Synopsys and TLi

TLi Achieves First-Pass Silicon Success with DesignWare AEON FTP Trim Non-Volatile Memory IP for Sensor ICs Targeting Smartphones

“We evaluated multiple IP solutions and found Synopsys’ DesignWare AEON FTP Trim NVM IP to be the best and of highest quality with lowest power. We integrated the IP in two weeks, accelerated our overall time-to-market by six months, and realized cost savings of up to 10%.” — Sangyun Han, Engineering Director, TLi

Business

TLi (Technology Leaders & Innovators) has been developing integrated circuits (ICs) for over 18 years. TLi’s most recent development is a 3-in-1 ambient light, proximity, and accelerometer sensor IC.

Challenges

- Develop proximity and ambient light sensor ICs and quickly achieve volume production
- Meet cost, area and power requirements of sensor ICs for smartphones
- Acquire a high-quality Non-Volatile Memory (NVM) IP solution that minimized integration risk and accelerated time-to-market

Synopsys Solutions

- DesignWare® AEON® FTP Trim NVM IP

Benefits

- Achieved first-pass silicon success while meeting customer demands
- Integrated NVM IP into their system-on-chip (SoC) in two weeks and accelerated overall time-to-market by 6 months
- Realized cost savings of up to 10% with a zero mask adder NVM IP solution

Overview

TLi offers high-performance, low-power accelerometers, temp-humidity sensor, UV sensor as well as comprehensive software libraries that support a full range of sensor combinations, operating systems and hardware platforms. Leading consumer, automotive, health and fitness and industrial companies worldwide use TLi sensors.

TLi achieved first-pass silicon success for their TL5601 product which supports integrated functions of an ambient light sensor (ALS) and a proximity sensor (PS). The sensor has photodiodes, amplifiers, ADC, digital interface logic and I2C to measure the volumes of ambient light and proximity.

TLi has always provided the maximum value to their customers worldwide and for that reason, they searched for and found high-quality NVM IP in Synopsys. “We evaluated multiple IP solutions and found the high-quality Synopsys DesignWare NVM AEON FTP Trim NVM IP to be the best.” Said Han.
During our evaluation process, we realized that the DesignWare AEON FTP Trim NVM IP offered a stronger solution. The IP was easy to use, small in area, and cost-effective with the integrated charge pump and single power supply.”—Sangyun Han, Engineering Director, TLI

High-Quality DesignWare IP Solutions
In addition to quality, TLI had other IP characteristics on their priority list of NVM IP needs. “During our evaluation process, we realized the DesignWare AEON FTP Trim NVM IP offered a stronger solution,” said Han. “The documentation and deliverables made the IP easy to use, its small form factor was significant for our target application, and it offered a cost-effective solution with the integrated charge pump and single power supply.”

Synopsys’ DesignWare NVM IP solution is validated through rigorous characterization, qualification and reliability testing. It is delivered as a hard GDSII block and encompasses all the required control and support circuitry including the charge pump and high voltage distribution circuits.

TLI’s chip provides higher sensitivity to light and proximity sensors without the extra color filter layering. “The DesignWare AEON FTP Trim NVM IP was used for trimming purposes to adjust sensing values, minimize chip-to-chip variations and improve yield,” said Han.

The DesignWare AEON FTP Trim NVM IP offers a competitive footprint as compared to one-time programmable (OTP) products with the advantage of re-programmability without requiring additional masks or processing steps.

Building Future Products
TLI continues to lead the industry in offering sensor ICs by maintaining a high level of quality standard, which they also expect from their suppliers. “Synopsys remains our preferred NVM IP provider. We have already started discussing our requirements for our future sensor designs,” said Han.

“Synopsys is our preferred long-term IP solutions provider. We have already started discussing NVM IP needs for our future designs.”—Sangyun Han, Engineering Director, TLI