DS26F32M Quad Differential Line Receivers

Check for Samples: DS26F32M

FEATURES

- **Military Temperature Range**
- **Input Voltage Range of ±7.0V (Differential or Common Mode) ±0.2V Sensitivity Over the Input Voltage Range**
- **Meets All the Requirements of EIA Standards RS-422 and RS-423**
- **High Input Impedance (18k Typical)**
- **30 mV Input Hysteresis**
- **Operation from Single +5.0V Supply**
- **Input Pull-Down Resistor Prevents Output Oscillation on Unused Channels**
- **Tri-state Outputs, with Choice of Complementary Enables, for Receiving Directly onto a Data Bus**
- **Propagation Delay 15 ns Typical**

DESCRIPTION

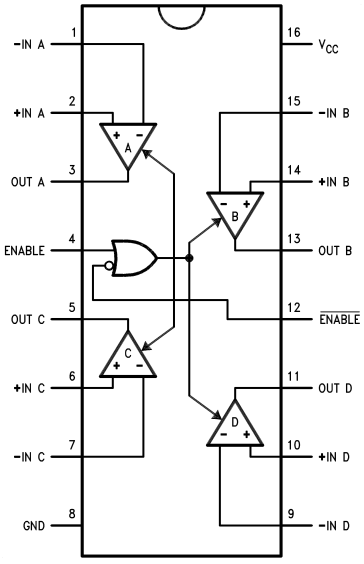
The DS26F32 is a quad differential line receiver designed to meet the requirements of EIA Standards RS-422 and RS-423, and Federal Standards 1020 and 1030 for balanced and unbalanced digital data transmission.

The DS26F32 offers improved performance due to the use of state-of-the-art L-FAST bipolar technology. The L-FAST technology allows for higher speeds and lower currents by utilizing extremely short gate delay times. Thus, the DS26F32 features lower power, extended temperature range, and improved specifications.

The device features an input sensitivity of 200 mV over the input common mode range of ±7.0V. The DS26F32 provides an enable function common to all four receivers and tri-state outputs with 8.0 mA sink capability. Also, a fail-safe input/output relationship keeps the outputs high when the inputs are open.

The DS26F32 offers optimum performance when used with the DS26F31 Quad Differential Line Driver.

Connection Diagram



For Complete Military Product Specifications, refer to the appropriate SMD or MDS.

Figure 1. 16-Lead DIP Top View
See Package Number NAJ0020A, NFE0016A or NAD0016A

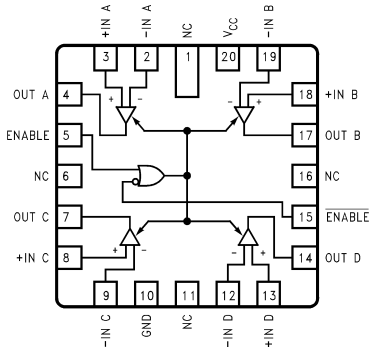


Figure 2. 20-Lead LCCC

Table 1. Function Table (1) (Each Receiver)

Differential Inputs	Enables		Outputs
$V_{ID} = (V_{IN}+) - (V_{IN}-)$	E	$\overline{E}$	OUT
$V_{ID} \geq 0.2V$	H	X	H
	X	L	H
$V_{ID} \leq -0.2V$	H	X	L
	X	L	L
X	L	H	Z

(1) H = High Level
L = Low Level
X = Immaterial

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings(1)(2)

Storage Temperature Range CDIP		−65°C + to 175°C
Operating Temperature Range	DS26F32M	−55°C to +125°C
	DS26F32C	0°C to +70°C
Lead Temperature CDIP (soldering, 60 sec)		300°C
Maximum Power Dissipation(3) at 25°C	Cavity Package	1500 mW
	Supply Voltage	7.0V
	Common Mode Voltage Range	±25V
	Differential Input Voltage	±25V
	Enable Voltage	7.0V
	Output Sink Current	50 mA

(1) Absolute Maximum Ratings are those values beyond which the safety of the device cannot be ensured. They are not meant to imply that the devices should be operated at these limits. The Electrical Characteristics provide conditions for actual device operation.
(2) If Military/Aerospace specified devices are required, please contact the TI Sales Office/ Distributors for availability and specifications.
(3) Derate cavity package 10 mW/°C above 25°C.

