |
| H         | L         | Power on       | Power on       | H          | L          |
| L         | H         | Power on       | Power on       | L          | H          |
| X         | X         | Not powered on | Power on       | L          | L          |
| X         | X         | Power on       | Not powered on | X          | X          |

## Absolute Maximum Ratings <sup>(1)</sup>

### Absolute electrical parameters

| Symbol          | Parameters                      | Min     | Max                  | Units |
|-----------------|---------------------------------|---------|----------------------|-------|
| V <sub>CC</sub> | Supply voltage                  | -0.3    | 6                    | V     |
| V <sub>IO</sub> | I/O service voltage             | GND-0.3 | V <sub>CC</sub> +0.5 |       |
| I <sub>O</sub>  | I/O port maximum output current | -50     | +50                  | mA    |
| T <sub>J</sub>  | Junction temperature            |         | 150                  | °C    |
| T <sub>S</sub>  | Storage temperature             | -50     | 150                  | °C    |
| T <sub>J</sub>  | Junction temperature            | -       | 150                  | °C    |

## ESD

### Electrostatic protection parameters

| Symbol   | Parameters                                                |       | Units |
|----------|-----------------------------------------------------------|-------|-------|
| VESD-HBM | Human Body Model, per ANSI/ESDA/JEDEC JS-001              | ±3000 | V     |
| VESD-CDM | Charged Device Model, per JEDEC specification JESD22-C101 | ±500  | V     |

## Recommended Operating Condition

At T<sub>A</sub> = -40°C to 85°C, V<sub>S</sub> = 2.5V to 5.5V (unless otherwise specified)

| Symbol          | Parameter                           | Test Condition                                                 | Min                 | Typ | Max                 | Units |
|-----------------|-------------------------------------|----------------------------------------------------------------|---------------------|-----|---------------------|-------|
| V <sub>DD</sub> | Supply Voltage                      | Operating                                                      | 2.5                 | -   | 5.5                 |       |
| V <sub>IH</sub> | Logic input is a high level         |                                                                | 0.7xV <sub>DD</sub> |     |                     | V     |
| V <sub>IL</sub> | Logical low-level input             |                                                                |                     |     | 0.3xV <sub>DD</sub> | V     |
|                 | Rated electrolyte isolation voltage | For 1 minute                                                   | 3000                |     |                     | V RMS |
|                 | Minimum external creepage distance  | Measure input to output, the shortest distance along the shell | 3.9                 |     |                     | mm    |
|                 | Minimum gap between PCB layers      | The shortest distance of each layer of PCB power domain        | 3.9                 |     |                     | mm    |

According to the following standards, insulation certification has been passed and safety has been confirmed.

| Item | Electrical safety standard               | Description                                                                                                          |
|------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 1    | UL 1577                                  | Standard for safety: Optical isolators                                                                               |
| 2    | IEC 60601-1                              | Medical electrical equipment-Part 1: General requirements for basic safety and essential performance                 |
| 3    | IEC 61010-1                              | Safety requirements for electrical equipment for measurement, control and laboratory use-Part1: General requirements |
| 4    | IEC 60950-1                              | Information technology equipment-Safety -Part 1: General requirements                                                |
| 5    | GB 4943.1-2011                           | Information technology equipment-Safety -Part 1: General Requirements                                                |
| 6    | DIN VDE V 0884-11(VDE V 0884-11):2017-01 | Magnetic and capacitive coupler for basic and reinforced isolation                                                   |

