

BCD Processes Overview

0.35*/0.18µm TS18/35PM Power Technology Family

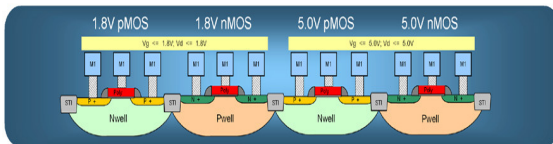
*Advanced back-end with 0.5µm front-end allowing 0.35 gate densities

Our industry leading Bi-polar-CMOS-DMOS (BCD) process is used in complex power management chips including driver ICs, battery and portable power management, power control for PCs, Class-D audio amplifiers, and other consumer, communications and computing applications. Our customizable LDMOS (20V to 80V) process provides design optimization and the lowest die size at any given breakdown voltage. Our roadmap includes devices to 700V for the next generation digital lighting. Our platform offers maximum flexibility, enabling our customers to create cost-effective products at any desired level of integration and achieve first-pass success for faster time-to-market. The integration of Non-Volatile Memory (NVM) provides significant differentiation and cost effectiveness for enhanced power management solutions.

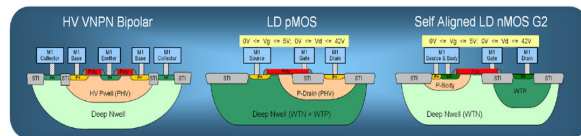
Comprehensive Power Platform: Unified Design Kit supporting a family of three process nodes

- 0.35µm: 5V only
- 0.35µm: 5V +HV (5V 60V/80V Bd)
- 0.18µm 1.8V 0.35 5V +HV (5V 60V/80V Bd)
- World Class Performance: R_{dson} 1.8 mOhm @ 8V Bvdss, 25 mOhm @ 33V Bvdss
- Robust Zero Mask adder Embedded Flash
- Rich Digital and Analog IP Libraries: Standard cell 1.8V and 5V, LV and HV ESD solutions, ENVM, IO, ARM core, etc.

CMOS Platform



HV Power Devices



| Device | | BVdss Volt | Rdson mΩ*mm² | Vth (gm) Volt | I _{dsat} uA/µm | I _{off} pA/µm | Ft GHz |
|---------------------|--|------------|--------------|---------------|-------------------------|------------------------|--------|
| Self-Aligned LDNMOS | 12V V _{DS} , 5V V _{GS} | 23 | 10.7 | 0.88 | 610 | <10 | 17.3 |
| Scalable Voltage | 25V V _{DS} , 5V V _{GS} | 34 | 28 | 0.95 | 410 | <10 | |
| Self-Aligned | 32V V _{DS} , 5V V _{GS} | 42 | 42 | 0.95 | 400 | <10 | |
| LDNMOS (1) | 42V V _{DS} , 5V V _{GS} | 57 | 64 | 0.95 | 360 | <10 | |
| | 60V V _{DS} , 5V V _{GS} | 80 | 90 | 0.95 | 330 | <10 | |
| LDPMOS (2) | 12V V _{DS} , 5V V _{GS} | 24 | 35 | 1.15 | 220 | <10 | |
| Scalable Voltage | 25V V _{DS} , 5V V _{GS} | 40 | 92 | 0.736 | 190 | <10 | |
| LDPMOS | 32V V _{DS} , 5V V _{GS} | 43 | 113 | 0.735 | 170 | <10 | |
| | 42V V _{DS} , 5V V _{GS} | 56 | 190 | 0.734 | 150 | <10 | |
| 5V Isolated nMOS | | >7 | 1.8 | 0.73 | 580 | <10 | |
| 5V Isolated pMOS | | >7 | 6.4 | -0.82 | 290 | <10 | |

(1) Ultra low Rdson transistors (30% reduction) are in development, expected Q4/09 (1 mask adder)

