



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

0.25- μ m Gallium Nitride Cross Section

General Description

The 0.25- μ 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- μ 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- μ m thick substrate.*

0.25- μ 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 ²
		300	pF/mm ²
		1200	pF/mm ²
Capacitors over vias		Yes	
TaN resistors	sheet resistance	50	Ohms/sq
Mesa resistors		390	
Vias		yes	
Substrate thickness		100	μ m
Wafer diameter		100	mm

Status of Release

This process is Limited Release