

# **TOWERJAZZ**

**The Global Specialty Foundry Leader**



## ***TowerJazz Investor and Analyst Day***

**March 8, 2016**

# **TOWERJAZZ**

**The Global Specialty Foundry Leader**



## ***Welcome and Introductions***

Noit Levy-Karoubi | Vice President of Investor Relations



# Disclaimers

## Forward Looking Statements

This presentation contains forward-looking statements within the meaning of the “safe harbor” provisions of the Private Securities Litigation Reform Act of 1995. These statements are based on management’s current expectations and beliefs and are subject to a number of risks, uncertainties and assumptions that could cause actual results to differ materially from those described in the forward-looking statements. All statements other than statements of historical fact are statements that could be deemed forward-looking statements. For example, statements of expected synergies from Tower’s merger with Jazz, customer benefits, costs savings, financial guidance, industry ranking, execution of integration plans and management and organizational structure are all forward-looking statements. The potential risks and uncertainties include, among others, that expected customer benefits, synergies and costs savings will not be achieved or that the companies are unable to successfully execute their integration strategies, as well as other risks applicable to both Tower and Jazz’s business described in the reports filed by Tower and Jazz with the Securities and Exchange Commission (the “SEC”) and, in the case of Tower, the Israel Securities Authority. These filings identify and address other important factors that could cause Tower and Jazz’s respective financial and operational results to differ materially from those contained in the forward-looking statements set forth in this document. Accordingly, no assurances can be given that any of the events anticipated by the forward-looking statements will transpire or occur, or if any of them do so, what impact they will have on the results of operations or financial condition of Tower or Jazz. Tower and Jazz are providing this information as of the date of this presentation and neither Tower nor Jazz undertakes any obligation to update any forward-looking statements contained in this document as a result of new information, future events or otherwise.

A more complete discussion of risks and uncertainties that may affect the accuracy of forward-looking statements included in this presentation or which may otherwise affect Tower or Jazz’s business is included under the heading “Risk Factors” in Tower’s most recent filings on Forms 20-F, F-4, F-3 and 6-K, as were filed with the SEC and the Israel Securities Authority and Jazz’s most recent filings on Forms 10-K and 10-Q, as were filed with the SEC. Actual results may differ materially from those projected or implied by such forward-looking statements. Tower and Jazz do not intend to update, and expressly disclaim any obligation to update, the information contained in this release.

# Agenda

|                 |  |                     |
|-----------------|--|---------------------|
| 8:00-8:30am     | Registration + Continental Breakfast                       |                     |
| 8:30-8:35am     | Welcome and introductions                                  | Noit Levy-Karoubi   |
| 8:35-9:00am     | CEO Opening  | Russell Ellwanger   |
| 09:00-09:40am   | Strategic Overview - Main Focuses and Growth Opportunities | Dr. Itzhak Edrei    |
| 09:40-10:10am   | Financial performance and strategy                         | Oren Shirazi        |
| 10:10-10:30am   | AM break   |                     |
| 10:30-11:00am   | Specialty Technology Offering and Growth Drivers: RF       | Dr. Marco Racanelli |
| 11:00-11:30am   | Specialty Technology Offering and Growth Drivers: PM       | Dr. Marco Racanelli |
| 11:30am-12:00pm | Specialty Technology Offering and Growth Drivers: CIS      | Dr. Avi Strum       |
| 12:00-12:30pm   | Q&A  |                     |
| 12:30-1:15pm    | Lunch Break  |                     |
| 1:15-1:30pm     | Transportation to SA Facility                              |                     |
| 1:30-2:00pm     | Worldwide Operational Overview                             | Rafi Mor            |
| 2:00-2:15pm     | CEO Summary  | Russell Ellwanger   |
| 2:15-3:15pm     | Fab Tour – Introduction and entering the fab               | Rafi Mor            |
| 3:15pm          | Closing  |                     |



# Our Leadership Team | TowerJazz Management



**MR. RUSSELL ELLWANGER**  
Chief Executive Officer  
Chairman, TPSCo



**DR. ITZHAK EDREI**  
President



**MR. RAFI MOR**  
Chief Operating Officer



**MR. OREN SHIRAZI**  
Chief Financial Officer  
Senior Vice President of  
Finance



**MRS. DALIT DAHAN**  
Senior Vice President of Human  
Resources and Information  
Technology



**MRS. NATI SOMEKH**  
Senior Vice President, Chief  
Legal Officer and Corporate  
Secretary



**MR. YOSHI NETZER**  
Senior Vice President of  
Corporate Planning



**MR. ILAN RABINOVICH**  
Vice President of Quality and  
Reliability and Vice President of  
Customer Support

# Our Leadership Team | Business Units and Sales



**DR. MARCO RACANELLI**

Senior Vice President and General Manager of RF/ High Performance Analog and Power Business Groups

General Manager of US Aerospace & Defense Business Group, Newport Beach Site Manager



**DR. AVI STRUM**

Senior Vice President and General Manager, CMOS Image Sensor Business Unit



**MR. SHIMON GREENBERG**

Vice President of Mixed-Signal/CMOS Business Unit



**MRS. ZMIRA SHTERNFELD-LAVIE**

Senior Vice President of Process Engineering R&D

General Manager of Transfer, Optimization and Development Process Services Business Unit (TOPS™)



**MR. ORI GALZUR**

Vice President of VLSI Design Center and Design Enablement



**MR. GARY SAUNDERS**

Senior Vice President of Worldwide Sales & General Manager, TowerUSA



**MR. TODD MAHLEN**

Vice President of Asia Pacific Sales and China Business Development



**MR. DANI ASHKENAZI**

Vice President of Sales for Israel & Europe and Vice President of Customer Solutions



**MR. MICHAEL SONG**

Vice President of Sales and President of TowerJazz Korea



**MR. FRA DRUMM**

Vice President of Business Development, USA



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# **TOWERj&L**

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## ***CEO Opening***

Russell Ellwanger | CEO

# Big Picture - What Drives Success?

- 2 things:

- **Vision**

- The vision dictates what skills are required in the staff

- **Staffing**

- The proper staff enables vision to be fulfilled and to evolve

# Alice in Wonderland | Lewis Carroll

*Alice approaching a crossroad, asked the Cheshire Cat*

Alice: *“can you please tell me which way I ought to go from here?”*

Cat: *“that depends a good deal on where you want to get to”*

Alice: *“I don’t much care where”*

Cat: *“then it doesn’t much matter which way you go...”*





# Vision, Mission, Values

## ■ Our Vision

- To be the world leader in specialty foundry solutions as measured by our customers, employees and investors.

## ■ Our Mission

- To bring to market specialty foundry solutions that provide unique value to our customers by attentively listening to and proactively providing for their needs, through attracting and retaining the best global talent to serve them.

## ■ Our Values

- Embrace a Customer Centric Mentality
- Knowledge, Skills and Attitude, Focused on Collaboration and Innovation
- Data Driven and Results Oriented
- Foster a Culture Built on Mutual Trust and Respect
- Demand Quality and Excellence in Everything We Do

## First Set of Strategies (2005-2008)

- We had a non servable debt structure and a Fab2 operational capacity that could not create cash positive
  - Show growth
  - Achieve financial milestones
  - ➔ Gain market confidence
  - ➔ Raise money/ restructure debt

# 2005 Status

| Financials                                | 2005 |
|---|------|
| Revenues \$M                              | 100  |
| Net Debt \$M (exc. In the money converts) | 550  |

| Operations    | 2005          |
|---------------|---------------|
| # of Fabs     | 2             |
| Locations     | 1             |
| Capacity KWPY | 290           |
| Employees     | 900           |
| Customers     | ~30 (4 in F2) |



# Accountable vs. Victim

|             |   |                                    |
|-------------|---|------------------------------------|
| Accountable | 8 | Get On with It                     |
|             | 7 | Find Improvements, Solutions       |
|             | 6 | Own It – Take Responsibility       |
|             | 5 | Acknowledge Reality – Get the Data |
|             | 4 | Wait and Hope Things Get Better    |
| Victim      | 3 | Make Personal Excuses              |
|             | 2 | Blame Others                       |
|             | 1 | Unaware There's a Problem          |

# What did we do? (1) STRUCTURE

- We reinvented ourselves to be a customer centric company
- Decentralized “core” capabilities to viable profit centers
  - Eliminated central R&D
  - Created Product-Lines with business owners controlling R&D, customer support and marketing

**Restructured organization to give “local” empowerment;  
Learned to fight the tendency of efficiency through centralization**

## Adizes quote

“The way you are structured, it’s easier to pee in your pants than to get to the bathroom” *(at least you have momentary warmth)*



## What did we do? (2) TARGETS

Set, communicated and celebrated aggressive but achievable targets :

Q4'05 positive EBITDA *Achieved ✓*

Opened a new cafeteria

– Q4'06 positive CF *Achieved ✓*

Corporate celebration

**“Clear, simple messages energize people and inspire them to action, thus simplicity leads to speed, one of the key drivers of business success”**

*(J.Welch, GE 2000 Annual report)*

## What did we do? (3) PEOPLE

- “Do not spend your time on your poor performers
  - If they hurt you – fire them; if not – wait for the next layoffs
- Do not spend your time on average performers
  - If you do – you will only have an average group
- Do not spend personal time even on your good performers
  - If you do – you will only have a good group
- Identify your STARS:
  - Spend all your time on them, give them big opportunities and high visibility

**You will then have a group of stars.”**

*Jim Morgan, AMAT*

## Second Set of Strategies/ tactics (2008 – 2010)

- Become analog leader
- Break \$500M revenue
- Jazz merger – became TowerJazz
  - Entered RF, expanded our technology offering
  - Fortified business units
  - Reduce company cost through consolidation and high utilization rates

# Foundry Landscape

| (\$M) | 2005         |            | 2010             |            | 2015             |            | Accumulated Growth |
|-------|--------------|------------|------------------|------------|------------------|------------|--------------------|
| A     | TSMC         | 8,217      | TSMC             | 13,307     | TSMC             | 26,439     | 222%               |
| B     | UMC          | 3,259      | UMC              | 3,965      | GlobalFoundries  | 4,990      | 341%               |
| C     | SMIC         | 1,171      | GlobalFoundries  | 3,510      | UMC              | 4,464      | 37%                |
| D     | PowerChip    | 1,587      | PowerChip        | 2,424      | SMIC             | 2,222      | 90%                |
| E     | Chartered    | 1,132      | SMIC             | 1,555      | PowerChip        | 1,268      | -20%               |
| 1     | Vanguard     | 353        | <b>TowerJazz</b> | <b>509</b> | <b>TowerJazz</b> | <b>961</b> | <b>842%</b>        |
| 2     | Dongbu       | 347        | Vanguard         | 505        | Vanguard         | 736        | 108%               |
| 3     | HHNEC        | 313        | Dongbu           | 495        | Hua Hong Semi    | 650        | 108%               |
| 4     | SSMC         | 280        | SSMC             | 330        | Dongbu HiTek     | 585        | 69%                |
| 5     | He Jian      | 250        | X-Fab            | 320        | SSMC             | 460        | 64%                |
| 11    | <b>Tower</b> | <b>102</b> |                  |            |                  |            |                    |

Digital Deep Sub Micron

Specialty Analog

The fastest growing foundry in the world

Source: IC Insights, EE Times, Company Reports



# TowerJazz Business Units – Specialty Technology Leader



RF  
& HPA



Power



CIS



MS  
CMOS



Aerospace  
& Defense

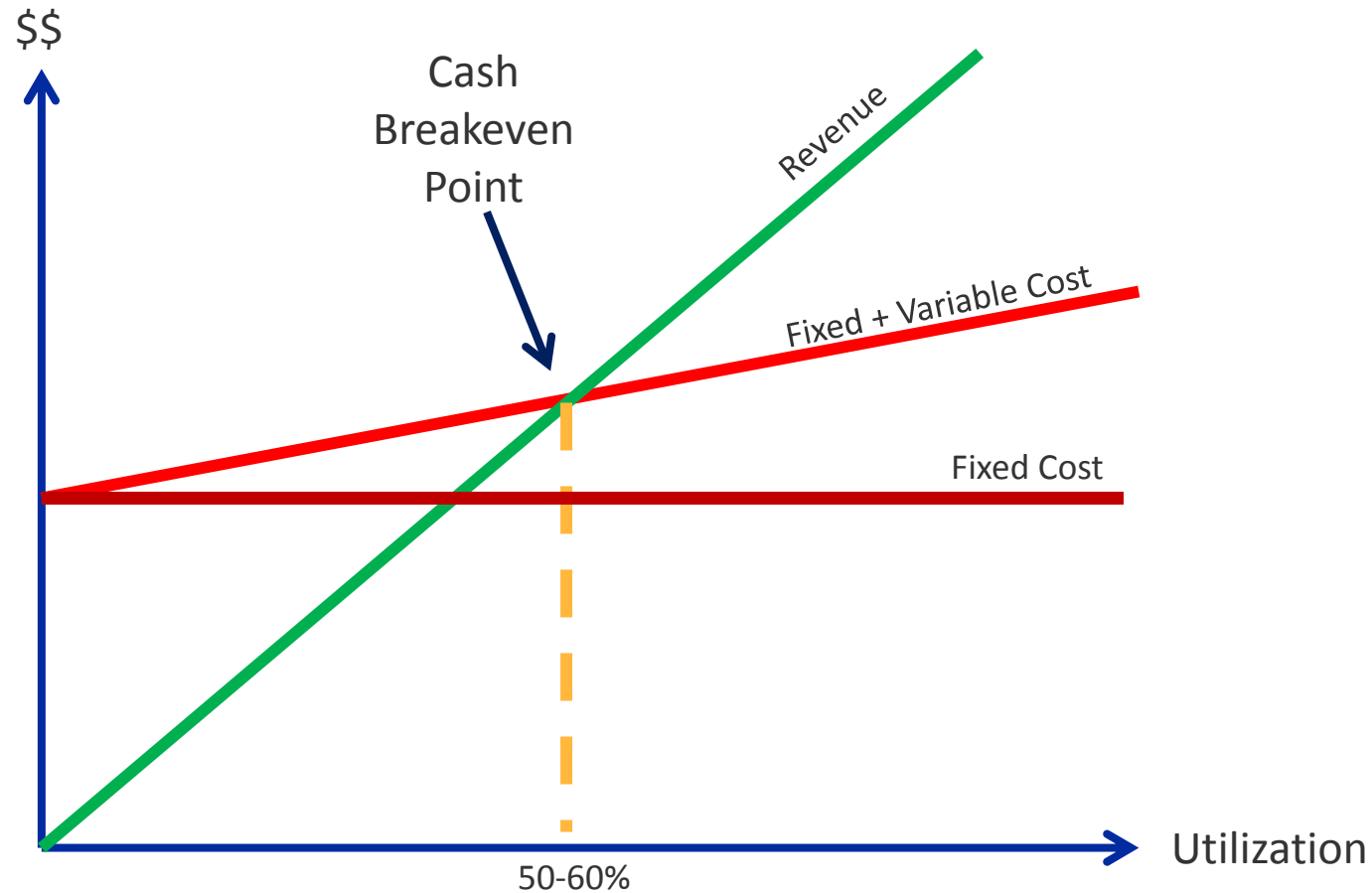


TOPS

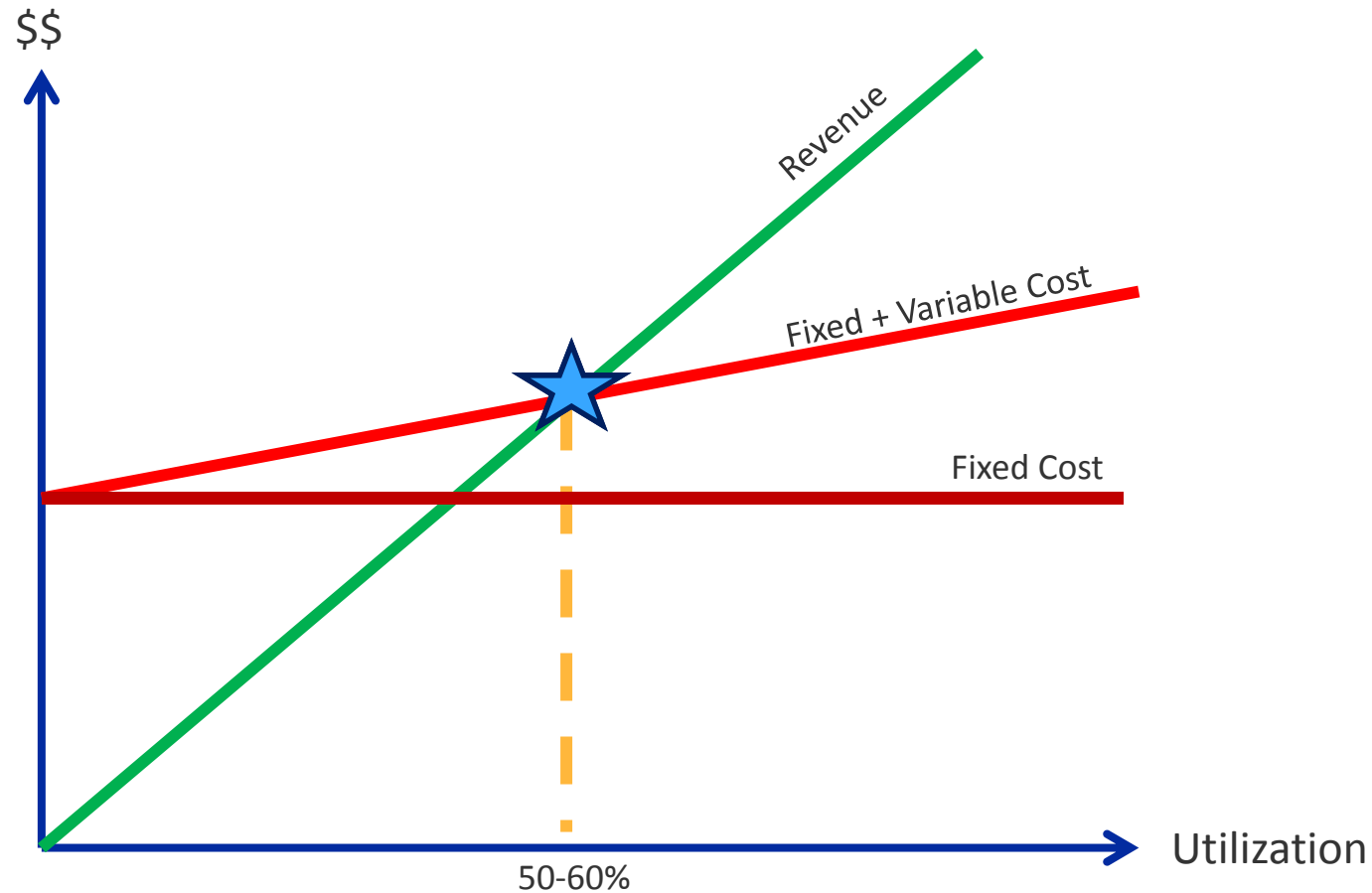
## Third Set of Strategies/ tactics (2011– 2015)

- Business and operational model enabling sustainable GAAP net profit
  - Strong strategic alignment with first tier customers on multi generation roadmaps
  - Acquire large capacity at very low cost with little to no running cost to be absorbed by TowerJazz

# Low cost, low risk, WIN WIN capacity acquisition



# Low cost, low risk, WIN WIN capacity acquisition

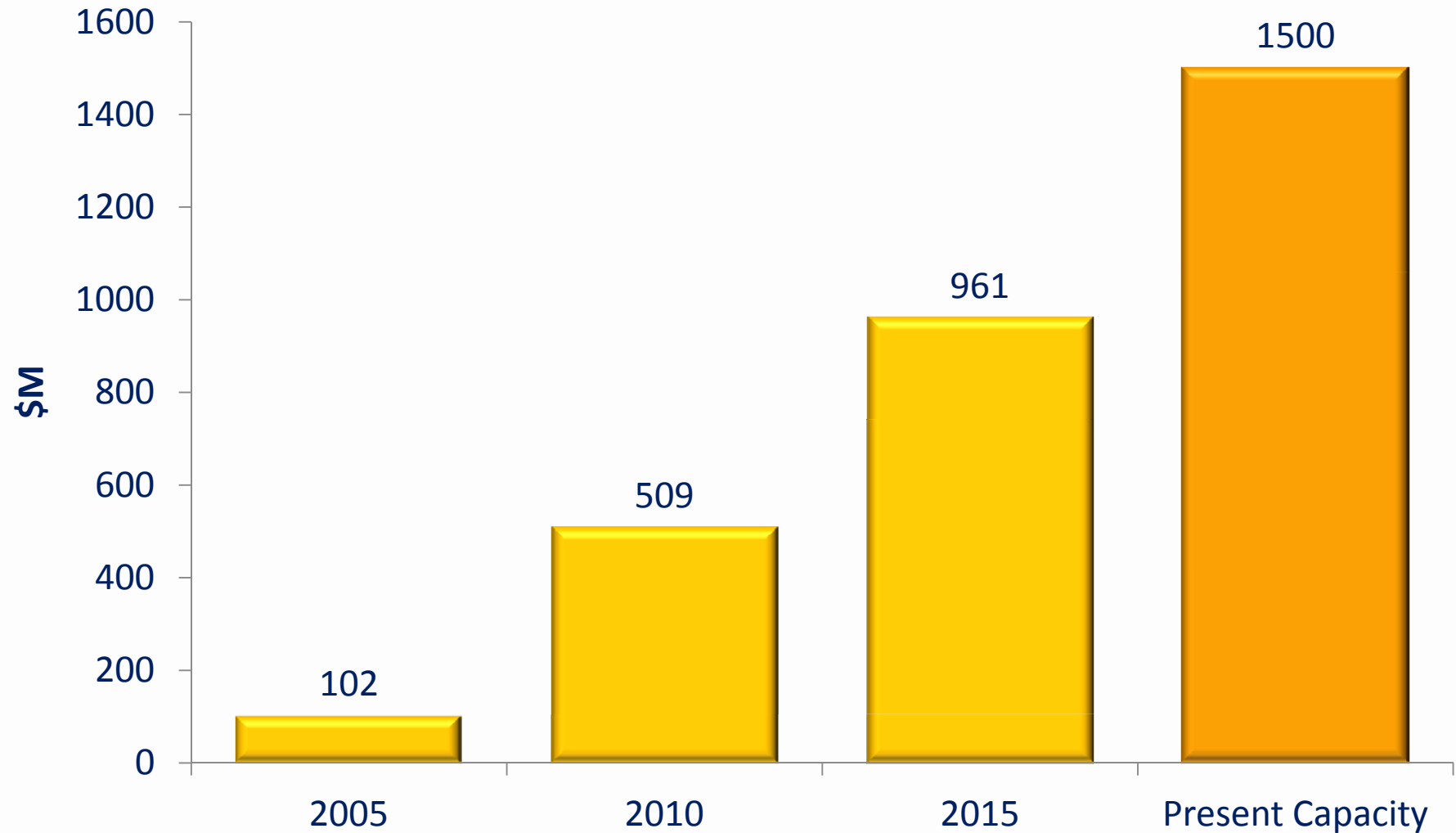


## Third Set of Strategies/ tactics (2011– 2015)

- Business and operational model enabling sustainable GAAP net profit
  - Strong strategic alignment with first tier customers on multi generation roadmaps
  - Acquire large capacity at very low cost with little to no running cost to be absorbed by TowerJazz
- TPSCo : ~ \$2B contract and 500k-600k wpy open capacity
- San Antonio : 15 years supply contract, ~ 150k WPY free capacity



# Annual Revenues



# 10 Year Anniversary

| Financials                                | 2005 | Present Run Rate |
|---|------|------------------|
| Revenues \$M                              | 100  | >1,000           |
| Net Debt \$M (exc. In the money converts) | 550  | 48               |

| Operations    | 2005 | Present Run Rate          |
|---------------|------|---------------------------|
| # of Fabs     | 2    | 7                         |
| Locations     | 1    | 3 continents/ 6 locations |
| Capacity KWPY | 290  | 2,350                     |
| Employees     | 900  | 4,500                     |
| Customers     | ~30  | >300                      |

# Corporate Targets

# Corporate Financial Targets 2016

- Revenue :
  - Target: growth throughout the year
  
- Continue to improve the margins across the board
  - 1-2 points negative first year impact of TJT (San Antonio fab) on margin percent but positive on all cash indices
  - Target:
    - GAAP operating margin from 8% for FY 2015 to double digit throughout 2016 with H2>H1



## Focus: net profit 2016/2017

- Maintain and grow positive net profit
  - Achieved: Q2'15 - \$8M → Q3'15 - \$14M → Q4'15 - \$22M
  - 2016 target: growth against Q4'15 annualized baseline
    - MH Fab2 capacity ramp at high utilization
    - NPB Fab3 realization of annualized capacity increase
    - TPSCo 3<sup>rd</sup> party revenues ramp to >\$25M/ quarter by EOY
  - 2017 target: additional growth
    - Fab2 realization of annualized capacity increase
    - Fab3 with higher margin mix
    - TPSCo 3<sup>rd</sup> party revenues increase to >\$50M/ quarter by EOY
    - TJT (San Antonio fab) revenue growth >25% 2017/16

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## ***Strategic Overview***

### ***Main Focuses and Growth Opportunities***

Dr. Itzhak Edrei | President

# Outline

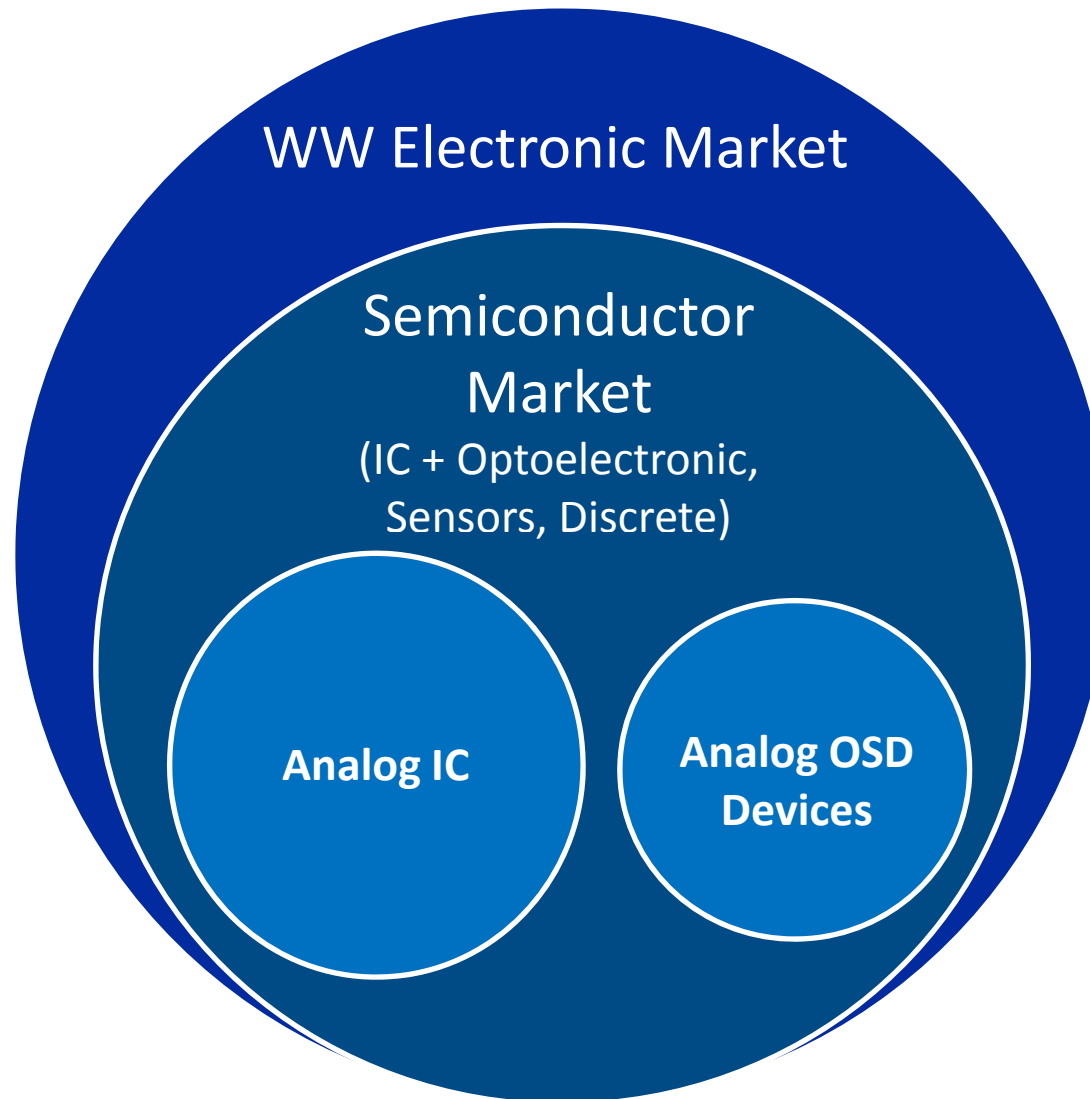
- The big picture and where we are
  - Macro-economics & semiconductor market trends
  - Worldwide IC Market
  - Analog IC Market
  - O-S-D Market
- Strategy : main focuses for profitable growth



