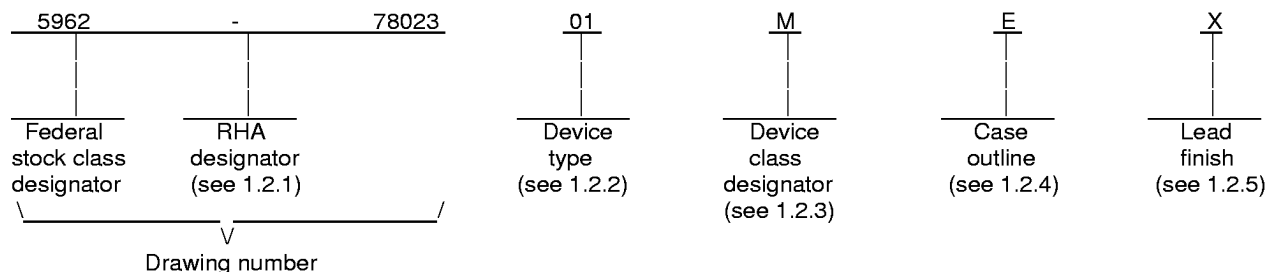


| REVISIONS                                                                                                                                                                      |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------|--|---|---|---|------------------------------------------------------------------------------------------|-----------------|---|---|---|-----------|--------------------|-------|----|----|
| LTR                                                                                                                                                                            | DESCRIPTION                                                                                                                                                                                     |  |  |  |                                   |  |   |   |   |                                                                                          | DATE (YR-MO-DA) |   |   |   |           | APPROVED           |       |    |    |
| K                                                                                                                                                                              | Add device type 02 and add vendor CAGE 27014. Change to one part-one part number format. Technical changes to 1.3, 1.4, table I, and table II. Change figure 2 to figure 3. Add figure 2. - mlp |  |  |  |                                   |  |   |   |   |                                                                                          | 91-04-19        |   |   |   |           | M. A. Frye         |       |    |    |
| L                                                                                                                                                                              | Changes in accordance with N.O.R. 5962-R062-92. - jt                                                                                                                                            |  |  |  |                                   |  |   |   |   |                                                                                          | 91-11-22        |   |   |   |           | Monica Poelking    |       |    |    |
| M                                                                                                                                                                              | Changes in accordance with N.O.R. 5962-R168-98. - drw                                                                                                                                           |  |  |  |                                   |  |   |   |   |                                                                                          | 98-09-01        |   |   |   |           | Raymond Monnin     |       |    |    |
| N                                                                                                                                                                              | Add radiation hardened information. Editorial changes throughout. - drw                                                                                                                         |  |  |  |                                   |  |   |   |   |                                                                                          | 99-05-12        |   |   |   |           | Raymond Monnin     |       |    |    |
| THE ORIGINAL FIRST SHEET OF THIS DRAWING HAS BEEN REPLACED.                                                                                                                    |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
| REV                                                                                                                                                                            |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
| SHEET                                                                                                                                                                          |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
| REV                                                                                                                                                                            |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
| SHEET                                                                                                                                                                          |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
| REV STATUS                                                                                                                                                                     |                                                                                                                                                                                                 |  |  |  | REV                               |  | N | N | N | N                                                                                        | N               | N | N | N | N         | N                  | N     | N  |    |
| OF SHEETS                                                                                                                                                                      |                                                                                                                                                                                                 |  |  |  | SHEET                             |  | 1 | 2 | 3 | 4                                                                                        | 5               | 6 | 7 | 8 | 9         | 10                 | 11    | 12 | 13 |
| PMIC N/A                                                                                                                                                                       |                                                                                                                                                                                                 |  |  |  | PREPARED BY<br>Monica Poelking    |  |   |   |   | DEFENSE SUPPLY CENTER COLUMBUS<br>COLUMBUS, OHIO 43216                                   |                 |   |   |   |           |                    |       |    |    |
| <b>STANDARD<br/>MICROCIRCUIT<br/>DRAWING</b><br><br>THIS DRAWING IS AVAILABLE<br>FOR USE BY ALL<br>DEPARTMENTS<br>AND AGENCIES OF THE<br>DEPARTMENT OF DEFENSE<br><br>AMSC N/A |                                                                                                                                                                                                 |  |  |  | CHECKED BY<br>Charles E. Besore   |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
|                                                                                                                                                                                |                                                                                                                                                                                                 |  |  |  | APPROVED BY<br>Michael A. Frye    |  |   |   |   | MICROCIRCUIT, LINEAR, QUAD HIGH SPEED<br>DIFFERENTIAL LINE DRIVER,<br>MONOLITHIC SILICON |                 |   |   |   |           |                    |       |    |    |
|                                                                                                                                                                                |                                                                                                                                                                                                 |  |  |  | DRAWING APPROVAL DATE<br>79-02-02 |  |   |   |   |                                                                                          |                 |   |   |   |           |                    |       |    |    |
|                                                                                                                                                                                |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   | REVISION LEVEL<br>N                                                                      |                 |   |   |   | SIZE<br>A | CAGE CODE<br>67268 | 78023 |    |    |
| SHEET                                                                                                                                                                          |                                                                                                                                                                                                 |  |  |  |                                   |  |   |   |   | 1 OF 13                                                                                  |                 |   |   |   |           |                    |       |    |    |

## 1. SCOPE

1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device classes Q and M) and space application (device class V). A choice of case outlines and lead finishes are available and are reflected in the Part or Identifying Number (PIN). When available, a choice of Radiation Hardness Assurance (RHA) levels are reflected in the PIN.

