Investor/Analyst Day 2018

MPS

Forward Looking Statements

This presentation includes forward-looking statements that involve risks and uncertainties, including our belief in continued expansion of our product lines, advances in our technology, anticipated market opportunities, gross margin targets, net & operating margin targets, inventory targets, continuing business diversification, growth and opportunities in China and Taiwan, and increasing sales penetration in Japan, Korea, the U.S., Singapore and Europe. Other forward-looking statements can be identified by terms such as “would,” “could,” “may,” “will,” “should,” “expect,” “Wall Street estimates,” “intend,” “plan,” “anticipate,” “believe,” “estimate,” “predict,” “potential,” “targets,” “target ranges”, “seek,” or “continue,” the negative of these terms or other variations of such terms. These statements are only predictions based on our current expectations and projections about future events. Because these forward-looking statements involve risks and uncertainties, there are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements. In this regard, you should specifically consider the risks identified in our most recent 10-K in the section entitled “Risk Factors,” including the risks, uncertainties and cost of litigation and risks related to fluctuations in our operating results.

Agenda

- Computing Power Evolution
- Battery Management
- Automotive Break
- e.Motion: A Market in Motion
- $1B to $2B
- E to E through eCommerce
- Financial Summary
- Q&A
- Event Summary

Computing Power Evolution

Jinghai Zhou

It All Started with Two Innovations

- **MPS Invented Intelli-phase in 2010**

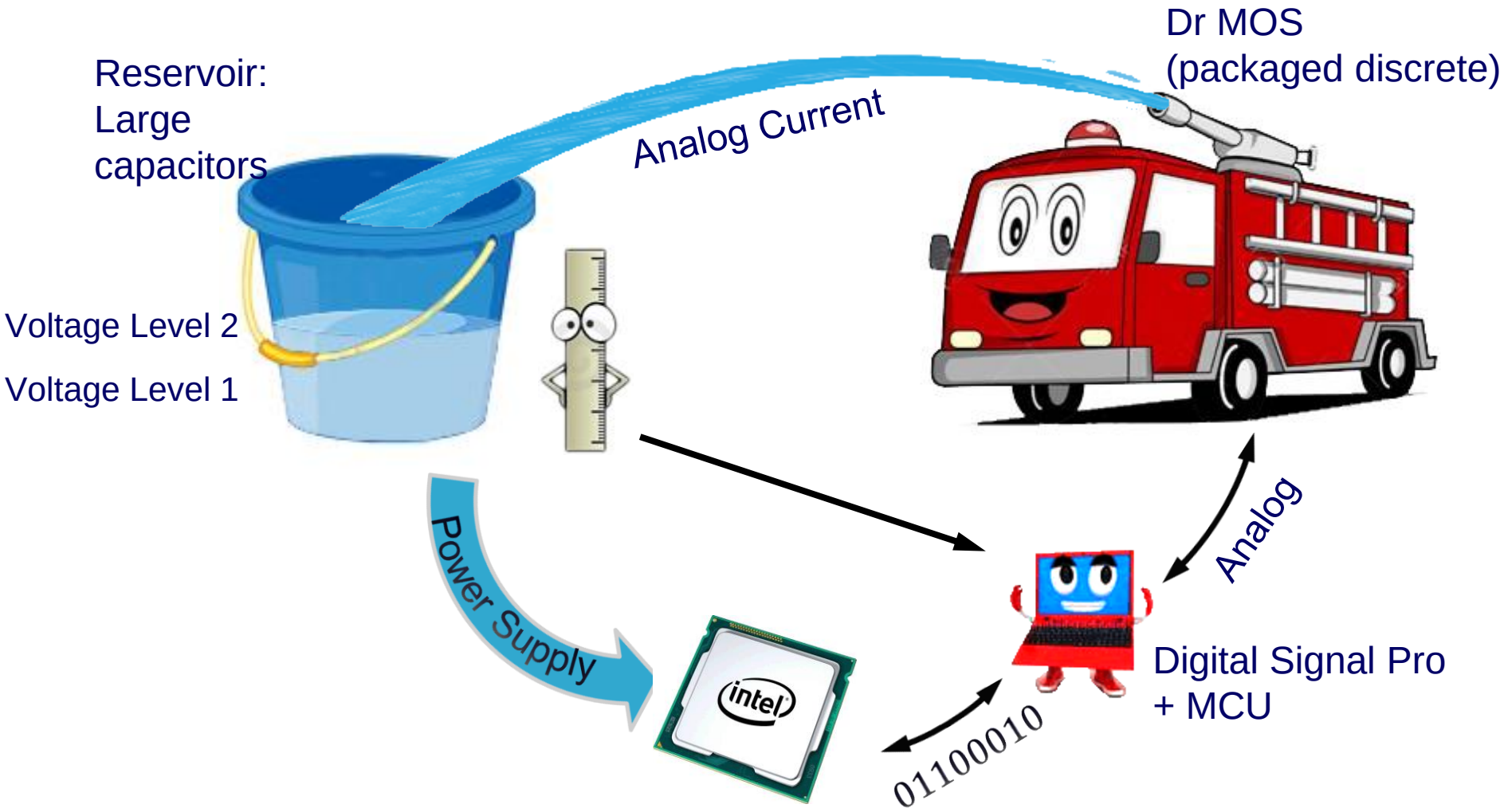
  World first monolithic power stage with integrated Accu-sense.

- **MPS Invented QSMOD in 2012**

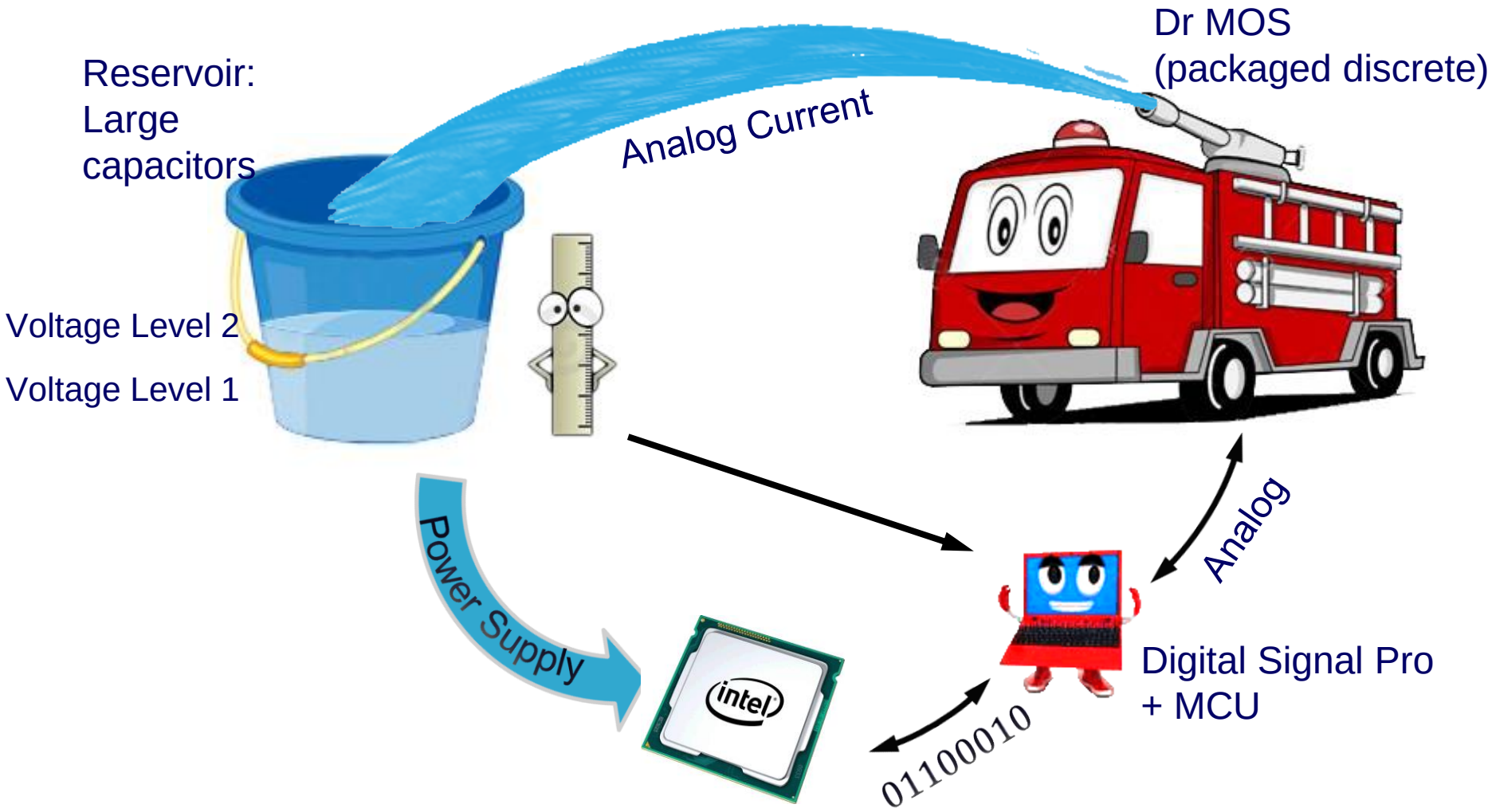
  Quantum State Modulation- Modulation based on finest digital steps to determine the real-time output voltage.

- **MPS First Server Core Power Solution Successfully Powered Intel Grantley Platform in June 2014.**

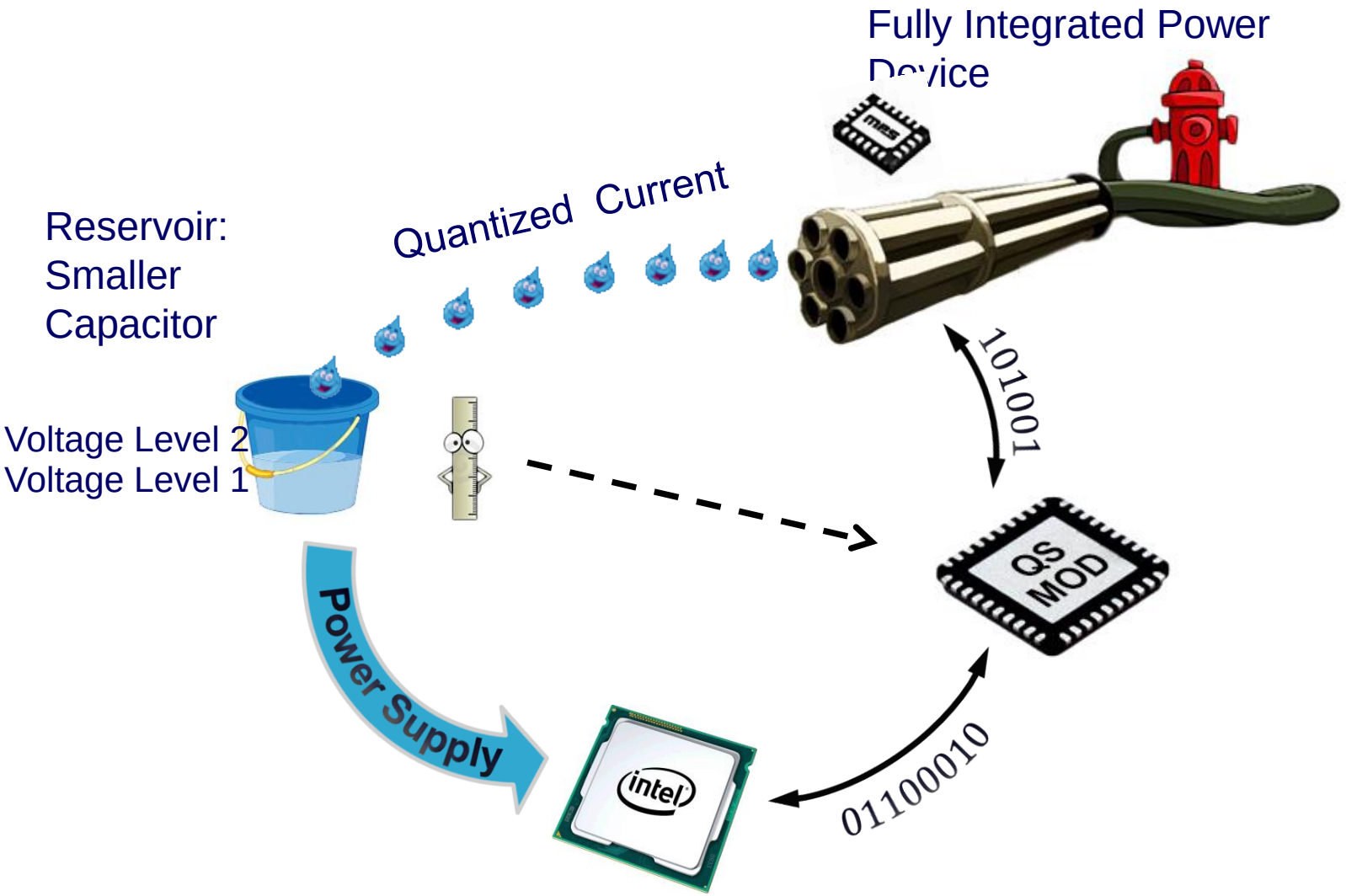
Existing Solutions – Discrete + Analog + Digital



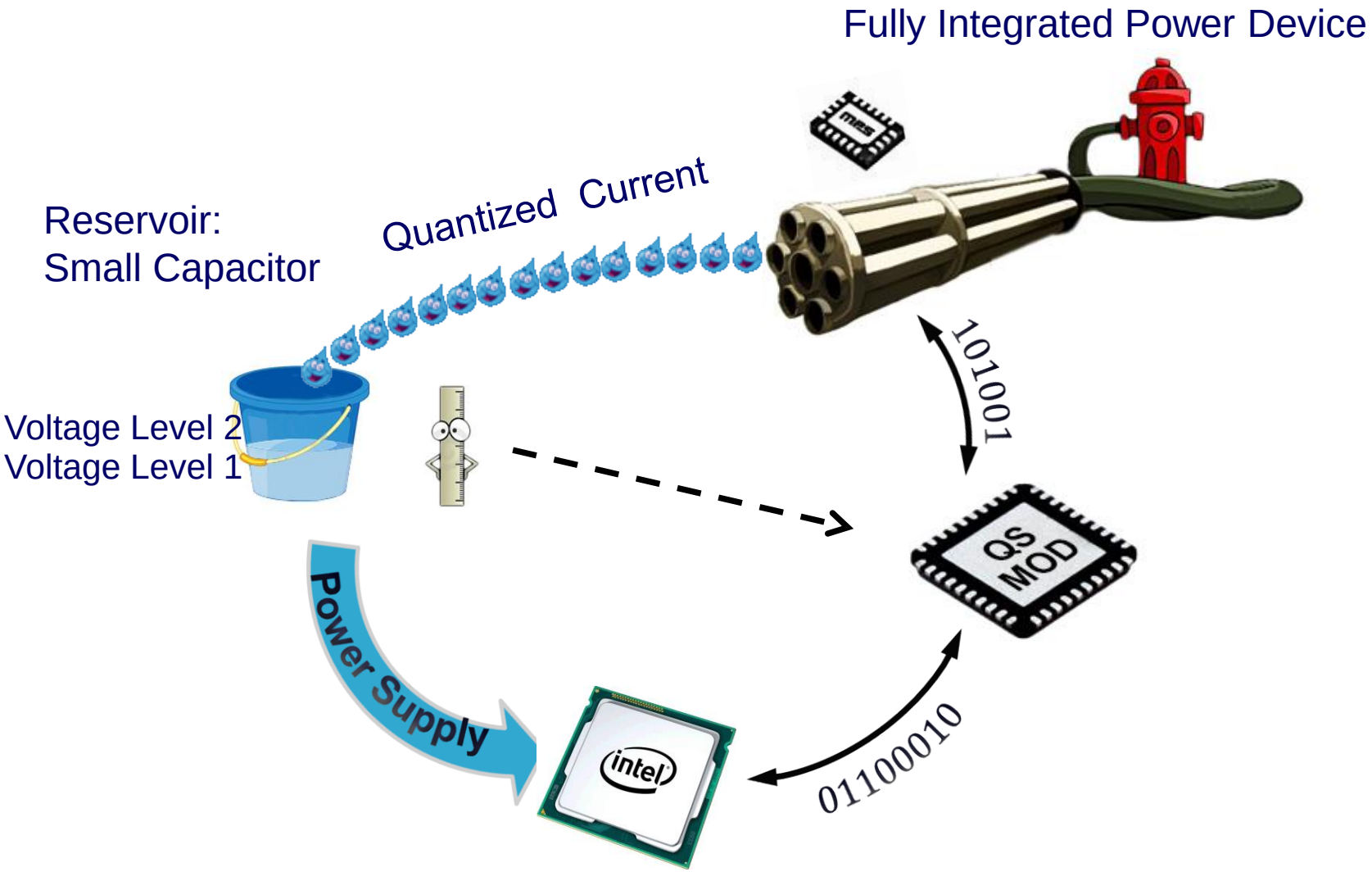
Existing Solutions – Discrete + Analog + Digital



QS MOD Solution: Fully Integrated + GUI



MPS' Quantum State Modulation__ QS Mod



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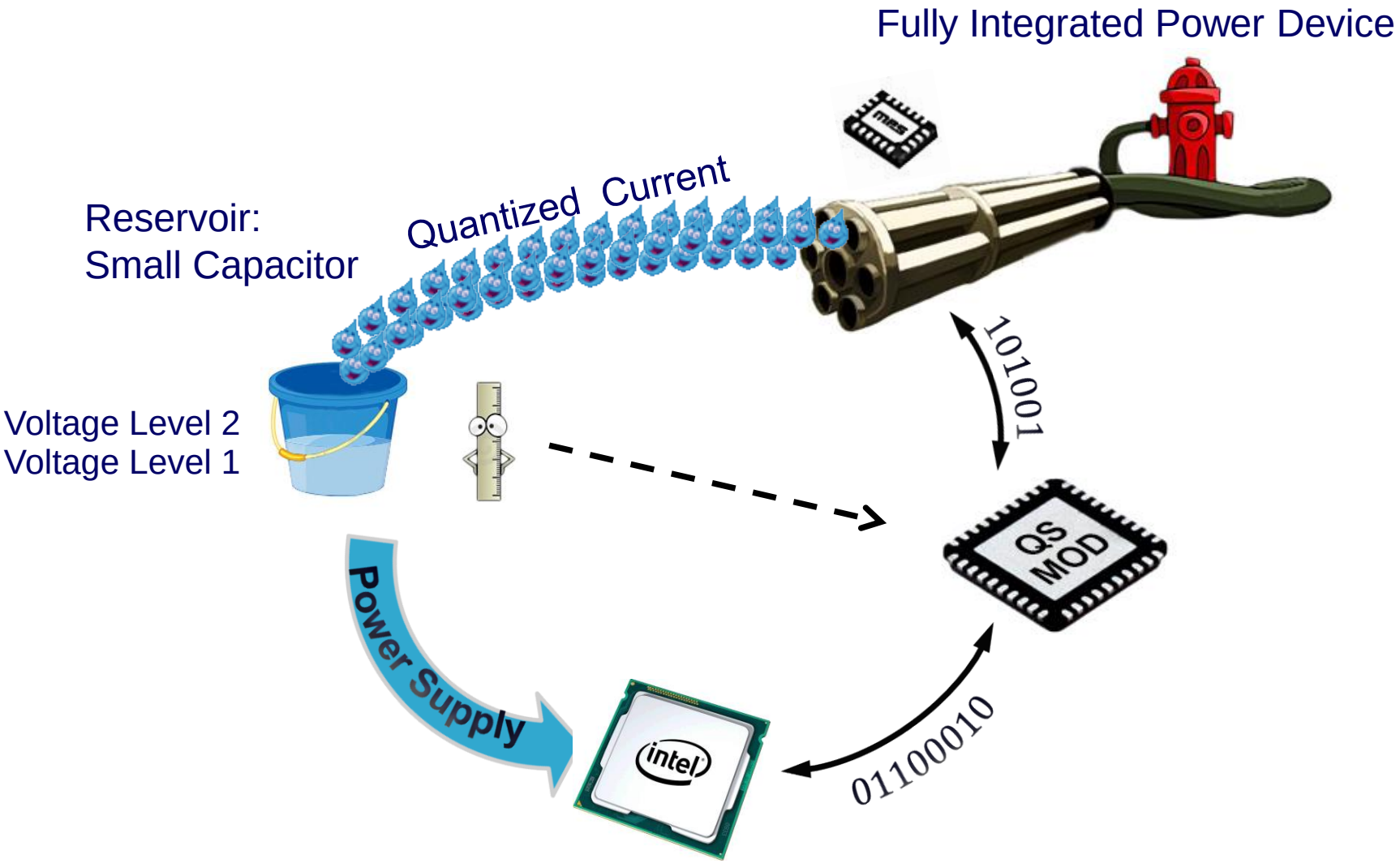

