## REVISIONS

| LTR | DESCRIPTION | DATE (YR-MO-DA) | APPROVED |
|---|---|---|---|
| A | Table I, change maximum for $V_{OS}$ and correct $V_{IN}$ range in footnote 1. Update format. Editorial changes throughout. | 1989 OCT 20 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REV | | | | | | | | | | | | |
| SHEET | | | | | | | | | | | | |
| REV | | | | | | | | | | | | |
| SHEET | | | | | | | | | | | | |
| REV STATUS OF SHEETS | REV | A | A | A | A | A | A | A | | A | A | A |
| | SHEET | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

| | | |
|---|---|---|
| PMIC N/A | PREPARED BY<br>Gary Zahn | DEFENSE ELECTRONICS SUPPLY CENTER<br>DAYTON, OHIO 45444 |
| **STANDARDIZED MILITARY DRAWING**<br>THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE<br>AMSC N/A | CHECKED BY<br>Charles E. Besore | MICROCIRCUITS, LINEAR, FAST ±150 mA, POWER BUFFER, MONOLITHIC SILICON |
| | APPROVED BY | |
| | DRAWING APPROVAL DATE<br>10 MAY 1988 | SIZE A · CAGE CODE 67268 · 5962-88562 |
| | REVISION LEVEL<br>A | SHEET 1 OF 11 |

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* U.S. GOVERNMENT PRINTING OFFICE: 1987 — 748-129/60911

**DISTRIBUTION STATEMENT A.** Approved for public release; distribution is unlimited.

## 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:

| 5962-88562 | 01 | X | X |
|---|---|---|---|
| Drawing number | Device type<br>(1.2.1) | Case outline<br>(1.2.2) | Lead finish per<br>MIL-M-38510 |

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

| Device type | Generic number | Circuit function |
|---|---|---|
| 01 | LT1010 | Fast ±150 mA power buffer |

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

| Outline letter | Case outline |
|---|---|
| X | See figure 1, TO-39 (4-lead can) |
| Y | See figure 1, TO-3 (4-lead can) |

1.3 Absolute maximum ratings.

Total supply voltage ($V_S$)- - - - - - - - - - - - - - ±22 V dc
Input voltage range - - - - - - - - - - - - - - - - V- + 0.5 V dc to V+ - 1.5 V dc
Power dissipation ($P_D$):
  Case X - - - - - - - - - - - - - - - - - - - - - - - 3.1 W
  Case Y - - - - - - - - - - - - - - - - - - - - - - - 5 W
Output short circuit duration - - - - - - - - - - - Indefinite
Storage temperature range - - - - - - - - - - - - - -65°C to +150°C
Lead temperature (soldering, 10 seconds) - - - - - +300°C
Junction temperature ($T_J$) - - - - - - - - - - - - +150°C
Thermal resistance, junction-to-case ($\theta_{JC}$):
  Case X - - - - - - - - - - - - - - - - - - - - - - - 40°C/W
  Case Y - - - - - - - - - - - - - - - - - - - - - - - 25°C/W

1.4 Recommended operating conditions.

Case operating temperature range ($T_C$)- - - - - - - -55°C to +125°C
Total supply voltage ($V_S$) - - - - - - - - - - - - - ±15 V dc

## 2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin 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. |

BULLETIN

MILITARY

| | | |
|---|---|---|
| MIL-BUL-103 | - | List of Standardized Military Drawings (SMD's). |

(Copies of the specification, standard, and bulletin 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 Functional diagram. The functional diagram shall be as specified on figure 2.

3.2.3 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 case operating temperature range.

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

3.5 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 MIL-BUL-103 (see 6.6 herein).

TABLE I. Electrical performance characteristics.

