Revasum, Inc. (ASX: RVS)

Investor Presentation

May 2019

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Revasum™

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Non-IFRS financial measures

Revasum uses certain measures to manage and report on its business that are not recognised under Australian Accounting Standards or IFRS. These measures are collectively referred to in this document as 'non-IFRS financial measures' under Regulatory Guide 230 'Disclosing non-IFRS financial information' published by ASIC. Management uses these non-IFRS financial measures to evaluate the performance and profitability of the overall business. The principal non-IFRS financial measures that are referred to in this document is EBITDA. EBITDA is earnings before interest, tax, depreciation and amortisation and significant items. Management uses EBITDA to evaluate the operating performance of the business prior to the impact of significant items, the non-cash impact of depreciation and amortisation and interest and tax charges.

Although Revasum believes that these measures provide useful information about the financial performance of Revasum, they should be considered as supplements to the income statement measures that have been presented in accordance with the Australia Accounting Standards and IFRS and not as a replacement for them.

Financial data
All dollar values are in US dollars (US$) unless as otherwise presented.

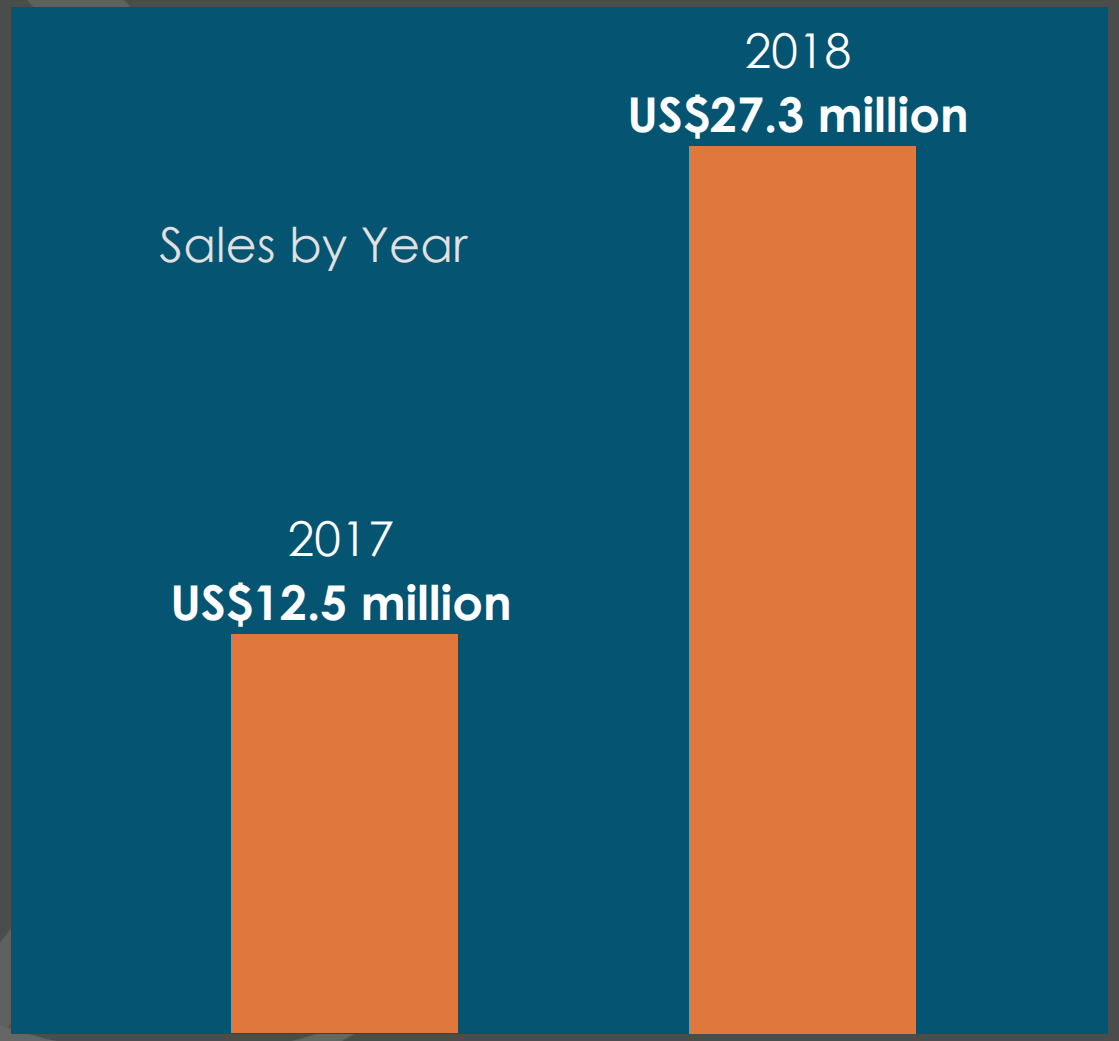
Revasum Overview (ASX: RVS)

A$96.45 million
Market Cap

A$1.26
Stock Price

16.9%
Management Ownership of Fully-Diluted

76,546,178
Shares on Issue

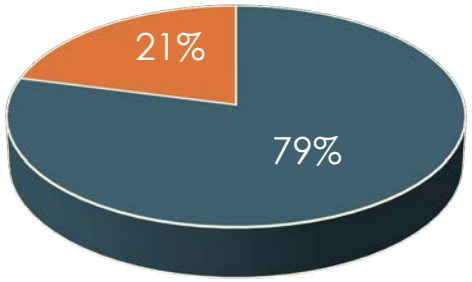


Share and Shareholder data as of 9 May 2019

Who is Revasum?

Revasum is a leading designer and manufacturer of equipment essential to the production of semiconductor devices ubiquitous in everyday life such as IoT, automotive, wearables, telecommunications and industrial applications.