1.2 PIN. The PIN is as shown in the following example:



1.2.1 RHA designator. Device classes Q and V RHA marked devices meet the MIL-PRF-38535 specified RHA levels and are marked with the appropriate RHA designator. Device class M RHA marked devices meet the MIL-PRF-38535, appendix A specified RHA levels and are marked with the appropriate RHA designator. A dash (-) indicates a non-RHA device.

1.2.2 Device type(s). The device type(s) identify the circuit function as follows:

| Device type | Generic number | Circuit function                           |
|-------------|----------------|--------------------------------------------|
| 01          | 26LS31         | Quad, high speed, differential line driver |
| 02          | 26F31          | Quad, high speed, differential line driver |

1.2.3 Device class designator. The device class designator is a single letter identifying the product assurance level as follows:

| Device class | Device requirements documentation                                                                                                                         |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| M            | Vendor self-certification to the requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A |
| Q or V       | Certification and qualification to MIL-PRF-38535                                                                                                          |

1.2.4 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

| Outline letter | Descriptive designator | Terminals | Package style         |
|----------------|------------------------|-----------|-----------------------|
| E              | GDIP1-T16 or CDIP2-T16 | 16        | Dual-in-line          |
| F              | GDIP2-F16 or CDFP3-F16 | 16        | Flatpack              |
| 2              | CQCC1-N20              | 20        | Leadless chip carrier |

1.2.5 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device class M.

|                                                                                                 |           |                     |            |
|-------------------------------------------------------------------------------------------------|-----------|---------------------|------------|
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### 1.3 Absolute maximum ratings. 1/

|                                                             |                                         |                                         |
|-------------------------------------------------------------|-----------------------------------------|-----------------------------------------|
| Power supply and input voltage .....                        | 7.0 V dc                                |                                         |
| Output voltage .....                                        | 5.5 V dc                                |                                         |
| Storage temperature range .....                             | -65°C to +150°C                         |                                         |
| Lead temperature (soldering, 10 seconds) .....              | +300°C                                  |                                         |
| Maximum power dissipation (P <sub>D</sub> ) .....           | 450 mW 2/                               |                                         |
| Junction temperature (T <sub>J</sub> ) .....                | +150°C                                  |                                         |
| Thermal resistance, junction-to-case (θ <sub>JC</sub> ):    |                                         |                                         |
|                                                             | <u>Device 01</u>                        | <u>Device 02</u>                        |
| Case F .....                                                | 14°C/W                                  | 13°C/W                                  |
| Case E .....                                                | 16°C/W                                  | 14°C/W                                  |
| Case 2 .....                                                | 19°C/W                                  | 15°C/W                                  |
| Thermal resistance, junction-to-ambient (θ <sub>JA</sub> ): |                                         |                                         |
|                                                             | <u>Device 01</u>                        | <u>Device 02</u>                        |
| Case F .....                                                | 163°C/W derate above +25°C at 6.1 mW/°C | 151°C/W derate above +25°C at 6.6 mW/°C |
| Case E .....                                                | 94°C/W derate above +25°C at 10.6 mW/°C | 88°C/W derate above +25°C at 11.4 mW/°C |
| Case 2 .....                                                | 83°C/W derate above +25°C at 12 mW/°C   | 81°C/W derate above +25°C at 12.3 mW/°C |

### 1.4 Recommended operating conditions.

|                                                             |                      |
|-------------------------------------------------------------|----------------------|
| Supply voltage range (V <sub>CC</sub> ) .....               | 4.5 V dc to 5.5 V dc |
| Minimum high-level input voltage (V <sub>IH</sub> ) .....   | 2.0 V dc             |
| Maximum low-level input voltage (V <sub>IL</sub> ) .....    | 0.8 V dc             |
| Ambient operating temperature range (T <sub>A</sub> ) ..... | -55°C to +125°C      |

### 1.5 Radiation features.

Maximum total dose available(Dose rate = 50 to 300 rads (Si)/s, MIL-STD-883, method1019.5, condition A) ..... 300 Krad(Si)

## 2. APPLICABLE DOCUMENTS

2.1 Government specification, standards, and handbooks. The following specification, standards, and handbooks form a part of this drawing to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

#### SPECIFICATION

##### DEPARTMENT OF DEFENSE

MIL-PRF-38535 - Integrated Circuits, Manufacturing, General Specification for.

