



The Semiconductor Lifecycle Solution TM

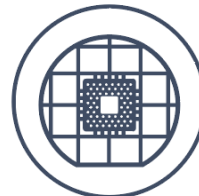
End of Life (EOL) in Semiconductors, Jena

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Supplier Development Manager**

20 March, 2019



Inventory Distribution



Product Manufacturing



Manufacturing Services

Agenda

- ❖ **Warum gibt es EOL**
- ❖ **EOL Challenges - Kunde/Hersteller**
- ❖ **Auf was sollen Sie achten**
- ❖ **Rochester und Zusammenarbeit mit Hersteller**

Global reach - Regional support



★ **Global Headquarters,**
Newburyport, MA USA

● **Regional Headquarters**

- EMEA St. Neots, UK
- APAC Singapore

● **Branch Offices**

- Phoenix, AZ USA
- Munich, Germany
- Shanghai, China
- Tokyo, Japan

● **Design Centers**

- Rockville, MD USA
- Burnsville, MN USA



Buy Online 24/7 – www.rocelec.com/buy

Supplier Authorization



100% Authorized by over 70 Leading Semiconductor Manufacturers.

- Authorized Original Manufacturer Stocking Distributor
- Licensed Semiconductor Manufacturer



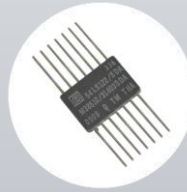
The 3 Pillars of Rochester's Business

Distribution Business

*EOL
Finished Goods*



*Distributor
Rotations
Safety Stock*



*Factory
Overstocks*



*Factory
Out-of-Date
Code*



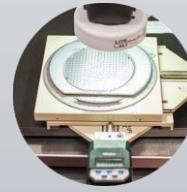
Manufacturing Business

EOL Die



Wafer Processing

- Wafer Fabrication
- Long Term Storage
- Die Processing



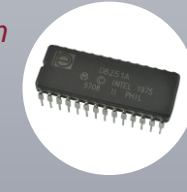
Assembly

- Hermetic (Ceramic/Cans)
- Plastic
- High Rel Testing



Design/Re-Creation

- Cloning
- Emulation
- Conversions



Services Business

Archive Services

- Design
- Test Program
- Customer S/W
- Mfg. Tooling
- Obsolete and Active



Analytic Services

- Material
- Electrical
- Characterization
- F/A



Test/Engineering

- Prod. Test Services (Wafer/Component)
- Test Engineering
- Characterization
- Engineering Services



Manufacturing Overview

Licensed manufacturer of semiconductor devices

- Over **12 billion** die in stock
- Over **20,000** device types manufactured
- Capability to manufacture over **70,000** device types
- Manufactured using information transferred directly to Rochester from OCM
- Ongoing active manufacturing of stock products
- Build to order products



Wafer fabrication

- Fab-Less semiconductor company
- Manufactured using information transferred directly from original component manufacturer.
- 5um NMOS to .6um Bipolar to .18um CMOS
- Ability to insert custom modules into existing fab processes matching the original products
- Comprehensive experience of all foundry process flows and variations



Manufacturing capabilities supporting

- Commercial
- Industrial
- Military (Mil Std. 883, SMD, QML)
- Space
- Customer specific processing (SCD / custom flows and/or specs)



Rochester Solutions

Design/Re-Creation

- Cloning
- Emulations
- Conversions



Wafer Processing

- Wafer fabrication management
- Die processing



Assembly

- Hermetic (Ceramic/Cans)
- Plastic



Test/Engineering

- Production test services
- Characterization
- Engineering services
- Reliability testing