## Electrical Characteristics

Performance parameters under 2.5V power supply (At  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ,  $V_{DD1}=V_{DD2}=2.5\text{V}$ )

| Parameter                        | Symbol             | Min                            | Max   |                                | Test Condition                                                     | Units                        |
|----------------------------------|--------------------|--------------------------------|-------|--------------------------------|--------------------------------------------------------------------|------------------------------|
| Data rate                        | DR                 | --                             | 90    | --                             |                                                                    | Mbps                         |
| High to low transmission latency | $t_{PHL}$          | --                             | 10    | 13                             | 50% input to 50% output                                            | ns                           |
| Low to high transmission latency | $t_{PLH}$          | --                             | 10    | 13                             | 50% input to 50% output                                            | ns                           |
| Minimum pulse width              | PW                 | 10                             | --    | --                             |                                                                    | ns                           |
| Channel matching                 | $t_M$              | --                             | --    | 3                              |                                                                    | ns                           |
| Pulse distortion                 | PWD                | --                             | --    | 6                              |                                                                    | ns                           |
| Output up time                   | $t_r$              | 1.5                            | 2     | 3                              | Output rise time, 10%~90% 10pF load                                | ns                           |
| Output drop time                 | $t_f$              | 1.5                            | 2     | 3                              | Lower up time, 90%~10% 10pF load                                   | ns                           |
| Power static current             | $I_{DDI(Q)}$       | --                             | 280   | --                             | Enter the suspension                                               | $\mu\text{A}/\text{channel}$ |
| Dynamic power current            | $I_{DDI(D)}$       | --                             | 5.4   | 6.4                            | The input signal is 2Mbps, $C_L=10\text{pF}$                       | $\text{mA}/\text{channel}$   |
| Dynamic power current            | $I_{DDI(D)}$       | --                             | 8     | 9.2                            | The input signal is 20Mbps, $C_L=10\text{pF}$                      | $\text{mA}/\text{channel}$   |
| Dynamic power current            | $I_{DDI(D)}$       | --                             | 12.7  | 15.2                           | The input signal is 60Mbps, $C_L=10\text{pF}$                      | $\text{mA}/\text{channel}$   |
| Input Currents                   | $I_{IA}, I_{IB}$   | -10                            | +0.01 | +10                            | $0\text{V} \leq V_{IA}, V_{IB} \leq (V_{DD1} \text{ or } V_{DD2})$ | $\mu\text{A}$                |
| Logic High Input Threshold       | $V_{IH}$           | 0.7 ( $V_{DD1}$ or $V_{DD2}$ ) | --    | --                             | --                                                                 | V                            |
| Logic Low Input Threshold        | $V_{IL}$           | --                             | --    | 0.3 ( $V_{DD1}$ or $V_{DD2}$ ) | --                                                                 | V                            |
| Logic High Output Voltages       | $V_{OAH}, V_{OBH}$ | $V_{DD1}$ or                   | 2.5   | --                             | $I_{Ox} = -20\mu\text{A}, V_{Ix} = V_{IxH}$                        | V                            |

|                              |                    |                                           |      |     |                                                       |   |
|------------------------------|--------------------|-------------------------------------------|------|-----|-------------------------------------------------------|---|
|                              |                    | $V_{DD2}$<br>- 0.1                        |      |     |                                                       |   |
|                              |                    | ( $V_{DD1}$<br>or<br>$V_{DD2}$ )<br>- 0.5 | 2.3  | --  | $I_{Ox} = -4 \text{ mA}, V_{Ix} = V_{IxH}$            | V |
| Logic Low Output<br>Voltages | $V_{OAL}, V_{OBL}$ | --                                        | 0    | 0.1 | $I_{Ox} = 20 \text{ } \mu\text{A}, V_{Ix} = V_{IxL}$  | V |
|                              |                    | --                                        | 0.04 | 0.1 | $I_{Ox} = 400 \text{ } \mu\text{A}, V_{Ix} = V_{IxL}$ | V |
|                              |                    | --                                        | 0.2  | 0.4 | $I_{Ox} = 4 \text{ mA}, V_{Ix} = V_{IxL}$             | V |

