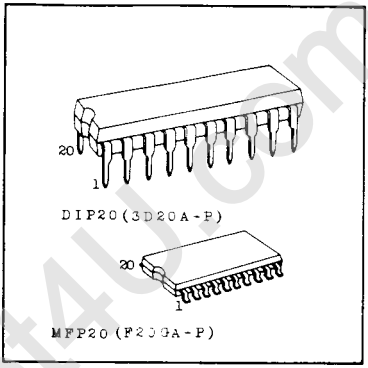
C²MOS DIGITAL INTEGRATED CIRCUIT
SILICON MONOLITHIC

# TC40H245P/F

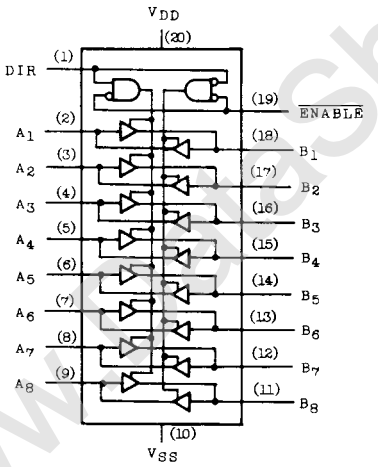
TC40H245 OCTAL BIDIRECTIONAL BUS BUFFER
NONINVERTED 3-STATE OUTPUTS




## MAXIMUM RATINGS

| CHARACTERISTIC | SYMBOL | RATING | SYMBOL |
|---|---|---|---|
| Supply Voltage | $V_{DD}$ | $V_{SS}$-0.5 ∿ $V_{SS}$+10 | V |
| Input Voltage | $V_{IN}$ | $V_{SS}$-0.5 ∿ $V_{DD}$+0.5 | V |
| Output Voltage | $V_{OUT}$ | $V_{SS}$-0.5 ∿ $V_{DD}$+0.5 | V |
| Input Current | $I_{IN}$ | ±10 | mA |
| Power Dissipation | $P_D$ | 300(DIP)/180(MFP) | mW |
| Storage Temperature | Tstg | -65 ∿ 150 | °C |
| Lead Temp./Time | Tsol | 260°C·10 sec | |

## PIN CONNECTION




## TRUTH TABLE

| CONTROL INPUTS | | DATA PORT STATUS |
|---|---|---|
| ENABLE | DIR | |
| L | L | B data to A bus |
| L | H | A data to B bus |
| H | X | High Impedance |

X=Don't care

- TC40H245 IS A OCTAL BIDIRECTIONAL BUS BUFFER THAT HAS 3-TATE OUTPUT.
- MOST SUITABLE FOR 8-BIT DATA LINE.
- LARGE OUTPUT CURRENT CAPACITY ENABLES TO DRIVE 10 LSTTL GATE.

## RECOMMENDED OPERATING CONDITIONS ($V_{SS}$=0.0V)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | | 2.0 | - | 8.0 | V |
| Input Voltage | $V_{IN}$ | | 0 | - | $V_{DD}$ | V |
| Operating Temperature | $T_{opr}$ | | -40 | - | 85 | °C |

