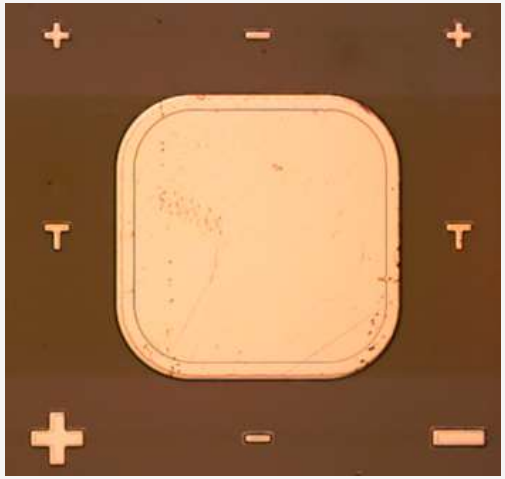
Semiconductor Diode For High Temperature Applications

An electronic device, able to function at 3× higher temperature than current devices



Total Number of interviews = 112
In Person=62

Electronic design engineers in aerospace industry will buy our components to reduce costly system failures.

Youngstown State University

Team 692

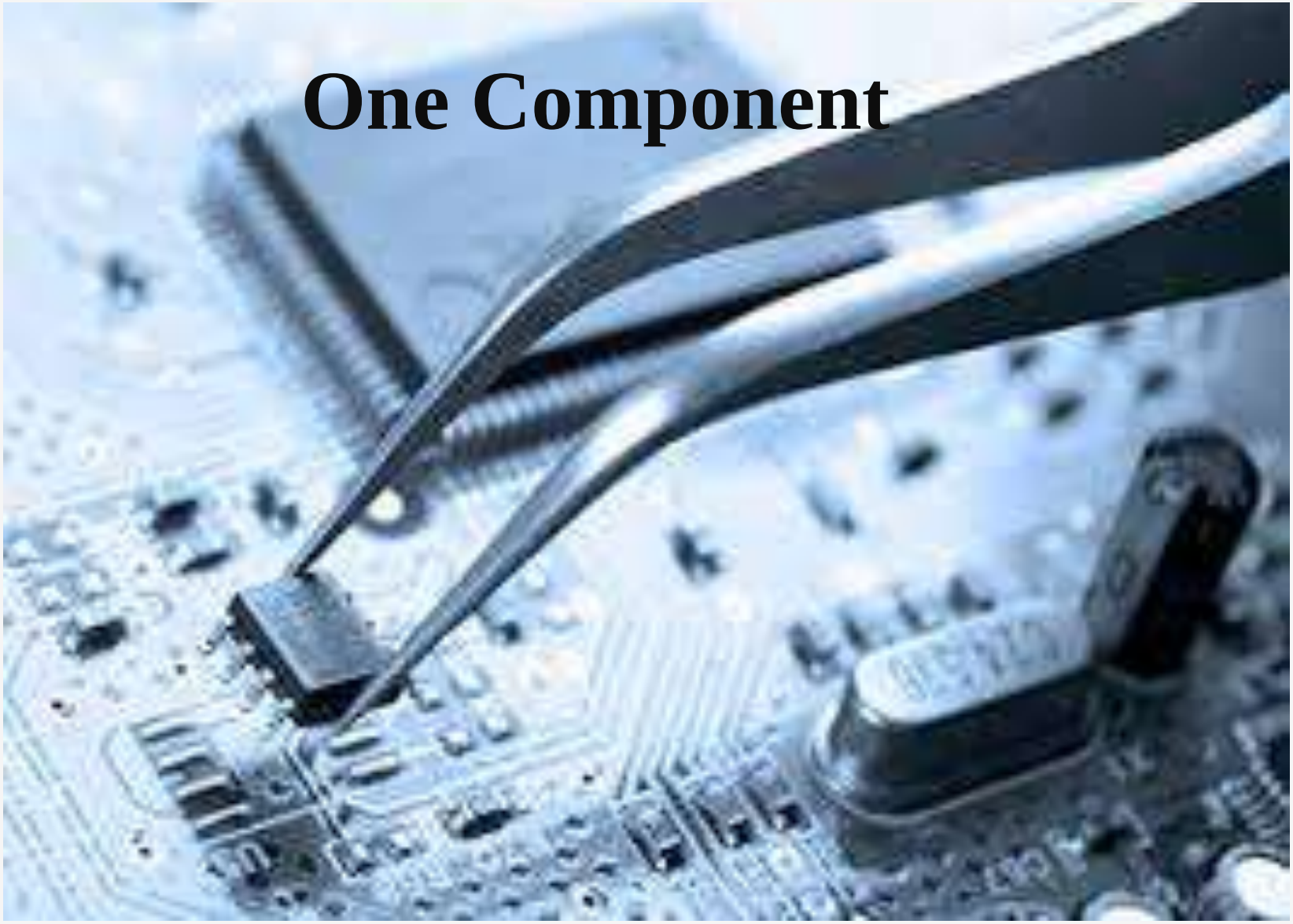
Electronics and High Temp Electronics

Standard ~ 125° C

High Temp Today ~ 225° C

Where we are ~ 600° C

One Component



Team Members

Dr. Tom Oder (PI)
Professor of Physics
Youngstown state university

Krishna Chaitanya Kundeti (EL)
Graduate Research assistant
Youngstown state university

Team 692

Dave Nestic (M)

Chief Executive, Regional Operations

TechBelt Energy Innovation Center

Team 692

Business Model Canvas at Kickoff in Atlanta

Key Partners

- Manufacturing foundry

Key Activities

- Produce prototypes.
- Develop performance
- Generate spec sheets.
- Produce device for

Key Resources

- Intellectual property.
- Physical: research
- Data on long term
- Huma n

Value Propositio

- Extend drilling deeper
- Decreased downtime
- Better data by enabling

Customer Relat

- Personal assistance.

Channels

- Reps/Distributors
- Direct to customers.

Customer Segm

- Design engineers in Drilling Industries – Oil, Gas.
- Design engineers in Aerospace
- Automotive
- Power distribution
- Process technology (gas, chemicals, cement)

FOCUS

Cost Structure

- High performance product
