
TGAN
transphorm
Leading the GaN Revolution
Fiscal Q1’23 Investor Update
August, 2022 | NASDAQ: TGAN

Safe Harbor Statement

- This presentation is made solely for informational purposes, and no representation or warranty, express or implied, is made by Transphorm, Inc. ("Transphorm") or any of its representatives as to the information contained in these materials or disclosed during any related presentations or discussions. This presentation is intended solely for the purposes of familiarizing investors with Transphorm. This presentation is not an offer to sell nor does it seek an offer to buy any securities.

- This presentation contains forward-looking statements. All statements other than statements of historical fact contained in this presentation, including statements regarding Transphorm's business strategy, plans and objectives for future operations, expectations regarding its total addressable market, products, and competitive position, are forward-looking statements. The words "may," "will," "estimate," "expect," "plan," "believe," "potential," "predict," "target," "should," "would," "could," "continue," "believe," "project," "intend" or similar terminology are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

- Transphorm may not actually achieve the plans, intentions, or expectations disclosed in these forward-looking statements, and you should not place undue reliance on these forward-looking statements. These statements are based upon

- management's current expectations, assumptions and estimates, and are not guarantees of future results or the timing thereof. Actual results may differ materially from those contemplated in these statements due to a variety of risks and uncertainties, including risks and uncertainties related to Transphorm's business and financial performance and cash flows and its ability to reduce operating losses and achieve profitability, attract and retain customers, continue commercial production, continue to access funding sources to finance operations, continue having access to third party manufacturers, develop new products, enhance existing products, compete effectively, manage growth and costs, and execute on its business strategy. The following-looking statements contained in this presentation are also subject to other risks and uncertainties, including those more fully described in our filings with the Securities and Exchange Commission, including our Quarterly Report on Form 10-Q for the quarter ended June 30, 2022, filed with the Securities and Exchange Commission on August 15, 2022

- The information contained herein is provided only as of the date on which this presentation is made and is subject to change. Transphorm is not under any obligation, except as may be required by law, to update or otherwise revise the information after the date of this presentation. Transphorm has not independently verified the statistical and other industry data generated by independent parties and contained in this presentation and accordingly cannot guarantee their accuracy or completeness.

Key Investment Highlights

GaN Power Semiconductor Pioneer and Leader

Disruptive Technology

GaN Enables Next Generation Power Conversion Solutions – 99% Efficiency[1], 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[2] 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

IP Portfolio Appraised in Excess of $200M[3]
Leader in Quality + Reliability, > 60 Billion Field hours, Silicon-like Reliability[4]
TGAN FET: Higher performance, easy to interface

