

Wavetek's GaAs Manufacturing in 6" CMOS Fab

Weber Wei, Jeff Lin, MT Wu, Jackie Huang, Sam Chou, Amos Yen, CG Shih, Vance Su,
MY Chen* and Alex Chien*

Wavetek Microelectronics Corporation, * United Microelectronics Corporation
No.10, Innovation Rd. 1, Hsinchu Science Park, Taiwan 300, ROC

Abstract

Wavetek founded in October of 2010 is a GaAs foundry company using UMC 6" CMOS factory (named as 6A). Both of GaAs process and CMOS process is manufactured in the same Fab. Part of tools from 6A and are in the original locations, like I-line stepper, PECVD-SiN...etc. The cross-contamination issue is prevented very well by dedicated tools, operators, engineers and systems.

In this paper, we will present the GaAs manufacturing flow and our technologies.

- How the GaAs manufacturing flow in CMOS factory is to prevent contamination from the operation and operation system.
- Wavetek HBT/pHEMT technologies
HBT2/HBT5 and 0.5um power pHEMT technologies are transferred from GCS. Then we developed own technologies, including
HBT6 for 12V small cell power amplifiers
0.5um and 0.25um E/D pHEMT for low noise and power applications.
0.5um and 0.25um power pHEMT.
0.25um process using i-line is adopted the concept of CMOS process to shrink photo dimension.
High density integration process with competitive for low die cost
- Procedure of new technology qualification

Wavetek's HBT Technology

Parameters	Unit	HBT1 (HL)	HBT2	HBT3	HBT5	HBT6
Application		W-CDMA WiFi (802.11 a/b/g/n/ac) LTE Gain Block	W-CDMA WiFi (802.11 a/b/g/n/ac) LTE Gain Block	MMMB GSM/Edge TD-SCDMA	GSM HV gain block	Small-Cell high Power WiFi
Current gain		70	70	70	70	70
BV _{ceo}	V	13.5	14	16.5	18.5	28
BV _{cbo}	V	24.5	25	27	33	55
f _T	GHz	45	40	35	32	20
f _{Max}	GHz	62	58	58	60	75

Wavetek's pHEMT Technology

Parameters	Unit	PS-50	ED-50		ED-25		PA-50	PA-25
Applications		W-CDMA WiFi (802.11 a/b/g/n/ac) LTE / GPS LNA Switch	W-CDMA WiFi (802.11 a/b/g/n/ac) LTE / GPS LNA Gain Block/Switch		W-CDMA WiFi (802.11 a/b/g/n/ac) LTE / GPS LNA Gain Block/Switch		2 - 20 GHz Gain Block & Power Amplifier	20 - 80 GHz Gain Block & Power Amplifier
Device Type		D-mode	E-mode	D-mode	E-mode	D-mode	D-mode	D-mode
Vth / Vp	V	-1	0.25	-1	0.3	-1	-1	-1
IDSS	mA/mm	266	1.0E-04	270	1.0E-04	320	300	320
GM	mS/mm	350	550	350	850	450	350	450
VBDG	V	15	15	15	12	15	20	18
Ron	ohm.mm	1.6	1.8	1.6	1.2	1	-	-
NF	dB	0.9 at 6GHz	0.7 at 6GHz	-	0.3 at 6GHz	-	0.9 at 10GHz	0.6 at 10GHz
ft	GHz	33	33	33	70	60	33	60
fmax	GHz	90	100	90	120	100	90	200