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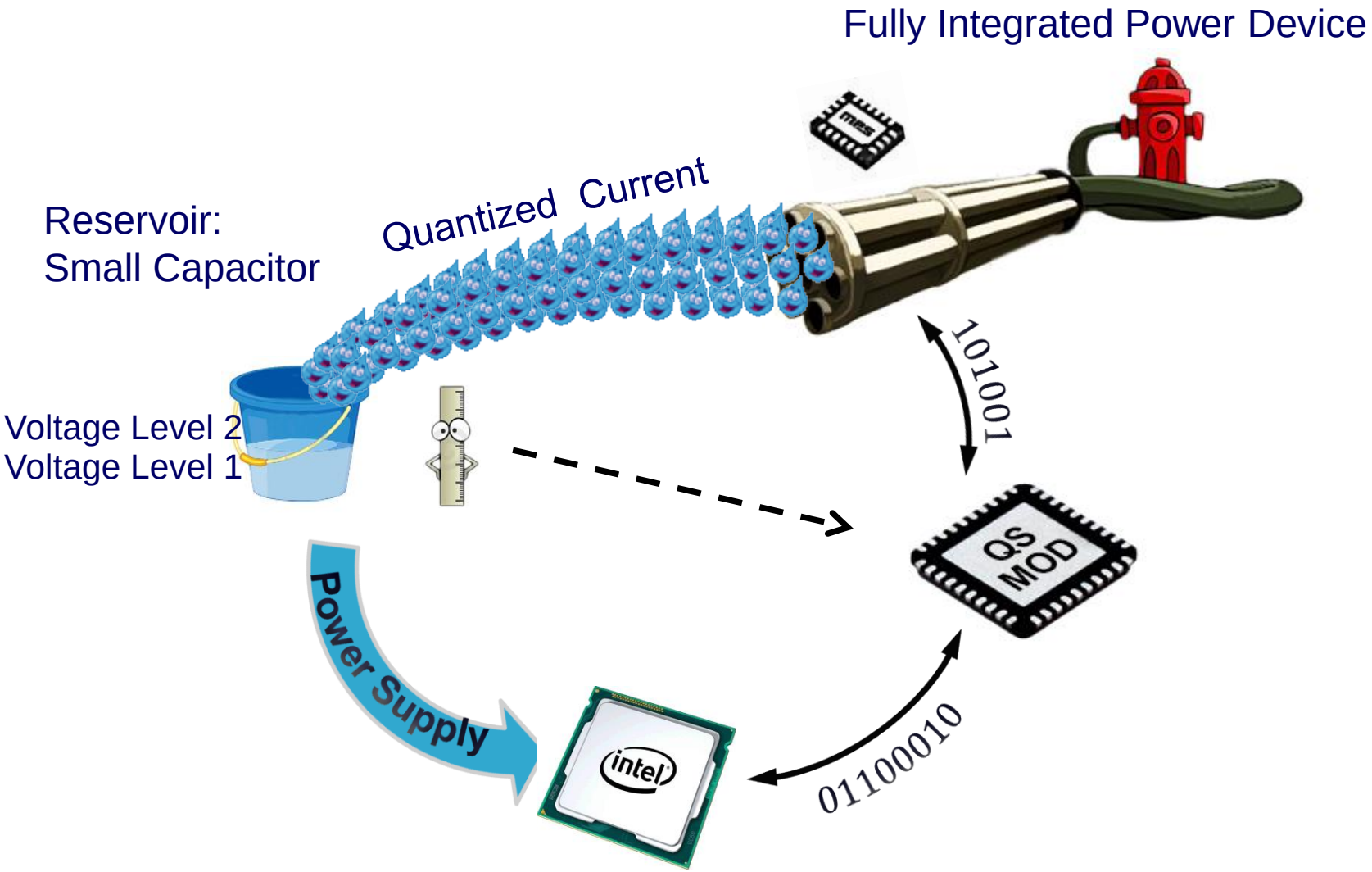
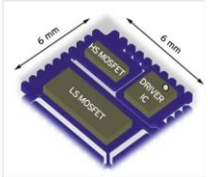
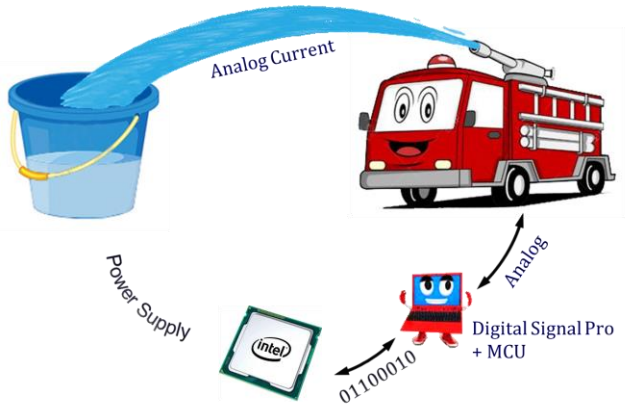


The Concept is Simple

Competitors

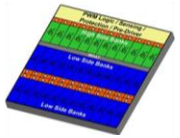
DrMOS
Discrete Solution

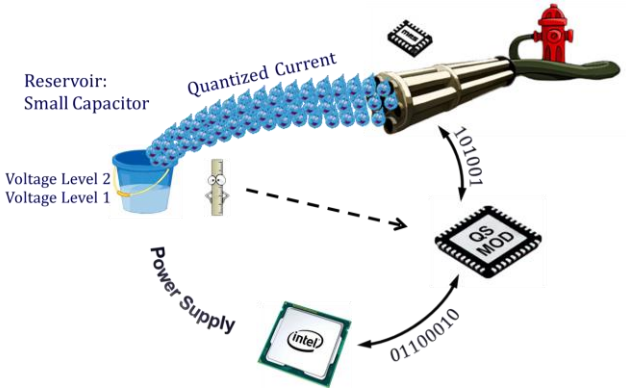




MPS

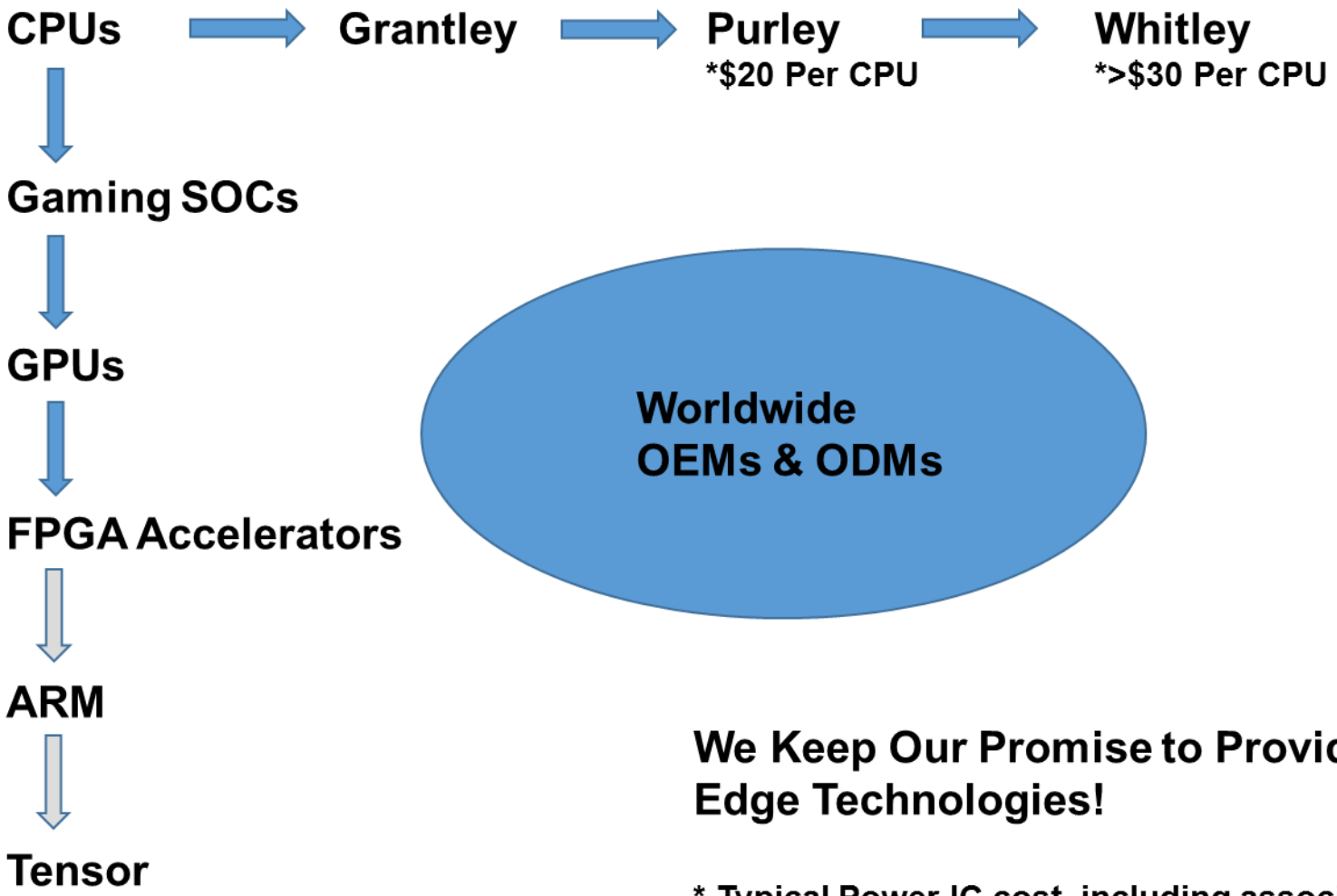
MPS
Intelli-Phase





Fast + **Accurate**

Great Technology Wins Its Own Way

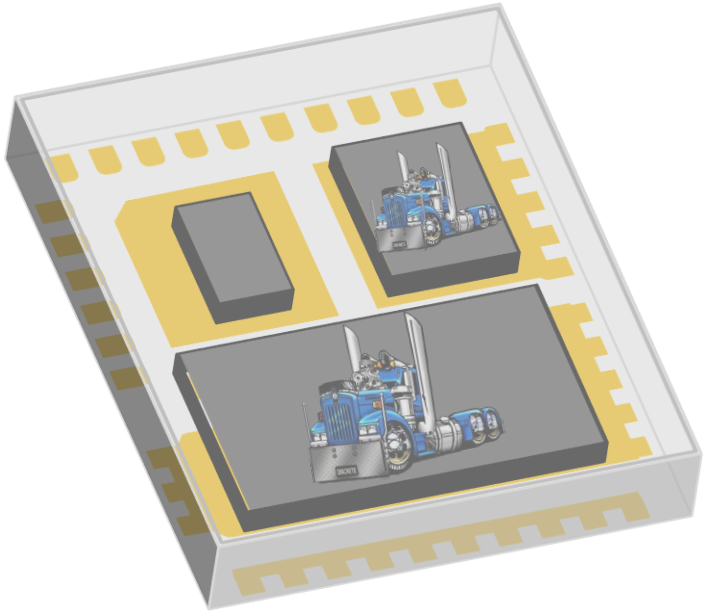


We Keep Our Promise to Provide Leading Edge Technologies!

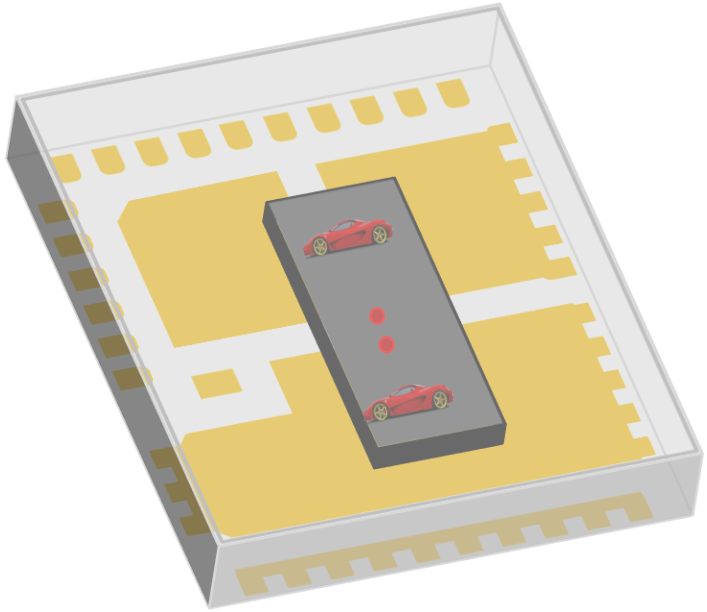
* Typical Power IC cost, including associated DDR Power

Common Footprint, Uncommon Performance

- Discrete Die DrMOS

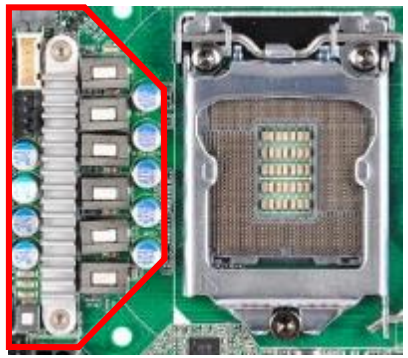


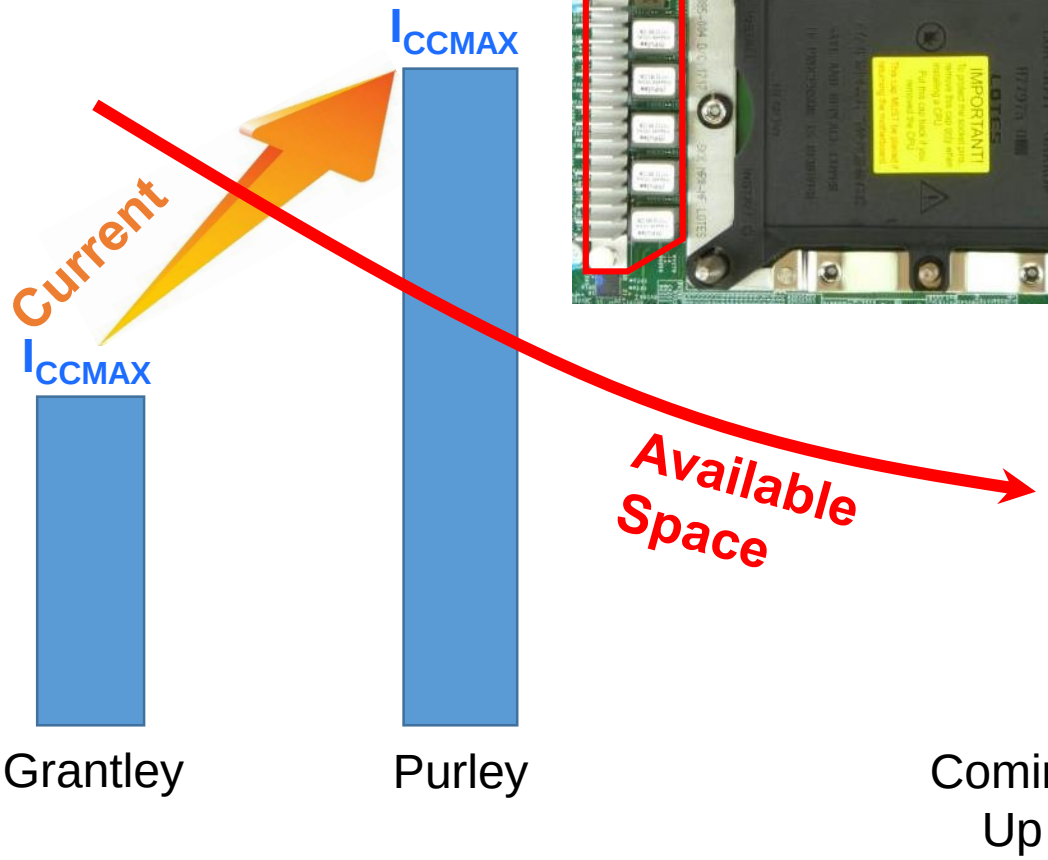
- Monolithic Intelli-Phase

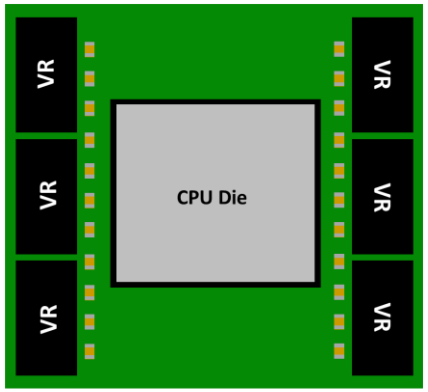


- **Common Footprint Allows Access to Today's Markets**
- **Monolithic Die Provides Superb Switching Performance and Intelligence**

