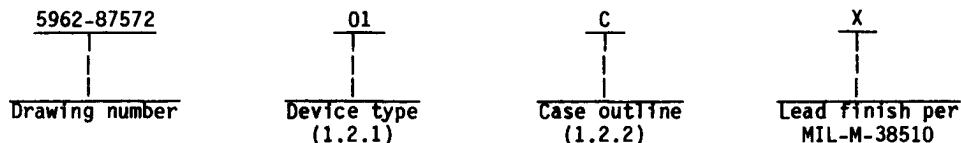




1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:



1.2.1 Device types. The device types shall identify the circuit function as follows:

| <u>Device type</u> | <u>Generic number</u> | <u>Circuit function</u>                                   |
|--------------------|-----------------------|---|
| 01                 | 527                   | High-speed voltage comparator with emitter-follower input |
| 02                 | 529                   | High-speed voltage comparator                             |
| 03                 | LM161                 | High-speed voltage comparator                             |

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

| <u>Outline letter</u> | <u>Case outline</u>  |
|-----------------------|--|
| B                     | F-3 (14 lead, .280" x .200" x .070"), flat package         |
| C                     | D-1 (14-lead, .785" x .310" x .200"), dual-in-line package |
| D                     | F-2 (14-lead, .390" x .260" x .085"), flat package         |
| I                     | A-2 (10-lead, .370" x .185"), can package                  |

1.3 Absolute maximum ratings.

|   |                             |
|---|-----------------------------|
| <u>Positive supply voltage (V<sub>1</sub><sup>+</sup>):</u> |                             |
| Device types 01 and 02                                      | +15 V dc                    |
| Device type 03  | +16 V dc                    |
| <u>Negative supply voltage (V<sub>1</sub><sup>-</sup>):</u> |                             |
| Device types 01 and 02                                      | -15 V dc                    |
| Device type 03  | -16 V dc                    |
| Gate supply voltage (V <sub>2</sub> <sup>+</sup> )          | +7 V dc                     |
| Output voltage  | +7 V dc                     |
| Differential input voltage (V <sub>IN</sub> )               | +5 V dc                     |
| Input common mode voltage                                   | +6 V dc                     |
| Lead temperature (soldering, 60 seconds)                    | +300°C                      |
| Power dissipation (P <sub>D</sub> )                         | 600 mW 1/                   |
| Junction temperature (T <sub>J</sub> )                      | +150°C                      |
| Thermal resistance, junction-to-case (θ <sub>JC</sub> )     | See MIL-M-38510, appendix C |
| Storage temperature range                                   | -65°C to +150°C             |

1.4 Recommended operating conditions.

|   |                        |
|---|------------------------|
| <u>Supply voltage:</u>                                |                        |
| V <sub>1</sub> <sup>+</sup>                           | +5 V dc to +10 V dc    |
| V <sub>1</sub> <sup>-</sup>                           | -6 V dc to -10 V dc    |
| V <sub>2</sub> <sup>+</sup>                           | +4.5 V dc to +5.5 V dc |
| Ambient operating temperature range (T <sub>A</sub> ) | -55°C to +125°C        |

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

|   |                            |                   |
|---|----------------------------|-------------------|
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|   | REVISION LEVEL<br><b>A</b> | SHEET<br><b>2</b> |

**2. APPLICABLE DOCUMENTS**

2.1 Government specification and standard. Unless otherwise specified, the following specification and standard, of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

**SPECIFICATION**

**MILITARY**

MIL-M-38510 - Microcircuits, General Specification for.

**STANDARD**

**MILITARY**

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

(Copies of the specification and standard required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

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 shall take precedence.

**3. REQUIREMENTS**

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

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

3.2.2 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

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

3.4 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in 6.4 herein.

3.5 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in 6.4. The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall state that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.6 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.7 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

|   |                  |                            |                   |
|---|------------------|----------------------------|-------------------|
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DESC FORM 193A  
SEP 87

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TABLE I. Electrical performance characteristics.