2018 Revenue



System Sales Parts & Service

SYSTEM SALES AVERAGE PRICE: $625,000

35 Systems shipped in 2018

Revasum's equipment is at the **beginning** of the technology we use every day

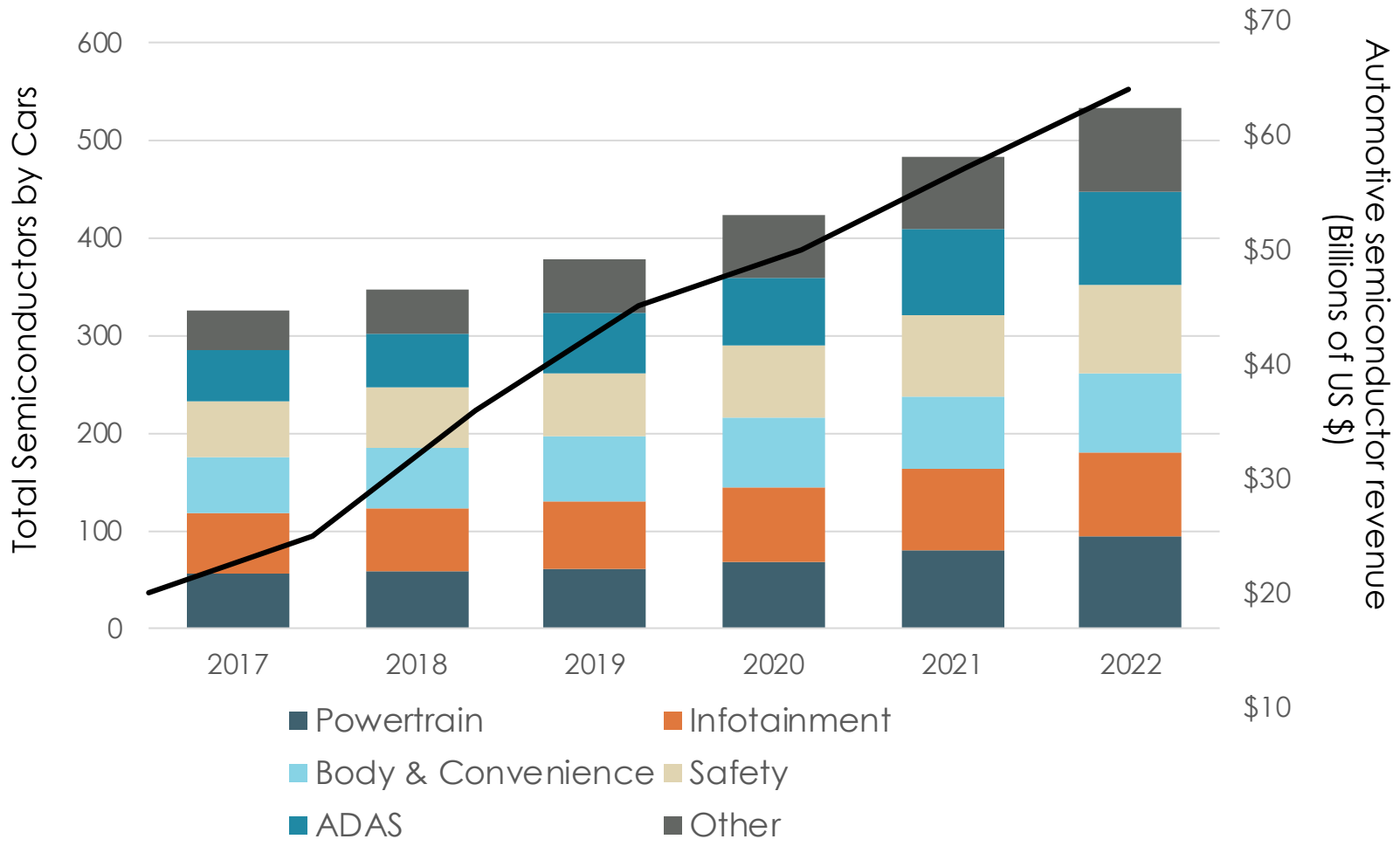
Many of the world's best known products start with Revasum equipment

Revasum sells their manufacturing equipment to microchip fabs

The microchip fabs use Revasum equipment to make the substrates for devices used in automobile's, 5G and IoT

