# 25Ω Octal Bidirectional Transceiver With 3-State Inputs and Outputs

**MC74F2245**

**25Ω OCTAL BIDIRECTIONAL TRANSCEIVER WITH 3–STATE INPUTS AND OUTPUTS**

**FAST™ SCHOTTKY TTL**

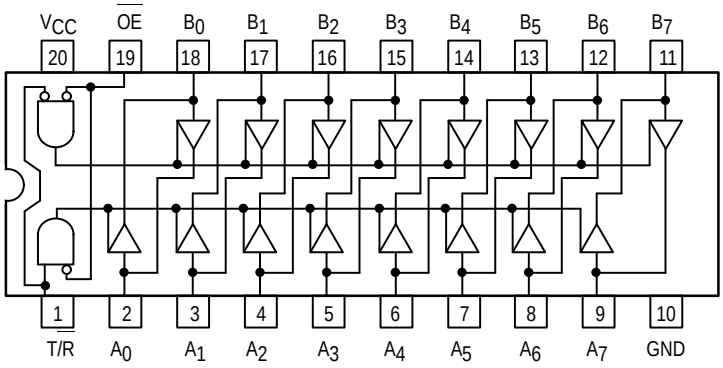
The MC74F2245 is designed for asynchronous communication between data buses. The device transmits data from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The output enable (OE) input disables the device so the buses are effectively isolated.

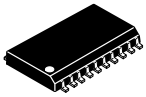
Both A and B outputs can sink up to 12mA; 25Ω resistors are included in the lower output circuit to reduce overshoot and undershoot.

The MC74F2245 is characterized for operation from 0°C to 70°C.

- 3–State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic SOIC (DW–Suffix) and Plastic SSOP (SD–Suffix)

**CONNECTION DIAGRAM** (TOP VIEW)



**DW SUFFIX**
PLASTIC SOIC
CASE 751D–04

**SD SUFFIX***
PLASTIC SSOP
CASE 940C–03

***Thermal Mounting Techniques are Recommended. Please refer to Motorola Application Note AN1567/D.***

**GUARANTEED OPERATING RANGES**

| Symbol | Parameter | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | Supply Voltage | | 4.5 | 5.0 | 5.5 | V |
| $T_A$ | Operating Ambient Temperature Range | | 0 | 25 | 70 | °C |
| $I_{OH}$ | Output Current — High | Outputs | | | –3.0 | mA |
| $I_{OL}$ | Output Current — Low | Outputs | | | 12 | mA |

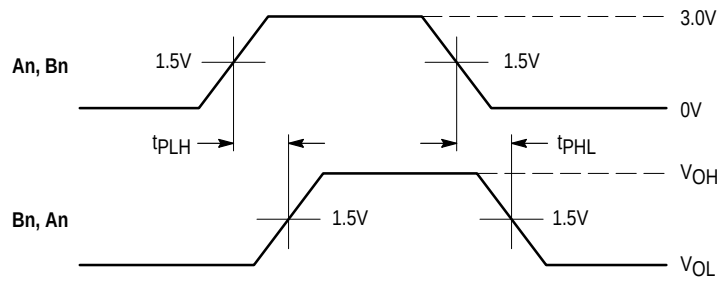
**DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE** (unless otherwise specified)