# The BIG Picture and Where We Are

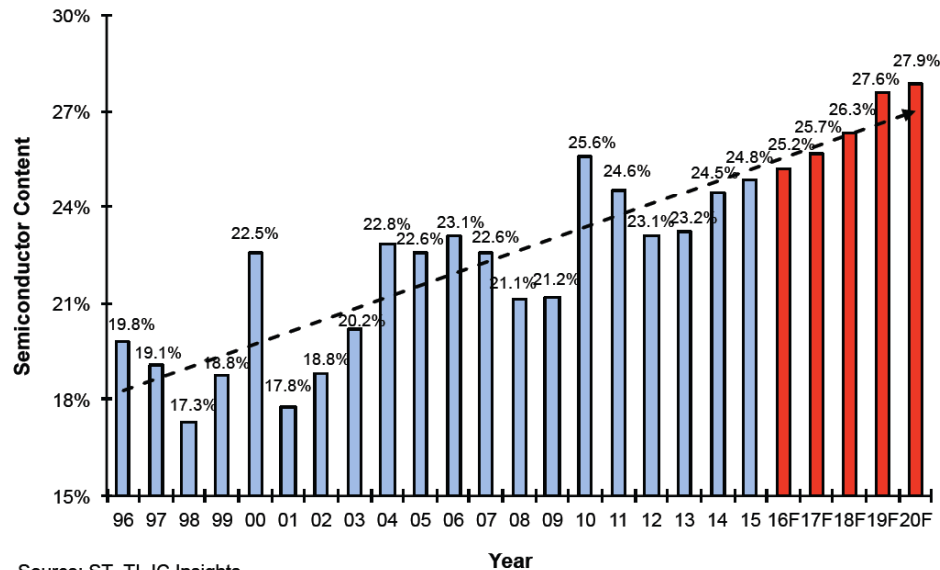
■ January 2016

# The Big Picture & where are we playing?

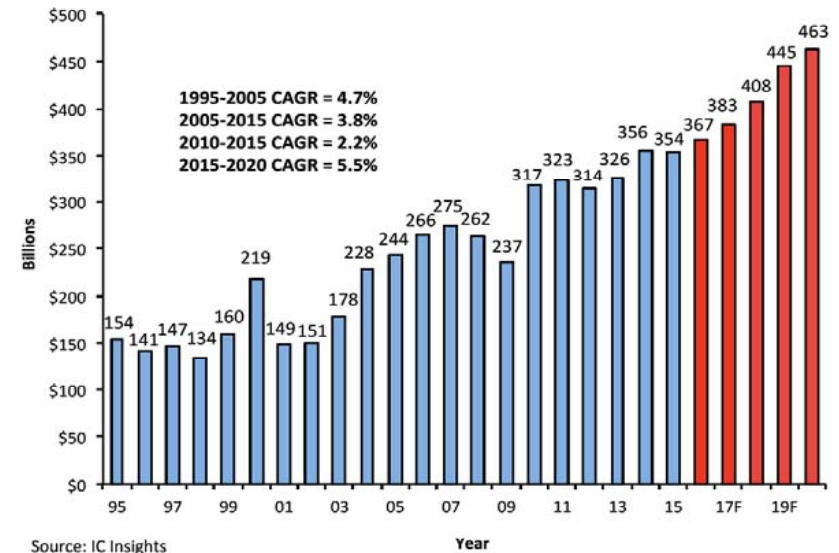


# Increase value of semiconductor

Electronic System Semiconductor Content



Worldwide Semiconductor Market History and Forecast (1995-2020F)



Percent of dollar content in electronic systems is increasing

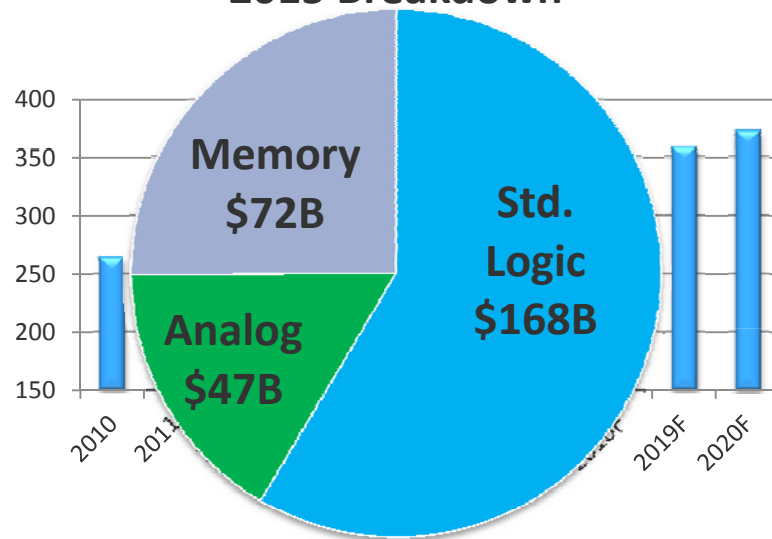
There is an increasing value of semiconductors used in electronic systems

# Total IC and O-S-D Markets

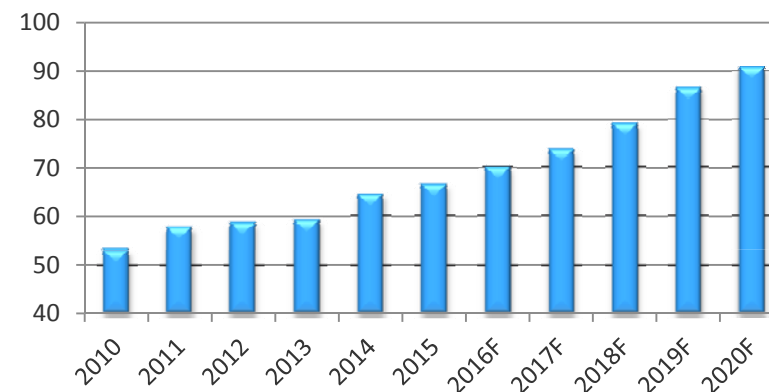
**Integrated Circuits**  
(std logic, analog, memory)

**Optoelectronics (CIS)**  
**Sensors/ Actuators**  
**Discrete**

**2015 Breakdown**



**O-S-D Market (\$B)**



# TowerJazz Business Units – Specialty Technology Leader



RF  
& HPA



Power



CIS



MS  
CMOS



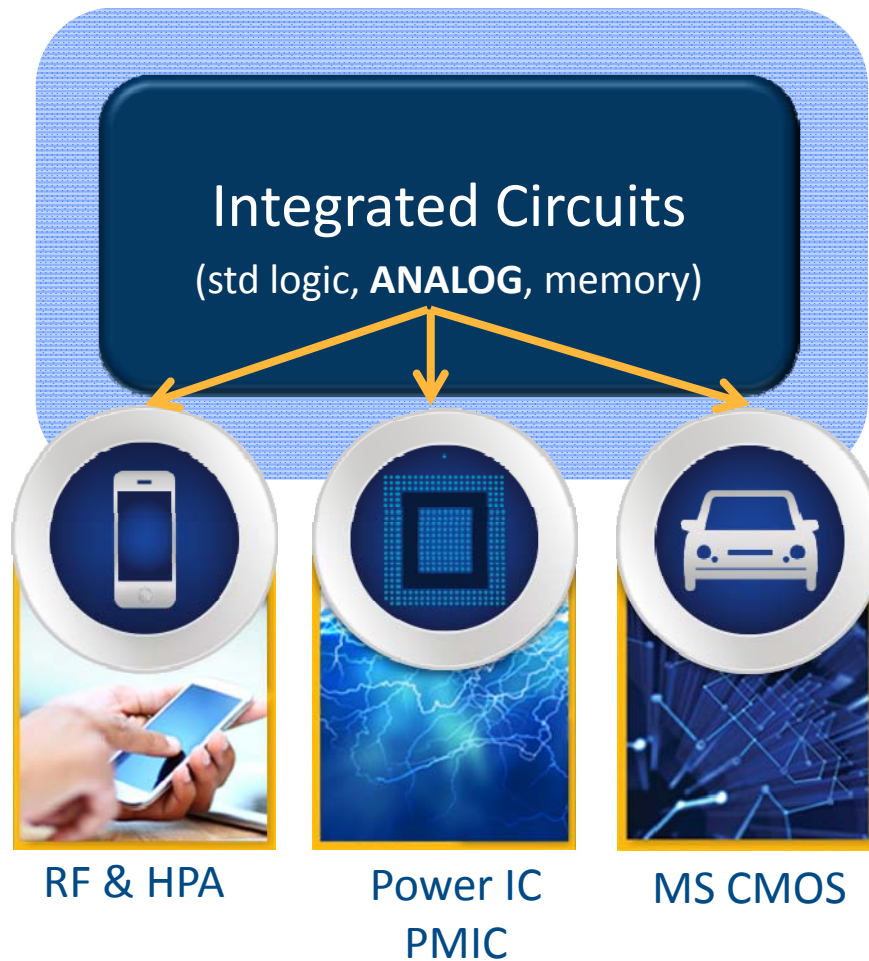
Aerospace  
& Defense



TOPS



# IC and O-S-D Markets



Optoelectronics (CIS)  
Sensors/ Actuators  
Discrete

# Analog markets by revenue and growth percent

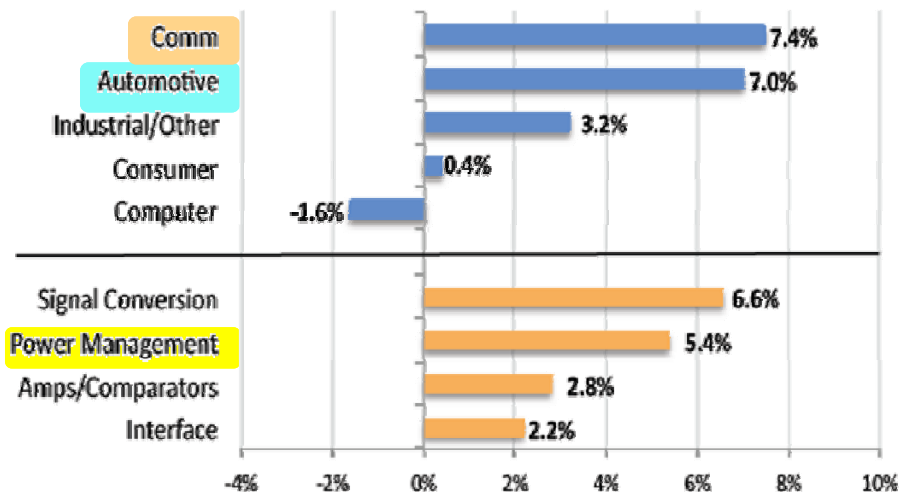
## 2016 Analog IC Sales Forecast

| General Purpose Analog              | Market (\$M)  | % of Total Analog | 16/15 % Chg |
|-------------------------------------|---------------|-------------------|-------------|
| Amplifiers & Comparators            | 2,914         | 6.0%              | 2%          |
| Interface                           | 2,042         | 4.2%              | 1%          |
| Power Management                    | 11,785        | 24.1%             | 4%          |
| Signal Conversion                   | 3,205         | 6.5%              | 10%         |
| <b>Total General Purpose Analog</b> | <b>19,946</b> | <b>40.7%</b>      | <b>4%</b>   |

| Application-Specific Analog              | Market (\$M)  | % of Total    | 16/15 % Chg |
|--|---------------|---------------|-------------|
| Consumer                                 | 1,845         | 3.8%          | -2%         |
| Computer                                 | 2,088         | 4.3%          | -4%         |
| Comm                                     | 15,760        | 32.2%         | 6%          |
| Automotive                               | 7,059         | 14.4%         | 5%          |
| Industrial/Other                         | 2,264         | 4.6%          | 2%          |
| <b>Total Application-Specific Analog</b> | <b>29,016</b> | <b>59.3%</b>  | <b>4%</b>   |
| <b>Total Analog Market</b>               | <b>48,962</b> | <b>100.0%</b> | <b>4%</b>   |

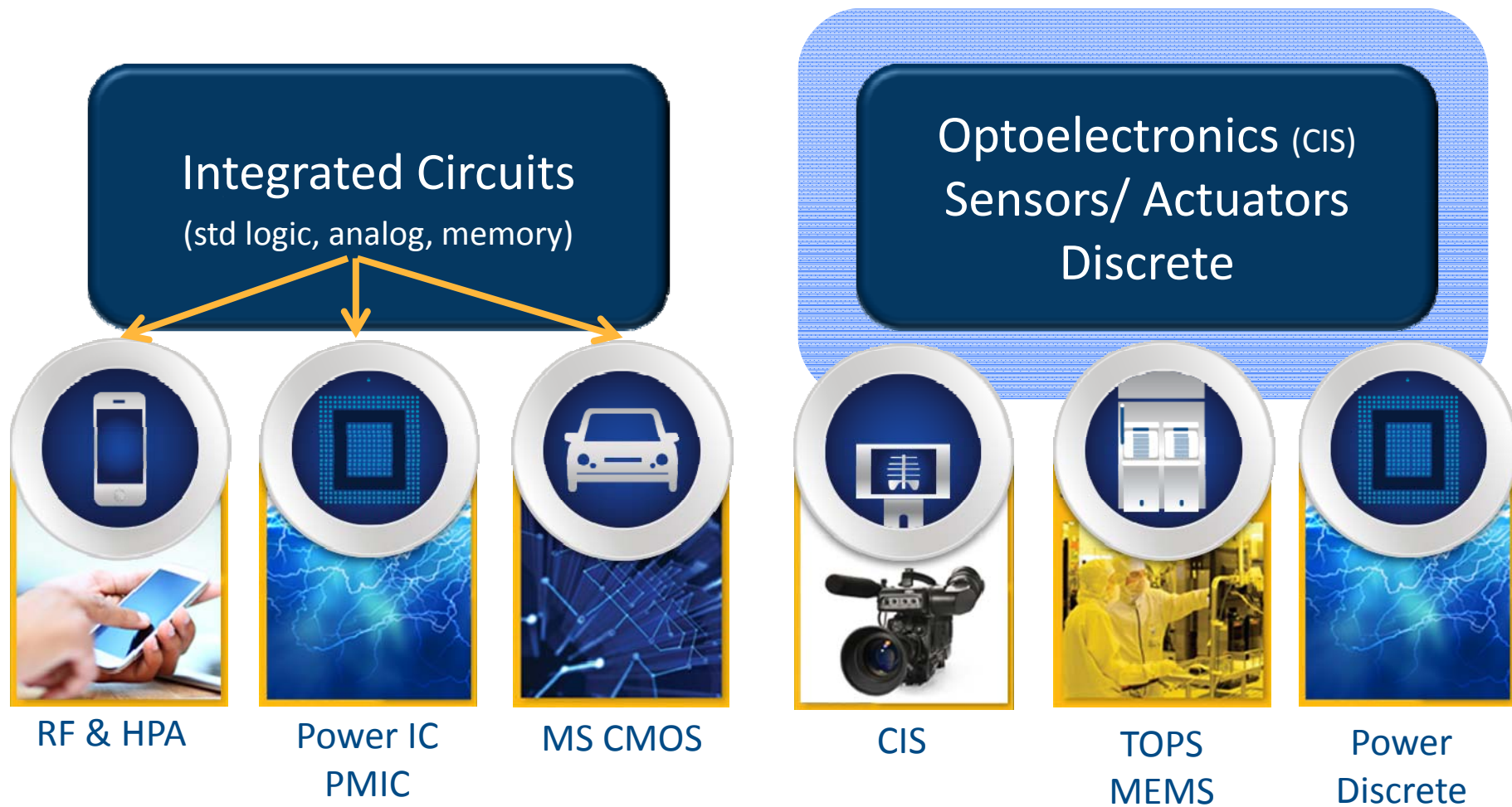
Source: IC Insights

## CAGRs for Analog Device Sales (2015-2020F)

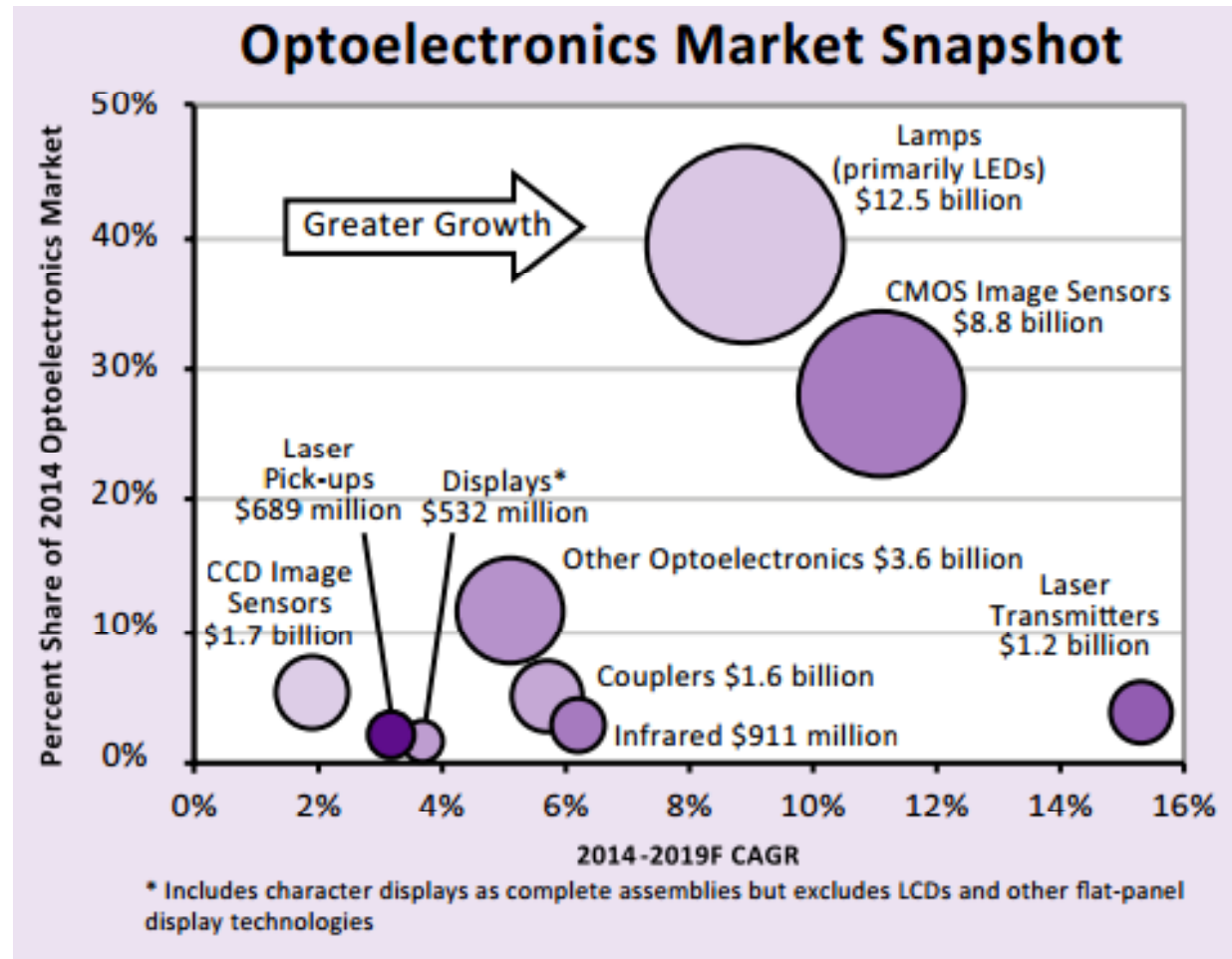


Source: IC Insights

# IC and O-S-D Markets

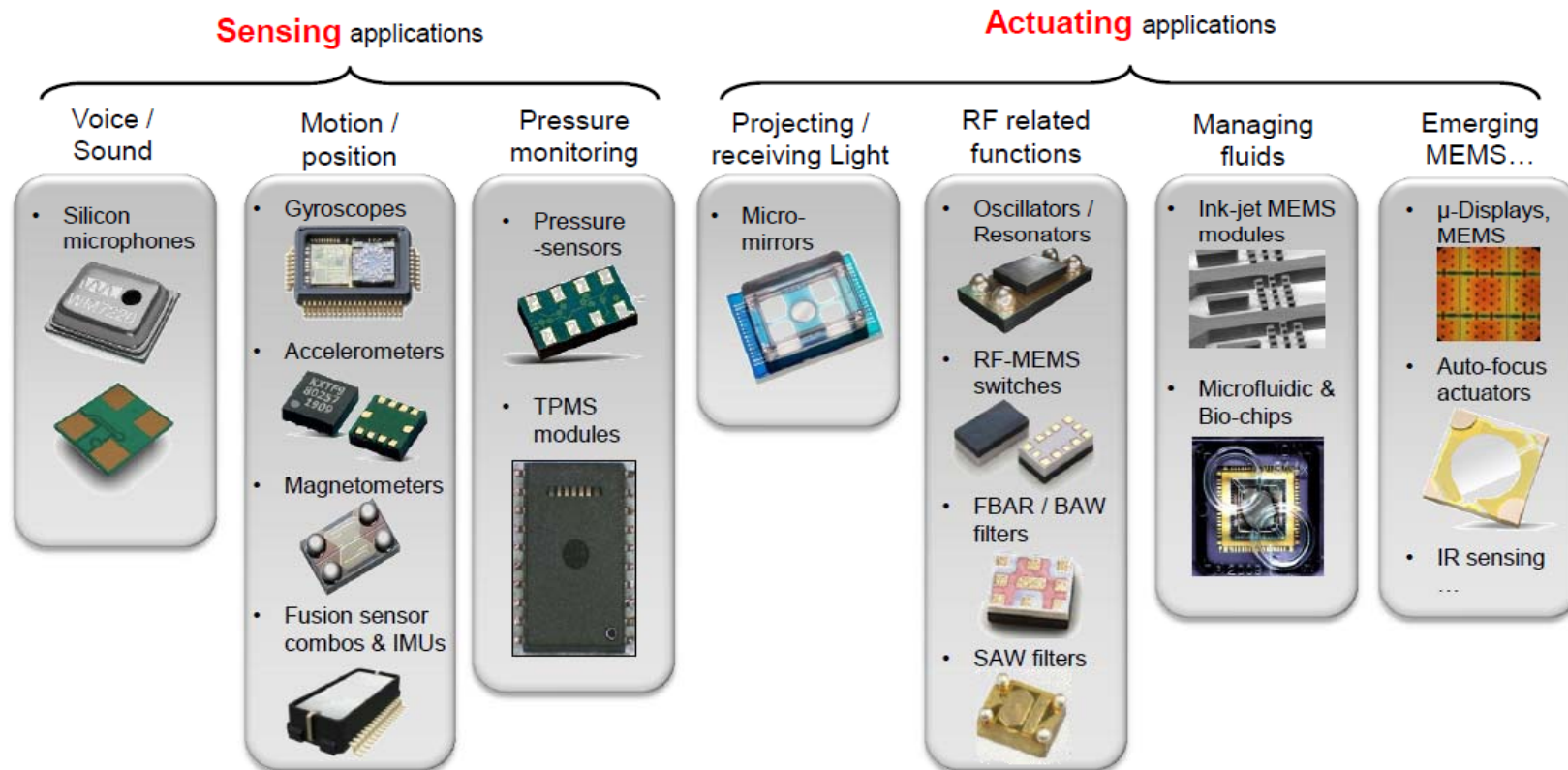


# O-S-D Market Structure: Optoelectronics





# O-S-D Market Structure: Sensors/ Actuators





## Transfer Optimization and Develop Process Services



- Transferring process flows to TowerJazz fabs
- Researching and developing new processes

# Our Target Customers

## IDMs

- 'Fabligh' outsourcing strategy
- Capacity shortage with internal fabs
- Double source policy
- Going through fab closure for cost reduction activities

## Fabless Companies

- With process IP looking for manufacturing site
- Process was developed at R&D centers and will be transferred and optimized to production at TowerJazz fabs

## Develop from R&D to Production

- Develop process IP, process module or flow in TowerJazz fabs

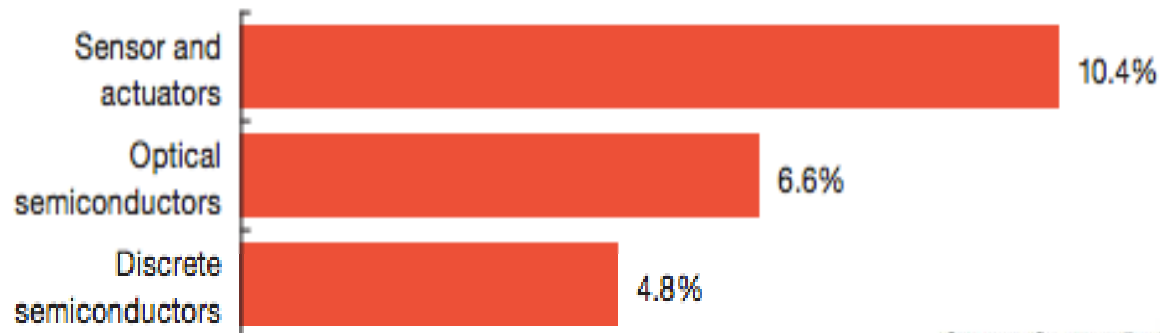
# TOPS Business and Operational Strategy

- Most of our TOPS customers are under long term supply agreements
- Provide manufacturing stability
  - “guaranteed” percentage of fab fixed costs coverage
  - Assurance against industry cyclicalities
- Among the customers: Infineon\*, Siliconix, Fairchild and many others

\* Through acquisition of International Rectifier

# O-S-D Market : Summary

CAGR 2014–2019 by component



Source: Gartner, PwC analysis.

**Optoelectronics** – expected to grow by a CAGR of 9% through 2019 mainly driven by LED and CIS.

**Discrete** – 383 Billion units shipped in 2014, growing use in portable devices for power managements, switching power supplies, battery charging. GaN/SiC – the next revolution?

**Sensors & Actuators** - MEMS are about 80% of \$ sales & 40% of the units. Market expected growth is driven mainly by IoT.