MARKET OPPORTUNITIES AND HIGHLIGHTS

Semiconductor Devices in Autos by Application

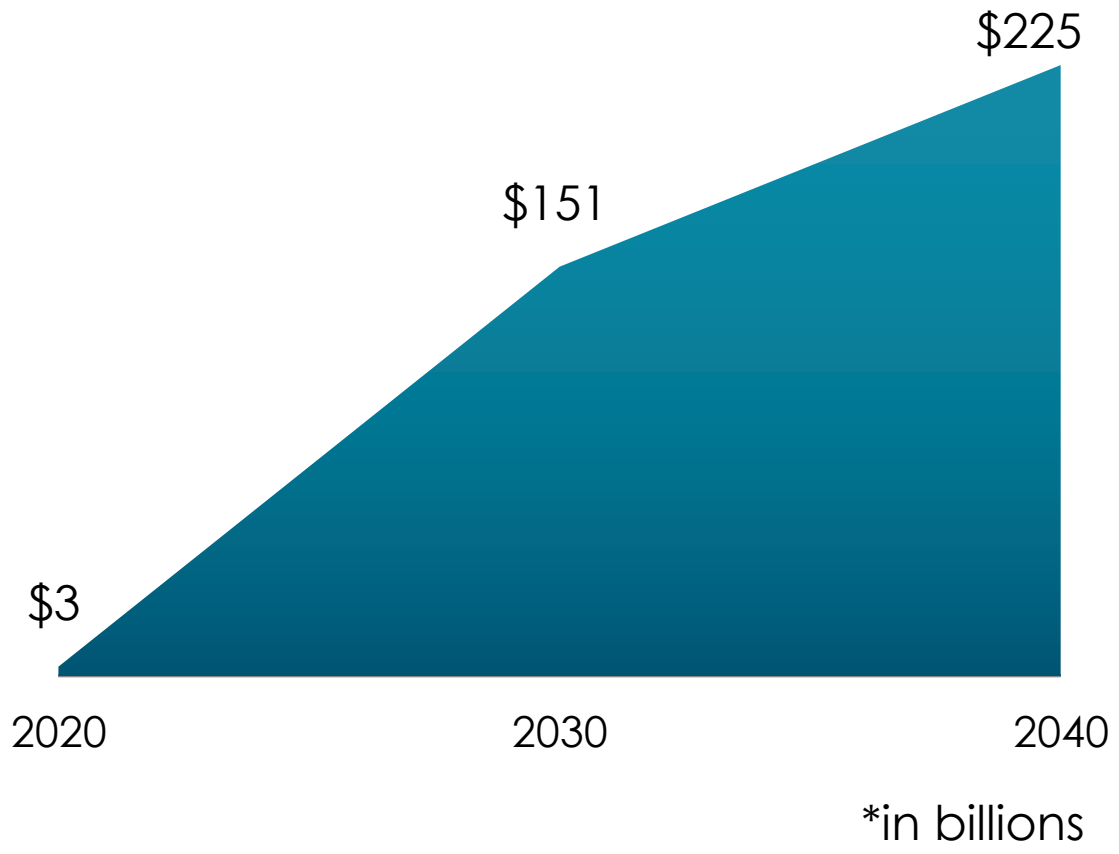


Source: HIS Markets

AUTOMOTIVE

As the automotive industry moves towards "Zero Emissions" transportation, manufacturers are rapidly ramping up their electrification programs; with most OEMs targeting 2025 for significant volumes of Battery Electric (BEVs), Hybrid Electric Vehicles (HEVs)and Super Charging Stations.

5G Semiconductor Device Market Forecast



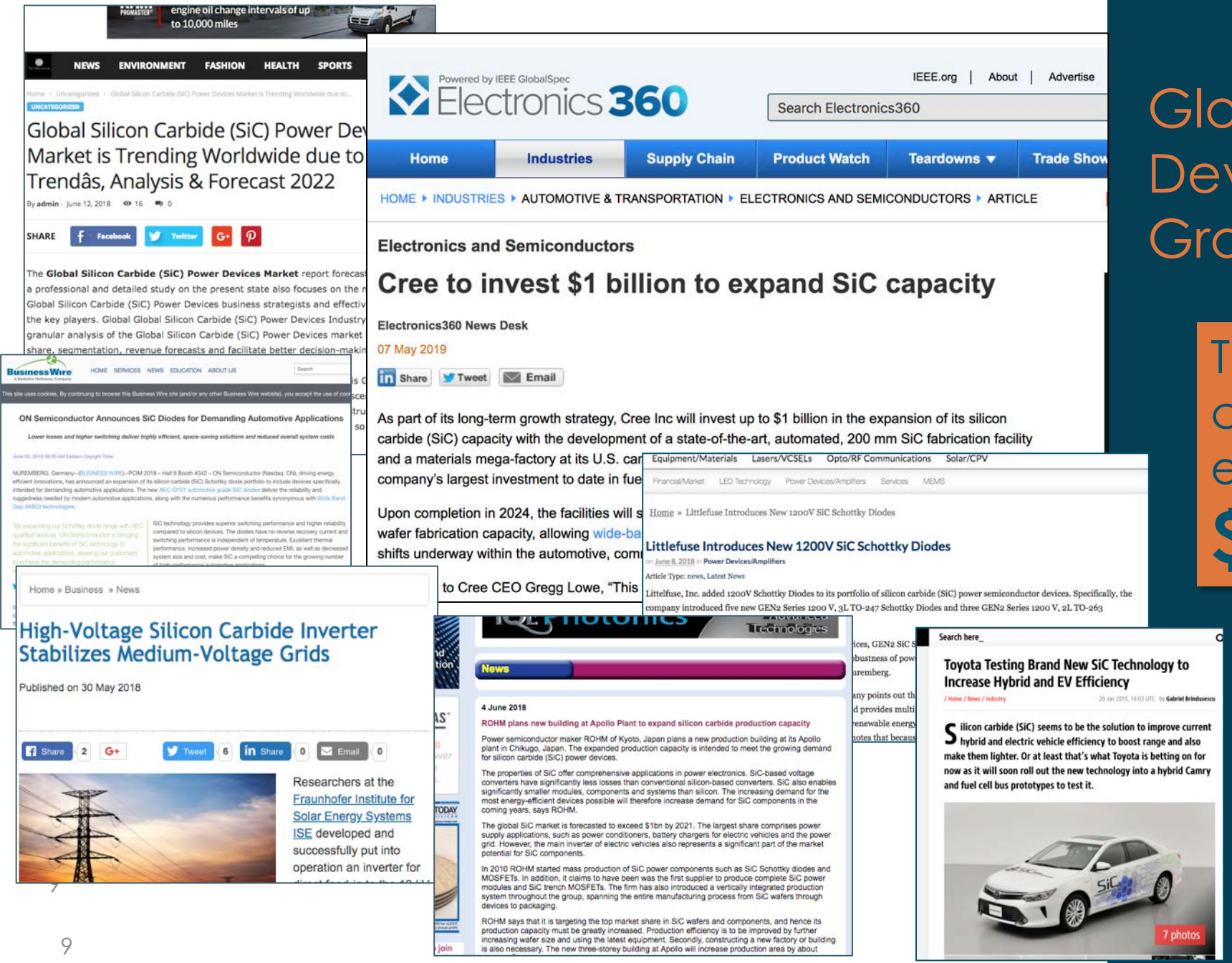
Source: Frost & Sullivan, End-markets for Semiconductor Manufacturing Equipment

The adoption of 5G is expected to be driven by end use adoption of devices requiring faster processing speed and lower latency.