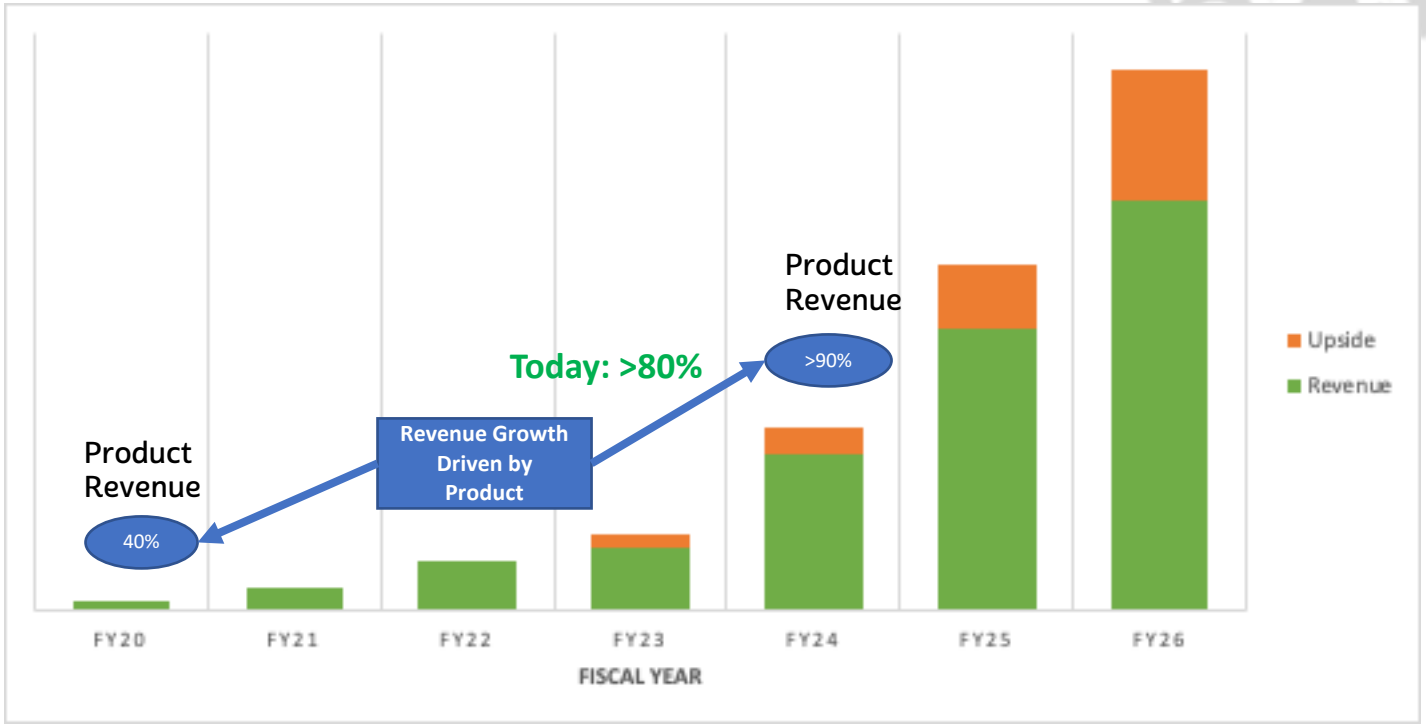
Team Led by World-Renowned GaN Experts

Proven Leadership, 18 PhDs and Over 300 Years of GaN Expertise

1 Measured TGAN >99% efficient power stages, commercial implementation
2 See slide 10 on GaN TAM Analysis
3 2021 Analysis done for GaN portfolio using Intracom Group Intellectual Property Solutions' patent valuation models based on 27 independent criteria, value consists of Transphorm's owned or exclusively licensed patents (non-exclusive patents not included)
4 Based on field performance, low power and high power GaN, FIT (Failure in Time) < 0.2 per Billion hours

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

Target Model:

5-year CAGR range: 50%+

Gross Margin: 40%+

Operating Margin: 20%+

Excludes licensing revenue in FY20, FY21, FY22

Targeting $3 Billion Power Market Opportunity in 2023

Upside to TAM from Electric Vehicle Powertrain starting in 2025

End Market Applications and GaN Benefits

Near Term → **Long Term**

Power Adapters | Compute

- Fast charging
- Lower thermals/ smaller form factor
- Lower system cost

Data Center | Comm Infrastructure | Crypto-Mining

- Ability to double available power in standardized server and 5G telecom form factors
- Enable Titanium-class effi[illegible]irement

Broad Industrial

- Reduces size/weight of systems
- More efficient charging for battery and/or battery-powered equipment and vehicles

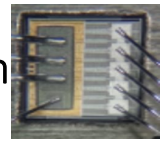
2W-3W-4W EV and Charging | + EV Powertrain from 2025

- Reduces size/weight of on-board chargers, power converters and power inverters
- Resulting in longer [illegible]r charge

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

TGAN Owns GaN Wafer Production Supply Chain

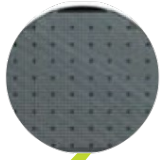
Asset-Light, Vertically Integrated Manufacturing Driving Innovation

Transphorm 

1. GaN FET design
(Safe Normally Off, Robust, High Performance, Easy to interface)

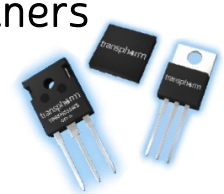
Transphorm 

2. Core Epi wafer starting material and manufacturing
(Multiple MOCVD Reactors, 6", 8" capable)



Transphorm (JV)

3. Wafer fab - AFSW
(GaN with Si-like yields[1])

Sub-con partners 

4. Packaging
(Use Multiple OSATs, with TGAN IP)

Transphorm and Partners 

5. Applications-driven resources
(Easy to Design for Partners)

1) P. Parikh et. al., GaN Power Commercialization with Highest Quality-Highest Reliability 650V HEMTs- Requirements, Successes and Challenges, 2018 IEEE International Electron Devices Meeting (IEDM), Dec 2018

TPH GaN vs. e-mode GaN: Why We Win!

Key Factors	Silicon MOSFET	e-mode GaN	Transphorm GaN FET
Ease of use (std. drivers, agnostic to controllers)	●	◐	●
Size (form factor) and Speed (frequency)	○	●	●
Performance (efficiency)[1]	○	◐	●
Added BoM components (cost)[2]	●	◐	●
Reliability and Robustness[3]	●	◐	●

● Strong
◐ Medium
○ Weak

[1,2]Based on multiple public and internal reference designs, https://www.transphormusa.com/en/reference-design/tsadp-sil-usbc-65w-rd/
[3]Impact of OFF-state Gate Bias on Dynamic R,on of p-GaN Gate HEMT (33rd ISPSD, 2021)

transphorm
NASDAQ: TGAN

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

Why Transphorm Wins:

- **Transphorm adopted in many more markets**
- "e-mode" input interface is weaker – hard to operate in widely used *TO Packages* for higher power
- Superior Dynamic performance from TGAN FET – *Higher* performance, from *smaller* GaN die
- Proven reliability & manufacturing for scaled device – *10 kW capable* single GaN device in production
- Higher power => higher energy and emissions impact, *e.g. Blockchain consumes 120 TWH, TGAN's 1% efficiency gain => 1TWH + (> 125 lbs of CO_2 emissions / TGAN Device[2]), >50,000 metric tons in 2022 alone (single market application!)*

In Production[1]			
Markets	GaN e-mode or "IC"	GaN FET	Power Range TGAN Wins
Adapters	✓	✓	30-250W
Datacenters	✗	✓	800-3200W
Gaming (Desktop)	✗ ✗	✓ ✓	1600W
Blockchain	✗	✓	1600-3600W
Industrial (≥ 500 W)	✗	✓	500-3000W
Aerospace			420-1200W

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, 60 design-ins

Ultra slim, light weight (65 W)

Compact, high efficiency (68 W)

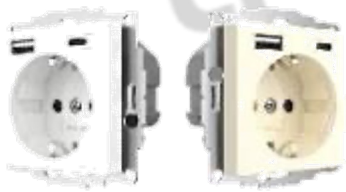
Quick Charge-5, USB C PD (100 W)

Compact Power Bar, 65W 1A-1C

Compact 100W 2C-1A

High-efficiency (65 W)

Wall plug – high efficiency, compact (35 W)



Note book – small size, 200 KHz high speed (160 W)

