<table>
<thead>
<tr>
<th>LTR</th>
<th>DESCRIPTION</th>
<th>DATE (YR-MO-DA)</th>
<th>APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Add radiation hardened requirements. -rrp</td>
<td>18-07-10</td>
<td>C. SAFFLE</td>
</tr>
</tbody>
</table>

**STANDARD MICROCIRCUIT DRAWING**

This drawing is available for use by all departments and agencies of the Department of Defense.

**PREPARED BY**
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**DRAWING APPROVAL DATE**
18-03-05

**MICROCIRCUIT, DIGITAL-LINEAR, TEMPERATURE SENSOR, MONOLITHIC SILICON**

**AMSC N/A**

**REVISION LEVEL**
A

**SIZE**
A

**CAGE CODE**
67268

**SHEET 1 OF 13**

**DISTRIBUTION STATEMENT A.** Approved for public release. Distribution is unlimited.
1. SCOPE

1.1 Scope. This drawing documents two product assurance class levels consisting of high reliability (device class Q) 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 is reflected in the PIN.

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

```
5962 R 17218 01 V X C
```

Federal stock class designator  RHA designator (see 1.2.1)  Device type (see 1.2.2)  Device class designator (see 1.2.3)  Case outline (see 1.2.4)  Lead finish (see 1.2.5)

Drawing number

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. A dash (-) indicates a non-RHA device.

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

<table>
<thead>
<tr>
<th>Device type</th>
<th>Generic number</th>
<th>Circuit function</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>TMP461-SP</td>
<td>Remote and local digital temperature</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sensor</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Device class</th>
<th>Device requirements documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q or V</td>
<td>Certification and qualification to MIL-PRF-38535</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Outline letter</th>
<th>Descriptive designator</th>
<th>Terminals</th>
<th>Package style</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>See figure 1</td>
<td>10</td>
<td>Flat pack</td>
</tr>
</tbody>
</table>

1.2.5 Lead finish. The lead finish is as specified in MIL-PRF-38535 for device classes Q and V.
1.3 Absolute maximum ratings. 1/

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage range (+V)</td>
<td>-0.3 V to +6 V</td>
</tr>
<tr>
<td>Input voltage:</td>
<td></td>
</tr>
<tr>
<td>THERM, ALERT / THERMC, SDA and SCL</td>
<td>-0.3 V to +6 V</td>
</tr>
<tr>
<td>+D, A0, A1</td>
<td>-0.3 V to (+V) + 0.3 V</td>
</tr>
<tr>
<td>-D</td>
<td>-0.3 V to +0.3 V</td>
</tr>
<tr>
<td>Input current</td>
<td>10 mA</td>
</tr>
<tr>
<td>Maximum junction temperature (T_J)</td>
<td>+150°C</td>
</tr>
<tr>
<td>Maximum power dissipation (P_D)</td>
<td>1.28 mW</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-60°C to +150°C</td>
</tr>
<tr>
<td>Thermal resistance, junction-to-case (top) (θ_JC)</td>
<td>20.7°C/W</td>
</tr>
<tr>
<td>Thermal resistance, junction-to-ambient (θ_JA)</td>
<td>39.2°C/W</td>
</tr>
</tbody>
</table>

1.4 Recommended operating conditions.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply voltage (+V)</td>
<td>+1.7 V to +3.6 V</td>
</tr>
<tr>
<td>Ambient operating temperature range (T_A)</td>
<td>-55°C to +125°C</td>
</tr>
</tbody>
</table>

1.5 Radiation features.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum total ionizing dose available (effective dose rate = 31 mrad(Si)/s)</td>
<td>100 krad(Si) 2/</td>
</tr>
<tr>
<td>Maximum total ionizing dose available (low dose rate ≤ 10 mrad(Si)/s)</td>
<td>100 krad(Si) 3/</td>
</tr>
</tbody>
</table>

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/ Device type 01 is irradiated at dose rate = 50 - 300 rad(Si)/s in accordance with MIL-STD-883, method 1019, condition A, and is guaranteed to a maximum total dose specified. The effective dose rate for device type 01 after extended room temperature anneal = 31 mrad(Si)/s per MIL-STD-883, method 1019, condition A, section 3.11.2. The total dose specification for these devices only applies to the specified effective dose rate, or lower environment.

