



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-L9615

CAN BUS TRANSCEIVER

网址 www.sztdbdt.com 🔍

用芯智造 · 卓越品质

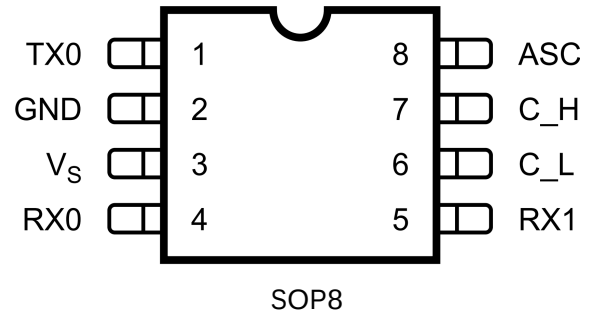
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Feature

- L9615 MEETS ISO/DIS 11898 UP TO 500KBAUD
- TRANSMITTER
 - GENERATION OF DIFFERENTIAL OUTPUT SIGNALS
 - SHORT CIRCUIT PROTECTED FROM -5V TO 36V, DETECTION & SHUTDOWN
 - SLOPE CONTROL TO REDUCE RFI AND EMI - TWO STATES ADJUSTABLE SLOPE CONTROL ($\leq 500\text{KBAUD}$ / $\leq 125\text{KBAUD}$)
- RECEIVER
 - DIFFERENTIAL INPUT WITH HIGH INTERFERENCE SUPPRESSION
 - COMMON MODE INPUT VOLTAGE RANGE (V_{COM}) FROM -2V TO $V_{\text{S}}+3\text{V}$
- PACKAGE: SO 8

