

# transphorm

# Leading the GaN Revolution

Fiscal Q2'23 Investor Update

November 9<sup>th</sup>, 2022 | NASDAQ: TGAN

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## **Key Investment Highlights**

### **GaN Power Semiconductor Pioneer and Leader**

#### **Disruptive Technology**

GaN Enables Next Generation Power Conversion Solutions – 99% Efficiency<sup>1</sup>, 50% More Compact/Lightweight, Lower System Cost

#### Large Market Opportunity

Transphorm's GaN Solutions will Enable the Future of Electric Vehicles and Fast-charging for 5G – Contributing to GaN TAM growing to \$6B<sup>2</sup> in 2026

#### Validation From Blue Chip Partners and Customers

Including KKR, SAS, Nexperia, Yaskawa, Marelli, Microchip, Diodes and the U.S. DoD(Navy), DOE



#### Ramping Commercially with Strong Manufacturing Base

Technology and Product Development completed, Integrated Manufacturing, \$24.1M FY-22 Revenues, Target >50% LT CAGR

#### Best-In-Class Differentiated GaN Technology + Industry's Strongest IP Position

IP Portfolio Appraised in Excess of \$200M<sup>3</sup> Leader in Quality + Reliability, > 80 Billion Field hours, Silicon-like Reliability<sup>4</sup> TGAN FET: Higher performance, easy interface, multiple packages

#### Team Led by World-Renowned GaN Experts

Proven Leadership, 18 PhDs and Over 300 Years of GaN Expertise, Recent expansion with Industry leaders

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## One Core Platform, Crossing the Power Spectrum

### Targeting \$3B Power Market Opportunity in 2023, Upside from EV Powertrain 2025+



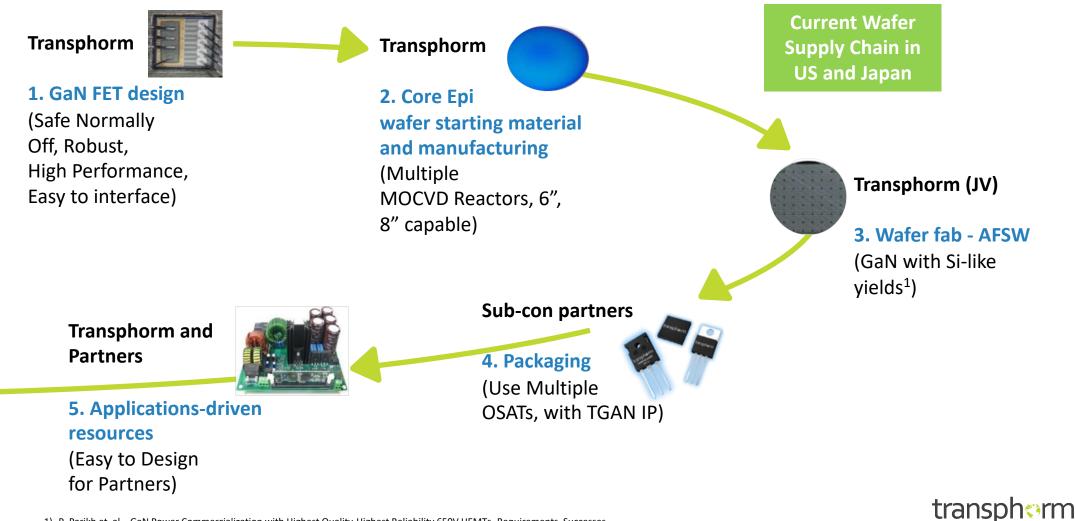
#### End Customers in Production with TPH GaN– 45W to 4 kW

- Fast charging
- Lower thermals/ smaller form factor
- Lower system cost
- Proven ability to double available power in standardized server/5G telecom form factors
- Enable Titanium-class efficiency
   EU requirement
- Reduces size/weight of systems
- More efficient charging for battery/battery-powered equipment and vehicles
- 2W-3W-4W: Reduces size/weight of on-board chargers, converters and inverters
- Longer distance per charge