CPU Demands Huge Current, with Much Less Available Space

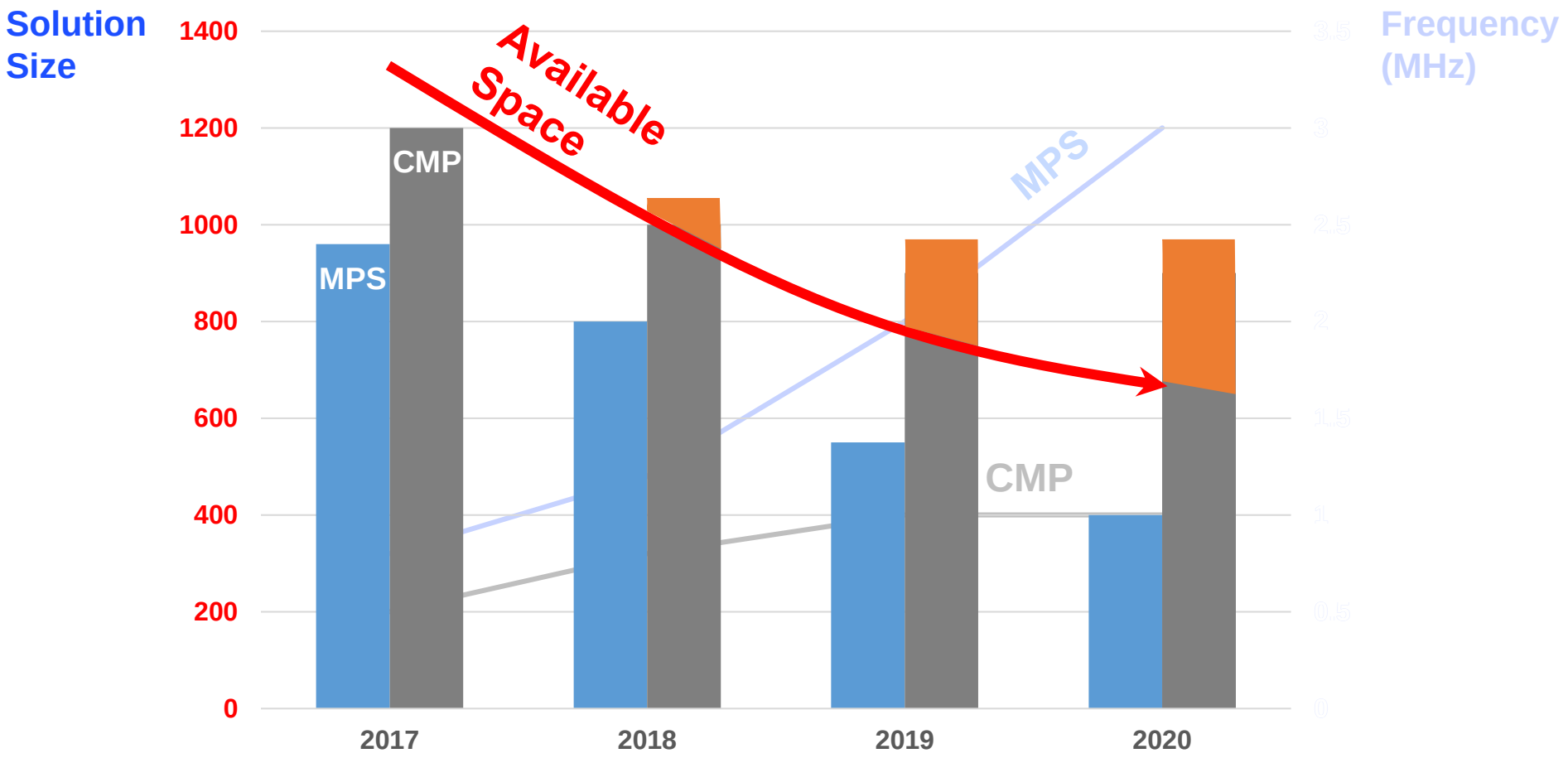






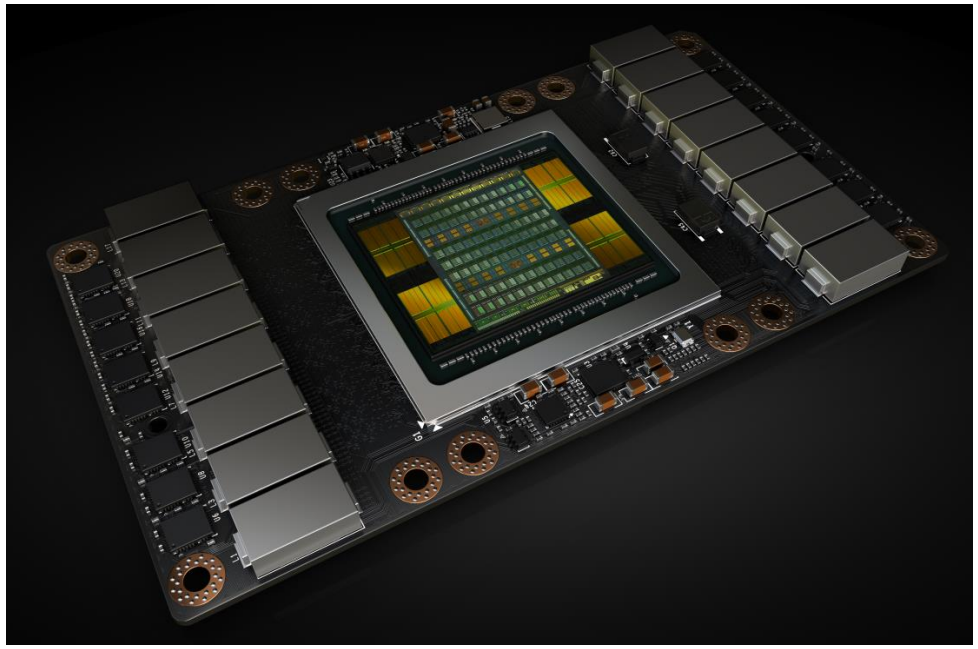
Bigger CPU Socket, More Memory DIMMs, The needs to Pull VR Closer to CPU- All Require Much Dense VRs

Why MPS is Winning?



While Others Hitting Size and Frequency Boundaries, MPS Monolithic Solution Takes Off

GPU as an AI Engine Gets Power Hungry

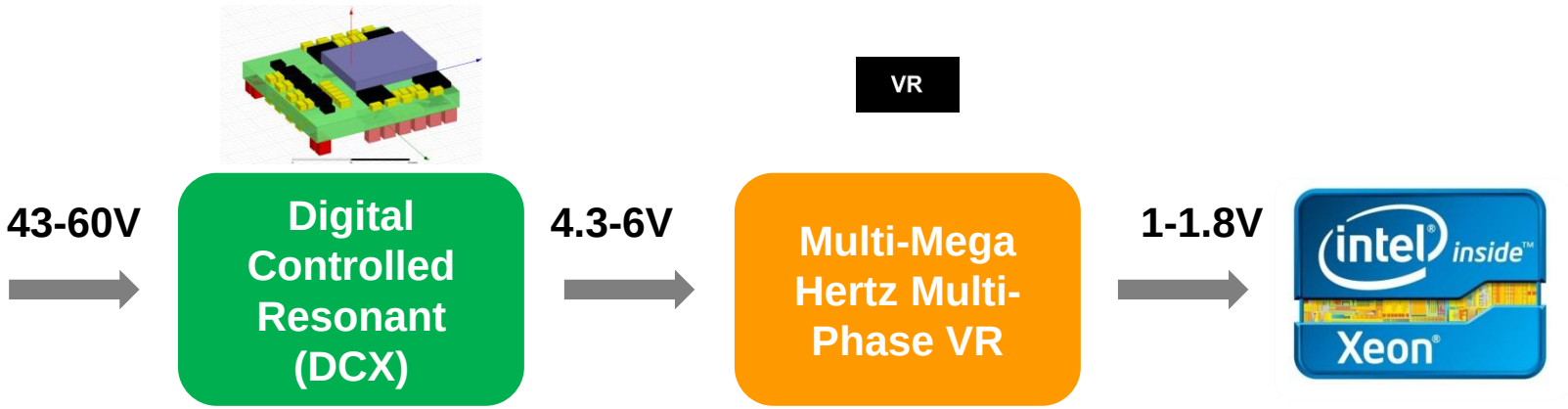


* Source: Nvidia GPU Conference, 2017

AI Engine Powered by MPS QSMOD-

Integration Brings Unprecedented Feature Sets to the System

Ready for the 48V Power Architecture for Data Centers



2-Stage Structure

- **Simplicity – well-understood architecture**
- **Scalability – can address different power levels**
- **Transient performance – independent second-stage offers superior performance**
- **Interchangeability – each stage can be upgraded independently**
- **Efficiency. Size. Cost – Optimized.**

Intel image source: https://en.wikipedia.org/wiki/Xeon#/media/File:Intel_xeon_inside.jpg

Autonomous Driving

MPS Powered AI Datacenters Allow Autonomous Vehicles to Learn…

Learning

Perception Prediction Policy

Inferencing

Next step- the inference engine that resides on the AV itself is what MPS will power!

The Evolving of the Computing Eco-System

Datacenter, Cloud

5G Network, Coming Soon →

5G Enabled Cloud 2.0

Happening Now →

Hyper Converged
- **-Storage**
- **-Computing**
- **-Networking**

MPS High Speed, High Density Power Solutions- Well Suited for Computing Infrastructure Now and Beyond

We Are the Champion

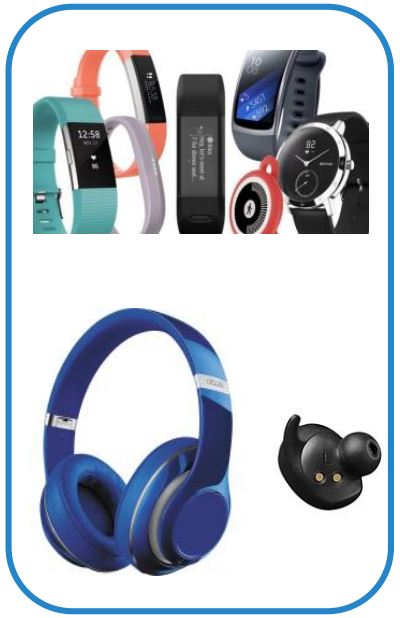
TOKYO 2020

Proudly Powering Olympics

Battery Management

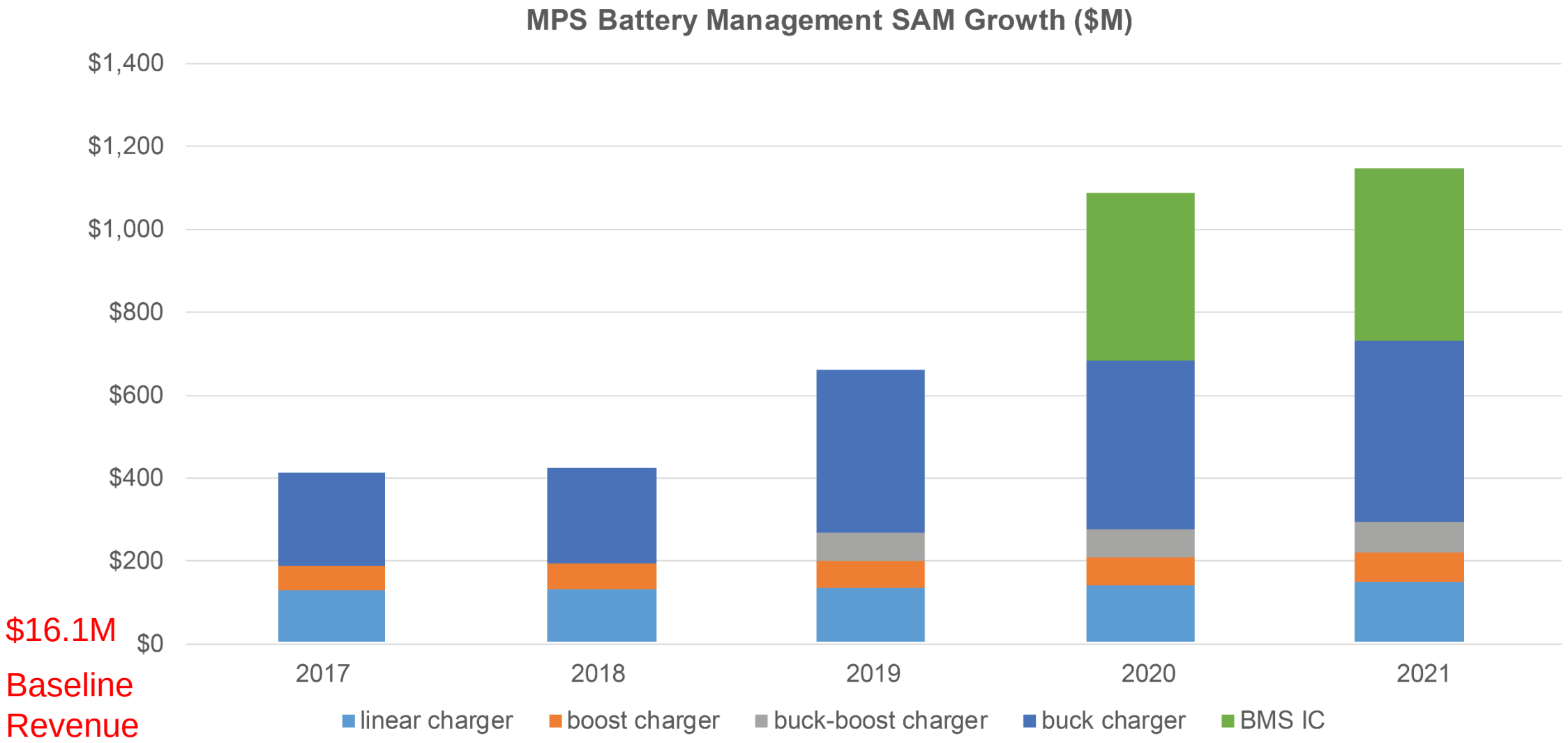
Chris Sporck

MPS Battery Management Applications

Portable Power	2-6 Cell non-USB Applications	Wearable Devices	Connected Devices	Mobile Computing	Battery Management Systems (BMS)
					

Increasing Value

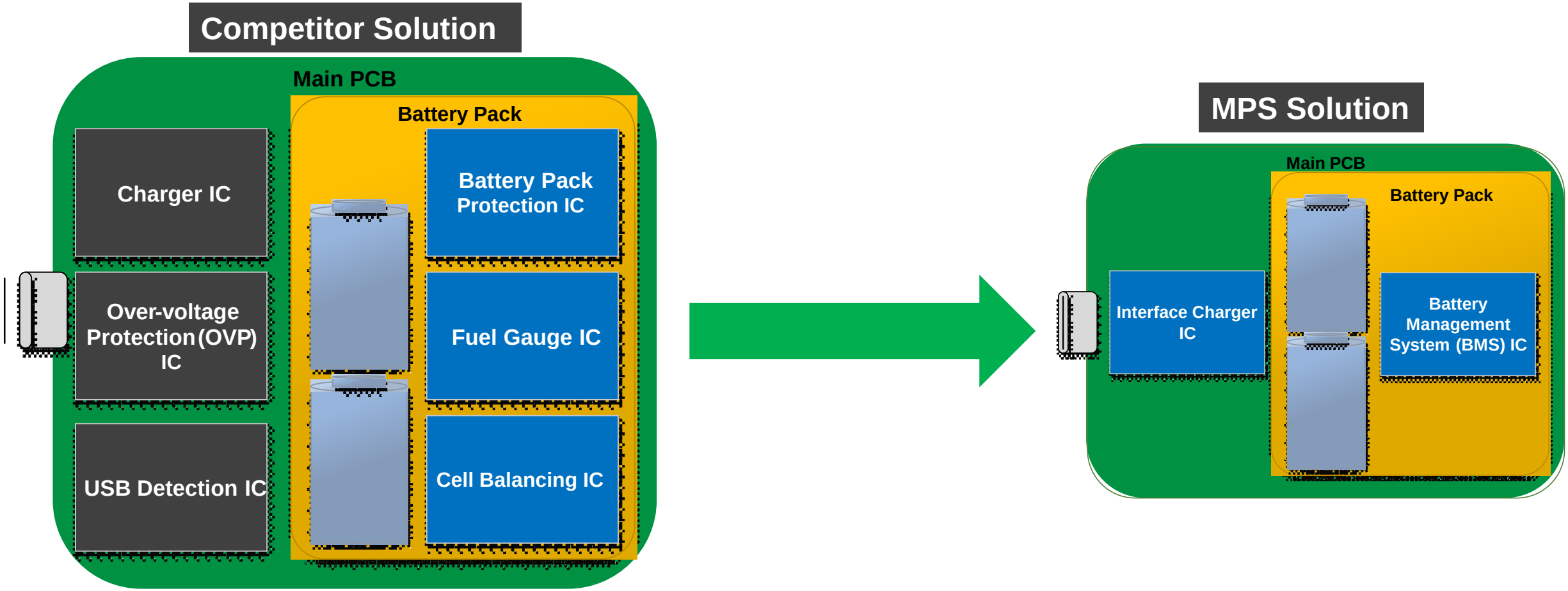
MPS Battery Management SAM Growth



$16.1M

Baseline Revenue

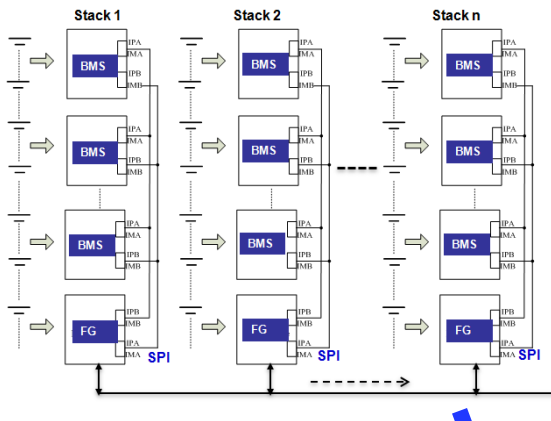
MPS Battery Management Advantages



- MPS solutions use our leading power FET technology to offer a high level of integration which means smaller total solution size, easier system design, and better cost structure