| Test                              | Symbol                 | Conditions 1/<br>-55°C < T <sub>A</sub> < +125°C<br>unless otherwise specified | Device type | Group A subgroups | Limits   |          | Unit |
|-----------------------------------|------------------------|--|-------------|-------------------|----------|----------|------|
|                                   |                        |  |             |                   | Min      | Max      |      |
| Input offset voltage              | V <sub>IO</sub>        |  | 01,02       | 1<br>2,3          |          | 4<br>6   | mV   |
|                                   |                        |  | 03          | 1<br>2,3          |          | 3<br>5   |      |
| Input bias current                | I <sub>B</sub>         | V <sub>IN</sub> = 0 V  | 01          | 1<br>2,3          |          | 2<br>4   | μA   |
|                                   |                        |  | 02          | 1<br>2,3          |          | 12<br>36 |      |
|                                   |                        |  | 03          | 1,2,3             |          | 20       |      |
| Input offset current              | I <sub>I(OFFSET)</sub> |  | 01          | 1<br>2,3          |          | 0.5<br>1 | μA   |
|                                   |                        |  | 02          | 1<br>2,3          |          | 3<br>9   |      |
|                                   |                        |  | 03          | 1<br>2,3          |          | 4<br>8   |      |
| Common mode voltage range         | V <sub>CM</sub>        |  | 01,02       | 1,2,3             | ±5       |          | V    |
| High level output voltage (LOGIC) | V <sub>OH</sub>        | V <sub>2+</sub> = 4.5 V<br>I <sub>SOURCE</sub> = -1 mA                         | A11         | 1,2,3             | 2.4      |          | V    |
| Low level output voltage (LOGIC)  | V <sub>OL</sub>        | V <sub>2+</sub> = 4.5 V<br>I <sub>SINK</sub> = 10 mA                           | A11         | 1,2,3             |          | 0.5      | V    |
| High level input voltage (STROBE) | V <sub>IH</sub>        | V <sub>2+</sub> = 4.5 V  | A11         | 1<br>2,3          | 2<br>2.4 |          | V    |
| Low level input voltage (STROBE)  | V <sub>IL</sub>        | V <sub>2+</sub> = 4.5 V  | A11         | 1,2,3             |          | 0.8      | V    |
| High level input current (STROBE) | I <sub>IH</sub>        | V <sub>2+</sub> = 5.5 V<br>V <sub>STROBE</sub> = 2.7 V                         | A11         | 1,2,3             |          | 200      | μA   |
| Low level input current (STROBE)  | I <sub>IL</sub>        | V <sub>2+</sub> = 5.5 V<br>V <sub>STROBE</sub> = 0.4 V                         | A11         | 1,2,3             |          | -2       | mA   |

See footnote at end of table.

|   |                            |                   |
|---|----------------------------|-------------------|
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|   | REVISION LEVEL<br><b>A</b> | SHEET<br><b>4</b> |

DESC FORM 193A  
SEP 87

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TABLE I. Electrical performance characteristics - Continued.

| Test                                 | Symbol  | Conditions 1/<br>-55°C < T <sub>A</sub> < +125°C<br>unless otherwise specified                         | Device<br>type | Group A<br>subgroups | Limits |                | Unit |
|--------------------------------------|---|--|----------------|----------------------|--------|----------------|------|
|                                      |   |  |                |                      | Min    | Max            |      |
| Output short circuit<br>current      | I <sub>OS</sub>                                       | V <sub>2+</sub> = 5.5 V,<br>V <sub>OUT</sub> = 0 V   | A11            | 1,2,3                |        | -70            | mA   |
| Supply current                       | I <sub>1+</sub><br>I <sub>1-</sub><br>I <sub>2+</sub> | V <sub>1+</sub> = 10 V, V <sub>1-</sub> = -10 V,<br>V <sub>2+</sub> = 5.5 V                            | A11            | 1,2,3                |        | 5<br>-10<br>20 | mA   |
| Input clamp voltage<br>(STROBE)      | V <sub>IC</sub>                                       | V <sub>2+</sub> = 5.5 V,<br>I <sub>IN</sub> = -18 mA   | A11            | 1,2,3                |        | -1.5           | V    |
| Propagation delay time               | t <sub>PLH</sub>                                      | V <sub>IN</sub> = ±100 mV step,<br>C <sub>L</sub> = 15 pF, T <sub>A</sub> = +25°C,<br>see figure 2, 2/ | 01<br>02<br>03 | 9                    |        | 26<br>22<br>20 | ns   |
|                                      | t <sub>PHL</sub>                                      |  | 01<br>02<br>03 |                      |        | 24<br>20<br>20 |      |
| Delay time between<br>output A and B |   |  | A11            | 9                    |        | 5              | ns   |

1/ V<sub>1+</sub> = +10 V, V<sub>1-</sub> = -10 V, V<sub>2+</sub> = +5 V, unless otherwise specified.  
 2/ For device types 01 and 02, R<sub>4</sub> = 390Ω. For device type 03, R<sub>4</sub> = 2.43 kΩ.