By 2025 there are expected to be ~1.2 billion 5G connections globally; accounting for 14% of all mobile connections.

Global Silicon Carbide Device Market Size Growing Fast

The global silicon carbide market size is expected to reach USD **$16 billion** by 2032



Global Silicon Carbide (SiC) Power Dev Market is Trending Worldwide due to Trendâs, Analysis & Forecast 2022

By admin · June 12, 2018

The **Global Silicon Carbide (SiC) Power Devices Market** report forecast a professional and detailed study on the present state also focuses on the r Global Silicon Carbide (SiC) Power Devices business strategists and effectiv the key players. Global Global Silicon Carbide (SiC) Power Devices Industry granular analysis of the Global Silicon Carbide (SiC) Power Devices market share, segmentation, revenue forecasts and facilitate better decision-makin

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Electronics and Semiconductors

Cree to invest $1 billion to expand SiC capacity

Electronics360 News Desk

07 May 2019

As part of its long-term growth strategy, Cree Inc will invest up to $1 billion in the expansion of its silicon carbide (SiC) capacity with the development of a state-of-the-art, automated, 200 mm SiC fabrication facility and a materials mega-factory at its U.S. car company's largest investment to date in fue

Upon completion in 2024, the facilities will s wafer fabrication capacity, allowing wide-ba shifts underway within the automotive, com

to Cree CEO Gregg Lowe, "This

ON Semiconductor Announces SiC Diodes for Demanding Automotive Applications

Lower losses and higher switching deliver highly efficient, space-saving solutions and reduced overall system costs

NUREMBERG, Germany--(BUSINESS WIRE)--PCIM 2018 – Hall 9 Booth #342 – ON Semiconductor (Nasdaq: ON), driving energy efficient innovations, has announced an expansion of its silicon carbide (SiC) Schottky diode portfolio to include devices specifically intended for demanding automotive applications. The new AEC-Q101 automotive grade SiC diodes deliver the reliability and ruggedness needed by modern automotive applications, along with the numerous performance benefits synonymous with Wide Band Gap (WBG) technologies.

Home » Littlefuse Introduces New 1200V SiC Schottky Diodes

Littlefuse Introduces New 1200V SiC Schottky Diodes

on June 8, 2018 in Power Devices/Amplifiers

Article Type: news, Latest News

Littelfuse, Inc. added 1200V Schottky Diodes to its portfolio of silicon carbide (SiC) power semiconductor devices. Specifically, the company introduced five new GEN2 Series 1200 V, 3L TO-247 Schottky Diodes and three GEN2 Series 1200 V, 2L TO-263

Home » Business » News

High-Voltage Silicon Carbide Inverter Stabilizes Medium-Voltage Grids

Published on 30 May 2018

Researchers at the Fraunhofer Institute for Solar Energy Systems ISE developed and successfully put into operation an inverter for

News

4 June 2018

ROHM plans new building at Apollo Plant to expand silicon carbide production capacity

Power semiconductor maker ROHM of Kyoto, Japan plans a new production building at its Apollo plant in Chikugo, Japan. The expanded production capacity is intended to meet the growing demand for silicon carbide (SiC) power devices.

The properties of SiC offer comprehensive applications in power electronics. SiC-based voltage converters have significantly less losses than conventional silicon-based converters. SiC also enables significantly smaller modules, components and systems than silicon. The increasing demand for the most energy-efficient devices possible will therefore increase demand for SiC components in the coming years, says ROHM.

The global SiC market is forecasted to exceed $1bn by 2021. The largest share comprises power supply applications, such as power conditioners, battery chargers for electric vehicles and the power grid. However, the main inverter of electric vehicles also represents a significant part of the market potential for SiC components.

In 2010 ROHM started mass production of SiC power components such as SiC Schottky diodes and MOSFETs. In addition, it claims to have been was the first supplier to produce complete SiC power modules and SiC trench MOSFETs. The firm has also introduced a vertically integrated production system throughout the group, spanning the entire manufacturing process from SiC wafers through devices to packaging.

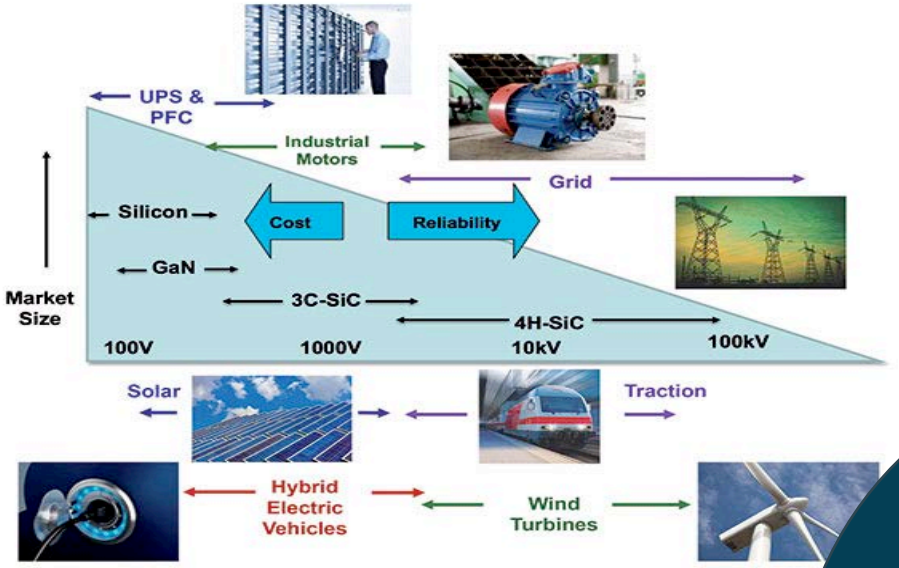
ROHM says that it is targeting the top market share in SiC wafers and components, and hence its production capacity must be greatly increased. Production efficiency is to be improved by further increasing wafer size and using the latest equipment. Secondly, constructing a new factory or building is also necessary. The new three-storey building at Apollo will increase production area by about

Search here_

Toyota Testing Brand New SiC Technology to Increase Hybrid and EV Efficiency

Silicon carbide (SiC) seems to be the solution to improve current hybrid and electric vehicle efficiency to boost range and also make them lighter. Or at least that's what Toyota is betting on for now as it will soon roll out the new technology into a hybrid Camry and fuel cell bus prototypes to test it.