Battery Management System (BMS) Growth Markets

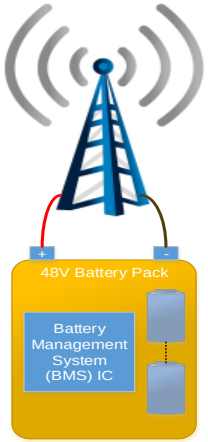
MPS BMS Solutions



Power Tools

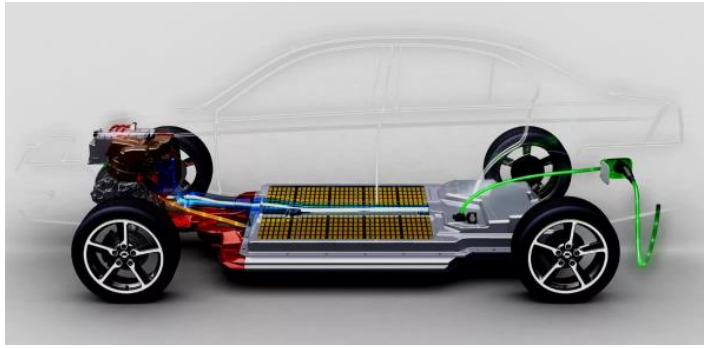
E-Bike

4G/5G Towers

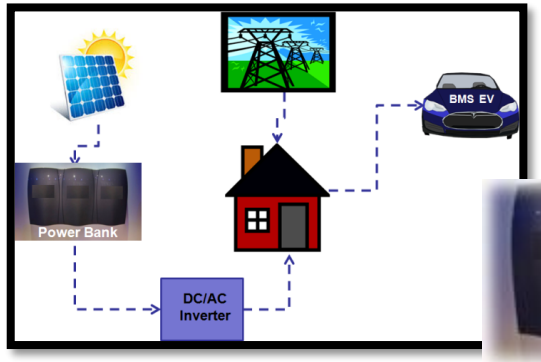


Factory Robots

EV

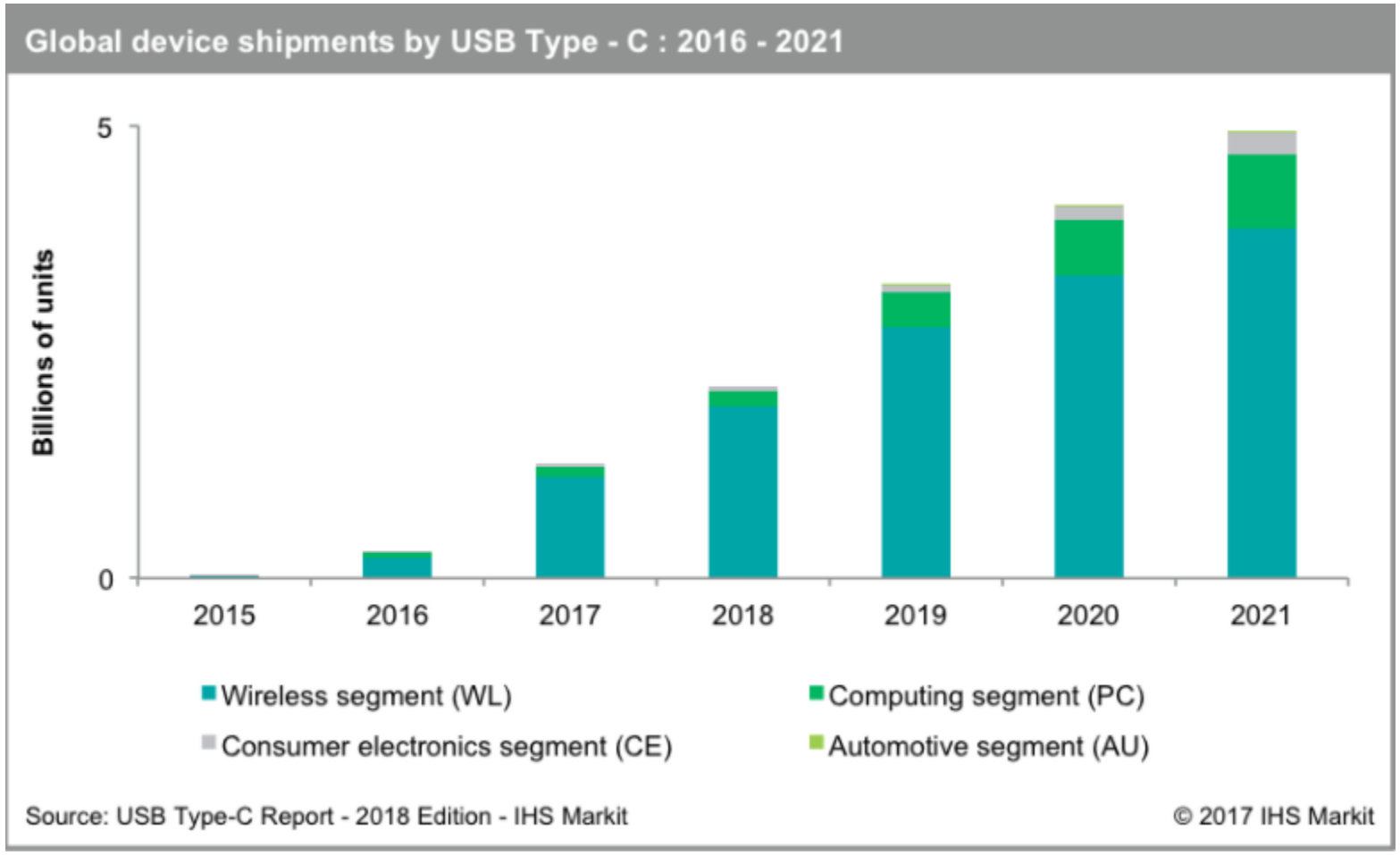


Home Backup



15KW Pack

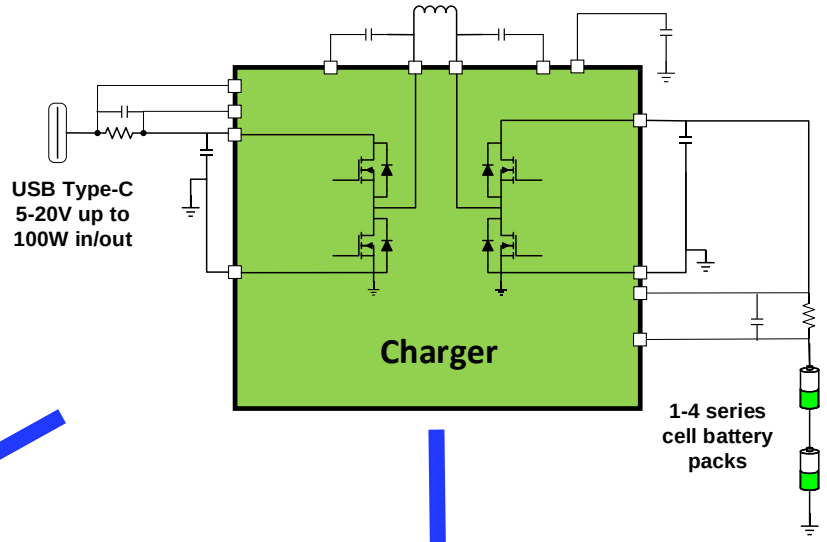
Capitalizing on USB Type-C and PD Expansion



- CAGR of 105% over the next 5 years and $3B TAM in semiconductor IC revenue in 2021
- MPS currently has key design wins in the Wireless and Consumer electronics segments

USB Type-C and PD Charging Growth Markets

MPS USB-C Charging Solutions



Wearable

Notebook & 2-in-1

Connected Devices

Portable Power

Smartphone & Tablet

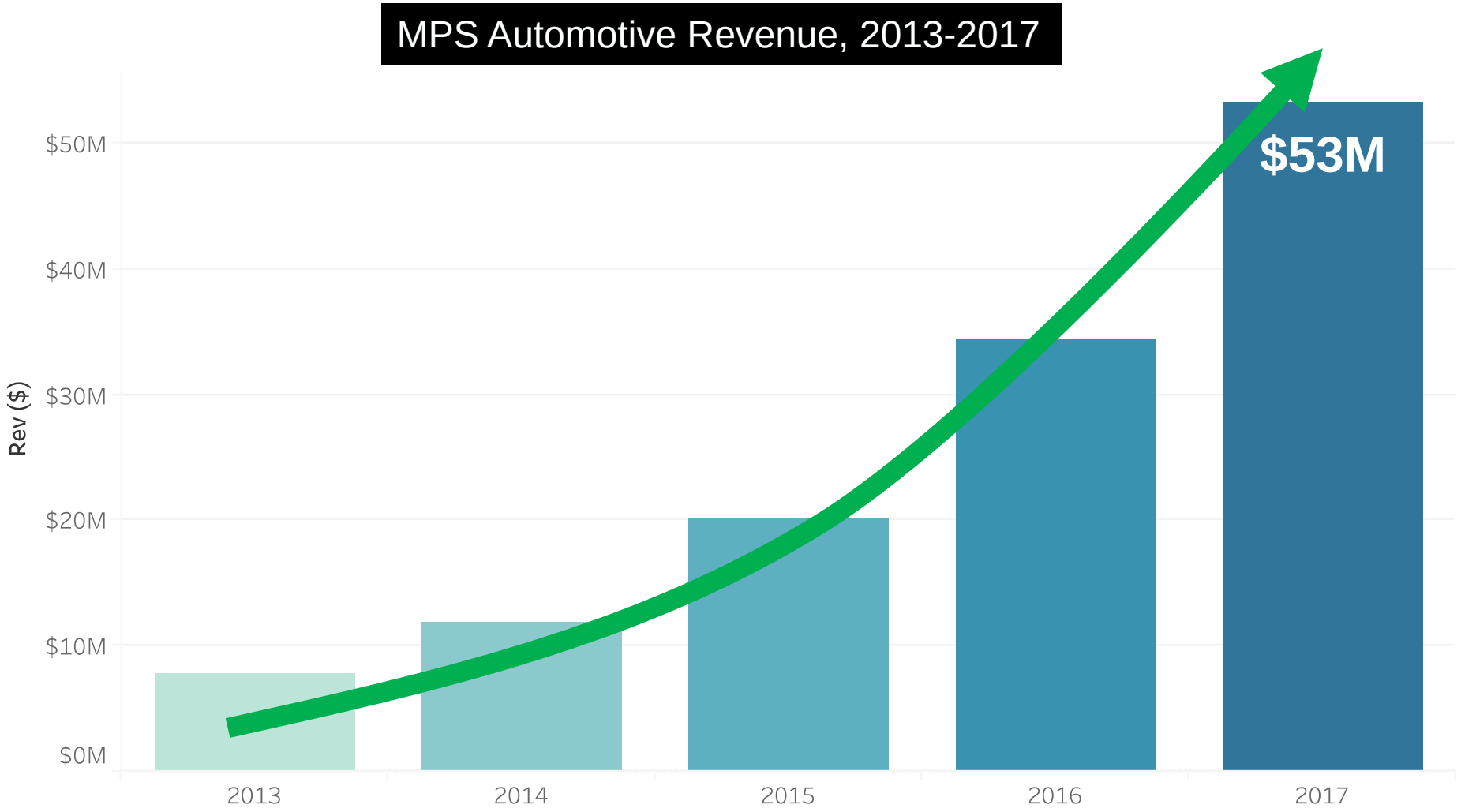
Why MPS Battery Management Will Win

- Increasing product offering diversity driving SAM expansion
- Growth strategy focused on high level of integration of charger, BMS, USB, and protection functions
- Fully monolithic chargers for high-power USB Power Delivery applications
- R & D investment on precision accuracy monitoring and protection circuits for BMS

Automotive

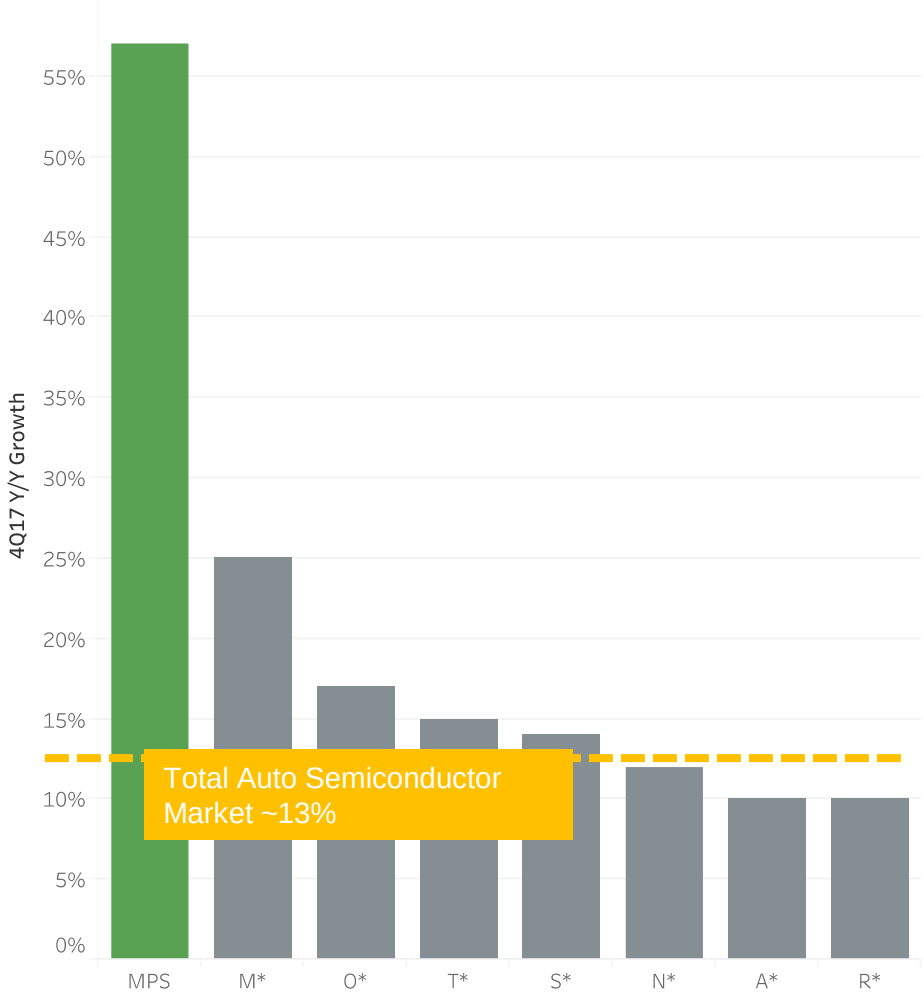
Allen Chen

MPS Automotive Growth is Accelerating



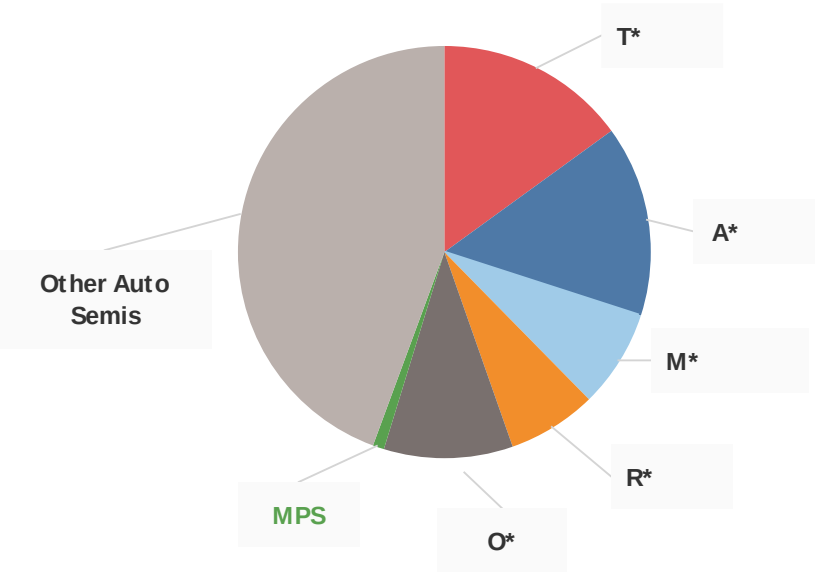
MPS Automotive Growing Over 4x Market

4Q17 Auto Revenue Growth, YoY



Source: *Deutsche Bank automotive semiconductor market tracker*

Auto Power Management Market Share

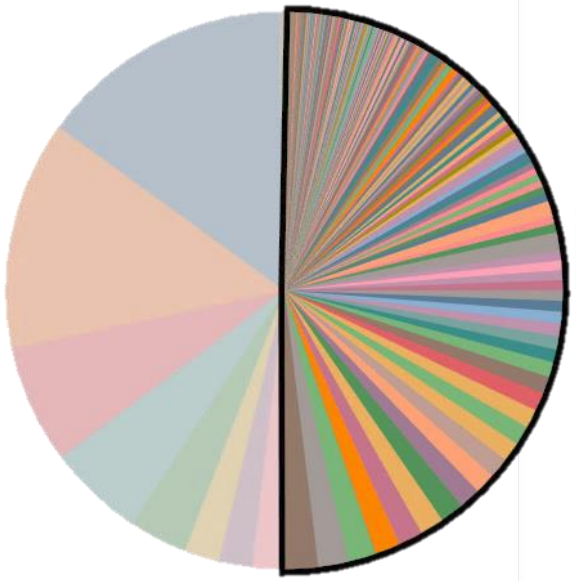


Power TAM: $7B

Source: *MPS internal analysis, competitor annual reports*

Great Revenue Diversification

Revenue Mix by Customer



50% of automotive revenue comes from ‘long tail’ customers

Key Regions

Automotive revenue shared amongst Europe, China, Japan, South Korea

MPS Ramping At Half of Top 50 Tier 1s

…and engaged with most of the rest

Tier 1 Automotive Suppliers

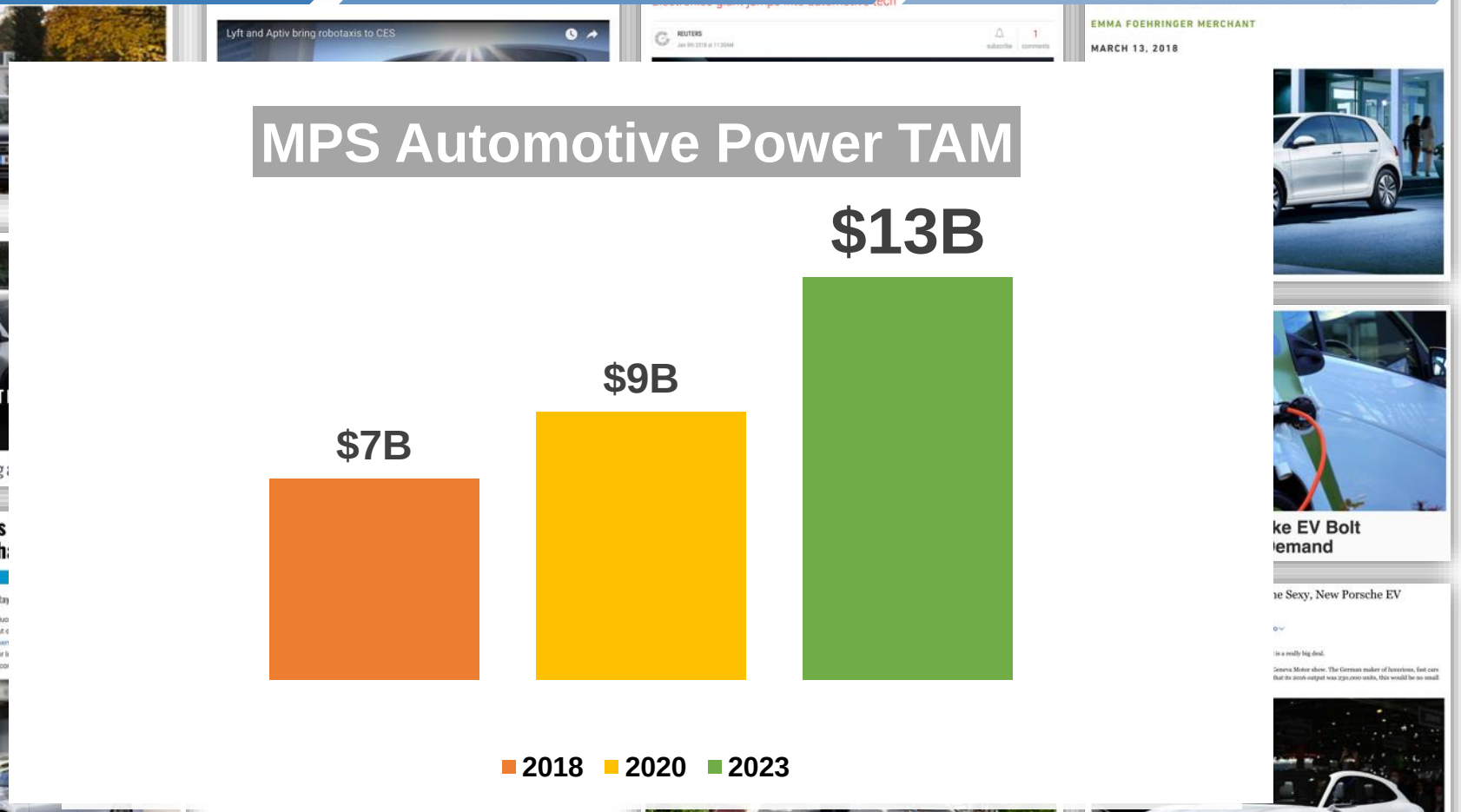
BOSCH
Continental
Autoliv
MARQUARDT
MAGNA
novero
ZF
Panasonic Automotive
HYUNDAI MOBIS
Visteon
DESAY
Valeo
APTIV
HARMAN A SAMSUNG COMPANY
HELLA

