



Picture is NOT to scale  
Metal 1 and Metal 2 not shown

**0.25- $\mu$ m Gallium Nitride Cross Section**

## General Description

The 0.25- $\mu$ m Gallium Nitride (GaN) 3MI (3-metal interconnect process on Silicon Carbide (SiC) combines high power density, excellent thermal conductivity, and high gain performance. The process is optimized for high-power operation through 18 GHz. Passives include 3 thick metal interconnect layers, precision TaN resistors, 3 MIM capacitor densities. Through-substrate vias offer excellent grounds at higher frequencies. Our air bridges produce minimal interconnect capacitance and 3MI's protective overcoat layer provides environmental robustness.

## Features

- 0.25- $\mu$ m amplifier transistors
- High Q passives
- 3 MIM capacitance densities
- TaN resistors
- High-density interconnects
- 3 metal layers
- Air bridges
- Substrate vias
- Silicon Carbide substrate for excellent thermal conductivity
- Protective Overcoat
- Operation up to  $V_d = 40$  V
- Gain: >10 dB @ 18 GHz;  
>17 dB @ 4 GHz
- 5-7 W/mm
- 50% - 75% PAE

## Applications

- Up to 18 GHz
- Military
- Space
- Power Amplifiers
- Low-noise amplifiers

*\* Unless otherwise noted; models and graphs in this process data sheet are for devices on a 100- $\mu$ m thick substrate.*

0.25- $\mu$ m Gallium Nitride 3MI Process Details			
Element	Parameter	Typical Value	Units
FETs	$I_{dss}$	900	mA/mm
	$G_m$	300	mS/mm
	$V_{bd}$	- 70	V
	$V_p$	- 4	V
	$F_t$ (peak)	32	GHz
MIM capacitors	density	240	pF/mm <sup>2</sup>
		300	pF/mm <sup>2</sup>
		1200	pF/mm <sup>2</sup>
Capacitors over vias		March 2010	
TaN resistors	sheet resistance	50	Ohms/sq
Vias		yes	
Substrate thickness		100	$\mu$ m
Wafer diameter		3 (76.2)	inches (mm)

### Status of Release

This process is Full-Foundry Released