

## AMIS-3066x - Difference Between 5 V and 3.3 V Versions



ON Semiconductor®

<http://onsemi.com>

### APPLICATION NOTE

#### Introduction

ON Semiconductor has two versions of the AMIS-3066x CAN high speed transceiver:

- AMIS-30660 full 5 V version
- AMIS-30663 version with 3.3 V interfacing towards CAN controller

The AMIS-30663 is a derivative of the AMIS-30660 silicon, with minor modifications at metal level. This application note describes the differences between the two products.

#### DIFFERENCES BETWEEN AMIS-30660 AND AMIS-30663

#### Block Diagrams

Both products are based on the same product specification and IP blocks. Detailed general block diagrams are shown in and Figures 1 and 2.

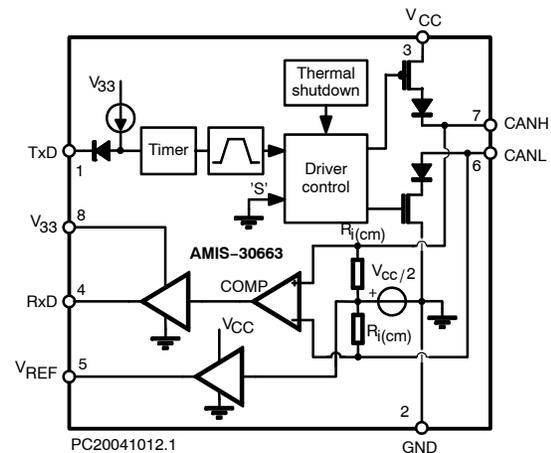


Figure 2. AMIS-30663 Block Diagram

#### Pinout Differences

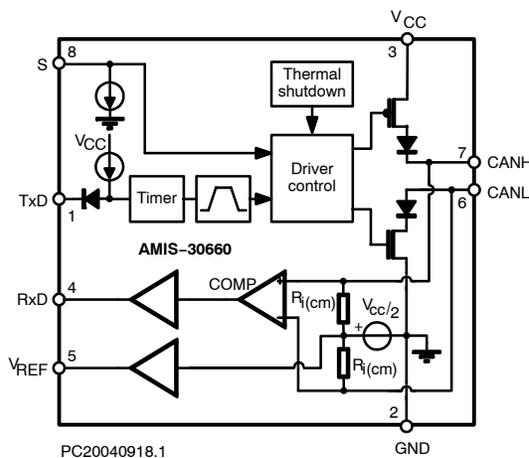
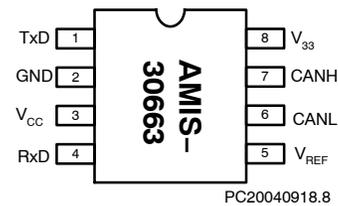
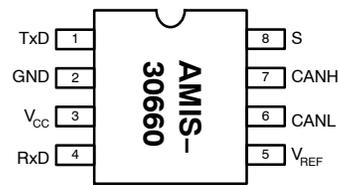


Figure 1. AMIS-30660 Block Diagram



PC20040918.8



PC20040918.3

Table 1. PIN DESCRIPTION

| Pin | AMIS-30660       | AMIS-30663       | Description   |
|-----|------------------|------------------|---|
| 1   | TxD              | TxD              | Transmit Data Input; Low Input → Dominant Driver; Internal Pullup Current                             |
| 2   | GND              | GND              | Ground  |
| 3   | V <sub>CC</sub>  | V <sub>CC</sub>  | Supply Voltage  |
| 4   | RxD              | RxD              | Receive Data Output; Dominant Transmitter → Low Output  |
| 5   | V <sub>REF</sub> | V <sub>REF</sub> | Reference Voltage Output  |
| 6   | CANL             | CANL             | LOW-Level CAN Bus Line (Low in Dominant Mode)   |
| 7   | CANH             | CANH             | HIGH-Level CAN Bus Line (High in Dominant Mode)   |
| 8   | S                | V <sub>33</sub>  | Select Input for High Speed or Silent Mode; Internal Pulldown Current<br>3.3 V Supply for Digital I/O |

The pin number 8 is a digital CMOS input pin (standby) on the AMIS-30660 device and is the I/O supply pin called V<sub>33</sub> for pin RxD on the AMIS-30663 product. Internally, on AMIS-30663, the stand-by signal is forced to ground. This means Pin 8 must be properly decoupled in application and treated as a supply pin while performing ESD and latch-up tests. The pullup on Pin TxD is connected via protection diode to V<sub>33</sub> and not to 5 V supply as in the AMIS-30660.