OEMs

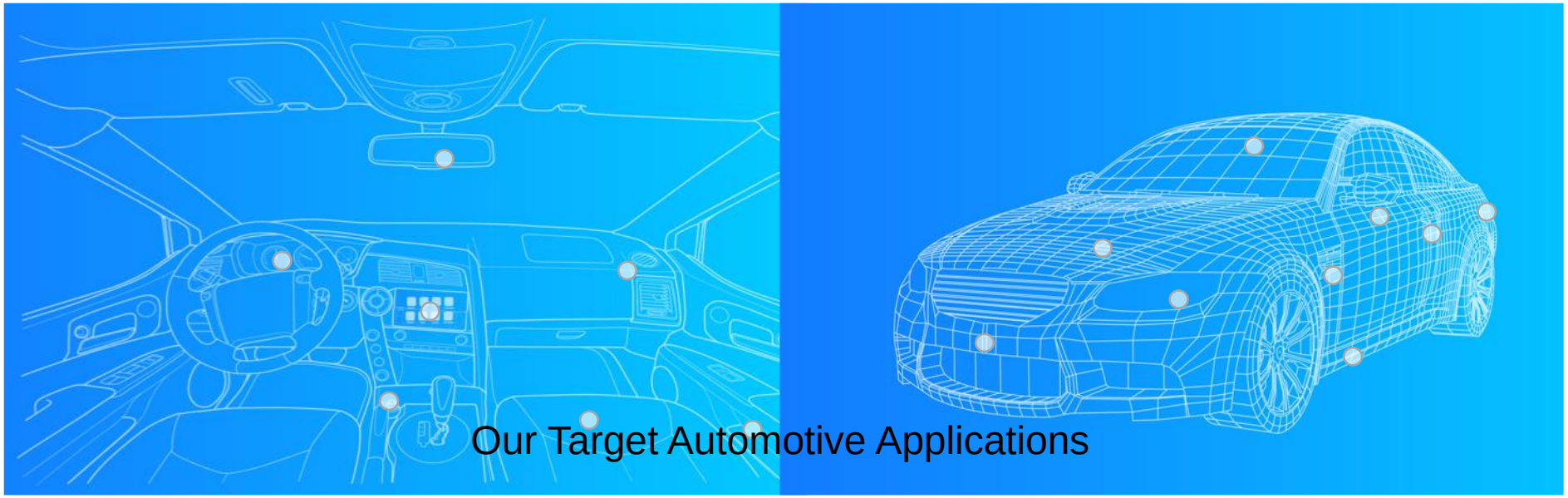
VW
BMW
GM
TOYOTA
GEELY
TESLA
Ford
RENAULT
NISSAN
mazda
HYUNDAI
Mercedes-Benz

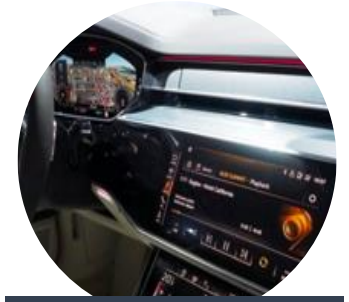
Three Major Automotive Trends

Autonomous Driving → Connected Cars → Electrification



Our Target Automotive Applications

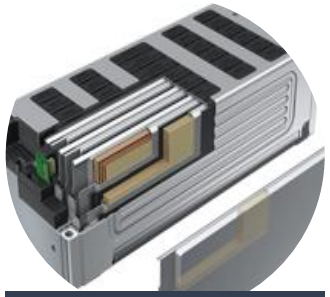




Digital Cockpit
Infotainment, Cluster, HUD, USB Charging

Lighting
Matrix Headlamp, Dynamic Lighting, Interior

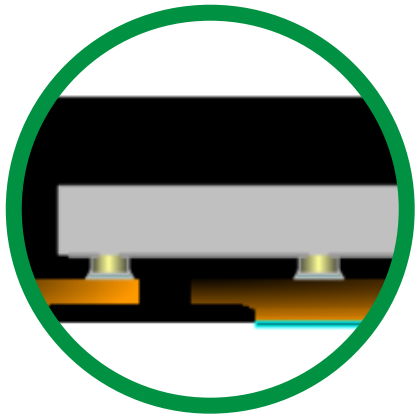
Body Electronics
HVAC, Seat, Lift Gate, Auto Door Handle, Moonroof



Battery Management
48V, HEV, EV

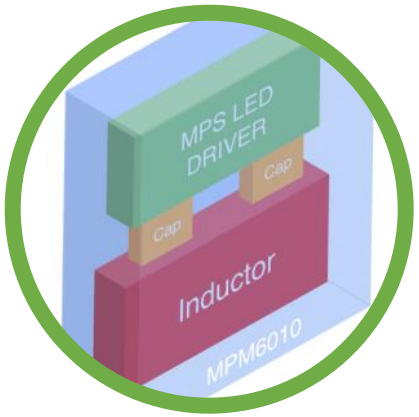
ADAS
Radar, Camera, Lidar, Self-Driving Compute

Technology is Our Core Advantage



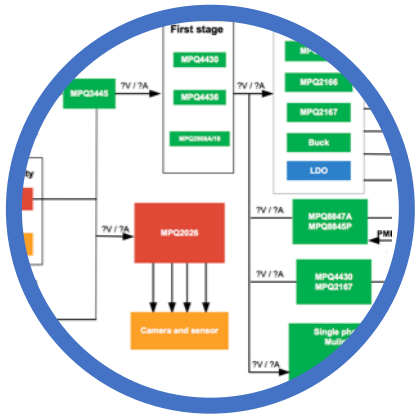
Packaging

- **1ST AUTO QUALIFIED FLIP-CHIP POWER PART** approved by a major Tier 1 (top 5)
- **2X POWER DENSITY** vs competition
- **BILLIONS** of units shipped – solid track record



Integration

- **WORLD'S MOST COMPACT** integrated LED driver module (with inductor)
- **4X SMALLER** than similar automotive solution from competition

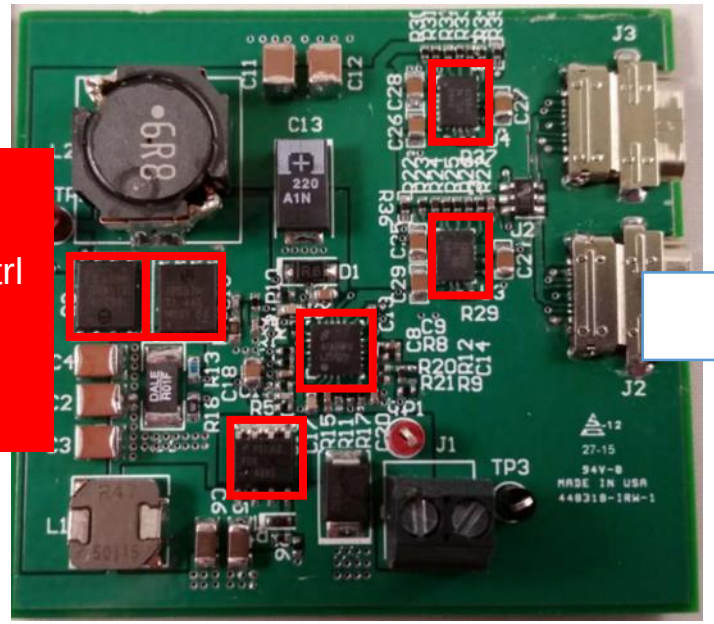


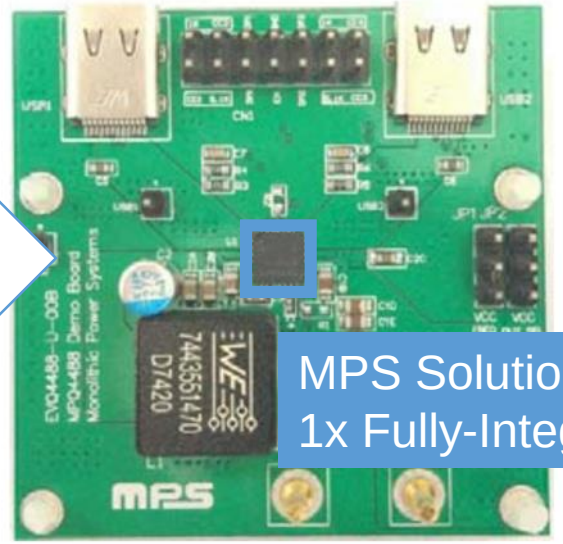
Full Power Tree

- **ONE-STOP SHOPPING** for <u>every</u> power rail
- **ADVANCED FEATURES** like digital programmability
- **RESIDENT EXPERTS** on hot topics like EMI and Thermal Management

Higher Integration: USB Charging, Power Modules

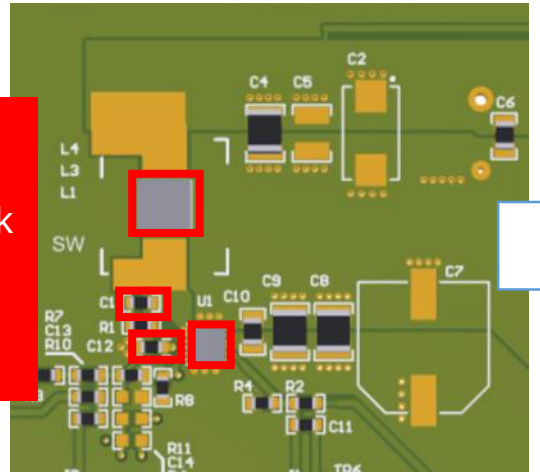
Competitor:
1x Buck Ctrl
2x Type-C Ctrl
1x DCP Ctrl
2x FETs
= 6 Parts

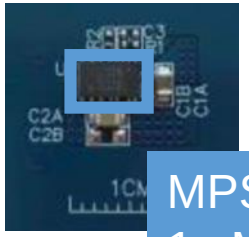




MPS Solution:
1x Fully-Integrated IC

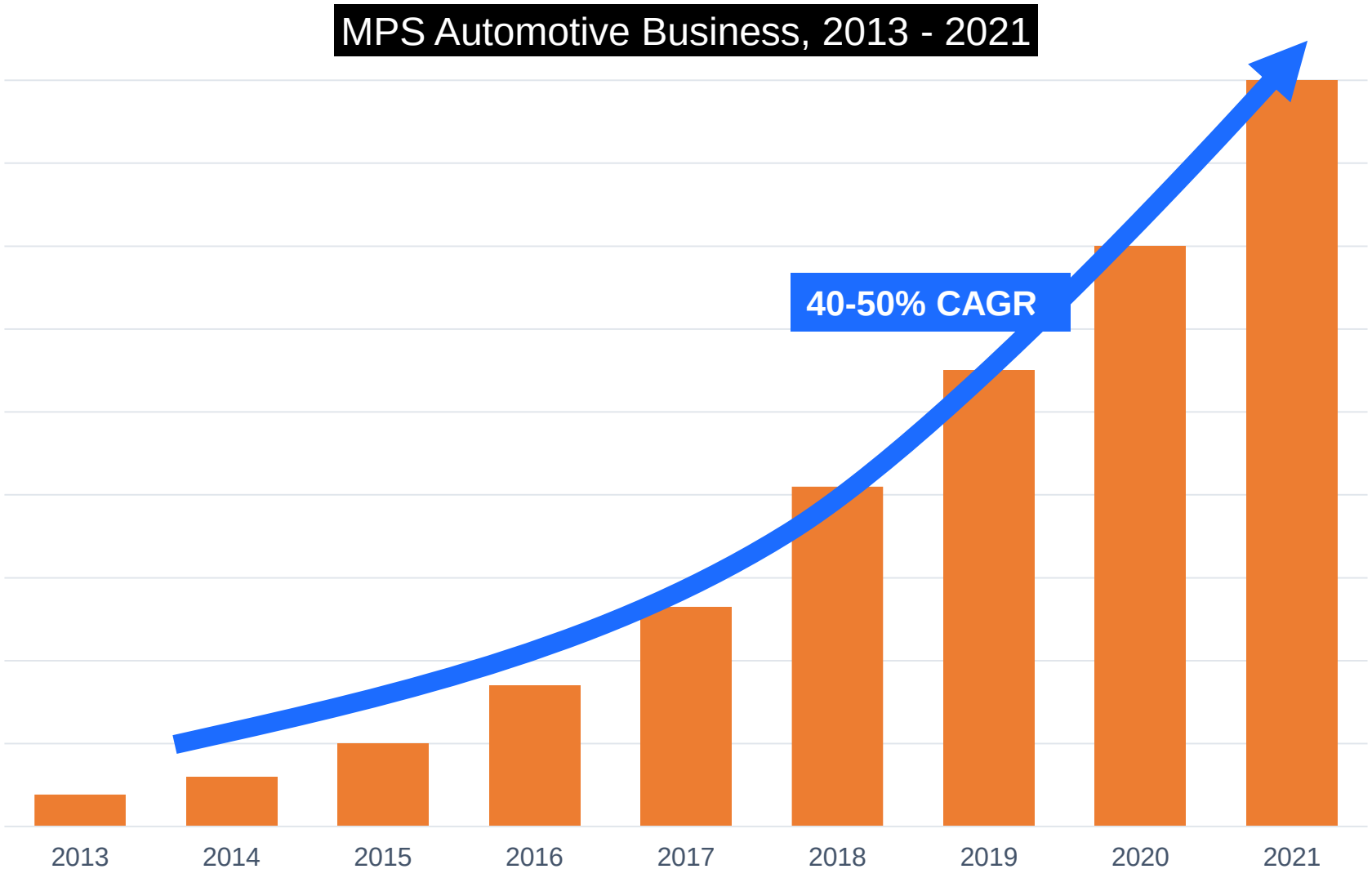
Traditional Solution:
1x Sync Buck
1x Inductor
2x Caps
= 4 Parts





MPS Solution:
1x Module

Automotive Long Term Goal



Michael Hsing

CEO

MPS

e.Motion™

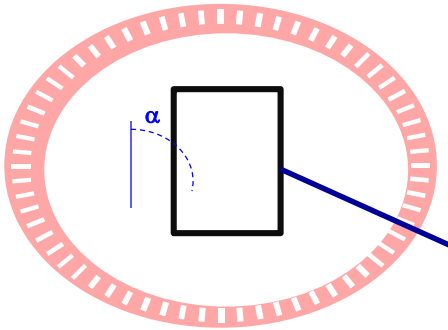
A Market in Motion

Jens Muttersbach

MPS

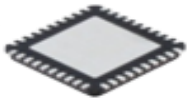
How does *e*.Motion™ work?

Sensima
3D magnetic field measurement



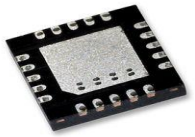
Width of a hair!

MPS Algorithm



e.Motion™
Platform

MPS
Integrated Motor Driver



Or

Competitor's solution

Eliminates electronic design!
Only needs software code adjustment!

Simple, Easy Solutions

e.Motion™

Our Solution for Integrated Motion Control

One-stop Solution for Advanced Drive Tasks

POSITION SENSING

Angle Feedback

Magnetic

Small & Robust

MOTOR DRIVERS

Energizing the Windings

Efficiency

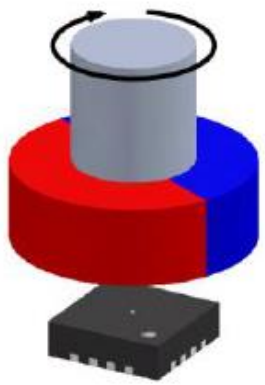
Size

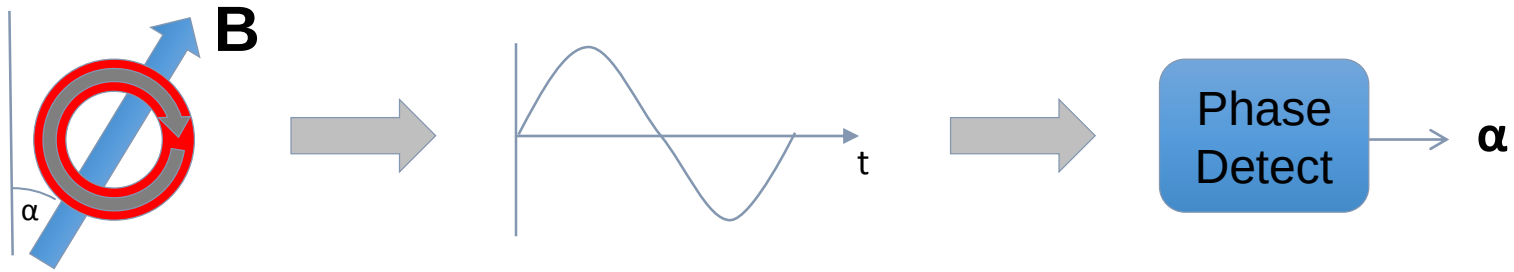
Huge and Diverse Market

	Consumer	Industrial	Automotive
Pure Sensing			
Controlled Motion			

MPS Spinaxis Technology– Our Unique Advantage

- MPS proprietary
- Integrated angle sensor
- Based on a simple time measurement





Customer Benefits

Replace bulky optical encoders	Lower power consumption
Fast sensing	Small components
Robust setup	Attractive price

MagAlpha Angle Sensor Family has Promising Growth

20+ products already have design wins:

Consumer	Industrial	Automotive	Medical

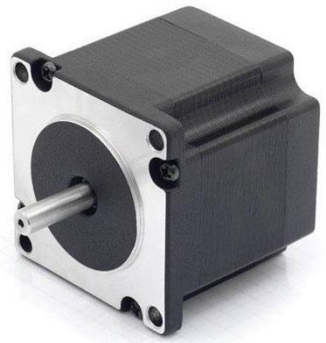
Controlled Motion

Leveraging MPS' strength in power semiconductors

Technology | **Packaging** | **Testing** | **Support**

Customer benefits

Size | **Efficiency** | **Thermal** | **Cost**

Stepper	Brushed DC	Brushless DC
		

A lot of Drive in Motor Drivers

Portfolio addressing stepper, brushed and brushless DC motors

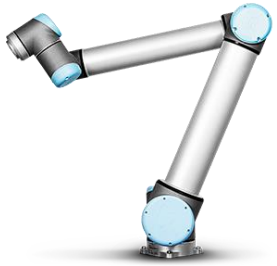
Providing high integration and efficiency in small footprints

Design wins:

Consumer

Industrial

Automotive



A Market in Motion

e.Motion™

Addresses the challenges & benefits of a growing market

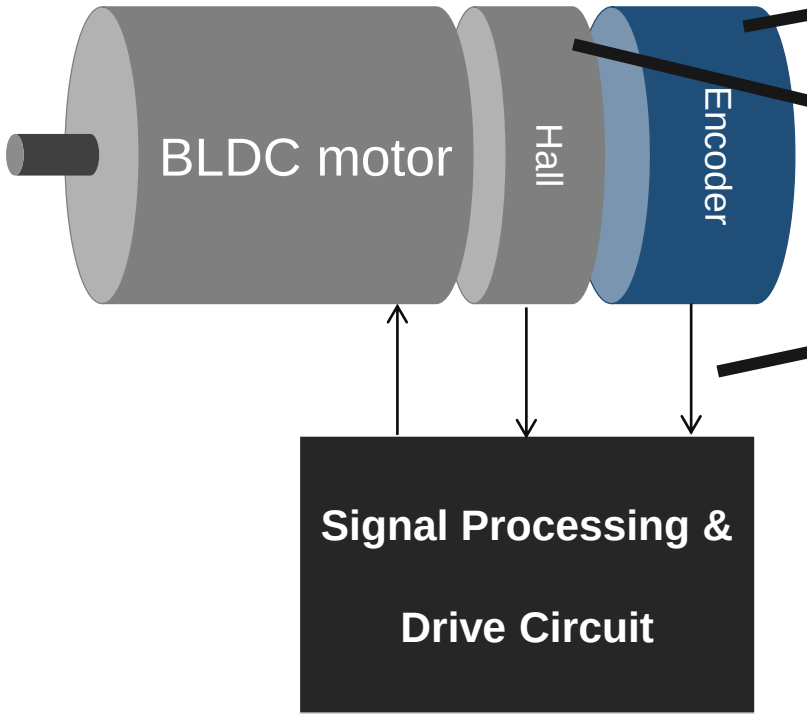
Motion control market trends

- Overall number of electric motors growing
- Strong trend towards brushless DC motors
  - **Efficiency**
  - **Space**
  - **Noise**
  - **Torque ripple**

- Challenge: cost for controlling BLDC motors

Typical Motion Control

Standard solution



Optical encoder: $2 … $100

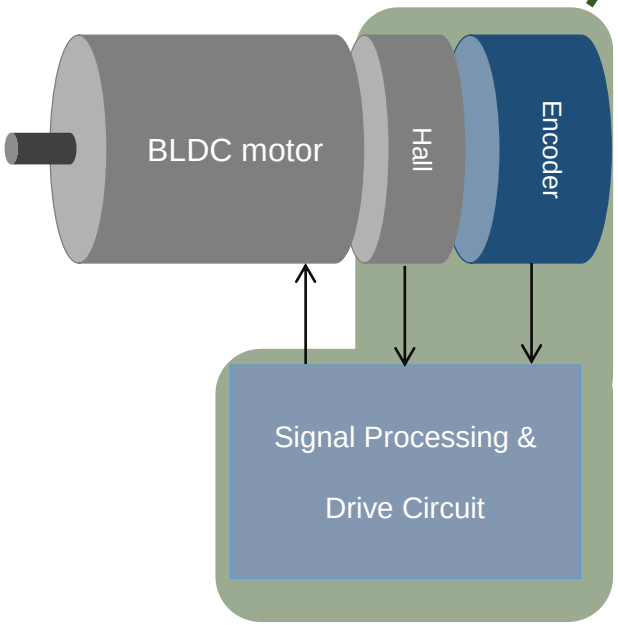
Hall elements: $0.5 … $2

Processing & drive circuit: $8 ... $50

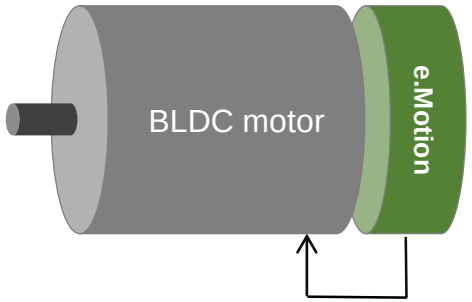
Overall System Size:
2x … 5x Volume of the Motor

Integrated Motion Control – e.Motion

Standard Solution

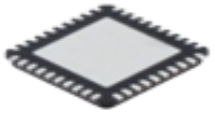


e.Motion™ solution



Position sensing
Signal processing
Motor driver

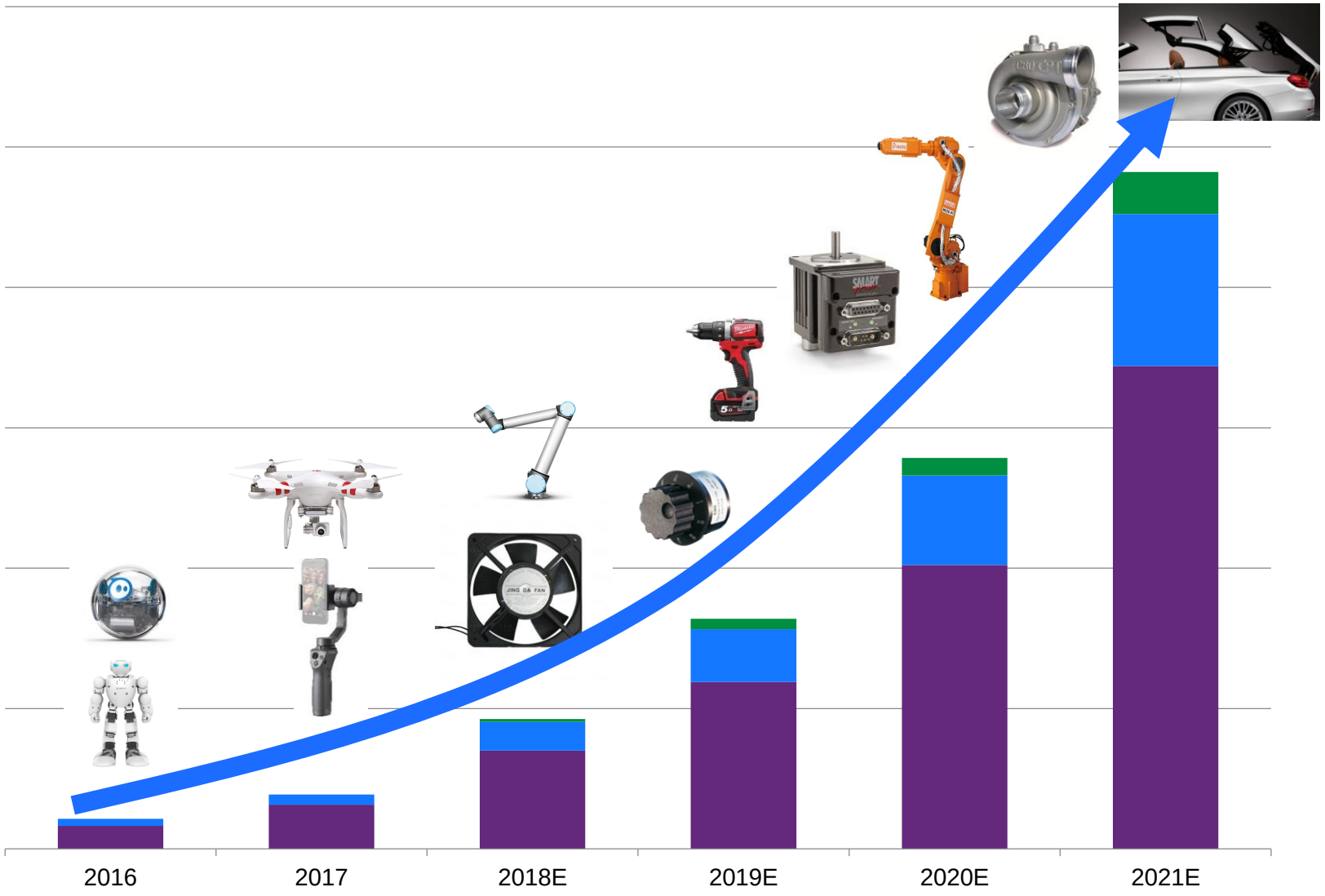
Combined into single e.Motion chip



4x4mm^2

Providing field-oriented control (FOC) algorithm to achieve best performance and efficiency

Motion Control Long Term Goal



60-80% CAGR

- Motor Drivers
- Position Sensors
- *e*.Motion™

Key Take-aways

- **Well positioned by unique technologies in both**
  - Magnetic position sensing
  - Motor drivers and pre-drivers
- **High growth rates in these markets**
- **Convergence into e.Motion**
  - Unique bundle for integrated motion control
  - High value for customers
- **Technical & cost advantage for customer**
- **Higher $ amount per application**

Michael Hsing

CEO

MPS

Product Families

AC/DC Power Conversion

- High-Voltage Buck Regulator
- High-Voltage LDO
- Flyback Controller
- Flyback Synchronous Rectifier
- Active PFC Controller
- LLC Resonant Converter Controller
- LLC Synchronous Rectifier
- PFC&LLC Combo Controller
- X Cap Bleeder

DC/DC Power Conversion

- Step-Up (Boost)
- Step-Down (Buck)
- Buck/Boost
- CPU Core Power
  - 50A DrMOS in a 5x5mm QFN

Battery Management

- Li-Ion Single and Multi-Cell
- USB Complaint Chargers
- Switching Chargers
- Linear Chargers
- Integrated Power Bank Solutions

Class-D Audio

- Analog Input Class-D Amplifiers
- PWM Input Power Stages

Display Backlighting Power

- Backlight Drivers
- Electro-Luminescent Drivers
- Photo Flash Drivers
- LCD Power Supplies

E-Fuse, USB & Load Switches

- Programmable Current Limit up to 50A per Device
- Adjustable Slew Rate
- Reverse Current Blocking
- Output Discharge (Load Switch)
- Integrated Auto Detection
- Pin Compatible
- Parallel able up to 10 Devices
- PMBus Command and Control

Automotive & Industrial

- AEC-Q100
  - DC/DC
  - LED Lighting
  - Power Modules
  - Motor Drivers
  - USB Charging
  - Display Backlighting
  - Precision Analog

LED Lighting & Illumination

- TRIAC Dimmable AC/DC LED Controller
- PWM and Analog Dimmable AC/DC LED Controller
- DC/DC LED Controller: Buck, Boost, & Buck-Boost
- LED Protection IC

Computing Power

- CPU Core Power
- High current DrMOS
  - 60A DrMOS in a 4x5mm QFN
- POL

Motor Drivers & Position Sensors

- Brushless DC Motor Driver
- Stepper Motor Driver
- Brushed DC Motor/Solenoid Driver
- Half-bridge/Full-bridge/Three-phase Power Stages
- Magnetic Angular Position Sensors

Power Modules

- 6V, 600mA- 4A
- 16V, 600mA – 60A
- 21V, 600mA – 2A
- 36V, 600mA – 5A
- 55V, 1A – 3A
- 75V, 300mA

Precision Analog

- Analog Switches
- Current Sense Amplifiers
- Operational Amplifiers
- Voltage Reference

