0.18 µm Process Family:

XC018

0.18 Micron Modular RF enabled CMOS Technology

MIXED-SIGNAL FOUNDRY EXPERTS

DESCRIPTION

The XC018 series is X-FAB's 0.18 micron Modular Logic and Mixed Signal Technology. The platfrom is ideal for SOC application. Main target applications are standard cell, semi-custom and full custom designs for Automotive, Consumer, Industrial as well as Tel-ecommunication products, while the low power and high voltage process is ideal for mobile applications as well as display drivers or controllers. Based upon the industrial standard single poly with up to six metal layers 0.18-micron drawn gate length N-well process, modules are also available for metal-insulator-metal capacitors, high resistive poly, dual gate oxide (1.8V with 3.3V or 5.0V) transistors.

Comprehensive design rules, precise SPICE models, analog and digital libraries, IP's and development kits support the process for major EDA vendors.

KEY FEATURES OVERVIEW

- 1.8V logic layout & performance compatible with the industry standard
- 0.18-micron single poly, up to six-metal N-well CMOS basic process
- Modular concept
- Standard & Low Power modules
- 1.8V core with 3.3V or 5.0V I/O option
- Salicided Source & Drain
- Direct STI
- Isolation well for all 1.8V, 3.3V & 5.0V MOS devices
- High value poly resistor
- Metal-Insulator-Metal capacitors
- Double MIM & Triple MIM Capacitors
- I/O cell library with 4kV HBM ESD protection levels
- RF characterisation and models for all RF MOS transistors and passive components
- Thick top metal for inductors and Smart Power applications
- Gate oxide thickness: 5.0V -125Å, 3.3V - 60Å, 1.8V - 30Å
- High Density up to 115000 gates per mm2
- Typical and worst-case models - BSIM3v3.24 (MOS, BJT, RES, CAP)
- MOS 1/f noise characterised & included in model
- Calibre & Assura verification deck
- Cadence PDK

APPLICATIONS

- Standard Logic/Controller circuits
- Mixed signal embedded systems/ systems on a chip (SOC)
- High Precision mixed signal circuits
- Low power mixed signal circuits
- Analog front ends for sensors
- Embedded High Voltage applicaitons
- RF Applications
- Communications, Consumer, Automotive and Industrial markets

QUALITY ASSURANCE

X-FAB spends a lot of effort to improve the product quality and reliability and to provide comprehen-sive support to the customers. This is maintained by the direct and flexible customer interface, the reliable manufacturing process and complex test and evaluation conceptions, all of them guided by strict quality improvement procedures developed by X-FAB. This comprehensive, proprietary quality improvement system has been certified to fulfill the requirements of the ISO 9001, ISO TS 16949 and other standards.

DELIVERABLES

- PCM tested wafers
- Optional engineering services: Multi Project Wafer (MPW) and Multi Layer Mask Service (MLM)
- Optional design services: feasibility studies, Place & Route, synthesis, custom block development

DIGITAL LIBRARIES

- Foundry-specific optimized libraries
- Low power, low leakage library for energy effecient and small size digital blocks
- Junction isolated library for low noise applications
- Multi-voltage library for multi-voltage and power cut-off applications
- Liberty™ synthesis models
- IEEE 1364 Verilog simulation models
- IEEE 1076.4 VHDL-VITAL simulation models

ANALOG LIBRARIES

- Operational Amplifiers
- Bias Cells
- Digital-to-Analog Converters
- Analog-to-Digital Converters
- RC Oscillators
- Power-On/Off-Reset
- Comperators
- Bandgaps
- Voltage Regulators
- Over-Temperature Detector

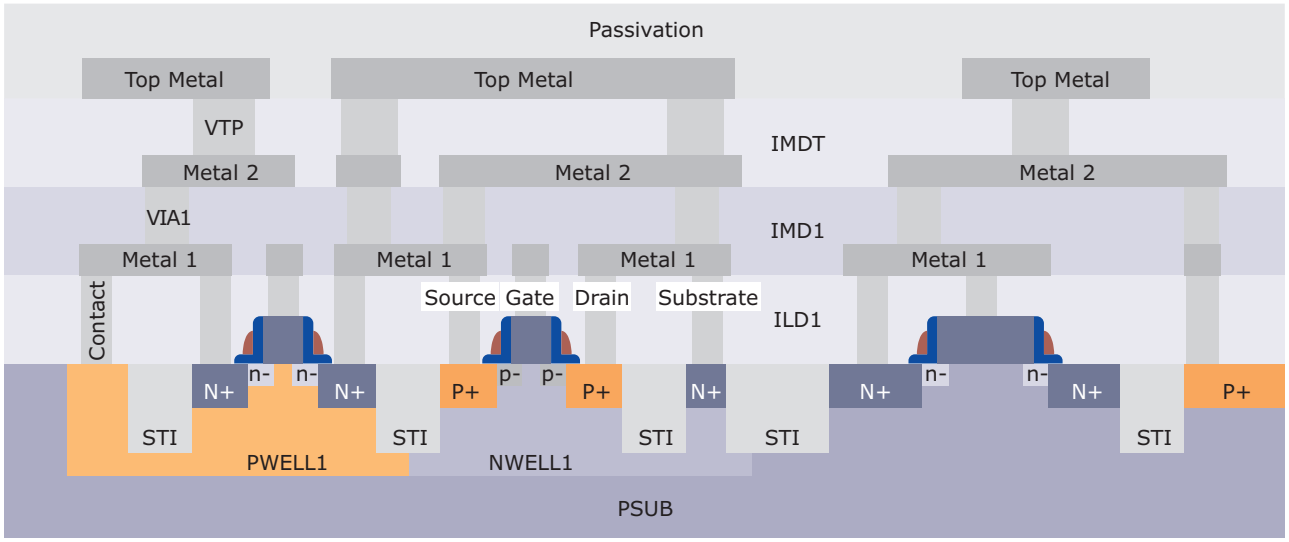
PRIMITIVE DEVICES

- NMOS/PMOS Transistors (1.8V, 3.3V & 5.0V)
- Bipolar Transistors
- Diodes
- Capacitors
- Resistors
- Varactors
- Inductors