7 photos



Property	SiC advantage		
E_g (eV) - band gap	x3	Si	1.1
		SiC	3.3
v_{sn} (cm/s) – electron saturation velocity	x2	Si	$1x10^7$
		SiC	$2x10^7$
μ_n (cm^2/Vs) – electron mobility	~	Si	1350
		SiC	950
e_r - dielectric constant	~	Si	11.8
		SiC	9.7
E_c (V/cm) - critical electric field	x15	Si	$2x10^5$
		SiC	$3x10^6$
k (W/cm K) - thermal conductivity	x3	Si	1.5
		SiC	5

SiC Advantages

70% more efficient

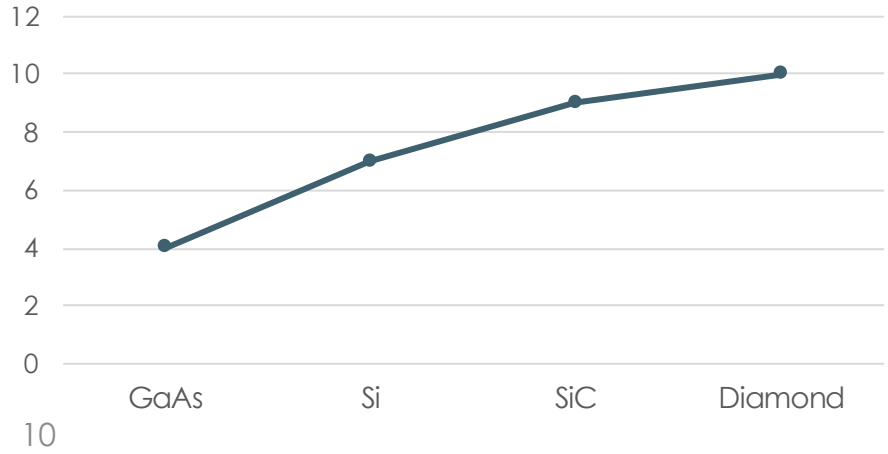
2-3X faster switching speed

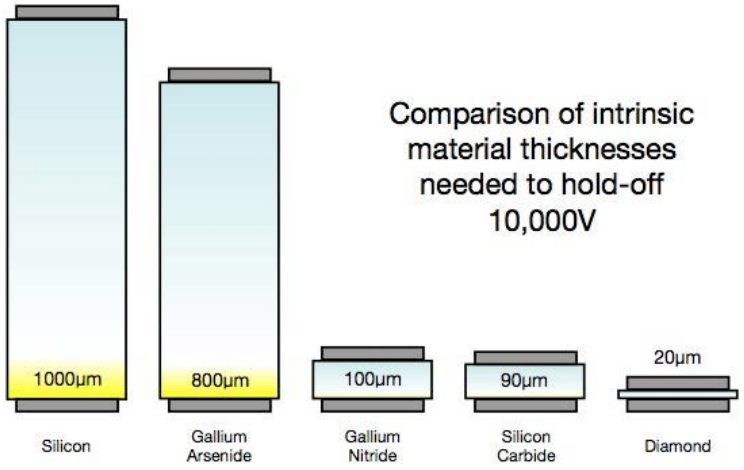
Deliver 65% increase in power density

