

DUAL CAN BUS TRANSCEIVER

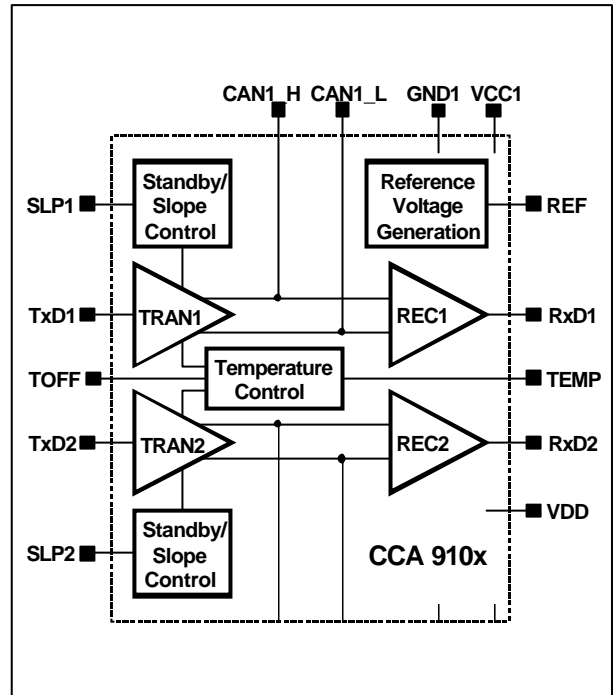
FEATURES

- ?? ISO 11898 compatible
- ?? two independent CAN-Transceiver in one package or Die
- ?? CAN-H, -L bus lines protected against short circuit and transients in automotive applications
- ?? Differential receiver with wide common-mode range for high immunity against EMI
- ?? Slope control
- ?? Wide operating temperature range -40 to 125 °C
- ?? Thermal protection with monitoring output
- ?? Low power standby mode
- ?? Digital supply range 3.3 to 5V
- ?? Single supply operation possible
- ?? Low cost

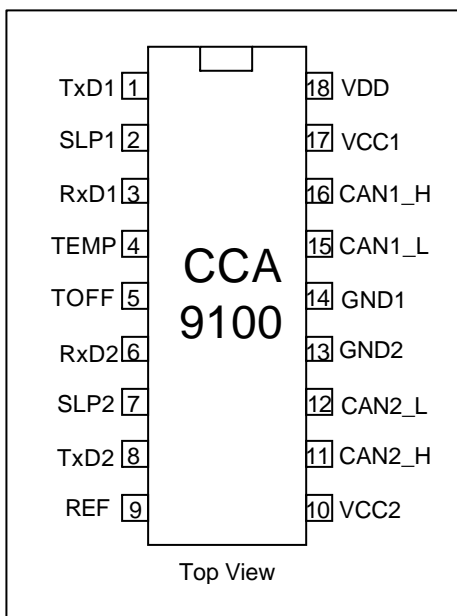
GENERAL DESCRIPTION

The CCA9100 dual 'Control Area Network' transceiver offers two individual interfaces between the CAN controllers and the physical bus lines. Both transceivers provide differential drive and receive capability between the bus and the CAN controllers. Because of its wide temperature range (-40 to 125 °C) and the protected bus pins the CCA9100 is best suited for automotive and industrial applications.

BLOCK DIAGRAM



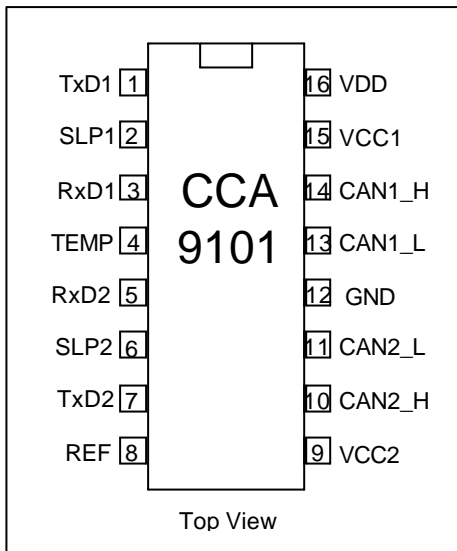
PIN CONFIGURATION (SOP-18)



PIN	NAME	DESCRIPTION
1	TxD1	Transmit data input 1
2	SLP1	Slope control input 1
3	RxD1	Receive data output 1
4	TEMP	Over temperature output (low active)
5	TOFF	Disable over temperature detection
6	RxD2	Receive data output 2
7	SLP2	Slope control input 2
8	TxD2	Transmit data input 2
9	REF	Reference voltage output
10	VCC2	Supply voltage transceiver 2
11	CAN2_H	High level CAN bus line 2
12	CAN2_L	Low level CAN bus line 2
13	GND2	Ground transceiver 2
14	GND1	Ground transceiver 1
15	CAN1_L	Low level CAN bus line 1
16	CAN1_H	High level CAN bus line 1
17	VCC1	Supply voltage transceiver 1
18	VDD	Digital supply voltage