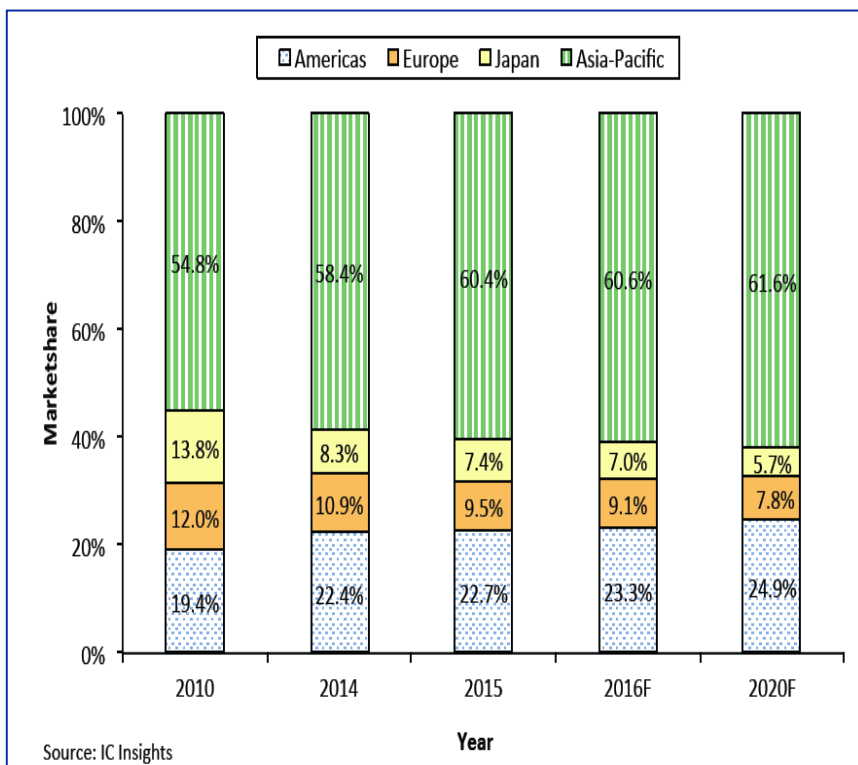
# Regional Taxonomy



# Global Footprint



# Worldwide IC Market by Region



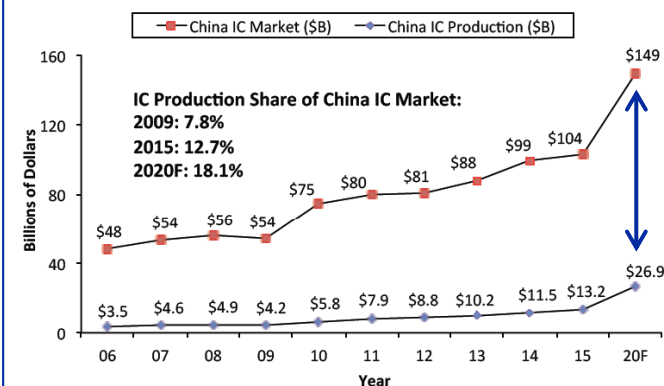
- Japan presence – advantage for APAC manufacturing
- Sales focus in China, Taiwan, South Korea
- New initiatives in China (backed by government support)

Asia-Pacific IC Market by Country (\$B)

| Region                    | 2010           | 2014           | 2015           | 2016F          | 2017F          | 2018F          | 2019F          | 2020F          |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>China/Hong Kong</b>    | \$74.8         | \$99.3         | \$103.5        | \$109.5        | \$116.7        | \$126.4        | \$140.7        | \$149.2        |
| Share of Total            | 52.3%          | 58.4%          | 59.7%          | 60.8%          | 61.9%          | 63.0%          | 64.0%          | 65.1%          |
| <b>Taiwan</b>             | \$34.5         | \$36.2         | \$36.1         | \$36.9         | \$38.1         | \$39.9         | \$43.1         | \$44.2         |
| Share of Total            | 24.1%          | 21.3%          | 20.8%          | 20.5%          | 20.2%          | 19.9%          | 19.6%          | 19.3%          |
| <b>South Korea</b>        | \$15.4         | \$16.2         | \$16.0         | \$16.0         | \$16.2         | \$16.7         | \$17.6         | \$17.6         |
| Share of Total            | 10.8%          | 9.5%           | 9.2%           | 8.9%           | 8.6%           | 8.3%           | 8.0%           | 7.7%           |
| <b>Singapore</b>          | \$11.2         | \$11.6         | \$11.3         | \$11.2         | \$11.1         | \$11.2         | \$11.7         | \$11.2         |
| Share of Total            | 7.8%           | 6.8%           | 6.5%           | 6.2%           | 5.9%           | 5.6%           | 5.3%           | 4.9%           |
| <b>Other</b>              | \$7.2          | \$6.8          | \$6.6          | \$6.5          | \$6.4          | \$6.4          | \$6.8          | \$6.9          |
| Share of Total            | 5.0%           | 4.0%           | 3.8%           | 3.6%           | 3.4%           | 3.2%           | 3.1%           | 3.0%           |
| <b>Total Asia-Pacific</b> | <b>\$143.0</b> | <b>\$170.0</b> | <b>\$173.4</b> | <b>\$180.1</b> | <b>\$188.6</b> | <b>\$200.7</b> | <b>\$219.9</b> | <b>\$229.2</b> |

Source: IC Insights

China IC Market vs. China IC Production Trends



# Summary

## The BIG Picture

# Worldwide IC and Analog Markets – Main Observations

- End Markets:
  - Communication, Power Management and Automotive are growing
- IC Market by Regions – APAC is the major end user
- Analog IC Market – sweet spot 0.13-0.18um
  - Market (\$) & units are growing
  - Not driven by number of transistors hence – stable technology nodes
  - Typically long life cycle products
  - 300mm analog technology offerings starting to emerge – TowerJazz to support next generations development and manufacturing with the TPSCo 300mm fab
  - Expertise in design, device, process - a differentiator

# Analog O-S-D Market – Main Observations

- Fast growing market
- Optoelectronics – CIS to continue growing fast
- MEMS – many promising growing markets (Consumer, automotive, industrial, communication ...)
  - We intend to expand our activity in this area as specialized foundry strategy
  - Penetration through partnership/purchase
- Discrete – still growing nicely.
  - GaN is seen in the future



# Strategy:

## Main Focuses for Profitable Growth

# Summary: Strategic Direction

- **What do we want for 2016-2020?**
  - TowerJazz continued growth
    - Utilization as a critical factor
  - Ensure our competitive advantage
    - Technology offering
    - Manufacturing capabilities
  - Retain our existing customers and increase customer base
  - Profitable business model with free cash flow creation
  - Continued branding: the leading analog specialty foundry

## Summary: Strategic Direction

### What questions to answer:

- Which of our growth engines should we retain (RF, TOPS, CIS, Power) and what is needed in order to retain them?
- What growth engines are we missing?
- Any new technical area that we need to enter to?
- Do we have the right facilities/ capacity to address growth needs?
- Any new geographic area that we need to enter?

## Summary: Strategic Direction

### What questions to answer:

- Which of our growth engines should we retain (RF, TOPS, CIS, Power) and what is needed in order to retain them?

YES. Continue to build RF/CIS/Power/TOPS

- Invest in roadmap to sustain the 8” and at the same time develop 300mm penetration
- Allow flexibility between fabs to ensure all are loaded
- Keep long life technologies in manufacturing at certain level to support cyclical periods
- Automotive –take advantage of the growing market with long life through TPSCo capabilities

# Summary: Strategic Direction

## What questions to answer:

- What growth engines are we missing?
- Any new technical area that we need to enter to?

## Sensors to fully meet IoT requirements

- Full MEMS sensors capability
- Magnetic sensors – through technology partnership

Develop GaN offering – in progress



## Summary: Strategic Direction

### What questions to answer:

- Do we have the right facilities/ capacity to address growth needs?
- YES.

# Summary: Strategic Direction

## What questions to answer:

- Any new geographic area that we need to enter?

## Specific China Strategy

- Expand “std” business – progressing well
- Partner to have local manufacturing capability (200mm and 300mm)

# **TOWERjazz**

**The Global Specialty Foundry Leader**



## ***TowerJazz Investor and Analyst Day***

**March 8, 2016**



# **TOWERJAZZ**

**The Global Specialty Foundry Leader**



## ***Financial performance and Future Focus***

Oren Shirazi | CFO

# Financial Performance

|   | Q1'05    | Q1'14 | Q1'15 | Q2'15 | Q3'15 | Q4'15 |
|---|----------|-------|-------|-------|-------|-------|
| Revenue (\$M)                           | 23       | 133   | 226   | 236   | 244   | 255   |
| Non-GAAP Gross Margin (%)               | (17)     | 34    | 36    | 37    | 38    | 41    |
| EBITDA (\$M)                            | (14)     | 27    | 51    | 59    | 63    | 75    |
| EBITDA Margin (%)                       | (61)     | 21    | 23    | 25    | 26    | 30    |
| Non-GAAP Net profit (\$M)               | (21)     | 19    | 50    | 54    | 58    | 70    |
| Net Profit (\$M)                        | (55)     | 39    | (73)  | 8     | 14    | 22    |
| Net Profit excl. one-time items * (\$M) | (55)     | (41)  | 2     | 8     | 14    | 22    |
| Shareholders' Equity (\$M)              | 113      | 200   | 292   | 300   | 325   | 386   |
| Cash On Hand (\$M)                      | 35       | 183   | 134   | 143   | 155   | 206   |
| Net Debt (\$M)                          | 489      | 405   | 162   | 160   | 134   | 105   |
| Net Debt/ Annual Ebitda (@Q*4)          | infinite | 3.75X | <0.8X | <0.7X | <0.6X | <0.4X |

\* One time items included (i) for Q1'15, \$85 million non-cash bonds F conversion effect and \$10 million tax non-cash income; (ii) for Q1'14, \$151 million TPSCO acquisition gain, net and \$71 million Nishiwaki cessation relates costs, net



# Fourth Quarter 2015 Financial Highlights

## Q4 Revenues

**\$255 million**

RECORD REVENUES

- **Strong and continuous revenue growth**
  - **Q4 record** revenues of \$255 million (8% YoY growth)
    - Represents **> \$1 billion** annual run rate
  - Q1 2016 mid range guidance of \$276 million (22% YoY growth)
- **Substantial Margins increase**
  - **Q4 GAAP net profit** of \$22 million, up from \$0.6M in Q4'14 and \$13.6M in Q3'15
  - **Record EBIDTA** of \$75.5 million (35% YoY increase)
    - Represents annual EBITDA run rate of \$300 million
  - GAAP gross margin in Q4'15 of 25% (up from 16% in Q4'14)
- **Strong Balance Sheet and Financial Ratios**
  - Reduced net debt to \$105 million (vs. \$318 million as of December 31, 2014)
  - Increased cash and short-term deposits to \$206 million
  - Reduced net debt/ EBITDA ratio from > 3.5X in Q1'14 to current **< 0.4X**
  - Current ratio of 2.1X as of Dec' 31, 2015 Vs. 1.3X as of Dec' 2014

# Full Year 2015 Financial Highlights

FY Revenues

**\$961 million**

RECORD REVENUES

## ■ Record Revenues

- **Record** revenues for the full year of \$961 million (16% YoY growth)

## ■ Substantial Margins increase

- GAAP gross profit of \$205 million (more than 3X as compared to 2014)
- **Record EBIDTA** of \$249 million (62% YoY increase)
- **GAAP net profits** since the second quarter of 2015 with sustainable operational and financial business model for GAAP net profit
  - \$8M in Q2'15, \$13.6M Q3'15, \$22M Q4'15

## ■ Strong Balance Sheet and Financial Ratios

- Reduced net debt to \$105 million (vs. \$318 million as of December 31, 2014)
- Increased cash and short-term deposits to \$206 million
- Reduced net debt/ EBITDA ratio from > 3.5X in Q1'14 to current **< 0.4X**
- Current ratio of 2.1X as of Dec' 31, 2015 Vs. 1.3X as of Dec' 2014

# Debt Summary

As of December 31, 2015 (as of December 31, 2014)

## Bonds Debt Summary

| Security Type       | Linked to           | Outstanding principal (\$M) | Key Terms  |
|---------------------|---------------------|-----------------------------|--|
| Bonds Series D      | Israeli price index | 6 (12)                      | Principal is due in December 2016; Straight bond, i.e not-convertible; Annual coupon of 8% payable once/year in December                           |
| Bonds Series F      | \$                  | 1 (197)                     | 7.8% coupon payable twice / year; convertible at \$10 into ordinary shares; principal is due in 2 installments on Dec' 2015 and Dec' 2016          |
| Jazz Bonds due 2015 | \$                  | 0 (45)                      | Annual coupon of 8% payable twice a year; Straight bond, i.e not-convertible; Principal was scheduled for June 2015; buy back done in January 2015 |
| Jazz Bonds due 2018 | \$                  | 58                          | Annual coupon of 8% payable twice a year; convertible at \$10.07 into ordinary shares of Tower ; Principal is due on December 2018                 |

## Banks Debt Summary

| Security Type  | Linked to | Outstanding principal (\$M) | Key Terms  |
|--|-----------|-----------------------------|--|
| IL Bank Loans  | \$        | 83 (101)                    | Leumi & Po'alim Banks 50%:50%; \$6M payable 2016, \$56M 2017, \$21M 2018; Annual interest rate of Libor+ 3.9%                      |
| Jazz Wells Fargo Bank Credit Line                      | \$        | 19                          | \$19M actual drawdown under up to \$70M credit line; Annual interest rate of Libor + 1.5%; principal is due Dec'2018               |
| Japanese Loan to TPSCo<br>(TowerJazz Panasonic entity) | JPY       | 144 (74)                    | Tibor + 1.65% - 2.00% term loans from JA Mitsui, Sumitomo Mitsui Trust bank, Showa & Bank Of Tokyo; payable from 2016 through 2020 |

• Total Debt as of December 31, 2015 is \$311M vs. \$505M as of December 31, 2014:

• Net debt is \$106M

• Reflecting < 0.4X Net Debt to EBITDA ratio

## Healthy Cap Table

- ✓ 86M Shares outstanding
- ✓ 6M Convertible @ \$10/ share
- ✓ 7M ESOP
- ✓ 5M warrants @ \$7.3/ share
- ✓ 3M capital notes

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- ✓ 107M fully diluted

=====

- ✓ No major shareholder with > 10%

# TowerJazz - Balance Sheet (in millions of \$)

|                                       | December 31,<br>2015 | September 30,<br>2015 | December 31,<br>2014 |
|---------------------------------------|----------------------|-----------------------|----------------------|
| <b>CURRENT ASSETS</b>                 |                      |                       |                      |
| Cash and cash equivalents             | 206                  | 155                   | 187                  |
| Trade accounts receivable             | 110                  | 123                   | 99                   |
| Other receivables                     | 7                    | 7                     | 6                    |
| Inventories                           | 106                  | 104                   | 88                   |
| Other current assets                  | 18                   | 24                    | 14                   |
| <b>Total current assets</b>           | <b>447</b>           | <b>413</b>            | <b>394</b>           |
| Long-term investments                 | 12                   | 12                    | 12                   |
| Property and equipment, net           | 460                  | 431                   | 419                  |
| Intangible assets, net                | 34                   | 37                    | 42                   |
| Goodwill                              | 7                    | 7                     | 7                    |
| Other assets, net                     | 7                    | 7                     | 10                   |
| <b>TOTAL ASSETS</b>                   | <b>967</b>           | <b>907</b>            | <b>884</b>           |
| <b>CURRENT LIABILITIES</b>            |                      |                       |                      |
| Current maturities of long-term debt  | 33                   | 49                    | 120                  |
| Trade accounts payable                | 92                   | 112                   | 99                   |
| Other current liabilities             | 86                   | 91                    | 81                   |
| <b>Total Current Liabilities</b>      | <b>211</b>           | <b>252</b>            | <b>300</b>           |
| Long-term debt                        | 257                  | 207                   | 267                  |
| Employee related liabilities          | 14                   | 16                    | 17                   |
| Deferred tax liabilities              | 70                   | 76                    | 75                   |
| Other long-term liabilities           | 29                   | 31                    | 30                   |
| <b>TOTAL LIABILITIES</b>              | <b>581</b>           | <b>582</b>            | <b>689</b>           |
| <b>Shareholders' equity</b>           | <b>386</b>           | <b>325</b>            | <b>195</b>           |
| <b>TOTAL LIABILITIES &amp; EQUITY</b> | <b>967</b>           | <b>907</b>            | <b>884</b>           |



# TowerJazz – Q4'15 & FY'15 Sources & Uses (in millions of \$)

|  | Year<br>ended<br>December 31,<br>2015 | Three months<br>ended<br>December 31,<br>2015 | Three months<br>ended<br>September 30,<br>2015 | Three months<br>ended<br>December 31,<br>2014 |
|--|---------------------------------------|---|--|---|
| Cash at beginning of the period                        | \$ 187,167                            | \$ 155,348                                    | \$ 142,503                                     | \$ 195,116                                    |
| Cash from operations, excluding interest payments      | 207,584                               | 54,779  | 54,689   | 41,218  |
| Exercise of warrants and options, net                  | 14,424                                | 4,168   | 4,602  | 5,654   |
| Long-term loan received by TPSCo                       | 70,592                                | 70,592  | --   | --  |
| Investments in property, equipment and other cap-ex    | (165,655)                             | (58,137)                                      | (39,579)                                       | (26,569)                                      |
| Debt repayment- principal                              | (69,689)                              | (18,006)                                      | (3,000)  | (15,980)                                      |
| Debt repayment- interest                               | (12,371)                              | (1,599)                                       | (3,867)  | (12,708)                                      |
| Nishiwaki cessation- employee termination related, net | (24,907)                              | --  | --   | 436   |
| TPSCo dividend to Panasonic                            | (1,570)                               | (1,570)                                       | --   | --  |
| Cash at end of the period                              | \$ 205,575                            | \$ 205,575                                    | \$ 155,348                                     | \$ 187,167                                    |

# TowerJazz – Q4'15 & FY'15 Sources & Uses (in millions of \$)

|   | Year ended<br>December 31, |            |              |
|---|----------------------------|------------|--------------|
|   | 2015                       | 2014       | 2013         |
| <b>CASH FLOWS - OPERATING ACTIVITIES</b>  |                            |            |              |
| Net loss  | \$ (29,127)                | \$ (1,372) | \$ (107,660) |
| Adjustments to reconcile net loss for the period<br>to net cash provided by operating activities: |                            |            |              |
| Income and expense items not involving cash flows:  |                            |            |              |
| Depreciation and amortization   | 168,032                    | 203,868    | 151,711      |
| Financing expense associated with debentures series F   | 87,973                     | 39,494     | 13,113       |
| Effect of indexation, translation and fair value measurement on debt                              | 16,078                     | (3,667)    | 4,091        |
| Financing costs relating to Jazz notes exchange   | --                         | 9,817      | --           |
| Other expense, net  | 190                        | 140        | 904          |
| Gain from acquisition   | --                         | (166,404)  | --           |
| Changes in assets and liabilities:  |                            |            |              |
| Trade accounts receivable   | (11,115)                   | (24,021)   | (5,194)      |
| Other receivables and other current assets  | (14,979)                   | 49,934     | (3,647)      |
| Inventories   | (17,908)                   | (1,758)    | (780)        |
| Trade accounts payable  | (26,162)                   | 11,107     | 25           |
| Deferred revenue and customers' advances  | 32,725                     | 1,915      | 1,202        |
| Other current liabilities   | 8,454                      | 25,744     | (38)         |
| Deferred tax liability, net   | (4,173)                    | (23,977)   | (11,453)     |
| Other long-term liabilities   | (14,775)                   | 4,517      | (6)          |
| Nishiwaki's employees termination payments  | (24,907)                   | (27,572)   | --           |
| Net cash provided by operating activities   | 170,306                    | 97,765     | 42,268       |
| <b>CASH FLOWS - INVESTING ACTIVITIES</b>  |                            |            |              |
| Investments in property and equipment, net (a)  | (165,370)                  | (50,209)   | (77,044)     |
| Investments in other assets, intangible assets and others   | (119)                      | (76)       | (409)        |
| Acquisition of subsidiary consolidated for the first time (b)                                     | --                         | 57,582     | --           |
| Decrease (increase) in Interest bearing deposits  | (30,000)                   | 10,000     | --           |
| Net cash provided by (used in) investing activities   | (195,489)                  | 17,297     | (77,453)     |
| <b>CASH FLOWS - FINANCING ACTIVITIES</b>  |                            |            |              |
| Proceeds from exercise of warrants and options  | 14,424                     | 10,399     | 105          |
| Proceeds from issuance of debentures, net   | --                         | 9,214      | --           |
| Proceeds on account of shareholders' equity, net  | --                         | --         | 38,851       |
| Proceeds from long-term loans   | 70,592                     | 85,884     | --           |
| Short-term loan repayment to Panasonic  | --                         | (85,884)   | --           |
| Bank debt repayment   | (18,200)                   | (41,181)   | --           |
| Debentures repayment  | (51,489)                   | (10,230)   | (6,540)      |
| TPSCo dividend to Panasonic   | (1,570)                    | --         | --           |
| Net cash provided by (used in) financing activities   | 13,757                     | (31,798)   | 32,416       |
| Effect of foreign exchange rate change  | (166)                      | (8,968)    | (7,758)      |
| INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS  | (11,592)                   | 74,296     | (10,527)     |
| CASH AND CASH EQUIVALENTS - BEGINNING OF PERIOD   | 187,167                    | 112,871    | 123,398      |
| CASH AND CASH EQUIVALENTS - END OF PERIOD   | \$ 175,575                 | \$ 187,167 | \$ 112,871   |

# Q4'15 Financial Statements (Vs. Q4'14), in thousands of \$

|  | Three months ended<br>December 31, |            | Three months ended<br>December 31, |             | Three months ended<br>December 31, |            |
|--|------------------------------------|------------|------------------------------------|-------------|------------------------------------|------------|
|  | 2015                               | 2014       | 2015                               | 2014        | 2015                               | 2014       |
|  | non-GAAP                           |            | Adjustments                        |             | GAAP                               |            |
| REVENUES   | \$ 254,602                         | \$ 235,289 | \$ --                              | \$ --       | \$ 254,602                         | \$ 235,289 |
| COST OF REVENUES                                 | 150,322                            | 151,105    | 39,750                             | 46,092      | 190,072                            | 197,197    |
| GROSS PROFIT                                     | 104,280                            | 84,184     | (39,750)                           | (46,092)    | 64,530                             | 38,092     |
| OPERATING COSTS AND EXPENSES                     |                                    |            |                                    |             |                                    |            |
| Research and development                         | 14,224                             | 13,676     | 1,480                              | 702         | 15,704                             | 14,378     |
| Marketing, general and administrative            | 14,518                             | 14,623     | 960                                | 902         | 15,478                             | 15,525     |
| Nishiwaki Fab restructuring costs and impairment | --                                 | --         | (991)                              | (20,228)    | (991)                              | (20,228)   |
|  | 28,742                             | 28,299     | 1,449                              | (18,624)    | 30,191                             | 9,675      |
| OPERATING PROFIT                                 | 75,538                             | 55,885     | (41,199)                           | (27,468)    | 34,339                             | 28,417     |
| INTEREST EXPENSE, NET                            | (2,366)                            | (7,817)    | --                                 | --          | (2,366)                            | (7,817)    |
| OTHER NON CASH FINANCING EXPENSE, NET            | --                                 | --         | (12,751)                           | (17,156)    | (12,751)                           | (17,156)   |
| OTHER INCOME, NET                                | 70                                 | 15         | --                                 | --          | 70                                 | 15         |
| PROFIT BEFORE INCOME TAX                         | 73,242                             | 48,083     | (53,950)                           | (44,624)    | 19,292                             | 3,459      |
| INCOME TAX BENEFIT (EXPENSE)                     | (1,107)                            | 1,410      | 5,886                              | (670)       | 4,779                              | 740        |
| PROFIT BEFORE NON CONTROLLING INTEREST           | 72,135                             | 49,493     | (48,064)                           | (45,294)    | 24,071                             | 4,199      |
| NON CONTROLLING INTEREST                         | (1,992)                            | (3,575)    | --                                 | --          | (1,992)                            | (3,575)    |
| NET PROFIT                                       | \$ 70,143                          | \$ 45,918  | \$ (48,064)                        | \$ (45,294) | \$ 22,079                          | \$ 624     |
| GROSS MARGINS                                    | 41.0%                              | 35.8%      |                                    |             | 25.3%                              | 16.2%      |
| OPERATING MARGINS                                | 29.7%                              | 23.8%      |                                    |             | 13.5%                              | 12.1%      |
| NET MARGINS                                      | 27.6%                              | 19.5%      |                                    |             | 8.7%                               | 0.3%       |

# Q4'15 Financial Statements (Vs. Q3'15), in thousands of \$

|  | Three months ended |               | Three months ended |               | Three months ended |               |
|--|--------------------|---------------|--------------------|---------------|--------------------|---------------|
|  | December 31,       | September 30, | December 31,       | September 30, | December 31,       | September 30, |
|  | 2015               | 2015          | 2015               | 2015          | 2015               | 2015          |
|  | non-GAAP           |               | Adjustments        |               | GAAP               |               |
| REVENUES   | \$ 254,602         | \$ 244,181    | \$ --              | \$ --         | \$ 254,602         | \$ 244,181    |
| COST OF REVENUES                                 | 150,322            | 150,575       | 39,750             | 38,223        | 190,072            | 188,798       |
| GROSS PROFIT                                     | 104,280            | 93,606        | (39,750)           | (38,223)      | 64,530             | 55,383        |
| OPERATING COSTS AND EXPENSES                     |                    |               |                    |               |                    |               |
| Research and development                         | 14,224             | 15,777        | 1,480              | 203           | 15,704             | 15,980        |
| Marketing, general and administrative            | 14,518             | 14,776        | 960                | 572           | 15,478             | 15,348        |
| Nishiwaki Fab restructuring costs and impairment | --                 | --            | (991)              | --            | (991)              | --            |
|  | 28,742             | 30,553        | 1,449              | 775           | 30,191             | 31,328        |
| OPERATING PROFIT                                 | 75,538             | 63,053        | (41,199)           | (38,998)      | 34,339             | 24,055        |
| INTEREST EXPENSE, NET                            | (2,366)            | (3,567)       | --                 | --            | (2,366)            | (3,567)       |
| OTHER NON CASH FINANCING EXPENSE, NET            | --                 | --            | (12,751)           | (5,312)       | (12,751)           | (5,312)       |
| OTHER INCOME (EXPENSE), NET                      | 70                 | (247)         | --                 | --            | 70                 | (247)         |
| PROFIT BEFORE INCOME TAX                         | 73,242             | 59,239        | (53,950)           | (44,310)      | 19,292             | 14,929        |
| INCOME TAX BENEFIT (EXPENSE)                     | (1,107)            | (1,195)       | 5,886              | 268           | 4,779              | (927)         |
| PROFIT BEFORE NON CONTROLLING INTEREST           | 72,135             | 58,044        | (48,064)           | (44,042)      | 24,071             | 14,002        |
| NON CONTROLLING INTEREST                         | (1,992)            | (451)         | --                 | --            | (1,992)            | (451)         |
| NET PROFIT                                       | \$ 70,143          | \$ 57,593     | \$ (48,064)        | \$ (44,042)   | \$ 22,079          | \$ 13,551     |
| GROSS MARGINS                                    | 41.0%              | 38.3%         |                    |               | 25.3%              | 22.7%         |
| OPERATING MARGINS                                | 29.7%              | 25.8%         |                    |               | 13.5%              | 9.9%          |
| NET MARGINS                                      | 27.6%              | 23.6%         |                    |               | 8.7%               | 5.5%          |

# FY'15 Financial Statements (Vs. FY'14), in thousands of \$

|  | Year ended<br>December 31, |                   | Year ended<br>December 31, |                     | Year ended<br>December 31, |                 |
|--|----------------------------|-------------------|----------------------------|---------------------|----------------------------|-----------------|
|  | 2015                       | 2014              | 2015                       | 2014                | 2015                       | 2014            |
|  | non-GAAP                   |                   | Adjustments                |                     | GAAP                       |                 |
| <b>REVENUES</b>                                      | \$ 960,561                 | \$ 828,008        | \$ --                      | \$ --               | \$ 960,561                 | \$ 828,008      |
| <b>COST OF REVENUES</b>                              | <u>594,610</u>             | <u>569,102</u>    | <u>160,586</u>             | <u>195,118</u>      | <u>755,196</u>             | <u>764,220</u>  |
| <b>GROSS PROFIT</b>                                  | <u>365,951</u>             | <u>258,906</u>    | <u>(160,586)</u>           | <u>(195,118)</u>    | <u>205,365</u>             | <u>63,788</u>   |
| <b>OPERATING COSTS AND EXPENSES</b>                  |                            |                   |                            |                     |                            |                 |
| Research and development                             | 58,797                     | 49,976            | 2,872                      | 1,865               | 61,669                     | 51,841          |
| Marketing, general and administrative                | 58,608                     | 55,057            | 4,185                      | 3,726               | 62,793                     | 58,783          |
| Nishiwaki Fab restructuring costs and impairment     | --                         | --                | (991)                      | 55,500              | (991)                      | 55,500          |
| Merger related costs                                 | --                         | --                | --                         | 1,229               | --                         | 1,229           |
|  | <u>117,405</u>             | <u>105,033</u>    | <u>6,066</u>               | <u>62,320</u>       | <u>123,471</u>             | <u>167,353</u>  |
| <b>OPERATING PROFIT (LOSS)</b>                       | 248,546                    | 153,873           | (166,652)                  | (257,438)           | 81,894                     | (103,565)       |
| <b>INTEREST EXPENSE, NET</b>                         | (13,179)                   | (33,409)          | --                         | --                  | (13,179)                   | (33,409)        |
| <b>OTHER NON CASH FINANCING EXPENSE, NET</b>         | --                         | --                | (109,930)                  | (55,404)            | (109,930)                  | (55,404)        |
| <b>GAIN FROM ACQUISITION, NET</b>                    | --                         | --                | --                         | 166,404             | --                         | 166,404         |
| <b>OTHER EXPENSE, NET</b>                            | <u>(190)</u>               | <u>(140)</u>      | <u>--</u>                  | <u>--</u>           | <u>(190)</u>               | <u>(140)</u>    |
| <b>PROFIT (LOSS) BEFORE INCOME TAX</b>               | 235,177                    | 120,324           | (276,582)                  | (146,438)           | (41,405)                   | (26,114)        |
| <b>INCOME TAX BENEFIT (EXPENSE)</b>                  | (3,469)                    | 1,563             | 15,747                     | 23,179              | 12,278                     | 24,742          |
| <b>PROFIT (LOSS) BEFORE NON CONTROLLING INTEREST</b> | 231,708                    | 121,887           | (260,835)                  | (123,259)           | (29,127)                   | (1,372)         |
| <b>NON CONTROLLING INTEREST</b>                      | (520)                      | 5,635             | --                         | --                  | (520)                      | 5,635           |
| <b>NET PROFIT (LOSS)</b>                             | <u>\$ 231,188</u>          | <u>\$ 127,522</u> | <u>\$ (260,835)</u>        | <u>\$ (123,259)</u> | <u>\$ (29,647)</u>         | <u>\$ 4,263</u> |



