


|   |  | REVISIONS |  |                                  |   |                          |   |   |          |                |  |   |  |  |  |  |  |  |  |
|---|--|-----------|--|----------------------------------|---|--------------------------|---|---|----------|----------------|--|---|--|--|--|--|--|--|--|
|   |  | LTR       | DESCRIPTION  |                                  |   |                          |   |   | DATE     | APPROVED       |  |   |  |  |  |  |  |  |  |
|   |  | A         | Update the Title; update the test conditions in Table I. Add Thermal resistance in section 1.4. Add Interface Schematic Figures: 3, 4, 5, and 6. - PHN |                                  |   |                          |   |   | 17-04-18 | Thomas M. Hess |  |   |  |  |  |  |  |  |  |
| <div></div> |  |           |  |                                  |   |                          |   |   |          |                |  |   |  |  |  |  |  |  |  |
| Prepared in accordance with ASME Y14.24   |  |           |  |                                  |   |                          |   |   |          |                |  |   |  |  |  |  |  |  |  |
| Vendor item drawing   |  |           |  |                                  |   |                          |   |   |          |                |  |   |  |  |  |  |  |  |  |
| REV   |  |           |  |                                  |   |                          |   |   |          |                |  |   |  |  |  |  |  |  |  |
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| REV STATUS OF PAGES   |  | REV       |  | A                                | A | A                        | A | A | A        | A              |  |   |  |  |  |  |  |  |  |
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| PMIC N/A  |  |           |  | PREPARED BY<br>PHU H. NGUYEN     |   |                          |   |   |          |                |  | DLA LAND AND MARITIME<br>COLUMBUS, OHIO 43218-3990<br><a href="http://www.landandmaritime.dla.mil/">http://www.landandmaritime.dla.mil/</a> |  |  |  |  |  |  |  |
| Original date of drawing<br>YY-MM-DD<br><br>16-05-04  |  |           |  | CHECKED BY<br>PHU H. NGUYEN      |   |                          |   |   |          |                |  | TITLE<br>MICROCIRCUIT, LINEAR, 0.2 GHz TO 8 GHz, GaAs, HBT MMIC, DIVIDE BY 8 PRESCALER  |  |  |  |  |  |  |  |
|   |  |           |  | APPROVED BY<br>CHARLES F. SAFFLE |   |                          |   |   |          |                |  |   |  |  |  |  |  |  |  |
|   |  |           |  | SIZE<br>A                        |   | CODE IDENT. NO.<br>16236 |   |   |          |                |  | DWG NO.<br>V62/16609  |  |  |  |  |  |  |  |
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DISTRIBUTION STATEMENT A. Approved for public release. *Distribution is unlimited.*

## 1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance 0.2 GHz to 8 GHz, GaAs, HBT MMIC, Divide by 8 Prescaler microcircuit, with an operating temperature range of -55°C to +105°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

|                   |   |                            |                             |                            |
|-------------------|---|----------------------------|-----------------------------|----------------------------|
| <u>V62/16609</u>  | - | <u>01</u>                  | <u>X</u>                    | <u>E</u>                   |
| Drawing<br>number |   | Device type<br>(See 1.2.1) | Case outline<br>(See 1.2.2) | Lead finish<br>(See 1.2.3) |

### 1.2.1 Device type(s).

| <u>Device type</u> | <u>Generic</u> | <u>Circuit function</u>                                 |
|--------------------|----------------|---|
| 01                 | HMC434         | 0.2 GHz to 8 GHz, GaAs, HBT MMIC, Divide by 8 Prescaler |

### 1.2.2 Case outline(s). The case outline(s) are as specified herein.

| <u>Outline letter</u> | <u>Number of pins</u> | <u>JEDEC PUB 95</u> | <u>Package style</u>          |
|-----------------------|-----------------------|---------------------|-------------------------------|
| X                     | 6                     | MO-178-AB           | Plastic small outline package |

### 1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

| <u>Finish designator</u> | <u>Material</u>      |
|--------------------------|----------------------|
| A                        | Hot solder dip       |
| B                        | Tin-lead plate       |
| C                        | Gold plate           |
| D                        | Palladium            |
| E                        | Gold flash palladium |
| Z                        | Other                |