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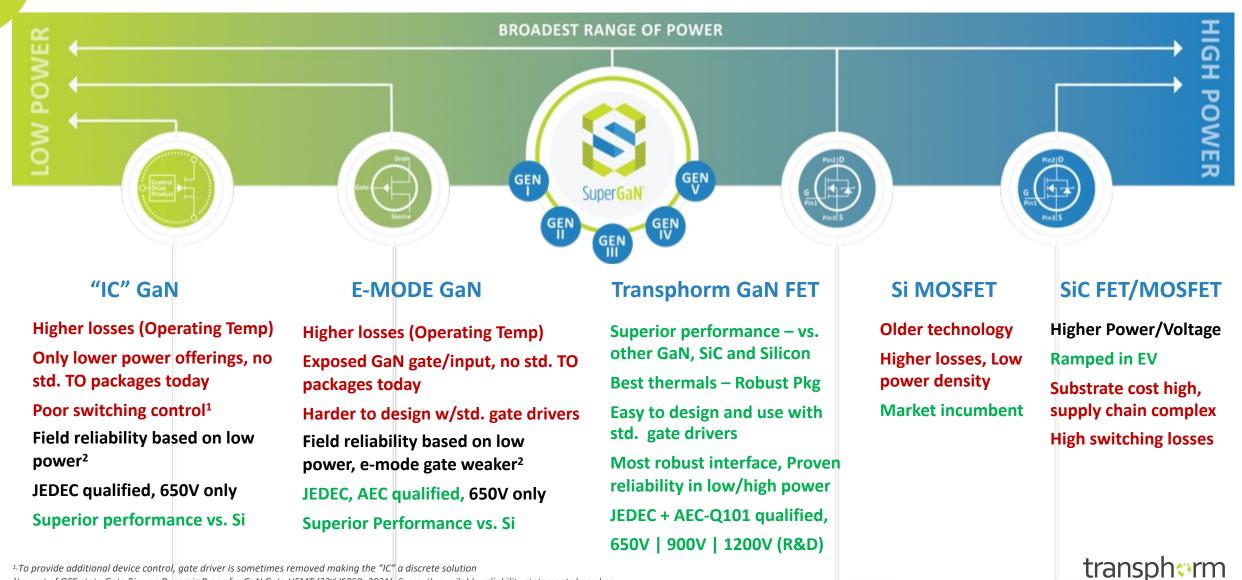
## **TGAN Owns GaN Wafer Production Supply Chain**

Asset-Light, Vertically Integrated Manufacturing Driving Innovation



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## Competitive Landscape – TGAN FET, vs. Other GaN, SiC, Si



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<sup>1</sup>. To provide additional device control, gate driver is sometimes removed making the "IC" a discrete solution <sup>2</sup>Impact of OFF-state Gate Bias on Dynamic R,on of p-GaN Gate HEMT (33<sup>rd</sup> ISPSD, 2021), Currently available reliability statements based on lower power consumer applications for which failures are not typically reported.

## TGAN FET: Higher Range, Reliability & Performance Spanning Low to High Power

### Why Transphorm GaN FETs Win

- Easy to use and drive (standard Si-like interface)
  - "e-mode" input interface is weaker hard to operate in widely used *TO Packages* for higher power
    - **1 GaN FET = 2 e-mode GaN** (mid-higher power)
- Superior Dynamic performance => Efficiency
  - Higher performance, from smaller GaN die (vs. e-mode)
    - 30-50% effective on-resistance (loss) benefit at operating Temperatures
- Proven reliability & manufacturing for scaled device
  - 45W 10 kW capable single GaN device in production
  - AEC qualified
- Higher power => higher energy and emissions impact,
  - Blockchain: 120 TWH, TGAN's 1% efficiency gain => 1TWH + > 125 lbs of CO<sub>2</sub> emissions / TGAN Device<sup>2</sup>

In Production <sup>1</sup>							
Markets	GaN e-mode or "IC"	GaN FET	Power Range TGAN Wins				
Adapters	<ul> <li>Image: A second s</li></ul>		30-250W				
Datacenters	×	$\checkmark$	800-3200W				
Gaming (Desktop)	×	$\checkmark$	1600W				
Blockchain	×	$\checkmark$	1600-3600W				
Industrial, Renewable (≥ 500 W)	×	~	500-3000W				
Aerospace	×	$\checkmark$	420-1200W				

1. Based on our best knowledge of released products, press release and in volume production with customers' systems

2. Based on existing rectifiers with 92% efficiency | Source: EPA estimated one kWh produces 1.52 pounds of carbon dioxide (excl. line-losses).