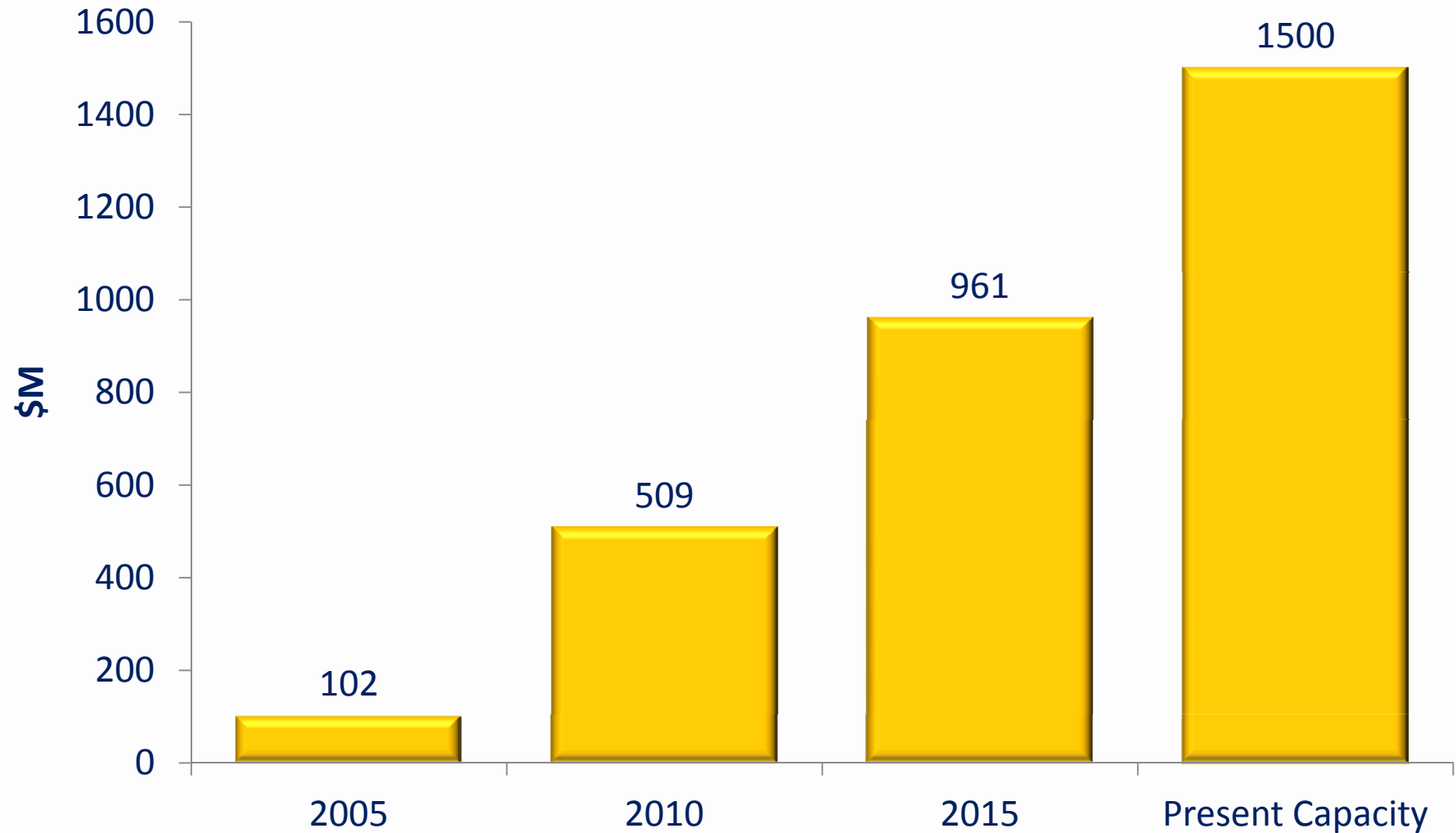
# Corporate Financial Targets 2016

- Revenue :
  - Target: growth throughout the year
  
- Continue to improve the margins across the board
  - 1-2 points negative first year impact of TJT (San Antonio fab) on margin percent but positive on all cash indices
  - Target:
    - GAAP operating margin from 8% for FY 2015 to double digit throughout 2016 with H2>H1

## Focus: Net profit 2016/2017

- Maintain and grow positive net profit
  - Achieved: Q2'15 - \$8M → Q3'15 - \$14M → Q4'15 - \$22M
  - 2016 target: growth against Q4'15 annualized baseline
    - MH Fab2 capacity ramp at high utilization
    - NPB Fab3 realization of annualized capacity increase
    - TPSCo 3<sup>rd</sup> party revenues ramp to >\$25M/ quarter by EOY
  - 2017 target: additional growth
    - Fab2 realization of annualized capacity increase
    - Fab3 with higher margin mix
    - TPSCo 3<sup>rd</sup> party revenues increase to >\$50M/ quarter by EOY
    - TJT (San Antonio fab) revenue growth >25% 2017/16

# Annual Revenues



# Financial Performance and Model

|   |  | Q4'15 |
|---|--|-------|
| Revenue (\$M)                           | <ul style="list-style-type: none"> <li>• Q4'15 reflects \$1.02B of annualized revenues which resulted in:                             <ul style="list-style-type: none"> <li>• \$300M EBITDA annual run rate</li> <li>• \$88M net profit annual run rate</li> </ul> </li> <li>• At the maximal potential of \$1.5B of revenues, by model:                             <ul style="list-style-type: none"> <li>• Over \$150M added EBITDA</li> <li>• Over \$100M added net profit</li> </ul> </li> </ul> | 255   |
| Non-GAAP Gross Margin (%)               |  | 41    |
| EBITDA (\$M)                            |  | 75    |
| EBITDA Margin (%)                       |  | 30    |
| Non-GAAP Net profit (\$M)               |  | 70    |
| Net Profit (\$M)                        |  | 22    |
| Net Profit excl. one-time items * (\$M) |  | 22    |
| Shareholders' Equity (\$M)              |  | 386   |
| Cash On Hand (\$M)                      |  | 206   |
| Net Debt (\$M)                          |  | 105   |
| Net Debt/ Annual Ebitda (@Q*4)          |  | <0.4X |

\* One time items included (i) for Q1'15, \$85 million non-cash bonds F conversion effect and \$10 million tax non-cash income; (ii) for Q1'14, \$151 million TPSCO acquisition gain, net and \$71 million Nishiwaki cessation relates costs, net

# **TOWERjazz**

**The Global Specialty Foundry Leader**



## ***TowerJazz Investor and Analyst Day***

**March 8, 2016**



# **TOWERJAZZ**

**The Global Specialty Foundry Leader**



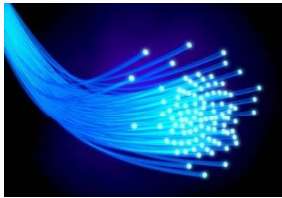
***RF and Power  
Markets and Growth Drivers***

# RF HPA Markets: \$300M Revenue, 50% '14 to '15 Growth



**Wireless**  
RF SOI and SiGe

**High Growth** driven by  
Smartphones and IoT



**Infrastructure**  
HP SiGe

**High Growth** driven by  
video, data internet traffic



**Other**  
SiGe

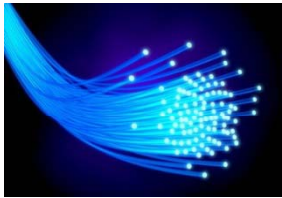
**Emerging Applications** driven by  
radar and other high-frequency  
applications, and **Traditional**  
**Analog Markets** in HDD and  
analog components

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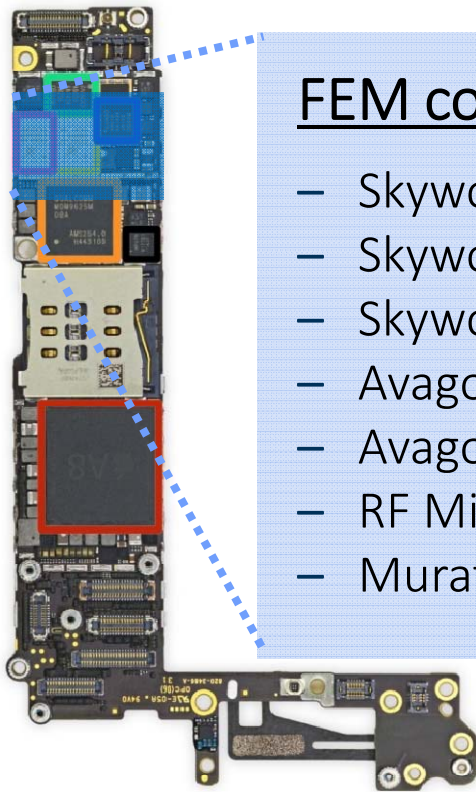
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Other  
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# Wireless FEM content in iPhone 6



## FEM content from ifixit teardown:

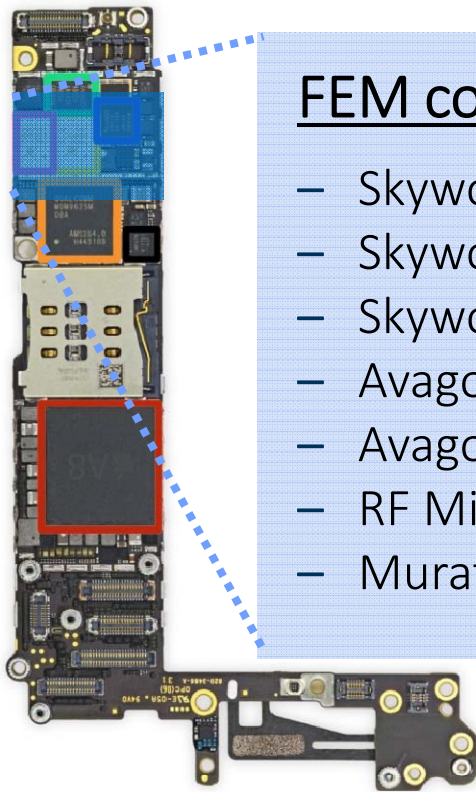
- Skyworks 77802-23 Low Band LTE PAD
- Skyworks 77803-20 Mid Band LTE PAD
- Skyworks 77356-8 Mid Band PAD
- Avago A8020 High Band PAD
- Avago A8010 Ultra High Band PA + FBARs
- RF Micro Devices RF5159 Antenna Switch
- Murata 339S0228 Wi-Fi Module



**RF Front-End-Module Content Growing**

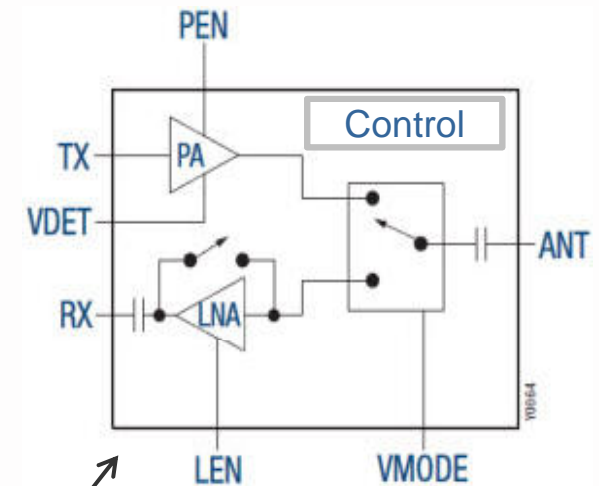


# Wireless FEM content in iPhone 6



## FEM content from ifixit teardown:

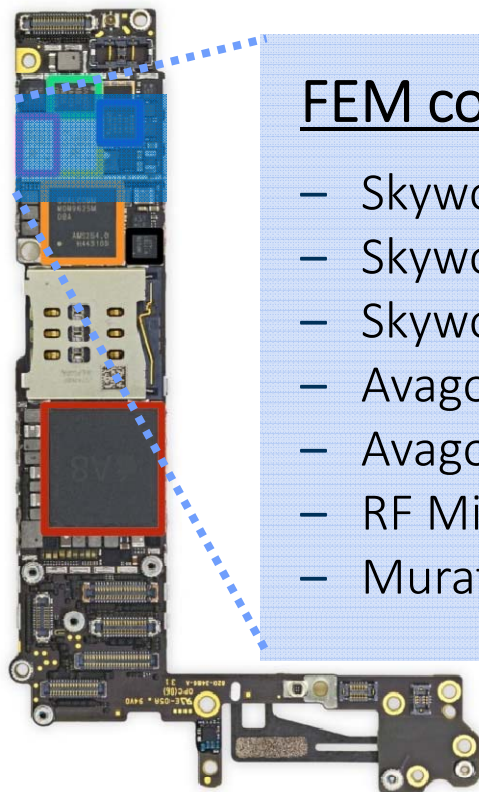
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- Avago A8020 High Band PAD
- Avago A8010 Ultra High Band PA + FBARs
- RF Micro Devices RF5159 Antenna Switch
- Murata 339S0228 Wi-Fi Module



**Switch, Low-Noise Amp (LNA), Power Amp (PA), Control are inside a FEM**

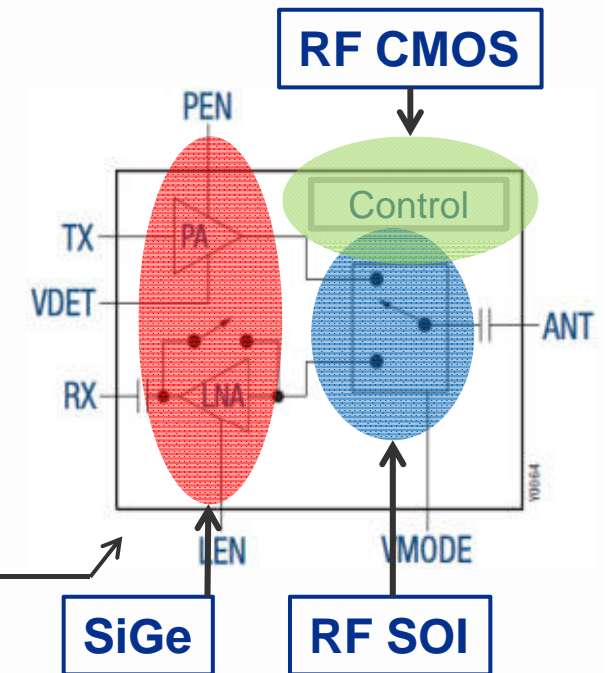


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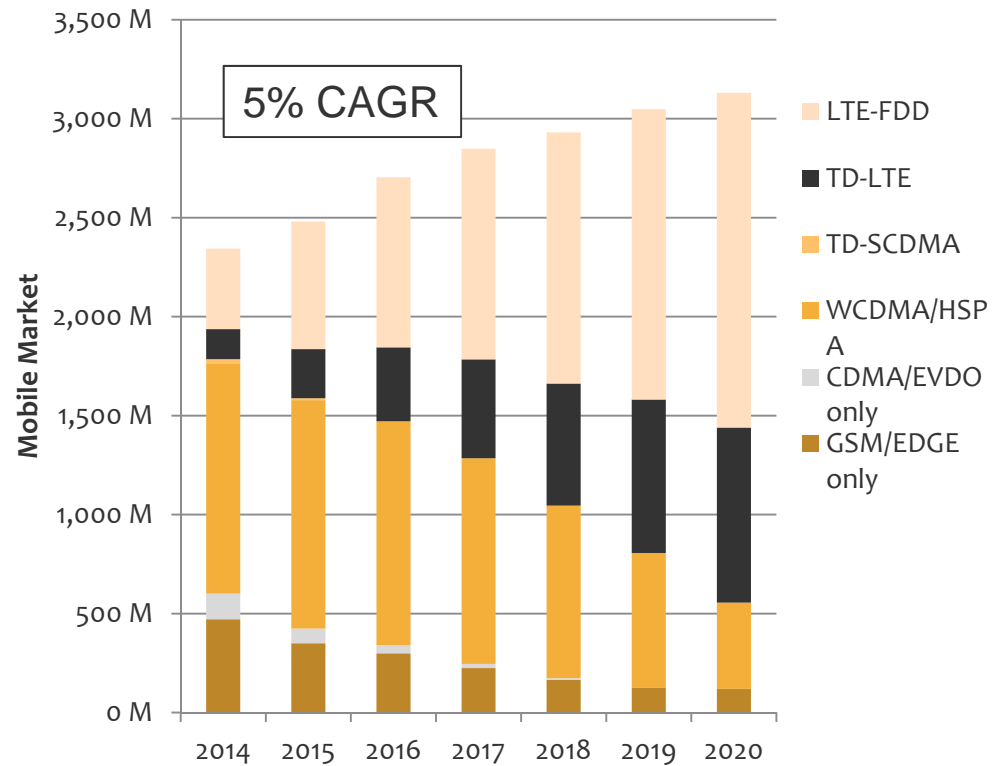
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- Avago A8020 High Band PAD
- Avago A8010 Ultra High Band PA + FBARs
- RF Micro Devices RF5159 Antenna Switch
- Murata 339S0228 Wi-Fi Module



**TowerJazz RF Technologies Used to Build these Components**  
**RF SOI (Switch), SiGe (LNA/PA), RF CMOS (Control)**

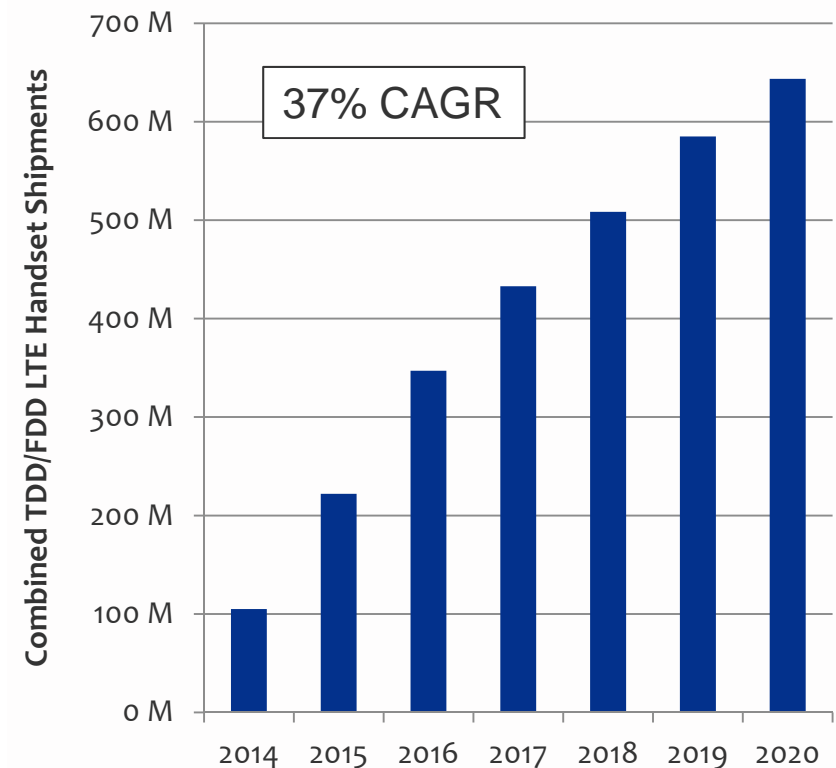
# Mobile Market

## Overall Growth Continues



Source: Mobile Experts

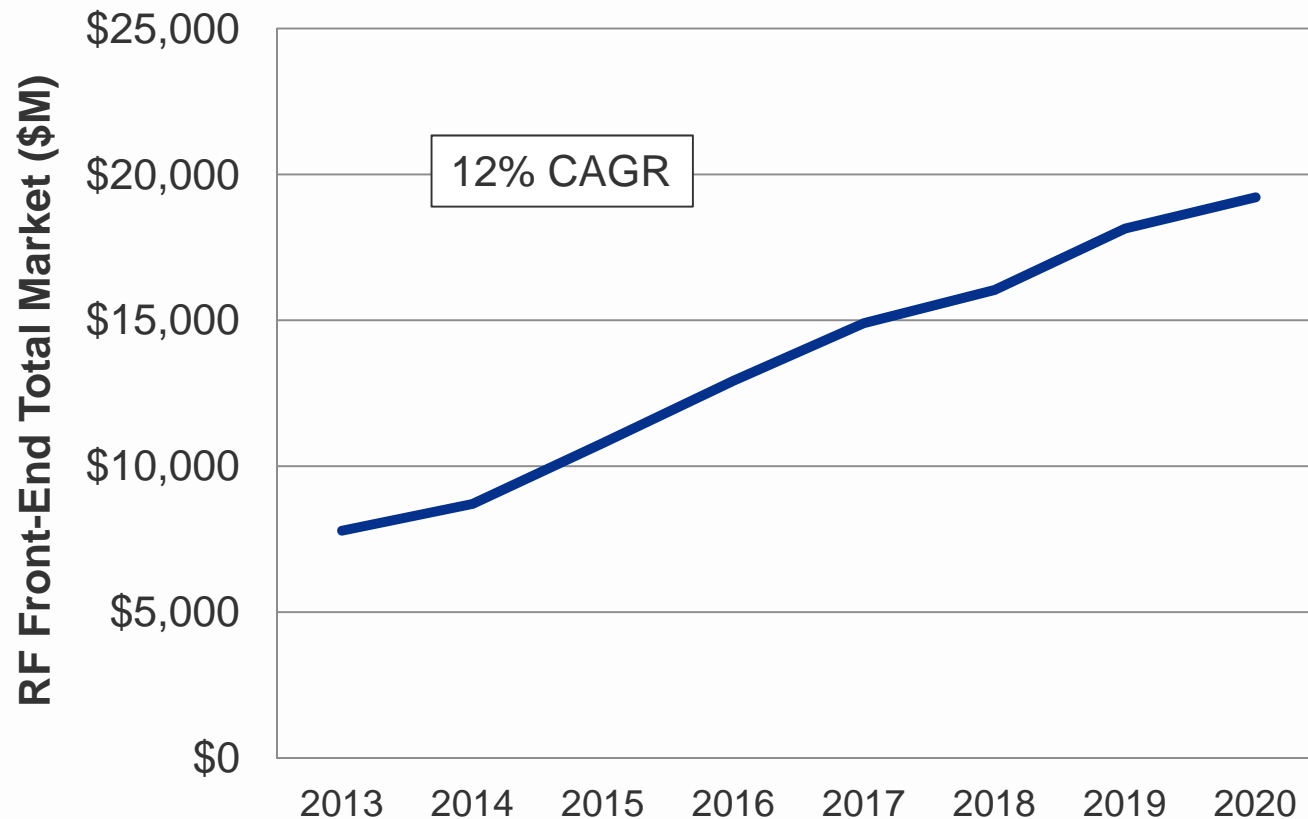
## More Complex 4G-LTE Growth is Stronger (5G could start in 2020)



Source: Mobile Experts

# RF Front-End-Module Market

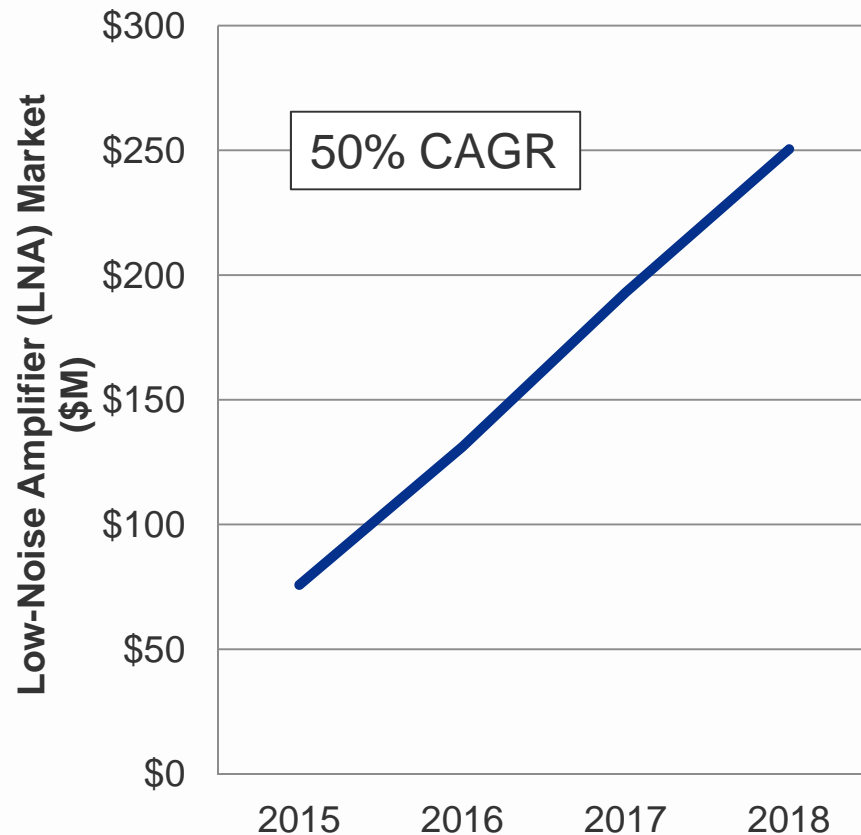
## Leading to Strong Front-End-Module Market Growth



Source: Mobile Experts

# Opportunity to Exceed Market Growth

## Low Noise Amplifier



### Reasons for Strong Growth

- Diversity Antenna (doubling the need)
- Main LNA coming off Transceiver
- GPS/WiFi LNA attach rate

### Primary Technology Used for LNA

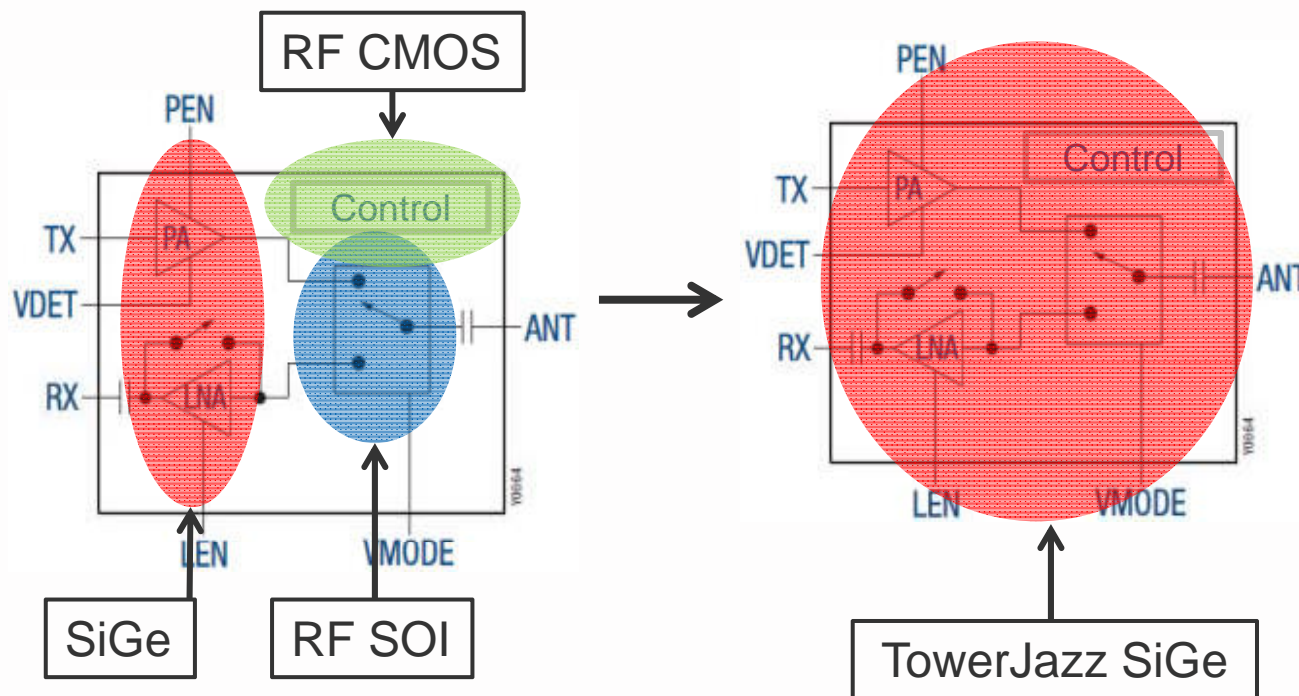
**SiGe** or RF SOI increasing share

PHEMT/CMOS decreasing share

Source: Mobile Experts

# Opportunity to Exceed Market Growth

## SiGe Power Amplifier and FEM Integration



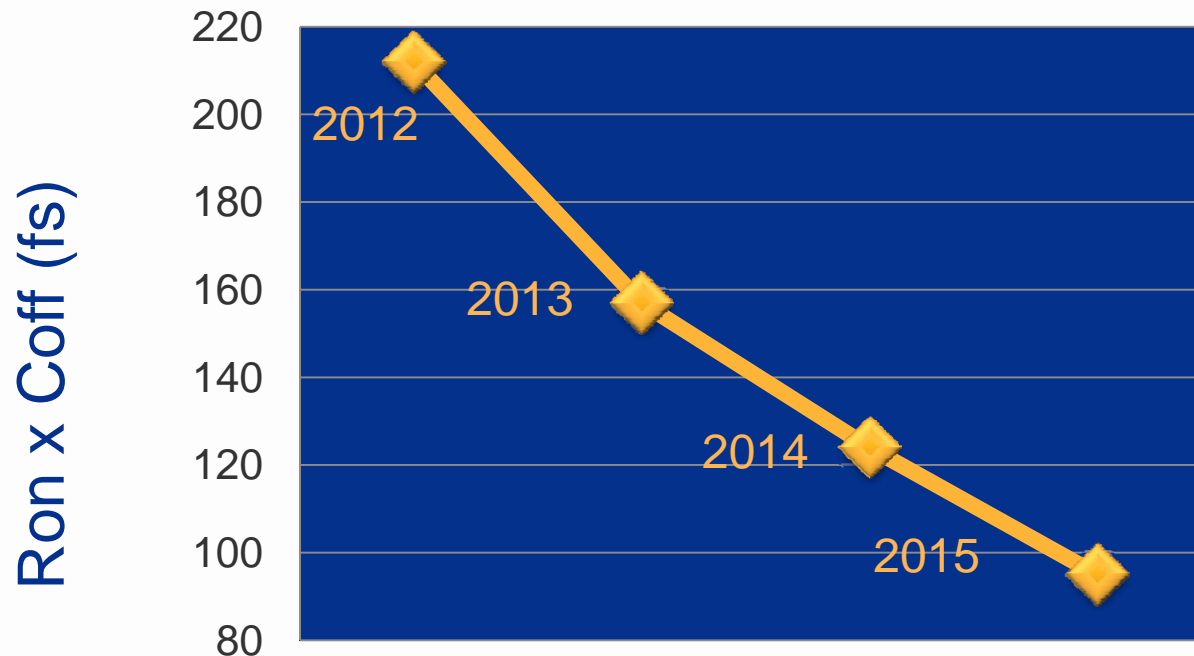
**Power Amplifier Market is Large (>\$3B) and Today largely GaAs**