| Test | Symbol | Conditions [1/]<br>$-55^\circ C \le T_C \le +125^\circ C$<br>unless otherwise specified | Group A subgroups | Limits |  | Unit |
|---|---|---|---|---|---|---|
|  |  |  |  | Min | Max |  |
| Output offset voltage | $V_{OS}$ | $I_L$ = 0 mA | 1 | 20 | 110 | mV |
|  |  |  | 2,3 | -10 | 220 |  |
|  |  | $V_S$ = ±15 V, $I_L$ = ±0 mA, $V_{IN}$ = 0 V | 1 | 40 | 90 |  |
| Input bias current | $I_{IB}$ | $I_L$ = 0 mA | 1 | 0 | 150 | µA |
|  |  |  | 2,3 | 0 | 300 |  |
|  |  | $I_L \le 150$ mA | 1 | 0 | 250 |  |
| Output resistance | $R_{OUT}$ | $I_L$ = ±1 mA | 1 | 6 | 9 | Ω |
|  |  | $I_L$ = ±150 mA | 1 | 6 | 9 |  |
|  |  |  | 2,3 |  | 12 |  |
| Slew rate | SR | $V_S$ = ±15 V, $V_{IN}$ = ±10 V<br>$V_{OUT}$ = ±8 V, $R_L$ = 100Ω<br>$T_C$ = +25°C | 4 | 75 |  | V/µs |
| Supply current | $I_S$ | $I_L$ = 0 mA | 1 |  | 8 | mA |
|  |  |  | 2,3 |  | 9 |  |
| Large signal gain | $A_V$ | $V_S$ = ±20 V, $I_{OUT}$ = 0 mA<br>$V_{OUT}$ = ±19.95 V | 4,5,6 | .995 | 1.00 | V/V |
| Saturation resistance | $R_{SAT}$ | 100 mV output clipping<br>$I_L$ = 150 mA | 1 |  | 18 | Ω |
|  |  |  | 2,3 |  | 24 |  |

See footnotes at end of table.

TABLE I. Electrical performance characteristics - Continued.

| Test | Symbol | Conditions 1/<br>$-55^\circ C \le T_C \le +125^\circ C$<br>unless otherwise specified | Group A subgroups | Limits | | Unit |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| Positive saturation offset voltage | $V^{+}_{SOS}$ | 100 mV output clipping<br>$I_L = 0$ mA | 1 | | 1.0 | V |
| | | | 2,3 | | 1.1 | |
| Negative saturation offset voltage | $V^{-}_{SOS}$ | | 1 | | 0.2 | |
| | | | 2,3 | | 0.3 | |
| Bias terminal voltage 2/ | $V_{BIAS}$ | $R_{BIAS} = 20\Omega$ | 1 | 750 | 810 | mV |
| | | | 2,3 | 560 | 925 | |

1/ Specifications apply for $4.5\text{ V} \le V_S \le 40\text{ V}$, $V- + 0.5\text{ V} \le V_{IN} \le V+ - 1.5\text{ V}$, unless otherwise specified.

2/ With case Y package, output stage quiescent current can be increased by connecting a resistor between the bias pin and V+. The increase is equal to the bias terminal voltage divided by this resistance.

3.6 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 MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 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.

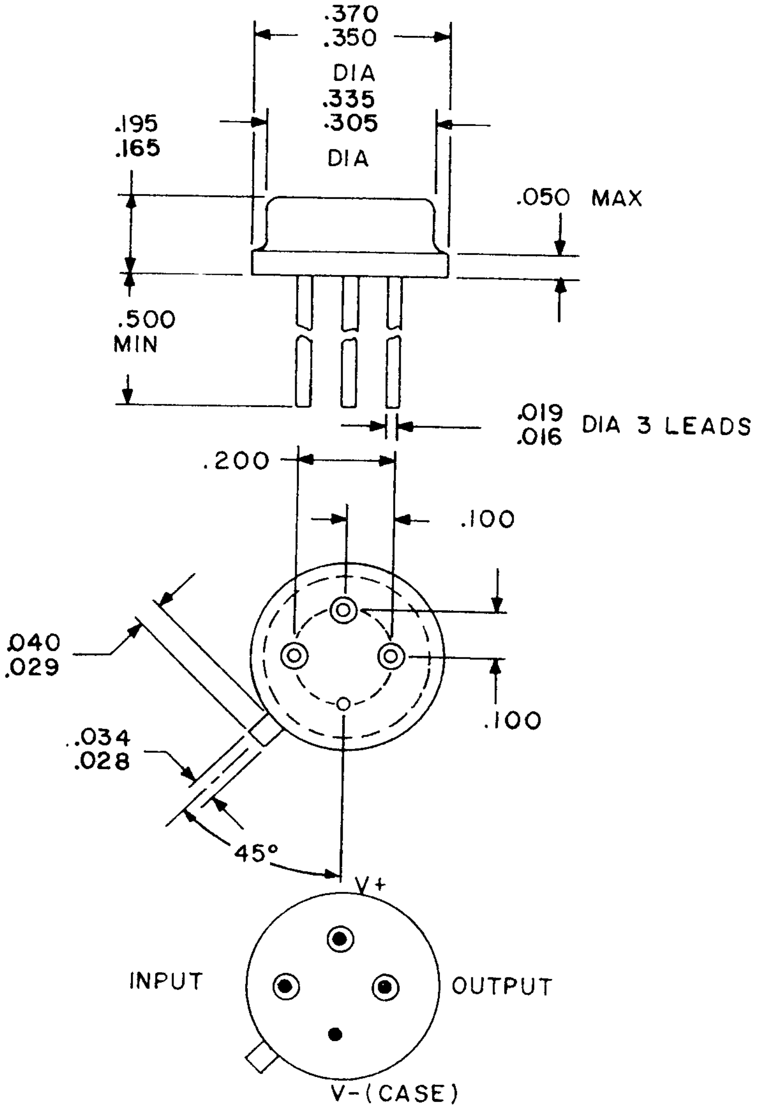
3.8 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 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).

