

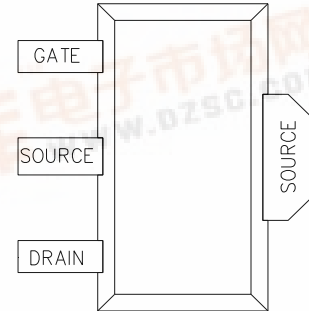


# LP3000SOT89

## LOW NOISE, HIGH LINEARITY PACKAGED PHEMT

### FEATURES

- ◆ 29 dBm Output Power at 1-dB Compression at 1.8 GHz
- ◆ 15 dB Power Gain at 1.8 GHz
- ◆ 1.3 dB Noise Figure
- ◆ 46 dBm Output IP3 at 1.8 GHz
- ◆ 55% Power-Added Efficiency



### DESCRIPTION AND APPLICATIONS

The LP3000SOT89 is a packaged Aluminum Gallium Arsenide / Indium Gallium Arsenide (AlGaAs/InGaAs) pseudomorphic High Electron Mobility Transistor (pHEMT). It utilizes a 0.25  $\mu\text{m}$  x 3000  $\mu\text{m}$  Schottky barrier gate, defined by electron-beam photolithography. The recessed “mushroom” gate structure minimizes parasitic gate-source and gate resistance. The epitaxial structure and processing have been optimized for reliable high-power applications. The LP3000 also features Si<sub>3</sub>N<sub>4</sub> passivation and is available in die form or in other packages.

Typical applications include PCS/Cellular low-voltage, high-efficiency amplifiers.

### ELECTRICAL SPECIFICATIONS @ $T_{\text{Ambient}} = 25^{\circ}\text{C}$

| Parameter                                       | Symbol              | Test Conditions   | Min   | Typ  | Max  | Units         |
|---|---------------------|---|-------|------|------|---------------|
| Saturated Drain-Source Current<br>LP3000SOT89-1 | $I_{\text{DSS}}$    | $V_{\text{DS}} = 2 \text{ V}; V_{\text{GS}} = 0 \text{ V}$  | 800   | 860  | 924  | mA            |
| LP3000SOT89-2                                   |                     |   | 925   | 975  | 1024 | mA            |
| LP3000SOT89-3                                   |                     |   | 1025  | 1060 | 1100 | mA            |
| Power at 1-dB Compression                       | P-1dB               | $V_{\text{DS}} = 5 \text{ V}; I_{\text{DS}} = 50\% I_{\text{DSS}}$                                      | 28    | 29   |      | dBm           |
| Power Gain at 1-dB Compression                  | G-1dB               | $V_{\text{DS}} = 5 \text{ V}; I_{\text{DS}} = 50\% I_{\text{DSS}}$                                      | 14    | 15   |      | dB            |
| Power-Added Efficiency                          | PAE                 | $V_{\text{DS}} = 5 \text{ V}; I_{\text{DS}} = 50\% I_{\text{DSS}};$<br>$P_{\text{IN}} = 15 \text{ dBm}$ |       | 55   |      | %             |
| Noise Figure                                    | NF                  | $V_{\text{DS}} = 5 \text{ V}; I_{\text{DS}} = 50\% I_{\text{DSS}}$                                      |       | 1.3  |      | dB            |
| Output Third-Order Intercept Point              | IP3                 | $V_{\text{DS}} = 5 \text{ V}; I_{\text{DS}} = 50\% I_{\text{DSS}};$<br>$P_{\text{IN}} = 3 \text{ dBm}$  |       | 46   |      | dBm           |
| Maximum Drain-Source Current                    | $I_{\text{MAX}}$    | $V_{\text{DS}} = 2 \text{ V}; V_{\text{GS}} = 1 \text{ V}$  |       | 1700 |      | mA            |
| Transconductance                                | $G_{\text{M}}$      | $V_{\text{DS}} = 2 \text{ V}; V_{\text{GS}} = 0 \text{ V}$  | 700   | 900  |      | mS            |
| Gate-Source Leakage Current                     | $I_{\text{GSO}}$    | $V_{\text{GS}} = -5 \text{ V}$  |       | 15   | 200  | $\mu\text{A}$ |
| Pinch-Off Voltage                               | $V_{\text{P}}$      | $V_{\text{DS}} = 2 \text{ V}; I_{\text{DS}} = 15 \text{ mA}$  | -0.25 | -1.2 | -2.0 | V             |
| Gate-Source Breakdown<br>Voltage Magnitude      | $ V_{\text{BDGS}} $ | $I_{\text{GS}} = 15 \text{ mA}$   | -10   | -12  |      | V             |
| Gate-Drain Breakdown<br>Voltage Magnitude       | $ V_{\text{BDGD}} $ | $I_{\text{GD}} = 15 \text{ mA}$   | -10   | -13  |      | V             |

