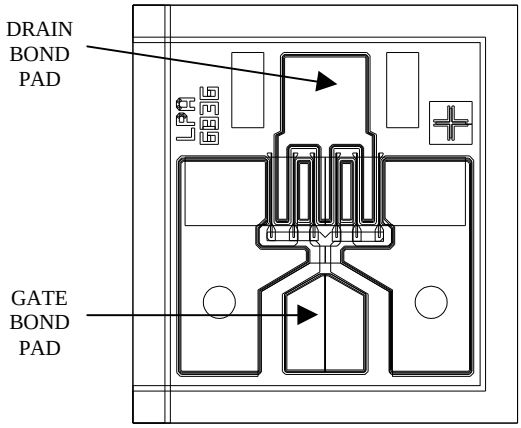
- FEATURES
  - ♦ 25 dBm Output Power at 1-dB Compression at 18 GHz
  - ♦ 9.5 dB Power Gain at 18 GHz
  - ♦ 55% Power-Added Efficiency
  - ♦ Source Vias to Backside Metallization



DIE SIZE: 15.4X14.2 mils (390x360 µm)
DIE THICKNESS: 3.9 mils (100 µm)
BONDING PADS: 3.0X3.0 mils (75x75 µm)

- DESCRIPTION AND APPLICATIONS

The FPA6836V 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 360 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 high dynamic range.

Typical applications include high dynamic range driver stages for commercial applications including wireless infrastructure systems, broad bandwidth amplifiers, and optical systems.

Source vias have been added for improved performance and assembly convenience. Each via hole has 0.02 nH of inductance. Additionally, the via holes remove the need for source bond wires, meaning only two bond wires are required for assembly. Because the via connects the source pad to the backside metallization, self-bias configurations should be designed with caution.

- 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	80	115	125	mA
Power at 1-dB Compression	P-1dB	V_{DS} = 8 V; I_{DS} = 50% I_{DSS}	24	25		dBm
Power Gain at 1-dB Compression	G-1dB	V_{DS} = 8 V; I_{DS} = 50% I_{DSS}	8.5	9.5		dB
Power-Added Efficiency	PAE	V_{DS} = 8 V; I_{DS} = 50% I_{DSS}		55		%
Maximum Drain-Source Current	I_{MAX}	V_{DS} = 2 V; V_{GS} = 1 V		190		mA
Transconductance	G_M	V_{DS} = 2 V; V_{GS} = 0 V	75	100		mS
Gate-Source Leakage Current	I_{GSO}	V_{GS} = -5 V		1	10	µA
Pinch-Off Voltage	V_P	V_{DS} = 2 V; I_{DS} = 2 mA	-0.25	-1.2	-2.0	V
Gate-Source Breakdown Voltage Magnitude	$\|V_{BDGS}\|$	I_{GS} = 2 mA	11	15		V
Gate-Drain Breakdown Voltage Magnitude	$\|V_{BDGD}\|$	I_{GD} = 2 mA	12	16		V
Thermal Resistivity	Θ_{JC}			100		°C/W

frequency=18 GHz

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Test Conditions	Min	Max	Units
Drain-Source Voltage	V_{DS}	$T_{Ambient}$ = 22 ± 3 °C		10	V
Gate-Source Voltage	V_{GS}	$T_{Ambient}$ = 22 ± 3 °C		-4	V
Drain-Source Current	I_{DS}	$T_{Ambient}$ = 22 ± 3 °C		2xI_{DSS}	mA
Gate Current	I_G	$T_{Ambient}$ = 22 ± 3 °C		18	mA
RF Input Power	P_{IN}	$T_{Ambient}$ = 22 ± 3 °C		180	mW
Channel Operating Temperature	T_{CH}	$T_{Ambient}$ = 22 ± 3 °C		175	ºC
Storage Temperature	T_{STG}	—	-65	175	ºC
Total Power Dissipation	P_{TOT}	$T_{Ambient}$ = 22 ± 3 °C		1.4	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°C:
  P_{TOT}= 1.4W – (0.0093W/°C) x T_{HS}
  where T_{HS} = heatsink or ambient temperature.

HANDLING PRECAUTIONS

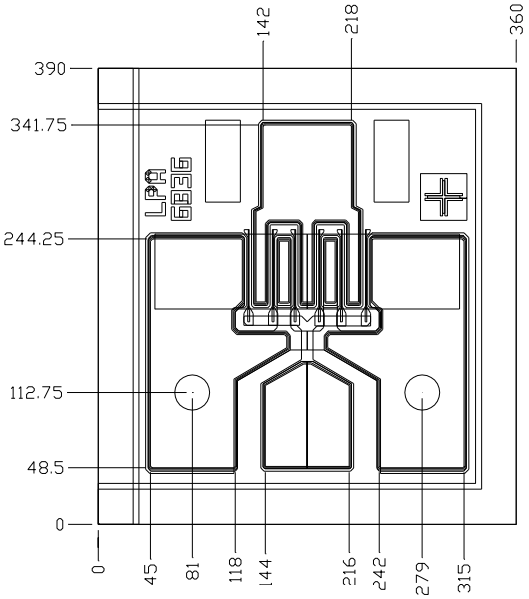
To avoid damage to the devices care should be exercised during handling. Proper Electrostatic Discharge (ESD) precautions should be observed at all stages of storage, handling, assembly, and testing. These devices should be treated as Class 1A (0-500 V). Further information on ESD control measures can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



Units in microns