### 1.3 Absolute maximum ratings. 1/

|  |                  |
|--|------------------|
| Supply voltage (VCC) .....             | -0.3 V to +3.5 V |
| RF input power (VCC = 3 V) .....       | 13 dBm           |
| Temperature:                           |                  |
| Operating .....                        | -55°C to +105°C  |
| Storage .....                          | -65°C to +125°C  |
| Junction, T <sub>J</sub> .....         | 135°C            |
| Nominal (T <sub>A</sub> = 105°C) ..... | 119°C            |
| Reflow .....                           | 260°C            |
| Electrostatic discharge sensitivity:   |                  |
| Human body model (HBM) .....           | Class 0          |

1/ Stresses beyond those listed under "absolute maximum rating" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

|   |                   |                                 |                              |
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#### 1.4 Thermal Resistance.

| Package Type   | $\theta_{JA}$ <u>2/</u> | $\theta_{JC}$ <u>3/</u> | Unit |
|----------------|-------------------------|-------------------------|------|
| Case Outline X | 359                     | 70                      | °C/W |

## 2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – Registered and Standard Outlines for Semiconductor Devices  
JESD51-12 – Guidelines for Reporting and Using Electronic Package Thermal Information.

(Copies of these documents are available online at <http://www.jedec.org> or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240–S, Arlington, VA 22201-2107).

## 3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

- A. Manufacturer's name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

#### 3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

3.5.3 GND Interface Schematic. The GND interface Schematic shall be as shown in figure 3.

3.5.4 IN Interface Schematic. The IN interface Schematic shall be as shown in figure 4.

3.5.5 OUT Interface Schematic. The OUT interface Schematic shall be as shown in figure 5.

3.5.6 VCC Interface Schematic. The VCC interface Schematic shall be as shown in figure 6.

2/ Simulated values per JEDEC JESD51-12 standards.

3/ Junction to GND package pin.

|   |                   |                                 |                              |
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TABLE I. Electrical performance characteristics. 1/

| Test                       | Symbol          | Conditions<br><u>2/</u><br>unless otherwise specified      | Limits |      |      | Unit   |
|----------------------------|-----------------|--|--------|------|------|--------|
|                            |                 |  | Min    | Typ  | Max  |        |
| Radio Frequency (RF) Input |                 |  |        |      |      |        |
| Frequency <u>3/</u>        |                 | Sine wave input  | 0.2    |      | 8    | GHz    |
| Power                      |                 | f <sub>IN</sub> = 1.0 GHz to 3.0 GHz                       | -10    |      | +10  | dBm    |
|                            |                 | f <sub>IN</sub> = 3.0 GHz to 8.0 GHz                       | 0      |      | 10   | dBm    |
| RF Output                  |                 |  |        |      |      |        |
| SSB Phase noise            |                 | 100 kHz offset, PIN = 0 dBm, f <sub>IN</sub> = 4.0 GHz     |        | -150 |      | dBc/Hz |
| Power                      |                 | f <sub>IN</sub> = 1.0 GHz to 8.0 GHz                       | -5     | -2   |      | dBm    |
| Reverse Leakage            |                 |  |        |      |      |        |
| Reverse Leakage            |                 | PIN = 0 dBm, f <sub>IN</sub> = 4.0 GHz , output terminated |        | -25  |      | dBm    |
| Supply                     |                 |  |        |      |      |        |
| Voltage                    | V <sub>CC</sub> |  | 2.85   | 3    | 3.15 | V      |
| Current                    | I <sub>CC</sub> |  |        | 62   | 83   | mA     |

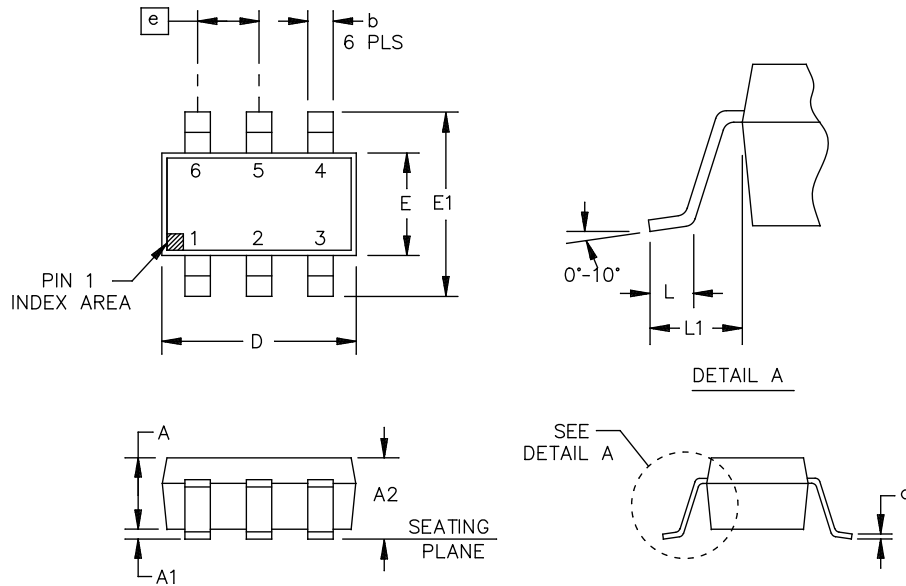
1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/  $V_{CC} = 3 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ ,  $50 \Omega$  system, unless otherwise noted. PIN is input power.

