



CAN BUS TRANSCEIVER

- 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 (≤500KBAUD/≤125KBAUD)
- RECEIVER
 - DIFFERENZIAL INPUT WITH HIGH INTERFERENCE SUPPRESSION
 - COMMON MODE INPUT VOLTAGE RANGE (V_{COM}) FROM -2V TO V_S+3V
- PACKAGE: SO 8

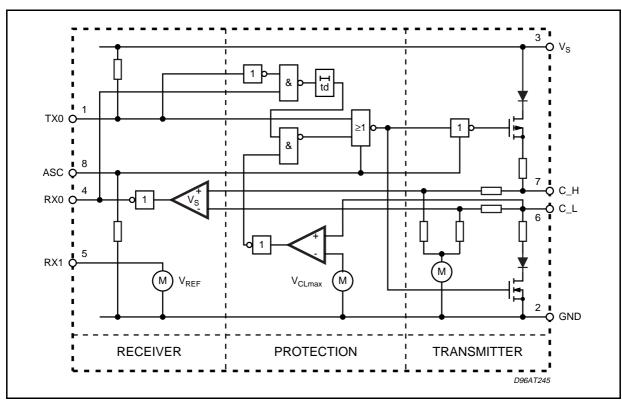


conditioning and processing in connection with a CAN controller. Data rates of up to 500KBAUD are supported using either shielded or non-shielded pair of lines.

DESCRIPTION

The L9615 is a bidirectional transceiver for signal

BLOCK DIAGRAM



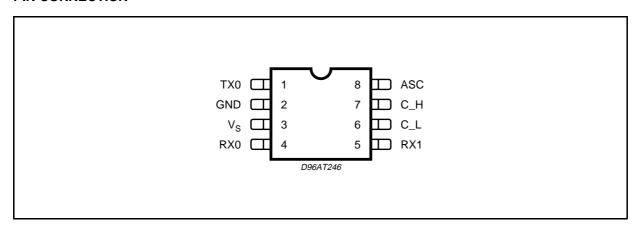
September 2003

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
Vs	Supply Voltage	-0.3 to 7	V
V_{C_H}, V_{C_L}	Bus Voltage at C_H, C_L (VS 0 to 5.5V)	-5 to 36	V
I _{C_H} , I _{C_L}	Off State Leakage Current at C_H, C_L (VS =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 (VS 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	℃
T _{op}	Operating Temperature Range	-40 to 110	℃

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

PIN CONNECTION



THERMAL DATA

Symbol	Parameter	Value	Unit

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		

2/8

ELECTRICAL CHARACTERISTICS ($T_{OP} = -40$ to 110° C; $V_{S} = 4.5$ to 5.5V; Dominat: VTXO = GND; Recessive: 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.	Тур.	Max.	Unit
Vs	Supply Voltage		4.5	5	5.5	V
Is	Supply Current	Dominant			80	mΑ
		Recessive			20	mA
TRANSMIT	TER SECTION (RA = 60Ω bet	ween C H and C L)				
Стхо	TXO Input Capacitance	0V < VTXO < Vs		25		pF
Vтхо	TXO High Level Input Voltage		0.7 V _S		Vs	
	TXO Low Level Input Voltage		0		0.3 V _S	
Ітхо	TXO High Level Input Current	VTXO = VS	-2	0	2	μΑ
	TXO Low Level Input Current	VTXO = GND	-275	0	-25	μA
Casc	ASC Input Capacitance	0V < VASC < VS		25		pF
Vasc	ASC Input Voltage for High Speed		0		0.1 V _S	-
	ASC Input Voltage for Low Speed		0.9 V _S		VS	
IASC	ASC Input Current	VASC = VS	25		275	μΑ
		VASC = 0V	-2	0	2	μΑ
Vc_н, Vc_L	Bus Voltage Recessive	Recessive	0.4 V _S	0.5 Vs	0.6 Vs	,
Іс_н, Іс_ь	Leakage Current Recessive	VC_L = V _{C_H} = -2 to 7V	-0.7		0.7	mA
		Vc_L = Vc_H = 1 to 4V	-0.3		0.3	mA
RIN(C_H, C_L)	Input Resistence	Recessive	5		50	ΚΩ
RDiff(C_H, C_L)	Differential Input Resistence	Recessive	10		100	ΚΩ
V _{Diff} = V _{C_L})	Differential Output Voltage	Dominant, R _A	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	$R_{CS} < 1\Omega$	1	5	10	μs
IA Supply Current in Case of Short Circuit, C_H to C_L, C_H to B (time = t _d)				150		mA
VC_Lmax	Overvoltage Protection Threshold on C_L		7	8	10	V
RECEIVE S	SECTION					
V _R XO	RXO High Level Output Voltage	V _{Diff} < 0.5V; I _{RXO} = 0.3mA; V _{C_H} = -2 to 7V; V _{C_L} = -2 to 7V;	0.9 V _S		Vs	V
	RXO Low Level Output Voltage	V _{Diff} > 0.9V; I _{RXO} = 1mA; V _{C_H} = -2 to 7V; V _{C_L} = -2 to 7V;			0.5	V
Vs = Input Signal Threshold		$V_{C_{-}H} = -2 \text{ to } 7V; V_{C_{-}L} = -2 \text{ to } 7V;$	500	700	900	mV
Vcom = (Vc_H +Vc_L)/2	Input Common Mode Voltage Range		-2		7	V
VHYS	Differential Input Hysteresis			150		mV
REFERENC	CE OUTPUT					
V _{RX1}	Reference Voltage	Irx1 = 0	0.45 Vs	0.5 Vs	0.55 Vs	V
R _{RX1}	Output Resistance	-	2		9	KΩ