Compact 30W Power Bar

Multi out 150W (2C-1A)

Compact, efficient USB-C (65W)

New 65W 2C-1A (Phihong)

New 65W 2C-1A)

New 120W 2C-2A-Axial

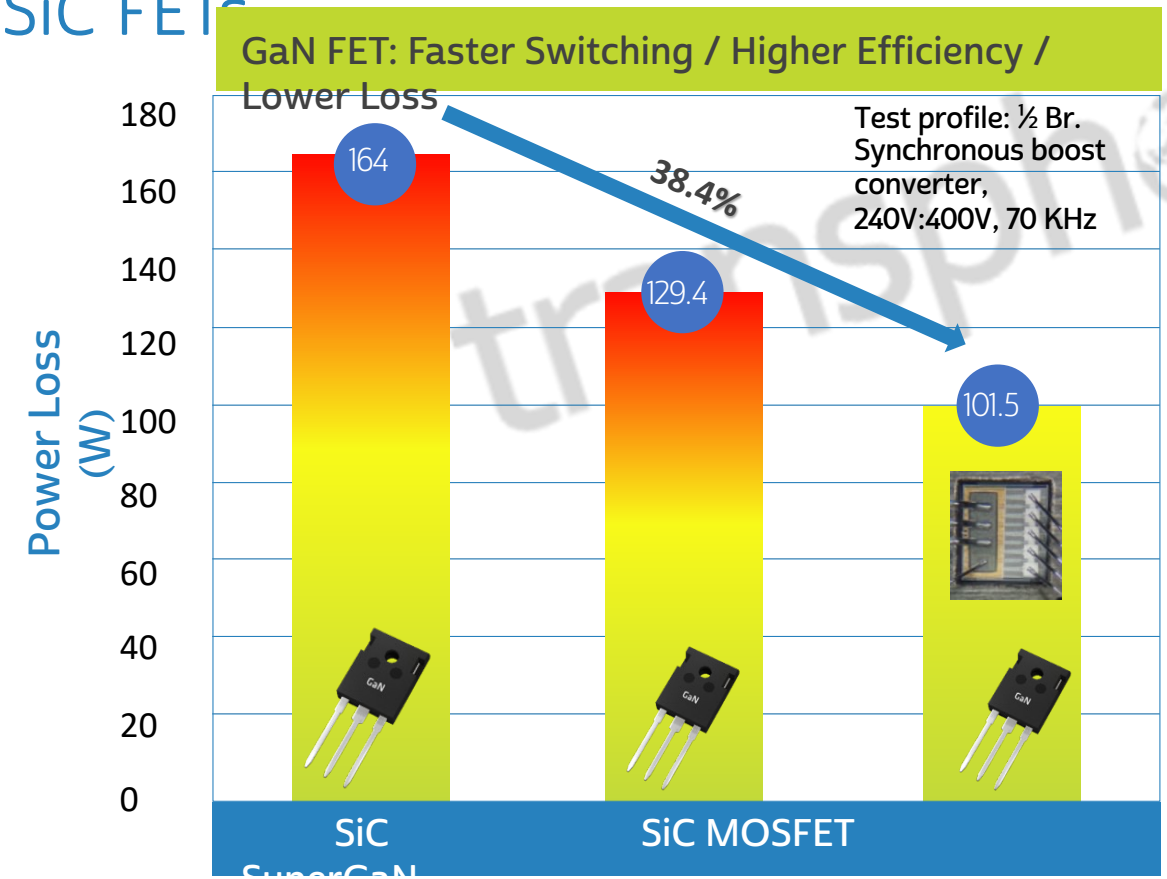
Ultra compact 240W

transphorm

NASDAQ: TGAN

Transphorm GaN FET Outperforms the Competition

SuperGaN® offers reduced power loss (25-38%) over SiC FETs



Device Power Loss Comparison (9.2 kW)
(Limited due to SiC FET junction temperature)

Recent 3rd party independent validation: 15-20% loss reduction (0.5-1% point efficiency improvement) at 5 kW in a resonant converter [1]

1. PCIM 2022, Technical Paper, Alejandro Llop et. al., "A Comparison among Wide Bandgap Devices using a CLLLC Bidirectional Resonant Converter"

Customers Select Transphorm GaN – High Power

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

CORSAIR

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

tom's HARDWARE

bel POWER SOLUTIONS & PROTECTION

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

"Ease of drivability and designability— **does not require custom drivers**. Proven reliability— JEDEC and AEC-Q101"

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

TDK

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

NEW

NEW

GaN benefit of low switching loss, 1st gaming psu with GaN in ASUS

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

EV challenges for existing

Lower Watts / Cubic Inch

\+

Power Loss

\+

Heat Constraints

\+

Limited Driving Distance

=

Higher Cost & Power Demand

Transphorm Gen IV 650V 35mΩ GaN FET

- Automotive qualified (AEC) today

- Charger / Converter / Inverters for EVs
- Earlier penetration into 2W-3W EVs (CY2023)
- Staying ahead: R&D for 1200V [1] with GaN for higher battery voltage EVs (taking on SiC higher Voltage FETs)