Operating Range

DS26F32M	Temperature	−55°C to +125°C
	Supply Voltage	4.5V to 5.5V

Electrical Characteristics (1)(2)

Over operating range, unless otherwise specified

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{TH}	Differential Input Voltage	−7.0V ≤ V_{CM} ≤ +7.0V, $V_O = V_{OL}$ or V_{OH}		−0.2	±0.06	+0.2	V
R_I	Input Resistance	−15V ≤ V_{CM} ≤ +15V, One Input AC Ground		14	18		kΩ
I_I	Input Current (under Test)	V_I = +15V, Other Input −15V ≤ V_I ≤ +15V				2.3	mA
		V_I = −15V, Other Input −15V ≤ V_I ≤ +15V				−2.8	
V_{OH}	Output Voltage HIGH	V_{CC} = Min, ΔV_I = +1.0V, $V_{\overline{ENABLE}}$ = 0.8V, I_{OH} = −440 µA	0°C to +70°C	2.8	3.4		V
			−55°C to +125°C	2.5	3.4		
V_{OL}	Output Voltage LOW	V_{CC} = Min, ΔV_I = −1.0V, $V_{\overline{ENABLE}}$ = 0.8V	I_{OL} = 4.0 mA			0.4	V
			I_{OL} = 8.0 mA			0.45	
V_{IL}	Enable Voltage LOW					0.8	V
V_{IH}	Enable Voltage HIGH			2.0			V
V_{IC}	Enable Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.5	V
I_{OZ}	Off State (High Impedance) Output Current	V_{CC} = Max	V_O = 2.4V			20	µA
			V_O = 0.4V			−20	
I_{IL}	Enable Current LOW	V_I = 0.4V			−0.2	−0.36	mA
I_{IH}	Enable Current HIGH	V_I = 2.7V			0.5	10	µA
I_I	Enable Input High Current	V_I = 5.5V			1.0	50	µA
I_{OS}	Output Short Circuit Current	V_O = 0V, V_{CC} = Max, See (3) ΔV_I = +1.0V		−15	−50	−85	mA
I_{CC}	Supply Current	V_{CC} = Max, All V_I = GND, Outputs Disabled			30	50	mA
V_{HYST}	Input Hysteresis	T_A = 25°C, V_{CC} = 5.0V, V_{CM} = 0V			30		mV

(1) Unless otherwise specified min/max limits apply across the −55°C to +125°C temperature range for the DS26F32M and across the 0°C to +70°C range for the DS26F32C. All typicals are given for V_{CC} = 5V and T_A = 25°C.
(2) All currents into the device pins are positive; all currents out of the device pins are negative. All voltages are reference to ground unless otherwise specified.
(3) Only one output at a time should be shorted.

Switching Characteristics (1)(2)

V_{CC} = 5.0V, T_A = 25°C

Symbol	Parameter	Conditions		Min	Typ	Max	Units
t_{PLH}	Input to Output	See (Figure 4, and Figure 5)	C_L = 15 pF		15	22	ns
t_{PHL}	Input to Output				15	22	ns
t_{LZ}	Enable to Output	See (Figure 4, and Figure 6)	C_L = 5 pF		14	18	ns
t_{HZ}	Enable to Output				15	20	ns
t_{ZL}	Enable to Output		C_L = 15 pF		13	18	ns
t_{ZH}	Enable to Output				12	16	ns

(1) All diodes are IN916 or IN3064.
(2) C_L includes probe and jig capacitance.