CCA 9100/9101 Dual CAN Bus Transceiver

PIN CONFIGURATION (SOP-16)



PIN	NAME	DESCRIPTION
1	TxD1	Transmit data input 1
2	SLP1	Slope control input 1
3	RxD1	Receive data output 1
4	TEMP	Over temperature output (low active)
5	RxD2	Receive data output 2
6	SLP2	Slope control input 2
7	TxD2	Transmit data input 2
8	REF	Reference voltage output
9	VCC2	Supply voltage transceiver 2
10	CAN2_H	High level CAN bus line 2
11	CAN2_L	Low level CAN bus line 2
12	GND	Ground
13	CAN1_L	Low level CAN bus line 1
14	CAN1_H	High level CAN bus line 1
15	VCC1	Supply voltage transceiver 1
16	VDD	Digital supply voltage

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min.	Max.	Unit
Supply voltages	V_{CC}, V_{DD}		-0.3	+18	V
Voltage on any pin except CANx_H,L			-0.3	$V_{CC}+0.3$	V
Voltage on bus pins	$V_{CAN1-H}, V_{CAN1-L}, V_{CAN2-H}, V_{CAN2-L}$		-18	+18	V
Max. transmission speed	$1/t_{CAN}$	$V_{SLP1}, V_{SLP2} < 0.3 * V_{CC}$	250		kbaud
Continous output current			-150	+150	mA
Operating temperature	T_{OP}		-40	+125	°C

CCA 9100/9101 Dual CAN Bus Transceiver

ELECTRICAL CHARACTERISTICS

Conditions unless otherwise specified: $V_{CC}=V_{DD} = 5.0V$; $-40^{\circ}C < T_{OP} < 125^{\circ}C$; $R_L = 60 \Omega$; $I_{SLP} > -10\mu A$
 All parameters are guaranteed over the whole temperature range by design, but only tested at $T_{OP} = 125^{\circ}C$.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
SUPPLY						
Supply voltage	V_{CC}		4.75		5.25	V
Supply current	I_{CC}	Both transceivers dominant $V_{TXD} = 1V$			150	mA
		Both transceivers recessive $V_{TXD} = 4V$ $V_{SLP} < 0.3 * V_{CC}$			20	mA
		Standby mode $V_{SLP} > 0.75 * V_{CC}$ $I_{TXD}, I_{RXD}, I_{REF} = 0$ $0V < V_{CAN-H}, V_{CAN-L} < V_{CC}$		500	800	μA
VOLTAGE REFERENCE						
Reference voltage output	V_{REF}		$0.45 * V_{CC}$		$0.55 * V_{CC}$	V
TRANSMITTERS						
Transmitter input voltage HIGH	V_{TXD-H}	Recessive bus state	$0.7 * V_{DD}$		$V_{DD} + 0.3$	V
Transmitter input voltage LOW	V_{TXD-L}	Dominant bus state	-0.3		$0.3 * V_{DD}$	V
Transmitter input current HIGH	I_{TXD-H}	Recessive bus state			-50	μA
Transmitter input current LOW	I_{TXD-L}	Dominant bus state	-100	-200	-300	μA
Recessive bus voltage	$V_{CAN-H-R}$ $V_{CAN-L-R}$	$V_{TXD} = 4V$; no load	2		3	V
Differential voltage between V_{CAN-H} and V_{CAN-L}	V_{DIFF-R}	$V_{TXD} = 4V$; no load	-0.5		0.05	V
CAN_H output voltage	$V_{CAN-H-D}$	$V_{TXD} = 1V$	2.75		4.5	V
CAN_L output voltage	$V_{CAN-L-D}$	$V_{TXD} = 1V$	0.5		2.25	V
Differential voltage between V_{CAN-H} and V_{CAN-L}	V_{DIFF-D}	$V_{TXD} = 1V$	1.5		3	V
SLOPE CONTROLS						
Input voltage for slope control	V_{SLP}		$0.4 * V_{CC}$		$0.6 * V_{CC}$	V
Input current for slope control	I_{SLP}		-10		-200	μA
Input voltage for highest speed	V_{HS}		-0.3		$0.3 * V_{CC}$	V
Input current for highest speed	I_{HS}				-0.5	mA
Input voltage for standby mode	V_{STB}		$0.75 * V_{CC}$		$V_{CC} + 0.3$	V
RECEIVERS ($V_{TXD} = 4V$; bus lines externally driven)						
Receiver output voltage HIGH	V_{RXD-H}	Recessive bus state: $V_{TXD} = 4V$; $I_{RXD} = -100\mu A$	$V_{DD} - 0.8$	$V_{DD} - 0.2$		V
Receiver output voltage LOW	V_{RXD-L}	Dominant bus state: $V_{TXD} = 1V$; $I_{RXD} = 2mA$			1.2	V
Differential input voltage (recessive)	$V_{DIFF(R)}$	$-2V < V_{CAN-H}, V_{CAN-L} < 7V$	-1.0		0.5	V
		$-7V < V_{CAN-H}, V_{CAN-L} < 12V$	-1.0		0.4	V
Differential input voltage (dominant)	$V_{DIFF(D)}$	$-2V < V_{CAN-H}, V_{CAN-L} < 7V$	0.9		5.0	V
		$-7V < V_{CAN-H}, V_{CAN-L} < 12V$	1.0		5.0	V
CAN_H, CAN_L input resistance	R_{I-CAN}	$V_{TXD} = 4V$; no load	5		50	k Ω
Differential input resistance	R_{D-CAN}	$V_{TXD} = 4V$; no load	10		100	k Ω
CAN_H, CAN_L input capacitance	C_{I-CAN}				20	pF
Differential input capacitance	C_{D-CAN}				10	pF

