Line Drivers/Receivers

DM7820A/DM8820A dual line receiver

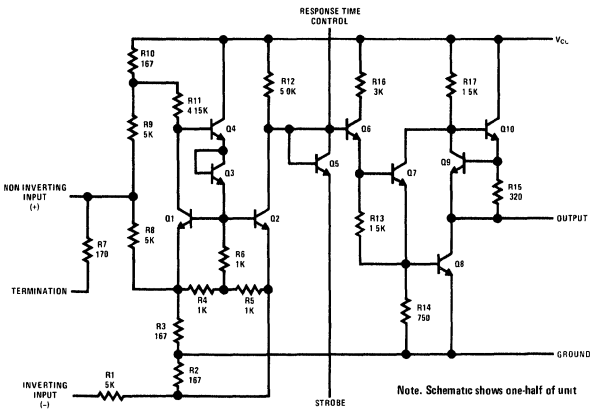
general description

The DM7820A and the DM8820A are improved performance digital line receivers with two completely independent units fabricated on a single silicon chip. Intended for use with digital systems connected by twisted pair lines, they have a differential input designed to reject large common mode signals while responding to small differential signals. The output is directly compatible with RTL, DTL or TTL integrated circuits. Some important design features include:

- Operation from a single +5V logic supply
- Input voltage range of ±15V
- Strobe low forces output to "1" state
- High input resistance
- Fanout of ten with either DTL or TTL integrated circuits
- Outputs can be wire OR'ed
- Series 54/74 compatible

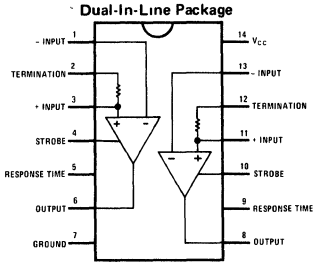
The response time can be controlled with an external capacitor to reject input noise spikes. The output state is a logic "1" for both inputs open. Termination resistors for the twisted pair line are also included in the circuit. Both the DM7820A and the DM8820A are specified, worst case, over their full operating temperature range (−55°C to 125°C and 0°C to 70°C respectively), over the entire input voltage range, for ±10% supply voltage variations.

schematic and connection diagrams



Note. Schematic shows one-half of unit

Dual-In-Line Package



Note Pin 7 connected to bottom of cavity package.

TOP VIEW

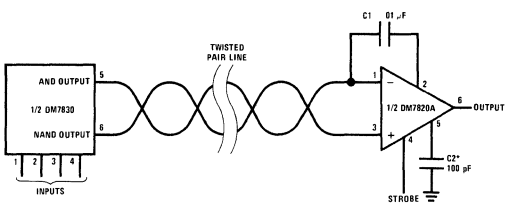
Order Number DM7820AJ or DM8820AJ
See Package 16

Order Number DM8820AN
See Package 22

Order Number DM7820AW or DM8820AW
See Package 27

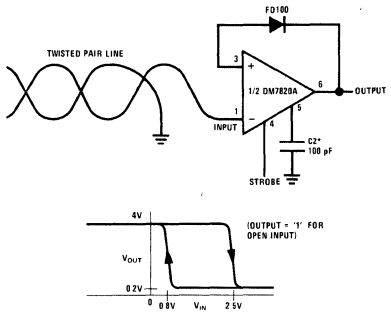
typical applications

Differential Line Driver and Receiver



*Optional to control response time

Single Ended (EIA-RS232C) Receiver with Hysteresis



absolute maximum ratings

Supply Voltage	8.0V
Common-Mode Voltage	±20V
Differential Input Voltage	±20V
Strobe Voltage	8.0V
Output Sink Current	50 mA
Power Dissipation (Note 1)	600 mW
Operating Temperature Range	
DM7820A	−55°C to 125°C
DM8820A	0°C to 70°C
Storage Temperature Range	−65°C to 150°C
Lead Temperature (Soldering, 10 sec)	300°C

electrical characteristics (Notes 2, 3 & 4)