**3.3 V Interface**

The AMIS-30663 may be used to interface with 3.3 V or 5 V controllers by using the V<sub>33</sub> Pin. This pin may be supplied with 3.3 V or 5 V to correspond with digital interface voltage levels.

**ELECTRICAL CHARACTERISTICS**

Table 2. AMIS-30660 (5 V VERSION)

| Symbol                                  | Parameter                 | Conditions                         | Min                   | Typ                    | Max  | Unit |
|---|---------------------------|------------------------------------|-----------------------|------------------------|------|------|
| <b>RECEIVER DATA OUTPUT (Pin RxD)</b>   |                           |                                    |                       |                        |      |      |
| V <sub>OH</sub>                         | HIGH-Level Output Voltage | I <sub>RxD</sub> = -10 mA          | 0.6 x V <sub>CC</sub> | 0.75 x V <sub>CC</sub> |      | V    |
| V <sub>OL</sub>                         | LOW-Level Output Voltage  | I <sub>RxD</sub> = 6 mA            |                       | 0.25                   | 0.45 | V    |
| <b>TRANSMITTER DATA INPUT (Pin TxD)</b> |                           |                                    |                       |                        |      |      |
| I <sub>IH</sub>                         | HIGH-Level Input Current  | V <sub>TxD</sub> = V <sub>CC</sub> | -1                    | 0                      | +1   | μA   |
| I <sub>IL</sub>                         | LOW-Level Input Current   | V <sub>TxD</sub> = 0 V             | -75                   | -200                   | -350 | μA   |

Table 3. AMIS-30663 (3.3 V VERSION)

| Symbol                                  | Parameter                 | Conditions                         | Min                   | Typ                    | Max  | Unit |
|---|---------------------------|------------------------------------|-----------------------|------------------------|------|------|
| <b>RECEIVER DATA OUTPUT (Pin RxD)</b>   |                           |                                    |                       |                        |      |      |
| V <sub>OH</sub>                         | HIGH-Level Output Voltage | I <sub>RxD</sub> = -10 mA          | 0.7 x V <sub>33</sub> | 0.75 x V <sub>33</sub> |      | V    |
| V <sub>OL</sub>                         | LOW-Level Output Voltage  | I <sub>RxD</sub> = 5 mA            |                       | 0.18                   | 0.35 | V    |
| <b>TRANSMITTER DATA INPUT (Pin TxD)</b> |                           |                                    |                       |                        |      |      |
| I <sub>IH</sub>                         | HIGH-Level Input Current  | V <sub>TxD</sub> = V <sub>33</sub> | -1                    | 0                      | +1   | μA   |
| I <sub>IL</sub>                         | LOW-Level Input Current   | V <sub>TxD</sub> = 0 V             | -50                   | -200                   | -300 | μA   |

