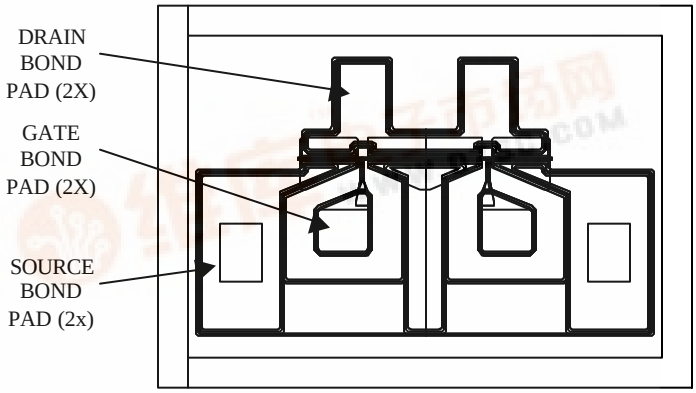
Filtronic

LP7512

ULTRA LOW NOISE PHEMT

- FEATURES
  - ♦ 0.6 dB Noise Figure at 12 GHz
  - ♦ 12 dB Associated Gain at 12 GHz
  - ♦ Low DC Power Consumption
  - ♦ Excellent Phase Noise



DIE SIZE: 18.0X13.0 mils (460x330 µm)
DIE THICKNESS: 3.9 mils (100 µm)
BONDING PADS: 1.9X1.9 mils (50x50 µm)

- DESCRIPTION AND APPLICATIONS

The LP7512 is an 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" gate structure minimizes parasitic gate-source and gate resistances. The epitaxial structure and processing have been optimized for ultra low noise and usable gain to 40 GHz. The LP7512 also features Si_3N_4 passivation and is available in a variety of packages.

Typical applications include low noise receiver preamplifiers for commercial applications including wireless systems and radio link systems.

- ELECTRICAL SPECIFICATIONS @ $T_{Ambient}$ = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Saturated Drain-Source Current	I_{DSS}	V_{DS} = 2 V; V_{GS} = 0 V	15	35	50	mA
Noise Figure	NF	V_{DS} = 2 V; I_{DS} = 25% I_{DSS}; f=12 GHz		0.6	0.9	dB
		f=18 GHz		1.0	1.4	dB
Associated Gain at minimum NF	G_A	V_{DS} = 2 V; I_{DS} = 25% I_{DSS}; f=12 GHz	9	10		dB
		f=18 GHz	7.5	8.5		dB
Transconductance	G_M	V_{DS} = 2 V; V_{GS} = 0 V	60	90		mS
Gate-Source Leakage Current	I_{GSO}	V_{GS} = -3 V		1	10	µA
Gate-Drain Leakage Current	I_{GDO}	V_{GD} = -3 V		1	10	µA
Pinch-Off Voltage	V_P	V_{DS} = 2 V; I_{DS} = 1 mA	-0.25	-0.8	-1.5	V
Thermal Resistivity	Θ_{JC}			325		°C/W

frequency=18 GHz

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Min	Max	Units
Drain-Source Voltage	V_{DS}	$T_{Ambient} = 22 \pm 3$ °C		4	V
Gate-Source Voltage	V_{GS}	$T_{Ambient} = 22 \pm 3$ °C		-2	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		5	mA
RF Input Power	P_{IN}	$T_{Ambient} = 22 \pm 3$ °C		50	mW
Channel Operating Temperature	T_{CH}	$T_{Ambient} = 22 \pm 3$ °C		175	ºC
Storage Temperature	T_{STG}	—	-65	175	ºC
Total Power Dissipation	P_{TOT}	$T_{Ambient} = 22 \pm 3$ °C		460	mW

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°C:
  P_{TOT}= 460mW – (3.1mW/°C) x T_{HS}
  where T_{HS} = heatsink or ambient temperature.

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.

ASSEMBLY INSTRUCTIONS

The recommended die attach is gold/tin eutectic solder under a nitrogen atmosphere. Stage temperature should be 280-290°C; maximum time at temperature is one minute. The recommended wire bond method is thermo-compression wedge bonding with 0.7 or 1.0 mil (0.018 or 0.025 mm) gold wire. Stage temperature should be 250-260°C.

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.