## Absolute Maximum Ratings(Note 1)

| | |
|---|---|
| Voltage at Any Pin | −0.3V to $V_{CC}$ + 0.3V |
| Operating Temperature Range | −55°C to +125°C |
| Storage Temperature Range | −65°C to +150°C |
| Power Dissipation | |
| Dual-In-Line | 700 mW |
| Small Outline | 500 mW |
| Operating $V_{CC}$ Range | 4.5V to 15V |
| Absolute Maximum $V_{CC}$ | 18V |
| $R_{EXT} \geq 80\ V_{CC}$ (Ω) | |
| Lead Temperature | |
| (Soldering, 10 seconds) | 260°C |

**Note 1:** "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The Electrical Characteristics table provides conditions for actual device operation.

## DC Electrical Characteristics

Max/min limits apply across temperature range, unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **CMOS to CMOS** | | | | | | |
| $V_{IN(1)}$ | Logical "1" Input Voltage | $V_{CC}$ = 5V | 3.5 | | | V |
| | | $V_{CC}$ = 10V | 8.0 | | | |
| $V_{IN(0)}$ | Logical "0" Input Voltage | $V_{CC}$ = 5V | | | 1.5 | V |
| | | $V_{CC}$ = 10V | | | 2.0 | |
| $V_{OUT(1)}$ | Logical "1" Output Voltage | $V_{CC}$ = 5V, $I_O$ = −10 μA | 4.5 | | | V |
| | | $V_{CC}$ = 10V, $I_O$ = −10 μA | 9.0 | | | |
| $V_{OUT(0)}$ | Logical "0" Output Voltage | $V_{CC}$ = 5V, $I_O$ = +10 μA | | | 0.5 | V |
| | | $V_{CC}$ = 10V, $I_O$ = +10 μA | | | 1 | |
| $I_{IN(1)}$ | Logical "1" Input Current | $V_{CC}$ = 15V, $V_{IN}$ = 15V | | 0.005 | 1.0 | μA |
| $I_{IN(0)}$ | Logical "0" Input Current | $V_{CC}$ = 15V, $V_{IN}$ = 0V | −1.0 | −0.005 | | μA |
| $I_{CC}$ | Supply Current (Standby) | $V_{CC}$ = 15V, $R_{EXT}$ = ∞, | | 0.05 | 300 | μA |
| | | Q1, Q2 = Logic "0" (Note 2) | | | | |
| $I_{CC}$ | Supply Current | $V_{CC}$ = 15V, Q1 = Logic "1", | | 15 | | mA |
| | (During Output Pulse) | Q2 = Logic "0" (Figure 4) | | | | |
| | | $V_{CC}$ = 5V, Q1 = Logic "1", | | 2 | | mA |
| | | Q2 = Logic "0" (Figure 4) | | | | |
| | Leakage Current at R/$C_{EXT}$Pin | $V_{CC}$ = 15V, $V_{CEXT}$ = 5V | | 0.01 | 3.0 | μA |
| **CMOS/LPTTL Interface** | | | | | | |
| $V_{IN(1)}$ | Logical "1" Input Voltage | $V_{CC}$ = 4.75V | $V_{CC}$ − 1.5 | | | V |
| $V_{IN(0)}$ | Logical "0" Input Voltage | $V_{CC}$ = 4.75V | | | 0.8 | V |
| $V_{OUT(1)}$ | Logical "1" Output Voltage | $V_{CC}$ = 4.75V, $I_O$ = −360 μA | 2.4 | | | V |
| $V_{OUT(0)}$ | Logical "0" Output Voltage | $V_{CC}$ = 4.75V, $I_O$ = 360 μA | | | 0.4 | V |
| **Output Drive (See Family Characteristics Data Sheet) (Short Circuit Current)** | | | | | | |
| $I_{SOURCE}$ | Output Source Current | $V_{CC}$ = 5V | −1.75 | | | mA |
| | (P-Channel) | $T_A$ = 25°C, $V_{OUT}$ = 0V | | | | |
| $I_{SOURCE}$ | Output Source Current | $V_{CC}$ = 10V | −8 | | | mA |
| | (P-Channel) | $T_A$ = 25°C, $V_{OUT}$ = 0V | | | | |
| $I_{SINK}$ | Output Sink Current | $V_{CC}$ = 5V | 1.75 | | | mA |
| | (N-Channel) | $T_A$ = 25°C, $V_{OUT}$ = $V_{CC}$ | | | | |
| $I_{SINK}$ | Output Sink Current | $V_{CC}$ = 10V | 8 | | | mA |
| | (N-Channel) | $T_A$ = 25°C, $V_{OUT}$ = $V_{CC}$ | | | | |

