National Semiconductor

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DS26S10
Quad Bus Transceiver

General Description

The DS26S10 is a quad Bus Transceiver consisting of 4 high speed bus drivers with open-collector outputs capable of sinking 100 mA at 0.8V and 4 high speed bus receivers. Each driver output is connected internally to the high speed bus receiver in addition to being connected to the package pin. The receiver has a Schottky TTL output capable of driving 10 Schottky TTL unit loads.

An active low enable gate controls the 4 drivers so that outputs of different device drivers can be connected together for party-line operation.

The bus output high-drive capability in the low state allows party-line operation with a line impedance as low as 100Ω. The line can be terminated at both ends, and still give considerable noise margin at the receiver. The receiver typical switching point is 2V.

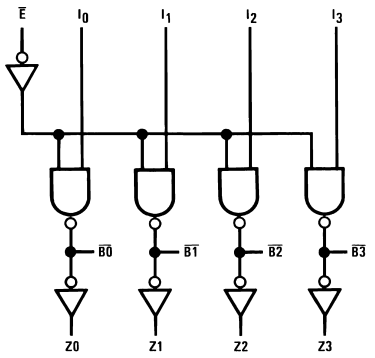
The DS26S10 features advanced Schottky processing to minimize propagation delay. The device package also has 2 ground pins to improve ground current handling and allow close decoupling between V_{CC} and ground at the package. Both GND 1 and GND 2 should be tied to the ground bus external to the device package.

Features

- Input to bus is inverting on DS26S10
- Quad high speed open-collector bus transceivers
- Driver outputs can sink 100 mA at 0.8V maximum
- Advanced Schottky processing
- PNP inputs to reduce input loading

Logic Diagrams

DS2610



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Absolute Maximum Ratings (Note *NO TARGET FOR FNXref NS859*)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/ Distributors for availability and specifications.

Storage Temperature	−65˚C to +150˚C
Temperature (Ambient) Under Bias	−55˚C to +125˚C
Supply Voltage to Ground Potential	−0.5V to +7V
DC Voltage Applied to Outputs for High Output State	−0.5V to +V_{CC} Max
DC Input Voltage	−0.5V to +5.5V
Output Current, Into Bus	200 mA
Output Current, Into Outputs (Except Bus)	30 mA
DC Input Current	−30 mA to +5 mA
Maximum Power Dissipation (Note 1) at 25˚C	
Molded Package	1362 mW

Operating Conditions

	Min	Max	Units
Supply Voltage (V_{CC})			
DS26S10	4.75	5.25	V
Temperature (T_A)			
DS26S10	0	+70	˚C

Note 1: Derate cavity package 9.6 mW/˚C above 25˚C; derate molded package 10.9 mW/˚C above 25˚C, derate PLCC package TBD mW/˚C above 25˚C.

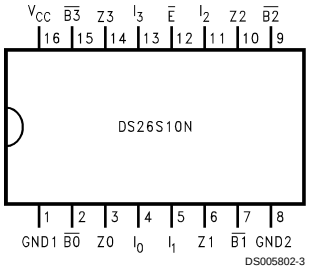
Electrical Characteristics

(Unless otherwise noted)