|   |                     |            |
|---|---------------------|------------|
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|   | REVISION LEVEL<br>A | SHEET<br>5 |

|                 |                             |                             |                             |
|-----------------|-----------------------------|-----------------------------|-----------------------------|
| Device types    | 01 and 02                   | 03                          |                             |
| Case outlines   | C and D                     | B and C                     | I                           |
| Terminal number | Terminal symbol             |                             |                             |
| 1               | V <sub>1</sub> <sup>+</sup> | V <sub>1</sub> <sup>+</sup> | INPUT A                     |
| 2               | NC                          | NC                          | INPUT B                     |
| 3               | INPUT A                     | INPUT A                     | V <sub>1</sub> <sup>-</sup> |
| 4               | INPUT B                     | INPUT B                     | STROBE B                    |
| 5               | NC                          | NC                          | OUTPUT B                    |
| 6               | V <sub>1</sub> <sup>-</sup> | V <sub>1</sub> <sup>-</sup> | GND                         |
| 7               | NC                          | NC                          | OUTPUT A                    |
| 8               | STROBE B                    | STROBE B                    | STROBE A                    |
| 9               | OUTPUT B                    | OUTPUT B                    | V <sub>2</sub> <sup>+</sup> |
| 10              | GND                         | GND                         | V <sub>1</sub> <sup>+</sup> |
| 11              | OUTPUT A                    | OUTPUT A                    | ---                         |
| 12              | NC                          | NC                          | ---                         |
| 13              | STROBE A                    | STROBE A                    | ---                         |
| 14              | V <sub>2</sub> <sup>+</sup> | V <sub>2</sub> <sup>+</sup> | ---                         |

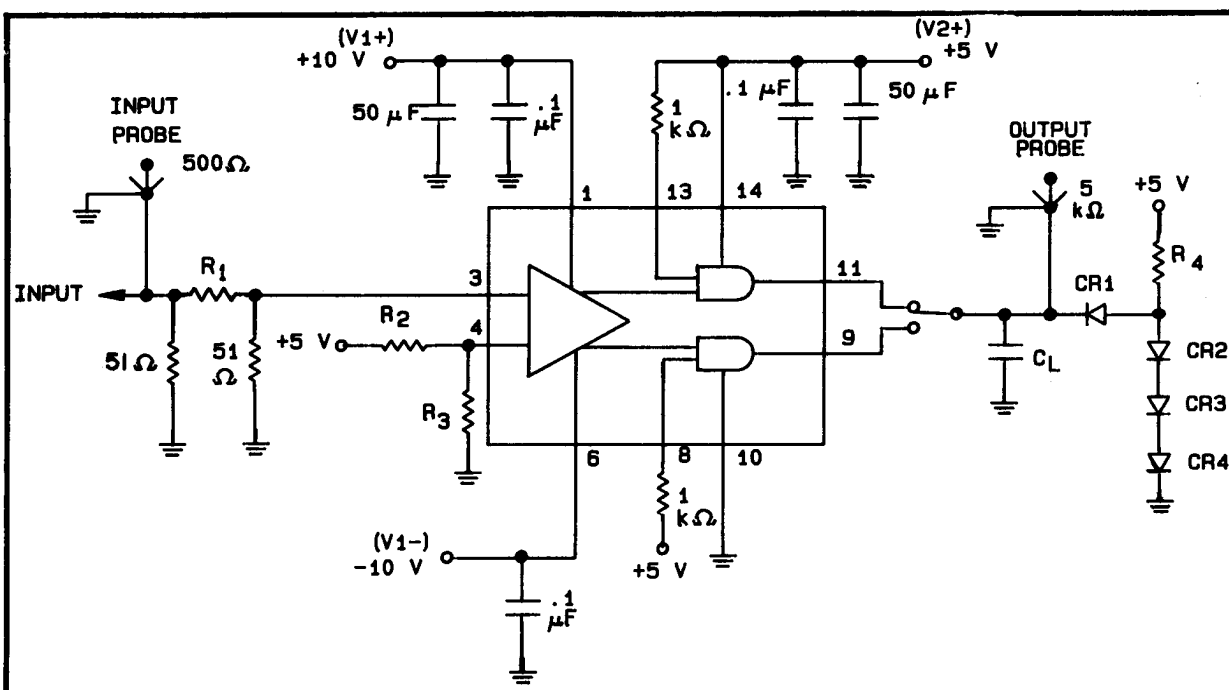
NC = no connection

FIGURE 1. Terminal connections.

|   |                  |                     |            |
|---|------------------|---------------------|------------|
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|   |                  | REVISION LEVEL<br>A | SHEET<br>6 |

DESC FORM 193A  
SEP 87

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PIN NUMBERS REFER TO CASES B, C, AND D  
 CR1 - CR4 = 1N94  
 R1 SELECTED FOR 15: 1 DIVIDER  
 R2 AND R3 SELECTED FOR 100 mV AT PIN 4