3/ The manufacturer supplying device type 01 also tested low dose rate condition D in accordance with MIL-STD-883 method 1019. The radiation end point limits for the noted parameters are guaranteed only for the conditions as specified in MIL-STD-883, method 1019, condition D to a maximum total dose of 100 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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION


DEPARTMENT OF DEFENSE STANDARDS


DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-103 - List of Standard Microcircuit Drawings.
MIL-HDBK-780 - Standard Microcircuit Drawings.

(Copies of these documents are available online at http://quicksearch.dla.mil.)

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 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.

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.

3.2.1 Case outline. The case outline shall be in accordance with 1.2.4 herein and figure 1.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Radiation exposure circuit. The radiation exposure circuit shall be maintained by the manufacturer under document revision level control and shall be made available to the preparing and acquiring activity upon request.

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. 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 "5962:0" 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

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.
### TABLE I. Electrical performance characteristics.

| Test                                      | Symbol          | Conditions 1/  
|                                           |                 | -55°C ≤ TA ≤ +125°C  
|                                           |                 | +V = 1.7 V to 3.6 V  
|                                           |                 | unless otherwise specified  
|                                           |                 | Group A subgroups  
|                                           |                 | Device type  
|                                           |                 | Limits  
|                                           |                 | Min  
|                                           |                 | Max  
|                                           |                 | Unit  
| Temperature measurement                   |                 |                 | 01 | -2.0 | +2.0 | °C  
| Local temperature sensor accuracy         | TA(LOCAL)       | TA = -55°C to +125°C,  
|                                           |                 | +V = 1.7 V to 3.6 V  
| Remote temperature sensor accuracy         | TA(REMOTE)      | TA = -55°C to +125°C,  
|                                           |                 | +V = 1.7 V to 3.6 V  
| Temperature sensor error versus supply     |                 | +V = 1.7 V to 3.6 V  
| (local or remote)                         |                 | 1, 2, 3 | 01 | -1.5 | +1.5 | °C  
|                                              |                 | 1, 2, 3 | 01 | -0.3 | +0.3 | °C/V  
| Analog-to-digital converter (ADC) conversion time |                 | One-shot mode, per channel  
| (local or remote)                         |                 | (local or remote)  
| Remote sensor source current high          |                 | Series resistance 1 kΩ (max)  
|                                           |                 | 1, 2, 3 | 01 | 88 | 152 | µA  
| Remote sensor source current medium        |                 | Series resistance 1 kΩ (max)  
|                                           |                 | 1, 2, 3 | 01 | 33 | 57 | µA  
| Remote sensor source current low           |                 | Series resistance 1 kΩ (max)  
|                                           |                 | 1, 2, 3 | 01 | 5.5 | 9.5 | µA  
| Serial interface                           |                 |                 |  
| High level input voltage                   | V_H              | 1, 2, 3 | 01 | 1.4 | V  
| Low level input voltage                    | V_L              | 1, 2, 3 | 01 | 0.45 | V  
| SDA output low sink current                |                 | 1, 2, 3 | 01 | 6 | mA  
| Low level output voltage                   | V_O              | I_OUT = -6 mA  
|                                           |                 | 1, 2, 3 | 01 | 0.4 | V  
| Serial bus input leakage current           |                 | 0 ≤ V_IN ≤ 3.6 V  
|                                           |                 | 1, 2, 3 | 01 | -1 | 1 | µA  
| Serial bus clock frequency                 |                 | 4, 5, 6 | 01 | 0.001 | 2.17 | MHz  
| Serial bus timeout                         |                 | 9, 10, 11 | 01 | 20 | 30 | ms  