Faster Charging & Increased Range w/

Future of EV with GaN-based solutions

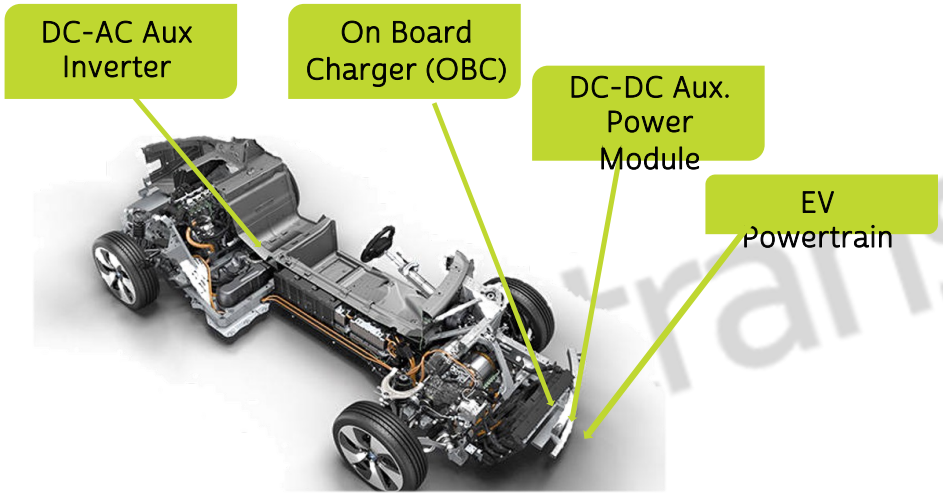
GaN-enabled Power Solution Benefits[1]:

- 2x More Watts / Cubic Inch, Faster Charging
- Less Power Loss (~20%)
- Reduced Size (~50%)
- Increased Range

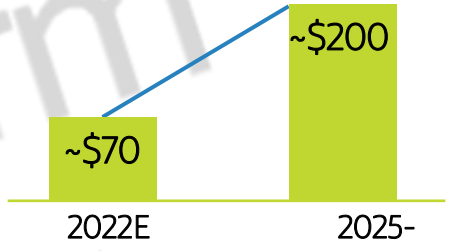
1) Program Management Update: January 2016, High efficiency high-density GaN-based 6.6kW bidirectional on-board charger for PEVs DOE Award number DE-EE0006834

Accelerating Opportunity for GaN Enabled Power in EV

1. GaN Opportunities in EV, 4W



1. Addressable GaN $ Content/EV, 4W[2]



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

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

On Board Charger (OBC)

Portable Chargers

Battery Swapping

Pole Chargers

2. EV 2W, 3W Market

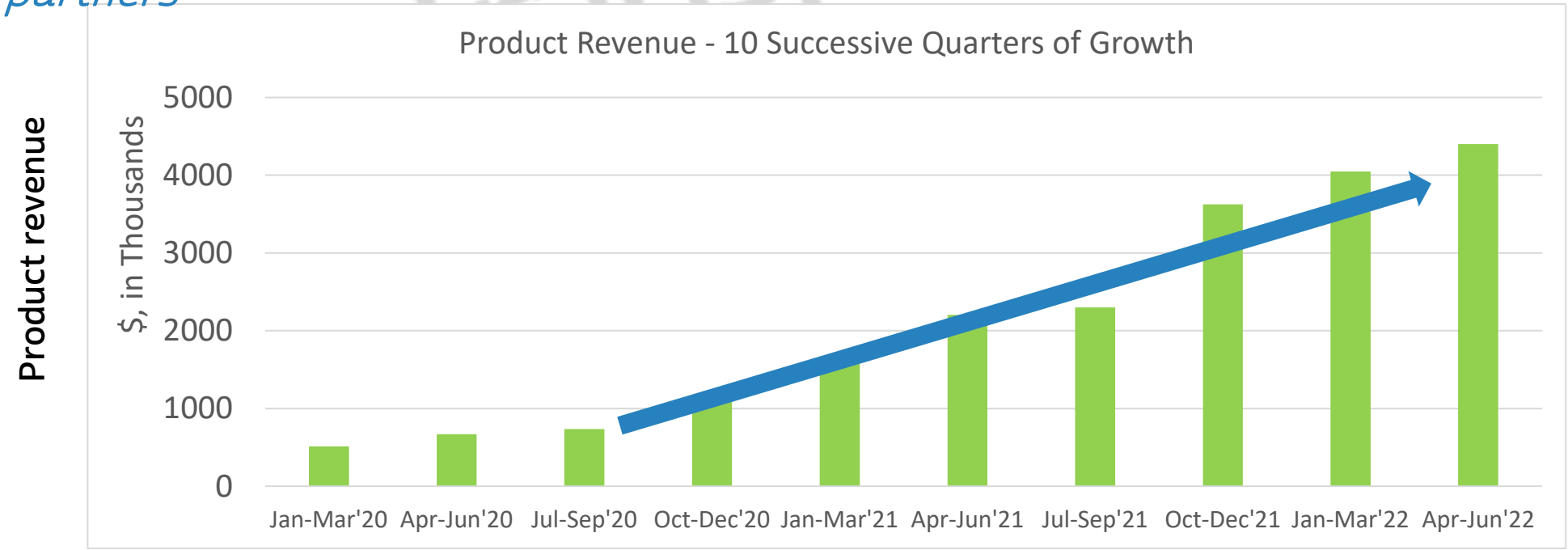
- TGAN FET already proven in battery-swapping
- Potential to address 75 Million 2W/3W WW (Asia dominated)[3], $8-10/vehicle

Transphorm GaN AEC-Q101 (Auto) Qualified NOW

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)

Strong QoQ of Product Revenue Growth

- *Maintaining leadership in higher power markets / 1-5kW segment (1 large device ~ 8 smaller Adapter/charger devices): Across the board wins and continued supply in gaming, blockchain, energy, medical*
  - *>60% revenues from high power*
- *Gain share in Adapter/chargers with proven superior performance, strong solutions partners*