#### STANDARDS

##### DEPARTMENT OF DEFENSE

MIL-STD-883 - Test Method Standard Microcircuits.  
MIL-STD-973 - Configuration Management.  
MIL-STD-1835 - Interface Standard For Microcircuit Case Outlines.

#### HANDBOOKS

##### DEPARTMENT OF DEFENSE

MIL-HDBK-103 - List of Standard Microcircuit Drawings (SMD's).  
MIL-HDBK-780 - Standard Microcircuit Drawings.

1/ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

2/ Must withstand the added P<sub>D</sub> due to short circuit test: e.g., I<sub>OS</sub>.

|                                                                                                 |           |                     |            |
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(Unless otherwise indicated, copies of the specification, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Item requirements. The individual item requirements for device classes Q and V shall be in accordance with MIL-PRF-38535 and as specified herein or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein. The individual item requirements for device class M shall be in accordance with MIL-PRF-38535, appendix A for non-JAN class level B devices and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-38535 and herein for device classes Q and V or MIL-PRF-38535, appendix A and herein for device class M.

3.2.1 Case outlines. The case outlines shall be in accordance with 1.2.4 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.3 Block or logic diagram. The block or logic diagram shall be as specified on figure 2.

3.2.4 Test circuit and switching waveforms. The test circuit and switching waveforms shall be as specified on figure 3.

3.2.5 Radiation exposure circuit. The radiation exposure circuit shall be as specified on figure 4.

3.3 Electrical performance characteristics and postirradiation parameter limits. Unless otherwise specified herein, the electrical performance characteristics and postirradiation parameter limits are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table IIA. The electrical tests for each subgroup are defined in table I.

3.5 Marking. The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-HDBK-103. For packages where marking of the entire SMD PIN number is not feasible due to space limitations, the manufacturer has the option of not marking the "5962-" on the device. For RHA product using this option, the RHA designator shall still be marked. Marking for device classes Q and V shall be in accordance with MIL-PRF-38535. Marking for device class M shall be in accordance with MIL-PRF-38535, appendix A.

3.5.1 Certification/compliance mark. The certification mark for device classes Q and V shall be a "QML" or "Q" as required in MIL-PRF-38535. The compliance mark for device class M shall be a "C" as required in MIL-PRF-38535, appendix A.

3.6 Certificate of compliance. For device classes Q and V, a certificate of compliance shall be required from a QML-38535 listed manufacturer in order to supply to the requirements of this drawing (see 6.6.1 herein). For device class M, a certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-HDBK-103 (see 6.6.2 herein). The certificate of compliance submitted to DSCC-VA prior to listing as an approved source of supply for this drawing shall affirm that the manufacturer's product meets, for device classes Q and V, the requirements of MIL-PRF-38535 and herein or for device class M, the requirements of MIL-PRF-38535, appendix A and herein.

3.7 Certificate of conformance. A certificate of conformance as required for device classes Q and V in MIL-PRF-38535 or for device class M in MIL-PRF-38535, appendix A shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change for device class M. For device class M, notification to DSCC-VA of change of product (see 6.2 herein) involving devices acquired to this drawing is required for any change as defined in MIL-STD-973.

3.9 Verification and review for device class M. For device class M, DSCC, DSCC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

|                                                                                                 |           |                     |            |
|-------------------------------------------------------------------------------------------------|-----------|---------------------|------------|
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TABLE I. Electrical performance characteristics.