See footnote at end of table.
<table>
<thead>
<tr>
<th>Test</th>
<th>Symbol</th>
<th>Conditions 1/</th>
<th>Group A subgroups</th>
<th>Device type</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital inputs (A0, A1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High level input voltage</td>
<td>V\textsubscript{IH}</td>
<td>1, 2, 3</td>
<td>01</td>
<td>0.9(+V)</td>
<td>(+V) + 0.3</td>
<td>V</td>
</tr>
<tr>
<td>Low level input voltage</td>
<td>V\textsubscript{IL}</td>
<td>1, 2, 3</td>
<td>01</td>
<td>-0.3</td>
<td>0.1(+V)</td>
<td>V</td>
</tr>
<tr>
<td>Input leakage current</td>
<td></td>
<td>0 \leq V\textsubscript{IN} \leq 3.6 V</td>
<td>1, 2, 3</td>
<td>01</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>Digital outputs (\textsc{THERM}, \textsc{ALERT}/\textsc{THERM})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output low sink current</td>
<td>V\textsubscript{OL}</td>
<td>1, 2, 3</td>
<td>01</td>
<td>6</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>Low level output voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>High level output leakage current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>µA</td>
</tr>
<tr>
<td>Power Supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specified supply voltage range</td>
<td>+V</td>
<td>1, 2, 3</td>
<td>01</td>
<td>1.7</td>
<td>3.6</td>
<td>V</td>
</tr>
<tr>
<td>Quiescent current</td>
<td>I\textsc{Q}</td>
<td>1, 2, 3</td>
<td>01</td>
<td>375</td>
<td>µA</td>
<td></td>
</tr>
<tr>
<td>Active conversion, local sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active conversion, remote sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby mode (between conversions)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Shutdown mode, serial bus inactive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Power-on reset threshold</td>
<td>POR</td>
<td>Rising edge</td>
<td>1, 2, 3</td>
<td>1.55</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Two-wire timing requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCL operating frequency</td>
<td>f\textsc{(SCL)}</td>
<td>4, 5, 6</td>
<td>01</td>
<td>0.001</td>
<td>0.4</td>
<td>MHz</td>
</tr>
<tr>
<td>Bus free time between stop and start condition</td>
<td>f\textsc{(BUF)}</td>
<td>9, 10, 11</td>
<td>01</td>
<td>1300</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Hold time after repeated start condition</td>
<td>f\textsc{(HDSTA)}</td>
<td>9, 10, 11</td>
<td>01</td>
<td>600</td>
<td>ns</td>
<td></td>
</tr>
</tbody>
</table>

See footnote at the end of the table.
<table>
<thead>
<tr>
<th>Test</th>
<th>Symbol</th>
<th>Conditions 1/</th>
<th>Group A subgroups</th>
<th>Device type</th>
<th>Limits</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-wire timing requirements – continued 2/</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated start condition setup time</td>
<td>$t_{(SUSTA)}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>600</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Stop condition setup time</td>
<td>$t_{(SUSTO)}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>600</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>Data hold time</td>
<td>$t_{(HDDAT)}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>900</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Data setup time</td>
<td>$t_{(SUDAT)}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>100</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>SCL clock low period</td>
<td>$t_{(LOW)}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>1300</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>SCL clock high period</td>
<td>$t_{(HIGH)}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>600</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Data fall time</td>
<td>$t_{F - SDA}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>300</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Clock fall and rise time</td>
<td>$t_{F, t_R - SCL}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>300</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High speed mode</td>
<td></td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Rise time for SCL ≤ 100 kHz</td>
<td>$t_{R}$</td>
<td>Fast mode</td>
<td>9, 10, 11</td>
<td>01</td>
<td>1000</td>
<td>ns</td>
</tr>
</tbody>
</table>

1/ Device type 01 supplied to this drawing has been characterized through all levels M, D, P, L, and R of irradiation. However, these devices are only tested at the “R” level. Pre and Post irradiation values are identical unless otherwise specified in Table I. When performing post irradiation electrical measurements for any RHA level, $T_A = +25^\circ C$ (see 1.5 herein).

Device type 01 is irradiated at dose rate = 50 - 300 rad(Si)/s in accordance with MIL-STD-883, method 1019, condition A, and is guaranteed to a maximum total dose specified. The effective dose rate for device type 01 after extended room temperature anneal = 31 mrad(Si)/s per MIL-STD-883, method 1019, condition A, section 3.11.2. The total dose specification for these devices only applies to the specified effective dose rate, or lower environment.