$1B to $2B

MPS

quicktron

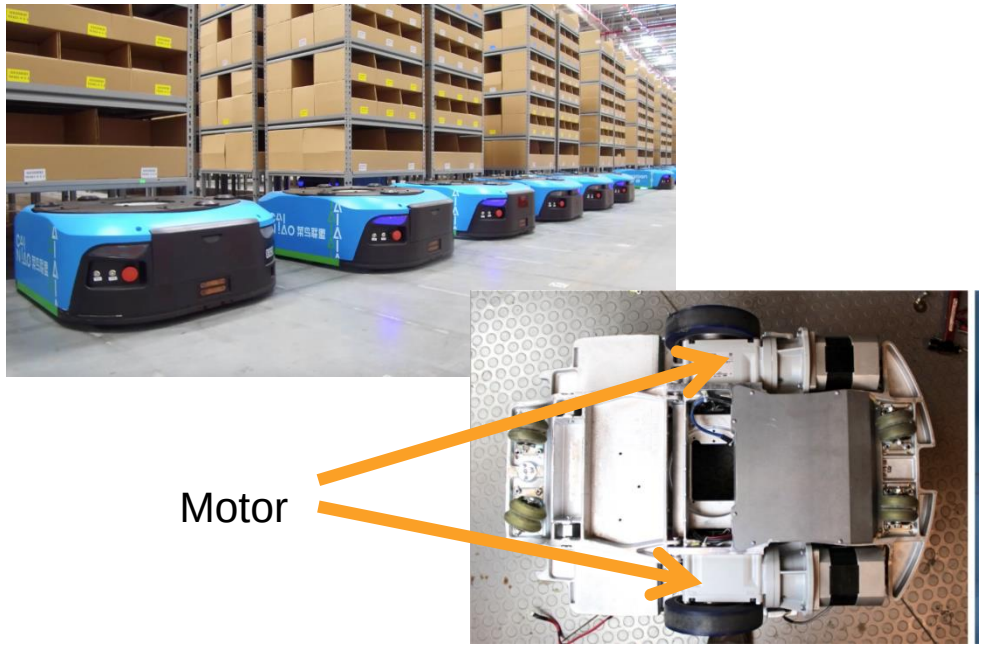
Parcel Sorters

Motor

Motor Control
& DCDC

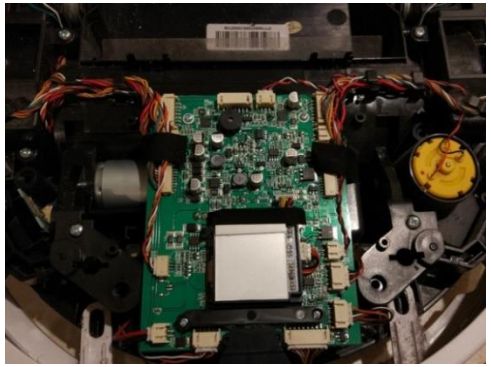
Optical
Encoder

Warehouse



Motor

Motor Control
DCDC
BMS



Battery

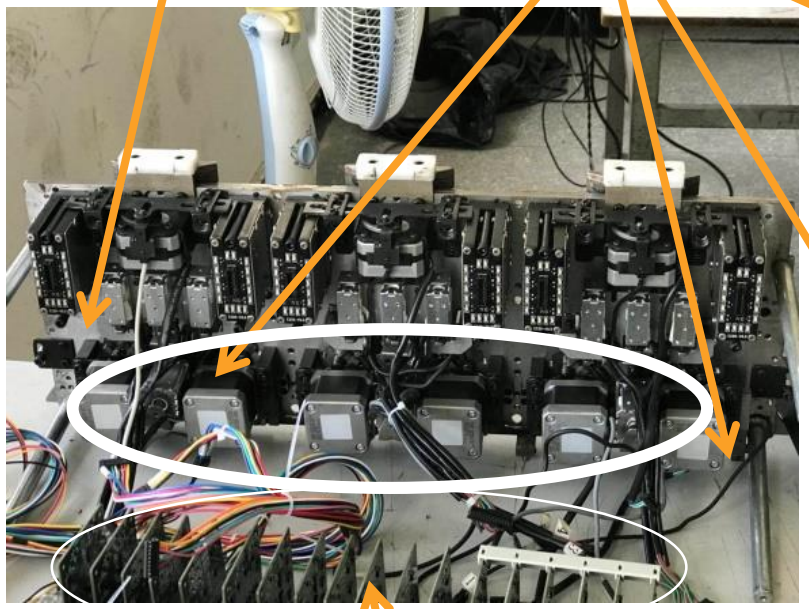
Textile Machinery Modernization

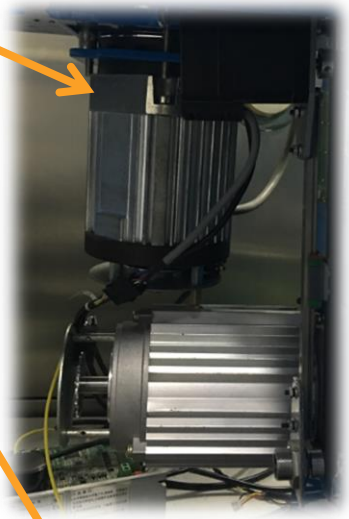
Motor control / DC-DC

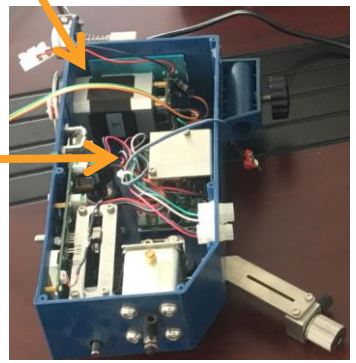
Textile Machine Teardown

Encoders

Motors







Motor Controllers & DC-DCs

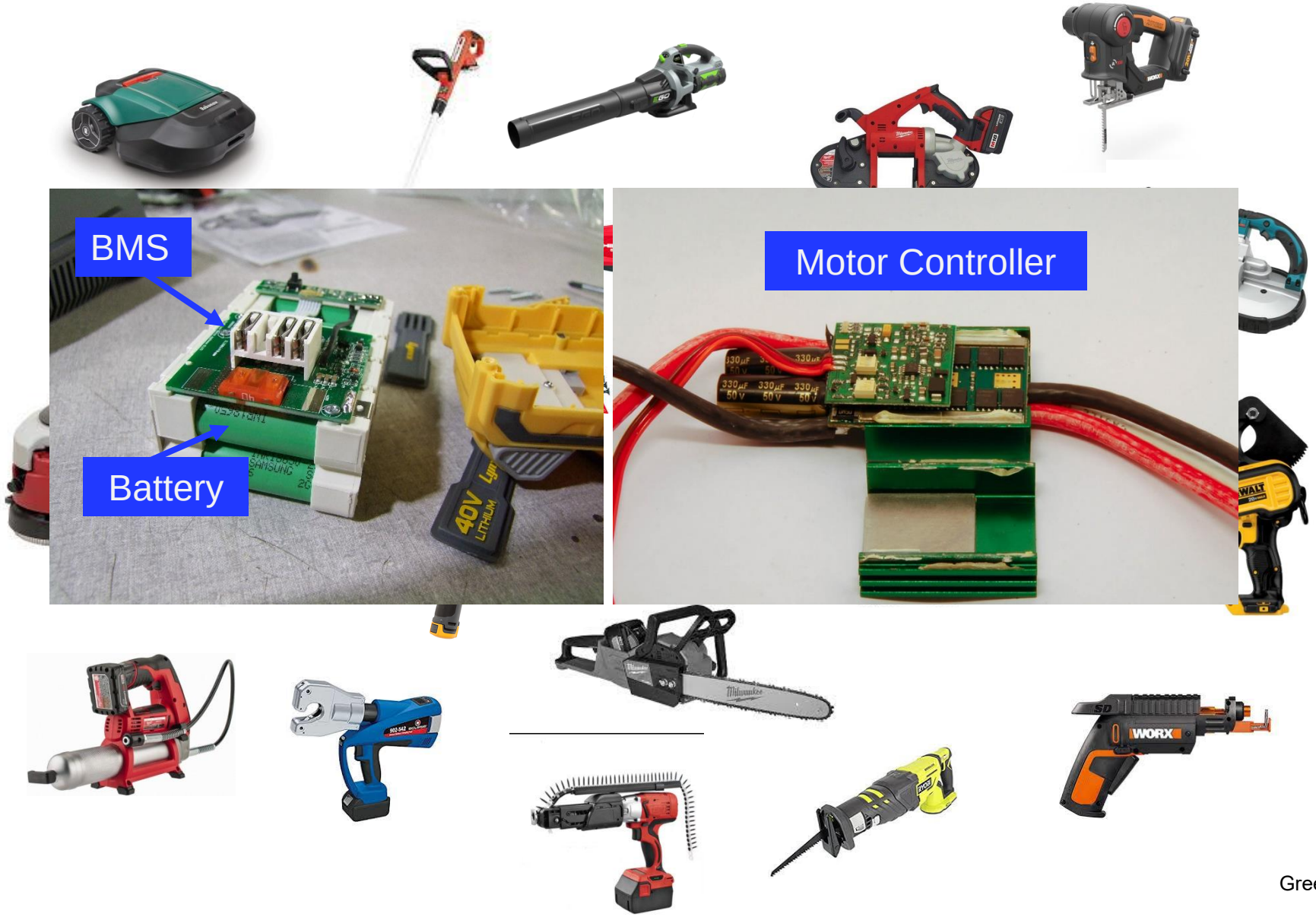
Building Automation

Air
Damper/Valve

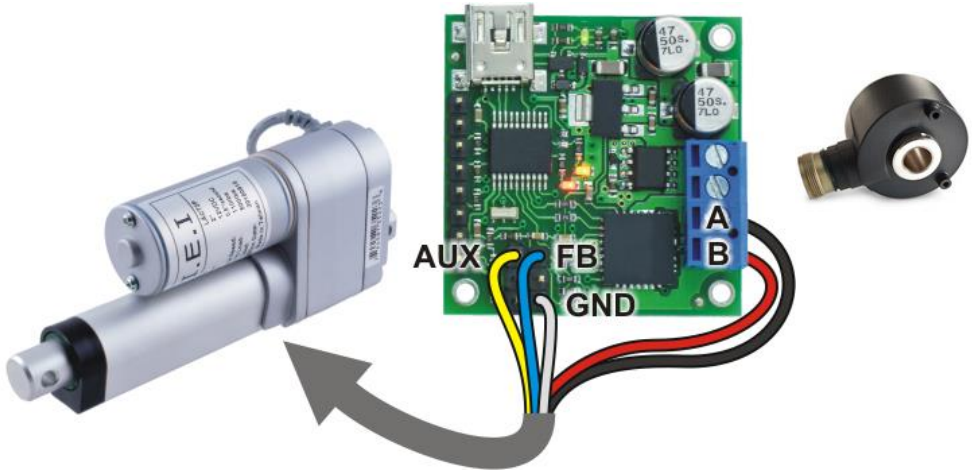
Fluid Valves
DC-DC, AC-DC

Motor Controller

Industrial Hand Tool Electrification

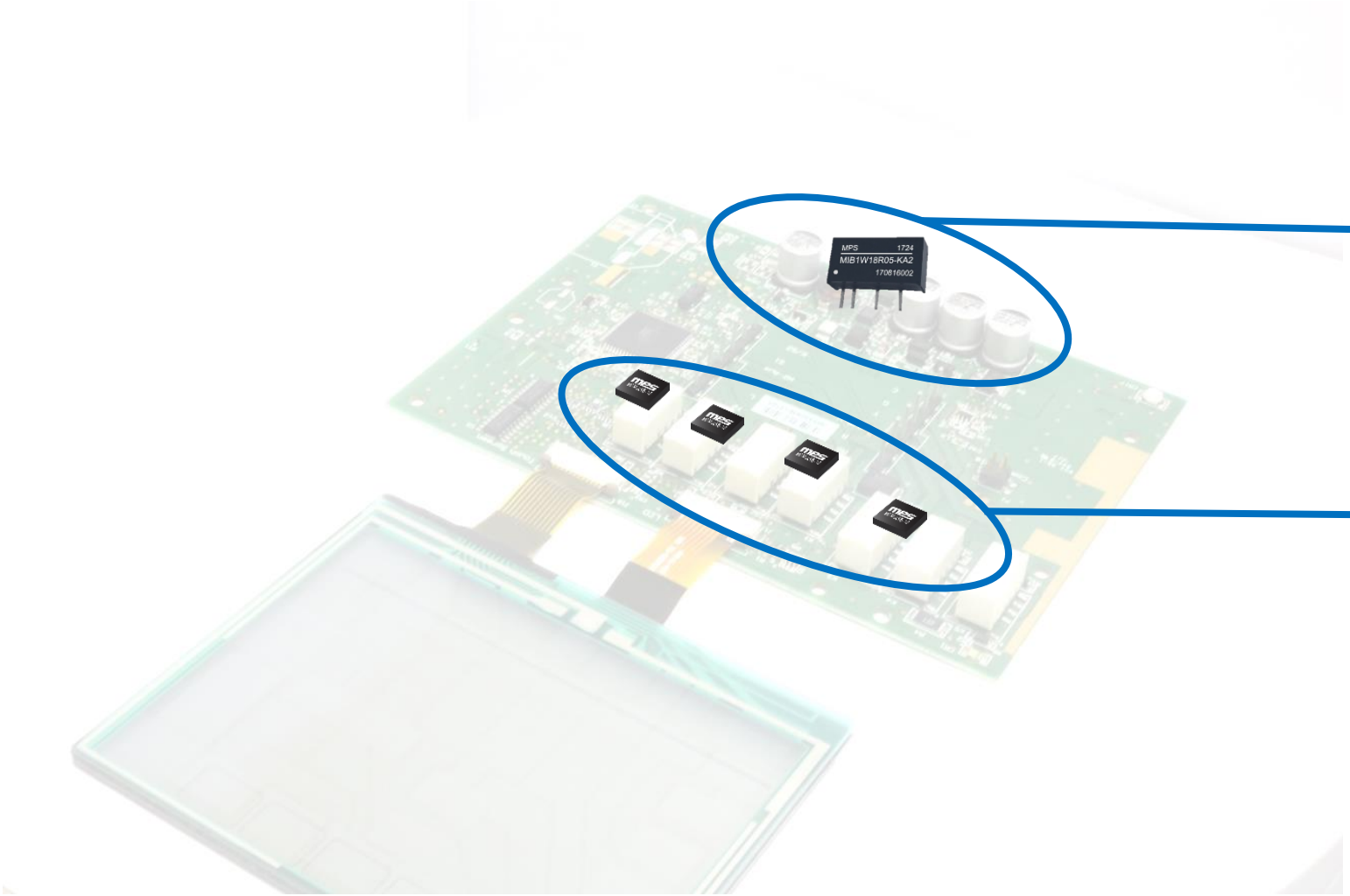


Others



Motor Control, DC-DC
AC-DC

Other Large Market Segment



ACDC, DCDC Replaced by on mEZ module

Relays Replaced by MPS electronic Relays

Leveraging 2000+ Products

AC/DC Power Conversion

- High-Voltage Buck Regulator
- High-Voltage LDO
- Flyback Controller
- Flyback Synchronous Rectifier
- Active PFC Controller
- LLC Resonant Converter Controller
- LLC Synchronous Rectifier
- PFC&LLC Combo Controller
- X Cap Bleeder

DC/DC Power Conversion

- Step-Up (Boost)
- Step-Down (Buck)
- Buck/Boost
- CPU Core Power
  - 50A DrMOS in a 5x5mm QFN

Battery Management

- Li-Ion Single and Multi-Cell
- USB Complaint Chargers
- Switching Chargers
- Linear Chargers
- Integrated Power Bank Solutions

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- Analog Input Class-D Amplifiers
- PWM Input Power Stages

Display Backlighting Power

- Backlight Drivers
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- LCD Power Supplies

E-Fuse, USB & Load Switches

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- Reverse Current Blocking
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- Parallel able up to 10 Devices
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- AEC-Q100
  - DC/DC
  - LED Lighting
  - Power Modules
  - Motor Drivers
  - USB Charging
  - Display Backlighting
  - Precision Analog

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- Stepper Motor Driver
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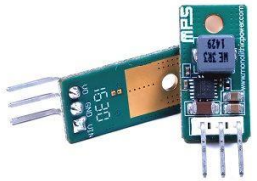
- 6V, 600mA- 4A
- 16V, 600mA – 60A
- 21V, 600mA – 2A
- 36V, 600mA – 5A
- 55V, 1A – 3A
- 75V, 300mA

Precision Analog

- Analog Switches
- Current Sense Amplifiers
- Operational Amplifiers
- Voltage Reference

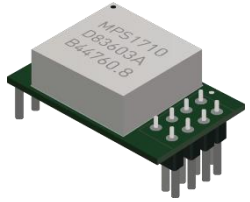
MPS Reconfigurable Standard Products

DC-DC



AC-DC

Motion Control



LED Lighting

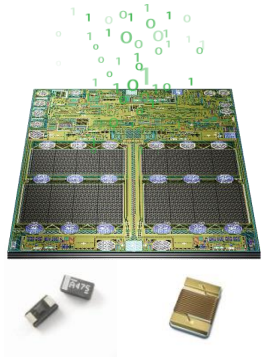
Audio Amp

Sensors

E to E through eCommerce

E to E through eCommerce

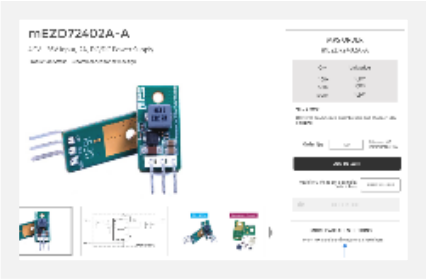
MPS AI Algorithm



BCD 5 Technology

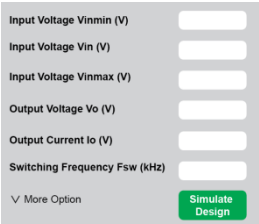
- Digital
- Memory
- Power
- Analog

eCommerce Website

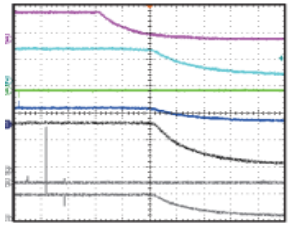


Interactive Web Based Design

User input



Performance Verification



Order

Auto Programming

Custom Parts

Delivered in Days

How MPS Wins with Field Programmable Modules and e-Commerce

Dean Gannon

Reaching Customers at Scale

Website Customer Acquisition

Paid Search

Direct

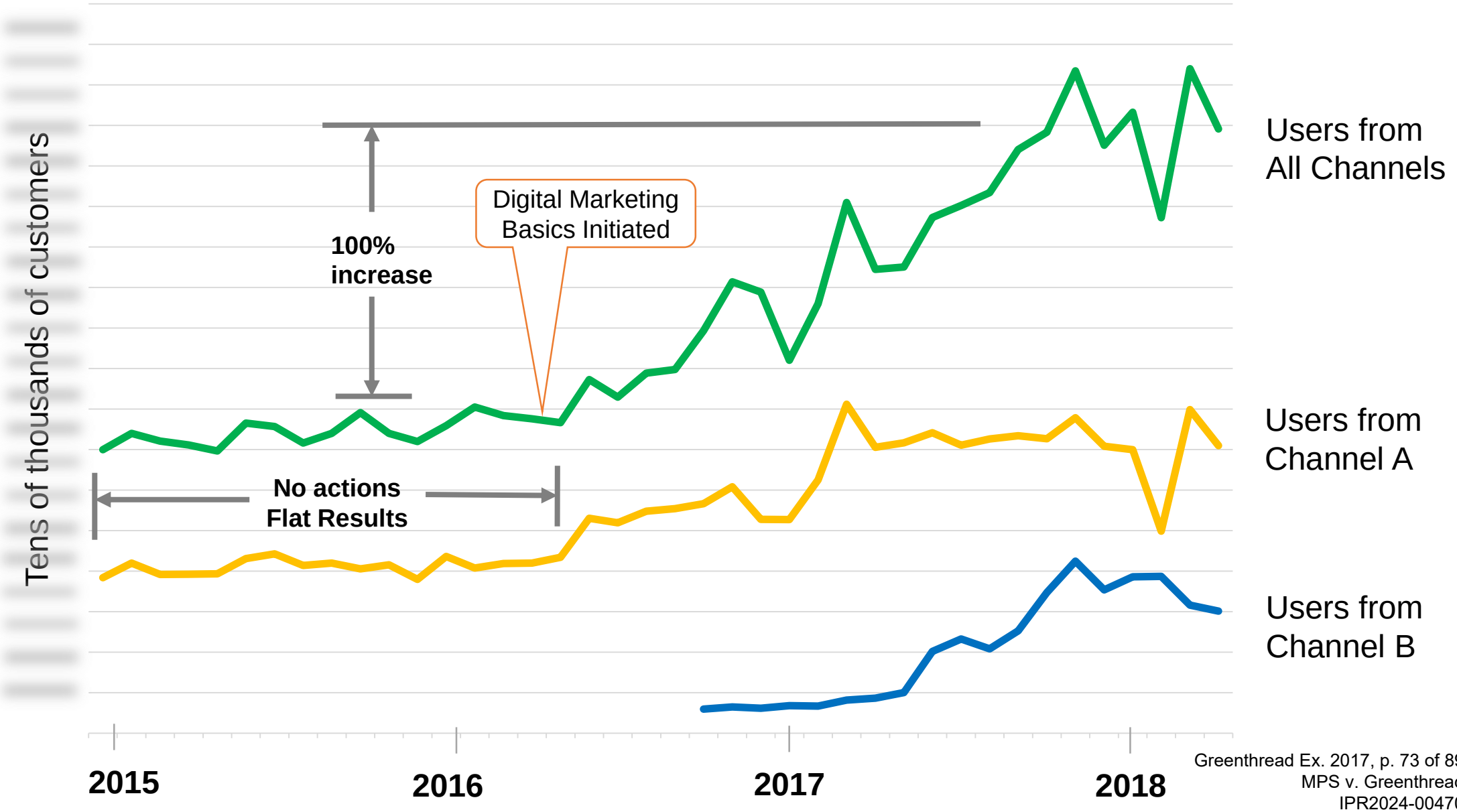
Referral

Social

Search Engines (SEO)

Email

Website User Growth



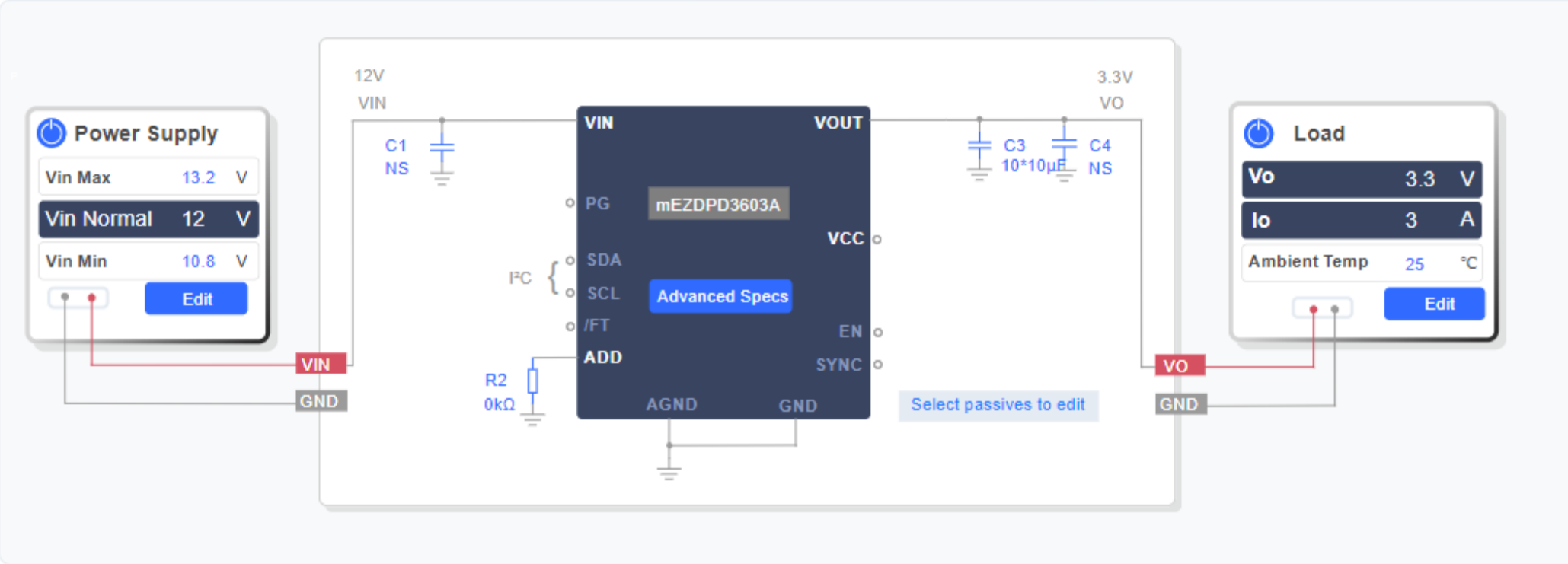
mEZD71201A-A - Step-D

Secure | https://www.monolithicpower.com/en/mezd71201a-a.html

STEP 1 **Create Your Design** | STEP 2 Evaluate Your Design | STEP 3 Get Production Ready

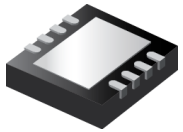
Name of Customer's Design v1.0

My Design: 2 Orderable 0 Modified | +NEW | Save



E to E Service/Solution through eCommerce

Every Design Customized



Input Voltage Vinmin (V)

Input Voltage Vin (V)

Input Voltage Vinmax (V)

Output Voltage Vo (V)

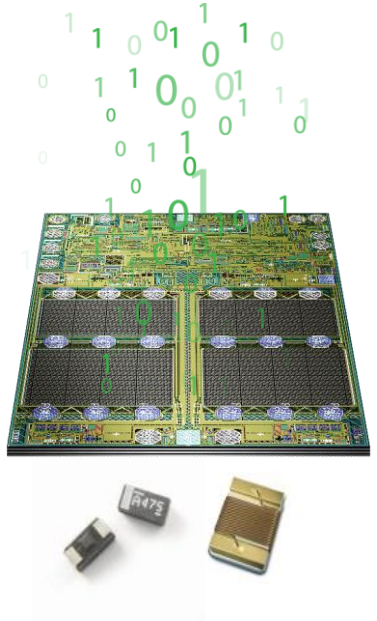
Output Current Io (V)

Switching Frequency Fsw (kHz)

