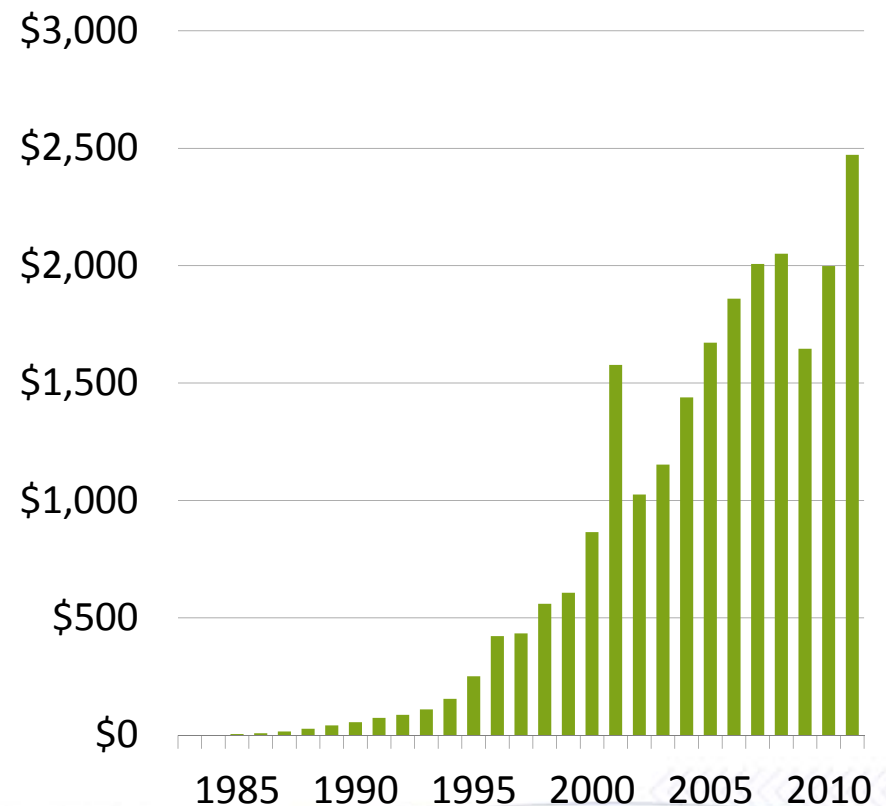


# About Maxim

## Nasdaq: MXIM

- Founded in 1983 to design analog semiconductors
- Maxim Today
  - > \$2.5B in annual revenue across all end markets
- The Leader in analog integration
  - > 34% of revenue from highly integrated analog products
- **Sensors**
  - > **Optical, MEMs, Touch**
  - > **Sensor Interface**

## Revenues (\$US Millions)



# Optical Sensors



## Ambient Light

- Mimics human eye
- Brightness control
- Smartphones
- Notebooks / Tablets
- Lighting Control
- E-Readers
- Security



## Proximity

- Object detection
- Display management
- Smartphones
- Tablets Notebooks
- Presence detection



## RGB

- Detect Full Spectrum of Light
- Identify type of light
- Color Temp Control
- Display, TV
- Tablet, Smartphone
- Environmental Automation

# Optical Sensors in today's mobile phone



## Ambient Light Sensor

- detect light level
- Increase/decrease brightness
- 1lx to 10,000lx (yesterday)
- 0.03lx to 65,000lx (today)
- **0.001lx to 65,000lx (tomorrow)**

## Proximity Sensor

- detect presence
- turn on/off display
- 2-3cm (yesterday)
- 3-4cm (today)
- **8-10cm (tomorrow)**