ELECTRICAL CHARACTERISTICS (continued)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OVER TEMPERATURE DETECTION						
Detector output voltage HIGH	V_{DT-H}	$I_{TEMP} = -100\mu A$	$V_{DD}-0.8$	$V_{DD}-0.2$		V
Detector output voltage LOW	V_{DT-L}	$I_{TEMP} = 2mA$			1.2	V
Detection temperature ON	T_{DT-ON}				160	°C
Detection temperature OFF	T_{DT-OFF}		130			°C
Detection hysteresis	T_{HYS}			20		°C

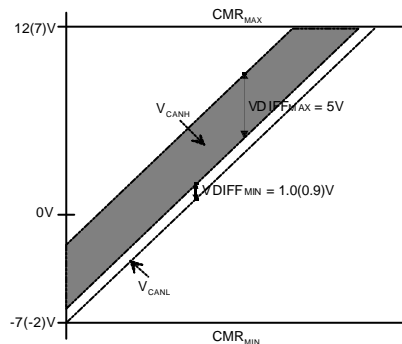
FUNCTIONAL TABLE (VCC = 4.5V to 5.5V)

TxD	SLP	System mode	Output		
			CAN_H	CAN_L	RxD
0	$< 0.75 * V_{CC}$	dominant	HIGH level	LOW level	0
1 or floating	$< 0.75 * V_{CC}$	recessive	floating	floating	1
X	$> 0.75 * V_{CC}$ See note1	standby	floating	floating	X

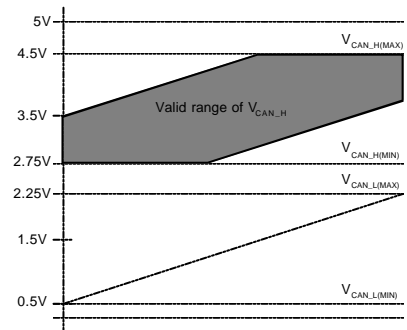
Note1: For standby mode both slope control inputs (SLP1, SLP2) must be above $0.75 * V_{CC}$. If only one transceiver is in standby mode the bus lines of this transceiver are undefined.

STATE VOLTAGE DIAGRAMS

DOMINANT STATE VOLTAGE DIAGRAMS

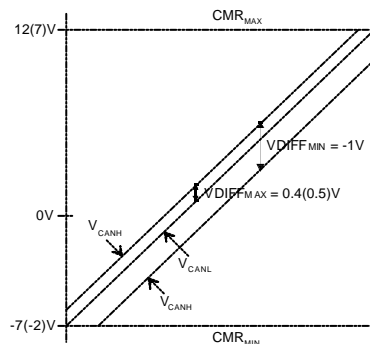


$$V_{CAN_H} = f(V_{CAN_L}, V_{DIFF(D)}, V_{CMR}) \text{ with } TxD = 1V$$

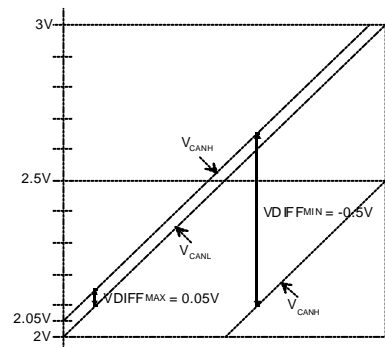


$$V_{CAN_H} = f(V_{CAN_L}, V_{DIFF(D)}) \text{ with } TxD = 1V$$

RECESSIVE STATE VOLTAGE DIAGRAMS



$$V_{CAN_H} = f(V_{CAN_L}, V_{DIFF(R)}, V_{CMR}) \text{ with } TxD = 4V$$



$$V_{CAN_H} = f(V_{CAN_L}, V_{DIFF(R)}) \text{ with } TxD = 4V$$

REVISION HISTORY

Revision	Date	Author	Item
1.0	14.02.00	Klumb	
1.1	25.08.00	Klumb	Package update
1.2	08.03.01	Schumacher	Features and transmission speed update

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