Key Business Focus – Scaling Product Revenue

Focus on 1) Expanding Capacity 2) Supply Chain and 3) Product Revenue

Key focus area	Achieved	Comments / Upcoming
1. Revenue/Products	✓ $4.4M Products (Total $5.2M)	• 10th sequentially higher Quarter • Record backlog in place
2. Adapters/Chargers: Design-ins, Production, Solutions (45W – 250W)	✓ Design-Ins: 60 (several added) ✓ In Production: >20 ✓ Solutions/Ref designs: >12 (7 new Ref Designs)	• Phihong Win shows design, performance leadership • Easy to use, no added driver, Small die vs. e-mode • Continued POs at major Tier 1s (Laptop, E-retailer)
3. High power: Design-Ins, Production, Ref. Designs (300W-4kW)	✓ Design-Ins: >35 (several added) ✓ In Production: >15 ✓ Eval kits/Ref designs: >8 (1-4kW)	• >60% of revenue High Power • Execution on >500K units PO for 3kW+ • Expand, Penetrate new segments, Lead
4. Product SKUs and Qualification	✓ Total: 17 (AEC qualified: 3) – new D2 Pak SMD ✓ 1200V R&D Demo – higher performance vs. SiC (ISPSD – IEEE conference, May 2023)	• Broadest offering (650/900V), • Compact surface-mount & thermally robust TOs • Next: Gen5 AEC qualification
5. Capacity Proof Points	✓ Packaging capacity in place (only in industry for PQFN through TO packages) ✓ Expanding and acquiring new epiwafer capacity	• Continued emphasis on supply chain management • Epi Reactors – Bring existing capacity online and acquire additional reactors (add'l in 2nd half of CY23)

Key Business Update – Strategic Partnerships

Manufacturing Capacity Increase, Partnerships

- Acquired 2 additional reactors, online in second half CY-2023
- Global Wafers (Partner) – Agreement formally signed, additional $5m equity via recent Greenshoe.
  - Further epiwafer expansion
- 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

- Yaskawa (Industrial) – Program aligned for cost effective innovative solutions for robotic applications
  - Pending $0.75m development funding completed (July'22)
- Nexperia (Automotive focus) – Continued epi and fab wafer supply, next milestone Gen5 AEC qual
- Japan Automotive: Continuing design-ins with other Japan EV, for CY 2024-25, dc-dc and obc opportunities
  - Started initiatives in EV 2-Wheeler/3-Wheeler (Asia) for faster EV (CY2023) revenue

Government Revenue and Epi Business

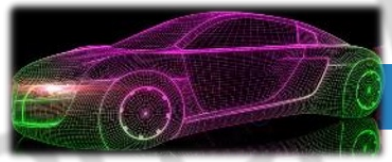
- Navy and Govt. Programs –Billing $0.7m in FQ1'23, current program wraps up in FQ3'23, and now targeting follow-on in FQ4'23. Complete 1200V ARPA-E effort.

Key Financial Highlights

Record Product Revenue, Stable EPS, TGAN now on NASDAQ

	Q1 FY23	Q4 FY22	Commentary
Revenue	**$5.2m** (85% Product)	**$4.9m** (80% Product)	• 10 successive quarters of revenue growth • Total Revenue increased 5% from Q4, 60% from Q4 FY22 • Product revenue increased 10% from Q4, 101% from Q4 FY22
Gross Margin	**21.5%**	**23.1%**	• Impact of some cost increases, investment in COG's team • Reduced Government income
OPEX (non-GAAP)	**$5.4m**	**$4.7m**	• $0.7m increase in quarter • Increases in personnel, G&A (legal, K costs)
EPS (non-GAAP)	**($0.08)**	**($0.08)**	• Stable EPS Q to Q
Stockholders Equity	**$42m**		• $43.1m cash and cash equivalents • Greenshoe adding $16m to balance sheet before fees
Operational Notables	⬆		• Record quarterly product bookings • Backlog in place to support growth • Strong hiring continues across the company • Increased liquidity from trading volumes

Positioned to Grow Across Multiple Segments



5G Market Adoption

Electric Vehicle (EV) Market Adoption

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/4W segments • Continued government contracts	• Continued momentum and broad market expansion • Automotive adoption growth • Leader in High Power, EV, Consumer segments • Positive cash flow generation • Execute to target model

Key Investment Highlights

GaN Power Semiconductor Pioneer and Leader

Disruptive Technology

GaN Enables Next Generation Power Conversion Solutions – 99% Efficiency[1], 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[2] 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

IP Portfolio Appraised in Excess of $200M[3]
Leader in Quality + Reliability, > 60 Billion Field hours, Silicon-like Reliability[4]
TGAN FET: Higher performance, easy to interface

Team Led by World-Renowned GaN Experts

Proven Leadership, 18 PhDs and Over 300 Years of GaN Expertise

1 Measured TGAN >99% efficient power stages, commercial implementation
2 See slide 10 on GaN TAM Analysis
3 2021 Analysis done for GaN portfolio using Intracom Group Intellectual Property Solutions' patent valuation models based on 27 independent criteria, value consists of Transphorm's owned or exclusively licensed patents (non-exclusive patents not included)
4 Based on field performance, low power and high power GaN, FIT (Failure in Time) < 0.2 per Billion hours


TGAN
transphorm
Investor Relations Contact:
David Hanover or Jack Perkins
KCSA Strategic Communications
transphorm@kcsa.com

Appendices

Financials

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 GaN-based 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
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)

