

# Maksim Kuzmenka

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14.01.1972 / Born in Minsk (Belarus), Married.



## Objective

I am looking for an interesting and creative job, connected with circuit and system design of analog and mixed signal ICs and/or discrete electronic, automotive and power electronic. I would like to highlight the following skills and experience I can offer:

- 16 years of electronic design experience in different areas.
- Expert level in design of mixed signal circuitry like GHz range transmitters, receivers, samplers with signal conditioning features (preemphasis, calibration, noise canceling).
- Advanced level in design of integral and discrete analog circuits like operational amplifiers, comparators, voltage regulators (LDOs), digital to analog converters (DAC).
- Advanced level in the design of power electronic, like switched mode power supplies (SMPS), power management circuitry, motor drivers.
- Deep understanding of analog circuitry and processes in distributed transmission lines.
- Very wide technical outlook. Knowledge in physics, chemistry, mechanics and avionics.
- Author and co-author of multiple [German and US patents](#).
- Non standard, elegant and smart technical solutions and problem solving.
- Team player. Very good presenters and teaching skills.
- Perfect English and conversational German levels.

## Keywords

Electrical engineer, circuit design, analog and mixed signal, IC design, chip design, power electronic, switched mode power supply, automotive electronic.

Analoge Schaltung Entwickler, Entwicklungsingenieur, Leistungselektronik, Hardware-Elektronik-Entwickler für analoge Schaltungstechnik.

## Job experience

### 2005–2009 Qimonda AG / Munich-Germany

DRAM IC design engineer / staff engineer.

- DRAM IC design within 4 generations of CMOS technologies, from 110nm till 46nm. and data rates up to 7 Gbps. Analog and mixed signal MOSFET based circuit design of output drivers with signal conditioning (impedance calibration, slew rate control, preemphasis), data receivers and samplers, operational amplifiers, controlled oscillators, charge pumps, level shifters, duty cycle correctors, low-jitter current mode and CMOS clock distribution circuitry, power regulators with sub nanosecond reaction time.
- Chip layout supervision. Power and signal integrity analysis, system level simulations. Worst case analysis. System level simulations including package and channel models.
- Participation in the chip debugging process together with product engineers. Development of “metal fixes”.
- Supervision and mentoring of newcomer’s, knowledge sharing via internal seminars and learning courses.
- In total 4 successful DRAM chips (GDDR3 and GDDR5 generations) taped out, debugged, qualified by NVIDIA and AMD and passed to the mass production. Latest project is industry 1<sup>st</sup> [GDDR5 512M and 1G chips](#) with up to 7 Gbps per pin bandwidth.

### **2001–2004 Infineon Technologies AG / Munich-Germany**

Design and signal integrity engineer / senior engineer.

- Definition and development of DDR memory interfaces, like a data bus, command/address bus, clock distribution network at GHz range signaling on the system and PCB level. Development of JEDEC standards for DDR2 and DDR3 memory generations.
- Simulation support of the memory module (DIMM and SODIMM) developing. System level signal integrity simulations using different levels of modeling: from behavior models till the transistor level models Worst case analysis. IC package signal integrity.
- Developing of bus topology. PCB layout support for DDR2 and DDR3 memory systems.

### **1996–2000 Rusbelpribor / Minsk-Belarus**

Circuit design engineer– switched mode power supply focus.

- Lead engineer on power supply subsystem of television 3D teodolite station and pulse mode-laser range-finder.
- Circuit design of switched mode power supply for solid-state laser (laser range-finder). Electromagnetic interference (EMI) protection system level development.
- Circuit design of servo motor control modules with pulse width modulation.
- Design of various control and measurement circuitry using temperature, pressure, circulation sensors, precision operational amplifiers, DAC/ADCs and interface logic ICs.

### **1993–1995 LEMT (Lasers in Ecology Medicine Technology) / Minsk-Belarus.**

Circuit design engineer– analog circuits focus.

- Circuit and PCB design of linear and pulse power supply modules for medical laser equipment.
- Circuit and PCB design of semiconductor laser modules for medical and industrial needs (trans-sclera therapy, smoke-meters, and triangulation), using discrete elements and precise analog ICs for power and temperature control and digital interfaces.