**Note 2:** In Standby (Q = Logic "0") the power dissipated equals the leakage current plus $V_{CC}/R_{EXT}$.

## AC Electrical Characteristics (Note 3)

$T_A = 25°C$, $C_L = 50$ pF, unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| $t_{pd\ A,\ B}$ | Propagation Delay from Trigger Input (A, B) to Output Q, $\overline{Q}$ | $V_{CC} = 5V$ | | 250 | 500 | ns |
| | | $V_{CC} = 10V$ | | 120 | 250 | |
| $t_{pd\ CL}$ | Propagation Delay from Clear Input (CL) to Output Q, $\overline{Q}$ | $V_{CC} = 5V$ | | 250 | 500 | ns |
| | | $V_{CC} = 10V$ | | 120 | 250 | |
| $t_S$ | Time Prior to Trigger Input (A, B) that Clear must be Set | $V_{CC} = 5V$ | 150 | 50 | | ns |
| | | $V_{CC} = 10V$ | 60 | 20 | | |
| $t_{W(A, B)}$ | Trigger Input (A, B) Pulse Width | $V_{CC} = 5V$ | 150 | 50 | | ns |
| | | $V_{CC} = 10V$ | 70 | 30 | | |
| $t_{W(CL)}$ | Clear Input (CL) Pulse Width | $V_{CC} = 5V$ | 150 | 50 | | ns |
| | | $V_{CC} = 10V$ | 70 | 30 | | |
| $t_{W(OUT)}$ | Q or $\overline{Q}$ Output Pulse Width | $V_{CC} = 5V$, $R_{EXT} = 10k$, $C_{EXT} = 0$ pF | | 900 | | ns |
| | | $V_{CC} = 10V$, $R_{EXT} = 10k$, $C_{EXT} = 0$ pF | | 350 | | ns |
| | | $V_{CC} = 15V$, $R_{EXT} = 10k$, $C_{EXT} = 0$ pF | | 320 | | ns |
| | | $V_{CC} = 5V$, $R_{EXT} = 10k$, $C_{EXT} = 1000$ pF (Figure 1) | 9.0 | 10.6 | 12.2 | µs |
| | | $V_{CC} = 10V$, $R_{EXT} = 10k$, $C_{EXT} = 1000$ pF (Figure 1) | 9.0 | 10 | 11 | µs |
| | | $V_{CC} = 15V$, $R_{EXT} = 10k$, $C_{EXT} = 1000$ pF (Figure 1) | 8.9 | 9.8 | 10.8 | µs |
| | | $V_{CC} = 5V$, $R_{EXT} = 10k$, $C_{EXT} = 0.1$ µF (Figure 3) | 900 | 1020 | 1200 | µs |
| | | $V_{CC} = 10V$, $R_{EXT} = 10k$, $C_{EXT} = 0.1$ µF (Figure 3) | 900 | 1000 | 1100 | µs |
| | | $V_{CC} = 15V$, $R_{EXT} = 10k$, $C_{EXT} = 0.1$ µF (Figure 3) | 900 | 990 | 1100 | µs |
| $R_{ON}$ | ON Resistance of Transistor between $R/C_{EXT}$ to $C_{EXT}$ | $V_{CC} = 5V$ (Note 4) | | 50 | 150 | Ω |
| | | $V_{CC} = 10V$ (Note 4) | | 25 | 65 | |
| | | $V_{CC} = 15V$ (Note 4) | | 16.7 | 45 | |
| | Output Duty Cycle | R = 10k, C = 1000 pF | | | 90 | % |
| | | R = 10k, C = 0.1 µF (Note 5) | | | 90 | |
| $C_{IN}$ | Input Capacitance | $R/C_{EXT}$ Input (Note 6) | | 15 | 25 | pF |
| | | Any Other Input (Note 6) | | 5 | | |