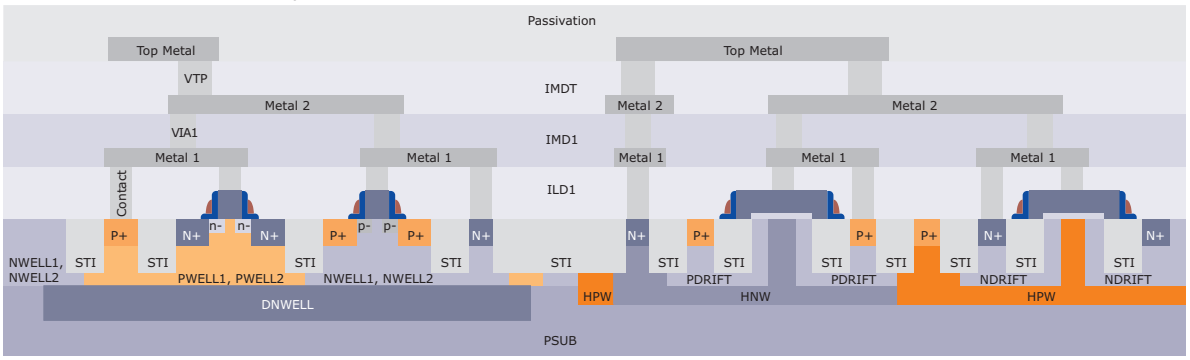
XC018 BASIC DESIGN RULES

Mask	width [µm]	Spacing [µm]
N-well	0.86	1.4
Active Area	0.22	0.28
Poly-silicon Gate	0.18	0.25
Poly-silicon Resistor	0.44	0.44
Contact	0.22	0.25
Metal 1	0.23	0.23
Via 1, 2, 3, 4	0.26	0.26
Metal 2, 3, 4, 5	0.28	0.28
Top Via	0.36	0.35
Top Metal	0.44	0.46
Thick Metal	3.0	2.5