| Test<br>(MIL-STD-883 test method)                         | Symbol            | Conditions <u>1/</u> , <u>2/</u><br>-55°C ≤ T <sub>A</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type | Limits |       | Unit |
|-----------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------------|----------------------|----------------|--------|-------|------|
|                                                           |                   |                                                                                                   |                      |                | Min    | Max   |      |
| Output high voltage (3006)                                | V <sub>OH</sub>   | V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -20 mA                                                 | 1, 2, 3              | All            | 2.5    |       | V    |
| Output low voltage (3007)                                 | V <sub>OL</sub>   | V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = 20 mA                                                  | 1, 2, 3              | All            |        | 0.5   | V    |
| Input high voltage                                        | V <sub>IH</sub>   | V <sub>CC</sub> = 4.5 V <u>3/</u>                                                                 | 1, 2, 3              | All            | 2.0    |       | V    |
| Input low voltage                                         | V <sub>IL</sub>   | V <sub>CC</sub> = 5.5 V <u>3/</u>                                                                 | 1, 2, 3              | All            |        | 0.8   | V    |
| Input low current (3009)                                  | I <sub>IL</sub>   | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0.4 V <u>4/</u>                                        | 1, 2, 3              | 01             | 0.10   | -0.36 | mA   |
|                                                           |                   |                                                                                                   |                      | 02             | 0.10   | -0.20 |      |
| Input high current (3010)                                 | I <sub>IH</sub>   | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 2.7 V <u>4/</u>                                        | 1, 2, 3              | All            | -2.0   | 20    | μA   |
| Input reverse current                                     | I <sub>I</sub>    | V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 7.0 V <u>4/</u>                                        | 1, 2, 3              | All            | -0.01  | 0.1   | mA   |
| Off-state (high impedance)<br>Output current (3020, 3021) | I <sub>O</sub>    | V <sub>CC</sub> = 5.5 V                                                                           | 1, 2, 3              | All            |        | 20    | μA   |
|                                                           |                   | V <sub>O</sub> = 2.5 V                                                                            |                      |                |        | -20   |      |
| Input clamp voltage (3022)                                | V <sub>I</sub>    | V <sub>CC</sub> = 4.5 V, I <sub>IN</sub> = -18 mA                                                 | 1, 2, 3              | All            |        | -1.5  | V    |
| Output short circuit current<br>(3011)                    | I <sub>OS</sub>   | V <sub>CC</sub> = 5.5 V <u>5/</u>                                                                 | 1, 2, 3              | All            | -30    | -150  | mA   |
| Power supply current<br>(3005)                            | I <sub>CC</sub>   | V <sub>CC</sub> = 5.5 V                                                                           | 1, 2, 3              | 01             |        | 80    | mA   |
|                                                           |                   | all outputs disabled                                                                              |                      | 02             |        | 50    |      |
|                                                           |                   | V <sub>CC</sub> = 5.5 V, all outputs<br>enabled                                                   |                      | 02             |        | 40    |      |
| Propagation delay,<br>output to output                    | t <sub>SKew</sub> | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 30 pF                                       | 9                    | 01             |        | 6.0   | ns   |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 9.0   |      |
|                                                           |                   |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 4.5   |      |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 7.0   |      |
|                                                           |                   | C <sub>L</sub> = 50 pF                                                                            | 9                    | 02             |        | 6.0   |      |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 9.0   |      |
| Propagation delay,<br>Input to output (3003)              | t <sub>PLH</sub>  | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 30 pF<br>See figure 3                       | 9                    | 01             |        | 20    | ns   |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 30    |      |
|                                                           |                   |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 15    |      |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 23    |      |
|                                                           |                   | C <sub>L</sub> = 50 pF                                                                            | 9                    | 02             |        | 16    |      |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 24    |      |
|                                                           | t <sub>PHL</sub>  | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 30 pF<br>See figure 3                       | 9                    | 01             |        | 20    | ns   |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 30    |      |
|                                                           |                   |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 15    |      |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 23    |      |
|                                                           |                   | C <sub>L</sub> = 50 pF                                                                            | 9                    | 02             |        | 17    |      |
|                                                           |                   |                                                                                                   | 10, 11               |                |        | 25    |      |

See footnotes at end of table.

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TABLE I. Electrical performance characteristics.

| Test<br>(MIL-STD-883 test method)               | Symbol           | Conditions <u>1/</u> , <u>2/</u><br>-55°C ≤ T <sub>A</sub> ≤ +125°C<br>unless otherwise specified | Group A<br>subgroups | Device<br>type | Limits |     | Unit |
|-------------------------------------------------|------------------|---------------------------------------------------------------------------------------------------|----------------------|----------------|--------|-----|------|
|                                                 |                  |                                                                                                   |                      |                | Min    | Max |      |
| Output disable time,<br>ENABLE to output (3003) | t <sub>PLZ</sub> | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 10 pF<br>See figure 3                       | 9                    | 01             |        | 35  | ns   |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 53  |      |
|                                                 |                  |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 35  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 53  |      |
|                                                 |                  |                                                                                                   | 9                    | 02             |        | 38  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 56  |      |
|                                                 | t <sub>PHZ</sub> | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 10 pF<br>See figure 3                       | 9                    | 01             |        | 30  | ns   |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 45  |      |
|                                                 |                  |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 20  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 27  |      |
|                                                 |                  |                                                                                                   | 9                    | 02             |        | 23  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 30  |      |
| Output enable time,<br>ENABLE to output         | t <sub>PZL</sub> | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 30 pF<br>See figure 3                       | 9                    | 01             |        | 45  | ns   |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 68  |      |
|                                                 |                  |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 25  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 37  |      |
|                                                 |                  |                                                                                                   | 9                    | 02             |        | 28  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 40  |      |
|                                                 | t <sub>PZH</sub> | V <sub>CC</sub> = 5.0 V <u>6/</u><br>C <sub>L</sub> = 30 pF<br>See figure 3                       | 9                    | 01             |        | 40  | ns   |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 60  |      |
|                                                 |                  |                                                                                                   | 9                    | 02 <u>7/</u>   |        | 30  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 50  |      |
|                                                 |                  |                                                                                                   | 9                    | 02             |        | 32  |      |
|                                                 |                  |                                                                                                   | 10, 11               |                |        | 52  |      |

1/ Devices supplied to this drawing will meet all levels M, D, P, L, R, F of irradiation. However, this device is only tested at the 'F' level. Pre and post irradiation values are identical unless otherwise specified in table I. When performing post irradiation electrical measurements for any RHA level, T<sub>A</sub> = +25°C.