### Customers Select Transphorm GaN – Adapters & Chargers (70+ design-ins)



## Customers Select Transphorm GaN – High Power (45+ design-ins)

### Efficient, Reliable, Highest Performance, East of Drivability and Designability



GaN benefit of low switching loss, 1<sup>st</sup> gaming psu with GaN in ASUS



"The Corsair AX1600i is the **best PSU** that money can buy today, period."

### tom'sHARDWARE

Gaming







"Transphorm's GaN in a totem-pole PFC configuration proved the most reliable. highest performing solution possible today,"

### 3 kVA UPS



Smallest (2U->1U) powerful 3kVA UPS -Today, Super Gan<sup>®</sup> is the Only Technology that Can Enable this Solution"

Server/Computing

"Based largely on the power semiconductors' proven quality and reliability as well as the team's reputation for successful collaboration,"



"We're expanding the reach of medical care, and Transphorm's GaN is helping us do it"



Medical

"proved to be better suited for the higher power ranges while offering the higher field reliability compared to alternatives"



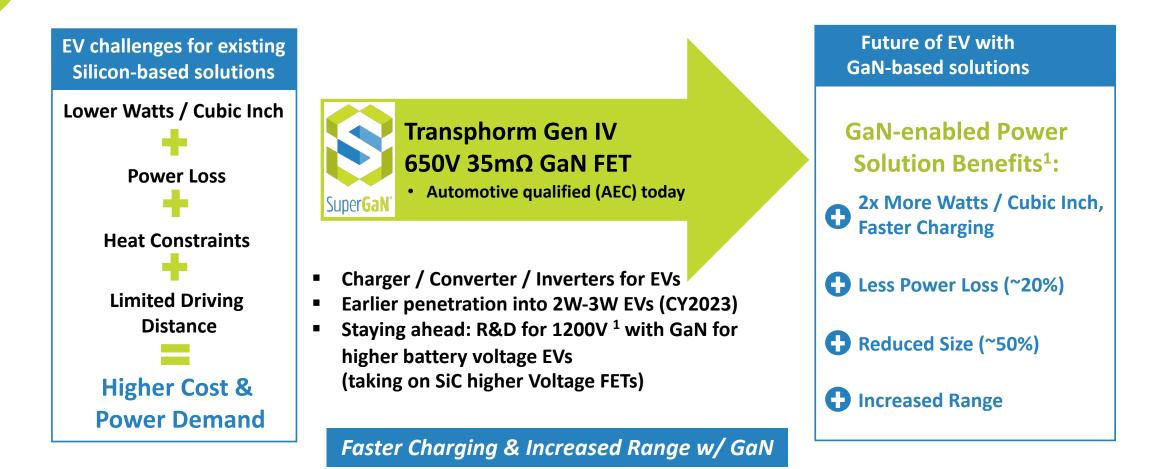


**Energy/Renewable** 





## GaN Enables Future of Next-Gen Electric Vehicles: 2W/3W/4W



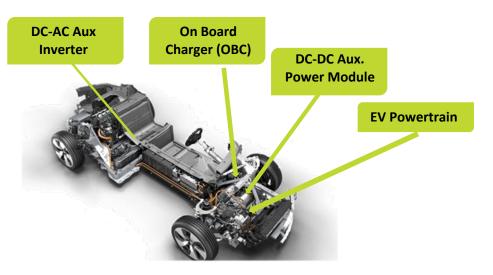
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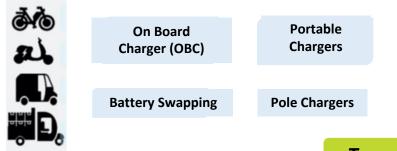
 Program Management Update: January 2016, High efficiency high-density GaN-based 6.6kW bidirectional on-board charger for PEVs DOE Award number DE-EE0006834

### Accelerating Opportunity for GaN Enabled Power in EV

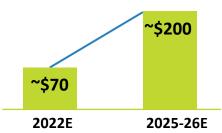
### **<u>1. GaN Opportunities in EV, 4W</u>**



