

1. Introduction

Class B Serial Transceiver

The XG7100 is a serial transceiver designed to provide bi-directional halfduplex communication meeting the automotive SAE Standard J-1850 Class B Data Communication Network Interface specification. It is designed to interface directly to on-board vehicle microcontrollers and serves to transmit and receive data on a double-wire bus at data rates of 41.6 kbps using Pulse Width Modulation (PWM).

Features

- Designed for SAE J-1850 PWM Class B Data Rates
- Ambient Operating Temperature of -40°C to 85°C
- Interfaces Directly to Standard 5.0V CMOS Microcontroller
- Up to 32 nodes can be connected
- $\pm 15\text{KV}$ ESD protection on BUS+ and BUS- pins(Human Body Model)
- Low current standby operation

2. PIN Configuration

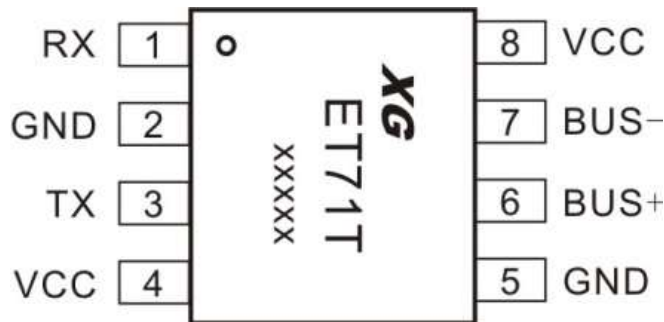


Figure 1: Package Type SOIC8

3. PIN Function Description

PIN	NAME	Function
1	RX	Receive output pin
2/5	GND	Ground
3	TX	Transmission Input pin
4/8	VCC	Power Supply +5V
6	BUS+	LAN BUS+ (out/in)
7	BUS-	LAN BUS- (out/in)

4. Logical Table

TX	RX	BUS+	BUS-	NOTE
0	1	1	0	Dominant, BUS is driven by other node
0	0	0	1	Bus is Passive State
0	0	1	1	Not allow (BUS error, short to VCC)
0	0	0	0	Not allow (BUS error, short to GND)
1	1	1	0	Dominant, when Tx =1, BUS is driven by this node
1	x	0	1	Non-existent
1	x	1	1	Non-existent
1	x	0	0	Non-existent

5. LAN Configuration of J1850 PWM

Figure 2 shows the LAN configuration of J1850 PWM. The LAN bus uses 2 lines: BUS + and BUS-. BUS + is connected to ground (GND) with resistance R1, and BUS (-) is connected to power supply (VDD) with resistance R2. At each node, BUS is connected to BUS+ and BUS- PIN of XG7100 to drive the LAN bus. Inverted signals (Figure 3) are output to both BUS + and BUS-. Maximum number of nodes is 32 .

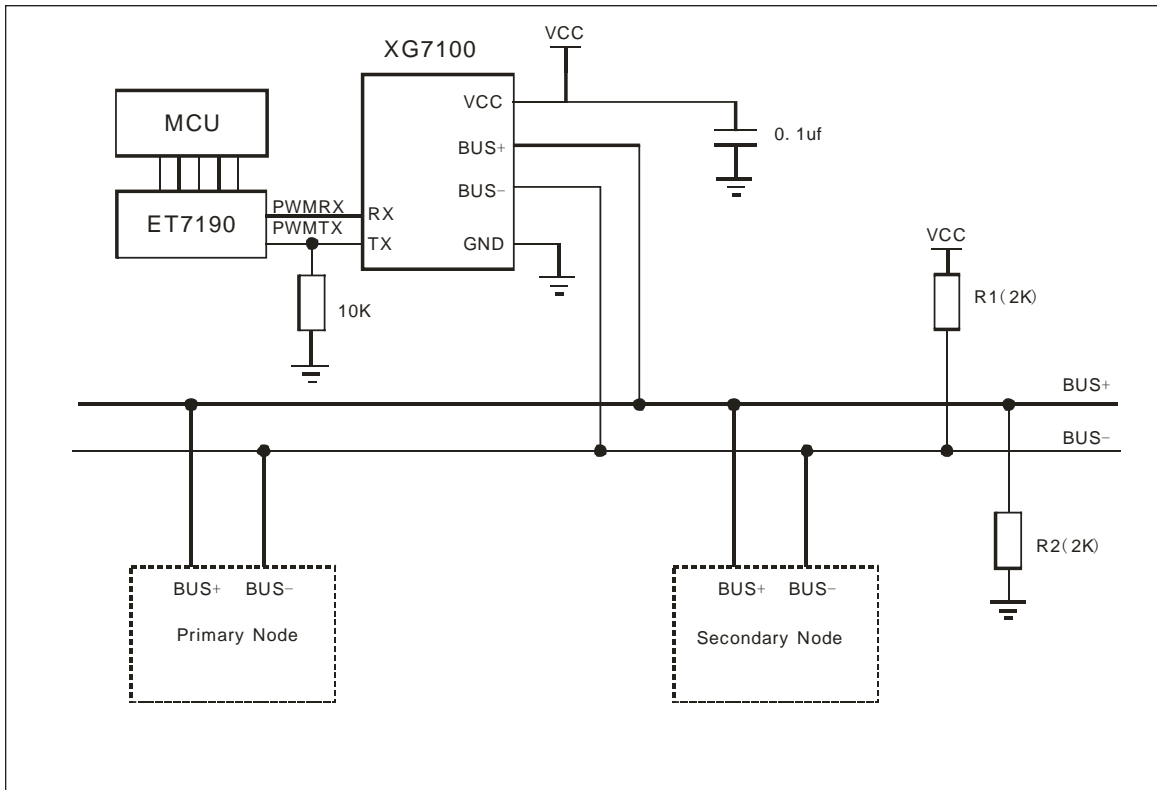


Figure 2: XG7100 Typical Application Diagram

6. MAXIMUM RATINGS

All voltages are with respect to ground unless otherwise noted.