- high value applications.
- Economies of scale –higher volume translate to lower production cost.

Revenue Streams

- Asset sale: we are selling diodes, transistors and related subsystems to certain markets/applications.
- Licensing the production process to customers for use in their own products.
- Non recurring Engineering Sale

Customer Interviews At West Virginia And Texas

Antero Resources
IOGA
Dominion Field Services
Dominion Transmission, Inc.
ECA
Ergon Oil Purchasing, Inc.
GASTAR
HALLIBURTON
Schlumberger
MRC
SLS Professional Energy Consultants
USI Insurance Services
C&J Energy Services
WES Water Energy Services, LLC

What We Found:

Great need **BUT,** Economy in Decline.

Business Model Canvas

Key Partners

- Other high temp component makers.

Key Activities

- Produce prototype
- Develop performan
- Generate spec
- Produce device

Key Resources

- Intellectu al
- Physica l:
- Data on long term
- Huma n

Value Propositio

- No cooling required
- Save fuel by cutting size and weight
- Increase payload in space missions
- Provide increased operational safety margin.
- Decrease costly drilling downtime.

Customer Relat

- Personal assistanc e.

Channels

- Electronic component Sales
- Direct to customer s.

Customer Segm

- Electronic Desig engineers in Drilling Industries – Oil, Gas.
- Electronic Design engineers in Aerospace and space exploration sensor and control applications.
- Electronic design engineers of components serving automotive and industrial engines.