Symbol	Parameter	Conditions (Note 2)		Min	Typ (Note 3)	Max	Units
V_{OH}	Output High Voltage (Receiver Outputs)	V_{CC} = Min, I_{OH} = −1 mA, V_{IN} = V_{IL} or V_{IH}	Military	2.5	3.4		V
			Commercial	2.7	3.4		V
V_{OL}	Output Low Voltage (Receiver Outputs)	V_{CC} = Min, I_{OL} = 20 mA, V_{IN} = V_{IL} or V_{IH}				0.5	V
V_{IH}	Input High Level (Except Bus)	Guaranteed Input Logical High for All Inputs		2.0			V
V_{IL}	Input Low Level (Except Bus)	Guaranteed Input Logical Low for All Inputs				0.8	V
V_I	Input Clamp Voltage (Except Bus)	V_{CC} = Min, I_{IN} = −18 mA				−1.2	V
I_{IL}	Input Low Current (Except Bus)	V_{CC} = Max, V_{IN} = 0.4V	Enable			−0.36	mA
			Data			−0.54	mA
I_{IH}	Input High Current (Except Bus)	V_{CC} = Max, V_{IN} = 2.7V	Enable			20	µA
			Data			30	µA
I_I	Input High Current (Except Bus)	V_{CC} = Max, V_{IN} = 5.5V				100	µA
I_{SC}	Output Short-Circuit Current (Except Bus)	V_{CC} = Max, (Note 4)	Military	−20		−55	mA
			Commercial	−18		−60	mA
I_{CCL}	Power Supply Current (All Bus Outputs Low)	V_{CC} = Max, Enable = GND	DS26S10		45	70	mA
			DS26S11			80	mA

Connection Diagram

Dual-In-Line Package



Top View
Order Number DS26S10N
See NS Package Number N16A
Plastic Chip Carrier

Bus Input/Output Characteristics

Symbol	Parameter	Conditions (Note 2)		Min	Typ (Note 3)	Max	Units
V_{OL}	Output Low Voltage	V_{CC} = Min	I_{OL} = 40 mA		0.33	0.5	V
			I_{OL} = 70 mA		0.42	0.05	
			I_{OL} = 100 mA		0.51	0.8	
I_O	Bus Leakage Current	V_{CC} = Max	V_O = 0.8V			−50	µA
			V_O = 4.5V			100	
I_{OFF}	Bus Leakage Currrent (power OFF)	V_O = 4.5V				100	µA
V_{TH}	Receiver Input High Threshold	Bus enable = 2.4V V_{CC} = Max		2.25	2.0		V
V_{TL}	Receiver Input Low Threshold	Bus enable = 2.4V V_{CC} = Min			2.0	1.75	

Note 2: For conditions shown as min or max, use the appropriate value specified under Electrical Characteristics for the applicable device type.

Note 3: Typical limits are at V_{CC} = 5V, 25˚C ambient and maximum loading.

Note 4: Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.

Switching Characteristics

(T_A = 25˚C, V_{CC} = 5V)

Symbol	Parameter	Conditions		Min	Typ	Max	Units
t_{PLH}	Data Input to Bus	R_B = 50Ω, C_B = 50 pF (Note 5)	DS26S10		10	15	ns
t_{PHL}	Data Input to Bus				10	15	ns
t_{PLH}	Enable Input to Bus		DS26S10		14	18	ns
t_{PHL}	Enable Input to Bus				13	18	ns
t_{PLH}	Bus to Receiver Out	R_B = 50Ω, R_L = 280Ω, C_B = 50 pF(Note 5)			10	15	ns
t_{PHL}	Bus to Receiver Out	C_L = 15 pF			10	15	ns
t_r	Bus	R_B = 50Ω, C_B = 50 pF (Note 5)		4.0	10		ns
t_f	Bus			2.0	4.0		ns

Note 5: Includes probe and jig capacitance.

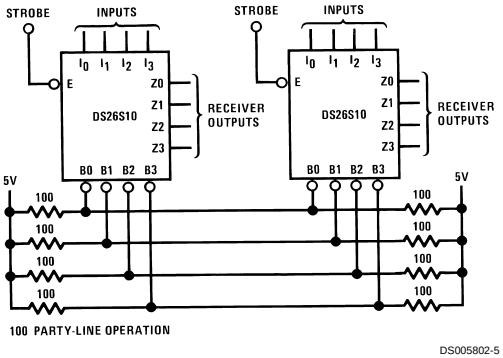
Truth Tables

DS26S10

Inputs		Outputs	
$\overline{E}$	I	$\overline{B}$	Z
L	L	H	L
L	H	L	H
H	X	Y	$\overline{Y}$

H = High voltage level
L = Low voltage level
X = Don't care
Y = Voltage level of bus (assumes control by another bus transceiver)