### 2. GaN Opportunities in EV, 2W, 3W



### **1. Addressable GaN \$ Content/EV, 4W<sup>2</sup>**



- Well-positioned for automotive opportunity with leading products, strategic partners
- EV Adoption increasing to 32 million (44 million -hyper adoption) vehicles by 2030<sup>1</sup>

### 2. EV 2W, 3W Market

- TGAN FET already proven in battery-swapping
- Potential to address 75 Million 2W/3W WW (Asia dominated)<sup>3</sup>, \$8-10/vehicle

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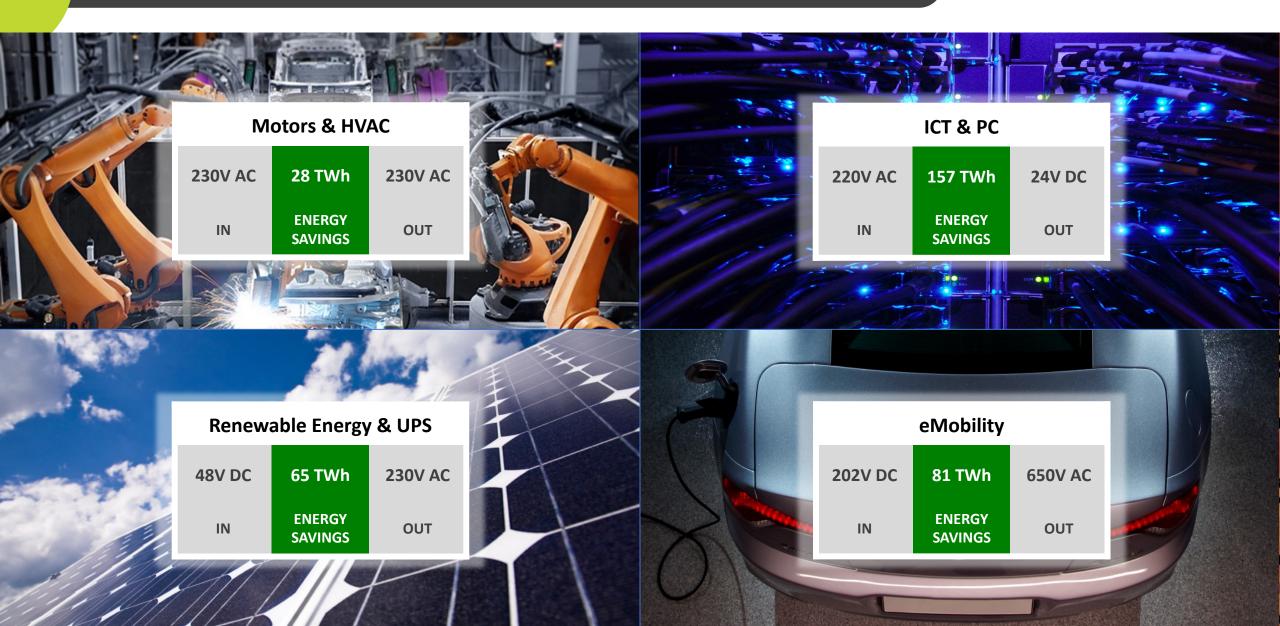
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#### Transphorm GaN AEC-Q101 (Auto) Qualified NOW

11 1 IHS and Goldman Sachs Global Investment Research

2 Transphorm company internal estimates, 2022 includes OBC/DCBC, 2025 includes inverter (100kw) 3 30m E-bikes in China, 30m motorcycles in Asian market potential to be EVs (Motocycledata.com, Statista)

