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

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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.

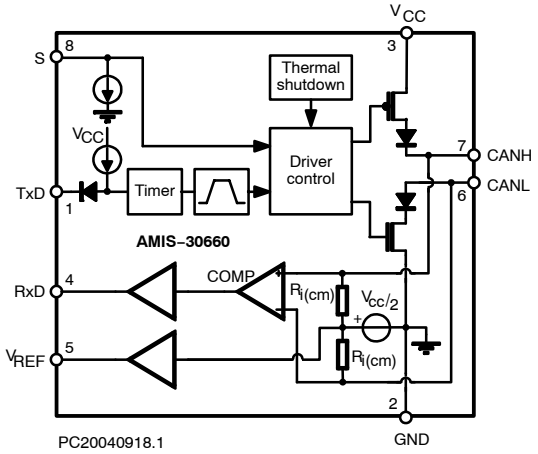


Figure 1. AMIS−30660 Block Diagram

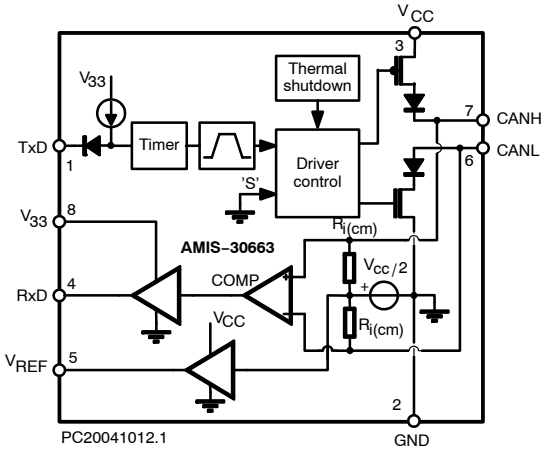
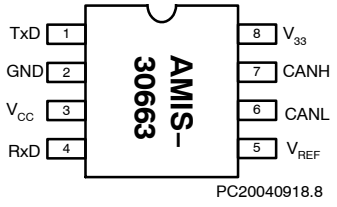


Figure 2. AMIS−30663 Block Diagram

Pinout Differences



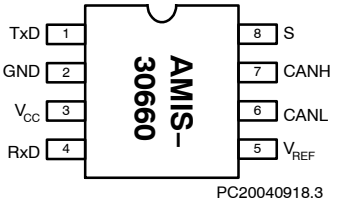


Table 1. PIN DESCRIPTION

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_{CC}	V_{CC}	Supply Voltage
4	RxD	RxD	Receive Data Output; Dominant Transmitter → Low Output
5	V_{REF}	V_{REF}	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_{33}	Select Input for High Speed or Silent Mode; Internal Pulldown Current 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_{33} 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_{33} 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_{33} 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
RECEIVER DATA OUTPUT (Pin RxD)						
V_{OH}	HIGH−Level Output Voltage	I_{RXD} = −10 mA	0.6 x V_{CC}	0.75 x V_{CC}		V
V_{OL}	LOW−Level Output Voltage	I_{RXD} = 6 mA		0.25	0.45	V
TRANSMITTER DATA INPUT (Pin TxD)						
I_{IH}	HIGH−Level Input Current	V_{TxD} = V_{CC}	−1	0	+1	μA
I_{IL}	LOW−Level Input Current	V_{TxD} = 0 V	−75	−200	−350	μA

Table 3. AMIS−30663 (3.3 V VERSION)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
RECEIVER DATA OUTPUT (Pin RxD)						
V_{OH}	HIGH−Level Output Voltage	I_{RXD} = −10 mA	0.7 x V_{33}	0.75 x V_{33}		V
V_{OL}	LOW−Level Output Voltage	I_{RXD} = 5 mA		0.18	0.35	V
TRANSMITTER DATA INPUT (Pin TxD)						
I_{IH}	HIGH−Level Input Current	V_{TxD} = V_{33}	−1	0	+1	μA
I_{IL}	LOW−Level Input Current	V_{TxD} = 0 V	−50	−200	−300	μA

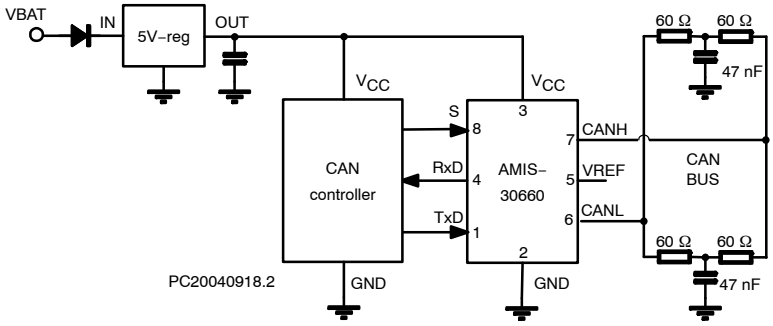


Figure 3. Typical Application Schematic for the AMIS−30660

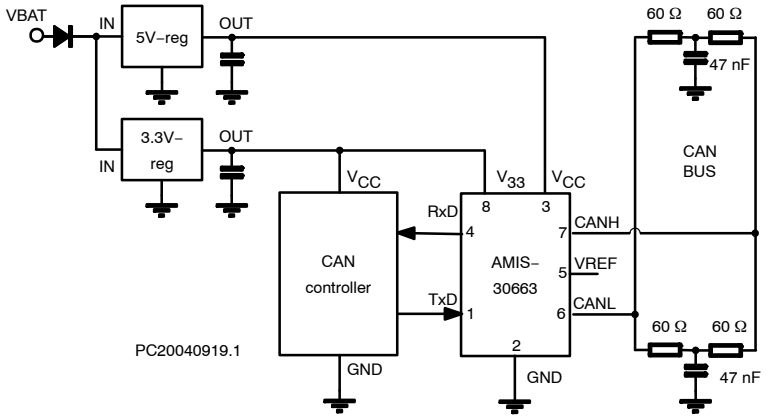


Figure 4. Typical Application Schematic for the AMIS−30663

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 V	40	85	130	ns
$t_{d(TxD-BUSoff)}$	Delay TxD to Bus Inactive	V_s = 0 V	30	60	105	ns
$t_{d(BUSon-RxD)}$	Delay Bus Active to RxD	V_s = 0 V	25	55	105	ns
$t_{d(BUSoff-RxD)}$	Delay Bus Inactive to RxD	V_s = 0 V	65	100	135	ns
$t_{pd(rec-dom)}$	Propagation Delay TxD to RxD from Recessive to Dominant	V_s = 0 V	70		230	ns
$t_{d(dom-rec)}$	Propagation Delay TxD to RxD from Dominant to Recessive	V_s = 0 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 RxD	25	55	110	ns
$t_{d(BUSoff-RxD)}$	Delay Bus Inactive to RxD	65	100	135	ns
$t_{pd(rec-dom)}$	Propagation Delay TxD to RxD from Recessive to Dominant	100		230	ns
$t_{d(dom-rec)}$	Propagation Delay TxD to RxD from Dominant to Recessive	100		245	ns

Table 6. SUPPLY VOLTAGE TO V_{33} PIN

Symbol	Parameter	Conditions	Min	Max	Unit
V_{33}	I/O Interface Voltage	Absolute Maximum Range	−0.3	+7	V
V_{33}	I/O Interface Voltage	Operating Range of V_{33} V Pin	2.9	3.6	V

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

PUBLICATION ORDERING INFORMATION

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