2/ These parts may be dose rate sensitive in a space environment and demonstrate enhanced low dose rate effect. Radiation end point limits for the noted parameters are guaranteed only for the conditions specified in MIL-STD-883, method 1019.5, condition A.

3/ V<sub>IH</sub> and V<sub>IL</sub> tests are not required and shall be applied as forcing functions for the V<sub>OH</sub> and V<sub>OL</sub> tests.

4/ The minimum limits apply to the device classes Q and V. For device class M, these limits are not tested. The limits specified for the input low current represents the numerical range in which this parameter will pass:

Device type 01: -0.36 to +0.10

Device type 02: -0.20 to +0.10

5/ Not more than one output should be shorted at one time, and the duration of the short circuit condition should not exceed 1 second.

6/ V<sub>IN</sub> = 1.3 V to V<sub>O</sub> = 1.3 V, V<sub>PULSE</sub> = 0 V to +3.0 V.

7/ This parameter is guaranteed by correlation to the testing at C<sub>L</sub> = 50 pF.

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|                 |                 |                 |
|-----------------|-----------------|-----------------|
| Case outlines   | 2               | E and F         |
| Device type     | 01 and 02       |                 |
| Terminal number | Terminal symbol |                 |
| 1               | N/C             | INPUT A         |
| 2               | INPUT A         | OUTPUT A+       |
| 3               | OUTPUT A+       | OUTPUT A-       |
| 4               | OUTPUT A-       | ENABLE          |
| 5               | ENABLE          | OUTPUT B-       |
| 6               | N/C             | OUTPUT B+       |
| 7               | OUTPUT B-       | INPUT B         |
| 8               | OUTPUT B+       | GND             |
| 9               | INPUT B         | INPUT C         |
| 10              | GND             | OUTPUT C+       |
| 11              | N/C             | OUTPUT C-       |
| 12              | INPUT C         | ENABLE          |
| 13              | OUTPUT C+       | OUTPUT D-       |
| 14              | OUTPUT C-       | OUTPUT D+       |
| 15              | ENABLE          | INPUT D         |
| 16              | N/C             | V <sub>CC</sub> |
| 17              | OUTPUT D-       | ---             |
| 18              | OUTPUT D+       | ---             |
| 19              | INPUT D         | ---             |
| 20              | V <sub>CC</sub> | ---             |

FIGURE 1. Terminal connections.

# CASE OUTLINES E AND F

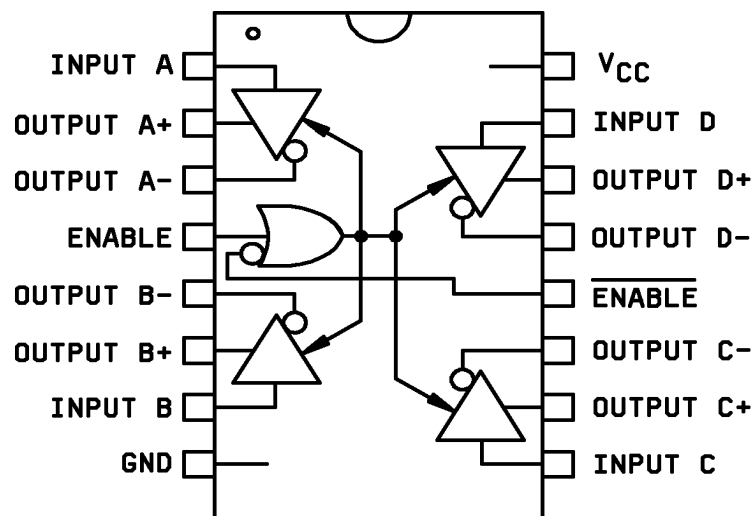


FIGURE 2. Block diagram.

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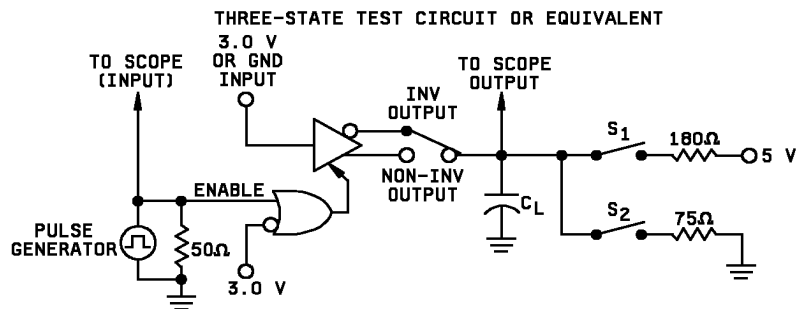
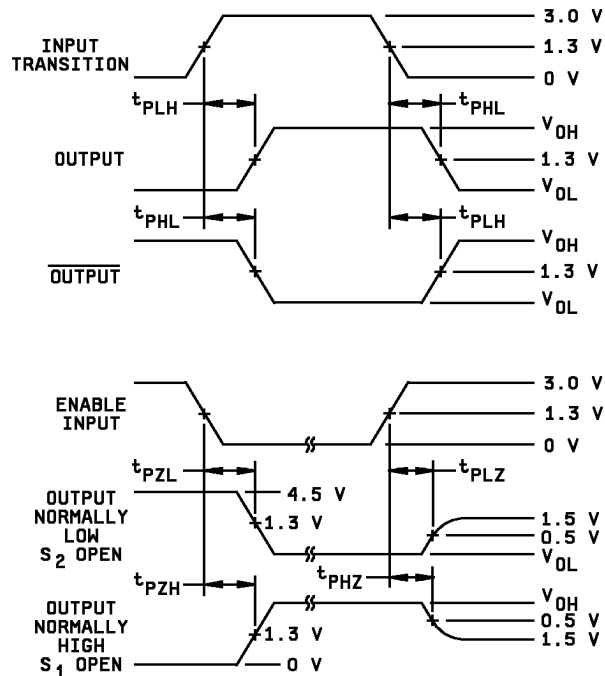
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NOTE: Pulse generator characteristics:  
 $Z_0 = 50 \Omega$   
 $PRR \leq 1.0 \text{ MHz}$   
 $t_r, t_f \leq 6 \text{ ns}$   
 $C_L$  includes probe and jig capacitance.