Performance parameters under 3.3V power supply (At  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$ ,  $V_{DD1}=V_{DD2}=3.3\text{V}$ )

| Parameter                           | Symbol           | Min                      | Max   |     | Test Condition                                                       | Units                        |
|-------------------------------------|------------------|--------------------------|-------|-----|----------------------------------------------------------------------|------------------------------|
| Data rate                           | DR               | --                       | 90    | --  |                                                                      | Mbps                         |
| High to low<br>transmission latency | $t_{PHL}$        | --                       | 7     | 12  | 50% input to 50% output                                              | ns                           |
| Low to high<br>transmission latency | $t_{PLH}$        | --                       | 7     | 12  | 50% input to 50% output                                              | ns                           |
| Minimum pulse<br>width              | PW               | 10                       | --    | --  |                                                                      | ns                           |
| Channel matching                    | $t_M$            | --                       | --    | 3   |                                                                      | ns                           |
| Pulse distortion                    | PWD              | --                       | --    | 6   |                                                                      | ns                           |
| Output up time                      | $t_r$            | 1.5                      | 2     | 3   | Output rise time, 10%~90% 10pF<br>load                               | ns                           |
| Output drop time                    | $t_f$            | 1.5                      | 2     | 3   | Lower up time, 90%~10% 10pF load                                     | ns                           |
| Power static current                | $I_{DDI(Q)}$     | --                       | 290   | --  | Enter the suspension                                                 | $\mu\text{A}/\text{channel}$ |
| Dynamic power<br>current            | $I_{DDI(D)}$     | --                       | 6.1   | 7.2 | The input signal is 2Mbps, $C_L=10\text{pF}$                         | $\text{mA}/\text{channel}$   |
| Dynamic power<br>current            | $I_{DDI(D)}$     | --                       | 9.3   | 11  | The input signal is 20Mbps, $C_L=10\text{pF}$                        | $\text{mA}/\text{channel}$   |
| Dynamic power<br>current            | $I_{DDI(D)}$     | --                       | 16.2  | 19  | The input signal is 60Mbps, $C_L=10\text{pF}$                        | $\text{mA}/\text{channel}$   |
| Input Currents                      | $I_{IA}, I_{IB}$ | -10                      | +0.01 | +10 | $0 \text{ V} \leq V_{IA}, V_{IB} \leq (V_{DD1} \text{ or } V_{DD2})$ | $\mu\text{A}$                |
| Logic High Input<br>Threshold       | $V_{IH}$         | 0.7<br>( $V_{DD1}$<br>or | --    | --  | --                                                                   | V                            |

|                            |                    |                                           |      |                                         |                                        |   |
|----------------------------|--------------------|-------------------------------------------|------|-----------------------------------------|----------------------------------------|---|
|                            |                    | $V_{DD2}$                                 |      |                                         |                                        |   |
| Logic Low Input Threshold  | $V_{IL}$           | --                                        | --   | 0.3<br>( $V_{DD1}$<br>or<br>$V_{DD2}$ ) | --                                     | V |
| Logic High Output Voltages | $V_{OAH}, V_{OBH}$ | $V_{DD1}$<br>or<br>$V_{DD2}$<br>- 0.1     | 3.3  | --                                      | $I_{Ox} = -20 \mu A, V_{Ix} = V_{IxH}$ | V |
|                            |                    | ( $V_{DD1}$<br>or<br>$V_{DD2}$ )<br>- 0.5 | 3.1  | --                                      | $I_{Ox} = -4 mA, V_{Ix} = V_{IxH}$     | V |
| Logic Low Output Voltages  | $V_{OAL}, V_{OBL}$ | --                                        | 0    | 0.1                                     | $I_{Ox} = 20 \mu A, V_{Ix} = V_{IxL}$  | V |
|                            |                    | --                                        | 0.04 | 0.1                                     | $I_{Ox} = 400 \mu A, V_{Ix} = V_{IxL}$ | V |
|                            |                    | --                                        | 0.2  | 0.4                                     | $I_{Ox} = 4 mA, V_{Ix} = V_{IxL}$      | V |