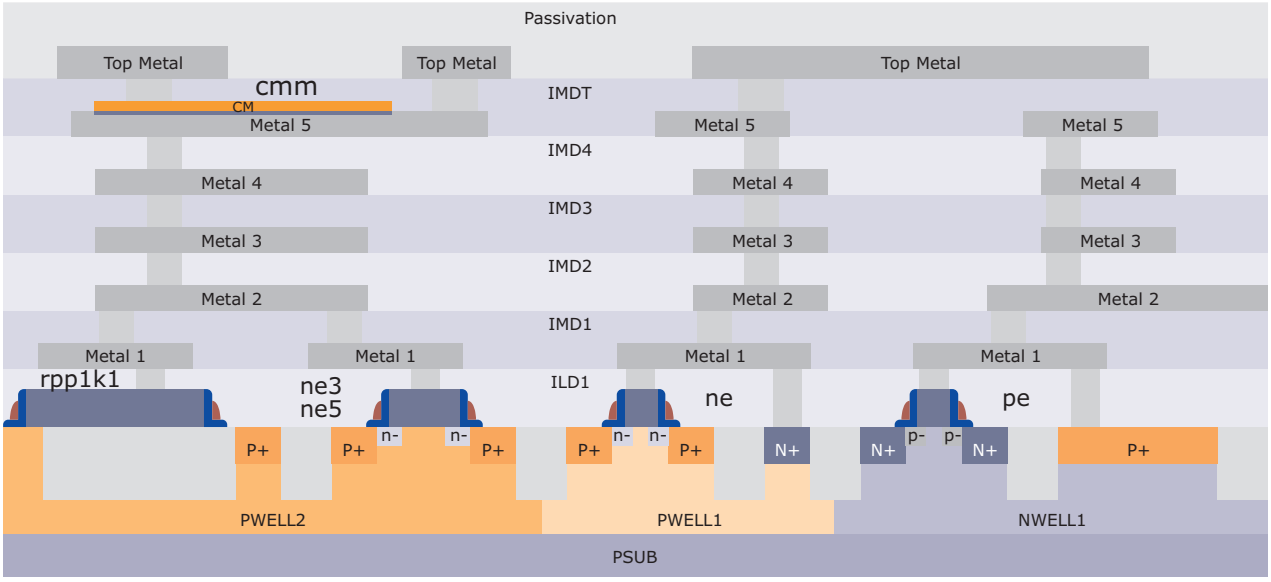
XC018 DEVICES SCHEMATIC CROSS SECTION



MOSST, MOSLP Module Transistors



ISOMOS & HV1 Module Transistors



HRPOLY, 4METALS, 5METALS, 6METALS, MIM Module

XH018 PROCESS FLOW

MOSLP/MOSST Module	Additional Modules	
Wafer Start		
	Zero layer oxide	ISOMOS
	Deep NWELL	ISOMOS
Active area 1.8V wells		
	3.3V / 5V wells	MOS3LP/MOS5(ST/LP)
1.8V gate oxide		
	3.3V / 5V gate oxide	MOS3LP/MOS5(ST/LP)
Poly silicon gate 1.8V NMOS		
1.8V PMOS	PMOS implant	MOS3(LP/ST)/MOS5(ST/LP)
	NMOS implant	MOS3(LP/ST)/MOS5(ST/LP)
Source/Drain implants		
	HRPOLY implant	HRPOLY
Salicidation Contact Metal 1 Via 1 Metal 2		
	Double MIM capacitor	DMIM
	Triple MIM capacitor	TMIM
	Via 2 Metal 3	4METALS
	Double MIM capacitor	DMIM
	Triple MIM capacitor	TMIM
	Via 3 Metal 4	5METALS
	Triple MIM capacitor	TMIM/ TMIMHM
	Via 4 Metal 5	6METALS
	MIM capacitor	MIM
Top Via Top Metal		
	Thick Via Thick Metal	METTHK
PAD		
	Polyimide deposition	PIMIDE
		mask steps

XC018 CORE MODULE

Module Name	Descriptions	Masks No.
MOSLP	Low power MOS module	17
MOSST	Standard MOS module	17

XC018 ADDITIONAL MODULES

MOS3LP	Low power 3.3V CMOS module	5
MOS3ST	Standard 3.3V CMOS module	3
MOS5LP	Low power 5V CMOS module	5
MOS5ST	Standard 5V CMOS module	5
ISOMOS	Triple well isolated CMOS module	2
HRPOLY	High resistance polysilicon module	1
OTP3	One-Time Programmable memory module	0
MIM	Single MIM module	1
DMIM	Double MIM module	1
TMIM	Triple MIM module	1
4METALS	4 metal module	2
5METALS	5 metal module	2
6METALS	6 metal module	2
THKMET	Thick metal module	2
PIMIDE	Polyimide module	1

XC018 RESTRICTION FOR MODULE COMBINATIONS

Module name	Use of the module also requires use of the following module(s)	Use of the module is not available with the use of the following module(s)
MOSLP		MOSST, MOS3ST, MOS5ST
MOSST		MOSLP, MOS3LP, MOS5LP
MOS3LP	MOSLP	MOSST, MOS3ST, MOS5ST, MOS5LP
MOS3ST	MOSST	MOSLP, MOS3LP, MOS5LP, MOS5ST
MOS5LP	MOSLP	MOSST, MOS3ST, MOS5ST, MOS3LP
MOS5ST	MOSST	MOSLP, MOS3LP, MOS5LP, MOS3ST
ISOMOS	MOSST, MOSLP, MOS3ST, MOS3LP, MOS5LP, MOS5ST	
OTP3	MOS3LP	MOSST, MOS3ST, MOS5ST, MOS5LP
MIM		DMIM, TMIM
DMIM	4METALS	MIM, TMIM
TMIM	5METALS	MIM, DMIM
5METALS	4METALS	
6METALS	5METALS	
THKMET		6METALS

Active Devices

XC018 MOS CORE TRANSISTORS

Device	Name	Available with module	|VT| [V]	IDS [µA/µm]	IOFF [pA/µm]	BVDS [V]	Max. VDS [V]	Max. VGS [V]
1.8V NMOS	ne	MOSLP MOSST	0.60 0.43	480 620	< 3 < 50	> 4.0	1.98	1.98
1.8V native Vt NMOS	nn	MOSLP MOSST	0.03 0.02	380			1.98	1.98
1.8V PMOS	pe	MOSLP MOSST	0.65 0.51	170 270	< 3 < 50	> 4.0	1.98	1.98
3.3V native Vt NMOS	nn3	MOS3ST, MOS3LP	0.18	670			3.6	3.6
3.3V NMOS	ne3	MOS3LP MOS3ST	0.70 0.75	600 600	< 3 < 10	> 7.0	3.6	3.6
3.3V PMOS	pe3	MOS3LP MOS3ST	0.63 0.66	300 310	< 3 < 10	> 7.0	3.6	3.6
5.0V NMOS	ne5	MOS5LP MOS5ST	0.77 0.78	530 550	< 5	> 10	5.5	5.5
5.0V PMOS	pe5	MOS5LP MOS5ST	0.84 0.86	240 250	< 10	> 8.4	5.5	5.5

XC018 RF MOS TRANSISTORS

Device	Name	Available with module	Ft [GHz]	Fmax [GHz]	Max. VDS [V]	Max. VGS [V]
1.8V NMOS RF	nerf	MOSLP	50	75	1.98	1.98
1.8V PMOS RF	perf	MOSLP	20	40	1.98	1.98
3.3V NMOS RF	ne3rf	MOS3LP	27	57	3.6	3.6
3.3V PMOS RF	pe3rf	MOS3LP	15	30	3.6	3.6
5.0V NMOS RF	ne5rf	MOS5LP	18	48	5.5	5.5
5.0V PMOS RF	pe5rf	MOS5LP	9	24	5.5	5.5