PARAMETER	CONDITIONS			MIN	TYP	MAX	UNITS
	V_{CM}	OUTPUT	OTHER				
Differential Threshold Voltage	$-3V \le V_{CM} \le +3V$	−400 μA	$V_{OUT} \ge 2.5V$		+0.06	+0.5	V
	$-15V \le V_{CM} \le +15V$	−400 μA	$V_{OUT} \ge 2.5V$		+0.06	+1.0	V
	$-3V \le V_{CM} \le +3V$	+16 mA	$V_{OUT} \le 0.4V$		−0.08	−0.5	V
	$-15V \le V_{CM} \le +15V$	+16 mA	$V_{OUT} \le 0.4V$		−0.08	−1.0	V
Inverting Input Resistance	$-15V \le V_{CM} \le +15V$			3.6	5		kΩ
Non-Inverting Input Resistance	$-15V \le V_{CM} \le +15V$			1.8	2.5		kΩ
Line Termination Resistance			$T_A = 25°C$	120	170	250	Ω
Inverting Input Current	+15V				+3.0	+4.2	mA
	0V				0	−0.5	mA
	−15V				−3.0	−4.2	mA
Non-Inverting Input Current	+15V				+5.0	+7.0	mA
	0V				−1.0	−1.6	mA
	−15V				−7.0	−9.8	mA
Power Supply Current	+15V	Logic "0"	$V_{DIFF} = -1V$		+3.9	+6.0	mA
	0V	Logic "0"	$V_{DIFF} = -0.5V$		+6.5	+10.2	mA
	−15V	Logic "0"	$V_{DIFF} = -1V$		+9.2	+14.0	mA
Logical "1" Output Voltage		−400 μA	$V_{DIFF} = +1V$	2.5	4.0	5.5	V
Logical "0" Output Voltage		+16 mA	$V_{DIFF} = -1V$	0	0.22	0.4	V
Logical "1" Strobe Input Voltage		+16 mA	$V_{OUT} \le 0.4V$, $V_{DIFF} = -3V$	2.1			V
Logical "0" Strobe Input Voltage		−400 μA	$V_{OUT} \ge 2.5V$, $V_{DIFF} = -3V$			0.9	V
Logical "1" Strobe Input Current			$V_{STROBE} = 5.5V$, $V_{DIFF} = +3V$		0.01	5.0	μA
Logical "0" Strobe Input Current			$V_{STROBE} = 0.4V$, $V_{DIFF} = -3V$		−1.0	−1.4	mA
Output Short Circuit Current		0V	$V_{CC} = 5.5V$, $V_{STROBE} = 0V$	−2.8	−4.5	−6.7	mA
Propagation Delays (see waveforms)							
Differential Input to "0" Output			$V_{CC} = 5V$, $T_A = 25°C$		30	45	ns
Differential Input to "1" Output			$V_{CC} = 5V$, $T_A = 25°C$		35	55	ns
Strobe Input to "0" Output			$V_{CC} = 5V$, $T_A = 25°C$		16	25	ns
Strobe Input to "1" Output			$V_{CC} = 5V$, $T_A = 25°C$		18	30	ns

Note 1: For operating at elevated temperatures, the device must be derated based on a thermal resistance of 100°C/W and a maximum junction temperature of 160°C for the DM7820A, or 150°C/W and 115°C maximum junction temperature for the DM8820A.

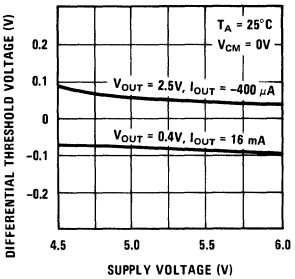
Note 2: These specifications apply for $4.5V \le V_{CC} \le 5.5V$, $-15V \le V_{CM} \le 15V$ and $-55°C \le T_A \le 125°C$ for the DM7820A or $0°C \le T_A \le 70°C$ for the DM8820A unless otherwise specified. Typical values given are for $V_{CC} = 5.0V$, $T_A = 25°C$ and $V_{CM} = 0V$ unless stated differently

Note 3: The specifications and curves given are for one side only. Therefore, the total package dissipation and supply currents will be double the values given when both receivers are operated under identical conditions.

