High Speed CAN Transceiver

Introduction

The AMIS 30663 CAN transceiver is the interface between a controller area network (CAN) protocol controller and the physical bus and may be used in both 12 V and 24 V systems. The digital interface level is powered from a 3.3 V supply providing true I/O voltage levels for 3.3 V CAN controllers.

The transceiver provides differential transmit capability to the bus and differential receive capability to the CAN controller. Due to the wide common mode voltage range of the receiver inputs, the AMIS 30663 is able to reach outstanding levels of electromagnetic susceptibility (EMS). Similarly, extremely low electromagnetic emission (EME) is achieved by the excellent matching of the output signals.

Key Features

- Fully Compatible with the "ISO 11898 2" Standard
- out Function



(Top View)

Thermal Protection

• Bus Pins Protected Against Transients in an Automotive

			Container		
		Package	Shipping Configuration †	Quantity	Temp. Range
AMIS30663CANG2G	HS CAN Transc. (3.3 V)	SOIC 8 GREEN	Tube/Tray	96	40°C to 125°C
AMIS30663CANG2RG	HS CAN Transc. (3.3 V)	SOIC 8 GREEN	Tape & Reel	3000	40°C to 125°C

+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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Figure 1. Block Diagram

Typical Application



Figure 2. Application Diagram





Table 3. Pin Out

Pin	Name	Description		
1	TxD	Transmit data input; low input \rightarrow dominant driver; internal pull up current		
2	GND	Ground		
3	V _{CC}	Supply voltage		
4	RxD	Receive data output; dominant transmitter \rightarrow low output		
5	V _{REF}	Reference voltage output		
6	CANL	LOW level CAN bus line (low in dominant mode)		
7	CANH	HIGH level CAN bus line (high in dominant mode)		
8	V ₃₃	3.3 V supply for digital I/O		

Functional Description

General

The AMIS 30663 is the interface between the CAN protocol controller and the physical bus. It is intended for use in automotive and industrial applications requiring baud rates up to 1 Mbaud. It provides differential transmit capability to the bus and differential receiver capability to the CAN protocol controller. It is fully compatible to the "ISO 11898 2" standard.

Operating Modes

AMIS 30663 only operates in high speed mode as illustrated in Table 4.

The transceiver is able to communicate via the bus lines. The signals are transmitted and received to the CAN controller via the pins TxD and RxD. The slopes on the bus lines outputs are optimised to give extremely low EME.

	P	in	Bus		
Mode	TxD	RxD	State	CANH	CANL
4.5	5.25				
High Speed	0	0	Dominant	High	Low
	1	1	Recessive	0.5 Vcc	0.5 Vcc
	Х	1	Recessive	0 < V _{CANH} < V _{CC}	$0 < V_{CANL} < V_{CC}$
	4. 5				
	> V _{IH}	1	Recessive	$0 < V_{CANH} < V_{CC}$	$0 < V_{CANI} < V_{CC}$

Table 4. Function Table (X = don't care)

Over-temperature Detection

A thermal protection circuit protects the IC from damage by switching off the transmitter if the junction temperature exceeds a value of approximately 160°C. Because the transmitter dissipates most of the power, the power dissipation and temperature of the IC is reduced. All other IC functions continue to operate. The transmitter off state resets when pin TxD goes HIGH. The thermal protection circuit is particularly needed when a bus line short circuits.

TxD Dominant Time-

Table 5. Absolute Maximum Ratings

Symbol	Parameter	Conditions	Min.	Max.	Unit
V _{CC}	Supply voltage		0.3		

Table 7. DC Characteristics

 $(V_{CC} = 4.75 \text{ to } 5.25 \text{ V}; V_{33} = 2.9 \text{ V to } 3.6 \text{ V}; T_{junc} = 40 \text{ to } +150^{\circ}\text{C}; R_{LT} = 60 \Omega \text{ unless specified otherwise.})$

Symbol	Parameter	Conditions	Min.	Тур.	Max.	Unit		
Bus Lines (pins CANH and CANL)								
R _{i(dif)}	Differential input resistance		25	50	75	KΩ		
C _{i(CANH)}	Input capacitance at pin CANH	$V_{TxD} = V_{CC}$; not tested		7.5	20	pF		
C _{i(CANL)}	Input capacitance at pin CANL	$V_{TxD} = V_{CC}$; not tested		7.5	20	pF		
C _{i(dif)}	Differential input capacitance	$V_{TxD} = V_{CC}$; not tested		3.75	10	pF		
I _{LI(CANH)}	Input leakage current at pin CANH	$V_{CC} = 0 V; V_{CANH} = 5 V$	10	170	250	μΑ		
I _{LI(CANL)}	Input leakage current at pin CANL	$V_{CC} = 0 V; V_{CANL} = 5 V$	10	170	250	μΑ		
V _{CM peak}	Common mode peak during transition from dom \rightarrow rec or rec \rightarrow dom	Figures 8 and 9	500		500	mV		
V _{CM step}	Difference in common mode between dominant and recessive state	Figures 8 and 9	150		150	mV		
Power on Rese	Power on Reset							
PORL	POR level	CANH, CANL, V _{ref} in tri state below POR level	2.2	3.5	4.7	V		
Thermal Shutdown								
T _{j(sd)}	shutdown junction temperature		150	160	180	°C		
Timing Characteristics (see Figures 6 and 7)								
t _{d(TxD BUSon)}	Delay TxD to bus active		40	85	110	ns		
td(TxD BUSoff)	Delay TxD to bus inactive		30	-				



AMIS-30663







Soldering

Introduction to Soldering Surface Mount Packages

This text gives a very brief insight to a complex technology. A more in depth account of soldering ICs can be found in the ON Semiconductor "Data Handbook IC26; Integrated



SOIC 8 CASE 751AZ ISSUE B

DATE 18 MAY 2015



*For additional information on our Pb Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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