frequency=1.8 GHz



## • ABSOLUTE MAXIMUM RATINGS

| Parameter                     | Symbol    | Test Conditions                   | Min | Max       | Units       |
|-------------------------------|-----------|-----------------------------------|-----|-----------|-------------|
| Drain-Source Voltage          | $V_{DS}$  | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | 7         | V           |
| Gate-Source Voltage           | $V_{GS}$  | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | -4        | V           |
| Drain-Source Current          | $I_{DS}$  | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | $I_{DSS}$ | mA          |
| Gate Current                  | $I_G$     | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | 30        | mA          |
| RF Input Power                | $P_{IN}$  | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | 1         | W           |
| Channel Operating Temperature | $T_{CH}$  | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | 175       | $^{\circ}C$ |
| Storage Temperature           | $T_{STG}$ | —                                 | -65 | 175       | $^{\circ}C$ |
| Total Power Dissipation       | $P_{TOT}$ | $T_{Ambient} = 22 \pm 3^{\circ}C$ |     | 3.75      | W           |

### Notes:

- Operating conditions that exceed the Absolute Maximum Ratings could result in permanent damage to the device.
- Power Dissipation defined as:  $P_{TOT} \equiv (P_{DC} + P_{IN}) - P_{OUT}$ , where  
 $P_{DC}$ : DC Bias Power  
 $P_{IN}$ : RF Input Power  
 $P_{OUT}$ : RF Output Power
- Absolute Maximum Power Dissipation to be de-rated as follows above  $25^{\circ}C$ :  
 $P_{TOT} = 3.75W - (0.025W/^{\circ}C) \times T_{HS}$   
where  $T_{PACK} = \text{source tab lead temperature..}$
- This PHEMT is susceptible to damage from Electrostatic Discharge. Proper precautions should be used when handling these devices.

## • OPTIMUM POWER OUTPUT MATCHING

| Frequency (GHz) | Load State |                 |
|-----------------|------------|-----------------|
|                 | Magnitude  | Phase           |
| 1.8             | 0.77       | -154 $^{\circ}$ |
| 2.2             | 0.68       | -150 $^{\circ}$ |
| 2.5             | 0.59       | -143 $^{\circ}$ |

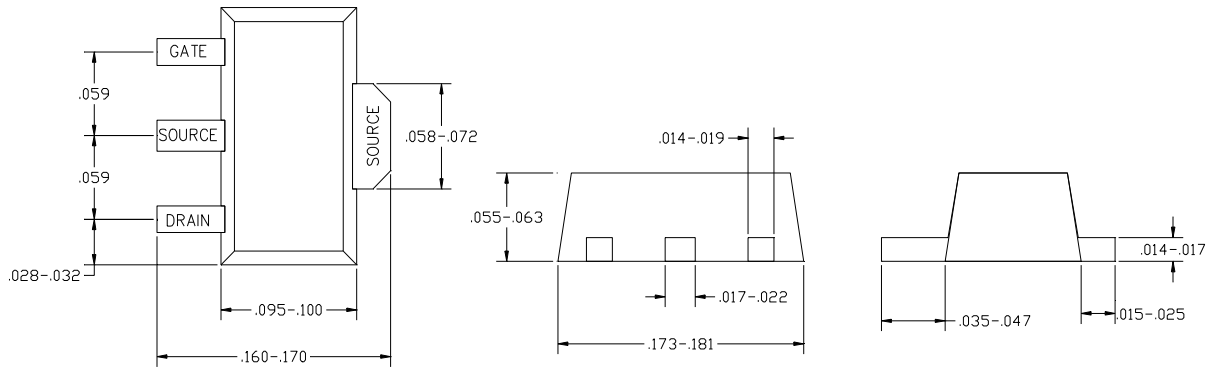
## • HANDLING PRECAUTIONS

To avoid damage to the devices care should be exercised during handling. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. These devices should be treated as Class 1A (0-500 V). Further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.

## • APPLICATIONS NOTES & DESIGN DATA

Applications Notes are available from your local Filtronic Sales Representative or directly from the factory. Complete design data, including S-parameters, noise data, and large-signal models are available on the Filtronic web site.

- **PACKAGE OUTLINE**  
(dimensions in inches)



All information and specifications are subject to change without notice.