Typical Application



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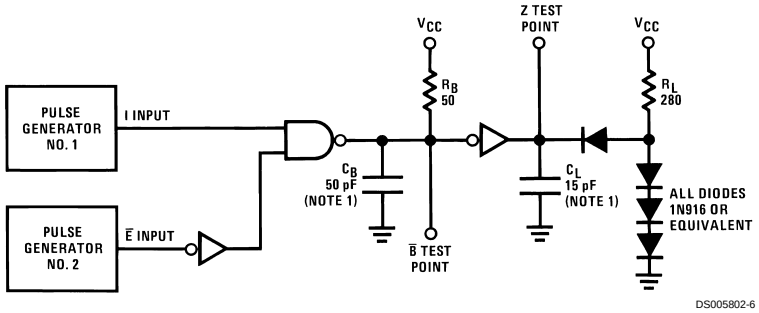
AC Test Circuit and Switching Time Waveforms



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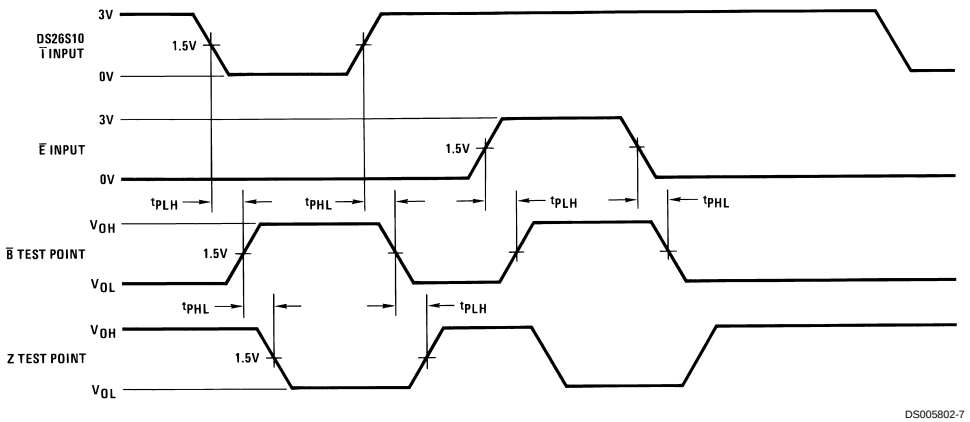
Note 1: Includes probe and jig capacitance.



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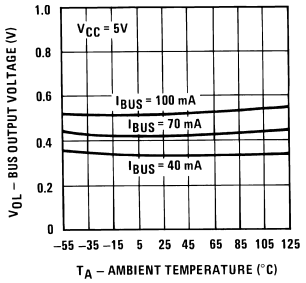
Typical Performance Characteristics

Typical Bus Output Low Voltage vs Ambient Temperature



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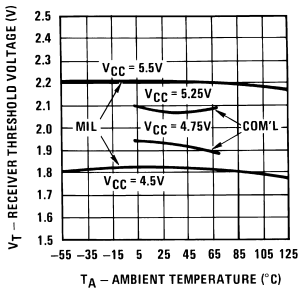
Receiver Threshold Variation vs Ambient Temperature



