SLLS104E – DECEMBER 1990 – REVISED MAY 1995

- **Meets or Exceeds the Requirements of ANSI EIA/TIA-422-B, EIA/TIA-423-B, and ITU Recommendation V.10 and V.11**
- **Low Power, I_{CC} = 10 mA Typ**
- **±7-V Common-Mode Range With ±200-mV Sensitivity**
- **Input Hysteresis . . . 60 mV Typ**
- **t_{pd} = 17 ns Typ**
- **Operate From a Single 5-V Supply**
- **3-State Outputs**
- **Input Fail-Safe Circuitry**
- **Improved Replacements for AM26LS32**

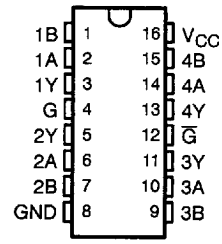
description

The AM26C32C, AM26C32I, and AM26C32M are quadruple differential line receivers for balanced or unbalanced digital data transmission. The enable function is common to all four receivers and offers a choice of active-high or active-low input. The 3-state outputs permit connection directly to a bus-organized system. Fail-safe design ensures that if the inputs are open, the outputs are always high.

The AM26C32 is manufactured using a BiCMOS process, which is a combination of bipolar and CMOS transistors. This process provides the high voltage and current of bipolar with the low power of CMOS to reduce the power consumption to about one-fifth that of the standard AM26LS32 while still maintaining ac and dc performance.

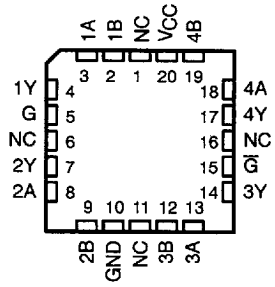
The AM26C32C is characterized for operation from 0°C to 70°C, the AM26C32I is characterized from −40°C to 85°C, and the AM26C32M is characterized from −55°C to 125°C.

AM26C32C, AM26C32I . . . D, DBT, N, OR NST PACKAGE
AM26C32M . . . J OR W PACKAGE
(TOP VIEW)



† The DB and NS packages are available left-ended taped and reeled only (order device AM26C32CDBLE or AM26C32CNSLE).

FK PACKAGE
(TOP VIEW)



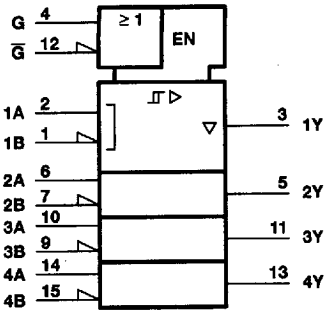
NC – No internal connection

FUNCTION TABLE
(each receiver)

DIFFERENTIAL INPUT	ENABLES		OUTPUT
	G	$\overline{G}$	
$V_{ID} \geq V_{IT+}$	H	X	H
	X	L	H
$V_{IT-} < V_{ID} < V_{IT+}$	H	X	?
	X	L	?
$V_{ID} \leq V_{IT-}$	H	X	L
	X	L	L
X	L	H	Z

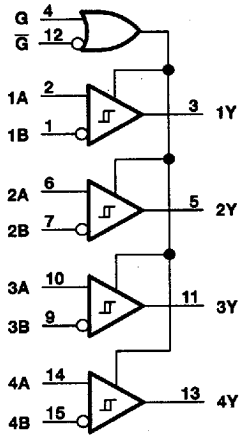
H = high level, L = low level, X = irrelevant
Z = high impedance (off), ? = indeterminate