FIGURE 3. Test circuit and switching waveforms.

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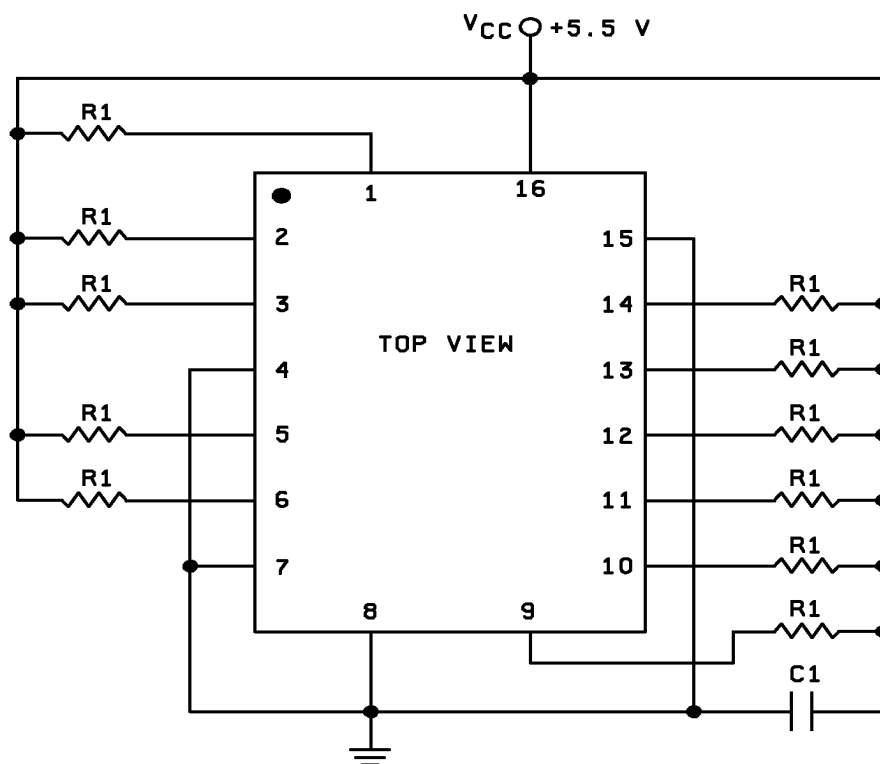
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$C_1 = 0.1 \mu\text{F}$   
 $R_1 = 1 \text{ k}\Omega, \frac{1}{4} \text{ W}$

FIGURE 4. Radiation exposure circuit.

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3.10 Microcircuit group assignment for device class M. Device class M devices covered by this drawing shall be in microcircuit group number 53 (see MIL-PRF-38535, appendix A).

3.11 PIN supersession information. The PIN supersession information shall be as specified in the appendix.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. For device classes Q and V, sampling and inspection procedures shall be in accordance with MIL-PRF-38535 or as modified in the device manufacturer's Quality Management (QM) plan. The modification in the QM plan shall not affect the form, fit, or function as described herein. For device class M, sampling and inspection procedures shall be in accordance with MIL-PRF-38535, appendix A.

4.2 Screening. For device classes Q and V, screening shall be in accordance with MIL-PRF-38535, and shall be conducted on all devices prior to qualification and technology conformance inspection. For device class M, screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection.

##### 4.2.1 Additional criteria for device class M.

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015.

(2)  $T_A = +125^{\circ}\text{C}$ , minimum.

b. Interim and final electrical test parameters shall be as specified in table IIA herein.

##### 4.2.2 Additional criteria for device classes Q and V.

a. The burn-in test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The burn-in test circuit shall be maintained under document revision level control of the device manufacturer's Technology Review Board (TRB) in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1015 of MIL-STD-883.

b. Interim and final electrical test parameters shall be as specified in table IIA herein.

c. Additional screening for device class V beyond the requirements of device class Q shall be as specified in MIL-PRF-38535, appendix B.