3/ Below 200 MHz, a square wave input is required.

|   |           |                         |                      |
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# Case X



| Symbol | Inches   |        |         | Millimeters |        |         |
|--------|----------|--------|---------|-------------|--------|---------|
|        | Minimum  | Medium | Maximum | Minimum     | Medium | Maximum |
| A      | .035     | .045   | .051    | 0.90        | 1.15   | 1.30    |
| A1     | .0019    | ---    | .005    | 0.05        | ---    | 0.15    |
| A2     | .037     | ---    | .057    | 0.95        | ---    | 1.45    |
| b      | .011     | ---    | .019    | 0.30        | ---    | 0.50    |
| c      | .003     | ---    | .007    | 0.08        | ---    | 0.20    |
| D      | .110     | .114   | .118    | 2.80        | 2.90   | 3.00    |
| E      | .059     | .062   | .066    | 1.50        | 1.60   | 1.70    |
| E1     | .102     | .110   | .118    | 2.60        | 2.80   | 3.00    |
| e      | .037 BSC |        |         | 0.95 BSC    |        |         |
| L      | .013     | .017   | .021    | 0.35        | 0.45   | 0.55    |
| L1     | .023 BSC |        |         | 0.60 BSC    |        |         |

## NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. Falls with JEDEC MO-178-AB.

FIGURE 1. Case outline.

|   |           |                         |                      |
|---|-----------|-------------------------|----------------------|
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|                 |                 |  |
|-----------------|-----------------|--|
| Device type     | 01              |  |
| Case outline    | X               |  |
| Terminal number | Terminal symbol | Description  |
| 1, 4            | NIC             | Not Internally Connected. These pins can be connected to RF and dc ground without affecting performance. The NIC pins are typically tied to GND for enhanced thermal performance (but not required). |
| 2               | GND             | Ground. This pin must be connected to both RF and dc ground.   |
| 3               | IN              | RF Input. This pin must be dc blocked.   |
| 5               | VCC             | Supply Voltage (3 V).  |
| 6               | OUT             | RF Output. This pin must be dc blocked.  |

FIGURE 2. Terminal connections.



FIGURE 3. GND Interface Schematic.

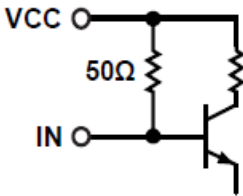


FIGURE 4. IN Interface Schematic.

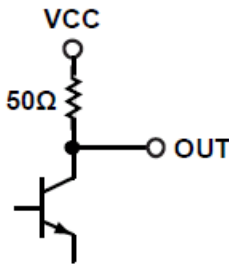


FIGURE 5. OUT Interface Schematic.

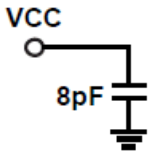


FIGURE 6. VCC Interface Schematic.

|   |           |                         |                      |
|---|-----------|-------------------------|----------------------|
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#### 4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

#### 5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

#### 6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 0.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <https://landandmaritimeapps.dla.mil/programs/smcr/default.aspx>

| Vendor item drawing<br>administrative control<br>number 1/ | Device<br>manufacturer<br>CAGE code | Ordering<br>Quantity  | Vendor part number |
|--|-------------------------------------|-----------------------|--------------------|
| V62/16609-01XE   | 24355                               | Small Reel units = 50 | HMC434SRJZ-EP-PT   |
|  |                                     | Reel units= 500       | HMC434SRJZ-EP-R7   |

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

#### CAGE code

24355

#### Source of supply

Analog Devices  
Route 1 Industrial Park  
P.O. Box 9106  
Norwood, MA 02062  
Point of contact: Raheen Business Park  
Limerick, Ireland

|   |                   |                                 |                              |
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