logic symbol†

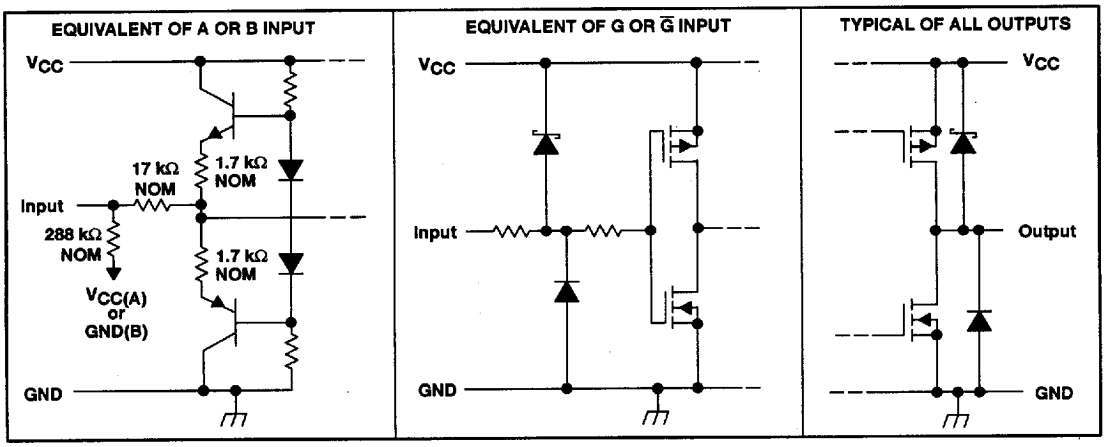


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



schematics



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{CC} (see Note 1) ..... 7 V
Input voltage range, V_I: A or B inputs ..... −11 V to 14 V
G or $\overline{G}$ inputs ..... −0.5 V to V_{CC} + 0.5 V
Differential input voltage range, V_{ID} ..... −14 V to 14 V
Output voltage range, V_O ..... −0.5 V to V_{CC} + 0.5 V
Output current, I_O ..... ±25 mA
Continuous total power dissipation ..... See Dissipation Rating Table
Operating free-air temperature range, T_A: AM26C32C ..... 0°C to 70°C
AM26C32I ..... −40°C to 85°C
AM26C32M ..... −55°C to 125°C
Storage temperature range, T_{stg} ..... −65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds ..... 260°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: All voltage values, except differential output voltage, V_{OD}, are with respect to network GND. Currents into the device are positive and currents out of the device are negative.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	950 mW	7.6 mW/°C	608 mW	494 mW	—
DB	781 mW	6.2 mW/°C	502 mW	409 mW	—
N	1150 mW	9.2 mW/°C	736 mW	598 mW	—
NS	625 mW	5.0 mW/°C	400 mW	325 mW	—
J	1375 mW	11 mW/°C	—	—	275 mW
W	1000 mW	8.0 mW/°C	—	—	200 mW

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}		4.5	5	5.5	V
High-level input voltage, V_{IH}		2			V
Low-level input voltage, V_{IL}				0.8	V
Common-mode input voltage, V_{IC}				±7	V
High-level output current, I_{OH}				−6	mA
Low-level output current, I_{OL}				6	mA
Operating free-air temperature, T_A	AM26C32C	0		70	°C
	AM26C32I	−40		85	
	AM26C32M	−55		125	

electrical characteristics over recommended ranges of V_{CC}, V_{IC}, and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IT+}	Differential input high-threshold voltage	$V_O = V_{OH}$ min, $I_{OH} = -440\ \mu A$	V_{IC} = full range			0.2	V
			V_{IC} = 0 to 5.5 V			0.1	
V_{IT-}	Differential input low-threshold voltage	V_O = 0.45 V, I_{OL} = 8 mA	V_{IC} = full range	−0.2‡			V
			V_{IC} = 0 to 5.5 V	−0.1‡			
V_{hys}	Hysteresis voltage ($V_{IT+} - V_{IT-}$)				60		mV
V_{IK}	Enable input clamp voltage	V_{CC} = 4.5 V,	$I_I = -18$ mA			−1.5	V
V_{OH}	High-level output voltage	V_{ID} = 200 mV,	$I_{OH} = -6$ mA	3.8			V
V_{OL}	Low-level output voltage	V_{ID} = −200 mV,	I_{OL} = 6 mA		0.2	0.3	V
I_{OZ}	Off-state (high-impedance-state) output current	$V_O = V_{CC}$ or GND			±0.5	±5	μA
I_I	Line input current	V_I = 10 V,	Other input at 0 V			1.5	mA
		$V_I = -10$ V,	Other input at 0 V			−2.5	
I_{IH}	High-level enable current	V_I = 2.7 V				20	μA
I_{IL}	Low-level enable current	V_I = 0.4 V				−100	μA
r_i	Input resistance	One input to ground		12	17		kΩ
I_{CC}	Supply current	V_{CC} = 5.5 V			10	15	mA

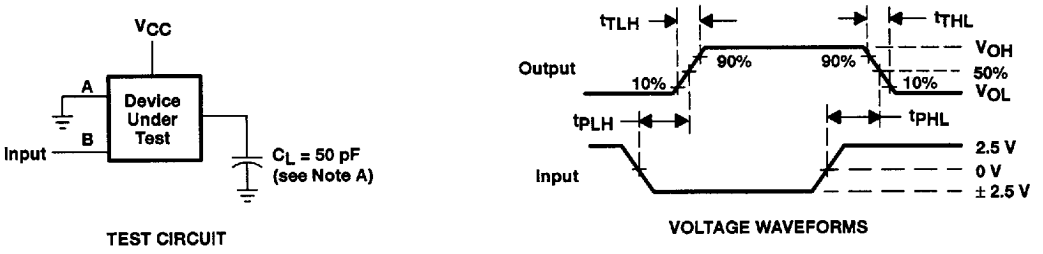
† All typical values are at V_{CC} = 5 V, V_{IC} = 0, and T_A = 25°C.
‡ The algebraic convention, in which the less positive (more negative) limit is designated minimum, is used in this data sheet for common-mode input voltage.