4.3 Qualification inspection for device classes Q and V. Qualification inspection for device classes Q and V shall be in accordance with MIL-PRF-38535. Inspections to be performed shall be those specified in MIL-PRF-38535 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

4.4 Conformance inspection. Technology conformance inspection for classes Q and V shall be in accordance with MIL-PRF-38535 including groups A, B, C, D, and E inspections and as specified herein except where option 2 of MIL-PRF-38535 permits alternate in-line control testing. Quality conformance inspection for device class M shall be in accordance with MIL-PRF-38535, appendix A and as specified herein. Inspections to be performed for device class M shall be those specified in method 5005 of MIL-STD-883 and herein for groups A, B, C, D, and E inspections (see 4.4.1 through 4.4.4).

##### 4.4.1 Group A inspection.

a. Tests shall be as specified in table IIA herein.

b. Subgroups 4, 5, 6, 7 and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

|                                                                                                 |           |                     |             |
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TABLE IIA. Electrical test requirements.

| Test requirements                                    | Subgroups<br>(in accordance with<br>MIL-STD-883,<br>method 5005, table I) | Subgroups<br>(in accordance with<br>MIL-PRF-38535, table III) |                       |
|------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------|-----------------------|
|                                                      | Device<br>class M                                                         | Device<br>class Q                                             | Device<br>class V     |
| Interim electrical<br>parameters (see 4.2)           | 1                                                                         | 1                                                             | 1                     |
| Final electrical<br>parameters (see 4.2)             | <u>1/</u> 1, 2, 3, 9                                                      | <u>1/</u> 1, 2, 3, 9                                          | <u>2/</u> 1, 2, 3, 9  |
| Group A test<br>requirements (see 4.4)               | 1, 2, 3, 9, 10, 11<br><u>3/</u>                                           | 1, 2, 3,<br>9, 10, 11                                         | 1, 2, 3,<br>9, 10, 11 |
| Group C end-point electrical<br>parameters (see 4.4) | 1, 2, 3                                                                   | 1, 2, 3                                                       | 1, 2, 3               |
| Group D end-point electrical<br>parameters (see 4.4) | 1, 2, 3                                                                   | 1, 2, 3                                                       | 1, 2, 3               |
| Group E end-point electrical<br>parameters (see 4.4) | 1                                                                         | 1                                                             | 1                     |

1/ PDA applies to subgroup 1.

2/ PDA applies to subgroups 1 and delta limits. Delta limits shall be in accordance with table IIB and shall be computed with reference to the previous interim electrical parameters.

3/ Subgroups 10 and 11, if not tested, shall be guaranteed to the specified limits in table I.

TABLE IIB. Delta limits at +25°C.

| Parameter <u>4/</u> | Device type | Limit    |
|---------------------|-------------|----------|
| V <sub>OH</sub>     | All         | ≤ 250 mV |
| V <sub>OL</sub>     | All         | ≤ 50 mV  |
| I <sub>CC</sub>     | All         | ≤ 8 mA   |

4/ These parameters shall be read and recorded at T<sub>A</sub> = +25°C before and after each burn-in and shall not change by more than the limits indicated. The delta rejects shall be included in the PDA calculation.

4.4.2 Group C inspection. The group C inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.2.1 Additional criteria for device class M. Steady-state life test conditions, method 1005 of MIL-STD-883:

- a. Test condition A, B, C or D. The test circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing or acquiring activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.
- b. T<sub>A</sub> = +125°C, minimum.
- c. Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

|                                                                                                 |           |                     |             |
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4.4.2.2 Additional criteria for device classes Q and V. The steady-state life test duration, test condition and test temperature, or approved alternatives shall be as specified in the device manufacturer's QM plan in accordance with MIL-PRF-38535. The test circuit shall be maintained under document revision level control by the device manufacturer's TRB in accordance with MIL-PRF-38535 and shall be made available to the acquiring or preparing activity upon request. The test circuit shall specify the inputs, outputs, biases, and power dissipation, as applicable, in accordance with the intent specified in test method 1005 of MIL-STD-883.

4.4.3 Group D inspection. The group D inspection end-point electrical parameters shall be as specified in table IIA herein.

4.4.4 Group E inspection. Group E inspection is required only for parts intended to be marked as radiation hardness assured (see 3.5 herein). RHA levels for device classes M, Q, and V shall be as specified in MIL-PRF-38535. End-point electrical parameters shall be as specified in table IIA herein.

4.4.4.1 Total dose irradiation testing. Total dose irradiation testing shall be performed in accordance with MIL-STD-883 method 1019, condition A, and as specified herein.

4.4.4.1.1 Accelerated aging test. Accelerated aging tests shall be performed on all devices requiring a RHA level greater than 5k rads(Si). The post-anneal end-point electrical parameter limits shall be as specified in table I herein and shall be the pre-irradiation end-point electrical parameter limit at 25°C ±5°C. Testing shall be performed at initial qualification and after any design or process changes which may affect the RHA response of the device.