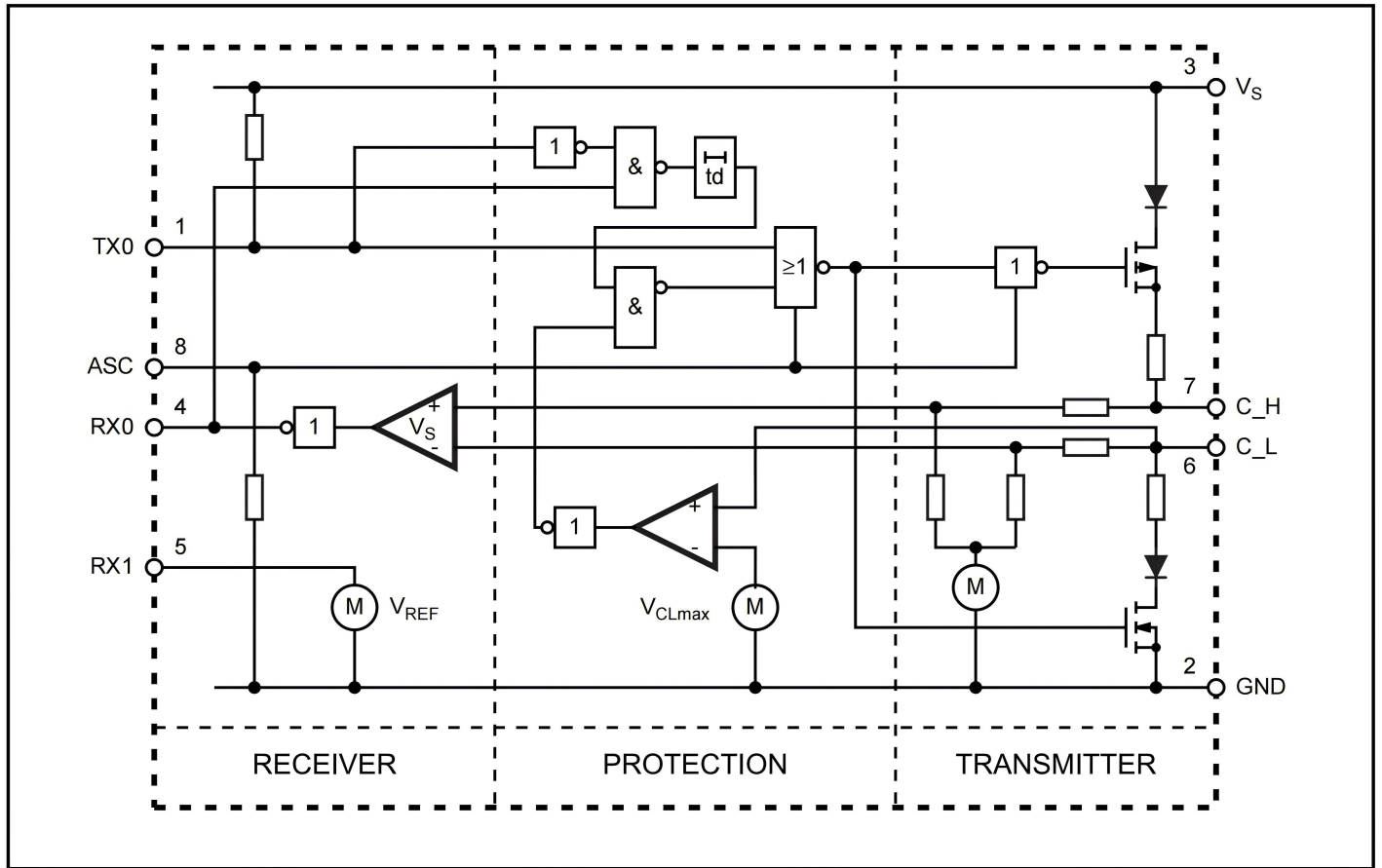


DESCRIPTION

The L9615 is a bidirectional transceiver for signal conditioning and processing in connection with a CAN controller. Data rates of up to 500KBAUD are supported using either shielded or non shielded pair of lines.



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage	-0.3 to 7	V
V_{C_H}, V_{C_L}	Bus Voltage at C_H, C_L (V_S 0 to 5.5V)	-5 to 36	V
I_{C_H}, I_{C_L}	Off State Leakage Current at C_H, C_L ($V_S=0$ to 5.5V, $V_{C_H}=-5$ to 36V, $V_{C_L}=-5$ to 36)	-3 to 5	mA
V_{DC}	DC Voltage at TXO, ASC (V_S 0 to 5.5V)	GND-0.3 to $V_S+0.3$	V
I_{RXO}	Output Current at RXO (V_S 0 to 5.5V)	-0.3 to 1	mA
T_{stg}, T_J	Storage and Junction Temperature Range	-40 to 150	°C
T_{op}	Operating Temperature Range	-40 to 110	°C

All voltages, except bus voltage, are defined with respect to pin 2. Positive currents flow into the IC.



PIN FUNCTIONS

N.	Name	Function
1	TXO	Transmitter Input
2	GND	Ground
3	Vs	Supply Voltage
4	RXO	Receive Output
5	RX1	Reference Voltage
6	C_L	Low Side Bus Output
7	C_H	High Side Bus Output
8	ASC	Adjustable Slope Control

DINAMIC CHARACTERISTICS

$C_A = 47\text{pF}$ between C_H and C_L ; $V_s = 5\text{V}$; $t_R < 5\text{ns}$ $C_{RXO} = 20\text{pF}$ between RXO and B; $R_A = 60\Omega$ between C_H and C_L

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
t_{OT}	Signal Delay TXO to C_H, C_L				50	ns
S_R	Differential Output Slew Rate (Transmitter)	$V_{ASC}=0\text{V}$	20		50	$\text{V}/\mu\text{s}$
		$V_{ASC}=V_s$	5		20	$\text{V}/\mu\text{s}$
t_{OR}	Signal Delay C_H, C_L to Rxo	$V_{ASC}=0\text{V}$			150	ns
t_{OTR}	Signal Delay Txo to Rxo	$V_{ASC}=0\text{V}$			300	ns

FUNCTIONAL TABLE

TXO	C_H	C_L	Bus State	RXO
L	H	L	Dominant	L
H or Floating	Floating $V_s/2$	Floating $V_s/2$	Recessive	H



ELECTRICAL CHARACTERISTICS

Top = -40 to 110°C; Vs = 4.5 to 5.5V; Dominant: VTXO = GND; Re-cessive: VTXO = Vs; All voltages, except bus voltage, are defined with respect to pin 2. Positive currents flow into the IC unless otherwise specified.