Income Statement

Record Product Revenue, Stable NON-GAAP performance

	June 30, 2022	March 31, 2022	June 30, 2021
Revenue, net	$ 5,156	$ 4,927	$ 3,216
Cost of goods sold	4,050	3,789	2,567
Gross profit	1,106	1,138	649
Operating expenses:			
Research and development	1,740	1,632	1,823
Sales and marketing	1,083	1,047	687
General and administrative	3,317	2,917	2,743
Total operating expenses	6,140	5,596	5,253
Loss from operations	(5,034)	(4,458)	(4,604)
Interest expense	182	181	204
Loss in joint venture	582	677	1,490
Changes in fair value of promissory note	-	-	1,024
Other income, net	(445)	(317)	(270)
Loss before tax expense	(5,353)	(4,999)	(7,052)
Tax expense	-	-	-
Net loss	**$ (5,353)**	**$ (4,999)**	**$ (7,052)**
Net loss per share - basic and diluted	**$ (0.10)**	**$ (0.09)**	**$ (0.17)**
Weighted average common shares outstanding - basic and diluted	**54,404,830**	**53,343,862**	**40,637,213**

Revenue of $5.2m in Quarter

- 10th successive quarter of product revenue growth
- Product revenue now over $4.4m (10% q/q growth)

Gross Margins

- 22% in Q1
- Reduced government revenue in Q
- Impacted by higher cost of raw materials and continued investment in production team

Operating Expenses

- OPEX increased q/q
  - G&A increases driven by increased legal and audit fees together with recruitment costs
  - Reduced ONR as lower billings in quarter

Non-GAAP EPS ($0.08)

Balance Sheet

Strong long term cash stability

	June 30, 2022 (unaudited)	March 31, 2022 (audited)	June 30, 2021 (unaudited)
Assets			
Current assets:			
Cash and cash equivalents	$ 42,613	$ 33,435	$ 1,962
Restricted cash	500	500	500
Accounts receivable	3,203	2,558	2,247
Inventory	6,963	6,330	2,924
Prepaid expenses and other current assets	2,575	1,971	2,160
Total current assets	55,854	44,794	9,793
Property and equipment, net	2,199	1,649	1,832
Operating lease right-of-use assets	3,448	-	-
Goodwill	1,056	1,180	1,303
Intangible assets, net	543	617	839
Investment in joint venture	339	143	-
Other assets	291	263	267
Total assets	**$ 63,730**	**$ 48,646**	**$ 14,034**
Liabilities and stockholders' equity (deficit)			
Current liabilities:			
Accounts payable and accrued expenses	$ 4,674	$ 3,588	$ 3,744
Deferred revenue	354	346	1,016
Development loan	-	-	8,000
Accrued interest	182	180	166
Unfunded commitment in joint venture	-	-	1,339
Accrued payroll and benefits	1,120	1,171	1,582
Operating lease liabilities	521	-	-
Total current liabilities	6,851	5,285	15,847
Revolving credit facility	12,000	12,000	12,000
Promissory note	-	-	17,190
Operating lease liabilities, net of current portion	2,941	-	-
Total liabilities	**21,792**	**17,285**	**45,037**
Commitments and contingencies			
Total Stockholders' equity (deficit)	**41,938**	**31,361**	**(31,003)**
Total liabilities and stockholders' equity (deficit)	**$ 63,730**	**$ 48,646**	**$ 14,034**

