AMI Semiconductor I2T30(E) technology

The Intelligent Interface Technology I2T30 is the medium voltage extension of the AMIS CMOS 0.7 µm mixed signal technology. I2T30 is based on and fully compatible with the C07MA technology and as such incorporates all C07MA rules.

The I2T30 technology as extension of the C07MA comprises:

- Precision highly linear thin oxide poly/diffused capacitors (from C07)
- Precision high ohmic polysilicon resistors (from C07)
- Low Vt PMOS transistor (from C07)
- Non-floating Medium voltage NDMOS: NDMOSC07, NND27D
- Floating medium voltage PDMOS: FPD35D
- Zener zap diode for OTP (from C07)

The I2T30E technology as extension of the I2T30 needs 1 extra mask (PBODY) to generate:

- Floating Medium voltage NDMOS: FND25D
- Floating Medium Voltage NPN: NPN30D
- PBODY resistor

Europractice distributes the design kit from AMIS, using the Synopsis & Cadence environment based on the Spectre simulator (Analog Artist) for mixed mode front-end simulation and Silicon Ensemble place&route for CMOS 0.7 back-end. Checks can be performed using the Dracula decks.

A full set of documentation and design kit is available after the appropriate DKLA is signed.

Key process technology specifications

Technology	0.7µm, refer to the AMI Semiconductor C07M-A technology specification sheet
Technology	I2T30(E)
Core voltage CMOS 0.7	5.0 V
I/O voltages CMOS 0.7	5.0V
Poly / Metal layer	1/2M (optional max. 3 metals for dedicated runs)
Substrate / well formation	P-sub, twin-well
Isolation	LOCOS
Gate oxide thickness (n+ doped)	17.0 nm
Interconnect	Aluminium alloy based, low interconnect resistivity
Low Vt	Low VT PMOS transistors
Passivation	Nitride based
Capacitors	Precision high linear thin oxide poly/diffusion capacitors
Nwell resistors	1250 Ohms
Resistors	Precision high Ohmic polysilicon resistors
Zener zap diode	Non-zapped diode: VZ@50µA = 3.5 - 4.2V, Rdiff@1mA = 10 - 230 Ohm Zapped diode: VZ@50µA < 0.9V, Rzapped@50µA < 20 KOhm

Poly pitch	1.5µm
Metal pitch	1.8µm for metal 1 2.2µm for metal 2
Interconnect thickness	0.42µm for Poly 0.8µm for metal1 1.0µm for metal2

EEPROM	Optional: 1 extra mask needed (DTUNWIN)
Serial EEPROM	< 128 bits Supply Voltage: 2.7-5.5 Volts Data clock: 5 MHz Operating temperature between -40ºC and 150ºC Parallel Output
Matrix EEPROM	2048 x 8 bits Supply Voltage: 4.5-5.5 Volts Data clock: 4 MHz Operating temperature between -40ºC and 85ºC Read/write: 8-bit data bus Address bus: 11 bits

Key electrical parameters

Parameter @ 25ºC		**Typ. Value**	**Unit**
NMOS	VTON (20/0.7, linear extrapolated)	0.74	V
	Vmax=Vbd	5.5	V
	IDS (20/0.7, VD=VG=5V)	358	µA/µm
	Body factor (20/0.7, VD=0.1V, Vbulk= 0→6.0V)	0.6	V1/2

Parameter @ 25ºC		**Typ. Value**	**Unit**
PMOS	VTON (20/0.7, linear extrapolated)	-0.95	V
	Vmax=Vbd	5.5	V
	IDS (20/0.7, VD=VG=5V)	-176	µA/µm
	Body factor (20/0.7, VD=0.1V, Vbulk= 0→6.0V)	0.42	V1/2

Parameter @ 25ºC		**Typ. Value**	**Unit**
Low Vt PMOS	VTON (20/1.2, linear extrapolated)	-0.78	V
	Vmax=Vbd	5.5	V
	IDS (20/1.2, VD=VG=5V)	-121	µA/µm
	Body factor (20/1.2, VD=0.1V, Vbulk= 0→6.0V)	0.5	V1/2

Parameter, floating @ 25ºC		**Typ. Value**	**Unit**
PDMOS for 30V FPD35D	VTON	-0.92	V
	Vmax=Vbd	-35	V
	Vgsmax (full lifetime)	5.5	V
	Ids (W=40 µm, Vds=20, Vgs=4.0V)	-3320	µA
	Ron*Area	0.228	Ω*mm2

Parameter, NON-floating @ 25ºC		**Typ. Value**	**Unit**
NDMOS for 27V NND27D	VTON	0.65	V
	Vmax=Vbd	27	V
	Vgsmax (full lifetime)	5.5	V
	Ids (W=40µm, Vds=20, Vgs=4.0V)	8300	µA
	Ron*Area	0.104	Ω*mm2

Parameter, @ 25ºC		**Typ. Value**	**Unit**
PNP	Hfe @ Ic=1 µA	22	-
	BVCEO @ Ic=1 µA	30	V

Parameter @25 ºC		**Typ. Value**	**Unit**
Poly/Gate Ox/Nwell capacitor	Cplate	0.75	fF/µm2
	Vbd_max (full life time)	15	V

Parameter @25 ºC		**Typ. Value**	**Unit**
High Resistance poly	Rsheet	2000	Ω/square
Low Resistance poly	Rsheet	27	Ω/square
N-well	Rsheet (W=20µm, L=80 µm)	1250	Ω/square

I2T30E option, extra PBODY mask

Parameter, floating @ 25ºC		Typ. Value	Unit
NDMOS for 25V FND25D	VTON	0.95	V
	Vmax=Vbd	25	V
	Vgsmax (full lifetime)	5.5	V
	Ids (40 µm, Vds=15, Vgs=5.0V)	6300	µA
	Ron*Area	0.139	Ω*mm2

Parameter, area= 500 µm2 (unitary device)		Typ. Value	Unit
NPN	Hfe @ Ic=10µA	150	-
	Bvceo @ Ie=1µA	40	V
	Bvces	46	V
	Imax	8	mA

Performance

Speed@5.0V: ring oscillator delay: 170ps/stage

Leakage	25C	
NMOS (W/L=20/0.7, Vds=7V, Vgs=0V)	< 10	pA/µm
PMOS (W/L=20/0.7, Vds=-7V, Vgs=0V)	< 10	pA/µm