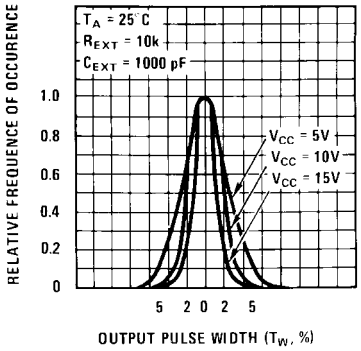
**Note 3:** AC Parameters are guaranteed by DC correlated testing.

**Note 4:** See AN-138 for detailed explanation $R_{ON}$.

**Note 5:** Maximum output duty cycle = $R_{EXT}/R_{EXT} + 1000$.

**Note 6:** Capacitance is guaranteed by periodic testing.

## Typical Performance Characteristics




0% Point pulse width:

At $V_{CC}$ = 5V, $T_W$ = 10.6 µs

At $V_{CC}$ = 10V,$T_W$ = 10 µs

At $V_{CC}$ = 15V,$T_W$ = 9.8 µs

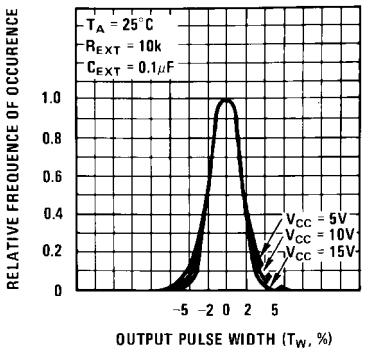
Percentage of units within +4%:

At $V_{CC}$ = 5V,90% of units

At $V_{CC}$ = 10V,95% of units

At $V_{CC}$ = 15V,98% of units

**FIGURE 1. Typical Distribution of Units for Output Pulse Width**




0% Point pulse width:

At $V_{CC}$ = 5V, $T_W$ = 1020 µs

At $V_{CC}$ = 10V,$T_W$ = 1000 µs

At $V_{CC}$ = 15V,$T_W$ = 982 µs

Percentage of units within +4%:

At $V_{CC}$ = 5V,95% of units

At $V_{CC}$ = 10V,97% of units

At $V_{CC}$ = 15V,98% of units

**FIGURE 3. Typical Distribution of Units for Output Pulse Width**

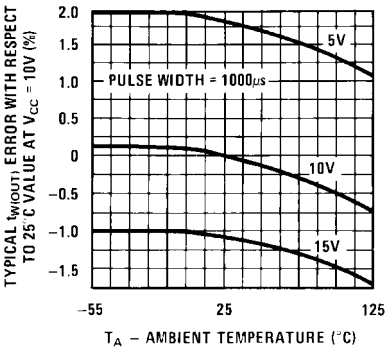



**FIGURE 2. Typical Variation in Output Pulse Width vs Temperature**

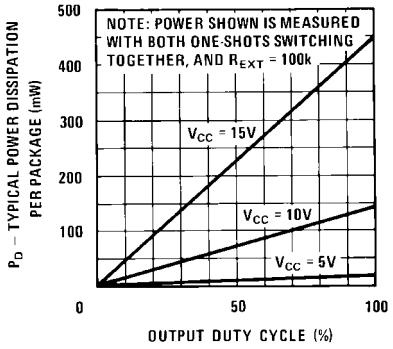
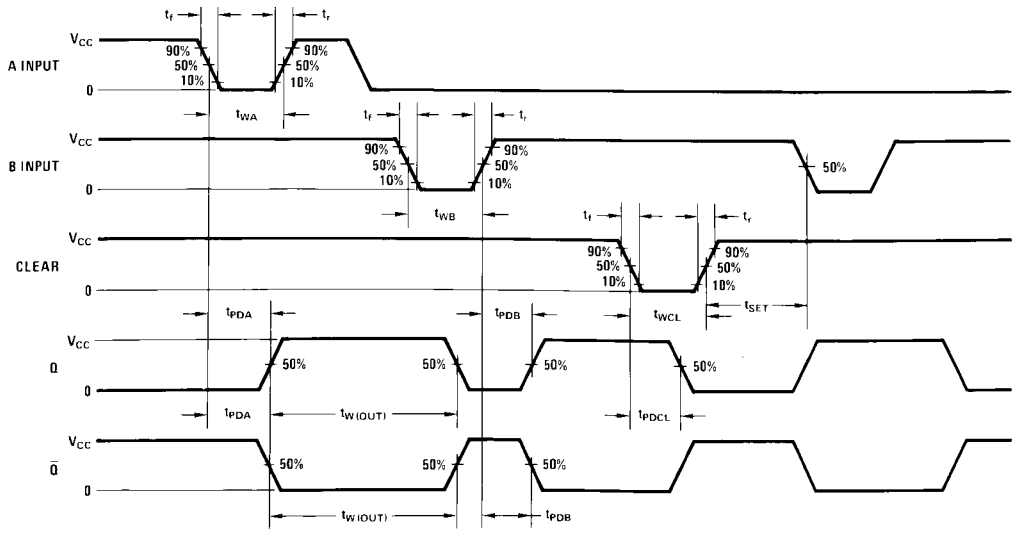


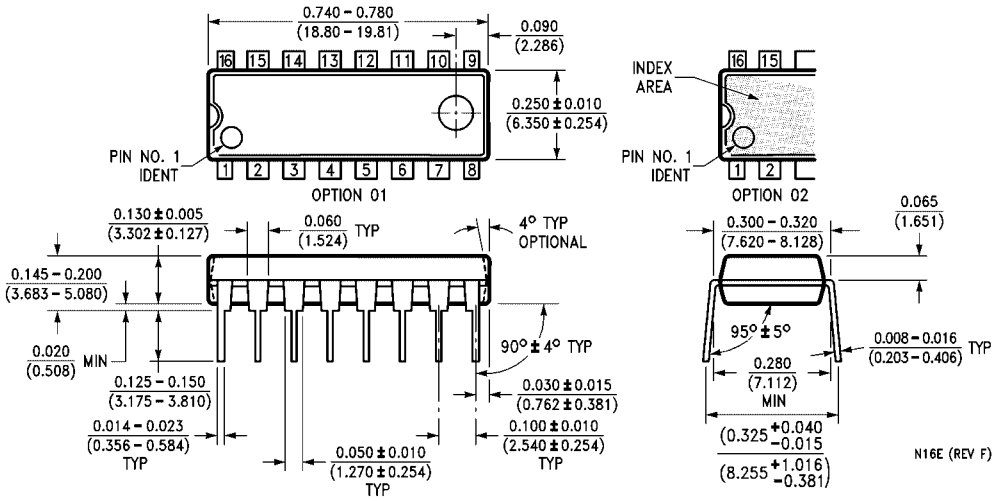

**FIGURE 4. Typical Power Dissipation per Package**

## Typical Performance Characteristics (Continued)
## Switching Time Waveforms




$t_r = t_f = 20$ ns

## Physical Dimensions inches (millimeters) unless otherwise noted




**16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide**
**Package Number N16E**

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