XH018 ISOMOS TRANSISTORS

Device	Name	Available with module	|VT| [V]	IDS [µA/µm]	IOFF [pA/µm]	|BVDS| [V]	max. VDS [V]	max. VGS [V]
Iso. 1.8V NMOS	nei	MOSLP+ISOMOS MOSST+ISOMOS	0.60 0.43	480 620	< 3 < 50	> 4.0	1.98	1.98
Iso. 1.8V PMOS	pei	MOSLP+ISOMOS MOSST+ISOMOS	0.65 0.51	170 270	< 3 < 50	> 4.0	1.98	1.98
Iso. 3.3V NMOS	ne3i	MOS3LP+ISOMOS MOS3ST+ISOMOS	0.70 0.75	600 600	< 3 < 10	> 7.0	3.6	3.6
Iso. 3.3V NMOS	pe3i	MOS3LP+ISOMOS MOS3ST+ISOMOS	0.63 0.66	300 310	< 3 < 10	> 7.0	3.6	3.6
Iso. 5.0V NMOS	ne5i	MOS5LP+ISOMOS MOS5ST+ISOMOS	0.77 0.78	530 550	< 5	> 10.0	5.5	5.5
Iso. 5.0V PMOS	pe5i	MOS5LP+ISOMOS MOS5ST+ISOMOS	0.84 0.86	240 250	< 10	> 8.4	5.5	5.5

Active Devices *(Continued)*

XC018 RF ISOMOS TRANSISTORS

Device	Name	Available with module	Ft [GHz]	Fmax [GHz]	Max. VDS [V]	Max. VGS [V]
Iso. 1.8V NMOS RF	neirf	MOSLP+ISOMOS	50	75	1.98	1.98
Iso. 1.8V PMOS RF	peirf	MOSLP+ISOMOS	20	40	1.98	1.98
Iso. 3.3V NMOS RF	ne3irf	MOS3LP+ISOMOS	27	57	3.6	3.6
Iso. 3.3V NMOS RF	pe3irf	MOS3LP+ISOMOS	15	30	3.6	3.6
Iso. 5.0V NMOS RF	ne5irf	MOS5LP+ISOMOS	18	48	5.5	5.5
Iso. 5.0V PMOS RF	pe5irf	MOS5LP+ISOMOS	9	24	5.5	5.5

XC018 BIPOLAR TRANSISTORS

Device	Name	Available with module	BETA	VA [V]	VBE [mV]	max. VCE [V]	max. VEB [V]
1.8V vPNP	qpva qpvb qpvc	MOSLP	2.5 2.6 2.7	> 100	708 668 635	1.98	1.98
1.8V vPNP	qpva qpvb qpvc	MOSST	2.5 2.6 2.7	> 100	708 668 635	1.98	1.98
3.3V vPNP	qpva3 qpvb3 qpvc3	MOS3LP	2.3 2.5 2.5	> 100	707 648 635	3.6	3.6
3.3V vPNP	qpva3 qpvb3 qpvc3	MOS3ST	2.3 2.5 2.5	> 100	707 668 635	3.6	3.6
5.0V vPNP	qpva5 qpvb5 qpvc5	MOS5LP	2.3 2.5 2.5	> 100	707 668 635	5.5	5.5
5.0V vPNP	qpva5 qpvb5 qpvc5	MOS5ST	2.3 2.5 2.5	> 100	707 668 635	5.5	5.5

Passive Devices

XC018 DIFFUSION RESISTORS

Device	Name	Available with module	RS [Ω/□]	Temp. Coeff. [10^{-3}/K]	Max VTB [V]
1.8V N+ diffusion	rdn	MOSLP, MOSST	62	1.4	1.98
1.8V P+ diffusion	rdp	MOSLP, MOSST	135	1.3	1.98
1.8V N-well	rnw	MOSLP, MOSST	970	3.0	5.5
3.3V N+ diffusion	rdn3	MOS3LP, MOS3ST	62	1.4	3.6
3.3V P+ diffusion	rdp3	MOS3LP, MOS3ST	135	1.3	3.6
3.3V N-well	rnw3	MOS3LP, MOS3ST	970	3.0	5.5
5.0V N+ diffusion	rdn5	MOS5LP, MOS5ST	62	1.4	5.5
5.0V P+ diffusion	rdp5	MOS5LP, MOS5ST	135	1.3	5.5
5.0V N-well	rnw5	MOS5LP, MOS5ST	1080	3.0	5.5

Passive Devices *(Continued)*

XC018 POLY RESISTORS

Device	Name	Available with module	RS [Ω/□]	Temp. Coeff. [10^{-3}/K]	Max VTB [V]
N+ Poly	rnp1	MOSLP, MOSST	330	-1.5	5.5
P+ Poly	rpp1	MOSLP, MOSST	280	-0.04	5.5
Lightly dope P+ Poly1	rpp1k1	HRPOLY	1000	-0.9	5.5

XC018 METAL RESISTORS

Device	Name	Available with module	RS [Ω/ □]	Thickness/junc. depth [µm]	Max J/W [mA/µm]	Temp. Coeff. [10^{-3}/K]	Max VTB [V]
Metal 1	rm1	MOSLP, MOSST	0.095	0.555	1.0	3.2	5.5
Metal 2	rm2	MOSLP, MOSST	0.085	0.555	1.0	3.2	5.5
Metal 3	rm3	4METALS	0.085	0.555	1.0	3.2	5.5
Metal 4	rm4	5METALS	0.085	0.555	1.0	3.2	5.5
Metal 5	rm5	6METALS	0.085	0.555	1.0	3.2	5.5
Top Metal	rmtp	MOSLP, MOSST	0.043	0.975	1.6	3.2	5.5
Thick Metal	rmtpl	THKMET	0.0095	3.000	6	3.5	5.5