PIVOT

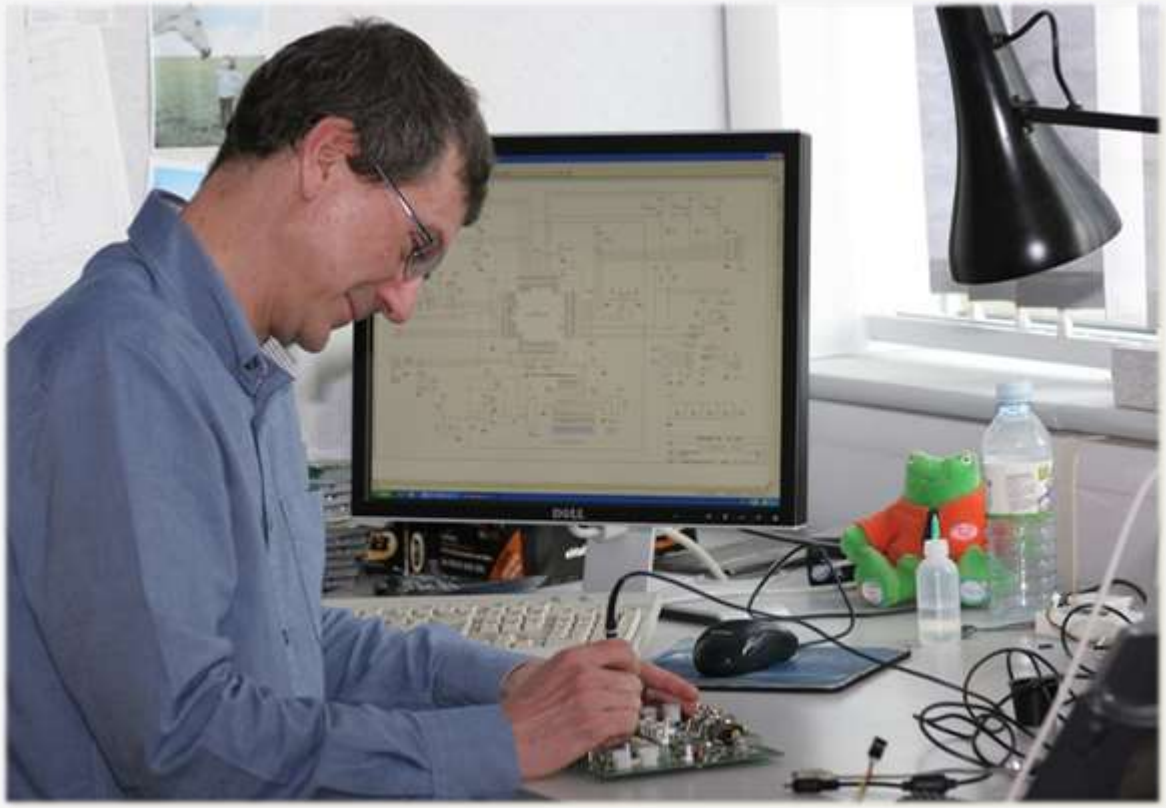
Cost Structure

- High performance product
- high value applications.
- Economies of scale – higher volume translate to lower production cost.

Revenue Streams

- Asset sale: we are selling diodes, transistors and related subsystems to
- Licensing the production process to customers for use in their own products.
- Non recurring Engineering Sale

Customer Archetype



Electronic Design Engineer- Decision maker

Here's What We Did

Oil and Gas Drilling

Aerospace And Space Exploration

Automotive and Industrial Engine

Customer Discovery Track

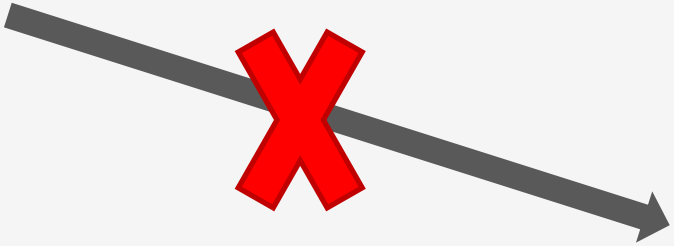
- In Person interviews

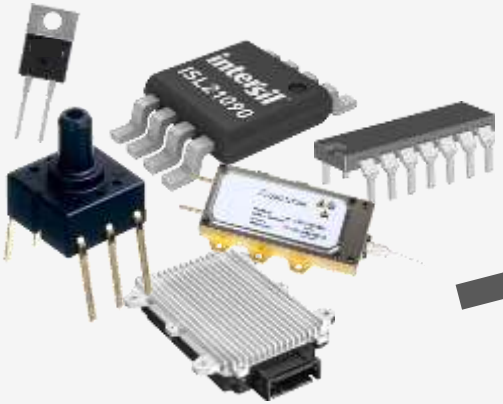
- Skype interviews

Customer interviews 6th and 7th week

What we found:

Diode(High-Temp)





Subsystem/Subassemblies(High-Temp)
Voltage reference, Switching circuits, pressure sensors, etc…

Market

Channel – Direct to Customer

For now…

What Next…

- Talk to more customers.
- Seek SBIR/STTR grants and partners.
- Go into the lab, develop subassemblies.
- Do more long-term testing.
- Get involved with industry working groups.

2min_lessonlearned video: https://youtu.be/OVcMgSgUHO0

1min_technical video: https://youtu.be/aYUKVpADvLM