Rating	Symbol	Value	Unit
Vcc DC Supply Voltage	Vcc	-0.5 to +12	V
Transmission Input Voltage	Vtx	-0.5 to +12	V
Receive output Voltage	Vrx	-0.5 to +12	V
Drive output Votage	V _{BUS(+)}	-0.5 to +12	V
Storage Temperature	Tstg	-65 to 150	° C
OperatingTemperature	Ta	-40 to 85	° C
Soldering Temperature (for 10 seconds)	Tsolder	300	° C
ESD Voltage Human Body Model	Vesd	±15000	V

7. STATIC ELECTRICAL CHARACTERISTICS

Characteristics noted under conditions of 7 Vcc=5V±5%, -40° C ≤ Ta ≤ 85° C . Typical values reflect the parameter's approximate mid point average value with Vcc = 5 V, Ta = 25°C. All positive currents are into the pin. All negative currents are out of the pin.

Characteristic	Syml	Min	Typ	Max	Uint
Operational Power Voltage	Vcc	4.5	5.0	5.5	V
Differential Driver Output (no load)	V _{OD}		-	5.0	V
TX Input High Voltage	Vtxh	2.0			V
TX Input Low Voltage	Vtxl			0.8	V
Tx input Current	Tx=5V	50	100	200	uA
	Tx=0V	-2.0	0.23	2.0	uA
RX Output High Voltage	Vrxh	3.5	4.5		V
RX Output Low Voltage	Vrxl		0.2	0.4	V
Rx output Current	Irx			8.0	mA
No-Load Supply Current(TX=1 Dominant)	ICC1		500	900	uA
No-Load Supply Current(TX=0 Passive)	ICC2		300	500	uA
Receiver Input Resistance	Rin		50		KΩ
Driver Short-Circuit Current (Tx=1 V _{BUS+} =0V)	I _{ov1}		120	250	mA
Driver Short-Circuit Current (TX=1 V _{BUS-} =5V)	I _{ov2}		120	250	mA

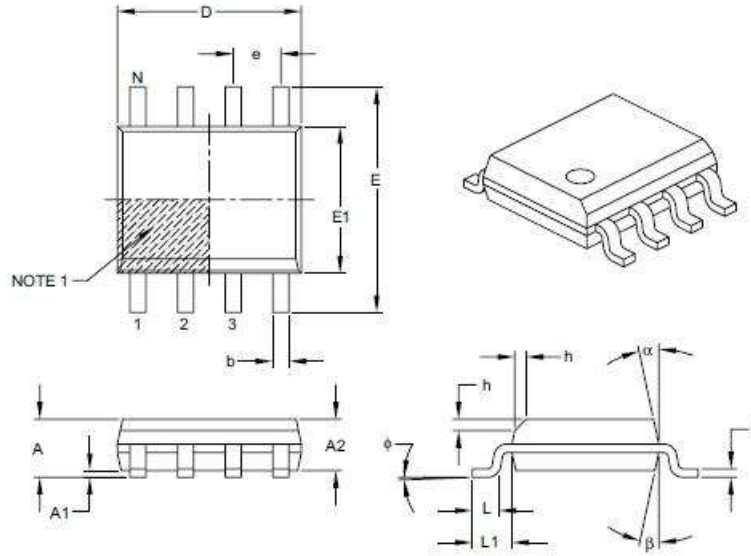
8. DYNAMIC ELECTRICAL CHARACTERISTICS

Characteristics noted under conditions of $V_{cc}=5V \pm 5\%$, $-40^{\circ} C \leq T_a \leq 85^{\circ} C$.

Characteristic	Symbl	Min	Typ	Max	Unit
Tx to BUS DelayTime (Rload=1 K Ω)	Ttxdelay	40	70	90	nS
BUS input to Rx Output	Low to high	20	60	200	ns
	High to low	20	40	200	ns
Maximum Data Rate	fmax		41.6		kbps

9. Packaging Information

8-Lead Plastic Small Outline Narrow 3.90mm Body (SOIC)



Dimension Limits	Units	MILLIMETERS		
		MIN	NOM	MAX
Number of Pins	N	8		
Pitch	e	1.27 BSC		
Overall Height	A	–	–	1.75
Molded Package Thickness	A2	1.25	–	–
Standoff §	A1	0.10	–	0.25
Overall Width	E	6.00 BSC		
Molded Package Width	E1	3.90 BSC		
Overall Length	D	4.90 BSC		
Chamfer (optional)	h	0.25	–	0.50
Foot Length	L	0.40	–	1.27
Footprint	L1	1.04 REF		
Foot Angle	φ	0°	–	8°
Lead Thickness	c	0.17	–	0.25
Lead Width	b	0.31	–	0.51
Mold Draft Angle Top	α	5°	–	15°
Mold Draft Angle Bottom	β	5°	–	15°

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. § Significant Characteristic.
3. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15 mm per side.
4. Dimensioning and tolerancing per ASME Y14.5M.

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

REF: Reference Dimension, usually without tolerance, for information purposes only.