



**MOTOROLA  
INTEGRATED CIRCUITS**

4300 Series  
4000 Series

These TTL integrated circuits provide complex functions designed for digital applications in the medium to high-speed range. They provide significant reduction in package count and increased logic per function over devices in the basic TTL and DTL families.

**FUNCTIONS AND  
CHARACTERISTICS**

**MAXIMUM RATINGS**

| Rating                                    | Value       | Unit |
|---|-------------|------|
| Supply Operating Voltage Range - $V_{CC}$ | 4.5 to 5.5  | Vdc  |
| Supply Voltage                            | +7.0        | Vdc  |
| Input Voltage - $V_{in}$                  | +5.5        | Vdc  |
| Output Voltage - $V_{out}$                | +5.5        | Vdc  |
| Maximum Junction Temperature              | +175        | °C   |
| Operating Temperature Range               | -55 to +125 | °C   |

**PACKAGING AVAILABLE  
(See page 88):**

|                         |                       |
|-------------------------|-----------------------|
| C - 14-LEAD DUAL INLINE | A - 14-LEAD FLAT PACK |
| E - 16-LEAD DUAL INLINE | F - 16-LEAD FLAT PACK |
| J - 24-LEAD DUAL INLINE | K - 24-LEAD FLAT PACK |

| FUNCTION  | TYPE/PKG | OUTPUT<br>LOADING<br>FACTOR        | PROPAGATION<br>DELAY<br>ns typ        | POWER<br>DISSIPATION<br>mW<br>typ/pkg |
|---|----------|------------------------------------|---------------------------------------|---------------------------------------|
| Dual 4-Channel Data Selector                    | 4300/C,A | 10                                 | Control Line = 18<br>Data Line = 11   | 150                                   |
| BCD-to-Binary/Binary-to-BCD<br>Number Converter | 4301/E,F | Open Collector<br>$I_{OL} = 16$ mA | Address Time<br><45 ns                | 300                                   |
| Dual Data Distributor                           | 4302/C,A | 10                                 | 10.5                                  | 175                                   |
| 16 Bit Scratch Pad Memory Cell                  | 4304/C,A | Open Collector<br>$I_{OL} = 40$ mA | Write mode 25<br>Sense mode 15        | 250                                   |
| 16 Bit Scratch Pad Memory Cell                  | 4305/C,A | Open Collector<br>$I_{OL} = 20$ mA | Write mode 25<br>Sense mode 25        | 250                                   |
| Binary to One-of-Eight Line Decoder             | 4306/C,A | 10                                 | 14                                    | 100                                   |
| Dual Binary to One-of-Four Line Decoder         | 4307/E,F | 10                                 | 14                                    | 125                                   |
| 8-Bit Parity Tree                               | 4308/C,A | 10                                 | 15 to 30                              | 150                                   |
| Dual 4-Bit Parity Tree                          | 4310/C,A | 10                                 | 9.5 to 22                             | 125                                   |
| 4-Bit Shift Register                            | 4312/C,A | 10                                 | 22/bit                                | 180                                   |
| Quad Type D Flip-Flop                           | 4315/E,F | 10                                 | 16                                    | 190                                   |
| Programmable Modulo-N Decade Counter            | 4316/E,F | 8                                  | Clock to Q3 = 50<br>Clock to Bus = 35 | 250                                   |
| Programmable Modulo 2, Modulo 5 Counters        | 4317/E,F | 8                                  | Clock to Q3 = 50<br>Clock to Bus = 35 | 250                                   |
| Programmable Modulo-N Hexadecimal Counter       | 4318/E,F | 8                                  | Clock to Q3 = 50<br>Clock to Bus = 35 | 250                                   |
| Dual Programmable Modulo 4 Counters             | 4319/E,F | 8                                  | Clock to Q3 = 50<br>Clock to Bus = 35 | 250                                   |
| Dual 4-Bit Comparator (Open Collector)          | 4321/E,F | 10                                 | 20                                    | 250                                   |