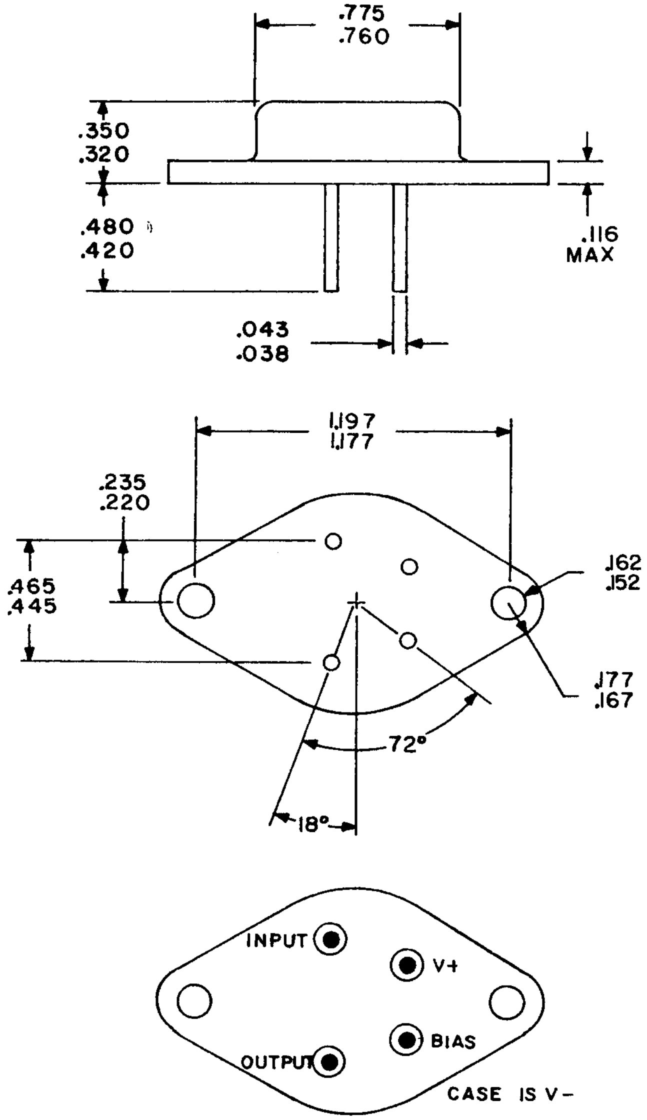
Case X



| Inches | mm |
|---|---|
| .016 | 0.41 |
| .019 | 0.48 |
| .028 | 0.71 |
| .029 | 0.74 |
| .034 | 0.86 |
| .040 | 1.02 |
| .050 | 1.27 |
| .100 | 2.54 |
| .165 | 4.19 |
| .195 | 4.95 |
| .200 | 5.08 |
| .305 | 7.75 |
| .335 | 8.51 |
| .350 | 8.89 |
| .379 | 9.40 |
| .500 | 12.70 |

FIGURE 1. Terminal connections and case outlines.

Case Y



| Inches | mm |
|---|---|
| .038 | 0.97 |
| .043 | 1.09 |
| .116 | 2.95 |
| .152 | 3.86 |
| .162 | 4.11 |
| .167 | 4.24 |
| .177 | 4.50 |
| .220 | 5.59 |
| .235 | 5.97 |
| .320 | 8.13 |
| .350 | 8.89 |
| .420 | 10.67 |
| .445 | 11.30 |
| .465 | 11.81 |
| .480 | 12.19 |
| .760 | 19.30 |
| .775 | 19.69 |
| 1.177 | 29.90 |
| 1.197 | 30.40 |

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.