# TC40H245P/F

ELECTRICAL CHARACTERISTICS ($V_{SS}$=0.0V)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | $V_{DD}$ (V) | -40°C | | 25°C | | | 85°C | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | MIN. | MAX. | MIN | TYP. | MAX. | MIN. | MAX | |
| High Level Output Voltage | | $V_{OH}$ | $\|I_{OUT}\|$<1μA $V_{IN}$=$V_{SS}$,$V_{DD}$ | 5 | 4.95 | - | 4.95 | 5.0 | - | 4.95 | - | V |
| Low Level Output Voltage | | $V_{OL}$ | $\|I_{OUT}\|$<1μA $V_{IN}$=$V_{SS}$,$V_{DD}$ | 5 | - | 0.05 | - | 0.0 | 0.05 | - | 0.05 | |
| High Level Output Current | | $I_{OH}$ | $V_{OH}$=4.6V $V_{IN}$=$V_{SS}$,$V_{DD}$ | 5 | -0.95 | - | -0.88 | - | - | -0.8 | - | mA |
| Low Level Output Current | | $I_{OL}$ | $V_{OL}$=0.4V $V_{IN}$=$V_{SS}$,$V_{DD}$ | 5 | 4.7 | - | 4.4 | - | - | 4.0 | - | |
| Input Voltage | "H" Level | $V_{IH}$ | $\|I_{OUT}\|$≤1μA $V_{OH}$=4.5V | 5 | 4.0 | - | 4.0 | - | - | 4.0 | - | V |
| | "L" Level | $V_{IL}$ | $V_{OH}$=0.5V | 5 | - | 1.0 | - | - | 1.0 | - | 1.0 | |
| Input Current | "H" Level | $I_{IH}$ | $V_{IH}$=8.0V | 8 | - | 0.5 | - | $10^{-4}$ | 0.5 | - | 5 | μA |
| | "L" Level | $I_{IL}$ | $V_{IL}$=0.0V | 8 | - | -0.5 | - | $-10^{-4}$ | -0.5 | - | -5 | |
| Output Disable Current | "H" Level | $I_{DH}$ | $V_{DH}$=8.0V | 8 | - | 0.5 | - | $10^{-4}$ | 0.5 | - | 5 | μA |
| | "L" Level | $I_{DL}$ | $V_{DL}$=0.0V | 8 | - | -0.5 | - | $-10^{-4}$ | -0.5 | - | -5 | |
| Quiescent Supply Current | | $I_{DD}$ | *$V_{IN}$=$V_{SS}$,$V_{DD}$ | 5 | - | 5.0 | - | 0.005 | 5.0 | - | 25 | μA |

* All valid input combinations.

SWITCHING CHARACTERISTICS (Ta=25°C, $V_{SS}$=0V, $V_{DD}$=5V, $C_L$=50pF, $R_L$=1kΩ)

| CHARACTERISTIC | | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Output Rise Time | | $t_{or}$ | Fig. 1 | - | 15 | 36 | ns |
| Output Fall Time | | $t_{of}$ | | - | 12 | 30 | |
| High Level Propagation Delay Time | | $t_{pLH}$ | Fig. 1 | - | 19 | 29 | ns |
| Low Level Propagation Delay Time | | $t_{pHL}$ | | - | 23 | 35 | |
| Output Disable Time | "H" Level | $t_{pHZ}$ | Fig. 3 | - | 40 | 60 | ns |
| | "L" Level | $t_{pLZ}$ | Fig. 2 | - | 31 | 47 | |
| Output Enable Time | "H" Level | $t_{pZH}$ | Fig. 3 | - | 39 | 60 | ns |
| | "L" Level | $t_{pZL}$ | Fig. 2 | - | 35 | 53 | |
| Input Capacitance | | $C_{IN}$ | DI, ENA | - | 5 | | PF |
| Input Capacitance | | $C_{IN}$ | A, B | - | 19 | | |

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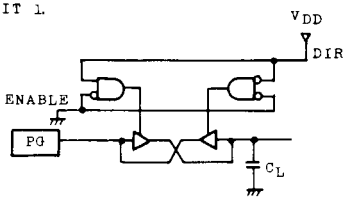
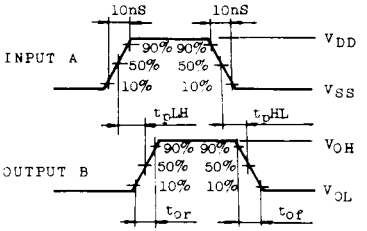
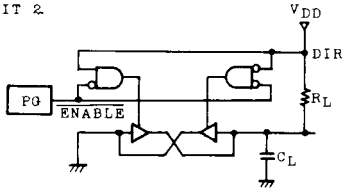
## SWITCHING TIME TEST CIRCUIT AND WAVEFORM

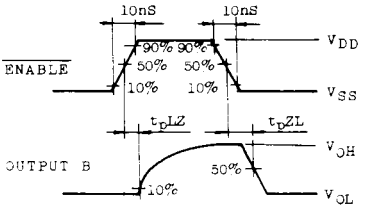
CIRCUIT 1.



