

| REVISIONS | | | | | | | | | | | | | |
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| LTR | DESCRIPTION | DATE (YR-MO-DA) | APPROVED | | | | | | | | | | |
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| REV | | | | | | | | | | | | | |
| SHEET | | | | | | | | | | | | | |
| REV | | | | | | | | | | | | | |
| SHEET | | | | | | | | | | | | | |
| REV STATUS OF SHEETS | REV | | | | | | | | | | | | |
| | SHEET | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | |
| PMIC N/A | PREPARED BY <i>Charles E. Besore</i> | DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444 | | | | | | | | | | | |
| STANDARDIZED MILITARY DRAWING | CHECKED BY <i>Ray Monnin</i> | | | | | | | | | | | | |
| | APPROVED BY <i>[Signature]</i> | | | | | | | | | | | | |
| | DRAWING APPROVAL DATE 24 JULY 1989 | | | | | | | | | | | | |
| THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE | REVISION LEVEL | SIZE A | CAGE CODE 67268 | 5962-88772 | | | | | | | | | |
| AMSC N/A | | SHEET 1 1 | | | | | | | | | | | |

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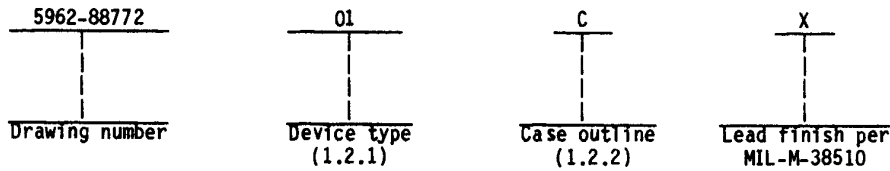
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DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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:



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

| <u>Device type</u> | <u>Generic number</u> | <u>Circuit function</u> |
|--------------------|-----------------------|--|
| 01 | ICL8038 | Precision waveform generator/voltage controlled oscillator |

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

| <u>Outline letter</u> | <u>Case outline</u> |
|-----------------------|--|
| C | D-1 (14-lead, .785" x .310" x .200"), dual-in-line package |

1.3 Absolute maximum ratings.

| | |
|---|-----------------------------|
| Supply voltage (V- to V+) - - - - - | 36 V dc |
| Input voltage (any pin) - - - - - | V- to V+ |
| Input current (pins 4 and 5) - - - - - | 25 mA |
| Output sink current (pins 3 and 9) - - - - - | 25 mA |
| Storage temperature range - - - - - | -65°C to +150°C |
| Lead temperature (soldering, 10 seconds) - - - - - | +300°C |
| Power dissipation (P _D) - - - - - | 750 mW 1/ |
| Thermal resistance, junction-to-case (θ _{JC}) - - - - - | See MIL-M-38510, appendix C |
| Junction temperature (T _J) - - - - - | +150°C |

1.4 Recommended operating conditions.

| | |
|---|-----------------------|
| Supply voltage range, single supply (V+) - - - - - | +10 V dc to +30 V dc |
| Supply voltage range, dual supply (V±) - - - - - | +5.0 V dc to ±15 V dc |
| Ambient operating temperature range (T _A) - - - - - | -55°C to +125°C |

1/ Derate above T_A = +100°C at 12.5 mW/°C.

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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 Functional diagram. The functional diagram shall be as specified on figure 2.

3.2.3 Case outline. The case outline shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified herein, 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 affirm 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.

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| TABLE I. Electrical performance characteristics. | | | | | | |
|---|-----------------------------------|--|----------------------|----------------|-------|------------|
| Test | Symbol | Conditions 1/ -55°C < T _A < +125°C unless otherwise specified | Group A subgroups | Limits | | Unit |
| | | | | Min | Max | |
| General characteristics | | | | | | |
| Supply voltage range, single voltage 2/ | V+ | | 1,2,3 | +10 | +30 | V |
| Supply voltage range, dual supply 2/ | V+ | | 1,2,3 | +5.0 | +15 | V |
| | V- | | | -5.0 | -15 | |
| Supply current | I _{SUP} | V _{SUP} = ±10 V, R _A and R _B currents not included | 1 | | 15 | mA |
| | | | 2,3 | | 24 | |
| Frequency characteristics (all waveforms) | | | | | | |
| Maximum frequency of oscillation | f _{MAX} | | 7,8A,8B | 100 | | kHz |
| Frequency drift with temperature | $\frac{\Delta f}{\Delta T}$ | Pins 7 and 9 connected, V _{SUP} = ±10 V | 4,5 | | 250 | ppm/ °C |
| | | | 6 | | 350 | |
| Frequency drift with supply voltage | $\frac{\Delta f}{\Delta V_{SUP}}$ | Over supply voltage range | 4,5,6 | | 0.5 | %/V |
| FM linearity 10:1 ratio | FML | | 9,10,11 | | 1.5 | % |
| See footnotes at end of table. | | | | | | |
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TABLE I. Electrical performance characteristics - Continued.