## **Education**

**1988–1993 [Belarusian State University of Informatics and Radio-electronics](#).** (Before 1998 Minsk Radio engineering Institute. MRTI). Specialization: electrical engineering.

## **Computer / software skills**

- UNIX (Solaris)– practical, 7 years, advanced user.
- HP/Agilent ADS, practical, 5 years, expert.
- Cadence Composer/Virtuoso/Assura / Allegro, practical, 5 years, advanced user.
- H-SPICE / Titan / Nanosim, practical 5 years. Advanced user.

## **Patents and publications**

Detailed patent list is on the homepage [http://www.kuzmenka.de/patent\\_list.pdf](http://www.kuzmenka.de/patent_list.pdf)

ISSCC 2006. “2Gb/s/pin 512Mb Graphics DRAM with Noise-Reduction Techniques”

ISSCC 2009 “7Gb/s/pin 512Mb Graphics GDDR5 DRAM”

## **Communication skills**

- Russian– native speaker
- English– fluent
- German– conversational

## **Hobby**

- Fly fishing. Mountain ski.

## Examples of designed circuits

(Not a complete project list)

### Power electronic

#### **Pulse power supply for solid-state pulse mode technological laser.**

- ~5kW/1kV at capacitive load.
- Resonance mode thyristor based inverter.
- MOSFET based duty-ark supply.
- Thyristor based ark ignition module.
- Discrete logic control board.

#### **Pulse power supply for solid-state pulse mode medical laser.**

- ~3kW/1kV at capacitive load.
- Bipolar transistor bridge inverter.
- Multi cell, multi-phase modular structure.

#### **Pulse power supply for ultra high pressure mercury lamp.**

- ~1kW stable current pulse power supply
- Power MOSFET based
- Thyristor based ignition module.

#### **3.3V / 40A Power supply for video processing unit.**

- Half bridge bipolar transistor based.
- Over voltage and over current protection.
- Strict noise requirements.

#### **Multi purpose linear power supplies**

- Half bridge bipolar transistor based.
- Over voltage and over current protection.
- Strict noise requirements.

#### **Small (pen-size) semiconductor laser power supply.**

- 1.5V battery supply, 3V/100mA output.

#### **Thyristor based over-voltage, over-current protection module**

- Zero crossing commutation of active and reactive loads.
- Extra-cheep oriented design.

#### **Motor drivers**

- Pulse mode with linear post-regulation.
- MOSFET based.

## IC design

### High speed I/O circuitry. CMOS IC 110nm to 65nm 3 metal DRAM process.

OCD (off-chip drivers), including serializers and level-shifters for GDDR3 and GDDR5 DRAM chips with:

- Bit-rate up to 7Gbps
- Auto calibration to the required impedance.
- Extremely low skew (~20ps.)
- Duty cycle violation in range of +/-1%
- Low I/O capacitance (~1pF)
- Slew-rate control and preemphasis.
- ESD strength ~2.5kV.
- Clock distribution network with small jitter and low supply noise sensitivity
- Receiver with setup / hold time to 20ps.

### DRAM chip power supply management

LDO voltage regulators for DRAM core supply.

- Any capacitive load stability.
- Extremely fast load response (~1nS) for operation with limited amount of decoupling.
- Small output transient over/under-shoot (<20mV)
- Low offset, drift and thermal variations.

Charge pumps for DRAM internal supply voltages

- Very low output ripple, low power supply noise.
- Frequency control

### DRAM chip CLK distribution tree

- Mixed CML / CMOS structure
- High supply rejection.
- Small output transient over/under-shoot (<20mV)
- Special shielding and guarding techniques.
- Low skew supply domain transitions.

### General purpose IC circuitry

- Low power / high-speed operational amplifiers and comparators.
- Accurate current / voltage reference generators with fast power-up (~1ns)
- Current controlled oscillators with wide frequency range (10MHz...2GHz).
- Trimming (low resolution) DACs.