The manufacturer supplying device type 01 also tested low dose rate condition D in accordance with MIL-STD-883 method 1019. The radiation end point limits for the noted parameters are guaranteed only for the conditions as specified in MIL-STD-883, method 1019, condition D to a maximum total dose of 100 krad(Si).

2/ See figure 3.
<table>
<thead>
<tr>
<th>Symbol</th>
<th>Inches</th>
<th>Millimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>A</td>
<td>.0820</td>
<td>.1021</td>
</tr>
<tr>
<td>b</td>
<td>.0150</td>
<td>.0190</td>
</tr>
<tr>
<td>c</td>
<td>.0034</td>
<td>.0066</td>
</tr>
<tr>
<td>D</td>
<td>.2695</td>
<td>.2833</td>
</tr>
<tr>
<td>E</td>
<td>.2632</td>
<td>.2770</td>
</tr>
<tr>
<td>E1</td>
<td>.1780</td>
<td>.1921</td>
</tr>
<tr>
<td>e</td>
<td>.0500 BSC</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>.2781</td>
<td>.3081</td>
</tr>
<tr>
<td>Q</td>
<td>.0299</td>
<td>.0401</td>
</tr>
</tbody>
</table>

**FIGURE 1. Case outline**

**STANDARD MICROCIRCUIT DRAWING**

DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990

DSCC FORM 2234
APR 97
<table>
<thead>
<tr>
<th>Terminal number</th>
<th>Terminal symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+V</td>
<td>Power supply. Positive supply voltage, 1.7 V to 3.6 V</td>
</tr>
<tr>
<td>2</td>
<td>+D</td>
<td>Analog input. Positive connection to remote temperature sensor.</td>
</tr>
<tr>
<td>3</td>
<td>-D</td>
<td>Analog input. Negative connection to remote temperature sensor.</td>
</tr>
<tr>
<td>4</td>
<td>THERM</td>
<td>Digital output. Thermal shutdown or fan-control pin. Open-drain; requires a pull-up resistor to a voltage between 1.7 V and 3.6 V.</td>
</tr>
<tr>
<td>5</td>
<td>A0</td>
<td>Digital input. Address select. Connect to GND, +V, or leave floating.</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>Supply ground connection.</td>
</tr>
<tr>
<td>7</td>
<td>ALERT / THERM</td>
<td>Digital output. Interrupt or SMBus alert output. Can be configured as a second THERM output. Open-drain; requires a pull-up resistor to a voltage between 1.7 V and 3.6 V.</td>
</tr>
<tr>
<td>8</td>
<td>SDA</td>
<td>Bidirectional digital input-output. Serial data line for SMBus. Open-drain; requires a pull-up resistor to a voltage between 1.7 V and 3.6 V.</td>
</tr>
<tr>
<td>9</td>
<td>SCL</td>
<td>Digital input. Serial clock line for SMBus. Input; requires a pull-up resistor to a voltage between 1.7 V and 3.6 V if driven by an open-drain output.</td>
</tr>
<tr>
<td>10</td>
<td>A1</td>
<td>Digital input. Address select. Connect to GND, +V, or leave floating.</td>
</tr>
</tbody>
</table>

FIGURE 2. Terminal connections.
FIGURE 3. Two-wire timing waveform.
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). The certificate of compliance submitted to DLA Land and Maritime-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.

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

4. VERIFICATION

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.

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.

4.2.1 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 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.

4.4.1 Group A inspection.

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

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

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 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 method 1005 of MIL-STD-883.
### TABLE IIA. Electrical test requirements.

<table>
<thead>
<tr>
<th>Test requirements</th>
<th>Subgroups (in accordance with MIL-PRF-38535, table III)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Device class Q</td>
</tr>
<tr>
<td>Interim electrical parameters (see 4.2)</td>
<td>1,2,3,4,5,6,9,10,11</td>
</tr>
<tr>
<td>Final electrical parameters (see 4.2)</td>
<td>1,2,3,4,5,6,9,10,11 1/</td>
</tr>
<tr>
<td>Group A test requirements (see 4.4)</td>
<td>1,2,3,4,5,6,9,10,11</td>
</tr>
<tr>
<td>Group C end-point electrical parameters (see 4.4)</td>
<td>1,2,3,4,5,6,9,10,11</td>
</tr>
<tr>
<td>Group D end-point electrical parameters (see 4.4)</td>
<td>1,4,9</td>
</tr>
<tr>
<td>Group E end-point electrical parameters (see 4.4)</td>
<td>---</td>
</tr>
</tbody>
</table>

1/ PDA applies to subgroup 1.
2/ Delta limits as specified in Table IIB shall be required where specified, and the delta limits shall be computed with reference to the zero hour electrical parameters (see table I).