| Test | Symbol | Conditions 1/ -55°C < T _A < +125°C unless otherwise specified | Group A subgroups | Limits | | Unit |
|----------------------------------|--------------------|--|----------------------|--------------------------|------|------------------|
| | | | | Min | Max | |
| Output characteristics | | | | | | |
| Square wave leakage current | I _{OLK} | Voltage at square wave out = 30 V _{p-p} | 1,3 | | 1.0 | μA |
| | | | 2 | | 5.0 | |
| Square wave saturation voltage | V _{SAT} | I _{SINK} = 2.0 mA | 1 | 0.4 | | V |
| | | | 2 | 0.6 | | |
| | | | 3 | 0.5 | | |
| Duty cycle adjust 2/ | ΔD | | 1,2,3 | 5.0 | 95.0 | % |
| Triangle/sawtooth/ramp amplitude | V _{T/S/R} | R _{TRI} = 100 kΩ | 1,2,3 | 0.3 xV _{SUP} | | V _{p-p} |
| Sine-wave amplitude | V _{SINE} | R _{SINE} = 100 kΩ | 1,2,3 | 0.2 xV _{SUP} | | V _{p-p} |
| Total harmonic distortion | THD | R _S = 1.0 MΩ 3/ | 4 | | 1.5 | % |
| | | | 5,6 2/ | | 3.5 | |

1/ V_{SUP} = ±10 V or +20 V unless otherwise specified. See test circuit on figure 3.
 2/ If not tested, shall be guaranteed to the limits specified in table I.
 3/ 82 kΩ connected between pins 11 and 12, triangle duty cycle set at 50 percent (use R_A and R_B).

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| | |
|-----------------|-----------------------------|
| Device type | 01 |
| Case outline | C |
| Terminal number | Terminal symbol |
| 1 | Sine wave adjust |
| 2 | Sine wave out |
| 3 | Triangle out |
| 4 | Duty cycle frequency adjust |
| 5 | Duty cycle frequency adjust |
| 6 | +V |
| 7 | FM bias |
| 8 | FM sweep input |
| 9 | Square wave out |
| 10 | Timing capacitor |
| 11 | -V or GND |
| 12 | Sine wave adjust |
| 13 | NC |
| 14 | NC |

FIGURE 1. Terminal connections.