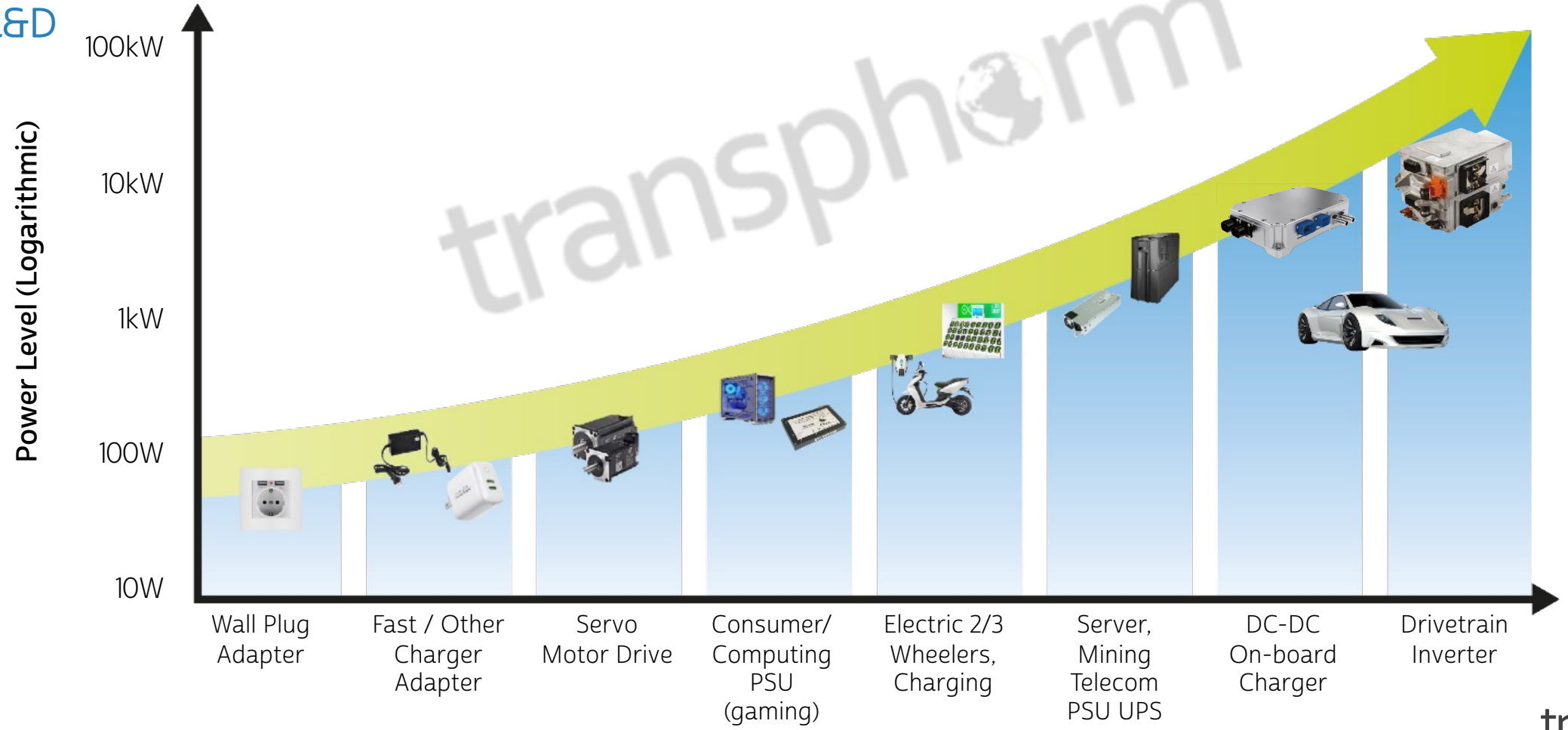
Notables

- Cash and cash equivalents of $43.1m
  - Greenshoe raised $16m before fees ($15.7m after fees)
  - Offset by ongoing operational burn - $6.1m before CAPEX (flat to Q4'FY22)
- Inventory increased to support backlog growth
- Yaskawa loan ($15m) converted to equity
- Development loan deliverables met
- Revolving credit facility ($12m) – due Q1FY24

Solid increase in trading volume

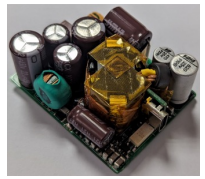
Comprehensive GaN Product Portfolio: 45 W to +10 kW

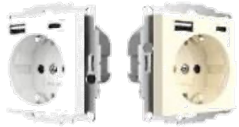
TGAN Core Platform Spanning the Power Spectrum: Wide breadth of 650V, 900V JEDEC/AEC-Q101 Qualified Products, 1200V and short circuit in R&D

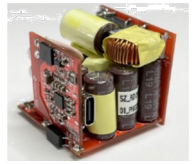


TGAN: Si like ease of use Expands Partnership in 45-250W Solutions

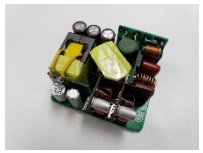
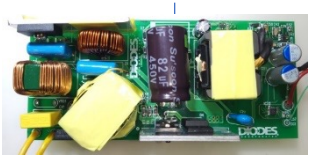
Design Company, Topology, and Power Density														
45 W			65 W			90 to 110 W			120 to 150 W			200-250 W		
Design	Topology	W/in³	Design	Topology	W/in³	Design	Topology	W/in³	Design	Topology	W/in³	Design	Topology	W/in³
transphorm	QRF	24	transphorm	QRF	25	transphorm	PFC+QRF	18*	DIODES	PFC/LLC	16	transphorm	PFC/LLC	25 (PCB)
External and In-wall			Silanna	ACF	30	Silanna	ACF	20	New	PFC/LLC	15*	New	PFC/LLC	15*
Supported by partners			DIODES	ACF	30	DIODES	ACF	20	Supported by partners			Supported by partners		



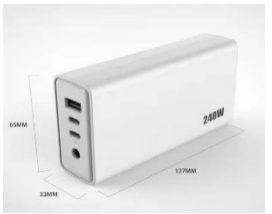








100W



150W


240W

* Including full casing

transphorm
NASDAQ: TGAN

Leadership in High-Power GaN – Secured new PO ~500,000 units

Efficient, Reliable, High Performance, Patented GaN Architecture

Block Chain Computing – Power Hungry Systems requiring Titanium efficiency

3kW+

Efficiency, Reliability

- Consumes ~120 TWh, equivalent to small country
- TGAN solutions can enable up to 1% higher efficiency
- 230 V_{AC} (> 125 lbs of CO_2 emissions / TGAN Device[1])
  - Greater than 50,000 metric tons in 2022

