# Filtronic

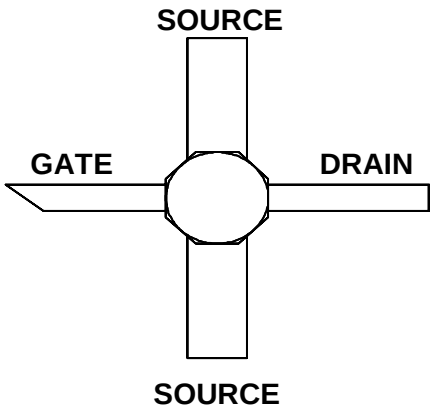
Solid State

# LP7612P70

## PACKAGED HIGH DYNAMIC RANGE PHEMT

### FEATURES

- **+20 dBm Typical Power at 18 GHz**
- **7.5 dB Typical Power Gain at 18 GHz**
- **16 dB Typical SSG at 2 GHz**
- **0.8 dB Typical Noise Figure at 2 GHz**
- **Low Intermodulation Distortion**
- **Color-coded by $I_{DSS}$ range**




### DESCRIPTION AND APPLICATIONS

The LP7612P70 is a packaged Aluminum Gallium Arsenide / Indium Gallium Arsenide (AlGaAs/InGaAs) Pseudomorphic High Electron Mobility Transistor (PHEMT), utilizing an Electron-Beam direct-write 0.25 µm by 200 µm Schottky barrier gate. The recessed "mushroom" Ti/Pt/Au gate structure minimizes parasitic gate-source and gate resistances. The epitaxial structure and processing have been optimized for high dynamic range. The LP7612's active areas are passivated with $Si_3N_4$, and the P70-52 ceramic package is ideal for low-cost, high-performance applications that require a surface-mount package. Packages are color-coded by $I_{DSS}$ range.

Typical applications include high dynamic range receiver preamplifiers for commercial applications including Cellular/PCS systems, broad bandwidth commercial instrumentation and military EW amplifiers, and commercial Space applications.

The LP7612 may be procured in a variety of grades, depending upon specific user requirements. Standard lot screening is patterned after MIL-STD-19500, JANC grade.

### PERFORMANCE SPECIFICATIONS ($T_A$ = 25°C)

| SYMBOLS | PARAMETERS | | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| $I_{DSS}$ | Saturated Drain-Source Current | LP7612-P70-1 GREEN | 40 | 50 | 65 | mA |
| | $V_{DS}$ = 2V $V_{GS}$ = 0V | LP7612-P70-2 RED | 66 | 75 | 85 | mA |
| $P_{1dB}$ | Output Power at 1dB Gain Compression at $f$ = 18 GHz | | | | | |
| | $V_{DS}$ = 5.0V, $I_{DS}$ = 50% $I_{DSS}$ | | 19.0 | 20.0 | | dBm |
| $G_{1dB}$ | Power Gain at 1dB Gain Compression at $f$ = 18 GHz | | | | | |
| | $V_{DS}$ = 5.0V, $I_{DS}$ = 50% $I_{DSS}$ | | 6.5 | 7.0 | | dB |
| $NF_{MIN}$ | Minimum Noise Figure at $f$ = 2 GHz | | | | | |
| | $V_{DS}$ = 3.3V, $I_{DS}$ = 25% $I_{DSS}$ | | | 0.8 | 1.2 | dB |
| $\eta_{ADD}$ | Power-Added Efficiency | | | 45 | | % |
| $I_{MAX}$ | Maximum Drain-Source Current | $V_{DS}$ = 2V $V_{GS}$ = +1V | | 125 | | mA |
| $G_M$ | Transconductance | $V_{DS}$ = 2V $V_{GS}$ = 0V | 60 | 80 | | mS |
| $V_P$ | Pinch-Off Voltage | $V_{DS}$ = 2V $I_{DS}$ = 1mA | -0.25 | -0.8 | -1.5 | V |
| $I_{GSO}$ | Gate-Source Leakage Current | $V_{GS}$ = -5V | | 1 | 15 | µA |
| $BV_{GS}$ | Gate-Source Breakdown Voltage | $I_{GS}$ = 1mA | -6 | -7 | | V |
| $BV_{GD}$ | Gate-Drain Breakdown Voltage | $I_{GD}$ = 1mA | -8 | -9 | | V |

