

Plasma Processing for MMIC Device Manufacture

Dr. Jay N. Sasserath
Vice President and Business Unit Director
Unaxis USA, Inc.
10050 16th St. North
St. Petersburg, FL 33716
(T) 727-577-4999, x344
jay.sasserath@unaxis.com

An overview of plasma processing used for GaAs device manufacturing will be presented. Due to the recent explosion wireless device manufacture, MMIC devices will be utilized as the primary vehicle for discussion (see Figures 1 & 2 below for specific applications). Two major groups of processes will be discussed, plasma processing and metallization techniques. For plasma processing, both parallel plate and high-density plasma systems will be fundamentally reviewed. Specific applications will then be discussed, with the advantages and disadvantages of each technique demonstrated for MMIC devices. For metallization processes, PVD and evaporation techniques will be discussed. Again, the advantages and disadvantages for each will be shown, using MMIC device processing as a demonstration vehicle. Time will be left at the end of the discussion for a question and answer session.

Figure 1: Overview of Plasma Processes Used in MMIC Device Manufacture

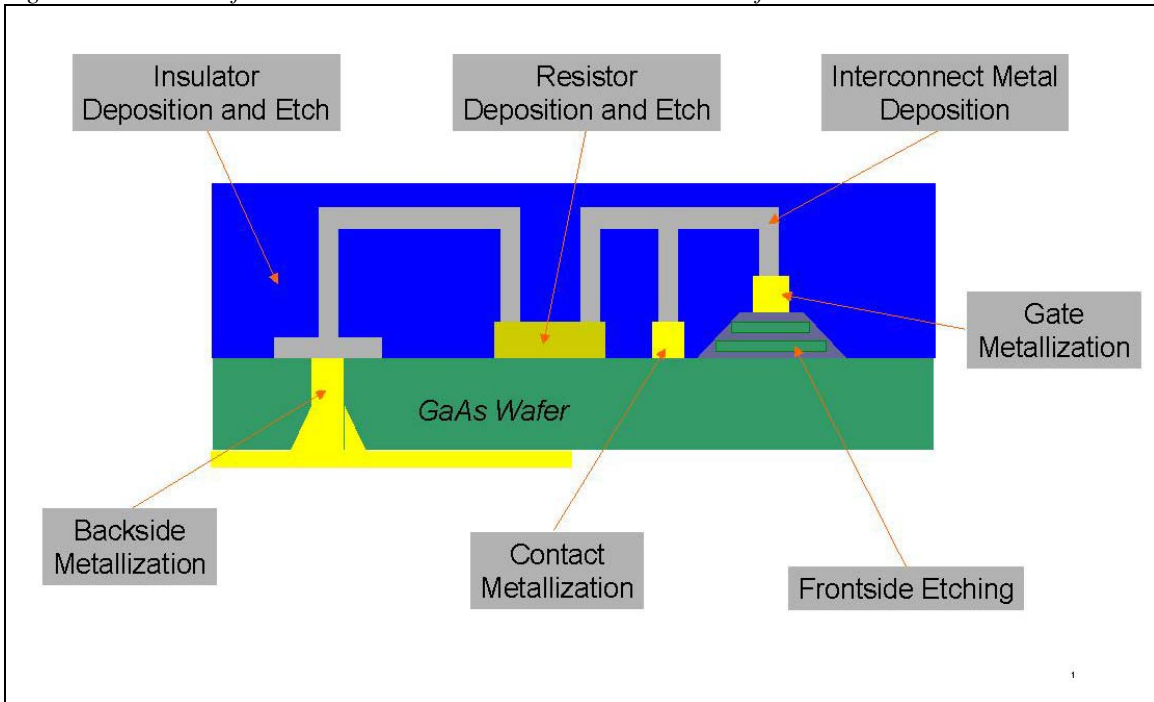


Figure 2: Technology Review for MMIC Device Processing

Process Step	Typical Films	ICP	PECVD	PVD	Evaporation
Frontside Etch	AlGaAs/GaAs/ InGaP	●			
Gate Metallization (Schottky Contact)	Ti, TiW, Pt, Au			●	●
Contact Metallization	Ni, Ge, Au, Ni, Zn				●
Resistor Layer Deposition	NiCr, TaN, AlN, Cemet, TiWSiN,			●	
Resistor Layer Etch	AlN, TaN	●			
Insulator Deposition	SiN		●	●	
Insulator Etch	SiN	●			
Interconnect Metallization	Au-based films Al-based films			●	●
Backside Via Etch	GaAs	●			
Backside Metal Seed Layer	Ti, TiW, Au			●	