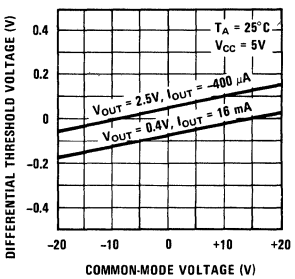
Note 4: Min and max limits apply to absolute values.

typical performance characteristics (Note 3)

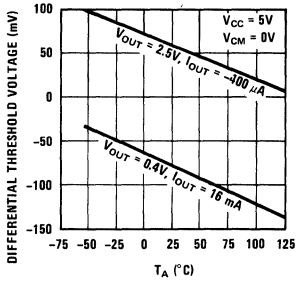
Supply Voltage Sensitivity



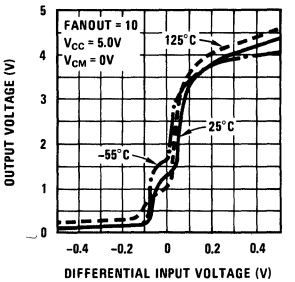
Common-Mode Voltage Sensitivity



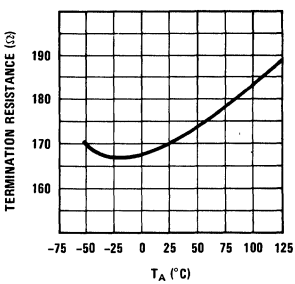
Temperature Sensitivity



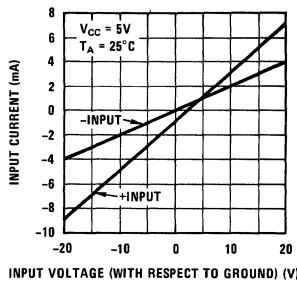
Transfer Function



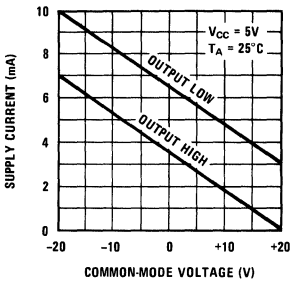
Termination Resistance



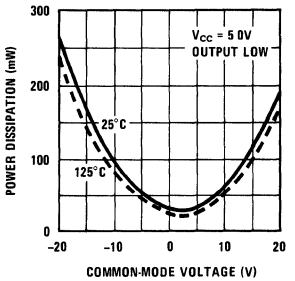
Input Characteristics



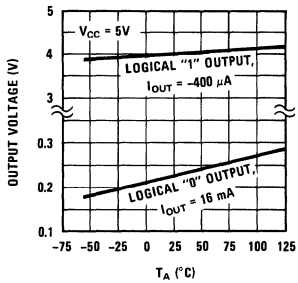
Power Supply Current



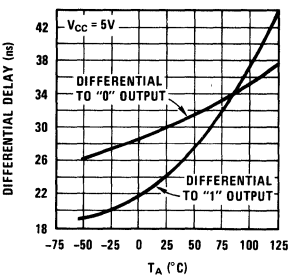
Internal Power Dissipation



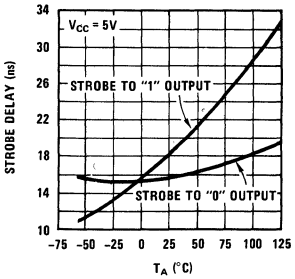
Output Voltage Levels



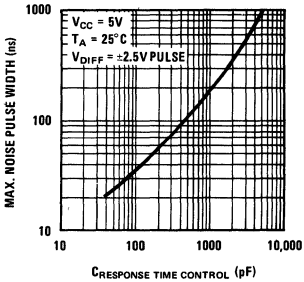
Differential Input Delays



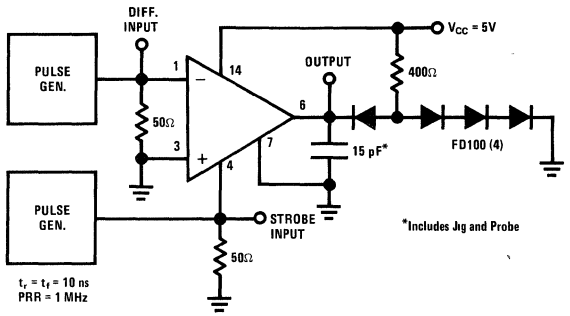
Strobe Delays

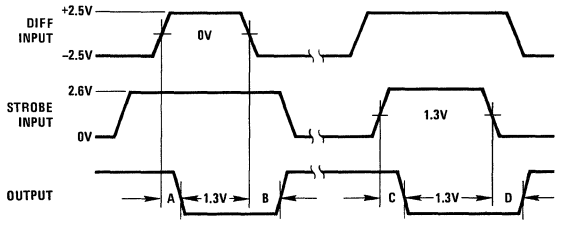


Noise Rejection



ac test circuit and waveforms





A = Differential Input to "0" Output
B = Differential Input to "1" Output
C = Strobe Input to "0" Output
D = Strobe Input to "1" Output

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