# AND8375/D

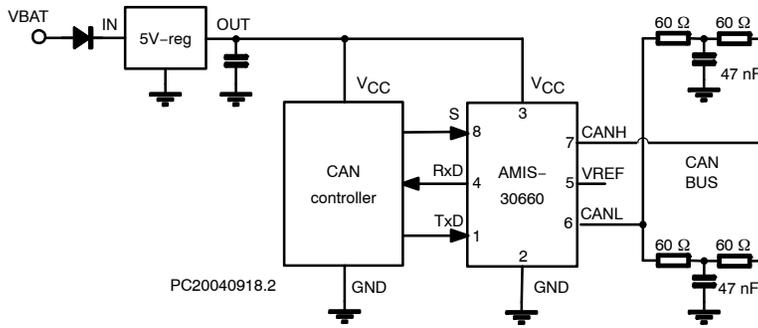


Figure 3. Typical Application Schematic for the AMIS-30660

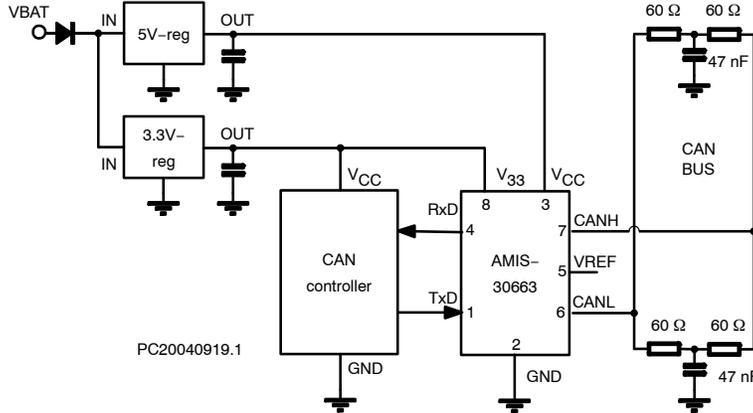


Figure 4. Typical Application Schematic for the AMIS-30663

## TIMING CHARACTERISTICS

Table 4. AMIS-30660 TIMING CHARACTERISTICS

| Symbol              | Parameter  | Conditions         | Min | Typ | Max | Unit |
|---------------------|--|--------------------|-----|-----|-----|------|
| $t_{d(TxD-BUSon)}$  | Delay TxD to Bus Active                                | $V_s = 0\text{ V}$ | 40  | 85  | 130 | ns   |
| $t_{d(TxD-BUSoff)}$ | Delay TxD to Bus Inactive                              | $V_s = 0\text{ V}$ | 30  | 60  | 105 | ns   |
| $t_{d(BUSon-RxD)}$  | Delay Bus Active to Rx                                 | $V_s = 0\text{ V}$ | 25  | 55  | 105 | ns   |
| $t_{d(BUSoff-RxD)}$ | Delay Bus Inactive to Rx                               | $V_s = 0\text{ V}$ | 65  | 100 | 135 | ns   |
| $t_{pd(rec-dom)}$   | Propagation Delay TxD to Rx from Recessive to Dominant | $V_s = 0\text{ V}$ | 70  |     | 230 | ns   |
| $t_{d(dom-rec)}$    | Propagation Delay TxD to Rx from Dominant to Recessive | $V_s = 0\text{ V}$ | 100 |     | 245 | ns   |

Table 5. AMIS-30663 TIMING CHARACTERISTICS

| Symbol              | Parameter  | Min | Typ | Max | Unit |
|---------------------|--|-----|-----|-----|------|
| $t_{d(TxD-BUSon)}$  | Delay TxD to Bus Active                                | 40  | 85  | 110 | ns   |
| $t_{d(TxD-BUSoff)}$ | Delay TxD to Bus Inactive                              | 30  | 60  | 110 | ns   |
| $t_{d(BUSon-RxD)}$  | Delay Bus Active to Rx                                 | 25  | 55  | 110 | ns   |
| $t_{d(BUSoff-RxD)}$ | Delay Bus Inactive to Rx                               | 65  | 100 | 135 | ns   |
| $t_{pd(rec-dom)}$   | Propagation Delay TxD to Rx from Recessive to Dominant | 100 |     | 230 | ns   |
| $t_{d(dom-rec)}$    | Propagation Delay TxD to Rx from Dominant to Recessive | 100 |     | 245 | ns   |

Table 6. SUPPLY VOLTAGE TO V<sub>33</sub> PIN

| Symbol          | Parameter             | Conditions                               | Min  | Max | Unit |
|-----------------|-----------------------|--|------|-----|------|
| V <sub>33</sub> | I/O Interface Voltage | Absolute Maximum Range                   | -0.3 | +7  | V    |
| V <sub>33</sub> | I/O Interface Voltage | Operating Range of V <sub>33</sub> V Pin | 2.9  | 3.6 | V    |

All other characteristics can be found in the data sheet and are identical for both versions.

**ON Semiconductor** and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## PUBLICATION ORDERING INFORMATION

### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
**Phone:** 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
**Fax:** 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
**Email:** [orderlit@onsemi.com](mailto:orderlit@onsemi.com)

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5773-3850

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local  
Sales Representative