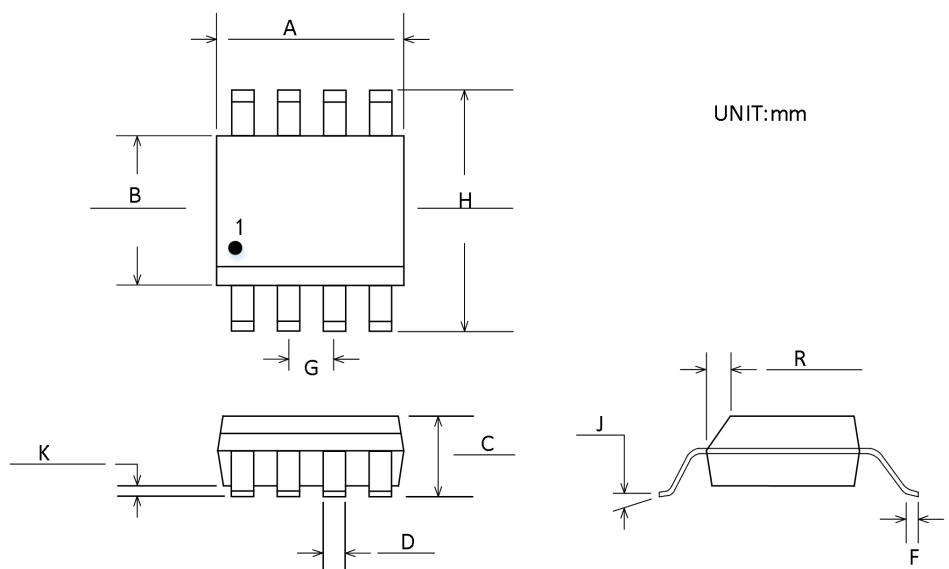
Performance parameters under 5V power supply (At  $T_A = -40^\circ C$  to  $85^\circ C$ ,  $V_{DD1}=V_{DD2}=5V$ )

| Parameter                        | Symbol       | Min | Max  |      | Test Condition                         | Units            |
|----------------------------------|--------------|-----|------|------|----------------------------------------|------------------|
| Data rate                        | DR           | --  | 90   | --   |                                        | Mbps             |
| High to low transmission latency | $t_{PHL}$    | --  | 5    | 8    | 50% input to 50% output                | ns               |
| Low to high transmission latency | $t_{PLH}$    | --  | 5    | 8    | 50% input to 50% output                | ns               |
| Minimum pulse width              | PW           | 10  | --   | --   |                                        | ns               |
| Channel matching                 | $t_M$        | --  | --   | 3    |                                        | ns               |
| Pulse distortion                 | PWD          | --  | --   | 6    |                                        | ns               |
| Output up time                   | $t_r$        | 1.5 | 2    | 3    | Output rise time, 10%~90% 10pF load    | ns               |
| Output drop time                 | $t_f$        | 1.5 | 2    | 3    | Lower up time, 90%~10% 10pF load       | ns               |
| Power static current             | $I_{DDI(Q)}$ | --  | 300  | --   | Enter the suspension                   | $\mu A$ /channel |
| Dynamic power current            | $I_{DDI(D)}$ | --  | 9.4  | 11.4 | The input signal is 2Mbps, $C_L=10pF$  | mA/channel       |
| Dynamic power                    | $I_{DDI(D)}$ | --  | 12.1 | 14.5 | The input signal is 20Mbps, $C_L=10pF$ | mA/channel       |

