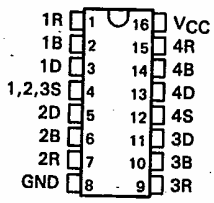
D2290, JANUARY 1977—REVISED SEPTEMBER 1986

- **Driver Inputs Compatible with TTL and MOS Circuitry**
- **Driver Outputs Stay Off During Power Up and Power Down**
- **Drivers Feature Open-Collector Outputs for Party-Line Operation**
- **Designed for Interchangeability with Motorola MC3446**
- **Meet IEEE Standard 488-1975**

D, J, OR N DUAL-IN-LINE PACKAGE
(TOP VIEW)



description

These circuits are quadruple single-ended line transceivers designed for bidirectional flow of data and instructions. The bus terminal characteristic complies with paragraph 3.5.3 of IEEE Standard 488 (see Figure 3). Each driver output is tied to the junction of an internal voltage divider that sets the no-load output voltage and provides bus termination. The driver outputs are guaranteed to be "off" during power up and power down if either input is high. The receivers feature 950 millivolts typical hysteresis for noise immunity.

The MC3446 is characterized for operation from 0°C to 70°C.

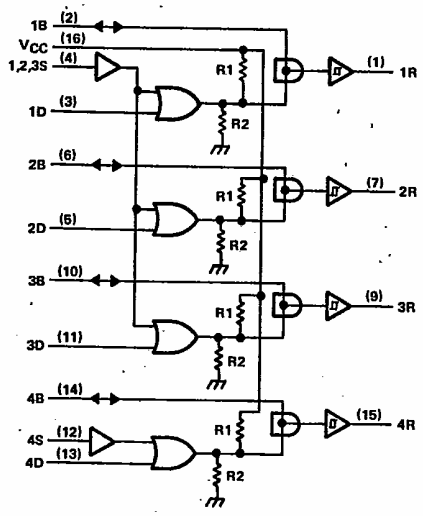
FUNCTION TABLE
(TRANSMITTING)

INPUTS		OUTPUT	
S	D	B	R
L	H	H	H
L	L	L	L

FUNCTION TABLE
(RECEIVING)

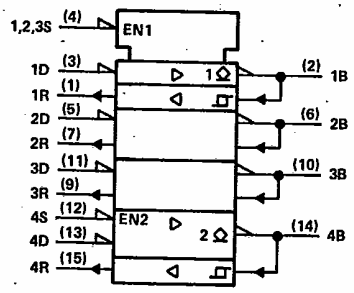
INPUTS			OUTPUT
S	B	D	R
H	H	X	H
H	L	X	L

logic diagram (positive logic)



R1 = 2.4 kΩ NOM, R2 = 5 kΩ NOM

logic symbol†



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

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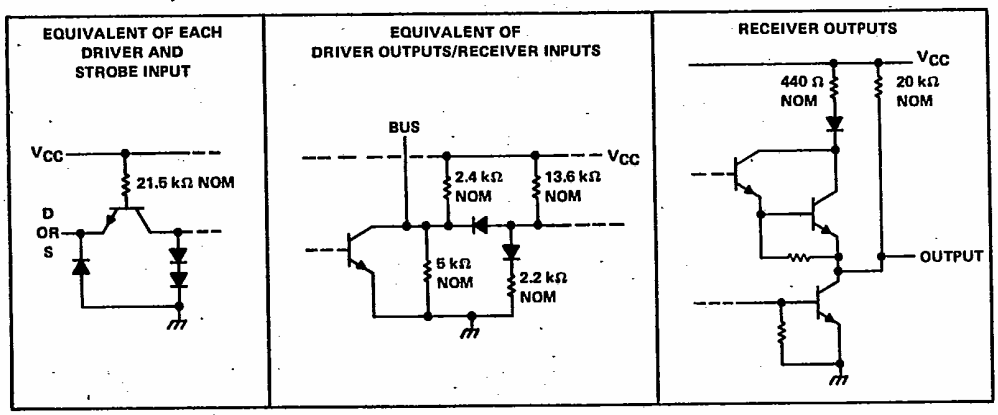
schematics of inputs and outputs



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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage . . . . . 5.5 V
Driver output current . . . . . 150 mA
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 2):
D package . . . . . 950 mW
J package . . . . . 1025 mW
N package . . . . . 1050 mW
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J package . . . . . 300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D and N package . . . . . 260°C

NOTES: 1. Voltage values are with respect to network ground terminal.
2. For operation above 25°C free-air temperature, refer to Dissipation Derating Curves in Appendix A. In the J package, use the 8.2 mW/°C curve, in the D package, use the 7.6 mW/°C curve, and in the N package, use the 9.2-mW/°C curve.