## Needs

More active time / more usage -> low power solutions

More flexibility -> smarter digital solutions

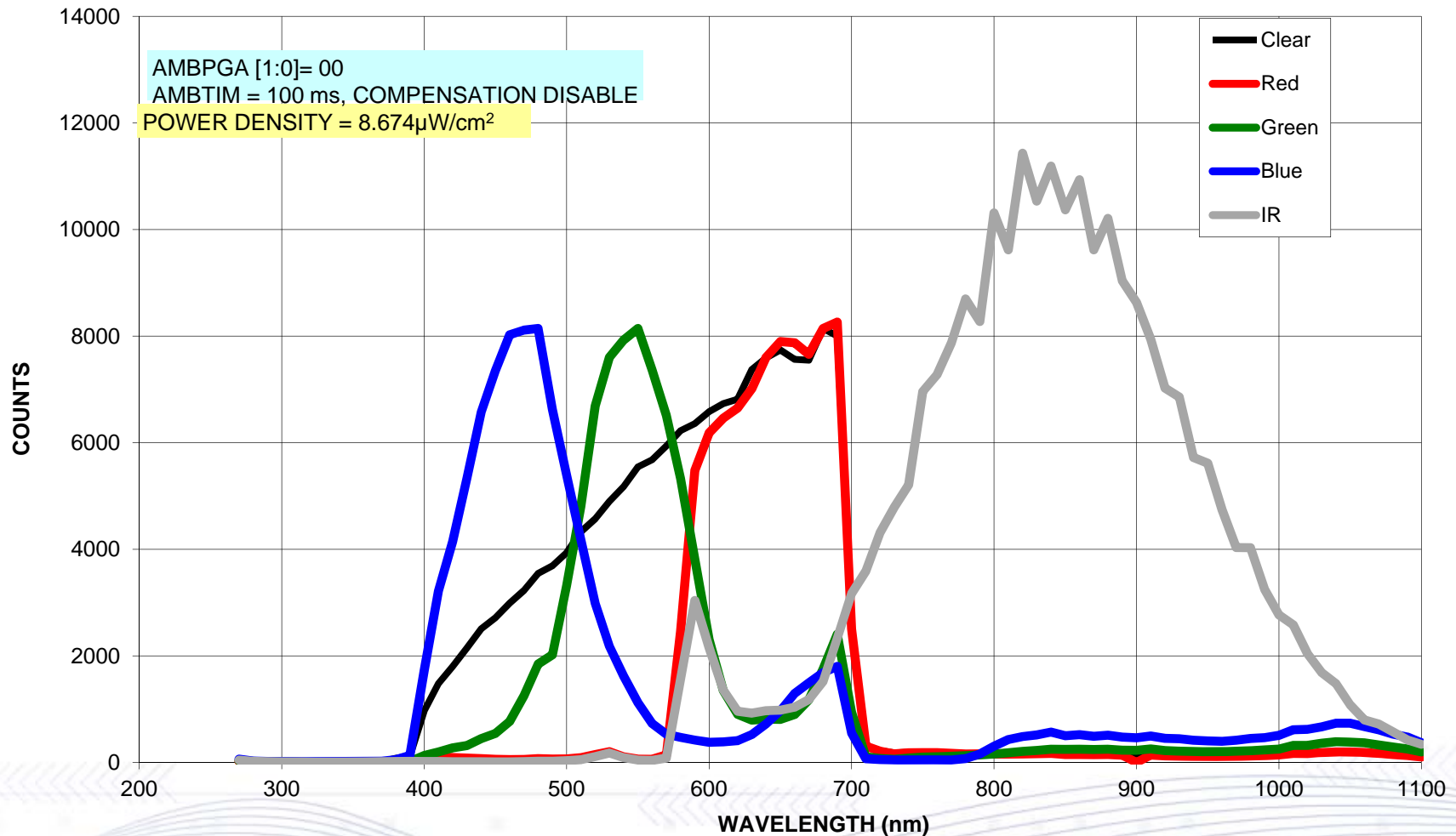
More sensing -> integration

# Maxim Differentiators

## “Optical Fusion”

- **Digital light sensor**
  - > Sensor + Analog Front End + Digital Processing
- **Extremely Low Power**
  - > 0.65uA active supply current for Ambient Light Sensor
- **Innovation and Integration**
  - > Auto gain adjustment
  - > 6 sensors in one package
- **Smallest footprint, thinnest, few external components**
  - > Easy to design in space constrained applications
- **In house development and manufacturing**
  - > Fast development, 1.8V compatibility, custom process