TTL

# TTL FUNCTIONS AND CHARACTERISTICS (continued)

| FUNCTION   | TYPE/PKG | OUTPUT LOADING FACTOR              | PROPAGATION DELAY ns typ    | POWER DISSIPATION mW typ/pkg |
|--|----------|------------------------------------|-----------------------------|------------------------------|
| Dual 4-Bit Comparator                                  | 4322/E,F | 10                                 | 20                          | 250                          |
| 4-Bit Universal Counter                                | 4323/C,A | 10                                 | 16/bit                      | 200                          |
| Full Adder   | 4326/C,A | 15/12*                             | 25/13**                     | 90                           |
| Full Adder   | 4327/C,A | 7/6*                               | 25/13**                     | 90                           |
| Adder (Dependent Carry)                                | 4328/C,A | 15/12*                             | 25/13**                     | 125                          |
| Adder (Dependent Carry)                                | 4329/C,A | 7/6*                               | 25/13**                     | 125                          |
| Adder (Independent Carry)                              | 4330/C,A | 15/12*                             | 25/13**                     | 125                          |
| Adder (Independent Carry)                              | 4331/C,A | 7/6*                               | 25/13**                     | 125                          |
| Carry Decoder  | 4332/C,A | —                                  | $\Delta t_{pd} = 4$ decoder | 20                           |
| Quad Latch (Open Collector)                            | 4335/C,A | 7                                  | 25                          | 140                          |
| Quad Latch   | 4337/C,A | 10                                 | 25                          | 150                          |
| Inverting/Non-Inverting One-of-Eight Decoder           | 4338/E,F | Open Collector<br>$I_{OL} = 20$ mA | Address Time<br><45 ns      | 240                          |
| Seven Segment Character Generator                      | 4339/E,F |                                    |                             | 240                          |
| Binary to Two-of-Eight Decoder                         | 4340/E,F |                                    |                             | 200                          |
| Single-Error Hamming Code Detector/Generator           | 4341/E,F |                                    |                             | 240                          |
| Quad Predriver   | 4342/C,A | Open Collector<br>$I_{OL} = 50$ mA | 15                          | 120                          |
| Dual Line Selector                                     | 4343/C,A | $I_{OL} = 400$ mA Pulsed           | 20                          | 70                           |
| Non-Inverting One-of-Eight Decoder                     | 4348/E,F | Open Collector<br>$I_{OL} = 16$ mA | Address Time<br><50 ns      | 240                          |
| Counter-Latch Decoder                                  | 4350/E,F | Open Collector<br>$I_{OL} = 40$ mA | $f_{Tog} = 35$ MHz          | 450                          |
| Counter-Latch Decoder                                  | 4351/E,F | Open Emitter                       | $f_{Tog} = 35$ MHz          | 450                          |
| Dual Decade Counter                                    | 4352/E,F | 10                                 | $f_{Tog} = 40$ MHz          | 350                          |
| Dual Hexadecimal Counter                               | 4353/E,F | 10                                 | $f_{Tog} = 40$ MHz          | 350                          |
| Dual Decade Up/Down Counter                            | 4354/J,K | 10                                 | $f_{Tog} = 12$ MHz          | 600                          |
| Dual Binary Up/Down Counter                            | 4355/J,K | 10                                 | $f_{Tog} = 12$ MHz          | 600                          |
| NBCD Adder   | 4356/E,F | 10                                 | 30                          | 300                          |
| Nines Complement/Zero Element                          | 4358/C,A | 10                                 | 30                          | 200                          |
| Bus Transfer Switch                                    | 4360/E,F | 10                                 | 25                          | 350                          |
| Dual Majority Logic Gate                               | 4362/C,A | 10                                 | $z = 20$<br>$z = 11$        | 75                           |
| 64-Bit Random Access Memory                            | 4364/E,F | Open Collector<br>$I_{OL} = 15$ mA | Access Time<br><60 ns       | 384                          |
| Dual MOS-to-TTL Level Translator with Tri-state Output | 4368/C,A | 10                                 | 20                          | 150                          |

\*4300/4000 Series loading specified for use with MTTLI Devices

\*\*Add delay, Carry delay

# PACKAGING INFORMATION

## Per MIL-M-38510 Package Case Outline

All of Lansdale's products come in one of 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 is a guide to how the product is available.

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

**FP (flat pack)**  
**DIP (dual inline)**  
**CAN (metal can)**

\* **LANSDALE STANDARD PACKAGES**

**CONTACT FACTORY FOR OTHER PACKAGE QUOTES**