30% fewer components

*vs. Silicon

Mohs Hardness Scale

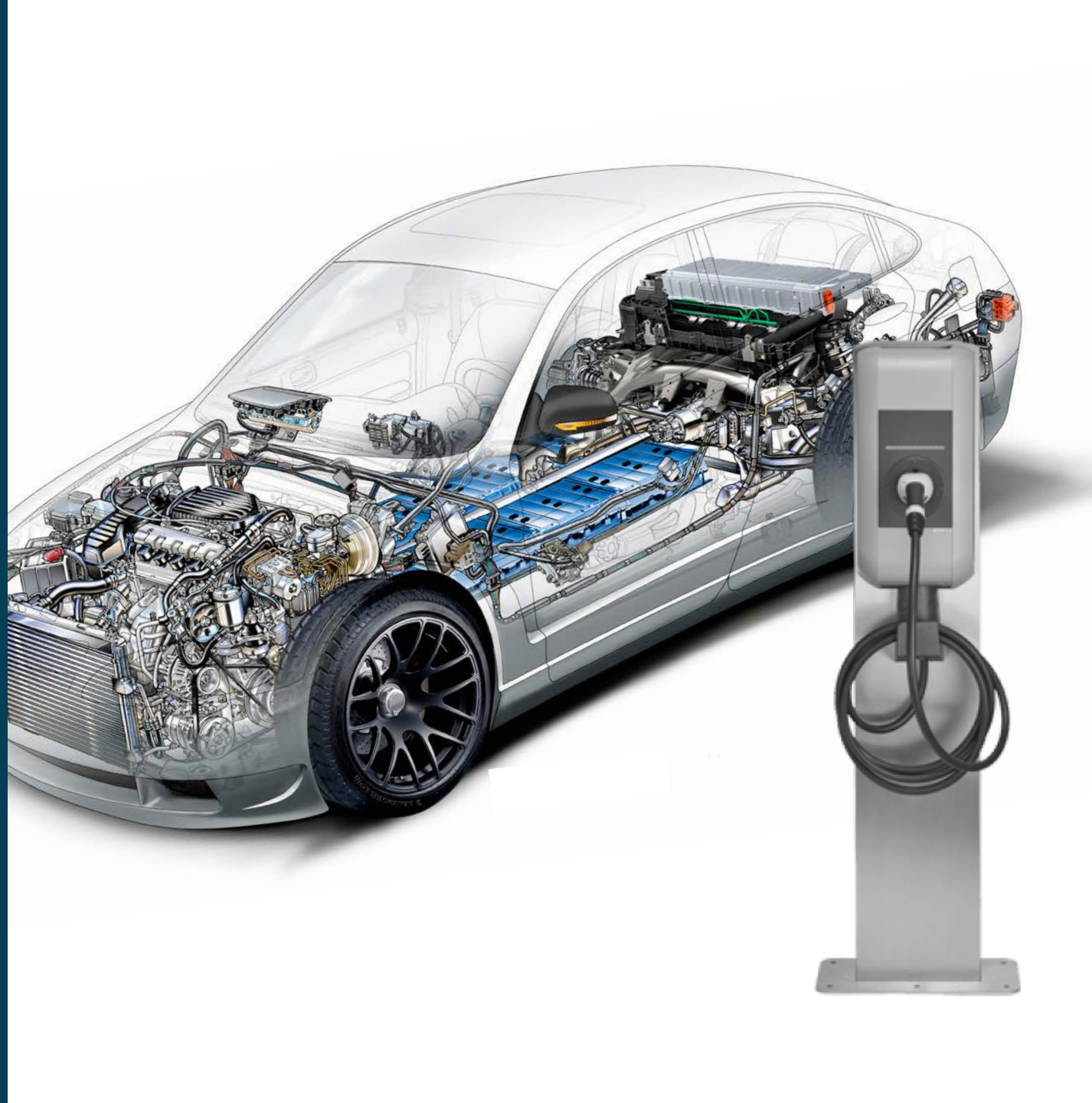


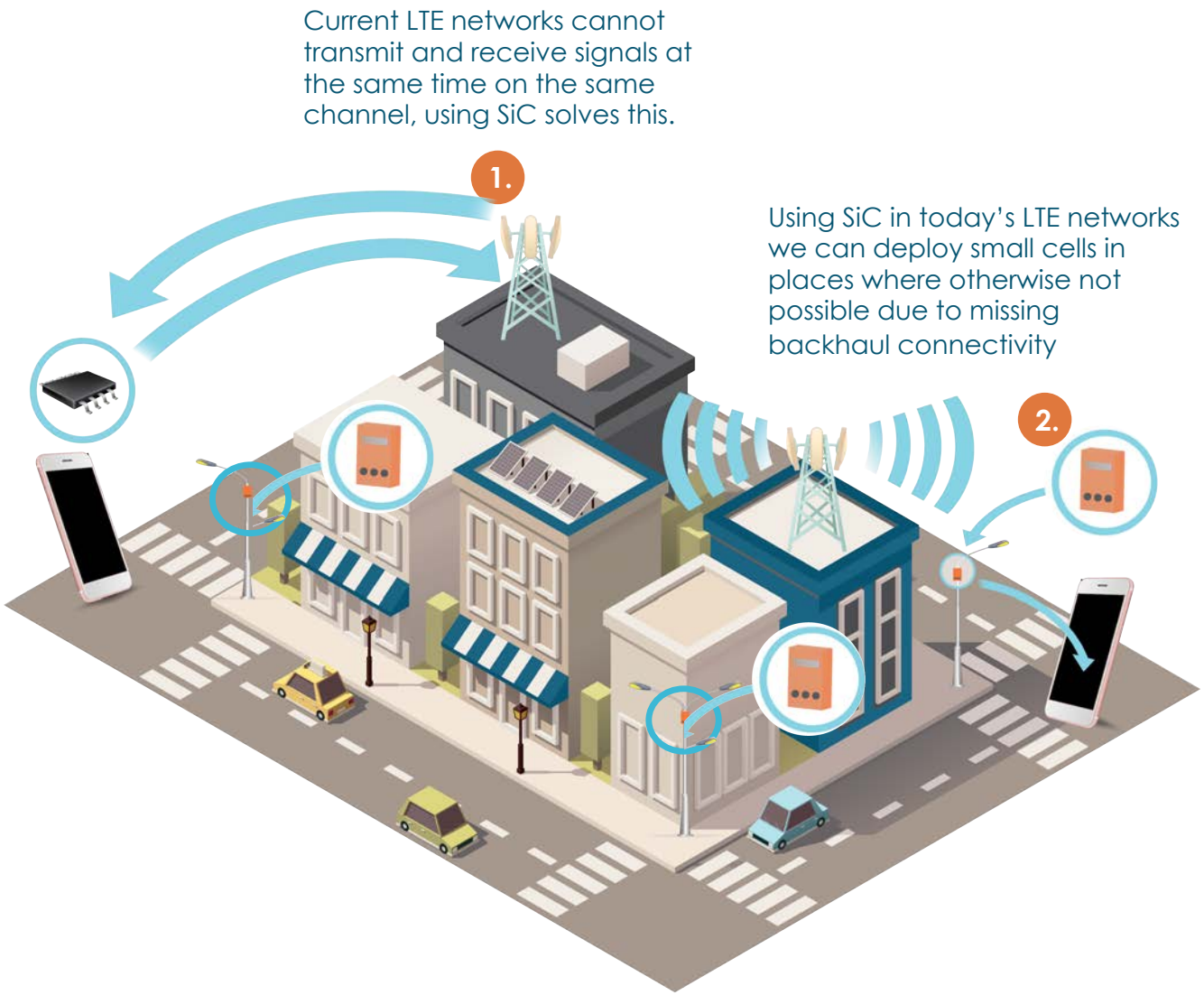


AUTOMOTIVE

SiC Driving EV Infrastructure with Higher Power Density and Switching Efficiency

As electric vehicles (EVs) have penetrated lithium battery markets, key electrochemical properties have imposed more challenging standards; while higher energy densities are desired for increased driving mileage, enhanced reaction kinetics are demanded for fast charging and high rate operations.