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Vs	Supply Voltage		4.5	5	5.5	V
Is	Supply Current	Dominant			80	mA
		Recessive			20	mA
TRANSMITTER SECTION (RA=60Ω between C_H and C_L)						
CTXO	TXO Input Capacitance	0V<V _{TXO} <Vs		25		pF
V _{TXO}	TXO High Level Input Voltage		0.7 Vs		Vs	
	TXO Low Level Input Voltage		0		0.3 Vs	
ITXO	TXO High Level Input Current	V _{TXO} =Vs	-2	0	2	μA
	TXO Low Level Input Current	V _{TXO} =GND	-275	0	-25	μA
C _{ASC}	ASC Input Capacitance	0V<V _{ASC} <Vs		25		pF
V _{ASC}	ASC Input Voltage for High Speed		0		0.1 Vs	
	ASC Input Voltage forLow Speed		0.9 Vs		VS	
I _{ASC}	ASC Input Current	V _{ASC} =Vs	25		275	μA
		V _{ASC} =0V	-2	0	2	μA
V _{C_H} ,V _{C_L}	Bus Voltage Recessive	Recessive	0.4 Vs	0.5 Vs	0.6Vs	
I _{C_H} ,I _{C_L}	Leakage Current Recessive	VC_L=V _{C_H} = -2 to 7V	-0.7		0.7	mA
		V _{C_L} =V _{C_H} =1 to 4V	-0.3		0.3	mA
R _{IN} (C_H,C_L)	Input Resistance	Recessive	5		50	KQ
R _{Diff} (C_H,C_L)	Differential Input Resistance	Recessive	10		100	KQ
V _{Diff} =V _{C_H} -V _{C_L})	Differential Output Voltage	Dominant,RA	1.5		3	V
V _{Diff} =V _{c_H} -V _{c_L})	Differential Output Voltage	Recessive	-500	0	50	mV
t _d	Short Circuit Detection Time C_H to C_L;C_H to B	R _{cs} <1Ω	1	5	10	μ s
I _A	Supply Current in Case of Short Circuit,C_H to C_L,C_H to B(time =t _d)			150		mA
V _{C_L} max	Overvoltage ProtectionThreshold on C L		7	8	10	V



ELECTRICAL CHARACTERISTICS(continued)

$T_{OP} = -40$ to 110°C ; $V_S = 4.5$ to 5.5V ; Dominant: $V_{TXO} = \text{GND}$; Re-cessive: $V_{TXO} = V_S$; All voltages, except bus voltage, are defined with respect to pin 2. Positive currents flow into the IC unless otherwise specified.

RECEIVE SECTION						
V_{RXO}	RXO High Level Output Voltage	$V_{Diff} < 0.5\text{V}; I_{RXO} = 0.3\text{mA}; V_{C_H} = -2$ to $7\text{V}; V_{C_L} = -2$ to $7\text{V};$	$0.9 V_S$		V_S	V
	RXO Low Level Output Voltage	$V_{Diff} > 0.9\text{V}; I_{RXO} = 1\text{mA}; V_{C_H} = -2$ to $7\text{V}; V_{C_L} = -2$ to $7\text{V};$			0.5	V
$V_S = V_{C_H} - V_{C_L}$	Input Signal Threshold	$V_{C_H} = -2$ to $7\text{V}; V_{C_L} = -2$ to $7\text{V};$	500	700	900	mV
$V_{COM} = (V_{C_H} + V_{C_L}) / 2$	Input Common Mode Voltage Range		-2		7	V
V_{HYS}	Differential Input Hysteresis			150		mV
REFERENCE OUTPUT						
V_{RX1}	Reference Voltage	$I_{RX1} = 0$	$0.45 V_S$	$0.5 V_S$	$0.55 V_S$	V
R_{RX1}	Output Resistance		2		9	K Ω