| Symbol | Parameter | | Limits Min | Typ | Max | Unit | Test Conditions | |
|---|---|---|---|---|---|---|---|---|
| $V_{IH}$ | Input HIGH Voltage | | 2.0 | | | V | Guaranteed Input HIGH Voltage | |
| $V_{IL}$ | Input LOW Voltage | | | | 0.8 | V | Guaranteed Input LOW Voltage | |
| $V_{IK}$ | Input Clamp Diode Voltage | | | | –1.2 | V | $I_{IN}$ = –18 mA | $V_{CC}$ = MIN |
| $V_{OH}$ | Output HIGH Voltage, Outputs | | 2.5 | | | V | $I_{OH}$ = –1.0 mA | $V_{CC}$ = 4.50 V |
| | | | 2.4 | 3.0 | | V | $I_{OH}$ = –3.0 mA | $V_{CC}$ = 4.50 V |
| | | | 2.7 | 3.2 | | V | $I_{OH}$ = –3.0 mA | $V_{CC}$ = 4.75 V |
| $V_{OL}$ | Output LOW Voltage, Outputs | | | 0.2 | 0.5 | V | $I_{OL}$ = 1 mA | $V_{CC}$ = MIN |
| $V_{OL}$ | Output LOW Voltage, Outputs | | | 0.5 | 0.75 | V | $I_{OL}$ = 12 mA | $V_{CC}$ = MIN |
| $I_{OZH} + I_{IH}$ | Output Off Current HIGH | | | | 70 | µA | $V_{OUT}$ = 2.7 V | $V_{CC}$ = MAX |
| $I_{OZL} + I_{IL}$ | Output Off Current LOW | | | | –650 | mA | $V_{OUT}$ = 0.5 V | $V_{CC}$ = MAX |
| $I_{IH}$ | Input HIGH Current | OE, T/R Inputs | | | 20 | µA | $V_{IN}$ = 2.7 V | $V_{CC}$ = MAX |
| | | OE, T/R Inputs | | | 100 | µA | $V_{IN}$ = 7.0 V | |
| | | $A_n$, $B_n$ Inputs | | | 1.0 | mA | $V_{IN}$ = 5.5 V | |
| $I_{IL}$ | Input LOW Current | T/R Input | | | –0.8 | mA | $V_{IN}$ = 0.5 V | $V_{CC}$ = MAX |
| | | OE Input | | | –1.2 | mA | | |
| $I_{OS}$ | Output Short Circuit Current (Note 2) | $A_n$ Outputs | –60 | | –150 | mA | $V_{OUT}$ = GND | $V_{CC}$ = MAX |
| | | $B_n$ Outputs | –100 | | –225 | mA | $V_{OUT}$ = GND | $V_{CC}$ = MAX |
| $I_{CCH}$ | Power Supply Current HIGH | | | | 90 | mA | $V_{CC}$ = MAX, Outputs HIGH | |
| $I_{CCL}$ | Power Supply Current LOW | | | | 120 | mA | $V_{CC}$ = MAX, Outputs LOW | |
| $I_{CCZ}$ | Power Supply Current OFF | | | | 110 | mA | $V_{CC}$ = MAX, Outputs OFF | |

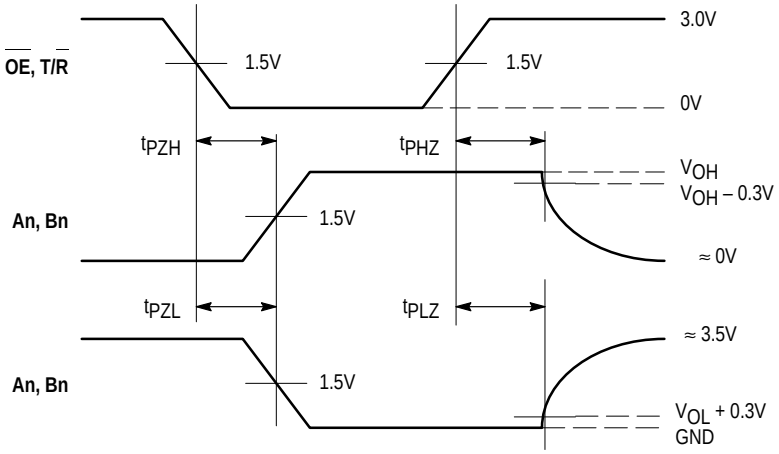
NOTES:
1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.
2. Not more than one output should be shorted at a time.

**AC CHARACTERISTICS**

| Symbol | Parameter | $T_A$ = +25°C, $V_{CC}$ = +5.0 V, $C_L$ = 50 pF Min | Max | $T_A$ = 0°C to +70°C, $V_{CC}$ = 5.0 V ± 10%, $C_L$ = 50 pF Min | Max | Unit |
|---|---|---|---|---|---|---|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>$A_n$ to $B_n$ or $B_n$ to $A_n$ | 2.5<br>2.5 | 6.0<br>6.6 | 2.5<br>2.5 | 7.0<br>7.1 | ns |
| $t_{PZH}$<br>$t_{PZL}$ | Output Enable Time | 3.0<br>3.5 | 7.3<br>10.6 | 3.0<br>3.5 | 8.5<br>12.0 | ns |
| $t_{PHZ}$<br>$t_{PLZ}$ | Output Disable Time | 2.5<br>2.0 | 6.5<br>6.5 | 2.5<br>2.0 | 7.5<br>7.5 | ns |