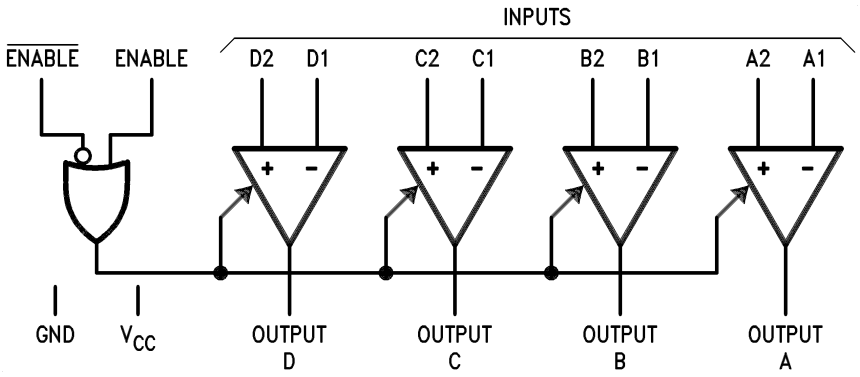


Figure 3. Logic Symbol

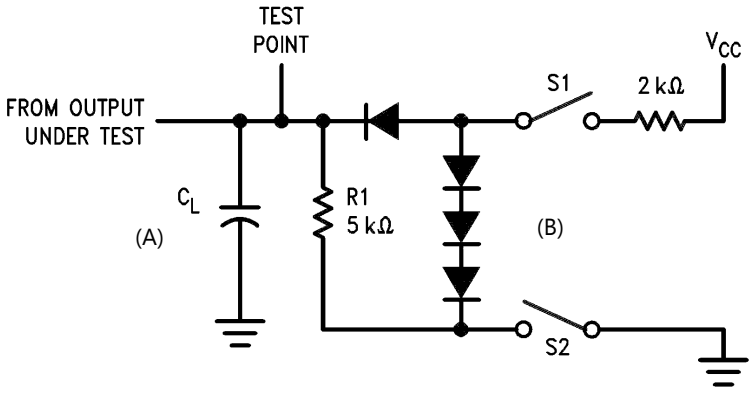


Figure 4. Load Test Circuit for Three-State Outputs

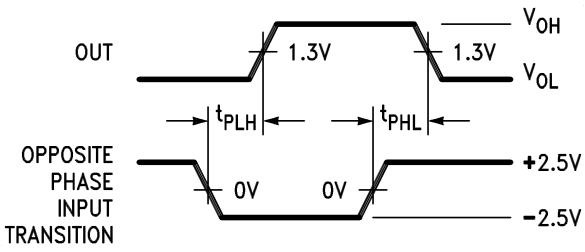


Figure 5. Propagation Delay(3)(4)(5)

(3) Diagram shown for $\overline{\text{ENABLE}}$ Low.
(4) S1 and S2 of Load Circuit are closed except where shown.
(5) Pulse Generator of all Pulses: Rate ≤ 1.0 MHz, Z_O = 50Ω, t_r ≤ 6.0 ns, t_f ≤ 6.0 ns.

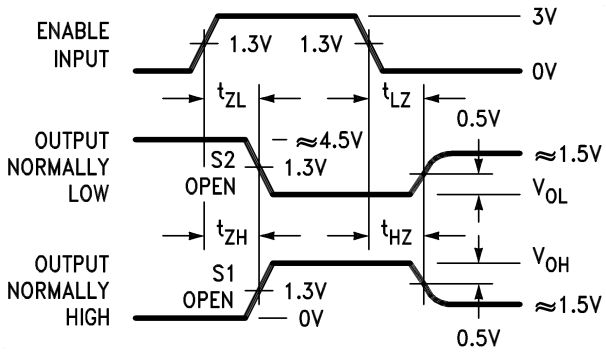
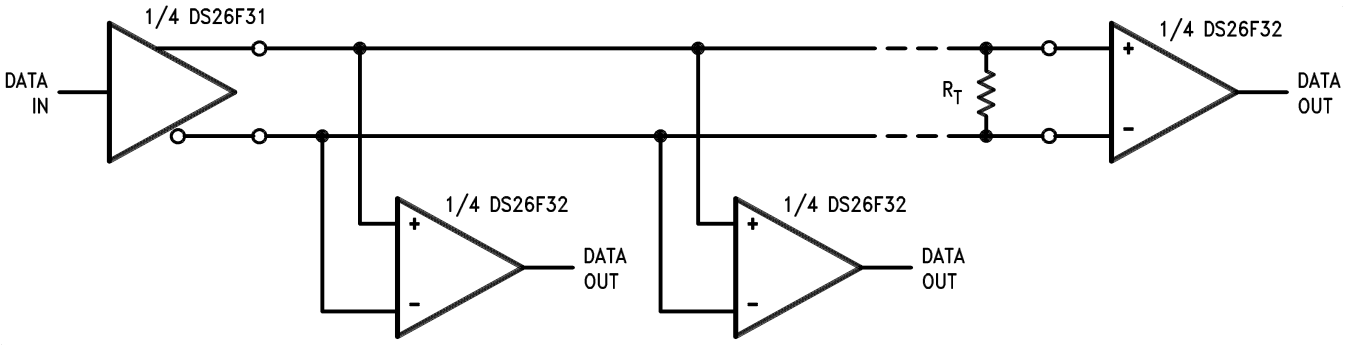


Figure 6. Enable and Disable Times(3)(4)(5)

TYPICAL APPLICATION



REVISION HISTORY

Changes from Revision B (April 2013) to Revision C	Page
• Changed layout of National Data Sheet to TI format	5

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