|                            |                    |                                  |       |                                |                                                             |            |
|----------------------------|--------------------|----------------------------------|-------|--------------------------------|-------------------------------------------------------------|------------|
| current                    |                    |                                  |       |                                |                                                             | nnel       |
| Dynamic power current      | $I_{DDI(D)}$       | --                               | 22    | 26                             | The input signal is 60Mbps, $C_L=10pF$                      | mA/channel |
| Input Currents             | $I_{IA}, I_{IB}$   | -10                              | +0.01 | +10                            | $0V \leq V_{IA}, V_{IB} \leq (V_{DD1} \text{ or } V_{DD2})$ | $\mu A$    |
| Logic High Input Threshold | $V_{IH}$           | 0.7 ( $V_{DD1}$ or $V_{DD2}$ )   | --    | --                             | --                                                          | V          |
| Logic Low Input Threshold  | $V_{IL}$           | --                               | --    | 0.3 ( $V_{DD1}$ or $V_{DD2}$ ) | --                                                          | V          |
| Logic High Output Voltages | $V_{OAH}, V_{OBH}$ | $V_{DD1}$ or $V_{DD2}$ - 0.1     | 5     | --                             | $I_{Ox} = -20 \mu A, V_{Ix} = V_{IxH}$                      | V          |
|                            |                    | ( $V_{DD1}$ or $V_{DD2}$ ) - 0.5 | 4.8   | --                             | $I_{Ox} = -4 mA, V_{Ix} = V_{IxH}$                          | V          |
| Logic Low Output Voltages  | $V_{OAL}, V_{OBL}$ | --                               | 0     | 0.1                            | $I_{Ox} = 20 \mu A, V_{Ix} = V_{IxL}$                       | V          |
|                            |                    | --                               | 0.04  | 0.1                            | $I_{Ox} = 400 \mu A, V_{Ix} = V_{IxL}$                      | V          |
|                            |                    | --                               | 0.2   | 0.4                            | $I_{Ox} = 4 mA, V_{Ix} = V_{IxL}$                           | V          |

## Package Outline Dimensions

### SOP-8



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | Min                       | Max  |
| A      | 4.80                      | 5.00 |
| B      | 3.80                      | 4.00 |
| C      | 1.35                      | 1.75 |
| D      | 0.31                      | 0.51 |
| F      | 0.40                      | 1.27 |
| G      | 1.27BSC                   |      |
| H      | 5.80                      | 6.20 |
| J      | 0°                        | 8°   |
| K      | 0.10                      | 0.25 |
| R      | 0.25                      | 0.50 |

SOP8 Package outline dimension

## Package/Ordering Information

| Product Type     | Operating Temperature | Package | Package Marking | Number of Packages |
|------------------|-----------------------|---------|-----------------|--------------------|
| CBMuD1200LAS8    | -40°C~85°C            | SOP-8   | 1200LA          | 编带和卷盘,每卷 2500      |
| CBMuD1200LAS8-RL | -40°C~85°C            | SOP-8   | 1200LA          | 编带和卷盘,每卷 3000      |
| CBMuD1200LAS8-RL | -40°C~85°C            | SOP-8   | 1200LA          | 编带和卷盘,每卷 4000      |
| CBMuD1200HAS8    | -40°C~85°C            | SOP-8   | 1200HA          | 编带和卷盘,每卷 2500      |
| CBMuD1200HAS8-RL | -40°C~85°C            | SOP-8   | 1200HA          | 编带和卷盘,每卷 3000      |
| CBMuD1200HAS8-RL | -40°C~85°C            | SOP-8   | 1200HA          | 编带和卷盘,每卷 4000      |
| CBMuD1201LAS8    | -40°C~85°C            | SOP-8   | 1201LA          | 编带和卷盘,每卷 2500      |
| CBMuD1201LAS8-RL | -40°C~85°C            | SOP-8   | 1201LA          | 编带和卷盘,每卷 3000      |
| CBMuD1201LAS8-RL | -40°C~85°C            | SOP-8   | 1201LA          | 编带和卷盘,每卷 4000      |
| CBMuD1201HAS8    | -40°C~85°C            | SOP-8   | 1201HA          | 编带和卷盘,每卷 2500      |
| CBMuD1201HAS8-RL | -40°C~85°C            | SOP-8   | 1201HA          | 编带和卷盘,每卷 3000      |
| CBMuD1201HAS8-RL | -40°C~85°C            | SOP-8   | 1201HA          | 编带和卷盘,每卷 4000      |