### US Energy Savings Over Next Two Decades (2041)



### Key Business Focus – Scaling Product Revenue

### 1) Capacity & Supply Chain, 2) High Power Leadership / Low Power expansion, 3) Superior new Products

Key focus area	Achieved	Comments / Upcoming
1. Revenue/Products	<ul> <li>✓ \$3.2M Products (Total \$3.7M)</li> </ul>	<ul> <li>Beat recent estimates</li> <li>Aggressively pursue new demand to counter macro headwinds (several senior Sales/Marketing team added)</li> </ul>
2. Adapters/Chargers: Design-ins, Production, Solutions (45W – 250W)	<ul> <li>✓ Design-Ins: 70+ (10+ new)</li> <li>✓ In Production: 25 (3 new)</li> <li>✓ Solutions/Ref designs: &gt;12</li> </ul>	<ul> <li>New design win at Tier 1 Laptop</li> <li>Continued POs at major Tier 1s won (Laptop, E-retailer), now shipping to a WW Top 3 Laptop manufacturer</li> <li>Easy to use, no added driver, Small die vs. e-mode</li> </ul>
3. High power: Design-Ins, Production, Ref. Designs (300W-4kW)	<ul> <li>✓ Design-Ins: 45+ (10+ new)</li> <li>✓ In Production: 20+ (5 new)</li> <li>✓ Eval kits/Ref designs: &gt;8 (1-4kW)</li> </ul>	<ul> <li>65% of revenue High Power</li> <li>Execution on &gt;500K units PO for 3kW+</li> <li>Expand, Penetrate new segments, Lead</li> </ul>
4. Product SKUs and Qualification	<ul> <li>✓ Total: 17 (AEC qualified: 3)</li> <li>✓ New - sampling Industry pin-pin PQFN packages complementing Performance PQFN Packages</li> </ul>	<ul> <li>Broadest offering (650/900V),</li> <li>Compact surface-mount &amp; thermally robust TOs</li> <li>Continuing: Gen5 AEC qualification</li> </ul>
5. Capacity Proof Points	<ul> <li>✓ Improved Japan Epi-wafer capacity</li> <li>✓ Completed acquisition of multiple new reactors</li> <li>✓ Packaging capacity in place (only in industry for PQFN through TO packages)</li> </ul>	<ul> <li>Continued emphasis on supply chain management</li> <li>Epi Reactors – Bring existing capacity online (FY23) and new reactors online (2<sup>nd</sup> half of CY23)</li> <li>Wafer Fab – Add capacity (at JV) in CY 2023</li> </ul>

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### **Key Business Update – Strategic Partnerships**

#### Manufacturing Capacity Increase, Partnerships

- Acquired 2 more reactors (total 4 recently), online in second half CY-2023 (3 locations CA, JP, TW)
- Global Wafers (Partner) Execution for expansion in progress.
- AFSW Fab (Transphorm's JV) Managing with GaNovation (Financial-Strategic partner) and investing for CY-2023 to be ready for increasing demand

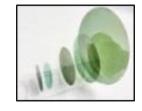
#### **Industrial and Automotive**

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- Yaskawa (Industrial) Program aligned for cost effective innovative solutions for robotic applications
  - Focus on next funding and development milestones (Dec'22)
- Nexperia (Automotive focus) Continued epi and fab wafer supply towards long term partnership
- Automotive: Continuing design-ins with EV, for CY 2024-25, On-Board-Charger and dc-dc Converter opportunities, initial look at drive train inverter (for 2026-2027 potential)
- Executing on initiatives in EV 2-Wheeler/3-Wheeler (Asia) for faster EV (CY2023) revenue

#### **Government Revenue and Epi Business**

- Navy and Govt. Programs –Billing \$0.5m in FQ2'23, current program wraps up in FQ3'23, and completed submission for a follow on for next 3 years (if awarded, expect in CY Q1'23. Continue 1200V effort.
- Manufacturing Funding Continue positioning for CHIPS act funding to expand US Epiwafer manufacturing, submissions expected in CQ1'23



Transphorm's OBC Reference Solution in works





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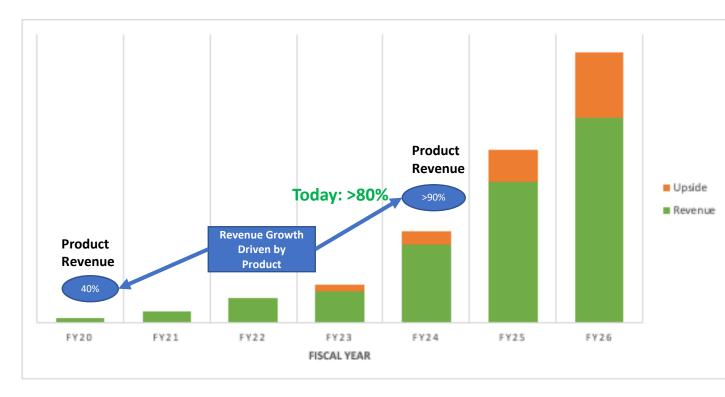
## **Key Financial Highlights**