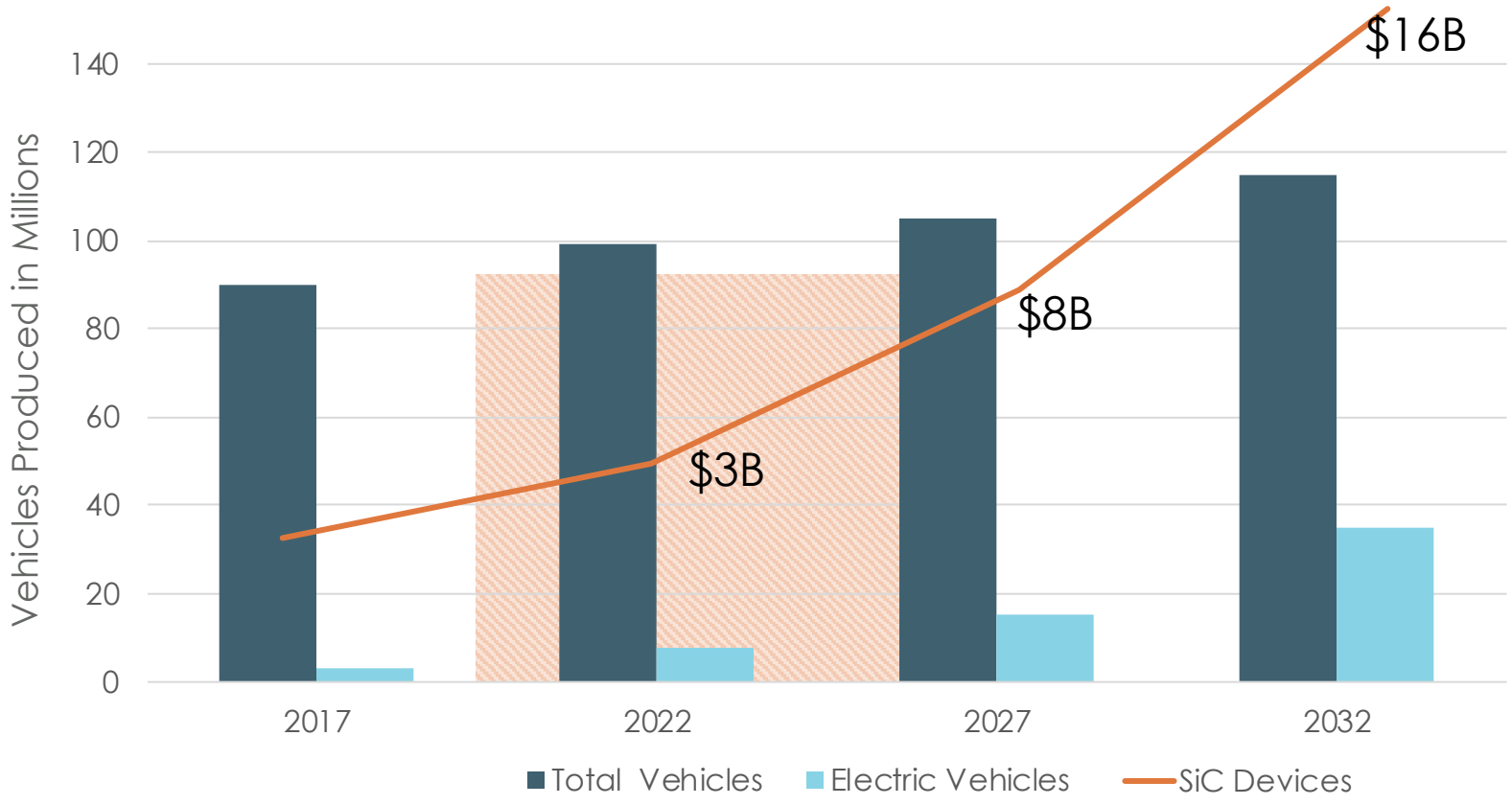


SiC for 5G is about Reducing the Size and Increasing Power

5G not only requires the installation of more base stations, but also more compression of power on the device level. Temperature, speed, power, efficiency, size and cost become key criteria for selecting a semiconductor technology upon which 5G base stations will be built.

GaN on SiC—is the clear choice for 5G based on its superior technology characteristics and lifetime total cost of ownership.

Even Modest EV Adoption Drives Massive SiC Equipment Demand



*Source: Morgan Stanley and Cree

What does SiC Mean for Revasum?

total SiC grinding and polishing equipment market of

$565m**

over the next 5 years

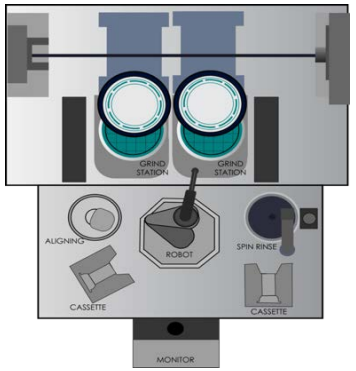
**Company estimate

Revasum Develops and Manufactures SiC Grinders and Polishers

Revasum grinders are designed to provide high reliability and consistent performance at a low cost of ownership

Revasum device-proven polishing equipment is ideal for a broad range of applications