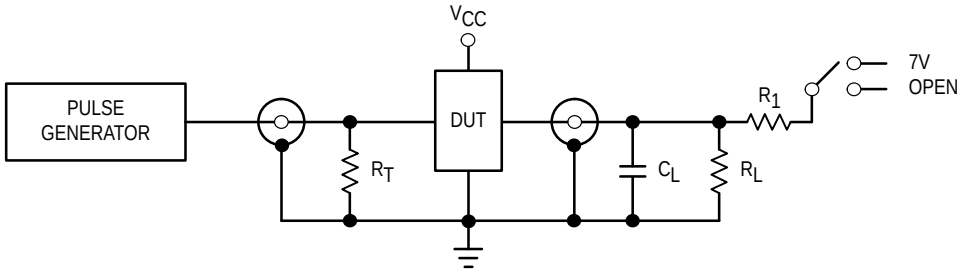



**WAVEFORM 1 – PROPROPAGATION DELAYS**
$t_R = t_F$ = 2.5ns, 10% to 90%; f = 1MHz; $t_W$ = 500ns




**WAVEFORM 2 – OUTPUT ENABLE AND DISABLE TIMES**
$t_R = t_F$ = 2.5ns, 10% to 90%; f = 1MHz; $t_W$ = 500ns

**Figure 1. AC Waveforms**



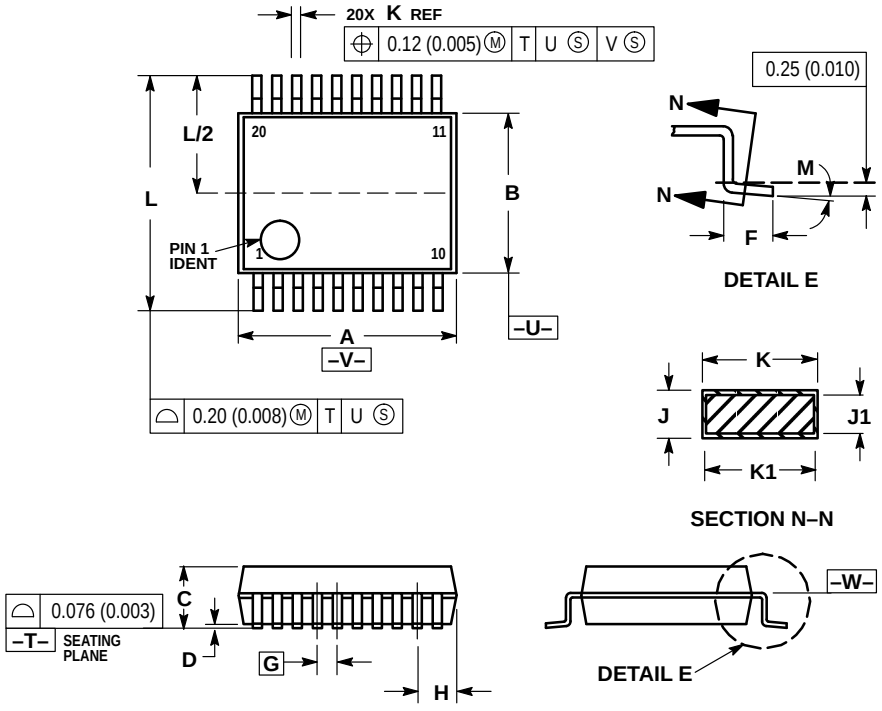

| TEST | SWITCH |
|---|---|
| $t_{PLH}$, $t_{PHL}$ | Open |
| $t_{PZL}$, $t_{PLZ}$ | 7V |
| $t_{PZH}$, $t_{PHZ}$ | Open |

$C_L$ = 50pF or equivalent (Includes jig and probe capacitance)
$R_L = R_1$ = 500Ω or equivalent
$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

