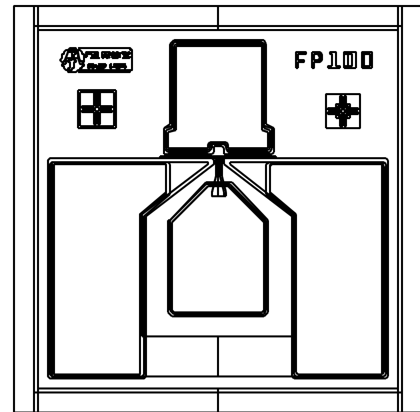
- FEATURES

  - 14 dBm P-1dB at 12 GHz
  - 9 dB Power Gain at 12 GHz
  - 3.0 dB Noise Figure at 12 GHz




DIE SIZE: 16.5 x 16.5 mils (420 x 420 µm)
DIE THICKNESS: 3.9 mils (100 µm typ.)
BONDING PADS: 3.3 x 3.5 mils (85 x 90 µm typ.)

- DESCRIPTION AND APPLICATIONS

The FP100 is an Aluminum Gallium Arsenide / Indium Gallium Arsenide (AlGaAs/InGaAs) Pseudomorphic High Electron Mobility Transistor (PHEMT), utilizing an Electron-Beam direct-write 0.25 um by 100 um Schottky barrier gate. The recessed “mushroom” gate structure minimizes parasitic gate-source and gate resistances. The FP100 features Si3N4 passivation.

Typical applications include general purpose, low noise and broadband amplifiers in the 2-20 GHz range. The device is well-suited for telecommunication applications.

- ELECTRICAL SPECIFICATIONS @ $T_{Ambient}$ = 22 ± 3 °C

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| Output Power @ 1dB Compression | $P_{1dB}$ | f = 12 GHz; $V_{DS}$ = 5V; $I_{DS}$ = 50% $I_{DSS}$ | 13 | 14 | | dBm |
| Power Gain @ 1dB Compression | $G_{1dB}$ | f = 12 GHz; $V_{DS}$ = 5V; $I_{DS}$ = 50% $I_{DSS}$ | 8 | 9 | | dB |
| Maximum Available Gain | MAG | f = 12 GHz; $V_{DS}$ = 5V; $I_{DS}$ = 50% $I_{DSS}$ | 14.5 | 15.5 | | dB |
| Noise Figure | NF | f = 12 GHz; $V_{DS}$ = 5V; $I_{DS}$ = 50% $I_{DSS}$ | | 3.0 | | dB |
| Power-Added Efficiency | $\eta$ | f = 12 GHz; $V_{DS}$ = 5V; $I_{DS}$ = 50% $I_{DSS}$; $P_{OUT}$ = 15.5 dBm | 20 | 25 | | % |
| Saturated Drain-Source Current | $I_{DSS}$ | $V_{DS}$ = 2 V; $V_{GS}$ = 0 V | 15 | | 30 | mA |
| Transconductance | $G_M$ | $V_{DS}$ = 2 V; $V_{GS}$ = 0 V | 15 | 20 | | mS |
| Pinch-Off Voltage | $V_P$ | $V_{DS}$ = 2 V; $I_{DS}$ = 1 mA | -0.50 | | -2.5 | V |
| Gate-Drain Breakdown Voltage Magnitude | $\|V_{BDGD}\|$ | $I_{GS}$ = 1 mA | 8 | 10.5 | | V |
| Gate-Source Breakdown Voltage Magnitude | $\|V_{BDGS}\|$ | $I_{GS}$ = 1 mA | 7 | 10 | | V |
| Gate-Source Leakage Current Magnitude | $\|I_{GSL}\|$ | $V_{GS}$ = -5 V | | 4 | 10 | µA |

- RECOMMENDED CONTINUOUS OPERATING LIMITS

| Parameter | Symbol | Nominal | Units |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 5 | V |
| Gate-Source Voltage | $V_{GS}$ | -0.8 | V |
| Drain-Source Current | $I_{DS}$ | 0.5 $I_{DSS}$ | mA |
| RF Input Power | $P_{IN}$ | 30 | mW |
| Channel Operating Temperature | $T_{CH}$ | 150 | ºC |
| Ambient Temperature | $T_{STG}$ | -20/50 | ºC |

Note: Device should be operated at or below Recommended Continuous Operating Limits for reliable performance.

- ABSOLUTE RATINGS

| Parameter | Symbol | Test Conditions | Min | Max | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | $T_{Ambient} = 22 \pm 3$ °C | | 7 | V |
| Gate-Source Voltage | $V_{GS}$ | $T_{Ambient} = 22 \pm 3$ °C | | -3 | V |
| Drain-Source Current | $I_{DS}$ | $T_{Ambient} = 22 \pm 3$ °C | | $I_{DSS}$ | mA |
| Gate Current | $I_G$ | $T_{Ambient} = 22 \pm 3$ °C | | 2.5 | mA |
| RF Input Power | $P_{IN}$ | $T_{Ambient} = 22 \pm 3$ °C | | 60 | mW |
| Channel Operating Temperature | $T_{CH}$ | $T_{Ambient} = 22 \pm 3$ °C | | 175 | ºC |
| Storage Temperature | $T_{STG}$ | — | -65 | 175 | ºC |

Note: Even temporary operating conditions that exceed the Absolute Maximum Ratings could result in permanent damage to the device.

- 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.

- 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.

All information and specifications are subject to change without notice.