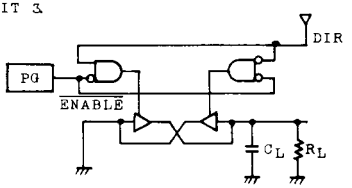



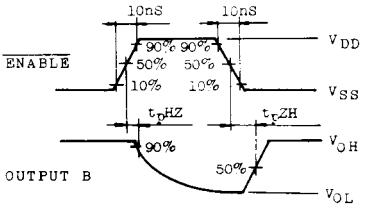

CIRCUIT 2.



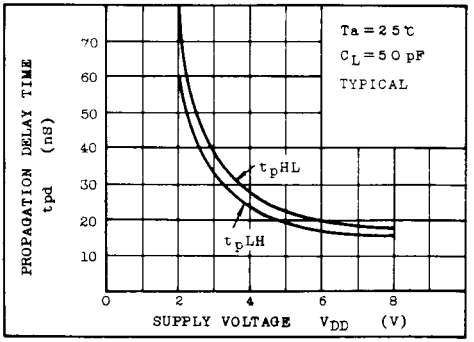




CIRCUIT 3.

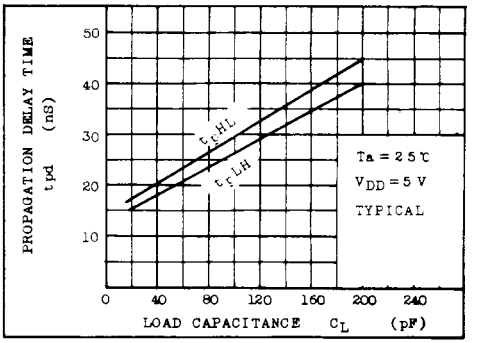



$t_{pd}$ - $V_{DD}$




$t_{pd}$ - $C_L$



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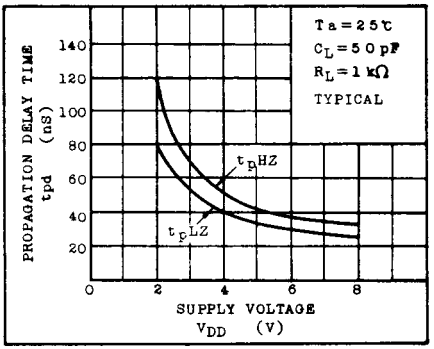
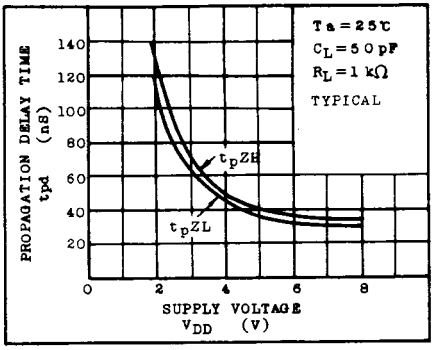
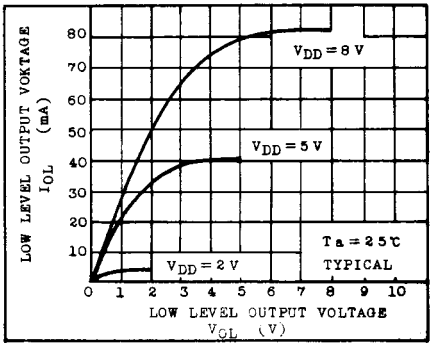
$t_{pd}$ - $V_{DD}$




$t_{pd}$ - $V_{DD}$




$I_{OL}$ - $V_{OL}$




$I_{OH}$ - ($V_{DD}$ - $V_{CH}$)