

GCS InGaP HBT Process Summary



GCS offers a total of five (5) power processes (P1, P2, P5, P6 and P7) for Handset wireless, WLAN, Mobile WiMAX and Infrastructure markets.

Our P1 and P2 processes are designed to achieve **High Ruggedness** and **Superior Linearity** at the same time.

P5 process featuring **Unbreakable Ruggedness** and **High Power Efficiency** at the same time was designed for GSM/EDGE power amplifier application. Several customers (including IDMs) have reported excellent VSWR >15:1 with 5V Vcc bias.

P6 process was designed with high breakdown voltage which enables high voltage (up to 10V bias) and high power application

Recently developed P7 process extends BVceo to 28V to allow 12V PA operation

Our high frequency VCO InGaP HBT process with integrated varactor, with Ft in the 60 GHz range, exhibits a super low phase noise of -110 dBc/Hz at 100KHz offset for center frequency of up to 15 GHz as demonstrated in many VCO products in the market. In addition, this process is also proven to be excellent for prescaler and other phase detector MMICs.

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- A family of HBT processes specifically designed for different applications
- Processes have passed extensively reliability and environmental tests
- Processes have been qualified by tier-one customers (including IDMs) and in production since 2001

Parameters	P1	P2	P5	P6	P7	D1
Applications	N-, W-CDMA, WiFi, WiMAX (802.11a,b,g)	CDMA, WiFi, WiMAX (802.11a, b, g)	GSM HV Gain Block	10V PA, Base Station, CATV	12V PA, Infrastructure Base Station PA	Low phase noise VCO
Current Gain @1KA/cm ²	120	70	70	70	70	150
BV _{ceo} @ 2KA/cm ² (V)	12.5	13.5	18.5	23	28	7.5
BV _{cbo} @ 2KA/cm ² (V)	23	23	33	45	55	17
F _v /F _{max} (GHz) (2.8x15um@25KA/um²)	45/55	40/58	32/60	30/65	20/70	60/65 [1]
Schottky Diode	Yes	Yes	Yes	Yes	Yes	Yes
Performance Example	Pout = 28 dBm, PAE = 65%, G = 20dB, Vcc = 3.5V, Freq = 2.0 GHz, DUT = 1,700 um ²	Pout = 28 dBm, PAE = 65%, G = 20dB, Vcc = 3.5V, Freq = 2.0 GHz, DUT = 1,700 um ²	Pout = 36 dBm, PAE = 70%, Lin. G = 18 dB, Vcc = 3.6V, Freq = 0.9 GHz, DUT = 6,900 um ²	Pout = 33 dBm, PAE = 70%, G = 21dB, Vcc = 10V, Freq = 2.0 GHz, DUT = 1,700um ²	Pout = 30 dBm, Vcc = 12V, DUT = 1,920um²	VCO fo=4.990 to 5.154 GHz Po=9.5dBm PN=105dBc/Hz @ 100KHz offset
Model Availability	GP, VBIC	GP, VBIC	GP, VBIC	GP, VBIC	In work	GP, VBIC
Reliability Data (@125 deg. C) (2x3x20um@25KA/cm²)	Ea > 1.1 eV MTTF >8E6 hrs	Ea > 1.1 eV MTTF >2.2E7 hrs	Ea > 1.1 eV MTTF >9E6 hrs	Ea > 1.2 eV MTTF >2E7 hrs	In work	Ea > 1.0 eV MTTF >1.4E6 hrs