INPUT  
 PRR = 1 MHz  
 Pw = 50 ns  
 tr = tf = 2 ns  
 INPUT = 3.00 V

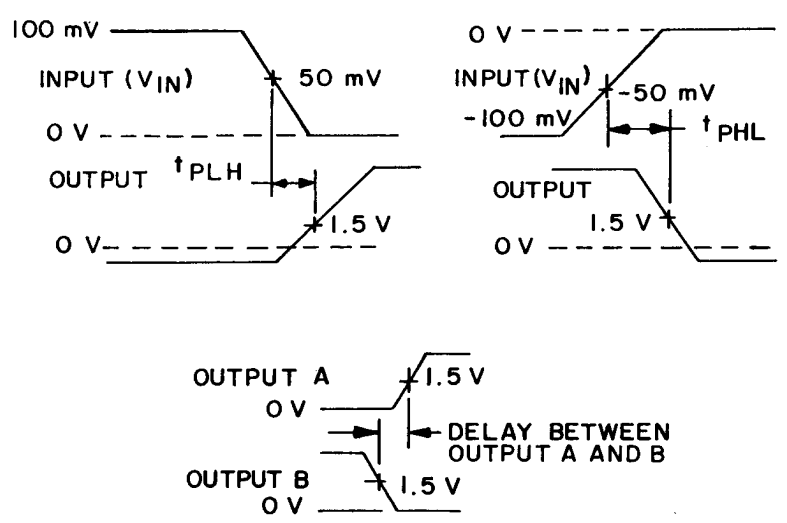


FIGURE 2. Switching time test circuit and waveforms.

|   |                     |            |
|---|---------------------|------------|
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|   | REVISION LEVEL<br>A | SHEET<br>7 |

DESC FORM 193A  
 SEP 87

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3.8 Verification and review. DESC, DESC'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.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

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

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

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

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

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

b. Subgroups 4, 5, 6, 7, 8, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.5 herein).

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

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

|   |                     |            |
|---|---------------------|------------|
| <b>STANDARDIZED<br/>MILITARY DRAWING</b><br>DEFENSE ELECTRONICS SUPPLY CENTER<br>DAYTON, OHIO 45444 | SIZE<br><b>A</b>    | 5962-87572 |
|   | REVISION LEVEL<br>A | SHEET<br>8 |

DESC FORM 193A  
SEP 87

U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904



TABLE II. Electrical test requirements.

|  |  |
|--|--|
| MIL-STD-883 test requirements                                      | Subgroups<br>(per method<br>5005, table I) |
| Interim electrical parameters<br>(method 5004)                     | ---  |
| Final electrical test parameters<br>(method 5004)                  | 1*, 2, 3, 9                                |
| Group A test requirements<br>(method 5005)                         | 1, 2, 3, 9                                 |
| Groups C and D end-point<br>electrical parameters<br>(method 5005) | 1  |

\*PDA applies to subgroup 1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

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

6.3 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone 513-296-5375.

|   |                  |                     |            |
|---|------------------|---------------------|------------|
| <b>STANDARDIZED<br/>MILITARY DRAWING</b><br>DEFENSE ELECTRONICS SUPPLY CENTER<br>DAYTON, OHIO 45444 | SIZE<br><b>A</b> |                     | 5962-87572 |
|   |                  | REVISION LEVEL<br>A | SHEET<br>9 |

DESC FORM 193A  
SEP 87

\* U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904

6.4 Approved sources of supply. Approved sources of supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have agreed to this drawing and a certificate of compliance (see 3.5 herein) has been submitted to DESC-ECS.

| Military drawing part number | Vendor CAGE number | Vendor similar part number <u>1/</u> |
|------------------------------|--------------------|--------------------------------------|
| 5962-8757201CX               | 18324              | 527/BCA                              |
| 5962-8757201DX               | 18324              | 527/BDA                              |
| 5962-8757202CX               | 18324              | 529/BCA                              |
| 5962-8757202DX               | 18324              | 529/BDA                              |
| 5962-8757203CX               | 27014              | LM161J/883B                          |
| 5962-8757203BX               | 27014              | LM161F/883B                          |
| 5962-8757203IX               | 27014              | LM161H/883B                          |

1/ 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

18324

27014

Vendor name and address

Signetics Corporation  
4130 South Market Street  
Sacramento, CA 95834

National Semiconductor  
2900 Semiconductor Drive  
Santa Clara, CA 95051

|   |                  |                     |             |
|---|------------------|---------------------|-------------|
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|   |                  | REVISION LEVEL<br>A | SHEET<br>10 |

DESC FORM 193A  
SEP 87

\* U. S. GOVERNMENT PRINTING OFFICE: 1988-549-904

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