	Q2 FY23	Q1 FY23	Commentary
Revenue	<b>\$3.7m</b> (>85% Product)	<b>\$5.2m</b> (>85% Product)	<ul> <li>Growth resuming in Q3</li> <li>Total Revenue increased 11% from Q2'FY22 (excl Licensing)</li> <li>Product revenue increased 38% from Q2 FY22</li> </ul>
Gross Margin	12%	21%	<ul> <li>Stable direct margins Q2 vs. Q1</li> <li>GM% - indirect costs a greater drag on margins at lower revenue base in Q2, drag will reduce as revenue increases</li> </ul>
OPEX (non-GAAP)	\$5.1m	\$5.4m	<ul><li>Reduced G&amp;A costs</li><li>Increased Sales/Apps headcount</li></ul>
EPS (non-GAAP)	(\$0.09)	(\$0.08)	Stable EPS Q to Q
Stockholders Equity	\$3	86m	<ul><li>\$34m cash and cash equivalents</li><li>Reduced Operational burn in Q2</li></ul>
Operational Notables			<ul> <li>Solid Backlog in place to support growth</li> <li>Capital expenditure to enable larger capacity</li> </ul>



## Target Operating Model

### **Building a High-Growth, Product Driven Cash Generating Business**



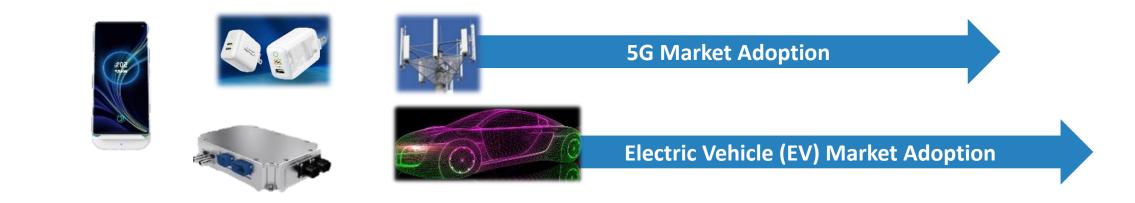
#### **Operating Guidelines:**

- Rapid top-line growth and GaN adoption across multiple end markets
- OpEx for continued development of best-in-class products and IP portfolio
- CAPEX investment for increased scale

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Target Model:	
5-year CAGR range:	50%+
Gross Margin:	40%+
Operating Margin:	20%+
Free Cash Flow:	10%+

### **Positioned to Grow Across Multiple Segments**



Adoption / Growth	Execution and Expansion	Achieve Target Model
CY 2021-2022	CY 2023	CY 2024+

- Multiple revenue streams in place
- Growing production across multiple segments
- Shipped > 1M units in December 2021
- Continued investment in growth across all aspects of the company
- Investing in capacity increases

- Broad market inflection point
- Ramping revenue across consumer, data centers and blockchain segments
- Continue to scale capacity aggressively
- Initial wins in EV 2W/3W segments
- Continued government contracts

- Continued momentum and broad market expansion
- Automotive adoption (EV 4W)
- Leader in High Power, EV, Consumer segments
- Positive cash flow generation
- Execute to target model