DINAMIC CHARACTERISTICS (C_A = 47pF between C_H and C_L ; V_S = 5V; t_R < 5ns; C_{RXO} = 20pF between RXO and B; R_A = 60 Ω between C_H and C_L)

Symbol	Parameter	Test Condition	Min.	Тур.	Max.	Unit
tот	Signal Delay TXO to C_H, C_L				50	ns
SR	Differential Output Slew Rate	VASC = 0V	20		50	V/μs
	(Transmitter)	VASC = VS	5		20	V/μs
tor	Signal Delay C_H, C_L to Rxo	Vasc = 0V			150	ns
totr	Signal Delay Txo to Rxo	VASC = 0V			300	ns

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 conditionand the transmitter output stages are disabled with a delay of max. $10\mu s$ to prevent destruction of the IC and high consumption of supply current I_S . If $Vc_L > Vc_{Lmax}$ the transmitter output stages would be disabled immediately.

Pin ASC makes it possible to select two different

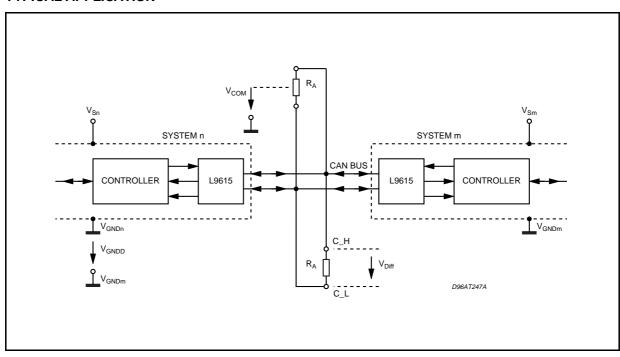
modes of operation: High speed (≤500kBaud) and low speed (≤125kBaud).

The ASC pin is tied to GND for normal operation at ≤500kBaud. For slower speed operation at ≤125kBaud the rise and fall slope of the bus output can be decreased to reduce EMI by connecting the ASC pin to Vs.

FUNCTIONAL TABLE

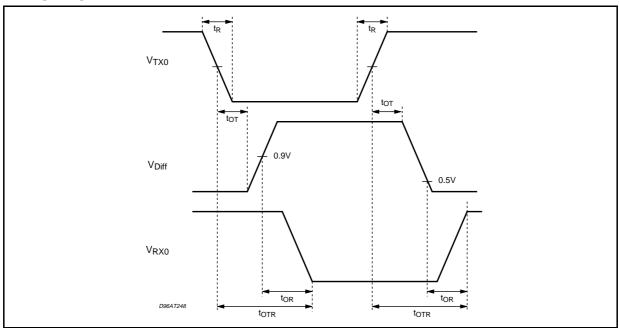
TXO	C_H	C_L	Bus State	RXO
L	Н	L	Dominant	لــ
H or Floating	Floating Vs/2	Floating Vs/2	Recessive	Н

TYPICAL APPLICATION

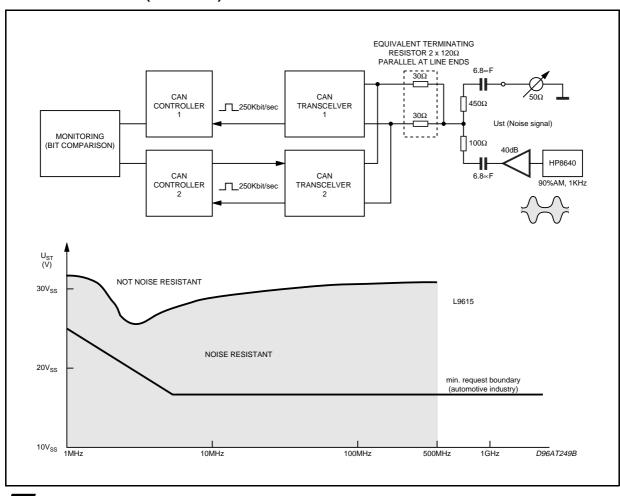


57

TIMING DIAGRAM

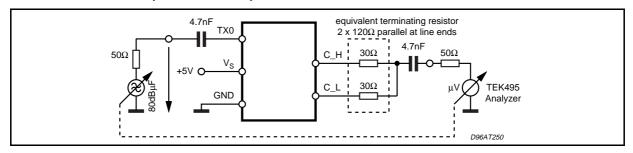


EMC PERFORMANCE (RECEIVER)