FIGURE 1. Terminal connections and case outlines - Continued.

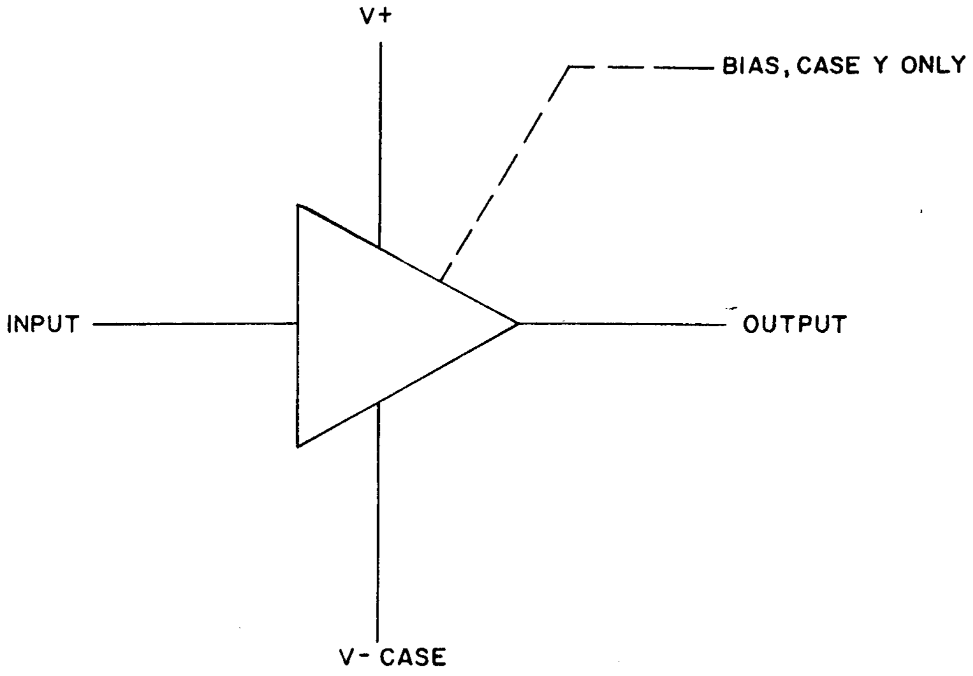


FIGURE 2. Functional diagram.

| | | | |
|---|---|---|---|
| **STANDARDIZED MILITARY DRAWING**<br>**DEFENSE ELECTRONICS SUPPLY CENTER**<br>**DAYTON, OHIO 45444** | **SIZE**<br>**A** | | 5962-88562 |
| | | **REVISION LEVEL** | **SHEET**<br>8 |

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TABLE II. Electrical test requirements.

| MIL-STD-883 test requirements | Subgroups (per method 5005, table I) |
|---|---|
| Interim electrical parameters (method 5004) | --- |
| Final electrical test parameters (method 5004) | 1*, 2, 3, 4, 5, 6 |
| Group A test requirements (method 5005) | 1, 2, 3, 4, 5, 6 |
| Groups C and D end-point electrical parameters (method 5005) | 1, 2, 3 |

* PDA applies to subgroup 1.

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 3.6 herein).

(2) $T_A = +125°C$, 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 7, 8, 9, 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 3.6 herein).

(2) $T_A$ = +125°C, minimum.

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

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 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-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC 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 microelectronics devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6022.

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

6.6 Approved source of supply. An approved source of supply is listed in MIL-BUL-103. Additional sources will be added to MIL-BUL-103 as they become available. The vendor listed in MIL-BUL-103 has agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS. The approved source of supply listed below is for information purposes only and is current only to the date of the last action of this document.

| Military drawing part number | Vendor CAGE number | Vendor similar part number 1/ |
|---|---|---|
| 5962-8856201XX | 64155 | LT1010MH/883 |
| 5962-8856201YX | 64155 | LT1010MK/883 |

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 | Vendor name and address |
|---|---|
| 64155 | Linear Technology Corporation<br>1630 McCarthy Boulevard<br>Milpitas, CA 95035-7487 |