Redefining Energy Efficiency
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The heart of all power conversion unit is a “SWITCH”

- Allows current to flow when switch is on
- Holds off voltage when the switch is off
- Manual mechanical switches are efficient; the switch on the wall
- Intelligence in a switch is enabled by switching them on and off fast in a controlled manner. Need electronics and when you use electronics there is penalty to pay in loss e.g. the dimmer switch vs. a simple switch

Answer is Gallium Nitride–based Power Conversion
Low loss when on and holds High Voltage when off
New solutions needed to meet growing energy demand

U.S. Net Electricity Generation
(Source: EIA)

U.S. Net Electricity Consumption
(Source: EPRI, E-Source & ExxonMobil)

Transphorm could reduce total electricity demand by over 10%
$80B in annual energy cost
600TWH energy saved 500 coal power plants equivalent
Transphorm’s GaN products can eliminate over 50% of power conversion losses to save hundreds of terawatt hours.
Transphorm savings potential is more than double the 270 TWh consumed annually on the U.S. west coast.
What does the market need

- Investment to make the technology market ready
- Provide the performance at an acceptable system cost (preferably at the same or lower cost). Increased technology cost defrayed by reduced commodity cost (Less Copper and Aluminum)
- Make it easy to use. Low investment needed by customers
- Market needs to be ready. A lead customer that causes a domino effect to shake the natural (and understandable) conservative nature of this market
Revolutionary Performance; Compact Packages

<20 kHz with filter

>300 kHz with integrated filter
Yaskawa PV converter GaN prototype

- Output power 4.5kw (Single Phase 200V)
- Input voltage 60-400V
- Maximum Power Efficiency > 98% (vs. >96.5% with Silicon)
- Ambient Noise < 27dB
- Volume about 10L <18L (existing Silicon based)

40% volume reduction

Significant loss reduction

Improved Efficiency In Major region
Transphorm’s Tru-Sine™ GaN Makes Motors More Efficient

Top-Performing IGBT Inverter
15kHz with pulse-width modulated output

Transphorm’s GaN Inverter
100kHz with compact filter & pure sine-wave output

DEMONSTRATED AND INDEPENDENTLY VALIDATED AVERAGE EFFICIENCY GAIN 5%
Higher efficiency shrinks adapter size and speeds recharge

10W AC Adapter for Apple
2” x 2” x 1”
4.25” x 2.55” x 0.73”
90 W

5W AC Adapter for Apple (80%)
1” x 1” x 1”
With 94% efficiency 15W is possible
Reduces charge time to 1/3
With 96% efficiency 24W is possible
Reduces charge time to 1/5
Case Study: low kW class data server / telecom power supplies

High power density enabled by high frequency, high efficiency & simpler architecture

- 30-50% increase in power density delivers 2kW in size of typical 1 - 1.5 kW power supply
- Smaller heat sinks, smaller passives and fewer components for reduced system BOM cost
- $2 million annual savings for each 1% efficiency improvement in typical data center