XC018 FRINGE CAPACITORS

Device	Name	Available with module	Cell Cap [fF]	BV [V]	Max. VTB [V]
Poly1/M1/M2 fringe	csf2p	MOSLP, MOSST	22.9	> 15	45
Poly1/M1/M2/M3 fringe	csf3p	4METALS	33.8	> 15	45
M1/M2/M3 fringe	csf3	4METALS	29.9	> 35	45
M1/M2/M3/MTP fringe	csft4	4METALS	33.8	> 35	45
M1/M2/M3/M4 fringe	csf4	5METALS	40.9	> 35	45
M1/M2/M3/M4/MTP fringe	csft5	5METALS	44.9	> 35	45
M1/M2/M3/M4/M5 fringe	csf5	6METALS	52.8	> 35	45
M1/M2/M3/M4/M5/MTP	csft6	6METALS	56.9	> 35	45

XC018 MIM CAPACITOR

Device	Name	Available with module	Area Cap [fF/µm²]	V Coeff. [1/V]	BV [V]	max. VTB [V]
Single MIM	cmm	MIM	1.00	15	> 20	5.5
Double MIM	cdmm	DMIM	2.00	3	> 20	5.5
Triple MIM	ctmm	TMIM	3.00	15	> 20	5.5

XC018 INDUCTORS

Device	Name	Module	Inductance [nH]	Q-Factor
Symmetric 3.8nH for 2.4GHz	I24a	THKMET	3.8	15.6
Symmetric 2.0nH for 5.0GHz	I50a	THKMET	2.0	12.9

Passive Devices *(Continued)*

XC018 MOS VARACTOR

Device	Name	Available with module	Tuning range [%]	Area Cap @ +/- 1V [fF/µm²]	Max VGB [V]
1.8V MOS	mosvc	MOSLP, MOSST	57	8.3 / 3.1	1.98
3.3V MOS	mosvc3	MOS3LP, MOS3ST	54	5.0 / 2.0	3.6
5.0V MOS	mosvc5	MOS5LP, MOS5ST	45	2.6 / 1.2	5.5

XC018 RF MOS VARACTORS

Device	Name	Available with module	Q @1GHz	max. VGB [V]
1.8V MOS RF	mosvcrf	MOSLP	50	1.98
3.3V MOS RF	mosvc3rf	MOS3LP	70	3.6
5.0V MOS RF	mosvc5rf	MOS5LP	140	5.5

XC018 RF DIODE VARACTORS

Device	Name	Available with module	Area Cap @0/2 V [fF/µm²]	Tuning range [%]	Q @1GHz	max. VCC [V]
1.8V Diode RF	dpvcrf	MOSLP	0.98 / 0.66	33	60	1.98
3.3V Diode RF	dpvc3rf	MOS3LP	1.0 / 0.66	34	60	3.6
5.0V Diode RF	dpvc5rf	MOS5LP	0.96 / 0.64	33	60	5.5

XC018 DIFFUSION DIODE

Device	Name	Available with module	Area Cap [fF/µm²]	|BV| [V]	Leakage Current [fA/µm²]	Max VCC [V]
1.8V N+ diff. /PW1	dn	MOSLP, MOSST	1.12	> 9	0.0005	1.98
1.8V P+ diff. /NW1	dp	MOSLP, MOSST	0.98	> 9	0.0005	1.98
1.8V NW1 /Psub	dnw	MOSSLP, MOSST	0.12	> 15	0.001	5.5
3.3V N+ diff. /PW2	dn3	MOS3LP, MOS3ST	0.87	>11	0.0007	3.6
3.3V P+ diff. /NW2	dp3	MOS3LP, MOS3ST	1.00	> 11	0.0007	3.6
3.3V NW2 /Psub	dnw3	MOS3LP, MOS3ST	0.12	> 15	0.001	5.5
5.0V N+ diff. /PW2	dn5	MOS5LP, MOS5ST	1.07	> 11	0.0007	5.5
5.0V P+ diff. /NW2	dp5	MOS5LP, MOS5ST	0.96	> 11	0.0007	5.5
5.0V NW2 /Psub	dnw5	MOS5LP, MOS5ST	0.13	> 15	0.001	5.5
1.8V DNW /Psub	ddnw	ISOMOS	0.50	> 15	0.0003	5.5
1.8V PW1 /DNW	dpw	ISOMOS	0.70	> 15	0.0005	5.5
3.3V PW2 /DNW	dpw3	ISOMOS	0.70	> 15	0.0005	5.5
5.0V PW2 /DNW	dpw5	ISOMOS	0.70	> 15	0.0005	5.5

Non-Volatile-Memory

XC018 POLY FUSE

Device	Name	Available with module	Unprog. Res. [Ω]	Prog. Res. [kΩ]	Prog. Max VCC [V]	Unprog. Max VCC [V]
Poly fuse	pfuse	MOSLP, MOSST	35	> 100	3.6	0.1