### TABLE IIB. Burn-in and operating life test delta parameters. 1/ 

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Symbol</th>
<th>Delta limits</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active conversion, local sensor</td>
<td>I_Q (Local)</td>
<td>6.2</td>
<td>µA</td>
</tr>
<tr>
<td>Active conversion, remote sensor</td>
<td>I_Q (Remote)</td>
<td>10</td>
<td>µA</td>
</tr>
<tr>
<td>Standby mode (between conversions)</td>
<td>I_Q (Standby)</td>
<td>3.6</td>
<td>µA</td>
</tr>
<tr>
<td>Shutdown mode, serial bus inactive</td>
<td>I_Q (Shutdown)</td>
<td>0.125</td>
<td>µA</td>
</tr>
<tr>
<td>VOL SDA</td>
<td>VOL</td>
<td>7.5</td>
<td>mV</td>
</tr>
<tr>
<td>VOL ALERT</td>
<td>VOL</td>
<td>7.5</td>
<td>mV</td>
</tr>
<tr>
<td>VOL THERM</td>
<td>VOL</td>
<td>7.5</td>
<td>mV</td>
</tr>
</tbody>
</table>

1/ 240 hour burn in and group C end point electrical parameters.

Deltas are performed at T_A = +25°C.
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).

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

b. For device classes Q and V, the devices or test vehicle shall be subjected to radiation hardness assured tests as specified in MIL-PRF-38535 for the RHA level being tested. All device classes must meet the postirradiation end-point electrical parameter limits as defined in table I at $T_A = +25^\circ C \pm 5^\circ C$, after exposure, to the subgroups 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 condition D as specified herein (see 1.5).

4.4.4.1.1 **Accelerated annealing test.** Accelerated annealing testing shall be performed on all devices requiring a RHA level greater than 5K Rad(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 limits at $25^\circ C \pm 5^\circ C$. 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.

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.

6.2 **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 using DD Form 1692, Engineering Change Proposal.

6.3 **Record of users.** Military and industrial users should inform DLA Land and Maritime when a system application requires configuration control and which SMD's are applicable to that system. DLA Land and Maritime 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 DLA Land and Maritime-VA, telephone (614) 692-8108.

6.4 **Comments.** Comments on this drawing should be directed to DLA Land and Maritime-VA, Columbus, Ohio 43218-3990, or telephone (614) 692-0540.

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 MIL-HDBK-103 and QML-38535. The vendors listed in MIL-HDBK-103 and QML-38535 have submitted a certificate of compliance (see 3.6 herein) to DLA Land and Maritime-VA and have agreed to this drawing.
Approved sources of supply for SMD 5962-17218 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 DLA Land and Maritime-VA. This information bulletin is superseded by the next dated revision of MIL-HDBK-103 and QML-38535. DLA Land and Maritime maintains an online database of all current sources of supply at [https://landandmaritimeapps.dla.mil/programs/smcr/](https://landandmaritimeapps.dla.mil/programs/smcr/).

<table>
<thead>
<tr>
<th>Standard microcircuit drawing PIN 1/</th>
<th>Vendor CAGE number</th>
<th>Vendor similar PIN 2/</th>
</tr>
</thead>
<tbody>
<tr>
<td>5962-1721801VXC</td>
<td>01295</td>
<td>TMP461-SP</td>
</tr>
<tr>
<td>5962R1721801VXC</td>
<td>01295</td>
<td>TMP461-RHA</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Vendor CAGE number</th>
<th>Vendor name and address</th>
</tr>
</thead>
<tbody>
<tr>
<td>01295</td>
<td>Texas Instruments, Inc. Semiconductor Group 8505 Forest Ln. PO Box 660199 Dallas, TX 75243</td>
</tr>
</tbody>
</table>

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