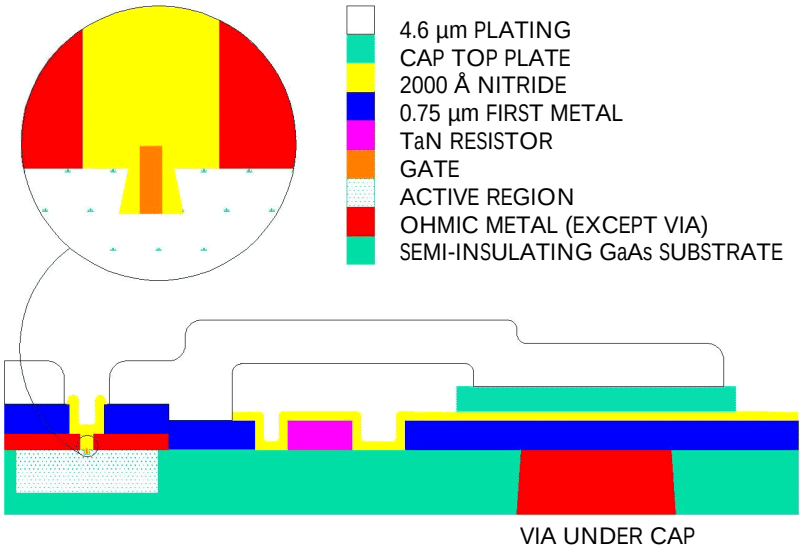
0.5-µm Low-Noise, Low-Current MesFET (LNLC)

Process Data Sheet



0.5-µm 2MI Process Cross Section

General Description

The 0.5-µm Low-Noise, Low-Current MesFET (LNLC) process is a cost-effective 2MI (2-metal-interconnect) depletion-mode ion-implant MesFET process for low-noise applications through 20 GHz. The LNLC process allows for switch, amplifier and diode integration and is used mainly in low-noise amplifier applications such as receivers. Passives include 2 thick-metal interconnect layers, precision TaN resistors, GaAs resistors, MIM capacitors, and through-substrate vias. The via-under-cap process aides in size compaction and offers excellent grounds at higher frequencies.

Features

- 0.5-µm amplifier transistors
- 0.5-µm switch transistors
- 0.5-µm diodes
- Device passivation
- High-Q passives
- MIM capacitors
- TaN resistors
- GaAs resistors
- 2 metal layers
- Air bridges
- Substrate vias
- Operation up to V_d = 5 V

Applications

- Up to 20 GHz
- Communications
- Space
- Military
- Low-noise amplifiers
- Driver amplifiers
- AGC amplifiers
- Limiting amplifiers
- Transimpedance amplifiers
- Differential amplifiers
- Digital and analog phase shifters
- Digital and analog attenuators
- Mixers (up and down converters)
- Multipliers
- Switches
- Oscillators

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0.5-µm Low-Noise MesFET Process Details			
Element	Parameter	Typical Value	Units
FETs	I_{dss}	190	mA/mm
	G_m	240	mS/mm
	V_{bd}	-13	V
	V_p	-1.15	V
MIM capacitors	density	300	pF/mm^2
Capacitors over vias		yes	
TaN resistors	sheet resistance	50	Ω/sq
GaAs resistors	sheet resistance	370	Ω/sq
Vias		yes	
Substrate	thickness	100	µm

FET Models Available (Noise)		
Gate Pitch (µm)	Gate Fingers	FET Sizes (µm)
26 26	4	300
26 26	8	300

Application Examples

DC to 14 GHz Power Amplifier TGA8349-SCC:
The TriQuint TGA8349-SCC is a GaAs monolithic low-noise distributed amplifier designed for use as a multi-octave general-purpose gain block. The device provides 3.1 dB noise figure at mid-band. Typical power output is 16 dBm at 1-dB gain compression.

2 to 20 GHz Low-Noise Amplifier TGA8310-SCC:
The TriQuint TGA8310-SCC is a monolithic low-noise distributed amplifier, which operates from 2 to 20 GHz. Typically, noise figure is 4 dB with a small signal gain of 9 dB. This low-noise distributed amplifier is suitable for a variety of wideband electronic warfare systems such as radar warning receivers, electronic counter measures, decoys, jammers and phased array systems.

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Process Data Sheet

Prototyping and Development

- Prototype Wafer Option (PWO)
  - Customer-specific masks
  - Customer schedule
  - 2 wafers delivered
  - Backside via process included
  - PCM (process control monitor) qualified wafers

Design Tools

- Device libraries of circuit elements:
  - FETs
  - Thin-film and implanted resistors
  - Capacitors
  - Inductors
- Agilent ADS design kit
- MASC Library

Training

- GaAs design classes:
  - Half-day introduction upon request
  - 3-day technical training upon request at the TriQuint Texas facility

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Process Status

0.5-µm Low-Noise, Low-Current MesFET (LNLC) is fully released and qualified
Contact TriQuint or visit
http://www.triquint.com/company/quality/
for more information on quality and reliability.

Applications Services

- Tiling of GDSII stream files including PCM (process control monitor)
- Design rule checking
- Layout versus schematic checking
- Engineering:
  - On-wafer DC test
  - On-wafer RF test
  - Thermal analysis
  - Yield enhancement
- Part qualification
- Failure analysis
- Space qualification

Manufacturing Services

- Mask making
- Wafer thinning
- Wafer dicing
- Substrate vias
- DC die-sort testing
- RF die-sort testing
- Final visual inspection

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