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}		4.75	5	5.25	V
High-level input voltage, V_{IH}	D or S	2			V
Low-level input voltage, V_{IL}	D or S			0.8	V
High-level output current, I_{OH}	Receiver			−0.4	mA
Low-level output current, I_{OL}	Driver			48	mA
	Receiver			8	
Operating free-air temperature, T_A		0		70	°C

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

PARAMETER			TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage	D or S	I_I = −12 mA			−1.5	V
V_{T+}	Positive-going input threshold voltage	B		1.5	1.8	2	V
V_{T-}	Negative-going input threshold voltage	B		0.6	0.85	1.1	V
V_{hys}	Input hysteresis, ($V_{T+} - V_{T-}$)	B		400	950		mV
V_{OH}	High-level output voltage	B	V_{IH} = 2.4 V, I_{OH} = 0	2.5	3.3	3.7	V
		R	V_{IH} = 2 V, I_{OH} = −400 μA	2.4			
V_{OL}	Low-level output voltage	B	V_{IL} = 0.8 V, I_{OL} = 48 mA			0.4	V
		R	V_{IL} = 0.8 V, I_{OL} = 8 mA			0.4	
$I_{O(bus)}$	Bus current	B	V_{IH} = 2.4 V, V_O = 5.5 V			2.5	mA
			V_{IH} = 2.4 V, V_O = 5 V	0.7			
			V_{IH} = 2.4 V, V_O = 0.4 V	−1.3		−3.2	
V_{OK}	Output clamp voltage	B	I_O = −12 mA			−1.5	V
I_I	Input current at maximum input voltage	D or S	V_I = 5.5 V			1	mA
I_{IH}	High-level input current	D or S	V_{IH} = 2.4 V		5	20	μA
I_{IL}	Low-level input current	D or S	V_{CC} = 5 V, V_{IL} = 0.4 V, T_A = 25°C		0.2	0.36	mA
I_{OS}	Short-circuit output current	R	V_{IH} = 2 V	4		14	mA
I_{CCH}	Supply current, all outputs high		No load		10	19	mA
I_{CCL}	Supply current, all outputs low		No load		32	39	mA

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

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		FROM	TO	TEST CONDITIONS	MIN	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	D	B	See Figure 1		40	ns
t_{PHL}	Propagation delay time, high-to-low-level output					50	
t_{PLH}	Propagation delay time, low-to-high-level output	S	B			50	ns
t_{PHL}	Propagation delay time, high-to-low-level output					50	
t_{PLH}	Propagation delay time, low-to-high-level output	B	R	See Figure 2		50	ns
t_{PHL}	Propagation delay time, high-to-low-level output					40	

PARAMETER MEASUREMENT INFORMATION

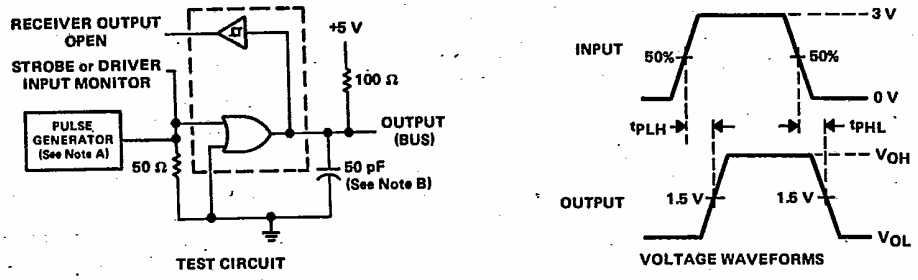

FIGURE 1

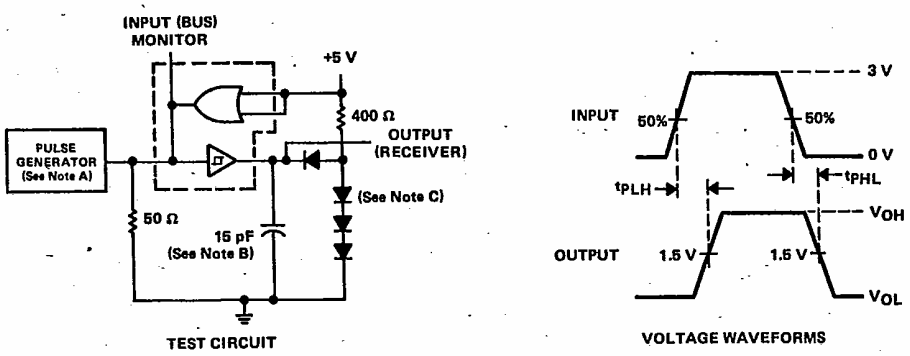

FIGURE 2

NOTES: A. The input pulse is supplied by a generator having the following characteristics: t_W = 100 ns, PRR ≤ 1 MHz, t_r ≤ 10 ns, t_f ≤ 10 ns, Z_{out} ≈ 50 Ω.
B. This value includes probe and jig capacitance.
C. All diodes are 1N916 or 1N3064.

TYPICAL CHARACTERISTICS

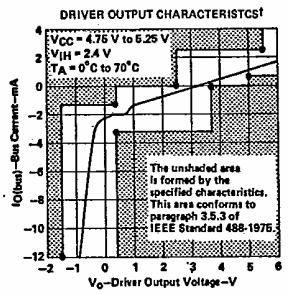

FIGURE 3

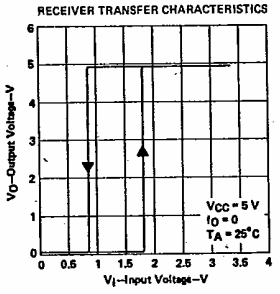

FIGURE 4

†Conditions for typical curve are V_{CC} = 5 V, T_A = 25°C.

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