switching characteristics over recommended ranges of operating conditions, C_L = 50 pF (unless otherwise noted)

PARAMETER		TEST CONDITIONS	AM26C32C AM26C32I			AM26C32M			UNIT
			MIN	TYP§	MAX	MIN	TYP§	MAX	
t_{PLH}	Propagation delay time, low- to high-level output	See Figure 1	9	17	27	9	17	27	ns
t_{PHL}	Propagation delay time, high- to low-level output		9	17	27	9	17	27	ns
t_{TLH}	Output transition time, low- to high-level output	See Figure 1		4	9		4	10	ns
t_{THL}	Output transition time, high- to low-level output			4	9		4	9	ns
t_{PZH}	Output enable time to high level	See Figure 2		13	22		13	22	ns
t_{PZL}	Output enable time to low level			13	22		13	22	ns
t_{PHZ}	Output disable time from high level	See Figure 2		13	22		13	26	ns
t_{PLZ}	Output disable time from low level			13	22		13	25	ns

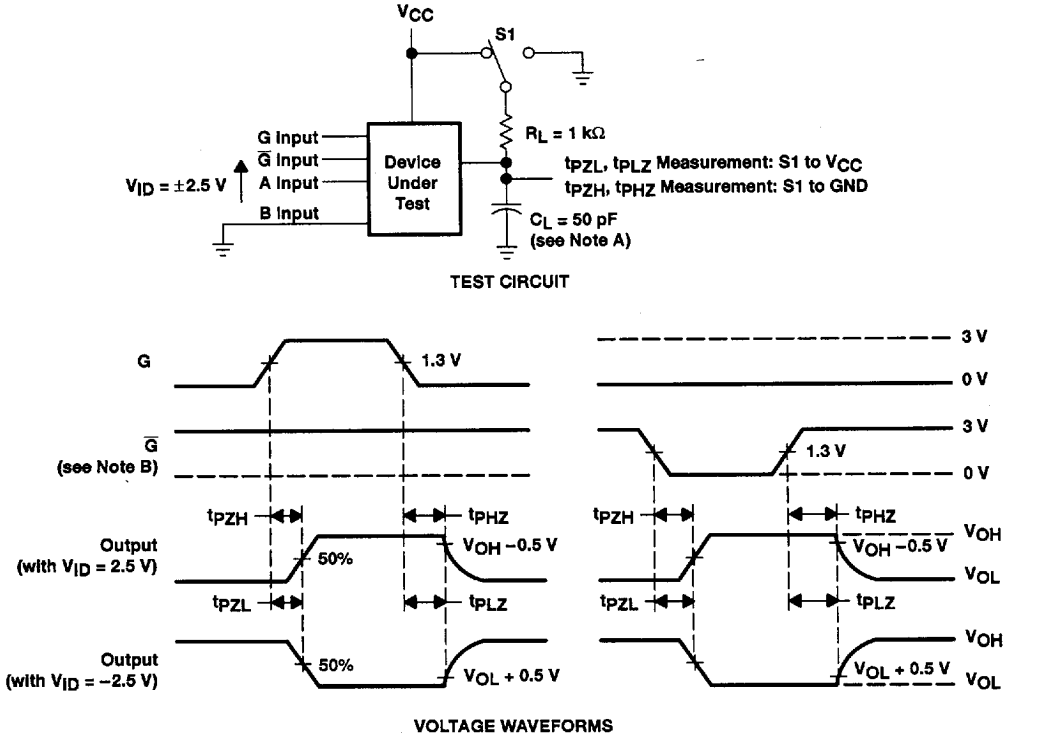
§ All typical values are at V_{CC} = 5 V, T_A = 25°C.

PARAMETER MEASUREMENT INFORMATION



NOTE A. C_L includes probe and jig capacitance.

Figure 1. Switching Test Circuit and Voltage Waveforms



NOTES: A. C_L includes probe and jig capacitance.
B. The input pulse is supplied by a generator having the following characteristics: PRR = 1 MHz, duty cycle ≤ 50%, $t_r = t_f = 6$ ns.

Figure 2. Enable/Disable Time Test Circuit and Output Voltage Waveforms