**Figure 2. Test Circuit**

## OUTLINE DIMENSIONS

**SD SUFFIX**
PLASTIC SSOP PACKAGE
CASE 940C–03
ISSUE B

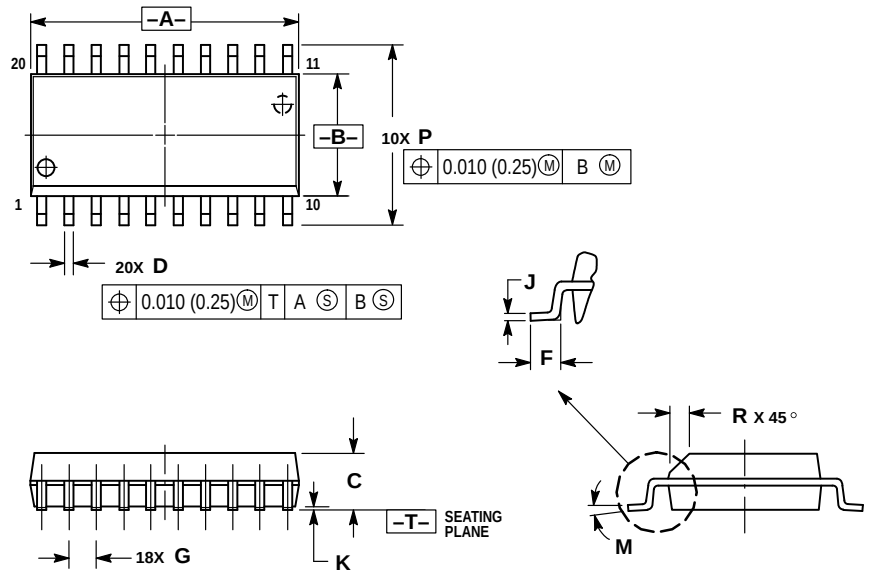



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION/INTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF K DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR INTRUSION SHALL NOT REDUCE DIMENSION K BY MORE THAN 0.07 (0.002) AT LEAST MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE –W–.

| | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 7.07 | 7.33 | 0.278 | 0.288 |
| B | 5.20 | 5.38 | 0.205 | 0.212 |
| C | 1.73 | 1.99 | 0.068 | 0.078 |
| D | 0.05 | 0.21 | 0.002 | 0.008 |
| F | 0.63 | 0.95 | 0.024 | 0.037 |
| G | 0.65 BSC | | 0.026 BSC | |
| H | 0.59 | 0.75 | 0.023 | 0.030 |
| J | 0.09 | 0.20 | 0.003 | 0.008 |
| J1 | 0.09 | 0.16 | 0.003 | 0.006 |
| K | 0.25 | 0.38 | 0.010 | 0.015 |
| K1 | 0.25 | 0.33 | 0.010 | 0.013 |
| L | 7.65 | 7.90 | 0.301 | 0.311 |
| M | 0 ° | 8 ° | 0 ° | 8 ° |

## OUTLINE DIMENSIONS

**DW SUFFIX**
PLASTIC SOIC PACKAGE
CASE 751D–04
ISSUE E




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 12.65 | 12.95 | 0.499 | 0.510 |
| B | 7.40 | 7.60 | 0.292 | 0.299 |
| C | 2.35 | 2.65 | 0.093 | 0.104 |
| D | 0.35 | 0.49 | 0.014 | 0.019 |
| F | 0.50 | 0.90 | 0.020 | 0.035 |
| G | 1.27 BSC | | 0.050 BSC | |
| J | 0.25 | 0.32 | 0.010 | 0.012 |
| K | 0.10 | 0.25 | 0.004 | 0.009 |
| M | 0° | 7° | 0° | 7° |
| P | 10.05 | 10.55 | 0.395 | 0.415 |
| R | 0.25 | 0.75 | 0.010 | 0.029 |



**How to reach us:**
**USA/EUROPE**: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1–800–441–2447

**MFAX**: RMFAX0@email.sps.mot.com –TOUCHTONE (602) 244–6609
**INTERNET**: http://Design–NET.com

**JAPAN**: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, Toshikatsu Otsuki,
6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 03–3521–8315

**HONG KONG**: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298