## MOTOROLA INTEGRATED CIRCUITS

500 Series
400 Series

TTL I integrated circuits comprise a family of transistor-transistor logic designed for general purpose digital applications. The family has a medium operating speed (20 MHz clock rate), good external noise immunity, high fan out, and the capability of driving lines up to 600 pF capacitance.

## MAXIMUM RATINGS

| Rating | Value | Unit |
|---|---|---|
| Supply Voltage - Continuous | +8.0 | Vdc |
| Supply Operating Voltage Range | 4.5 to 6.0 | Vdc |
| Input Voltage - $V_{in}$ | +5.5 | Vdc |
| Output Voltage - $V_{out}$ | +5.5 | Vdc |
| Operating Temperature Range | -55 to +125 | °C |
| Storage Temperature Range | -65 to +150 | °C |
| Maximum Junction Temperature | +175 | °C |
| Thermal Resistance - Junction to Case ($\theta_{JC}$) | 0.09 | °C/mW |
| Thermal Resistance - Junction to Ambient ($\theta_{JA}$) | 0.26 | °C/mW |

PACKAGING AVAILABLE
(See page 52):
C - 14-LEAD DUAL INLINE  A - 14-LEAD FLAT PACK

## FUNCTIONS AND CHARACTERISTICS

| FUNCTION | TYPE | LOADING FACTOR EACH OUTPUT | PROPAGATION DELAY ns typ | POWER DISSIPATION mW typ/pkg |
|---|---|---|---|---|
| Dual 4-Input NAND Gate | 500<br>550 | 15<br>7 | 10 | 30 |
| Expandable 4-wide 2-2-2-3-Input AND-OR-INVERT Gate | 501<br>551 | 15<br>7 | 12 | 30 |
| 8-Input NAND Gate | 502<br>552 | 15<br>7 | 12 | 15 |
| 2-Wide 3-Input AND-OR-INVERT Gate with Gated Complement | 503<br>553 | 15<br>7 | 11 | 35 |
| Expandable 3-Wide 3-Input AND-OR-INVERT Gate | 504<br>554 | 15<br>7 | 12 | 25 |
| Expandable 2-Wide 4-Input AND-OR-INVERT Gate | 505<br>555 | 15<br>7 | 12 | 20 |
| Expandable 8-Input NAND Gate | 506<br>556 | 15<br>7 | 18 | 15 |
| Line Driver | 507<br>557 | 15<br>7 | 25@ 1000 pF Load | 60 |

# TTL I FUNCTIONS AND CHARACTERISTICS (continued)



| FUNCTION | TYPE | LOADING FACTOR EACH OUTPUT | PROPAGATION DELAY ns typ | POWER DISSIPATION mW typ/pkg |
|---|---|---|---|---|
| Quad 2-Input NAND Gate | 508<br>558 | 15<br>7 | 10 | 60 |
| 4-Wide 3-2-2-3-Input Expander for AND-OR-INVERT Gates | 509<br>559 | 15<br>7 | – | – |
| Dual 4-Input Expander for AND-OR-INVERT Gates | 510<br>560 | 15<br>7 | – | – |
| Dual 4-Input Expander for NAND Gates | 511<br>561 | 15<br>7 | – | – |
| Triple 3-Input NAND Gate | 512<br>562 | 15<br>7 | 10 | 45 |
| R-S Flip-Flop | 513<br>563 | 15<br>7 | $t_{on}$ = 15<br>$t_{off}$ = 20 | 30 |
| Gated R-S Flip-Flop | 514<br>564 | 15<br>7 | $t_{on}$ = 7.5<br>$t_{off}$ = 20 | 30 |
| AND J-K Flip-Flop | 515<br>565 | 15<br>7 | $t_{on}$ = 25<br>$t_{off}$ = 13 | 40 |
| OR J-K Flip-Flop | 516<br>566 | 15<br>7 | $t_{on}$ = 25<br>$t_{off}$ = 13 | 50 |
| Triple 2-Input Bus Driver | 519<br>569 | – | 50/15 | 54 |
| Expandable Dual 2-Wide 2-Input AND-OR-INVERT Gate | 520<br>570 | 15<br>7 | 12 | 40 |
| AC Coupled R-S Flip-Flop | 521<br>571 | 15<br>7 | 18 | 30 |
| Dual Type D Flip-Flop | 522<br>572 | 15<br>7 | 16 | 84 |
| Dual J-K Flip-Flop (Separate Clock) | 523<br>573 | 16<br>8 | $t_{on}$ = 12<br>$t_{off}$ = 10 | 110 |
| Dual J-K Flip-Flop (Common Clock) | 524<br>574 | 16<br>8 | $t_{on}$ = 12<br>$t_{off}$ = 10 | 110 |
| Hex Inverter | 525<br>575 | 15<br>7 | 10 | 90 |
| Dual 3-Input Pulse Shaper/Delay AND Gate | 526<br>576 | 16<br>8 | 15 | 60 |
| OR Expandable Dual 4-Input AND Gate | 527<br>577 | 15<br>7 | 10 | 38 |
| Dual 2-Wide 2-3-Input OR Expander | 528<br>578 | – | – | 15 |
| Hex Inverter | 529<br>579 | 15<br>7 | 10 | 90 |

# PACKAGING INFORMATION

## Per MIL-M-38510 Package Case Outline

Lansdale's products come in the following configurations. On each of the product pages in the catalog, there is a package box. The letters in that box correspond to one of the letters below. This provides a description of the packages.

| LETTER | DESIGNATION | DESCRIPTION |
|---|---|---|
| A * | F-1 | 14-LEAD FLAT PACK (1/4" X 1/4") |
| B | F-3 | 14-LEAD FLAT PACK (3/16" X 1/4") |
| C * | D-1 | 14-LEAD DUAL INLINE (1/4" X 3/4") |
| D * | F-2 | 14-LEAD FLAT PACK (1/4" X 3/8") |
| E * | D-2 | 16-LEAD DUAL INLINE (1/4" X 7/8") |
| F * | F-5 | 16-LEAD FLAT PACK (1/4" X 3/8") |
| G | A-1 | 8-LEAD CAN |
| H * | F-4 | 10-LEAD FLAT PACK (1/4" X 1/4") |
| I * | A-2 | 10-LEAD CAN |
| J * | D-3 | 24-LEAD DUAL INLINE (1/2" X 1 1/4") |
| K * | F-6 | 24-LEAD FLAT PACK (3/8" X 5/8") |
| L | D-9 | 24-LEAD DUAL INLINE (1/4" X 1 1/4") |
| M * | A-3 | 12-LEAD CAN |
| P | D-4 | 8-LEAD DUAL INLINE (1/4" X 3/8") |
| Q * | D-5 | 40-LEAD DUAL INLINE (9/16" X 2 1/16") |
| R * | D-8 | 20-LEAD DUAL INLINE (1/4" X 1 1/16") |
| S | F-9 | 20-LEAD FLAT PACK (1/4" X 1/2") |
| V | D-6 | 18-LEAD DUAL INLINE (1/4" X 15/16") |
| W | D-7 | 22-LEAD DUAL INLINE (3/8" X 1 1/8") |
| Y * | D-10 | 28-LEAD DUAL INLINE (1/2" X 1 1/2") |

** LANSDALE STANDARD PACKAGES*

***CONTACT FACTORY FOR OTHER PACKAGE QUOTES***