STANDARD CELL LIBRARIES

XC018 LOGIC LIBRARY

Device	Library feature	Voltage range	Application benefits
D_CELLS	Standard Speed & Low Power	1.8V	standard speed, low power cells available, P&R compatible with D_CELLS_LL
D_CELLS_LL	Low Leakage & Low Power	1.8V	low leakage (0.21um channel length), low power cells (X0) available, P&R compatible with D_CELLS
D_CELLS_JI	Junction Isolated, Standard Speed & Low Power	1.8V	standard speed, low power cells (X0) available, noise protection
D_CELLS_JILL	Junction Isolated, Low Leakage & Low Power	1.8V / 1.2V	low leakage (0.21um channel length), low power cells available, noise protection, voltage shifting, P&R compatible with D_CELLS_JI

I/O LIBRARIES

XC018 I/O CELLS LIBRARY

Device	Library Feature	V_{CORE} *	V_{IO} *	ESD Level	Application benefits
IO_CELLS_3V	Standard, 3.3V/1.8V multi supply voltage	1.8V	3.3V	4kV HBM	Pad limited
IO_CELLS_F3V	Standard, 3.3V/1.8V multi supply voltage	1.8V	3.3V	2kV HBM	Core limited
IO_CELLS_5V	Standard, 5.0V/1.8V multi supply voltage	1.8V	1.8V	4kV HBM	Pad limited
IO_CELLS_F5V	Standard, 5.0V/1.8V multi supply voltage	1.8V	1.8V	2kV HBM	Core limited
IO_CELLS_JI3V	Junction isolated, 1.8V/3.3V multi supply voltage	1.8V	3.3V	4kV HBM	Pad limited

* Please refer to the library databook for details about available PVT ranges

ANALOG LIBRARIES

XC018 1.8V A_CELLS ANALOG LIBRARY

Library	Cell Name	Operating conditions	Required module
Bandgap	abgpc01_1v8	VDD: 1.62V to 1.98V; T: -40...125°C	MOSLP, 4METALS
Bias Cells	abiac06_1v8 abiac08_1v8	VDD: 1.62V to 1.98V; T: -40...125°C	MOSLP, 4METALS
DAC	adacc02_1v8	VDDA: 1.62V to 1.98V; T: -40...125°C; Digital part VDD: 1.62V to 1.98V;	MOSLP, 4METALS
Operational Amplifiers	aopac01_1v8 aopac02_1v8 aopac03_1v8 aopac04_1v8 aopac09_1v8 aopac10_1v8 aopac11_1v8 aopac12_1v8	VDD: 1.62V to 1.98V; T: -40...125°C	MOSLP, 4METALS
Power-On/Off-Resets	aporc01_1v8 aporc02_1v8 aporc03_1v8	VDD: 1.62V to 1.98V; T: -40...125°C	MOSLP, 4METALS
RC Oscillators	arcoc01_1v8 arcoc02_1v8 arcoc03_1v8 arcoc04_1v8 arcoc05_1v8 arcoc06_1v8 arcoc07_1v8 arcoc08_1v8 arcoc09_1v8 arcoc10_1v8 arcoc11_1v8 arcoc12_1v8	VDD: 1.62V to 1.98V; T: -40...125°C	MOSLP, 4METALS

XC018 3.3V A_CELLS ANALOG LIBRARY

Library	Cell Name	Operating conditions	Required module
Bias Cells	abiac01_3v3 abiac02_3v3 abiac03_3v3	VDD: 2.7V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METALS
Bias Cells	acsoc01_3v3 acsoc02_3v3	VDD: 2.7V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METALS
Bandgap	abgpc01_3v3 abgpc02_3v3 abgpc03_3v3	VDD: 2.4V to 3.6V; T: -40...125°C	MOSLP, MOS3LP, 4METALS
Operational Amplifier	aopac01_3v3 aopac02_3v3 aopac03_3v3 aopac06_3v3 aopac07_3v3 aopac08_3v3 aopac09_3v3	VDD: 2.7V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METALS
Comparators	acmpc01_3v3 acmpc02_3v3 acmpc03_3v3	VDD: 2.7V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METALS
RC Oscillators	arcoc01_3v3 arcoc02_3v3 arcoc03_3v3 arcoc04_3v3	VDD: 2.7V to 3.6V; T: -40...125°C	MOSLP, MOS3LP, 4METALS
Crystal Oscillators	axtoc01_3v3_ji axtoc02_3v3_ji	VDD: 2.4V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METLAS