FUNCTIONAL DESCRIPTION

The L9615 is used as an interface between a CAN controller and the physical bus. The device provides transmitting capability to the CAN controller.

The transmitter outputs C_H and C_L are protected against short circuits and electrical transients which may occur in an automotive environment. In case of short circuit (C_H to C_L , C_H to B) the protection circuit recognizes this fault condition and the transmitter output stages are disabled with a delay of max. $10\mu\text{s}$ to prevent destruction of the IC and high consumption of supply current I_S . If $V_{C_L} > V_{C_Lmax}$ the transmitter output stages would be disabled immediately. Pin ASC makes it possible to select two different modes of operation: High speed ($\leq 500\text{kBaud}$) and low speed ($\leq 125\text{kBaud}$).

The ASC pin is tied to GND for normal operation at $\leq 500\text{kBaud}$. For slower speed operation at $\leq 125\text{kBaud}$ the rise and fall slope of the bus output can be decreased to reduce EMI by connecting the ASC pin to V_S .



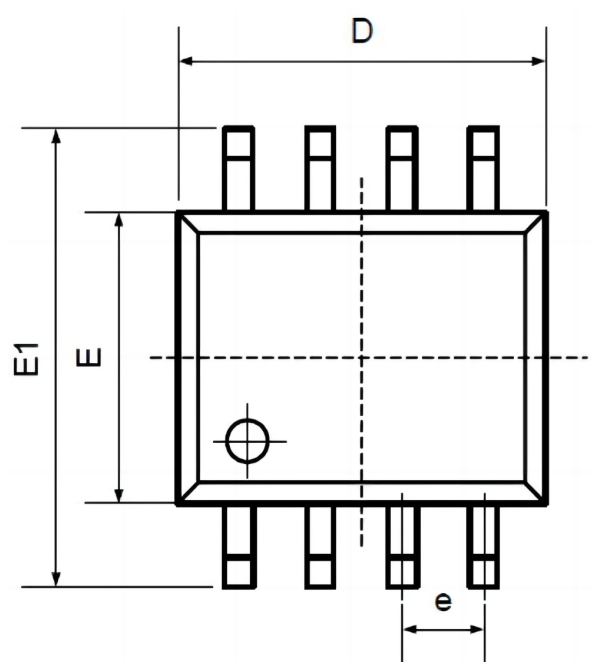
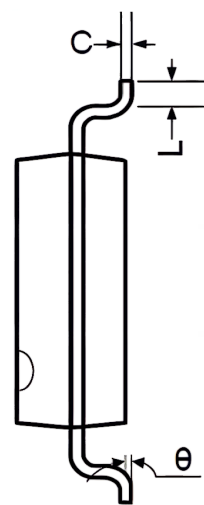
Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
L9615D013TR-TUDI	SOP8	Tape,Reel,4000	L9616	-40 to 110°C
			L9616D	

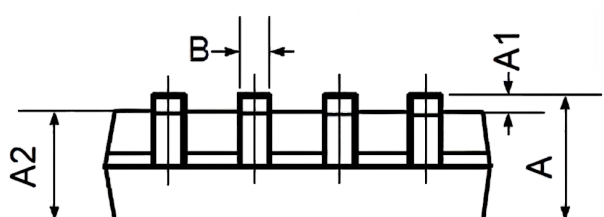
Revision history

	Date	Revision	Page
V1.0	2021/5	New	1-12
V1.1	2024/7	Update model and PDF template	1-9

Package SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°





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