0.5  $\mu\text{m}$  pHEMT Device Cross-Section

## Features

- D-Mode, -0.8 V Vp
- InGaAs Active Layer pHEMT Process
- 0.5  $\mu\text{m}$  Optical Lithography Gates
- 20 V D-G Breakdown Voltage
- High Density Interconnects:
  - 2 Global
  - 1 Local
- High-Q Passives
- Thin Film Resistors
- High Value Capacitors
- Backside Vias Optional
- Based on Production 0.25  $\mu\text{m}$  pHEMT and Passives Processes
- TOM3 FET Models Available Q4'02

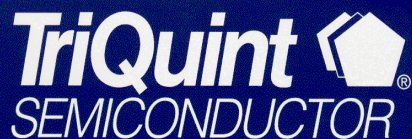
## General Description

TriQuint's 0.5  $\mu\text{m}$  pHEMT process is based on our production released 0.25  $\mu\text{m}$  gate process. TQPHT substitutes lower cost optical lithography in place of e-beam and adds TriQuint's unique thick metal scheme. This process is targeted for high gain amplifiers and high linearity and low loss in RF switch applications. The TQPHT process offers a D-Mode pHEMT with a -0.8 V pinch off. The three metal interconnecting layers are encapsulated in a high performance dielectric that allows wiring flexibility, optimized die size and plastic packaging simplicity. Precision NiCr resistors and high value MIM capacitors are included allowing higher levels of integration, while maintaining smaller, cost-effective die sizes.

## Applications

- Highly Efficient and Linear Power Amplifiers
- Low Loss Switches for Wireless Transceivers and Basestations
- High Supply Voltage Applications
- Integrated RF Front Ends- LNA, SW, PA

**Target Pre-Production  
Release Date:  
Q3, 2002**



# TQPHT

## 0.5 um pHEMT Foundry Service

<b>-0.8V Vp, D-Mode Target Process Details</b>			
Element	Parameter	Value	Units
D-Mode pHEMT	Vp	-0.8	V
	Idss	200	mA/mm
	I <sub>max</sub>	400	mA/mm
	G <sub>m</sub>	350	mS/mm
	Breakdown, V <sub>dg</sub>	17	V
	F <sub>t</sub> @ I <sub>dss</sub>	25	GHz
	F <sub>max</sub> @ I <sub>dss</sub>	90	GHz
	C <sub>off</sub> @ V <sub>ds</sub> =0.5V	1.2	pF/mm
	R <sub>on</sub> @ I <sub>ds</sub> =I <sub>max</sub>	4	Ohm-mm
	<b>Common Process Element Details</b>		
Gate Length		0.5	μm
Interconnect		3	Metal Layers
MIM Caps	Value	600	pF/mm <sup>2</sup>
	Breakdown	typ min	40 25
Resistors	NiCr	50	Ohms/sq
	Bulk	350	Ohms/sq
Vias		Yes	
Mask Layers	No Vias	12	
	With Vias	14	

### Design Tool Availability

- Preliminary Design Manual Now
- Device Library of Circuit Elements: FETs, Diodes, Thin Film Resistors, Capacitors, Inductors
- Parameters for TOM3 Model in ADS Simulator
- TOM3 Model for MWO Soon
- Layout Library for ICED Now
- Cadence Layout Library Q3'02
- Rule Sets for Design Rule Check: Q3'02

Please contact your local TriQuint Semiconductor Representative/ Distributor or Foundry Services Division Marketing for Additional information:  
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