∨ More Option

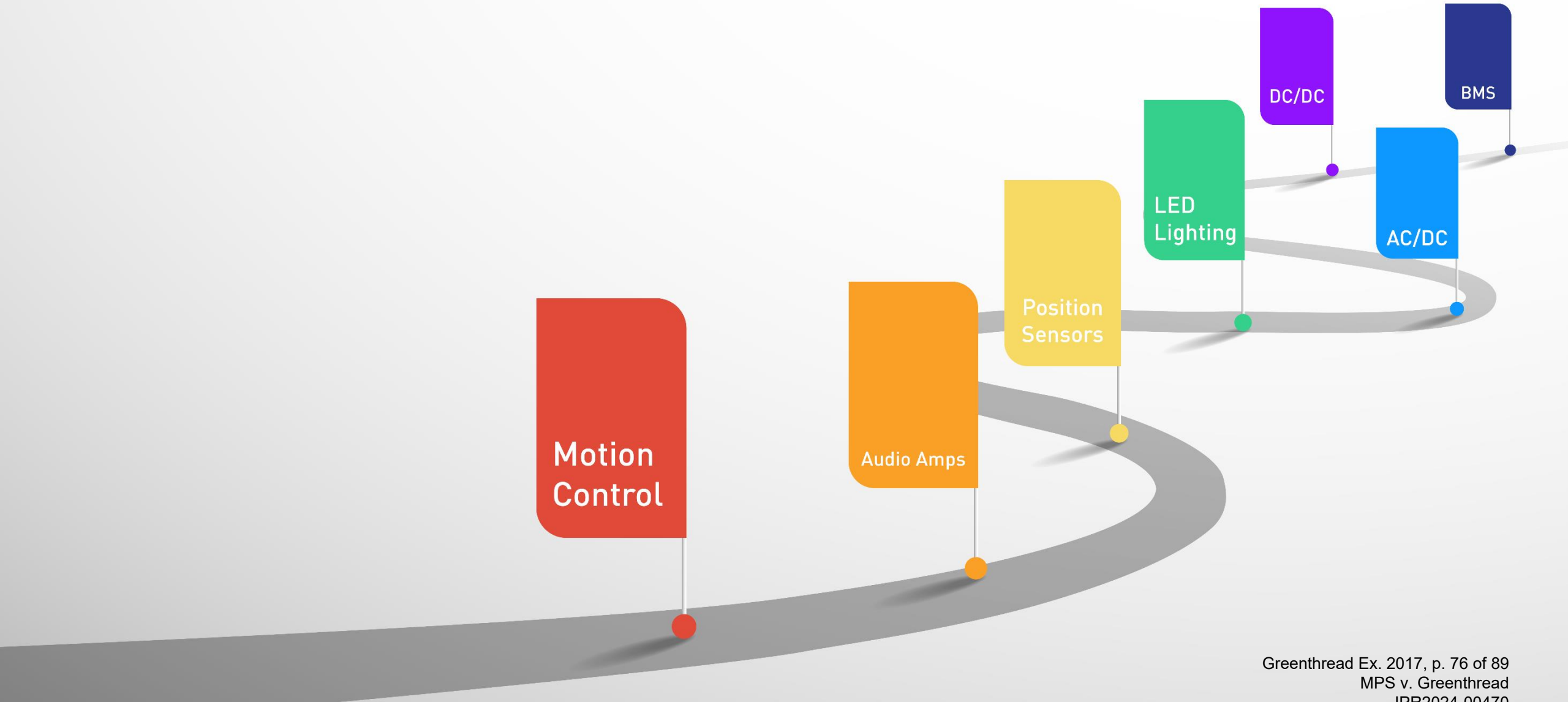
Simulate Design

MPS Algorithm

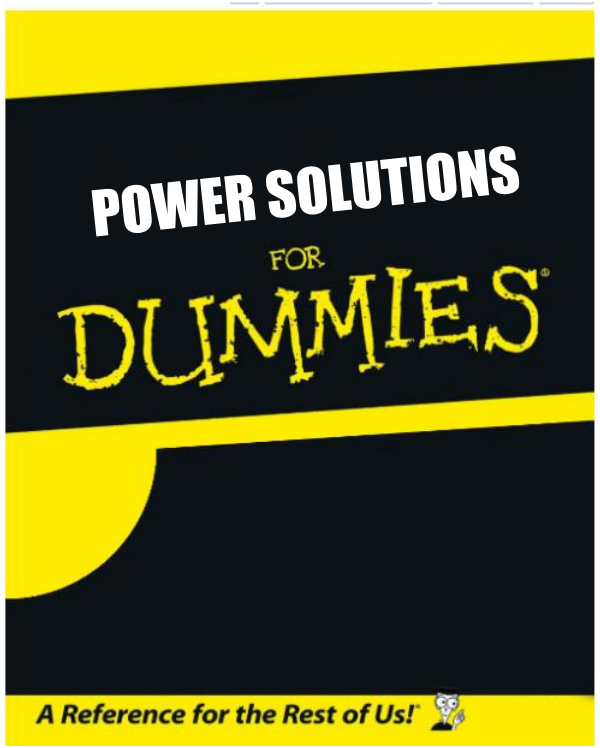


Custom Parts Delivered in Days

Product Roadmap



Turnkey Power Solutions



$9B Addressable Market

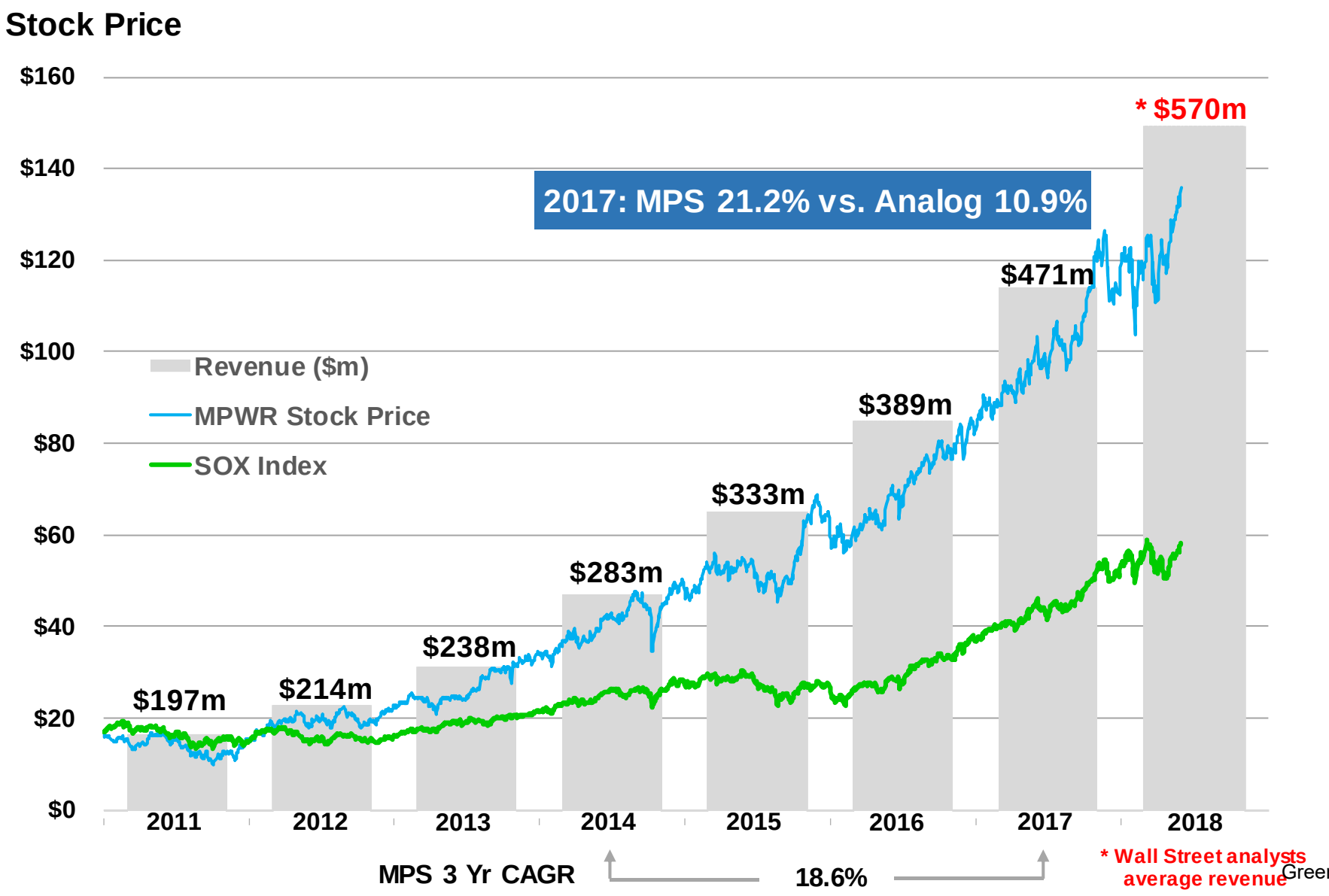
Financial Summary

Bernie Blegen

Q2 ‘18 Guidance

	Initial Guide April 26, ‘18	Updated June 7, ‘18
Revenue	$135 – $141M	**$138 – 141$M**
Non-GAAP Gross Margin%	55.4% - 56.4%	**55.6% – 56.4%**
Non-GAAP R&D + SG&A	$33.7 – $36.7M	**$34.7 – $36.7M**
Stock Comp	$15.2 – $17.2M	**$15.2 – $17.2M**
Fully diluted shares	43.9 – 44.9M	**43.9 – 44.9M**

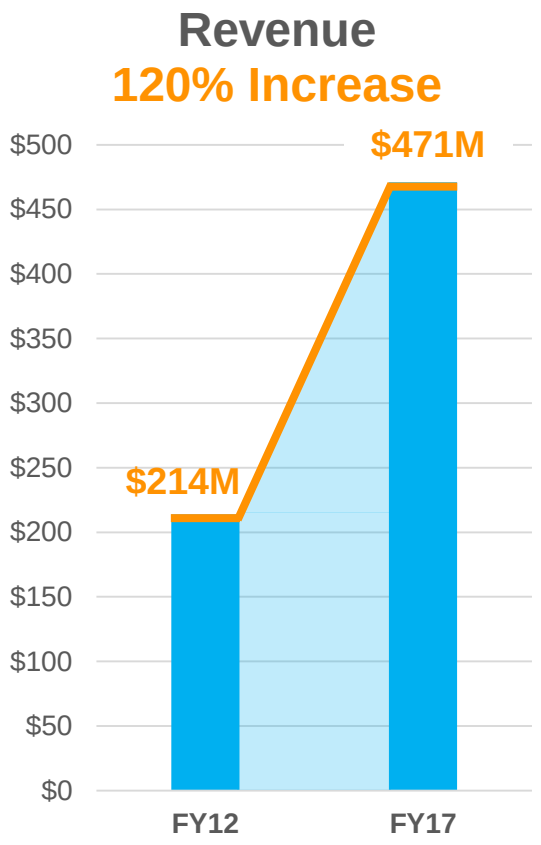
Consistent Revenue Growth & Shareholders' Return

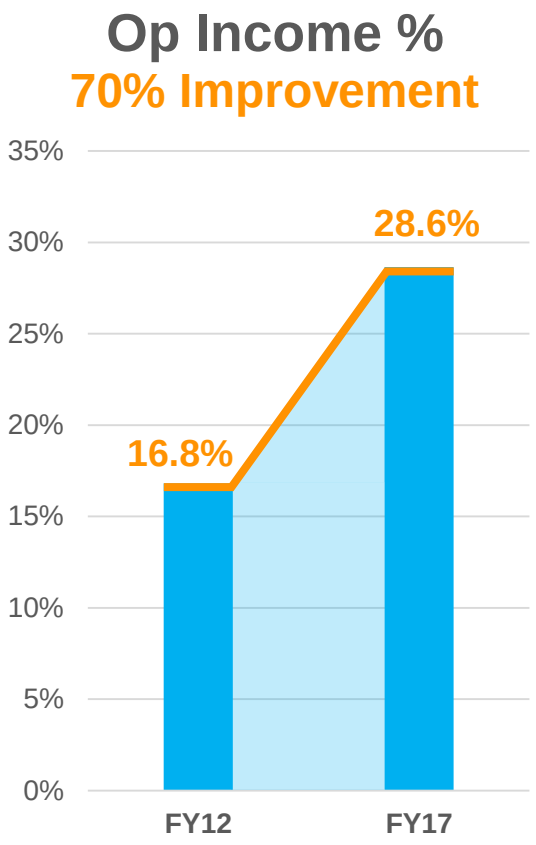


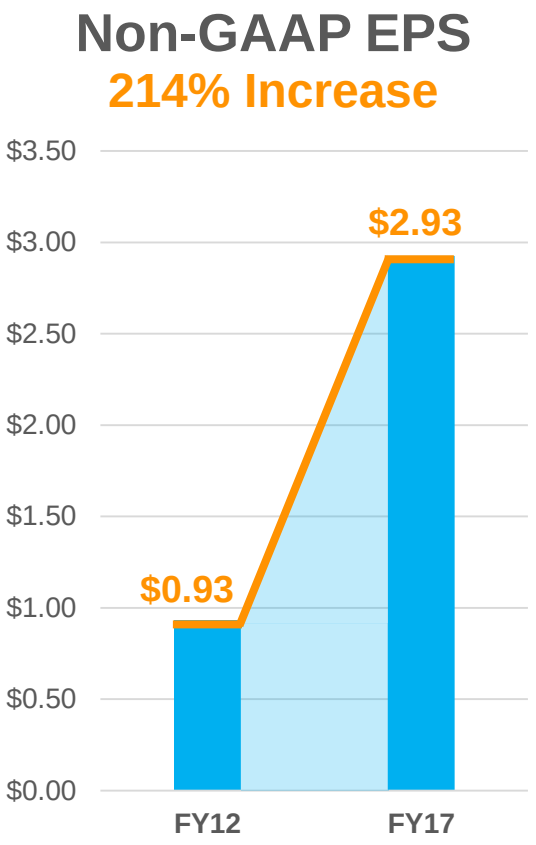
Diverse End Markets

% of Revenue	2010	2014	2017	18Q1	2014-2017 CAGR
Automotive	1.9%	4.2%	11.4%	15.5%	65.4%
Storage / Computing	10.4%	16.3%	21.4%	23.5%	29.7%
Industrial / Other	4.8%	13.2%	13.4%	12.6%	19.2%
Consumer	65.1%	43.4%	40.3%	36.7%	15.6%
Communications	17.8%	22.9%	13.5%	11.7%	-0.5%
Total	100%	100%	100%	100%	18.6%

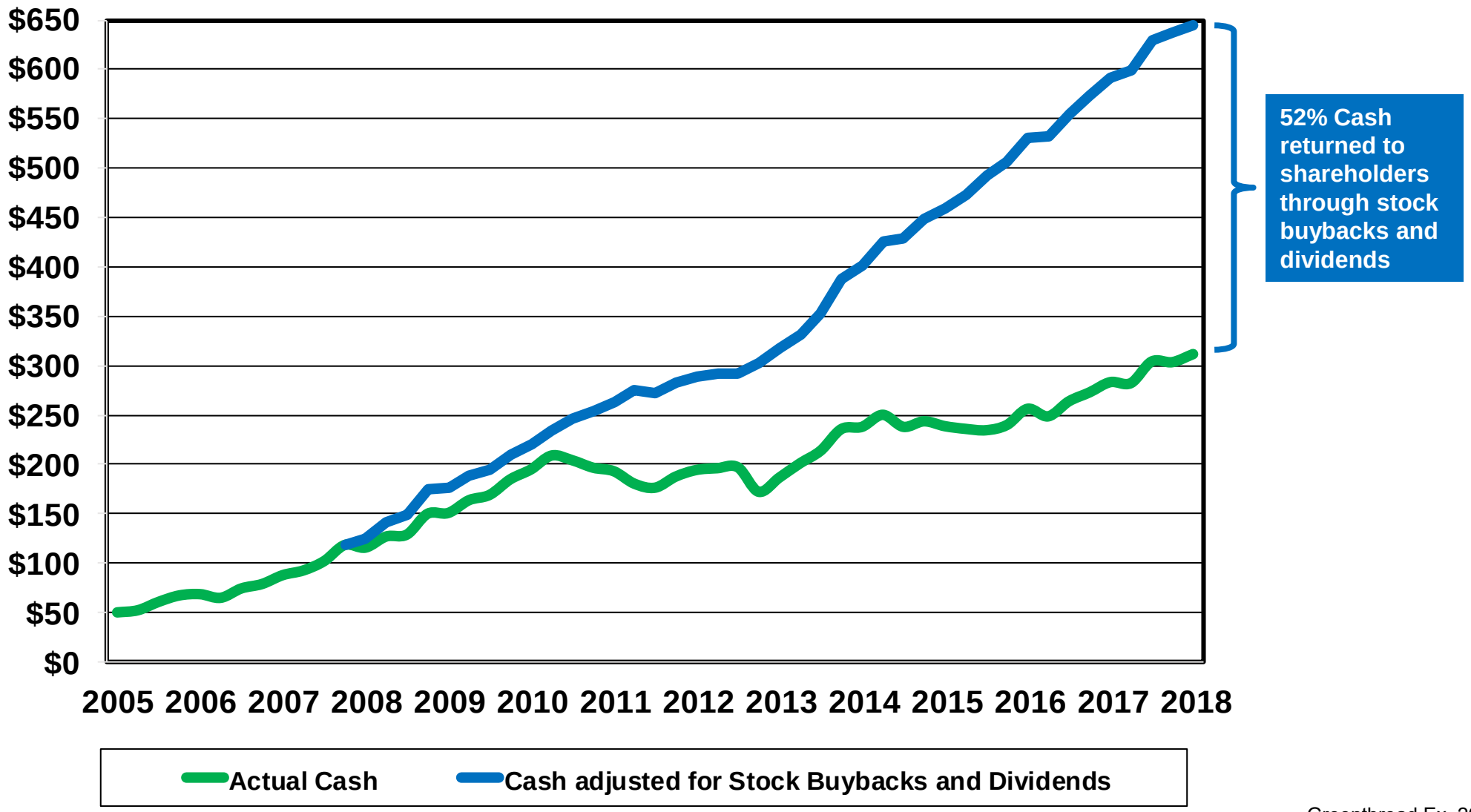
Operating Leverage and Margin Expansion







Capital Allocation



Growth Drivers by End Market

Computing	Automotive	Industrial	Infrastructure	Consumer
Cloud Based Data Center	Body Controls	Instrumentation	5G and Wireless	IOT
GPU's	LED Lighting	Factory & Bldg Automation	Base Stations	Wireless Charging
Portable	ADAS	Robotics	Networking	Power Management
Storage	Battery Management	Healthcare	Optical	Augmented Reality
Artificial Intelligence	Infotainment	Commercial Lighting		

SAM Expansion

Market	2015 SAM	2018 SAM
Automotive	$6B	$7B
Motion Control	$2B	$3B
ACDC	$1B	$2B
Modules	$1B	$2B
Cloud Computing (Server / Storage)	$800M	$1B
Networking / Telecom	$600M	$1B
Battery Management	$600M	$1B
Total Market SAM	**$12B**	**$17B**

Strategic Goals

- ☑ Full digital solutions – Synthetic Analog
- ☑ Integrated, software based, control with 3D sensor motor drive
- ☑ Advanced power analog processes
- ☑ Continued Compute and Automotive gains
- ☑ Future Network Infrastructure and Industrial wins

Financial Model (Non-GAAP) June 2018

	Financial Model		2017	2021	
	2015	2018	Actual	Target	Chg v '17
Revenue, YoY	20+% growth	20+% growth	$470.9m	$1BN	114%
Gross Margin	Mid to High 50's	Mid to High 50's	55.6%	57.5%	1.9 pts
R&D & SG&A	50% – 60% of annual revenue growth%	50% – 60% of annual revenue growth%	27.0%	21.5%	(5.5) pts
Operating Margin			28.6%	36.0%	7.4 pts
Capital Allocation		30% – 40% of free cash flow	34.0%		

Q&A

Michael Hsing	CEO
Bernie Blegen	CFO
Maurice Sciammas	VP of Sales and Marketing
Jinghai Zhou	Cloud Computing
Chris Sporck	Battery Management
Allen Chen	Automotive
Dean Gannon	e-Commerce
Jens Muttersbach	e.Motion

Closing Summary

- Disruptive new products allowing unprecedented levels of integration, efficiency and ease of use.
- Pressing ahead with process technology lead
- Expanding in high growth, end markets of Automotive, Industrial, Cloud Computing and Networking
- Significant operating leverage while continuing to invest in next generation products and markets