**SiGe PA promises acceptable performance, lower cost, higher integration**



# Opportunity to Exceed Market Growth

## Technology Leadership in RF SOI



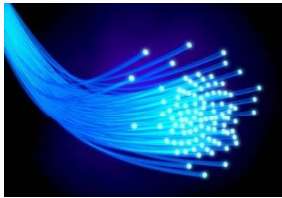
Best in class process technology provides **Power** and **Data Rate** advantage for our customers and their customers

# RF HPA Markets: \$300M Revenue, 50% '14 to '15 Growth



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HP SiGe

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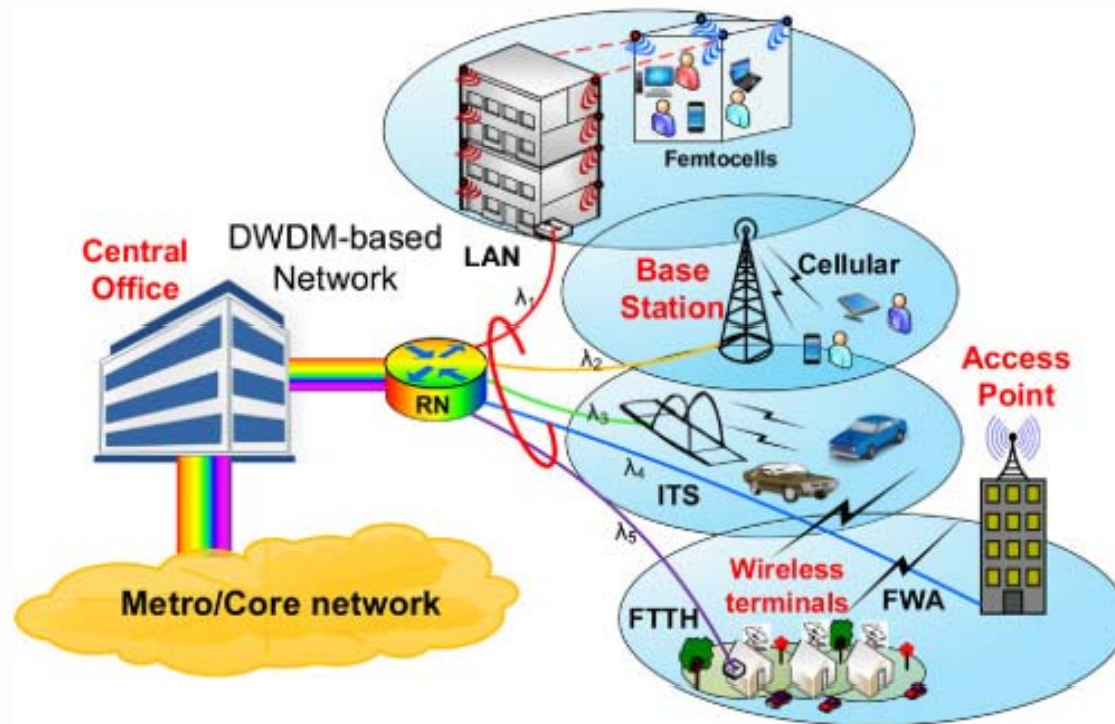


**Other**  
SiGe

Emerging Applications driven by  
radar and other high-frequency  
applications, and Traditional  
Analog Markets in HDD and  
analog components

# Optical Fiber Data Transport

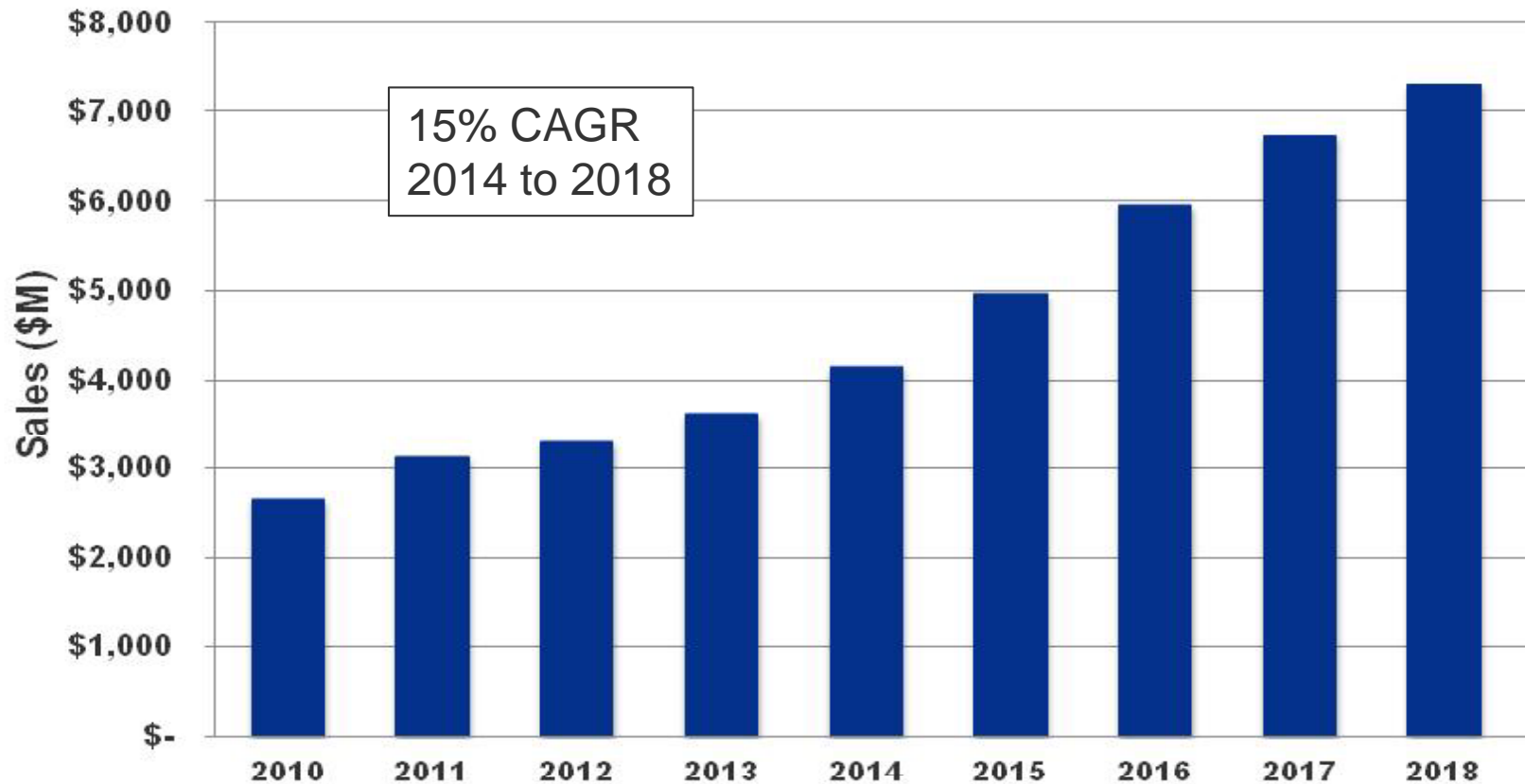
## Data Networks



## Data Centers

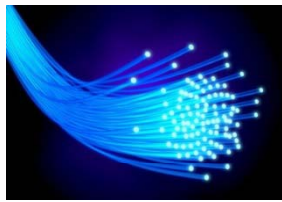


# Total Market for Optical Transceivers

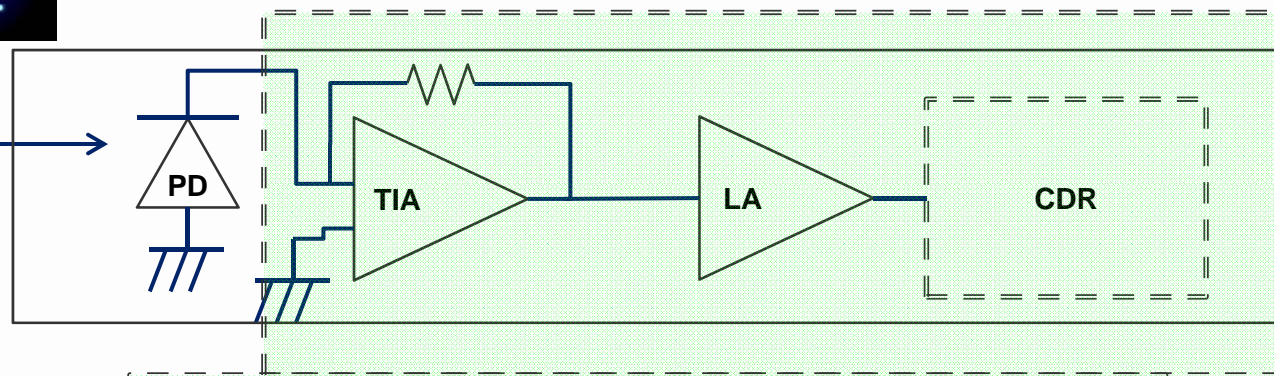


Source: LightCounting

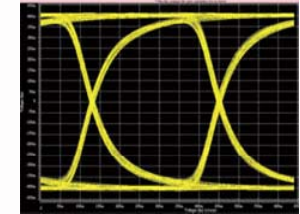
# Front-End Components We Enable



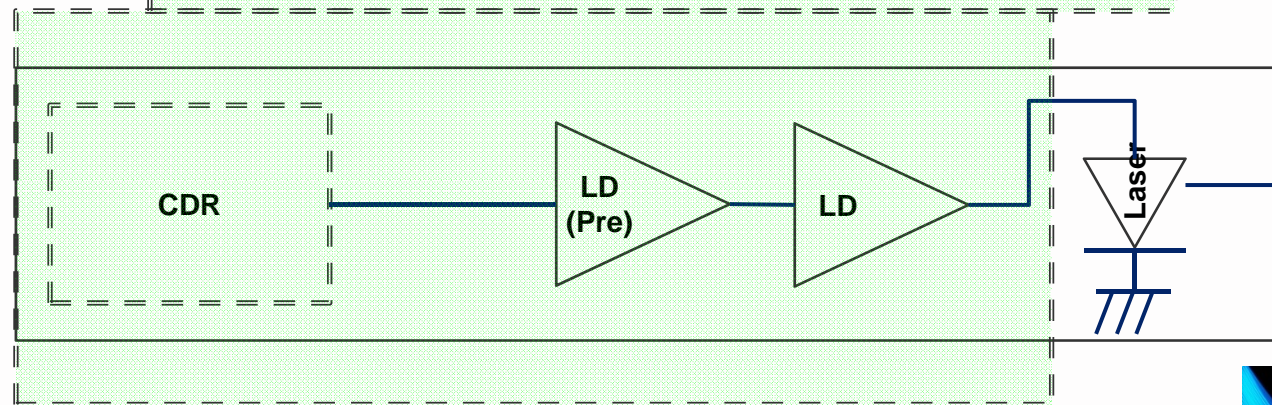
Fiber



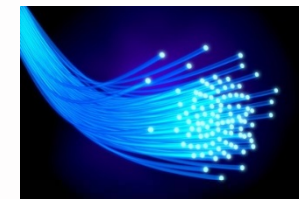
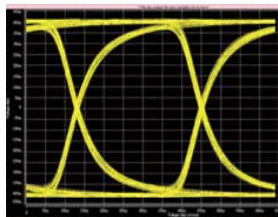
Receive Port



Transmit Port



Fiber





# TowerJazz Strategy to Maintain Strong Market Position

## 1. High Performance SiGe Technology Leadership

- Best in class overall SiGe figures of merit
- Offer unique, patented feature to boost performance of TIAs

## 2. Tier 1 customers partnering on Roadmap

- Estimate to own >50% of the serviceable market today

## 3. Exploring Si Photonics to expand serviceable market

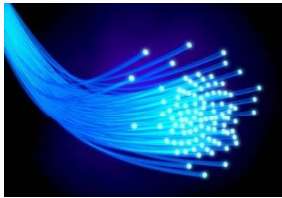
- Potential for future growth in addition to SiGe

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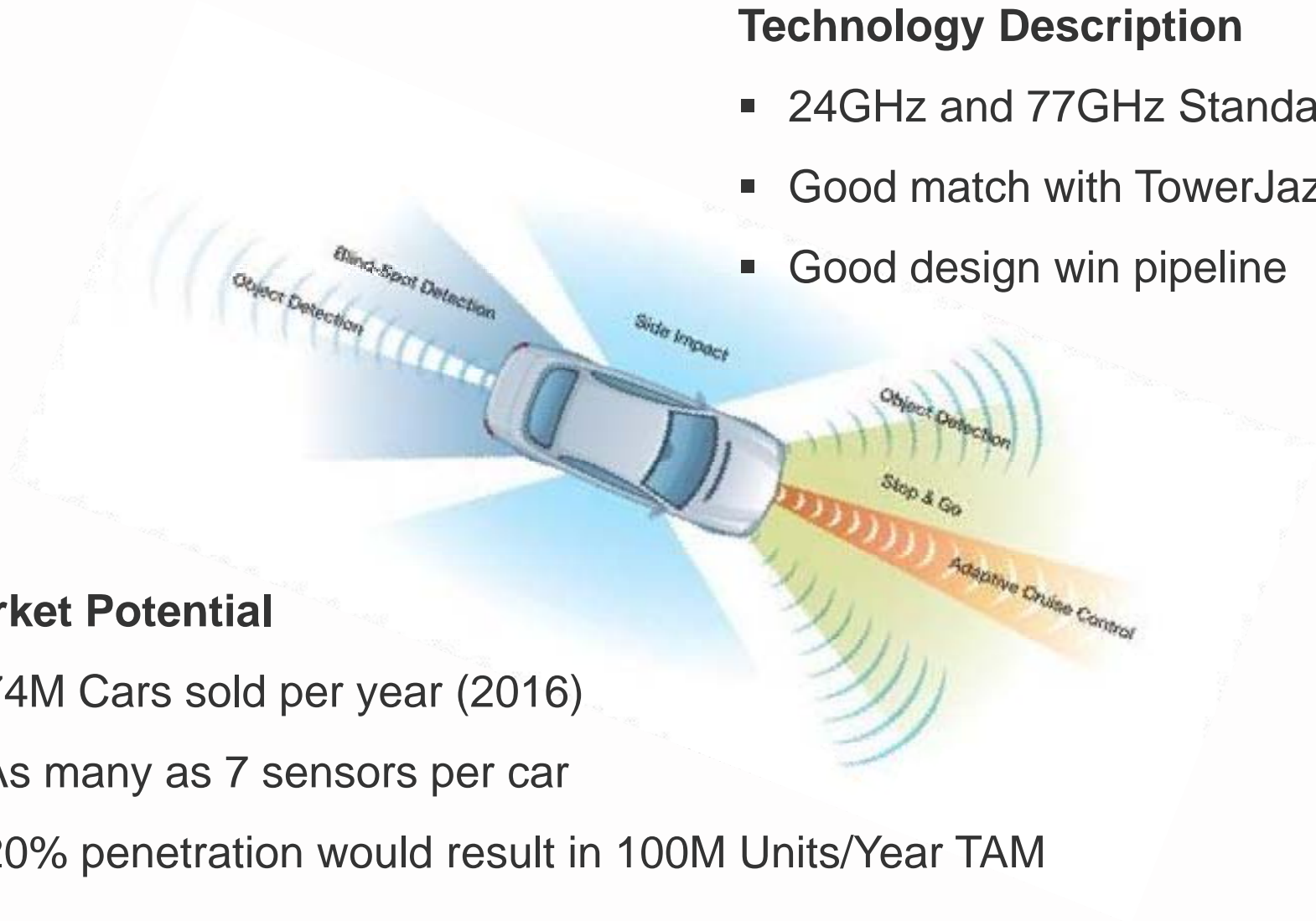
**Other**  
SiGe

**Emerging Applications** driven by  
radar and other high-frequency  
applications, and **Traditional**  
**Analog Markets** in HDD and  
analog components

# Example: Automotive Radar for Collision Avoidance

## Technology Description

- 24GHz and 77GHz Standards
- Good match with TowerJazz SiGe
- Good design win pipeline



## Market Potential

- 74M Cars sold per year (2016)
- As many as 7 sensors per car
- 20% penetration would result in 100M Units/Year TAM

# Example: Hard Disk Drive PreAmp

## Technology Description

- PreAmp to read/write disk is built in c-SiGe
- TowerJazz has recently developed a competitive c-SiGe Technology



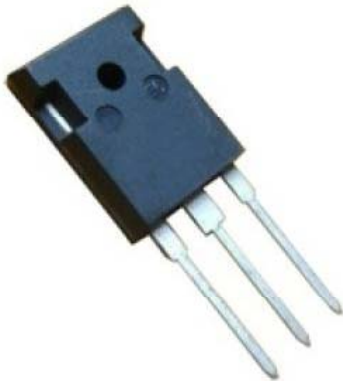
## Market Potential

- 550Mu per year (2016)
- Cloud storage increase balancing PC decline in HDD to maintain market
- Little market share today for TowerJazz results in a large opportunity

# Power Markets: \$265M Revenue, 20% '14 to '15 Growth



**Power ICs**  
**0.18um BCD**



**Power Discrete**  
**TOPS Business Model**



# Overview

## Power Products

Handle  
High Voltage OR  
High Current OR  
Both

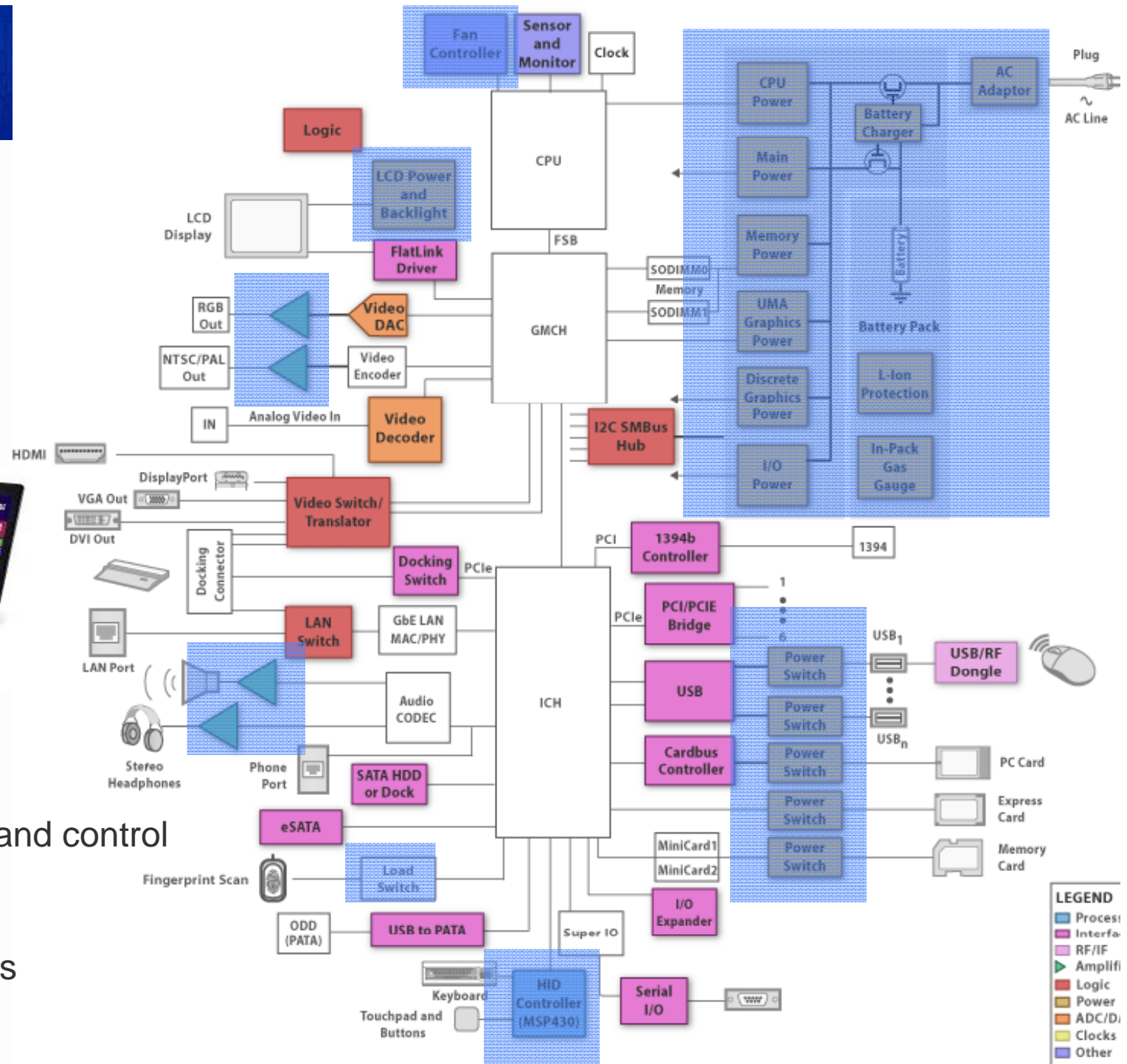


## ICs

Integrate Power and control

## Discrete

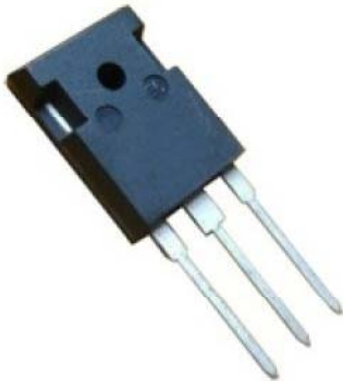
Power Transistors



# Power Markets: \$265M Revenue, 20% '14 to '15 Growth

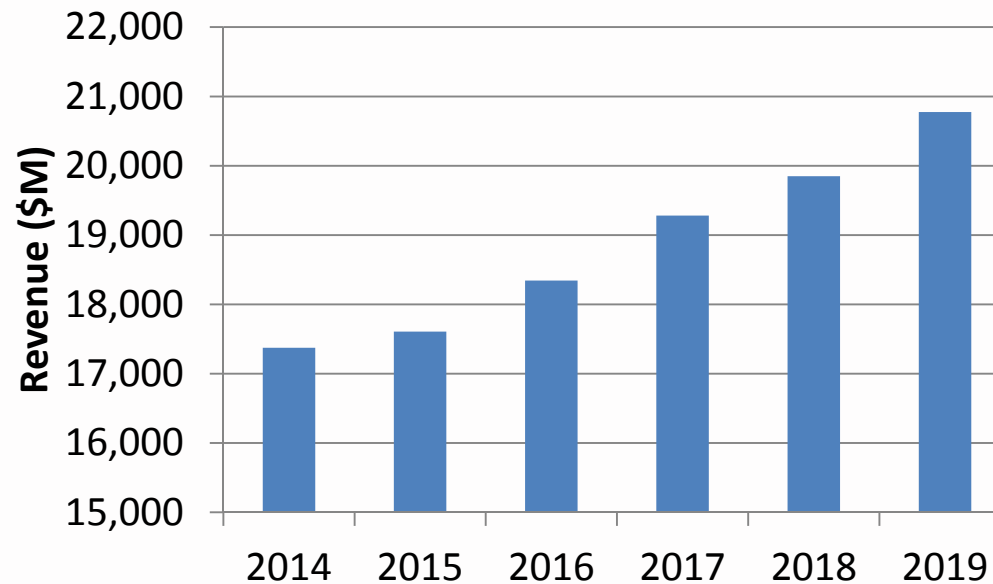


**Power ICs**  
**0.18um BCD**



**Power Discrete**  
**TOPS Business Model**

# Power IC Market



Source: IC Insights (partitioning of ASSP into Power IC and other markets done by TowerJazz)

## TowerJazz Position and Strategy for Growth

- 2014 to 2015 TowerJazz growth significantly outpaced market growth
- Gaining share through:
  - Joint development with 1<sup>st</sup> tier IDM
  - Differentiated technology enabling Fabless or Fab light

# Gaining Market Share with Best-in-Class Power IC Platform

## Low Voltage

1.8V / 5V–60V

PMIC, DC/DC, Audio,  
Display/Motor Drivers, POE



## Medium Voltage

80V–200V

Automotive, Industrial, Medical



## High Voltage

200V–700V

AC/DC, LED Lighting, IGBT  
and MOSFET Drivers



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Information herein shall not be furnished to third parties or made public.