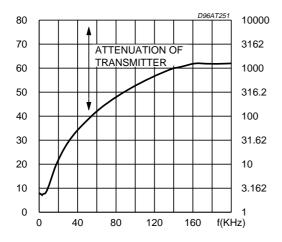
57

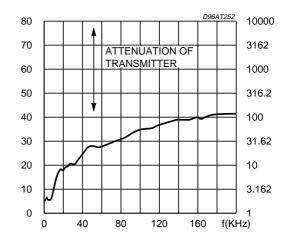
EMC PERFORMANCE (TRANSMITTER)



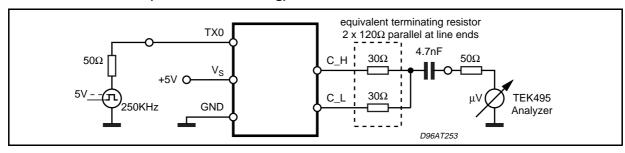
Transceiver Without Emc Reducing Measures

Transceiver With Emc Reducing Measures



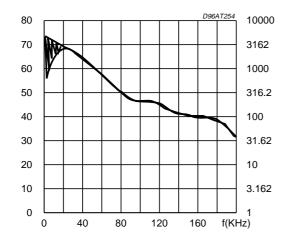


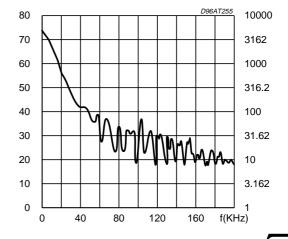
EMC PERFORMANCE (Transceiver Sending)



Transceiver Without Emc Reducing Measures

Transceiver With Emc Reducing Measures

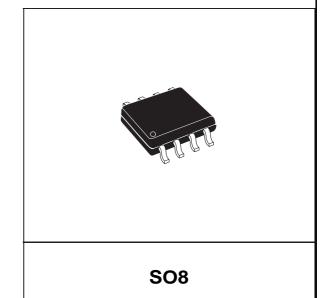




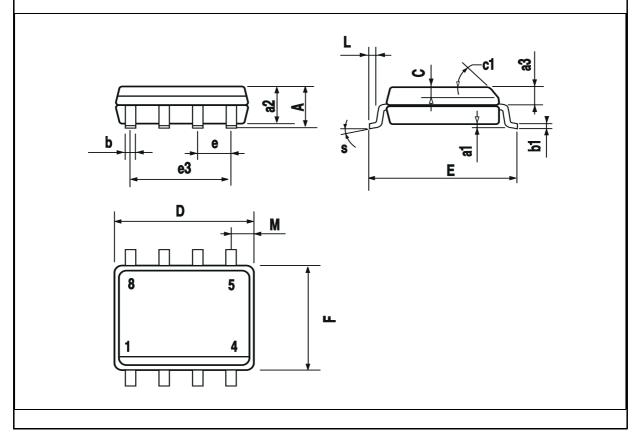
6/8

DIM.	mm			inch			
Dilvi.	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
Α			1.75			0.069	
a1	0.1		0.25	0.004		0.010	
a2			1.65			0.065	
аЗ	0.65		0.85	0.026		0.033	
b	0.35		0.48	0.014		0.019	
b1	0.19		0.25	0.007		0.010	
С	0.25		0.5	0.010		0.020	
c1			45° ((typ.)			
D (1)	4.8		5.0	0.189		0.197	
Е	5.8		6.2	0.228		0.244	
е		1.27			0.050		
e3		3.81			0.150		
F (1)	3.8		4.0	0.15		0.157	
L	0.4		1.27	0.016		0.050	
М			0.6			0.024	
S	8° (max.)						

OUTLINE AND MECHANICAL DATA



⁽¹⁾ D and F do not include mold flash or protrusions. Mold flash or potrusions shall not exceed 0.15mm (.006inch).



477

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners

© 2003 STMicroelectronics - All rights reserved

STMicroelectronics GROUP OF COMPANIES

Australia – Belgium - Brazil - Canada - China – Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States

www.st.com