ANALOG LIBRARIES *(Continued)*

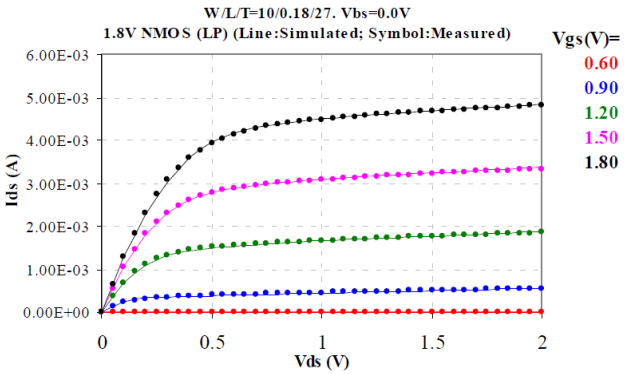
XH018 3.3V A_CELLS ANALOG LIBRARY

Library	Cell Name	Operating conditions	Required module
ADC	aadcc01_3v3 aadcc02_3v3 aadcc03_3v3	VDDA: 2.7V to 3.6V; T: -40...125°C	MOSLP, MOS3LP, 4METALS
DAC	adacc01_3v3	VDDA: 2.7V to 3.6V; T: -40...85°C; Digital part VDD: 1.62V to 1.98V;	MOSLP, MOS3LP, 4METALS
Power-On-Reset	aporc01_3v3 aporc02_3v3 aporc03_3v3	VDD: 2.7V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METALS
Voltage Regulators	aregc01_3v3	T: -40...85°C	MOSLP, MOS3LP, 4METALS
Over-Temperature Detector	atmpc01_3v3	VDD: 2.7V to 3.6V; T: -40...140°C	MOSLP, MOS3LP, 4METALS
Voltage Controlled Oscillators	avcoc01_3v3	VDD: 2.7V to 3.6V; T: -40...85°C	MOSLP, MOS3LP, 4METALS

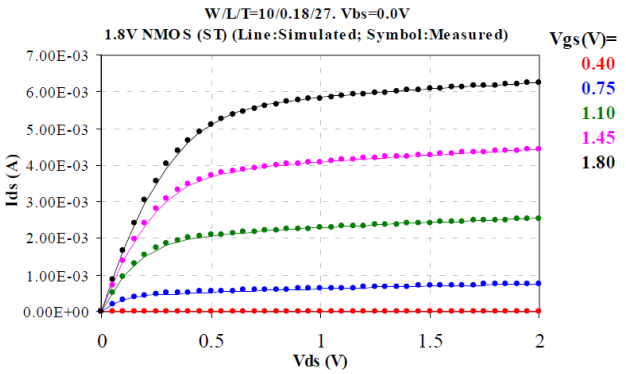
XC018 5.0V A_CELLS ANALOG LIBRARY

Library	Cell Name	Operating conditions	Required module
Bias Cells	abiac06_5v abiac07_5v	VDD: 3.5V to 5.5V; T: -40...125°C	MOSLP, MOS5LP, 4METALS
Bias Cells	acsoc01_5v acsoc02_5v	VDD: 3.5V to 5.5V; T: -40...125°C	MOSLP, MOS5LP, 4METALS
Bandgap	abgpc01_5v abgpc02_5v abgpc03_5v abgpc04_5v	VDD: 3.5V to 5.5V; T: -40...125°C	MOSLP, MOS5LP, 4METALS
Operational Amplifier	aopac01_5v aopac02_5v aopac03_5v aopac04_5v	VDD: 4.0V to 5.5V; T: -40...85°C	MOSLP, MOS5LP, 4METALS
Comparators	acmpc01_5v acmpc02_5v acmpc03_5v	VDD: 4.0V to 5.5V; T: -40...85°C	MOSLP, MOS5LP, 4METALS
RC Oscillators	arcoc01_5v arcoc02_5v arcoc03_5v arcoc04_5v	VDD: 4.0V to 5.5V; T: -40...125°C	MOSLP, MOS5LP, 4METALS
Crystal Oscillators	axtoc01_5v axtoc02_5v	VDD: 3.5V to 5.5V; T: -40...85°C	MOSLP, MOS5LP, 4METLAS
ADC	aadcc01_5v	VDDA: 4.5V to 5.5V; T: -40...85°C digital part VDD: 1.62V to 1.98V	MOSLP, MOS5LP, 4METLAS
DAC	adacc01_5v	VDDA: 4.5V to 5.5V; T: -40...85°C digital part VDD: 1.62V to 1.98V	MOSLP, MOS5LP, 4METLAS
Power On Reset	aporc01_5v aporc02_5v aporc03_5v	VDD: 4.0V to 5.5V; T: -40...85°C	MOSLP, MOS5LP, 4METLAS
Over-Temperature Detector	atmpc01_5v	VDD: 4.5V to 5.5V; T: -40...135°C	MOSLP, MOS5LP, 4METLAS

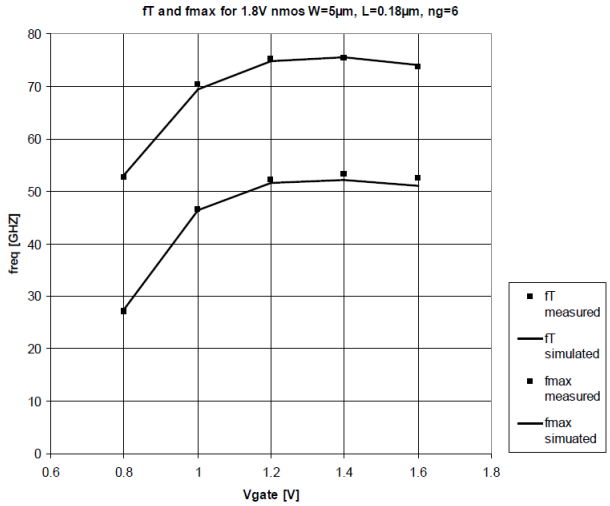
EXAMPLES FOR MEASURED AND MODELED PARAMETER CHARACTERISTICS



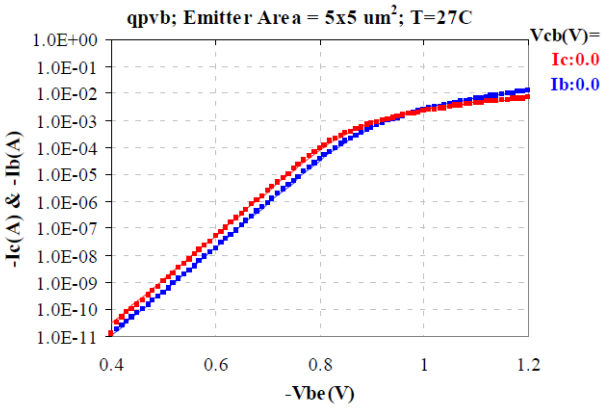
Output characteristics of device ne (MOSLP) for a typical wafer, W/L = 10/0.18, VGS = 0.6, 0.9, 1.2, 1.5, 1.8V, VBS = 0V symbol = measured, solid line = BSIM3V3 model