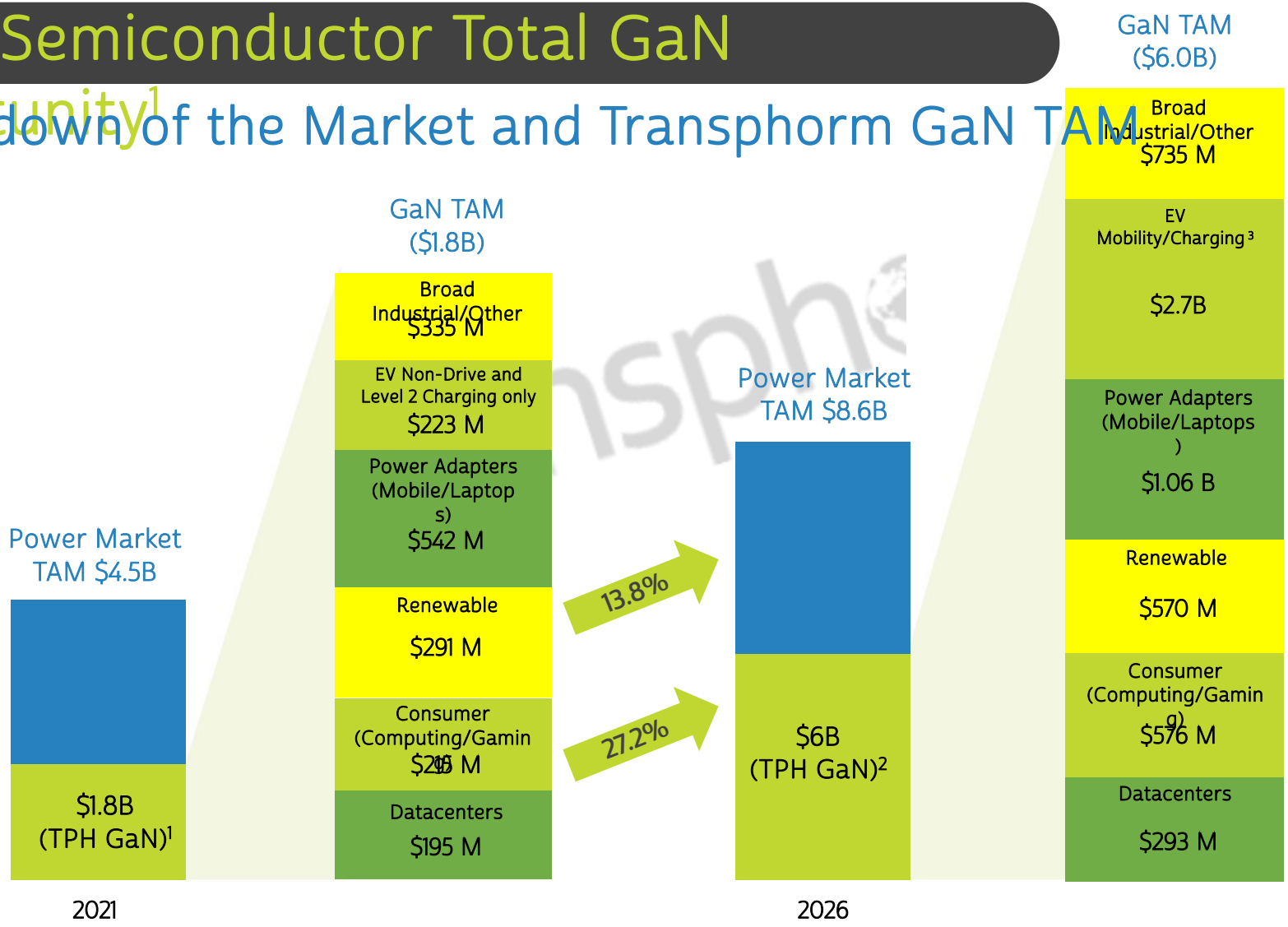
Data Center Server Power – We have enabled Titanium performance for > 4 years

- 5 MW Data center, $103K saved / year, 397 tons reduced carbon footprint[2]
- Regulations like EU Ecodesign[3] in 2023 expected to accelerate GaN adoption
  - Increased order from existing customer

Notes:
1) Based on company estimates done for a 5MW data center
2) Based on existing rectifiers with 92% efficiency | Source: EPA estimated one kWh produces 1.52 pounds of carbon dioxide (excl. line-losses).
3) European Union's Ecodesign Directive (Directive 2009/125/EC).

Power Semiconductor Total GaN Opportunity[1]

A Breakdown of the Market and Transphorm GaN TAM



1 Market access based on current, future device offerings with operations to support shipments. Does not include the adoption of GaN technology nor Transphorm's yearly adoption rate
2 Shows the breakout; potential GaN market sizes, does not include any adoption rate
3 Includes modules for EV inverter and EV fast charging starting in 2024 and beyond
4 See appendix for references

Transphorm Advantage: Enabling Customers by Taking GaN Benefits to the Next Level

Faster, Smaller, More Efficient and Robust Solutions

Intrinsic Benefits of GaN	
Performance	· Field-proven best-in-class efficiency · Demonstrated and in volume over wide power levels
Quality & Reliability	· JEDEC + AEC-Q101, best-in-class robustness · < 0.2 FIT | > 60B hours
Volume Production Capability	· In-house GaN supply, vertically integrated value chain · Capacity to support higher unit volumes
Comprehensive Product Portfolio	· Products span low-to-high power, 45W to +10kW · Only company with 900V GaN, 1200V and short circuit in R&D
Ease of Drivability and Design-in	· Compatibility with standard Silicon packages w/ superior thermal heatsink capability · Growing number of reference designs and IC partners
Patent & IP Coverage	Industry's strongest GaN IP position with >1K patents · From material and process to design and application

Myths/Mis-information

Myths Clarified: “IC” or Discrete Integrated or Other – Performance/Ease of Use/Reliability/Cost is what matters

Normally off: “e-mode/ d-mode”

Fact:
Customer/Application demands Normally off Transistor.

TGAN FETs are Normally Off - just like MOSFETS

TPH GaN FET vs GaN E-mode/IC Performance

Fact:
GaN FET solution proven higher performance.

For example, in comparable adapter solutions.
Higher power: TGAN wins (e-mode not there today)

Drivers/ Integration

Fact:
Many modern controllers have drivers integrated (free)

TGAN FETs – Integrated Si

TGAN FETs – No extra driver or interfacing need, and where drivers needed, it is a Silicon-like interface.