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The Global Specialty Foundry Leader

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# TS35PM

$V_{gs}=5V$

$V_{ds}=5V-60V$ , eNVM

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AC/DC, LED Lighting, IGBT  
and MOSFET Drivers

# TS18PM

+ 1.8V Digital

# TS35PM

$V_{gs}=5V$

$V_{ds}=5V-120V$ , eNVM

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200V–700V

AC/DC, LED Lighting, IGBT  
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**TS18UHV**  
+ up to 700V LDMOS

**TS18PM**  
+ 1.8V Digital

**TS35PM**  
V<sub>gs</sub>=5V  
V<sub>ds</sub>=5V-120V,  
eNVM

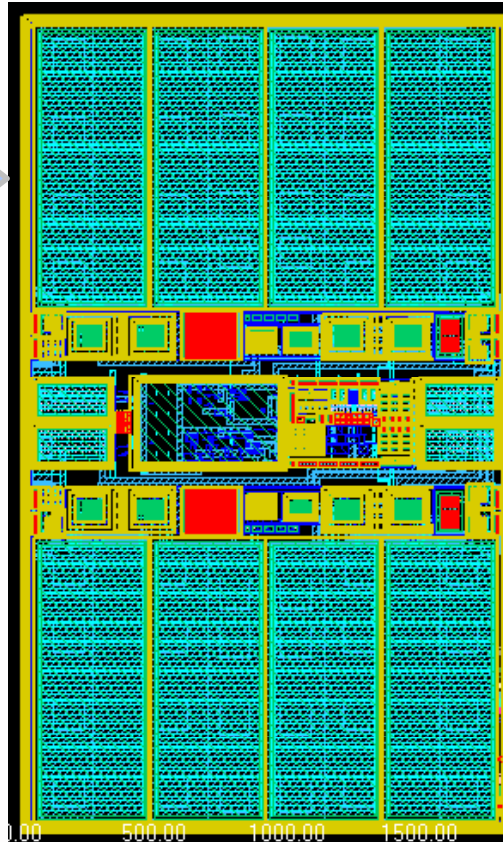
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# Unique Features: Isolation Advantage

Power transistors manage dozens of watts at current levels of several amps and inject high currents to substrate

Good isolation prevents noise from disrupting the control circuits

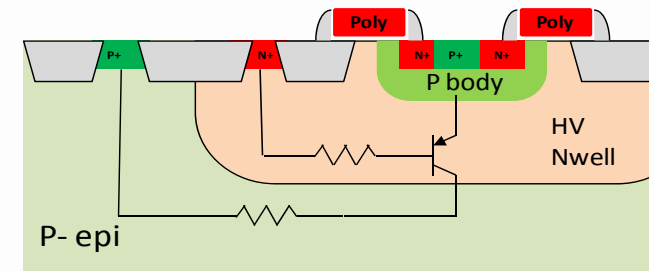


The control circuits operated at micro amps are exposed to substrate noise

# Unique Features: Isolation Advantage

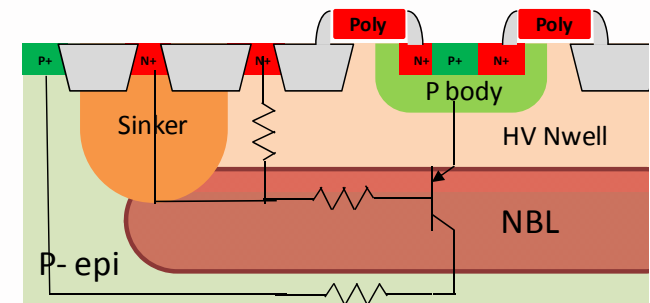
## Base Isolation: (LED, DC-DC)

- Guard rings provides the lateral isolation
- Typical for less than 1.5A applications



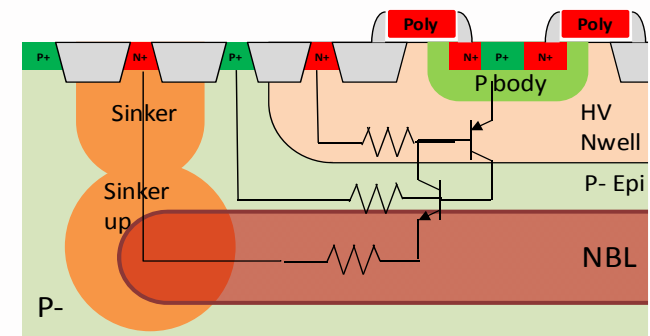
## Shallow Epi: (Class D, Motors)

- Suppressed substrate current
- Typical for 2A to 5A applications



## Deep Epi: (AMOLED, POLs)

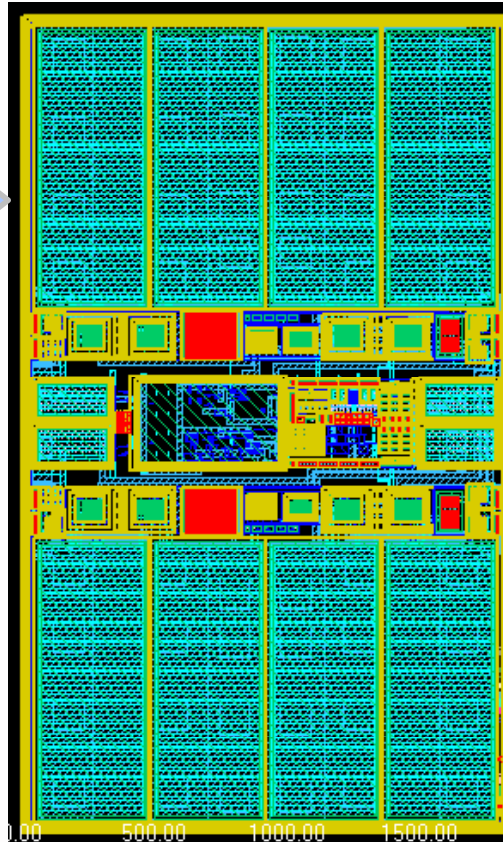
- Suitable for negative voltage operation
- Ideal for 5A to 20A applications





# Unique Features: Die Size or Rdson Advantage

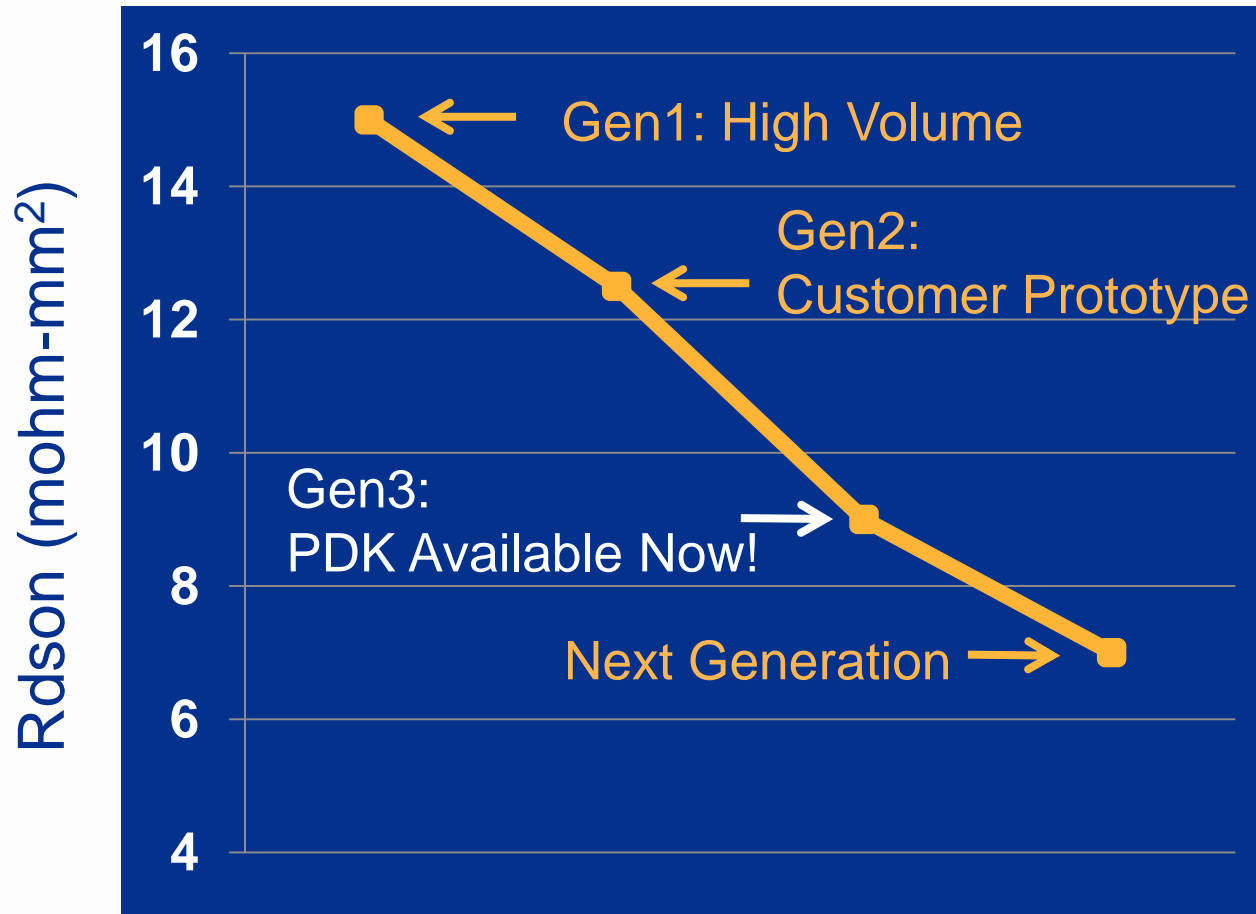
Area of Power transistors directly proportional to “Rdson” of the process technology



Low Rdson  
Results in smaller  
die, less heat,  
lower cost



# Unique Features: Die Size or Rdson Advantage

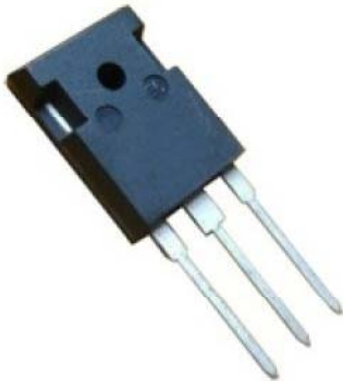


## Best Foundry Rdson Offering with Aggressive Roadmap

# Power Markets: \$265M Revenue, 20% '14 to '15 Growth

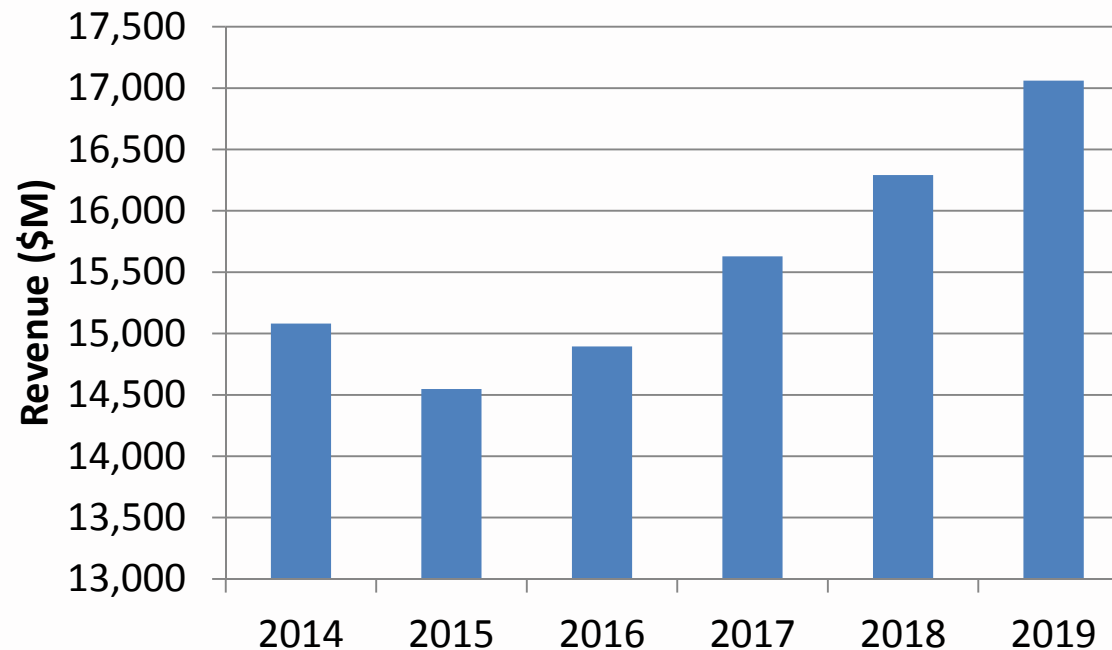


Power ICs  
0.18um BCD



**Power Discrete**  
**TOPS Business Model**

# Power Discrete Market



Source: IC Insights

## TowerJazz Position and Strategy for Growth

- 2014 to 2015 TowerJazz grew revenue despite market decline
- Gaining share through TOPs model due in part to industry and factory consolidation

# Summary

## ■ RF and HPA

- **Wireless:** Strong growth driven by smartphone and IoT FEM
- **Infrastructure:** growth from fiber-optic data transport
- **Other:** emerging markets such as automotive radar and growth opportunities through share gains in other analog markets

## ■ Power

- **IC:** strong technology (IDM-like) to gain share from IDMs through fabless and fab-light customers
- **Discrete:** Tier 1 customer base through TOPs Business model gaining share through fab closures, consolidation and next generation enablement

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**The Global Specialty Foundry Leader**



## ***TowerJazz Investor and Analyst Day***

**March 8, 2016**



# **TOWERJAZZ**

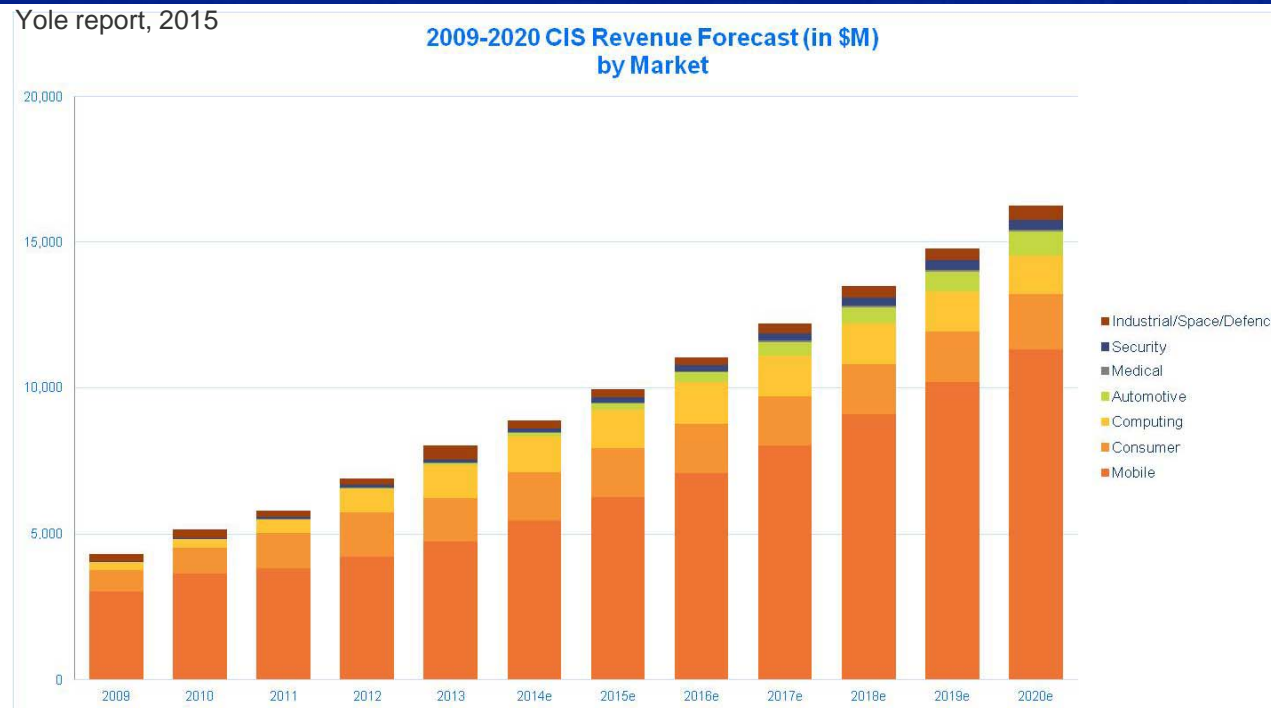
**The Global Specialty Foundry Leader**



## ***CIS Specialty Offering, Markets and Growth Drivers***

Dr. Avi Strum | SVP and GM, CMOS Image Sensor BU

# Overall CMOS Image Sensors Market



- Revenues are dominated by mobile, consumer and computing which represent ~90% of all CIS revenues in 2014.
  - Mobile represents 60-70%.
- From 2014 to 2020, global revenue growth will remain at ~10.6% CAGR.
- Automotive, Medical and Security growth is much higher than the average (2 to 3x higher)

# TowerJazz CIS Key Focus Markets

*Technology, Flexibility, Experience and Commitment allows our customers to bring to the market the best in class products*

## Professional Photography

Highest requirements for image quality  
Large sensors, very high resolution,  
demanding frame rate  
Very low defect count  
Very high sensitivity, dynamic  
range & low noise



## Medical X-Ray

Market Leader for dental x-ray CMOS  
Supplying all Tier-1 vendors  
Smallest endoscopy solution



## Industrial & High Speed

High speed and high accuracy  
Global shutter technology  
“Intelligent” pixels  
2D and line sensors



## Automotive & Security

High sensitivity and high dynamic range  
High NIR sensitivity  
Linear HDR for color imagers



## 3D Gesture Control

Design wins with market leaders  
High volume and yet good margin market  
High NIR sensitivity  
ToF and structured light solutions



# High end Photography

## ■ Market

- High end DSLR and ILC/MLC
- Cinematography and Broadcast high end video
- ~15Mu annually
  - Wafer value of ~\$1B (SAM)



## ■ Market leaders

- Nikon (~40%), Canon (~40%), Sony (~10%)
  - Nikon buys sensors from Sony
  - Canon produce their own sensors (older technology)



## ■ Opportunity

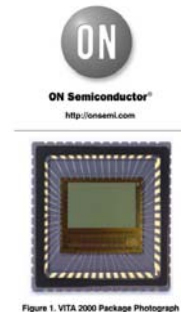
- TPSCo 300mm 65nm state of the art technology and Panasonic reputation
- Japanese fab that can be an alternative to Sony or internal manufacturing



# Industrial high speed global shutter cameras

## ■ Market

- Still CCD dominated, suppliers are Sony, Dalsa, Panasonic
- Fast move to CMOS
  - Sony announced EOL of CCD
- Estimated sensor market size \$300M (\$100M in wafer value)



## ■ Opportunity

- TowerJazz serves most of the providers (e2v, On Semi, CMOSIS,...) that competes against Sony
- TPSCo 110nm technology supports the smallest pixels in the industry (2.8um) and will serve as the next generation platform for our customers (for ~10 years)





# Dental and Medical X-Ray sensors market

## ■ Market

- Intra oral digital sensors
- Extra oral digital sensors (panoramic and CT)
- Medical Large panels, currently served by TFT technology
- Current market ~\$30-40M in wafers value



## ■ Current

- TowerJazz already has >50% market share in the intra oral market
- Fast growth in the extra oral and medical markets

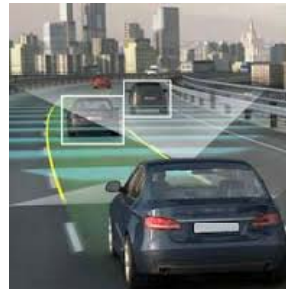
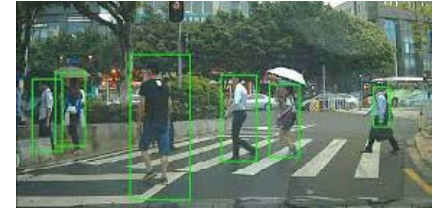
## ■ Opportunity

- Replacement of most of the TFT panels with CMOS.
- Can bring the market wafer value to >\$200M



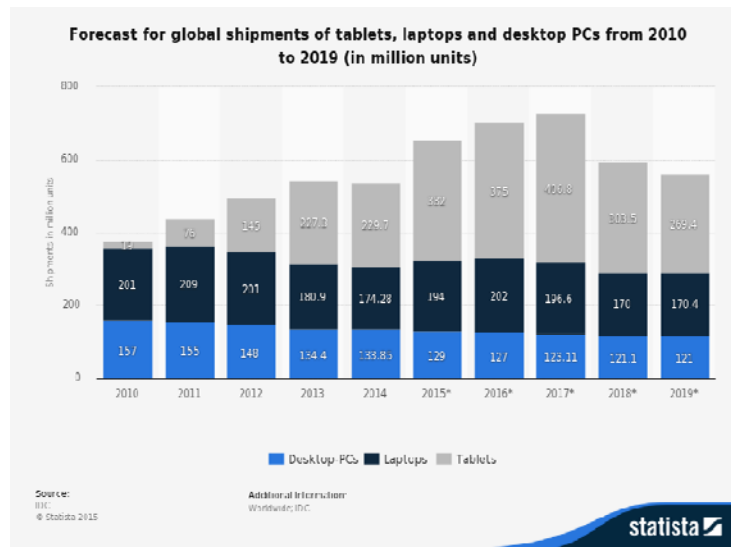
# Automotive

- Market: The fastest growing camera market
  - Forward and backwards looking cameras
  - Side cameras – replacing mirrors
  - External ADAS cameras for lane departure and collision warning
  - Internal cameras for head positioning warning
  - 3D gesture control camera
- TowerJazz and TPSCo already sell to the automotive market
  - We can leverage Panasonic reputation and the Fab location
  - Technology for very high dynamic range and high sensitivity



# 3D gesture recognition and gesture control

- Market: the hottest market in the PC and gaming area
  - Intel's RealSense™ technology for gesture control
  - AR (Augmented Reality) and VR (Virtual Reality) for gaming and simulations
  - 3D rendering for 3D printing
    - 15-20% of total market = ~90-120Mu
    - Roughly \$100-130M market in wafer revenue



# Summary

- TowerJazz focus on the fastest growing CIS market applications
  - Automotive/ Security
  - Medical
  - 3D
  - Industrial
- Focused markets have much longer life for devices and for process node
- Higher and more stable ASPs and margins compared with the cellular market



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**March 8, 2016**



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**March 8, 2016**



## Worldwide Operational Overview



# TJ Operations in Numbers

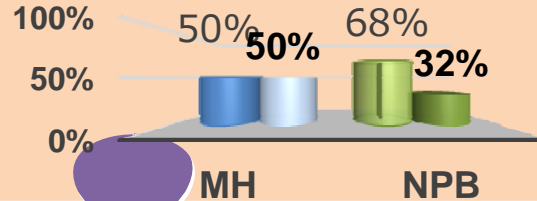


**3804**

Employees  
Worldwide

| Profession   | Total       |
|--------------|-------------|
| Engineers    | 720         |
| Technicians  | 591         |
| Operators    | 2155        |
| Support      | 86          |
| Managers     | 252         |
| <b>Total</b> | <b>3804</b> |

**Tech: 59% Males & 41% Females**



**410**

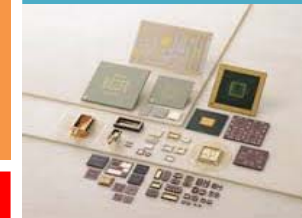
New employees were  
hired during 2015.



**7 Fabs**  
With **2.3M**  
wafer  
Capacity

**6170**

Active  
Products



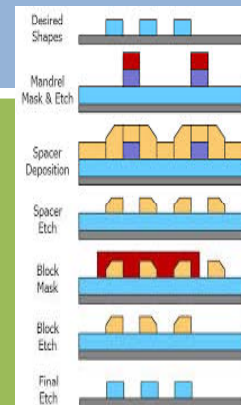
**302**

Worldwide  
Customers

Israel - 18  
Europe-42  
Korea- 24  
Japan- 20  
China- 40  
Taiwan-9  
USA - 149



**1160**  
Active  
Process Flows



**1252 New  
products In 2015**



**334 New  
Process  
Flows  
added  
during 2015**

**24 X 7**  
Operation  
With full  
redundancy-  
Rarely Stops

**3178 Tools**

**6" : 350**  
**8" : 2536**  
**12" : 292**

# TJ Operations Main Targets & Challenges

## Capacity & Utilization

### Target High Asset utilization of 85%

Build new Capacity (Packaged deals with the OEM and 3<sup>rd</sup> party used tools), Duplicate major process flows between Fabs to increase operational flexibility.

## OSD & Lead Time

### Strive for Best in benchmark OSD and Lead time

OSD >98% and Lead-time <2 DPL at 0.18u Technology. Priority Lots to expedite New developments and Introduction of new products.

## Capacity & Utilization

### Target High Asset utilization of 85%

Build new Capacity (Packaged deals with the OEM and 3<sup>rd</sup> party used tools), Duplicate major process flows between Fabs to increase operational flexibility.

## Quality: Plant Yield Die Yield & RMA

### CPk> 1.67 , Plant Yield >97.5% , RMA <0.2%, typical Die Yield >95%.

Support Automotive customers. ISO Certified for : Quality- ISO 9001 ; Environmental- 14001; IP Security- BS/ISO 27001; Safety- OHSAS 18001; Automotive – ISO 16949

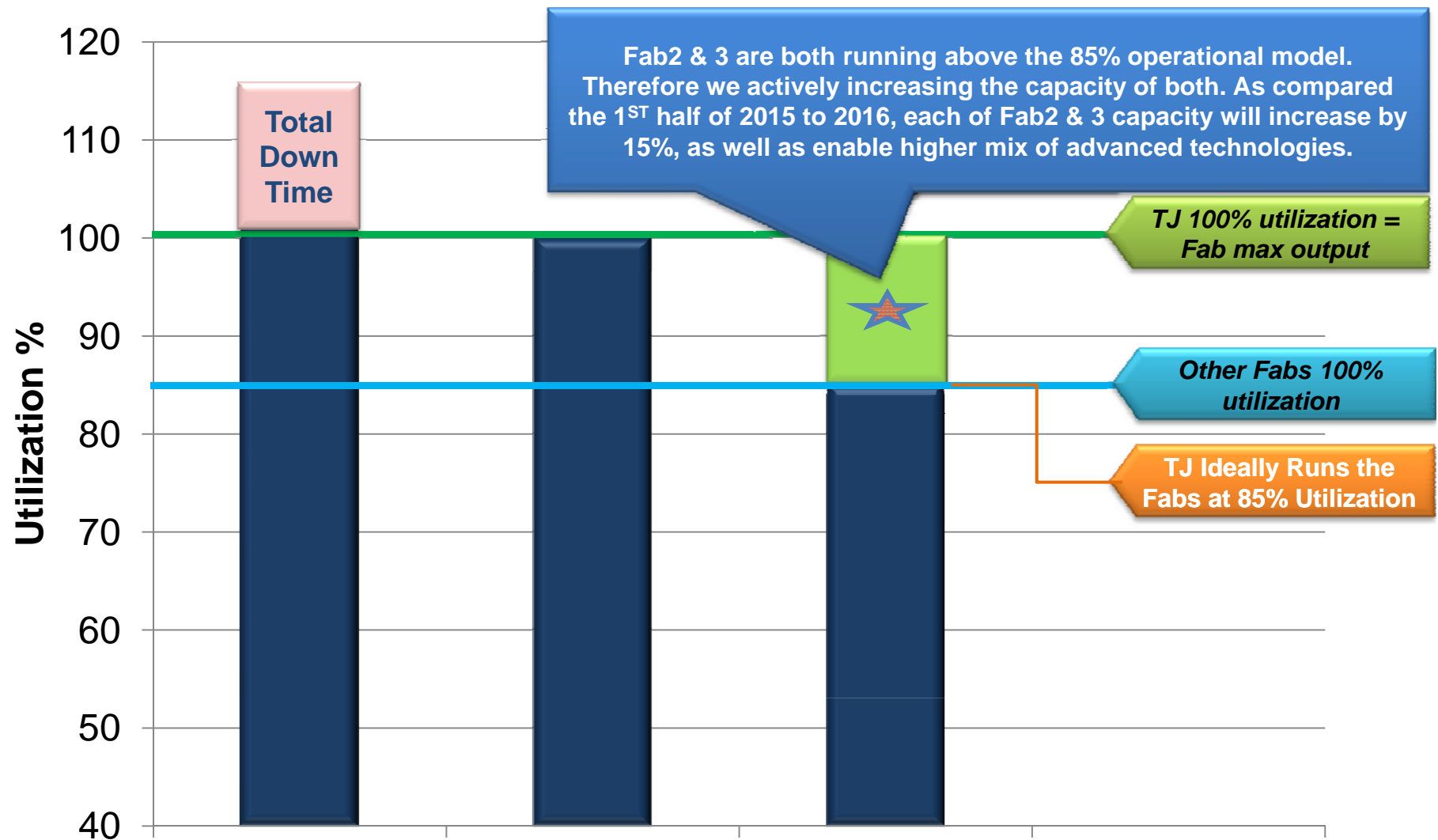
## New Technologies Ramp to Mass Production

### Align the technological Roadmap with major customers

Transfer new technologies from the R&D to the Fabs and Ramp into mass production with the Quality mentioned above.

# TJ Utilizing the Equipment X% above others

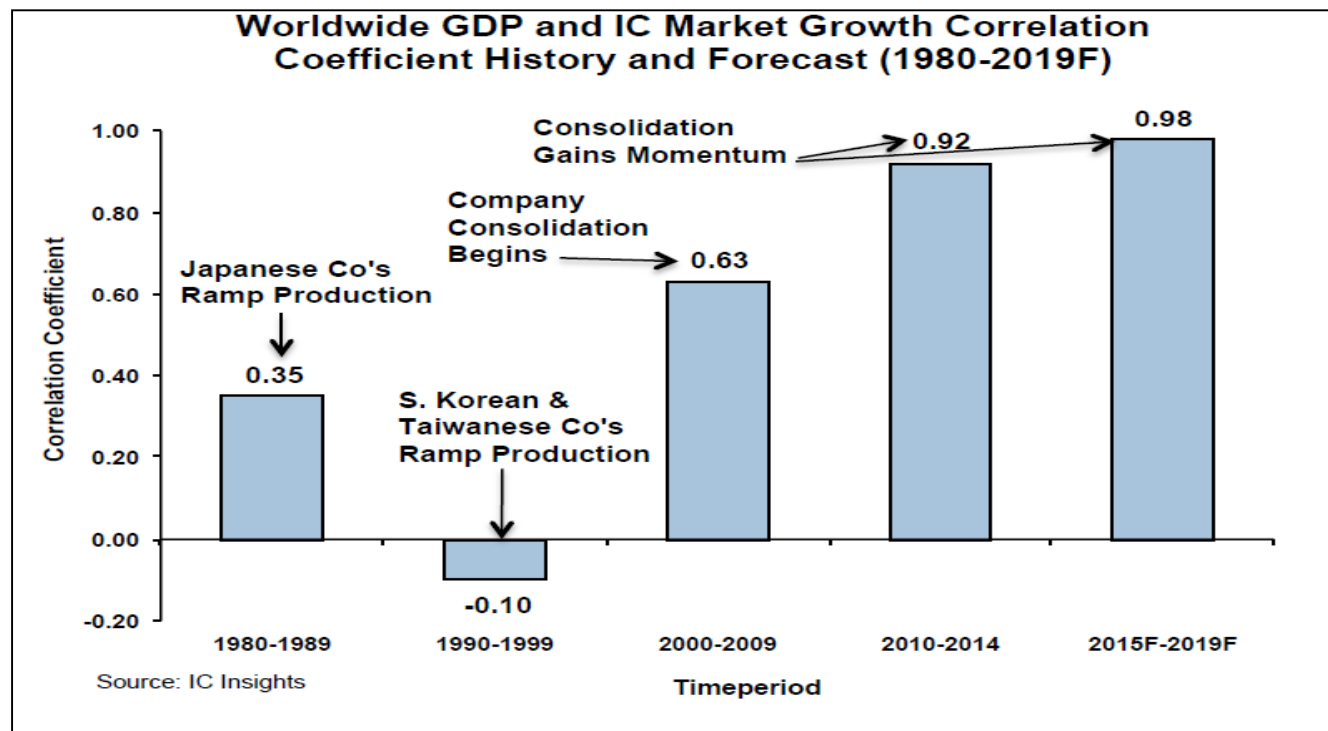
TJ 85% utilization = Others 100%.