**DSS-037 WD**

**Phone:** (408) 988-1845 **Internet:** http://www.Filtronicsolidstate.com **FAX:** (408) 970-9950

| ABSOLUTE MAXIMUM RATINGS (25°C) | | |
|---|---|---|
| **SYMBOL** | **PARAMETER** | **RATING[1]** |
| $V_{DS}$ | Drain-Source Voltage | 6V |
| $V_{GS}$ | Gate-Source Voltage | -3V |
| $I_{DS}$ | Drain-Source Current | 2 x $I_{DSS}$ |
| $I_G$ | Gate Current | 5 mA |
| $P_{IN}$ | RF Input Power | 60 mW |
| $T_{CH}$ | Channel Temperature | 175°C |
| $T_{STG}$ | Storage Temperature | -65/175°C |
| $P_T$ | Power Dissipation | 400mW[3,4] |

| RECOMMENDED CONTINUOUS OPERATING LIMITS | | |
|---|---|---|
| **SYMBOL** | **PARAMETER** | **RATING[2]** |
| $V_{DS}$ | Drain-Source Voltage | 5V |
| $V_{GS}$ | Gate-Source Voltage | -0.8V |
| $I_{DS}$ | Drain-Source Current | 0.75 x $I_{DSS}$ |
| $I_G$ | Gate Current | 2 mA |
| $P_{IN}$ | RF Input Power | 30 mW |
| $T_{CH}$ | Channel Temperature | 150°C |
| $T_{STG}$ | Storage Temperature | -20/50°C |
| $P_T$ | Power Dissipation | 350 mW[3,4] |
| $G_{XdB}$ | Gain Compression | 6 dB |

**NOTES:**

1. Operating conditions that exceed the Absolute Maximum Ratings could result in permanent damage to the device.
2. Recommended Continuous Operating Limits should be observed for reliable device operation.
3. Power Dissipation defined as: $P_T \equiv (P_{DC} + P_{IN}) - P_{OUT}$, where: $P_{DC}$ = DC bias power, $P_{OUT}$ = RF output power, and $P_{IN}$ = RF input power.
4. Power Dissipation to be de-rated as follows above 25°C:
   Absolute Maximum: $P_T = 400mW - (2.7mW/°C) \times T_{HS}$
   Recommended Continuous Operating: $P_T = 350mW - (2.8mW/°C) \times T_{HS}$
   where $T_{HS}$ = heatsink or ambient temperature.
5. Specifications subject to change without notice.

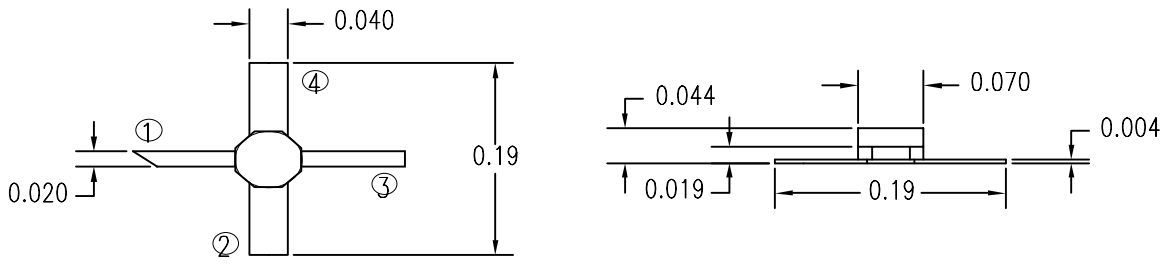
**HANDLING PRECAUTIONS:**

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 (0-500V), and further information on ESD control measures can be found in MIL-STD-1686 and MIL-HDBK-263.

**PACKAGE CHARACTERISTICS:**

The P70-52 package is available with a standard gold over nickel finish. The package lids are epoxy sealed and are capable of passing MIL-STD hermeticity (Gross Leak).

**PACKAGE OUTLINE:** (DIMENSIONS IN INCHES)

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