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-PRF-38535 for device classes Q and V or MIL-PRF-38535, appendix A for device class M.

## 6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use for Government microcircuit applications (original equipment), design applications, and logistics purposes.

6.1.1 Replaceability. Microcircuits covered by this drawing will replace the same generic device covered by a contractor prepared specification or drawing.

6.1.2 Substitutability. Device class Q devices will replace device class M devices.

6.2 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-973 using DD Form 1692, Engineering Change Proposal.

6.3 Record of users. Military and industrial users should inform Defense Supply Center Columbus when a system application requires configuration control and which SMD's are applicable to that system. DSCC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DSCC-VA, telephone (614) 692-0525.

6.4 Comments. Comments on this drawing should be directed to DSCC-VA , Columbus, Ohio 43216-5000, or telephone (614) 692-0674.

6.5 Abbreviations, symbols, and definitions. The abbreviations, symbols, and definitions used herein are defined in MIL-PRF-38535 and MIL-HDBK-1331.

6.6 Sources of supply.

6.6.1 Sources of supply for device classes Q and V. Sources of supply for device classes Q and V are listed in QML-38535. The vendors listed in QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DSCC-VA and have agreed to this drawing.

6.6.2 Approved sources of supply for device class M. Approved sources of supply for class M are listed in MIL-HDBK-103. The vendors listed in MIL-HDBK-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DSCC-VA.

|                                                                                                 |           |                     |             |
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## APPENDIX

### 10. SCOPE

10.1 Scope. This appendix contains the PIN supersession information to support the one part-one part number system. For new system designs, after the date of April 19, 1991 the new PIN shall be used in lieu of the old PIN. For existing system designs prior to the date of April 19, 1991 the new PIN can be used in lieu of the old PIN. This is a mandatory part of the document. The information contained herein is intended for compliance. The PIN supersession data shall be as in 30.

20. APPLICABLE DOCUMENTS. This section is not applicable to this appendix.

### 30. SUPERSESSION DATA

#### New PIN

5962-7802301MEA  
5962-7802301MFA  
5962-7802301M2A

#### Old PIN

7802301EA  
7802301FA  
78023012A

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## STANDARD MICROCIRCUIT DRAWING BULLETIN

DATE: 99-05-12

Approved sources of supply for SMD 78023 are listed below for immediate acquisition information only and shall be added to MIL-HDBK-103 and QML-38535 during the next revision. MIL-HDBK-103 and QML-38535 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DSCC-VA. This bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535.

| Standard<br>microcircuit drawing<br>PIN <u>1</u> / | Vendor<br>CAGE<br>number | Vendor<br>similar<br>PIN <u>2</u> / |
|----------------------------------------------------|--------------------------|-------------------------------------|
| 5962-7802301M2A                                    | 0C7V7                    | 26LS31/B2A                          |
| 5962-7802301MEA                                    | 0C7V7                    | 26LS31/BEA                          |
| 5962-7802301MEA                                    | 27014                    | DS26LS31MJ/883                      |
| 5962-7802301MFA                                    | 0C7V7                    | 26LS31/BFA                          |
| 5962-7802301MFA                                    | 27014                    | DS26LS31MW/883                      |
| 5962-7802301Q2A                                    | 27014                    | DS26LS31ME/883                      |
| 5962-7802301VEA                                    | 27014                    | DS26LS31MJ-QMLV                     |
| 5962-7802301VFA                                    | 27014                    | DS26LS31MW-QMLV                     |
| 5962-7802302M2A                                    | 27014                    | DS26F31ME/883                       |
| 5962-7802302MEA                                    | 27014                    | DS26F31MJ/883                       |
| 5962-7802302MFA                                    | 27014                    | DS26F31MW/883                       |
| 5962-7802302VEA                                    | 27014                    | DS26F31MJ-QMLV                      |
| 5962-7802302VFA                                    | 27014                    | DS26F31MW-QMLV                      |
| 5962F7802301MEA                                    | 27014                    | DS26LS31MJFQML                      |
| 5962F7802301MFA                                    | 27014                    | DS26LS31MWFQML                      |
| 5962F7802301Q2A                                    | 27014                    | DS26LS31MEFQML                      |
| 5962F7802301VEA                                    | 27014                    | DS26LS31MJFQMLV                     |
| 5962F7802301VFA                                    | 27014                    | DS26LS31MWFQMLV                     |

STANDARD MICROCIRCUIT DRAWING BULLETIN – continued.

- 1/ The lead finish shown for each PIN representing a hermetic package is the most readily available from the manufacturer listed for that part. If the desired lead finish is not listed contact the vendor to determine its availability.
- 2/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

Vendor CAGE  
number

Vendor name  
and address

27014

National Semiconductor  
2900 Semiconductor Drive  
P.O. Box 58090  
Santa Clara, CA 95052-8090  
Point of contact: 333 Western Avenue  
South Portland, ME 04106

0C7V7

Qualified Parts Laboratory, Inc.  
3605 Kifer Road  
Santa Clara, CA 95051

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