# IC industry shifts to a top-down model driven by consumer spending.

- While worldwide electronic systems production represents only 2% of the worldwide GDP, the interdependence between them is on the rise as the IC industry shifts from a bottom-up business model driven by capacity and capital spending, to a top-down model driven by consumer spending.



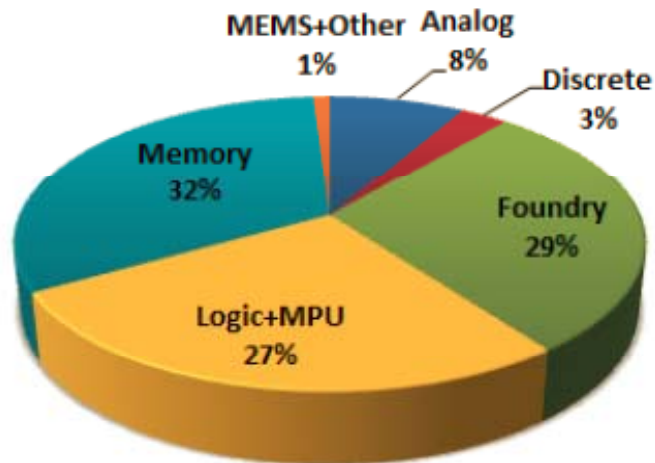
- McClellan came to this conclusion by comparing the correlation coefficient between the Worldwide GDP and IC market since the '80s and forecasted out to 2018 (Figure 1).

# Change of Landscape- 200mm Capacity by Product type

- 19M WPY for Foundry in 2006 growing to 28M WPY in 2018.
- TJ 200mm (excluding F1 and F7) grow from 0.42M WPY in 2006 (2.2% of foundry capacity) to ~2M WPY (7.2%) in 2018

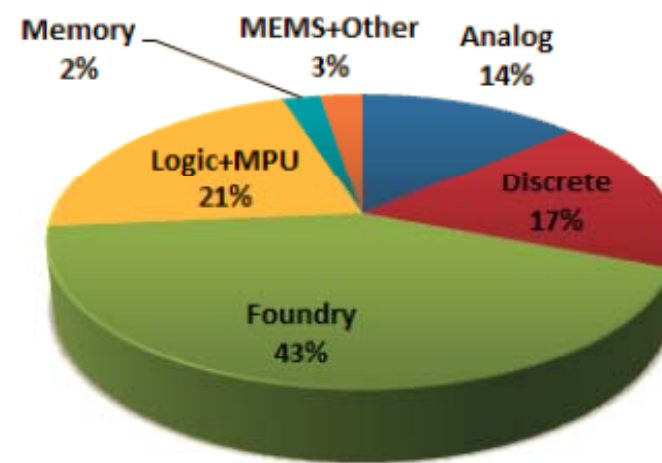
**Capacity 200mm Fabs in 2006**

5.47 million wpm



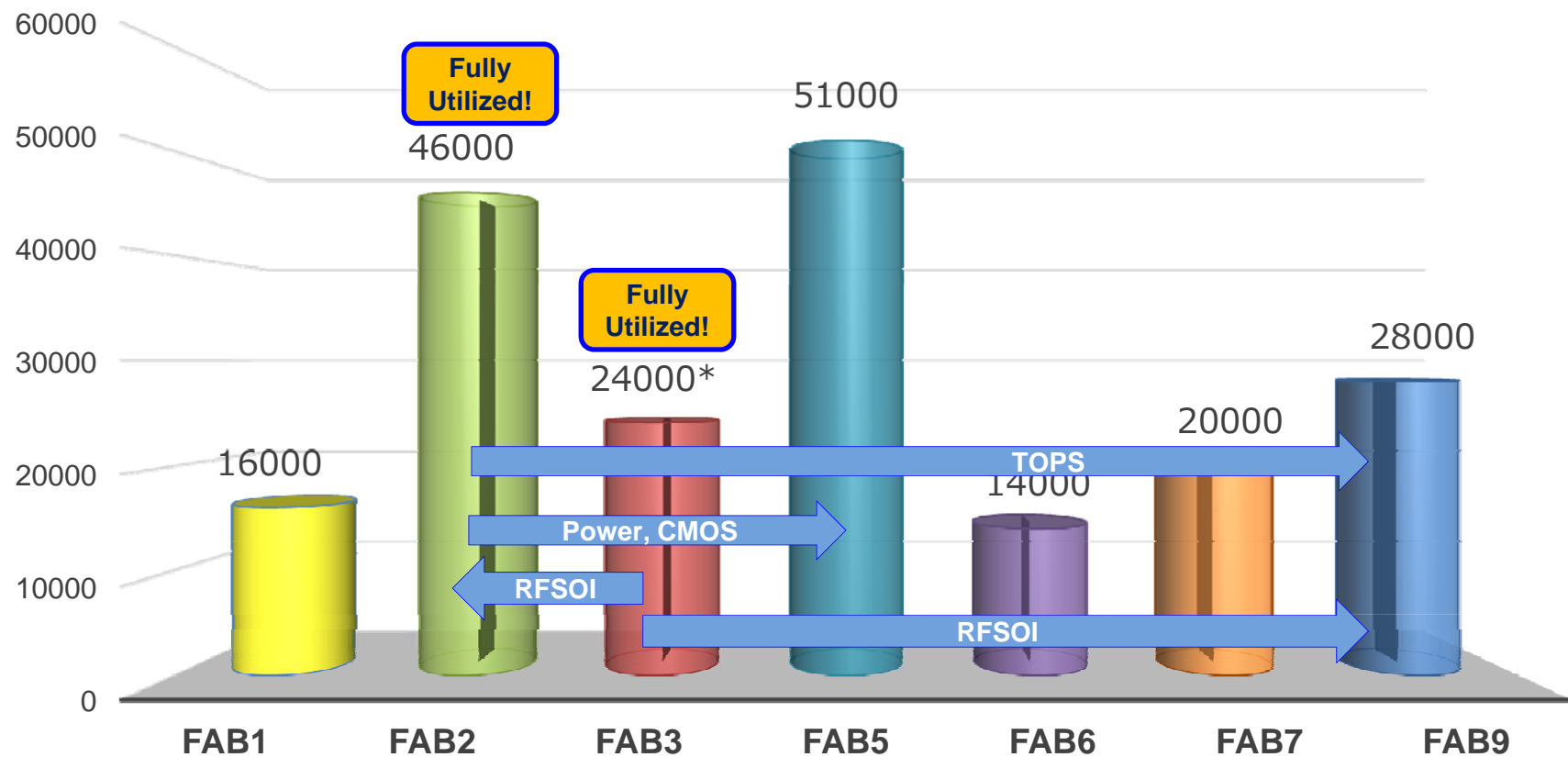
**Capacity 200mm Fabs in 2018**

5.43 million wpm



# TJ Capacity – 2.3M wafers / Year (8" equivalent)

RFSOI offload from Fab3 to Fab2 and Fab9 (SA) and TOPS from Fab2 to Fab9



\* Very high layer count flows

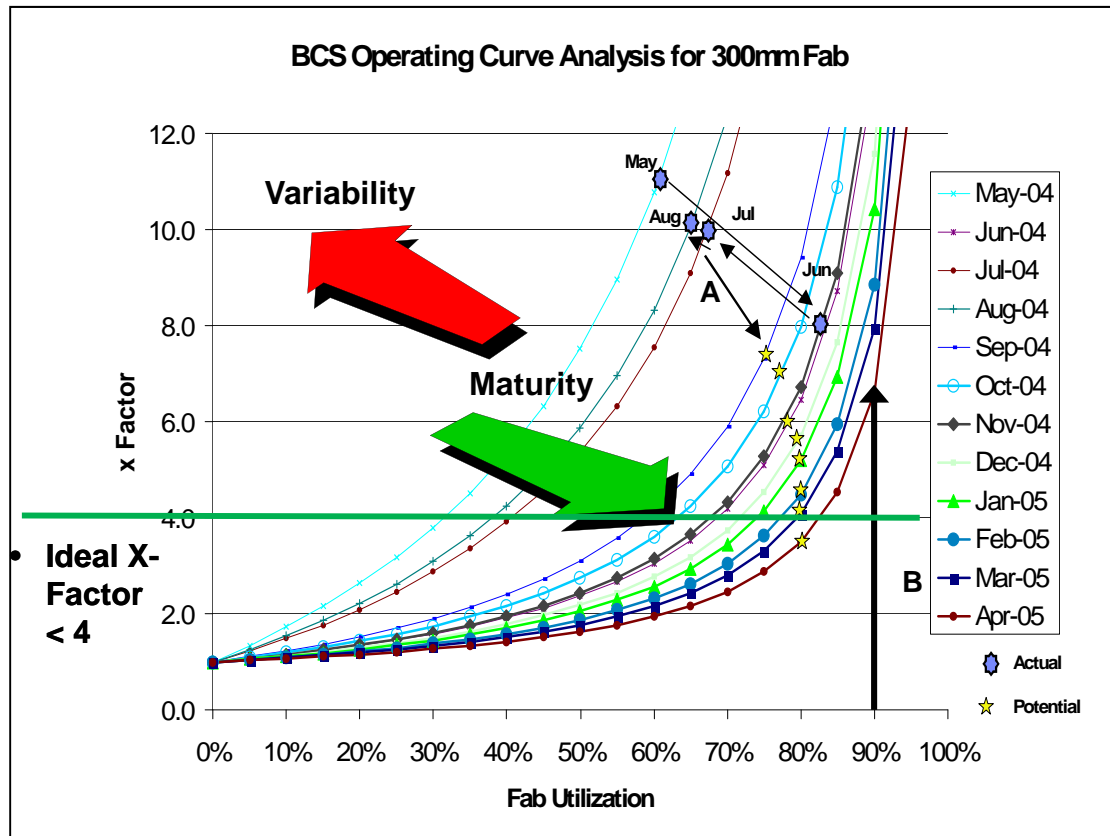
# TJ Operations Main Targets & Challenges

## OSD & Lead Time

### Strive for Best in benchmark OSD and Lead time

OSD >98% and Lead-time <2 DPL at 0.18u Technology. Priority Lots to expedite New developments and Introduction of new products.

# Reduce variability through Lean and Six Sigma principles and Increase Loading with minimal Impact on CT.



## Variability Reduction

Lower Variability will allow higher assets utilization with reasonable CT.

- Controlled Priority Lots /Hot Lots
- Higher Redundancy
- Operators and technicians Skills
- WIP balance
- Product/Process Mix
- Reliable equipment (random Failures and PM events)
- Batch for transport between operation



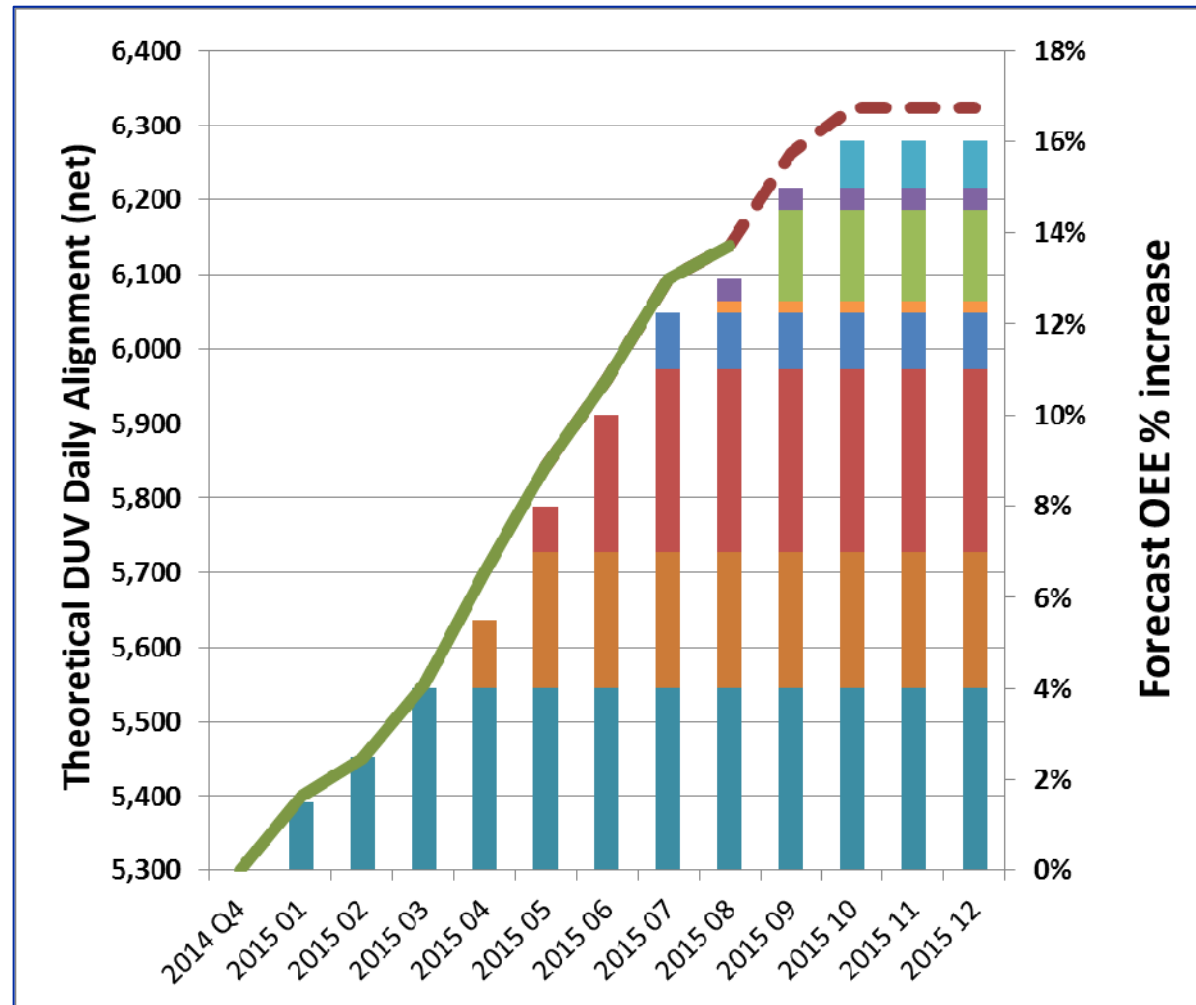
# TJ Operations Main Targets & Challenges

## Cost Savings

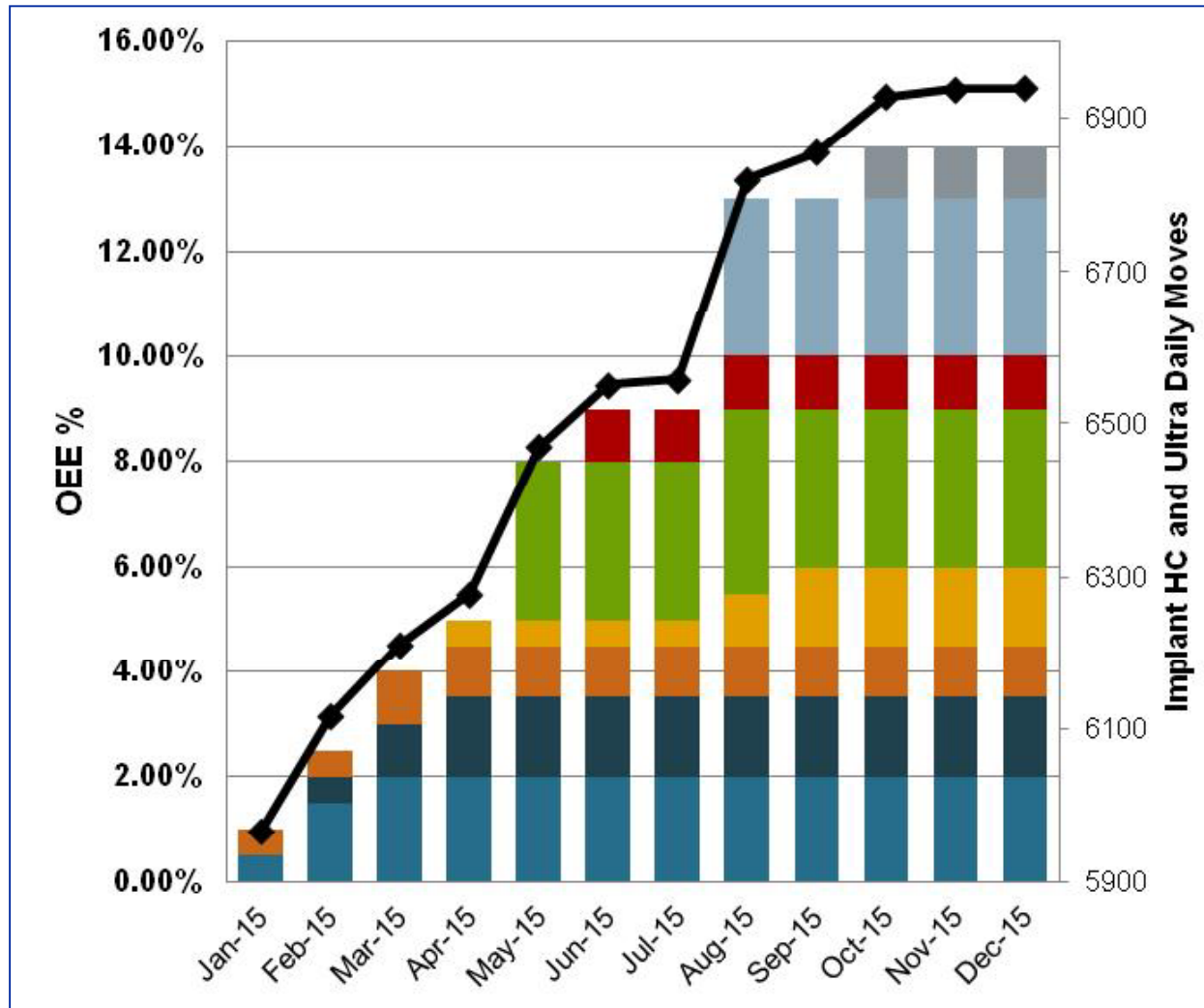
**Must produce parts at the absolute lowest possible cost**

**OEE improvement projects on BN, Qualify alternative materials and Parts,  
Reduce material usage, Lower price on same materials.**

## Photo Cell OEE improvement - Gained 75% of a Photo Cell = Capacity increase without capital spending

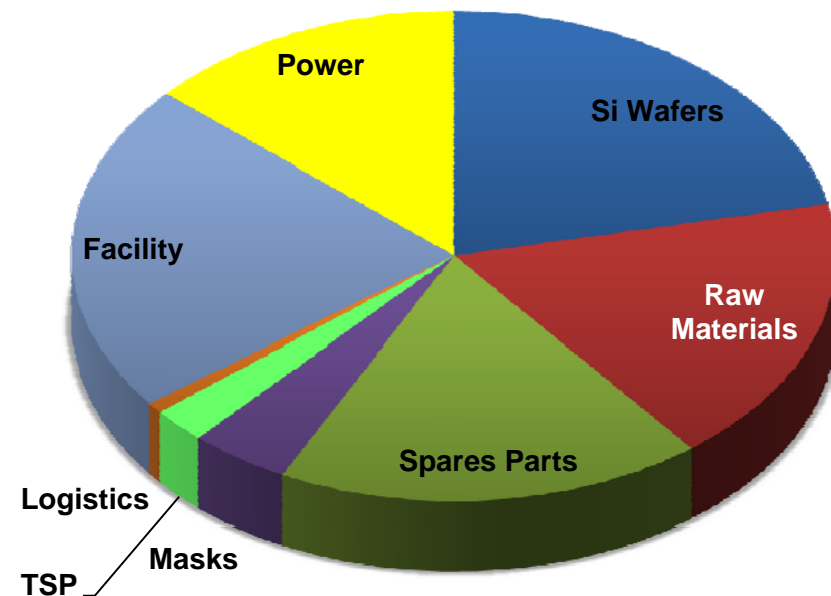


## Implant HC OEE improvement - Gained 90% of a n Planter= Capacity increase without capital spending



# Total Expenses in 2015 by Category

- Yearly cost reductions achieved by:
  - Reduced usage optimization
  - Joint supplier efficiency programs
  - Post M&A price negotiations



**Quality:  
Plant Yield  
Die Yield  
& RMA**

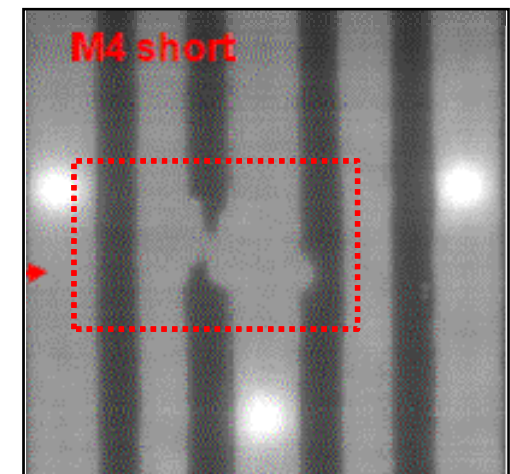
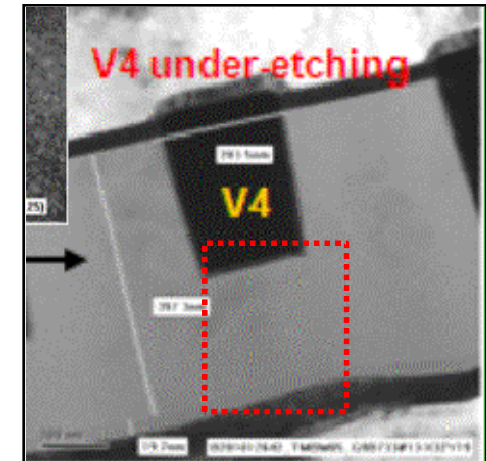
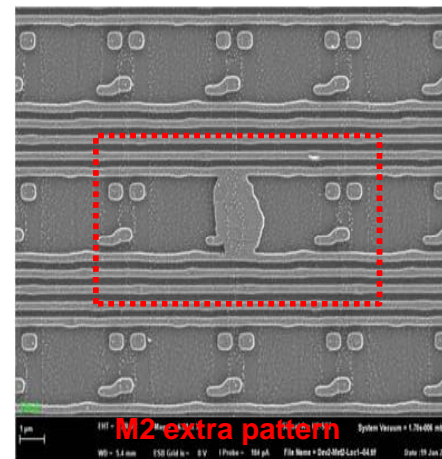
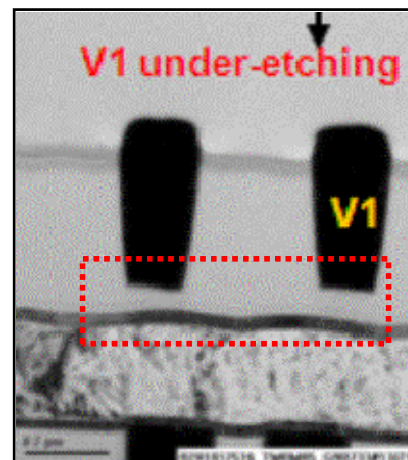
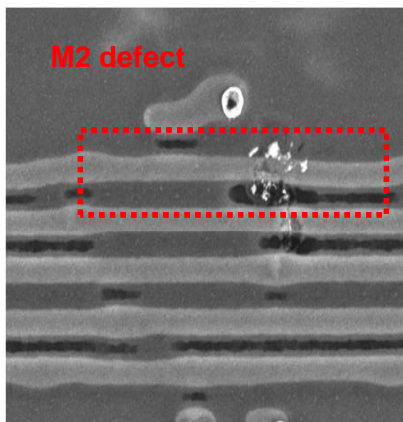
**CPk> 1.67 , Plant Yield >97.5% , RMA <0.2%, typical Die Yield >95%.**

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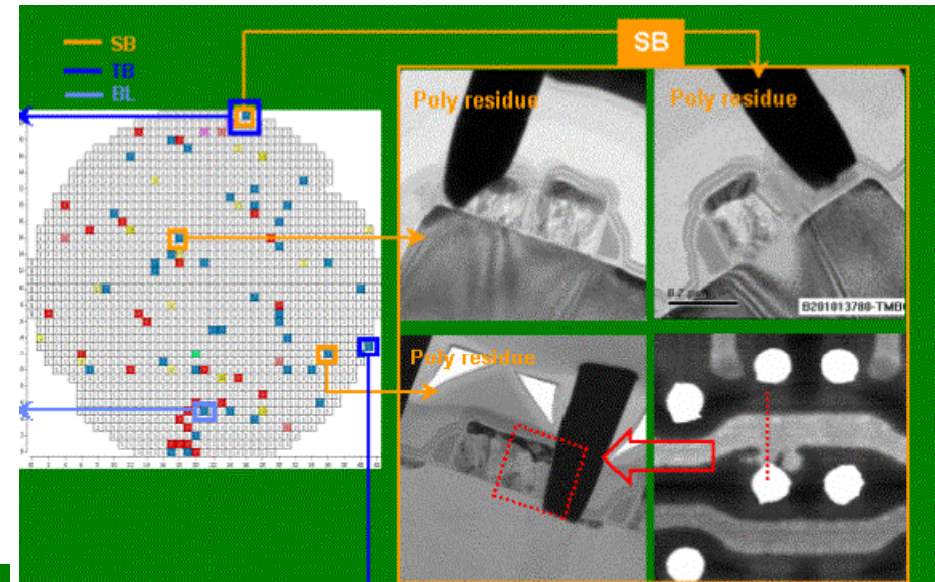
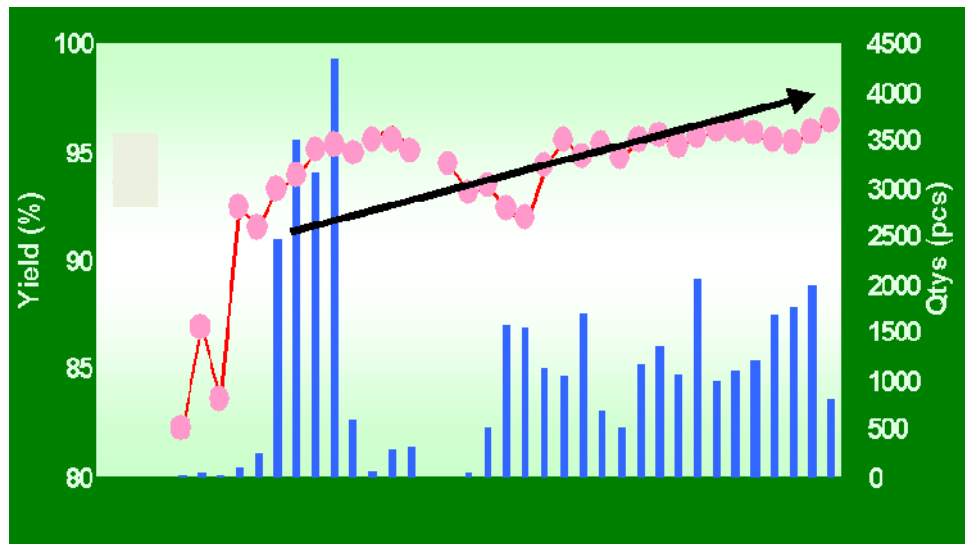
# Imperfections in Fab Processes: Face it. Fix it.