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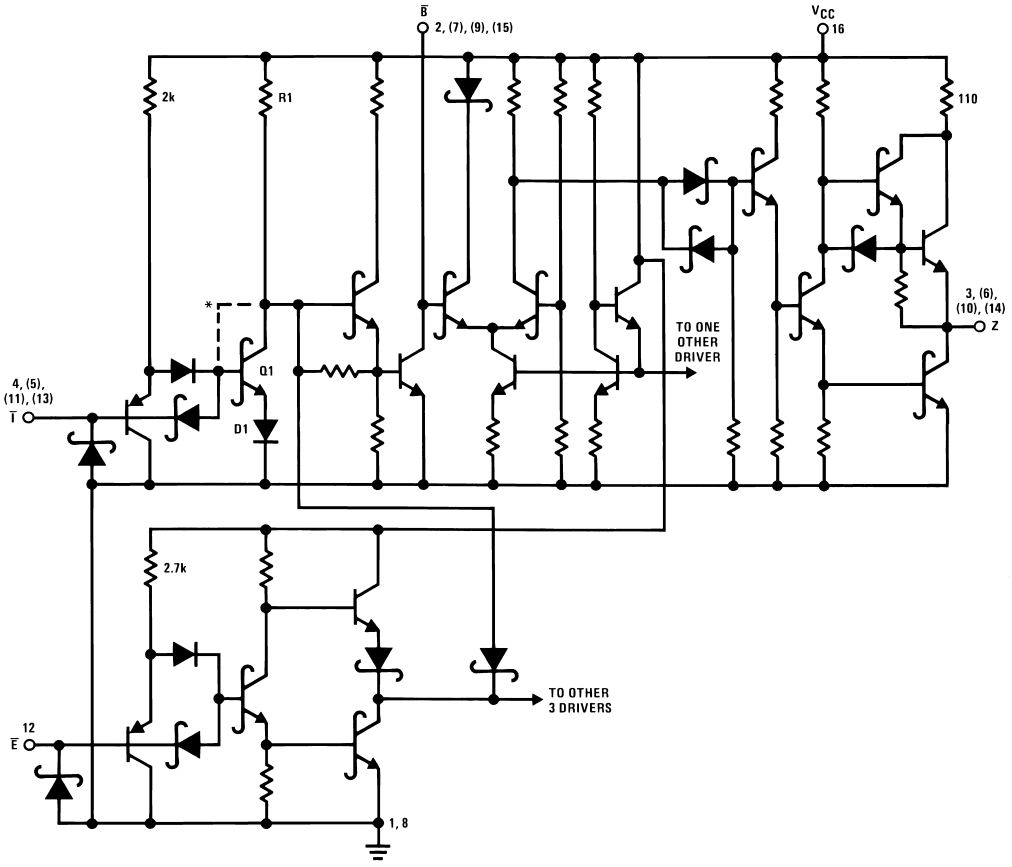
Schematic Diagram



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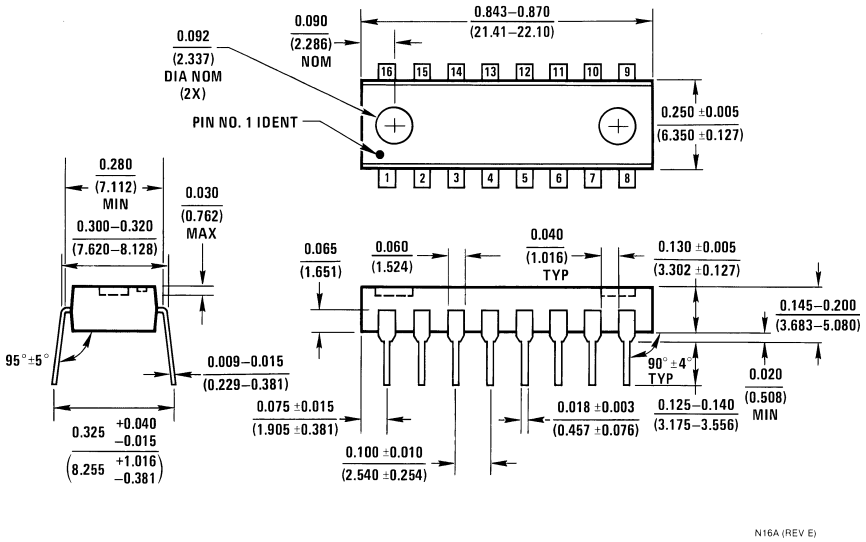
V_{CC} = Pin 16
GND 1 = Pin 1
GND 2 = Pin 8
Connect for DS26S10
*Remove R1, Q1, D1 for DS26S10

Physical Dimensions inches (millimeters) unless otherwise noted



N16A (REV E)

Molded Dual-In-Line Package (N)
Order Number DS26S10N
NS Package Number N16A

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