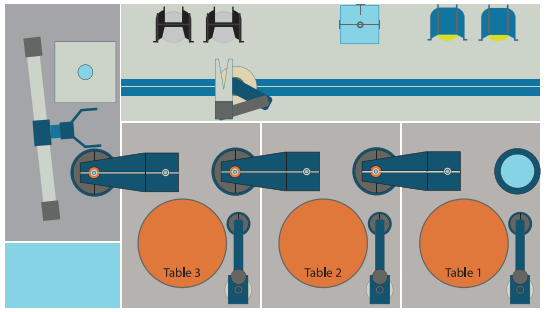
SiC GRINDER



Market Advantage

We have #1 market share for SiC backside thinning

SiC POLISHERS



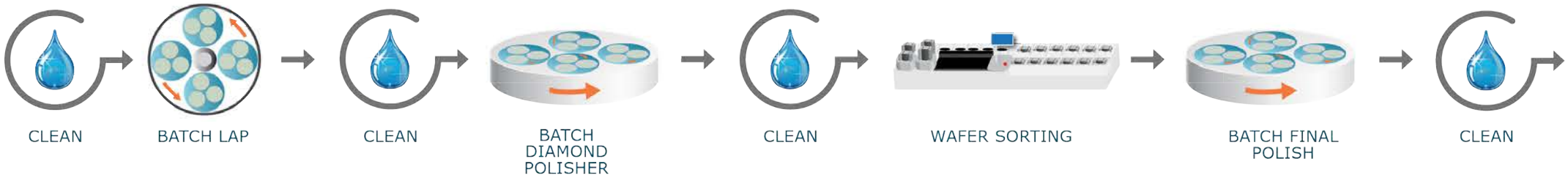
Market Advantage

Flatter, smoother, more consistent prime wafers result in higher device yields

Processing 6" SiC Wafers is Difficult

Traditional Batch Process

This process sequence involves numerous separate process tools and is fraught with issues including manual loading and unloading of wafers, the requirement for wafer sorting to group wafers by thickness, damage induced by the loose lapping abrasive, low yields, and unacceptably high risk of scrap (an entire batch of wafers may be scrapped if even one wafer cracks or breaks during a batch process).



REVASUM HAS THE **SOLUTION!**

Revasum's Single Wafer Process

Revasm's single wafer tools can significantly simplify the process sequence. The key improvements include individual wafer processing, better controls, fully-automated handling, two-sided grinding, integrated cleaning for both the grinder and polisher, elimination of diamond polish step, and elimination wafer sorting prior to final polish.

REVASUM SiC GRINDER

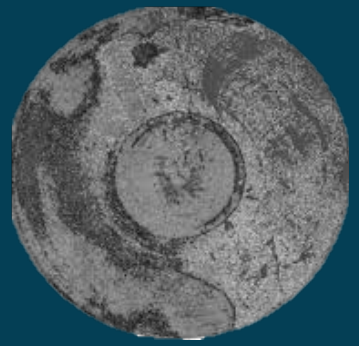
REVASUM SiC POLISHERS

Traditional Batch

A dirty, manual process

Manual load and unload from each batch step increases scrap (wet wafers are slippery and break easily!)

Wafers sit in slurry and debris while being unloaded by hand



Dried slurry is like dried cement – tough to remove

Revasum Single Wafer A Clean Automated Process

Fully automated, cassette-to-cassette handling. Single and two-sided processing requires minimal labor.

Integrating cleaning prevents slurry and debris from drying on the surface of the wafer.

Revasum is the Clear Choice for SiC Device Processing

Most SiC is produced on 4" wafers. To meet market demands fabs are switching to 6" and even 8" wafers.

To make the move to larger wafer size, Revasum's single wafer process is clearly the better choice.

	Revasum's Single Wafer Processing SiC Substrates	Batch Wafer Processing SiC Substrates
Higher Throughput		✓
Better wafer-to-wafer consistency	✓	
Improved TTV	✓	
No Wafer Sort Required	✓	
Reduce Sub-surface Damage	✓	
Better Yield	✓	
Improved EPI readiness	✓	
Fully Automated	✓	
Clean, Dry wafer after polish	✓	
Cost of Ownership	✓	

FINANCIAL PERFORMANCE AND INVESTMENT HIGHLIGHTS

2018 Financial Highlights / 1H19 Outlook

(USD in millions)	**FY18 Actual**	**IPO FY18***	**IPO 1H19***	**1H19 Current Guidance**
Revenue	$27.3M	$27.5M	$20.5M	$15M - $16.5M
Gross Profit	$10.2M	$10.0M	$8.6M	
GM%	37%	36%	42%	
Operating Expenses	$11.2M	$11.1M	$6.5M	
Operating Income(Loss)	($1.0M)	($1.2M)	$2.1M	

Reconciliation of Adjusted EBITDA to Operating Loss

(USD in millions)	**FY18 Actual**	**IPO FY18***	**IPO 1H19***	**1H19 Current Guidance**
Adjusted EBITDA	$0.8M	$0.3M	$2.9M	($1.5M) to $1.0M
IPO Costs	($1.3M)	($1.0M)	$0.0M	
Share Based Comp.	($0.3M)	($0.3M)	($0.3M)	
Depr. and Amort.	($0.2M)	($0.2M)	($0.5M)	
Operating Income(Loss)	($1.0M)	($1.2M)	$2.1M	

1H19 Revenue Guidance lowered April 2019 due to revised delivery and production schedule and booking forecast.

Cash Balance of US$19.8 (unaudited) as of 31 March 2019 and no debt.

* IPO Prospectus Forecast for Fiscal Year 2018 and six months ended 30 June 2019

INVESTMENT HIGHLIGHTS / OUTLOOK

- Capitalizing on strong growth in demand for end-use products driven by the Automotive, IoT, & 5G markets.
- New Product development of SiC-focused Polisher tracking to be delivered on-time and on-budget in 2H19.
- Strategically focused on the wafer substrate and device markets sized 200mm and below where there is a known shortage of equipment supply.
- Experienced Management Team
- Strong Intellectual Property Portfolio

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