- **Mask making:** Dust, focusing
- **Growing oxide:** Warping in furnace, uneven reactions
- **Resist:** Over exposure, not hardened enough, Lifting
- **Etching:** Over etch of resist and/or oxide
- **Lateral diffusion:** Affects transistor channel lengths
- **Multiple layers:** Mask alignment
- **Defect/Residues:** from the process chamber walls.



# Solve It & Improve It.

- Defect reduction
- Process window characterization
- Process weakness
- Hardware control / PM / Lifetime
- Design improvement
- Innovation



## Summary:



- **High Assets Utilization:** Offload to utilize all Fabs at >85% , Serve the increasing customer demand and increase TJ revenue and margins.
- **Reduced Lead time:** To shorten Time to Market for New products → fuel our future Growth.
- **Cost Reduction:** OEE Improvement to reduce Capex investment. COGS Savings to increase Margins.
- **Perfect Quality:** Zero Field Returns, high Yields - to retain the customers and win new products.



# **TOWERJAZZ**

**The Global Specialty Foundry Leader**



## ***TowerJazz Investor and Analyst Day***

**March 8, 2016**



## CEO Summary



# “Where were we” ,”where are we today” and “where should we be”?

## Where were we?

- Manufacturing footprint limited to the “West” (MH, NPB).
- Customer base dominated by North America IDMs and fabless customers.
- Low fab utilization and negative profit.

## Where are we today?

- Global manufacturing footprint with addition of TPSCo.
- Strong presence in APAC (~50%)
- Higher utilization, we ARE profitable.

## Where should we be in 5 years?

- More successful acquisitions (as Panasonic, Maxim) , fab in China, 300mm included.
- Larger presence and manufacturing in China
- All available capacity at 85% utilization, in order to meet “\$1.5B financial model”.

## Closing Thoughts

“Leadership and learning are  
indispensible to each other.”  
*(John F. Kennedy)*

# **TOWERjazz**

**The Global Specialty Foundry Leader**



## ***TowerJazz Investor and Analyst Day***

**March 8, 2016**





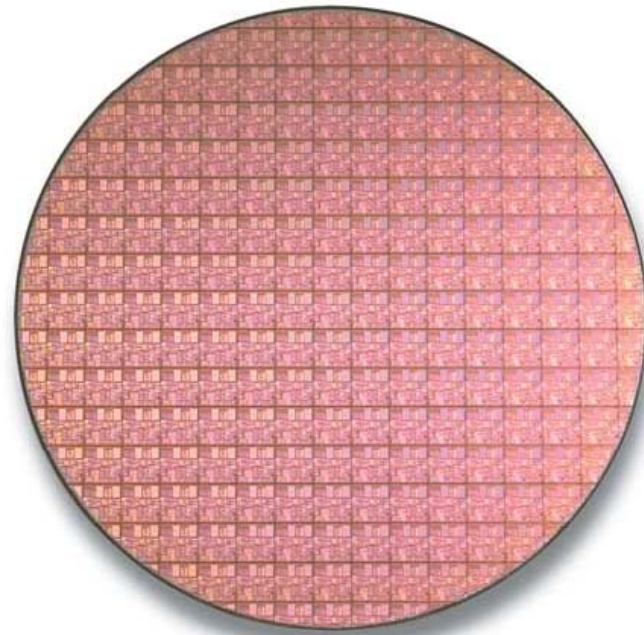
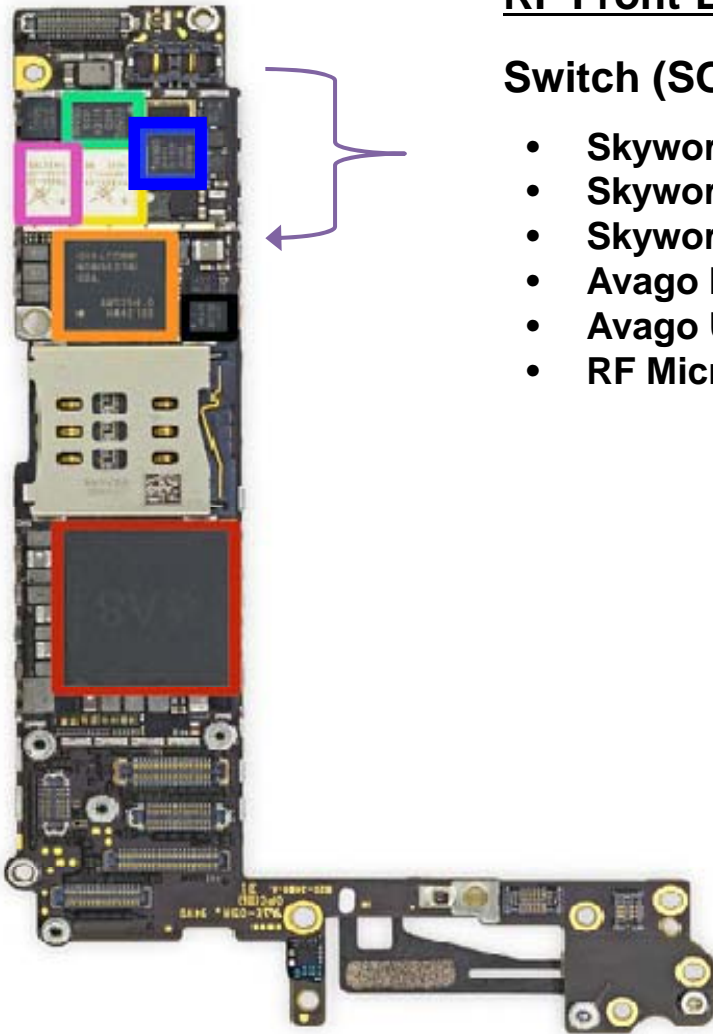
## Fab Tour Introduction

# What are you going to see in the Fab? - What are we doing?

## RF Front-End-Module content in iPhone6:

### Switch (SOI), PA (GaAs, SiGe), Control (RF CMOS)

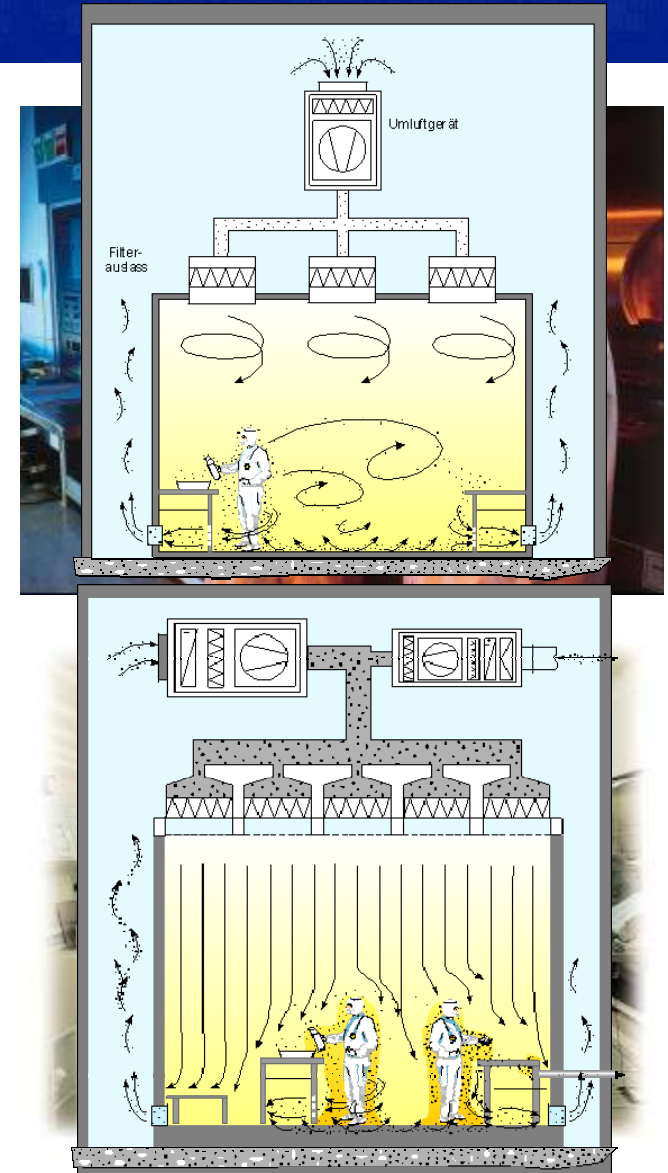
- Skyworks Low Band LTE PA
- Skyworks Mid Band LTE PA
- Skyworks Mid Band PA
- Avago High Band PA
- Avago Ultra High Band PA + FBARs
- RF Micro Devices Antenna Switch Module





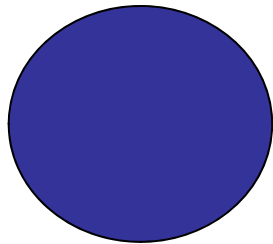
# The Clean Room

- **Class 1** is defined as less than 1 particle with diameter larger than  $0.5\mu$  per cubic foot.
- **Temperature/Humidity:** A typical specification is  $21\text{ }^{\circ}\text{C} \pm 1$  and  $38\% \pm 5\%$  RH.
- **Water:**
  - **30 to 1:** cost ratio to treat and discharge city water to ultra pure quality
  - **4.8 million** gallons of water used per day.
  - **60,000:** city population that can be served by the amount of water used.
- **Energy:**
  - **50%** of total energy, used for HVAC in a semiconductor manufacturing facility
  - **7500** houses use the equivalent amount of power needed for a typical fabrication plant.
  - **\$1M/Month** typical monthly electric bill for large Fab.

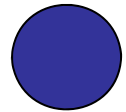


# What is a particle?

- Minute quantity of dust, or other material, not visible to the human eye



Human hair  
50 microns

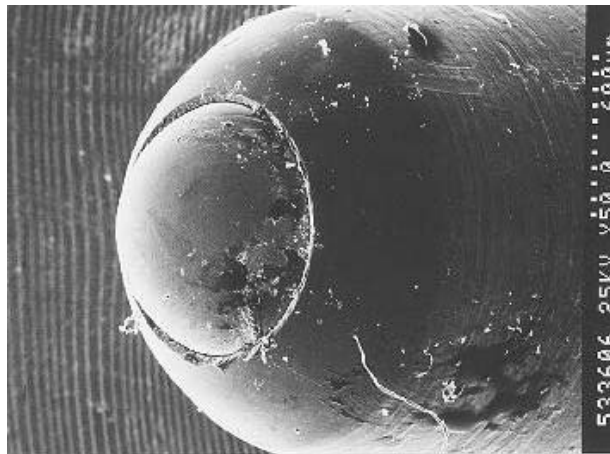


Dust 25  
microns

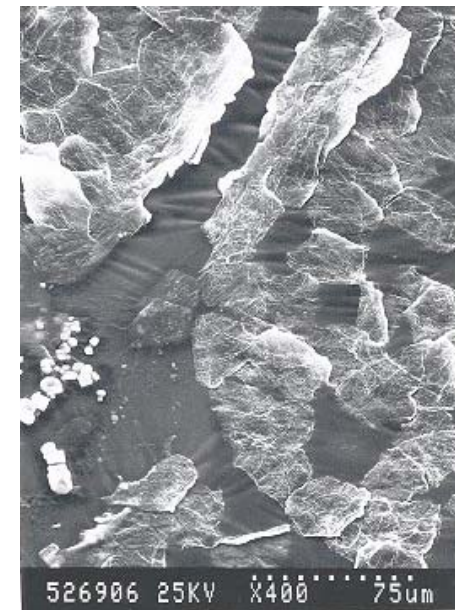


Other 0.5  
microns

- Device yield and/or reliability can be affected by particles smaller than 1/10 of the minimum feature size



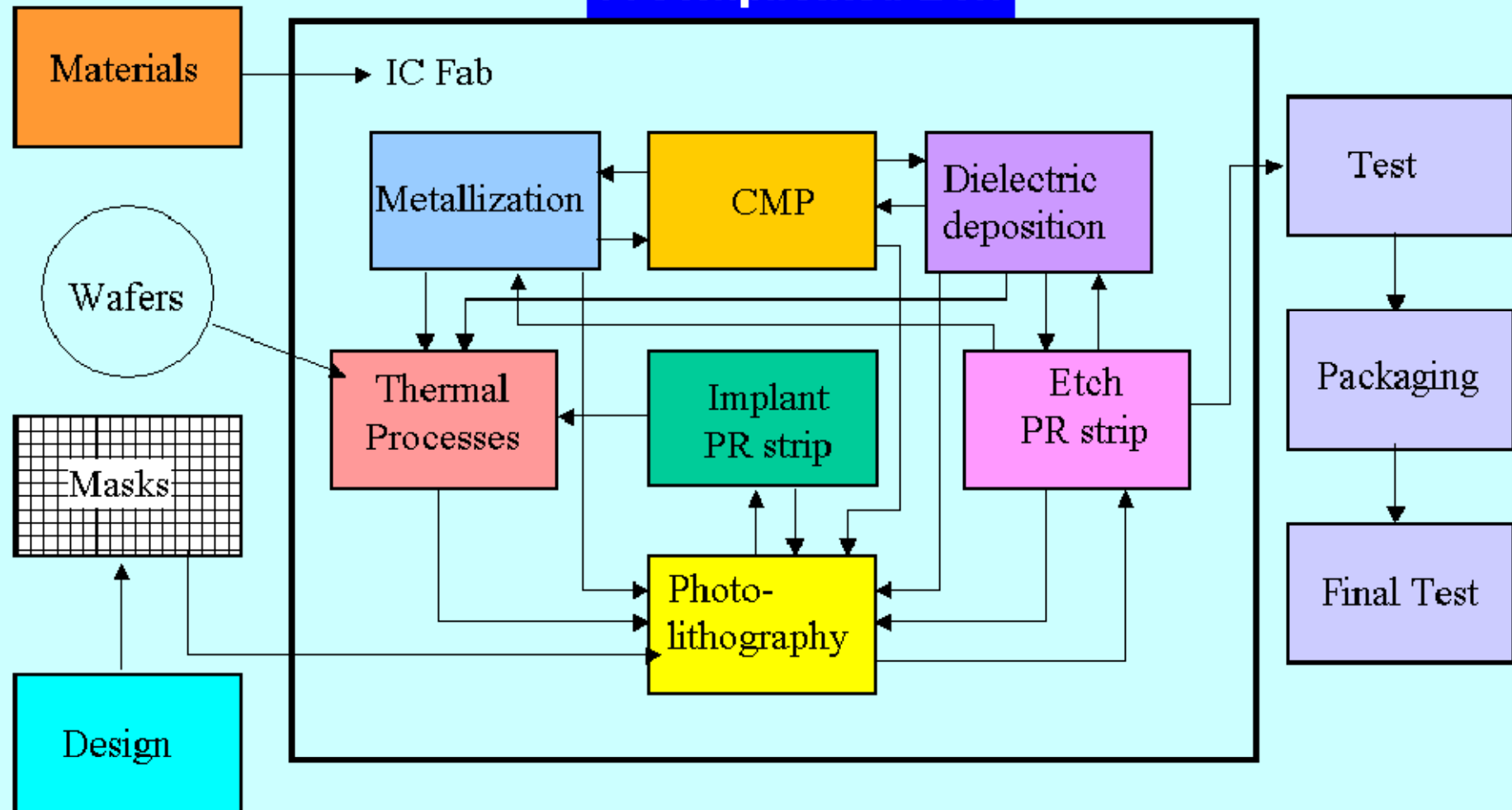
Ballpoint pen



Skin Flake

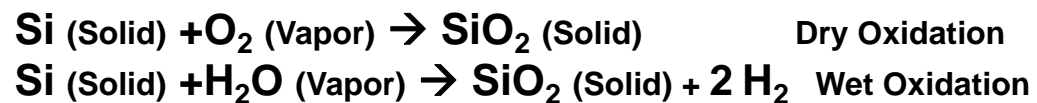
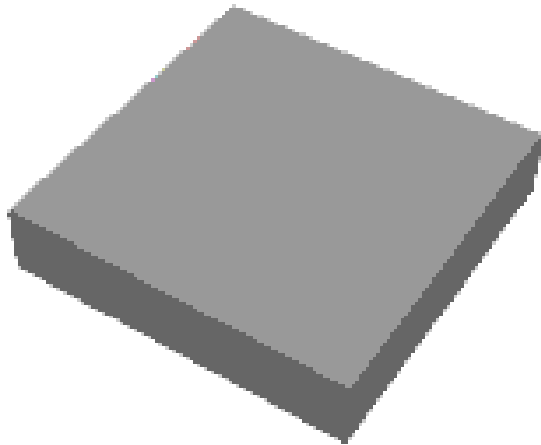
# IC Manufacturing

## A complicated Box



# Diffusion: Thermal Processes- Oxide Growth

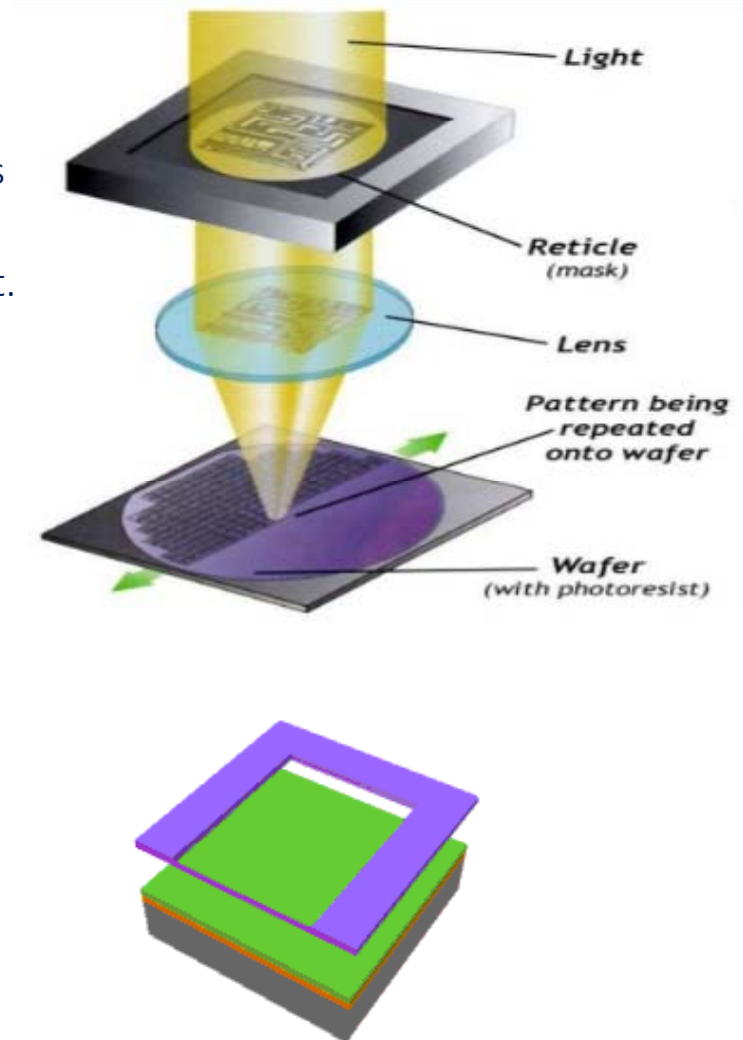
- On the wafer, the first layer of **silicon dioxide** is grown by exposing it to extreme heat and gas.
- The silicon dioxide on the wafer, is too thin to be seen by the naked eye.





# Photolithography Process

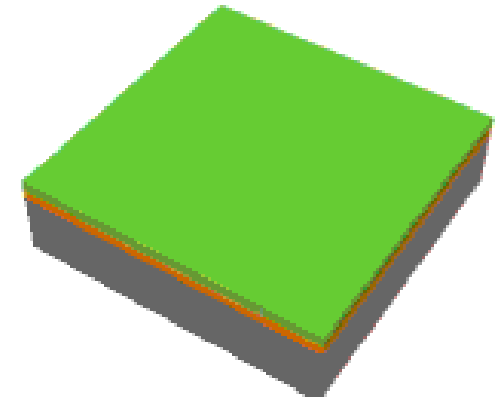
- The wafer is coated with Photo resist Material.
- The reticle containing a layer's image of one or more die are exposed by a UV light through a lens system onto the wafer.
- The wafer is then stepped over to the next die and the process repeated until the wafer is completely exposed.
- Photo resist becomes soluble when exposed to ultraviolet light.



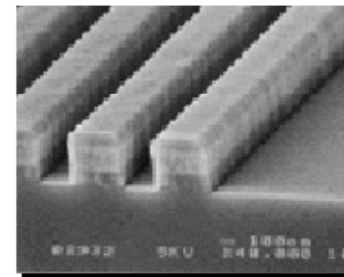
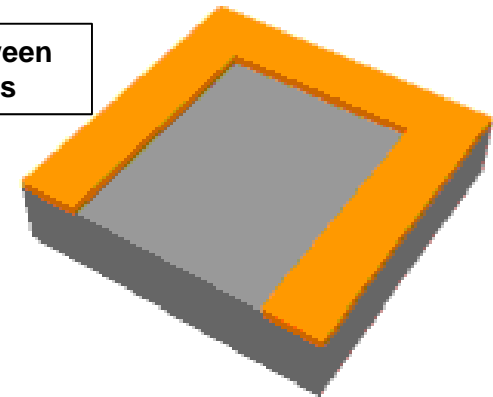


# Etch & Strip

- The exposed PR is completely dissolved by a solvent.
- This reveals a pattern of PR made by the mask on the  $\text{SiO}_2$ .
- The revealed  $\text{SiO}_2$  is etched away with chemicals.
- The rest of the photo resist is removed. This process leaves ridges of silicon dioxide on the silicon wafer base.

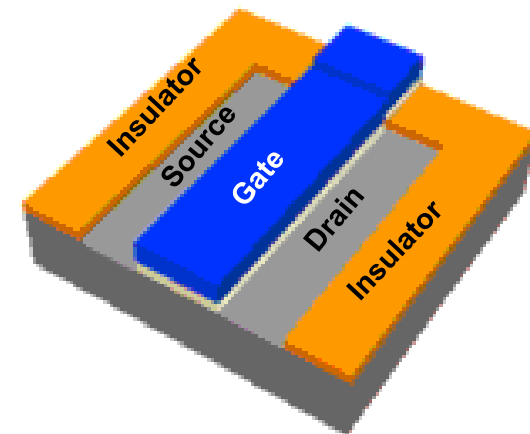
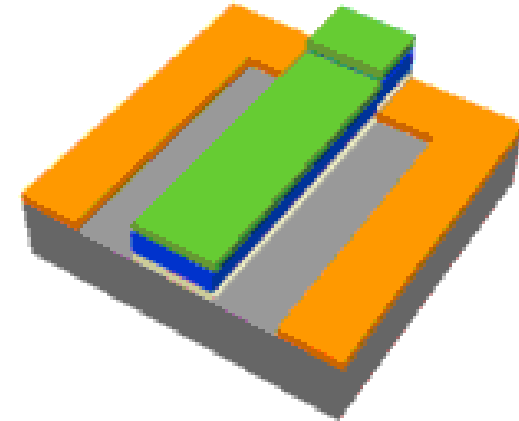


Insulation between  
multiple devices



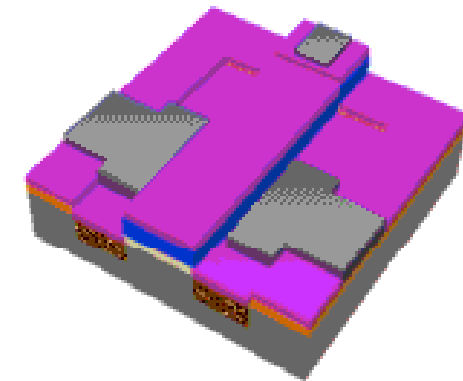
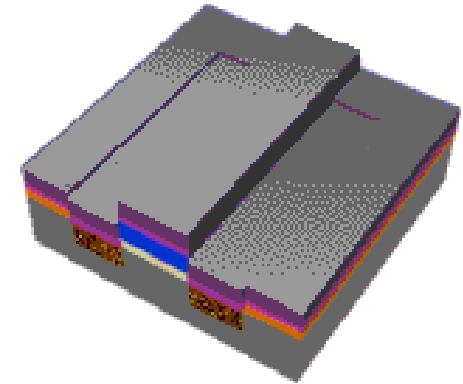
# Building the Gate of the transistor

- The photo resist is dissolved with solvent to expose the polysilicon and silicon dioxide.
- Both are then etched away with chemicals.
- The remaining photo resist is removed, leaving ridges of polysilicon and silicon dioxide.



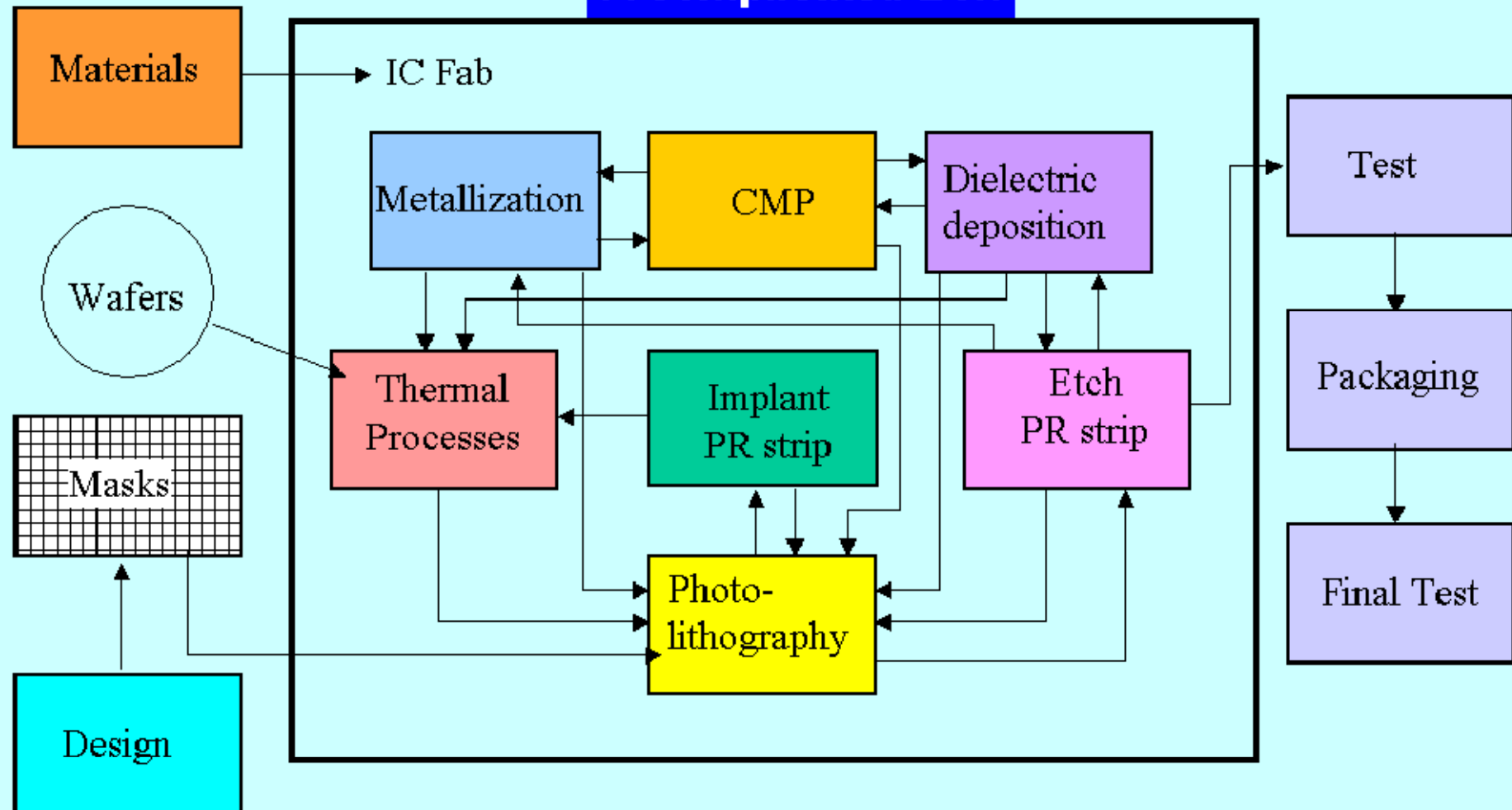
# Layers upon Layers: Dielectric, Contact & Metal . Up to Six Metal layers.

- The layering and masking processes are repeated.
- Deposit Dielectric Layer ( $\text{SiO}_2$ ) to isolate between the Metal Layers.
- Creating windows that allow for connections to be made between the layers.
- Atoms of metal are deposited on the wafer, filling the windows.
- Another masking and etching stage leaves strips of the metal that make the electrical connections.



# IC Manufacturing

## A complicated Box



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## **TowerJazz Investor and Analyst Day**

**THANK YOU!**



***TOWERjazz***

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