| | | | |
|---|------------------|----------------|------------|
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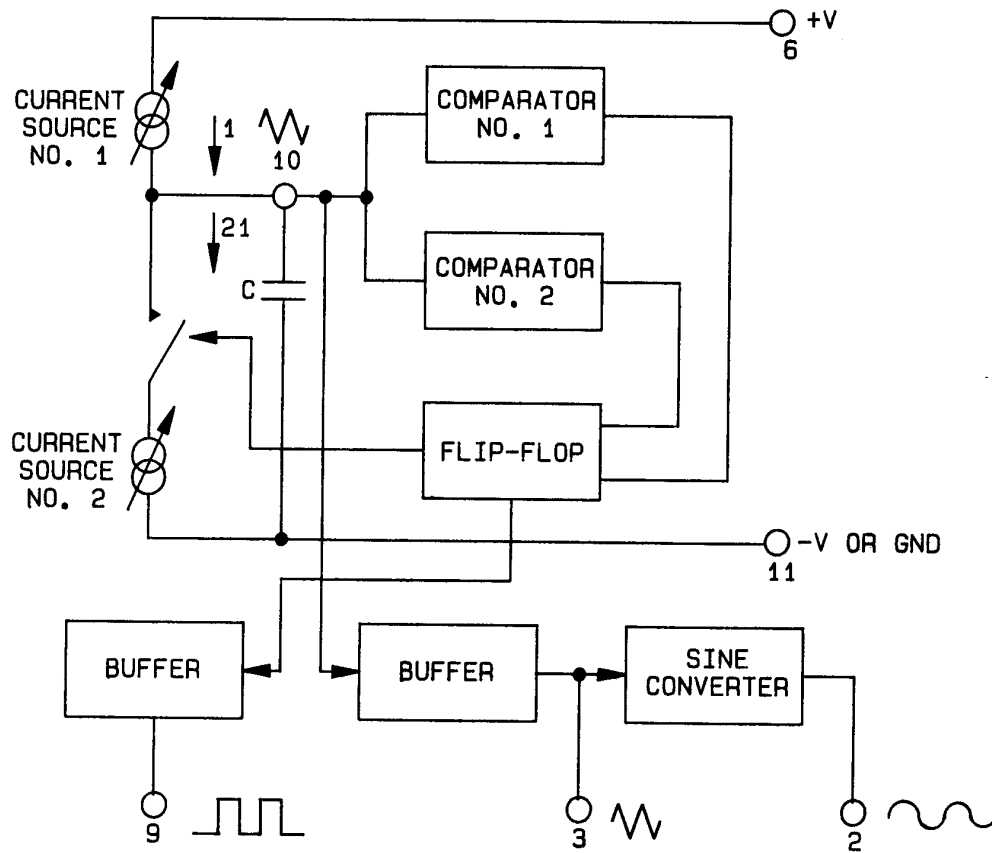
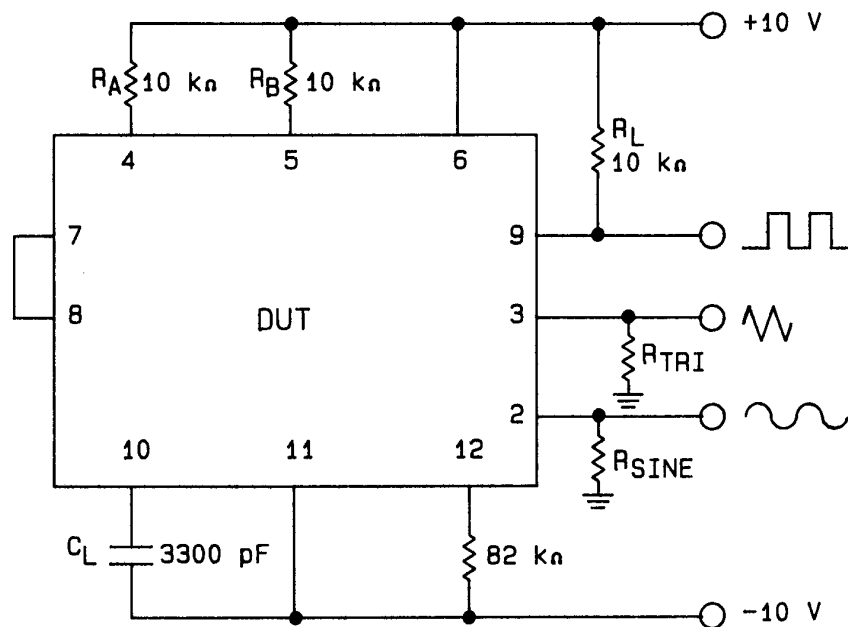


FIGURE 2. Functional diagram.

| | | | |
|---|------------------|----------------|------------|
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NOTES:

1. R_L is not used for leakage current and saturation voltage testing. During these tests, oscillation can be halted by forcing pin 10 to +5.0 V or -5.0 V.
2. Output amplitude is tested under static conditions by forcing pin 10 to +5.0 V then to -5.0 V.

FIGURE 3. Test circuit.

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

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.

Tests shall be as specified in table II herein.

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.

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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) | 1 |
| Final electrical test parameters (method 5004) | 1*,2,3,4,5,6,7, 8A,8B,9,10,11 |
| Group A test requirements (method 5005) | 1*,2,3,4,5,6,7, 8A,8B,9,10,11 |
| Groups C and D end-point electrical parameters (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.

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6.4 Approved source of supply. An approved source of supply is listed herein. Additional sources will be added as they become available. The vendor listed herein has agreed to this drawing and a 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> |
|------------------------------|--------------------|--------------------------------------|
| 5962-8877201CX | 32293 | ICL8038AMJD/883B |

1/ Caution. Do not use this number for item acquisition. Items acquired by this number may not satisfy the performance requirements of this drawing.

Vendor CAGE number

32293

Vendor name and address

Intersil, Incorporated
2450 Walsh Avenue
Santa Clara, CA 95051

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