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## TGAN

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## **Income Statement**

### **Exceeded Consensus Revenue target, Reduced OPEX**

	Three Months Ended				Six Months Ended		
	9/	30/2022	6/30/2022	9/30/2021	9	/30/2022	9/30/2021
Revenue, net	s	3,670 \$	5,156	\$ 11,303	\$	8,826 \$	14,519
Cost of goods sold		3,232	4,050	2,239		7,282	4,806
Gross profit		438	1,106	9,064		1,544	9,713
		12%	21%	80%		17%	67%
Operating expenses:							
Research and development		1,830	1,740	1,591		3,570	3,414
Sales and marketing		1,066	1,083	825		2,149	1,512
General and administrative		3,044	3,317	2,714		6,361	5,457
Total operating expenses		5,940	6,140	5,130		12,080	10,383
(Loss) income from operations		(5,502)	(5,034)	3,934		(10,536)	(670)
Interest expense		184	182	220		366	424
Loss in joint venture		684	582	1,092		1,266	2,582
Changes in fair value of promissory note		_	_	(1,629)		_	(605)
Other income, net		(375)	(445)	(1,729)		(820)	(1,999)
(Loss) income before tax expense		(5,995)	(5,353)	5,980		(11,348)	(1,072)
Tax expense							
Net (loss) income	\$	(5,995) \$	(5,353) \$	\$ 5,980	\$	(11,348) \$	(1,072)
Net loss per share - basic	\$	(0.10) \$	(0.10)	\$ 0.15	\$	(0.20) \$	(0.03)

#### Revenue of \$3.7m in Q2

- Product revenue \$3.2m
- Government \$0.5m
- Q2'FY22 included \$8m in one-time licensing revenue

#### **Gross Margins**

- 12% in Q2 (9% decrease from PQ) due to drag from indirect costs at lower Q2 vs Q1 revenue
- Direct margin of core products stable

#### **Operating Expenses**

• Lowered OPEX - primarily G&A down due to Q1 year end procedures

#### Non-GAAP EPS (\$0.09)



Subject to completion of review procedures

## **Balance Sheet**

### Solid Cash Position, Strong Stockholders Equity

	Septen	nber 30, 2022	June 30, 2022	September 30, 2021
Assets				
Current assets:				
Cash and cash equivalents	s	33,496 \$	42,613	\$ 1,988
Restricted cash		500	500	500
Accounts receivable		1,617	3,203	1,585
Inventory		8,966	6,963	4,774
Prepaid expenses and other current assets		2,068	2,575	1,329
Total current assets		46,647	55,854	10,176
Property and equipment, net		5,328	2,199	1,761
Operating lease right-of-use assets		3,312	3,448	_
Goodwill		996	1,056	1,286
Intangible assets, net		469	543	765
Investment in joint venture		414	339	89
Other assets		784	291	259
Fotal assets	\$	57,950 \$	63,730	\$ 14,336
Liabilities and stockholders' equity (deficit) Current liabilities:				
Accounts payable and accrued expenses	S	4,492 \$	4,674	\$ 4,047
Deferred revenue		263	354	<b>60</b> 7
Accrued interest		184	182	184
Accrued payroll and benefits		1,331	1,120	1,447
Operating lease liabilities		532	521	_
Revolving credit facility		12,000	12,000	-
Promissory note		_		15,597
Total current liabilities		18,802	18,851	21,882
Revolving credit facility, net of current portion		_	_	12,000
Operating lease liabilities, net of current portion		2,803	2,941	
Total liabilities		21,605	21,792	33,882
Total Stockholders' equity (deficit)		36,345	41,938	(19,546)
Total liabilities and stockholders' equity (deficit)	\$	57,950 \$	63,730	\$ 14,336

#### **Notables**

- Cash and cash equivalents of \$34m
- Fixed assets increased 2 reactors, other operational tools
- Inventory increased solid backlog remains in place
- AR lower strong collections in the period
- ASC 842 adopted in Q1 asset/liability now on B/Sheet
- Revolving credit facility (\$12m) due FY24