Analog Devices

| Resistors | Ω/Sqr | TC1 PPM/C | TC2 PPM/C ² | VC1 PPM/V | VC2 PPM/V ² |
|--------------------------------------|---------------------|--------------|---------------------------|--------------|---------------------------|
| HIPO-High Ohmic P-type Poly resistor | 1000 | -912 | 1.59 | 0.36 | -34 |
| NMOP0-Medium Ohmic N Poly resistor | 400 | -1250 | 2.04 | -45 | -61 |
| PMOP0-Medium Ohmic P Poly resistor | 310 | -86.5 | 0.656 | -130 | -14.5 |
| N+ AA Diffusion resistor | 70 | 1425 | 1.025 | 826 | 7.6 |
| P+ AA Diffusion resistor | 120 | 1380 | 0.271 | 626 | -17.5 |
| Nwell under AA resistor | 450 | 3173 | 10.3 | 4636 | -63.86 |
| Nwell under STI resistor | 1000 | 2732.7 | 9.27 | 7744 | -364.5 |
| Metal 1-Metal 5 resistor | 0.08 | 3261.6 | -0.157 | - | - |
| Metal Last resistor | 0.04 | 3210 | -3.87 | - | - |
| N+ LOPO (Salicided Poly) resistor | 6 | 2744 | 0.323 | 14.26 | 6673 |
| P+ LOPO (Salicided Poly) resistor | 5 | 3260 | 0.91 | -1.41 | 6917 |
| N+ AA Diffusion (Salicided) resistor | 7 | 2790 | 0.48 | 195.6 | 1319 |
| P+ AA Diffusion (Salicided) resistor | 5 | 3310 | 0.52 | -714.3 | 1753 |

| Bipolar Devices | Beta (Vbc = 0V) | Bvceo (V) |
|----------------------|-----------------|-----------|
| VPNP (10x10) | 2.95 | 15.2 |
| High-Gain VNPN (5x5) | 60 | 9 |
| HV-VNPN | 25 | 74 |
| HV-VPNP | 105 | 19.5 |

| Capacitors | Cpacitance (fF/ μm^2) |
|--|-----------------------------------|
| MIM - Metal-Insulator-Metal (Single plate) | 1 |
| MIM - High C, Metal-Insulator-Metal (Single plate) | 1.7 |
| MIM - High C, Stacked Metal-Insulator-Metal | 3.4 |

| Diodes | BV Volt | IFOR uA | IREV nA | RS Ω |
|---|--------------|---------------|--------------|----------------|
| Isolated Surface Zener (zero cost) | 6.8V | 100uA (0.8V) | <10nA (@ 5V) | |
| Isolated Buried Zener (under development) | 5.5V | TBD | TBD | |
| Schottky Diode | 28.2 (@ 1uA) | 0.35 (@ 0.2V) | 95 (@ 25V) | 543 |

BCD Design Kits Overview

- Advanced LDMOS models capture asymmetric gate capacitance, non-linear drift resistance, flicker noise
- Scalable models and p-cells for all devices
- Scalable drain extension of power cells to enable fine-tuning of device sizes and voltage range

Customer Service and Support

- **eBizz website:** <https://online.jazzsemi.com>
- **eTower website:** <https://etower.towersemi.com>
- File Exchange for design kits and online documentation
- Online WIP, Tape-Out and Help Ticket System
- Dedicated Sales and Engineering Support

Analog Mixed-Signal Design Kit Features

- Cadence[®]-based Design Kit
- Cadence[®] Assura[™] DRC/LVS/RCX
- Support for Mentor[®] Calibre interactive/XRC
- Support for Spectre, ADS (& RFDE), HSPICE simulators
- Includes basic ESD structures

ASIC Library Views and Features

- Standard Cell Libraries/ I/O Libraries
- Synopsys and Cadence ASIC Flows
- Memory Generators

Supported Models

- **MOSFETs:** Binned BSIM4 models, RF extension model, mismatch, statistical and noise models
- **NPNs:** Scalable HiCum, mismatch, statistical and noise models
- **MIM Caps:** RF models, mismatch and statistical models
- **Resistors:** Mismatch, statistical and noise models

About TowerJazz

Tower Semiconductor Ltd. (NASDAQ: TSEM, TASE: TSEM), the global specialty foundry leader and its fully owned U.S. subsidiary Jazz Semiconductor, operate collectively under the brand name TowerJazz, manufacturing integrated circuits with geometries ranging from 1.0 to 0.13-micron. TowerJazz provides industry leading design enablement tools to allow complex designs to be achieved quickly and more accurately and offers a broad range of customizable process technologies including SiGe, BiCMOS, Mixed-Signal and RFCMOS, CMOS Image Sensor, Power Management (BCD), and Non-Volatile Memory (NVM) as well as MEMS capabilities. To provide world-class customer service, TowerJazz maintains two manufacturing facilities in Israel and one in the U.S. with additional capacity available in China through manufacturing partnerships. For more information, please visit www.towerjazz.com.