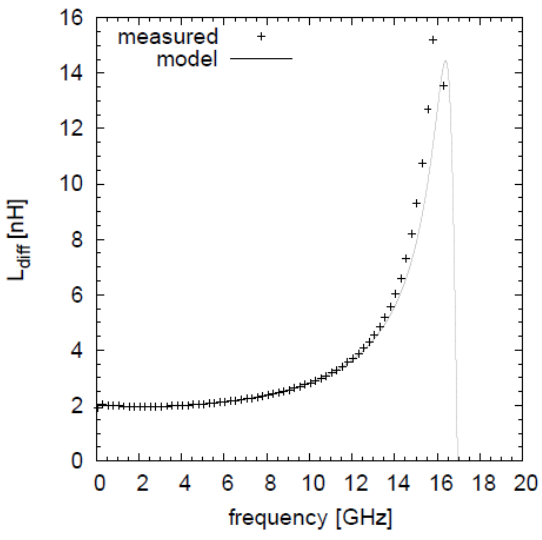
Output characteristics of device ne (MOSLP) for a typical wafer, W/L = 10/0.18, VGS = 0.4, 0.75, 1.1, 1.45, 1.8V, VBS = 0V symbol = measured, solid line = BSIM3V3 model



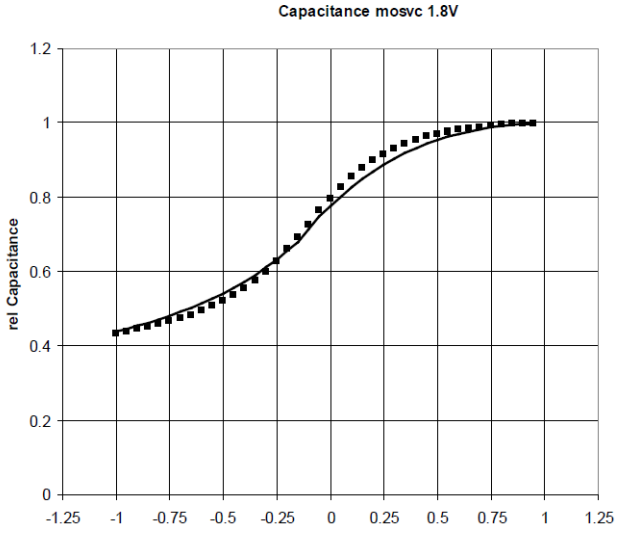
Device nert: fT and fmax for a typical wafer. VDS = 1.5V



Gummel plot of 1.8V vertical PNP transistor qpvb for a typical wafer, symbols = measured values, solid line = SPICE model

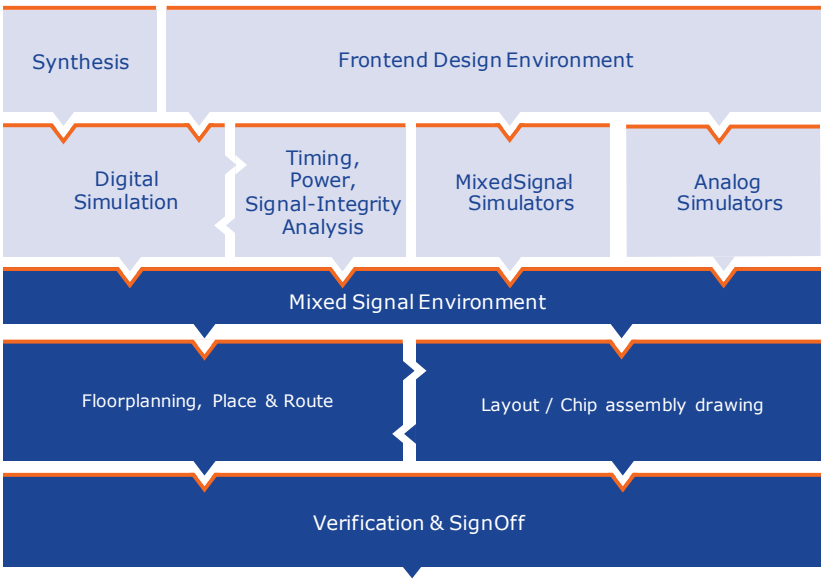


Device I50a: inductance for a typical wafer



Capacitance vs. voltage for mosvc for a typical wafer symbols = Crel measured, solid line = Crel simulated

XC018 SUPPORTED EDA TOOLS



Note: Diagram shows overview of reference flow at X-FAB. Detailed information of suported EDA tools for major vendors like Cadence, Mentor and Synopsys can be found on X-FAB's online technical information center X-TIC.

X-FAB'S IC DEVELOPMENT KIT "THEKIT"

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