Subject to completion of review procedures

## **GAAP to NON-GAAP Reconciliation**

	Three Months Ended			Six Months Ended				
	_	9/30/2022	6/30/2022	9/30/2021		9/30/2022	9/30/2021	
GAAP net (loss) income	\$	(5,995) \$	(5,353) \$	5,980	s	(11,348) \$	(1,072)	
Adjustments:								
Stock-based compensation		636	582	511		1,218	1,008	
Depreciation		165	152	134		317	257	
Amortization		74	74	74		148	143	
Changes in fair value of promissory note		_	-	(1,629)		_	(605)	
Other income	_	—	-	(1,455)		_	(1,455)	
Total adjustments to GAAP net (loss) income		875	808	(2,365)		1,683	(647)	
Non-GAAP net (loss) income	\$	(5,120) \$	(4,545) \$	3,615	\$	(9,665) \$	(1,719)	
GAAP net (loss) income per share - basic	s	(0.10) \$	(0.10) \$	0.15	s	(0.20) \$	(0.03	
Adjustment		0.01	0.02	(0.06)		0.03	(0.01	
Non-GAAP net (loss) income per share - basic	\$	(0.09) \$	(0.08) S	0.09	s	(0.17) \$	(0.04	
GAAP net (loss) income per share - diluted	s	(0.10) \$	(0.10) \$	0.14	s	(0.20) \$	(0.03	
Adjustment	Ĩ	0.01	0.02	(0.05)		0.03	(0.01)	
Non-GAAP net (loss) income per share - diluted	s	(0.09) \$	(0.08) \$	0.09	s	(0.17) \$	(0.04	
		Three Months Ended				Six Months Ended		
		9/30/2022	6/30/2022	9/30/2021	9/30/2022		9/30/2021	
GAAP operating expenses	s	5,940 S	6,140 S	5,130	s	12,080 S	10,383	
Adjustments:								
Stock-based compensation		583	543	472		1,126	94	
Depreciation		165	152	134		317	25	
Amortization		74	74	74	_	148	14	
Total adjustments to GAAP operating expenses		\$22	769	680		1,591	1,34	
Non-GAAP operating expenses	s	5,118 \$	5,371 \$	4,450	S	10,489 \$	9,036	

## **Non-GAAP OPEX lower in the quarter** Government, G&A (legal/audit) **SBC increased in quarter** New options approved in Q2 **Depreciation slightly higher Ongoing CAPEX investment Fair Value adjustments** Prior converted note with Yaskawa – nonrecurring

Subject to completion of review procedures



## **Glossary of Terms and Abbreviations**

AC – alternating current

AEC-Q101 – Automotive Electronic Council's electronic components stress qualification standard

AFSW – Aizu Fujitsu Semiconductor Wafer Solution Limited, our joint venture wafer fabrication facility located in Aizu Wakamatsu, Japan

BJT – bipolar junction transistor, a semiconductor device

Bus voltage – voltage into, out of or within connections of a power electronic system

CMOS – complementary MOS (metal oxide semiconductor), widely used semiconductor transistor architecture

D2Pak – a surface mountable version of the TO220 package

DC – direct current

Die/Chip – an individual semiconductor device on the wafer, prior to packaging

EAR – Export Administration Regulation

Epi/Epiwafer/Epimaterials – GaN device layers grown on a substrate, from which active GaNbased devices are subsequently manufactured in a wafer fabrication facility

Fab – fabrication, generally referring to a semiconductor wafer fabrication facility

FET – field effect transistor, a type of switching transistor

Figure of Merit - a quantity used to characterize the performance of a device, system or method, relative to its alternatives

FIT – failure in time, referring to the expected number of device failures per billion hours of operation

GaN – gallium nitride

HEMT – high electron mobility transistor, a type of switching transistor with superior electronic properties

IGBT – insulated-gate bipolar transistor, a three-terminal power semiconductor device primarily used as an electronic switch

JEDEC – Joint Electron Device Engineering Council, an independent semiconductor engineering trade organization and standardization body that represents all areas of the electronics industry

LIDAR – light detection and ranging, a remote sensing method that uses light in the form of a pulsed laser to measure distance

Lossy – in the context of switching devices, subject to loss of power due to switching inefficiencies and other factors

MOCVD – metal organic chemical vapor deposition, a technique for layering GaN layers onto substrates such as a silicon substrate and making the starting GaN semiconductor material (i.e., an epiwafer)

Moore's law – the observation that the number of transistors in a dense integrated circuit doubles about every two years

 $\label{eq:MOSFET-metal-oxide-semiconductor} MOSFET-metal-oxide-semiconductor field-effect transistor, a type of transistor Normally Off-default position is off$ 

Power converters / Inverters – electronic systems used to convert electricity from AC to DC (such as a charger), DC-AC (such as an inverter) or in some cases AC-AC or DC-DC within the systems converting from one voltage level to another

PQFN – power quad flat no lead package, a compact surface mountable package used in power semiconductors

RF – radio frequency

SCR – silicon controlled rectifier, an early semiconductor switching device

Si – silicon

SiC – silicon carbide

TO – transistor outline leaded packages commonly used in power semiconductors (such as TO220, TO247)