# What if I give you a color spectrometer?



# Market Trend Overview

## RGB Sensor

- **Smarter Ambient Light Sensing**

- > Used in phones, displays to adjust backlight
- > Better color sensing is needed for any lighting condition

- **Richer Color Displays**

- > Displays have reached a good enough resolution
- > Display should adjust to ambient color

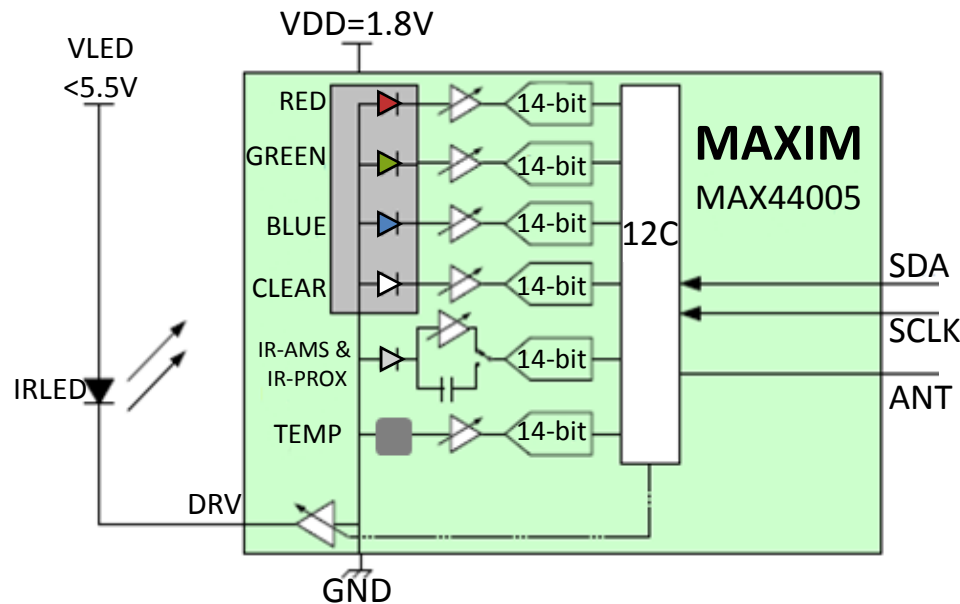
- **Better Product Design**

- > The consumer products have been limited to black/tinted frames.
- > RGB Sensing opens up “cooler” designs





# MAX44005 – RGB & Proximity Sensor With ADC

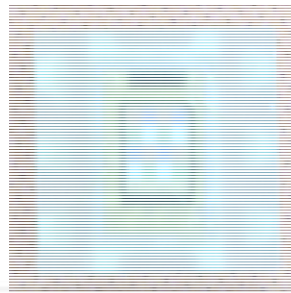
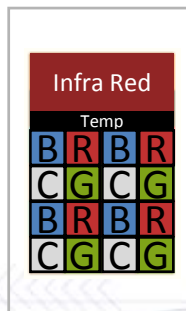


## Benefits

- 6 sensors in parallel
- Component saving. Connect LED to battery
- Reliable proximity sensing

## Features

- Supply Current
  - 20uA RGB IR multi channel
  - 0.04uA shutdown
- 1.8V supply voltage
- 0.001lx ambient light sensitivity
- 1 pulse LED technology
  - Save total power
  - Improved sunlight rejection
- Temperature calibration
- Interrupt





# RGB Usage Cases

- **Detect color temperature**
  - > Fine tune your display to get better user experience
- **Detect type of light (fluorescent, incandescent)**
  - > Set the mood of your display
  - > Decide whether you're inside or outside of a building
    - Help other functions (GPS, Compass)
  - > Detect frequency of the light (50Hz, 60Hz)
- **Color bezel devices**
  - > Consumers pay to differentiate their phones
- **Any time auto white balance adjustment**
  - > Better picture/video capturing
- **Pulse rate and pulse oximetry sensing**
- **Superior color sensing if accompanied with a light source**

# Demo and Q&A