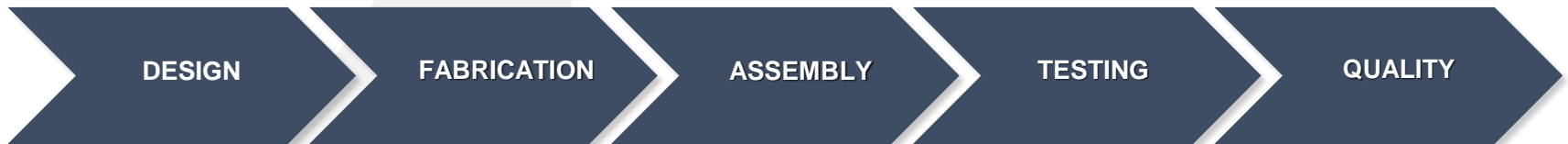
Analytic Services

- Material characterization
- Electrical characterization
- Failure analysis



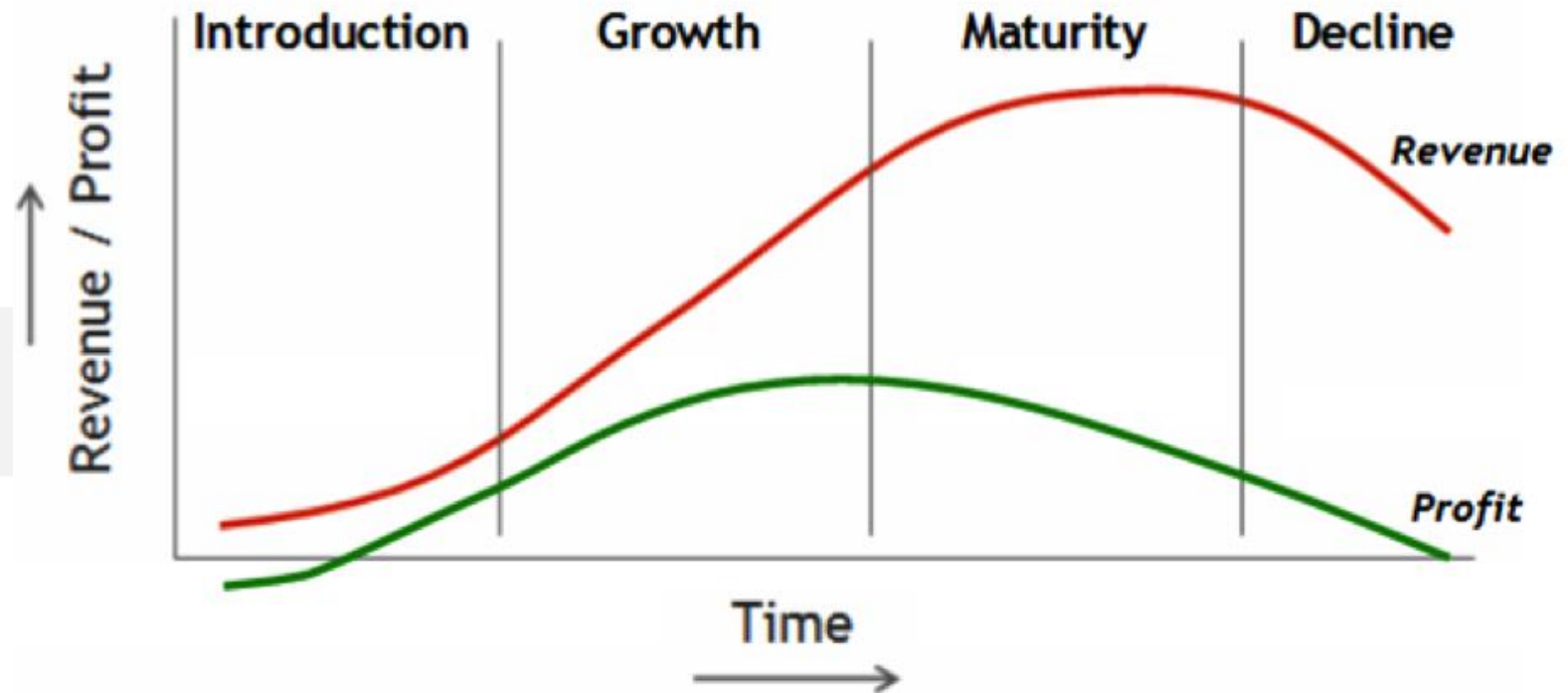
Archive Services

- Designs
- Test programs
- Customer S/W
- Tooling
- Obsolete and active

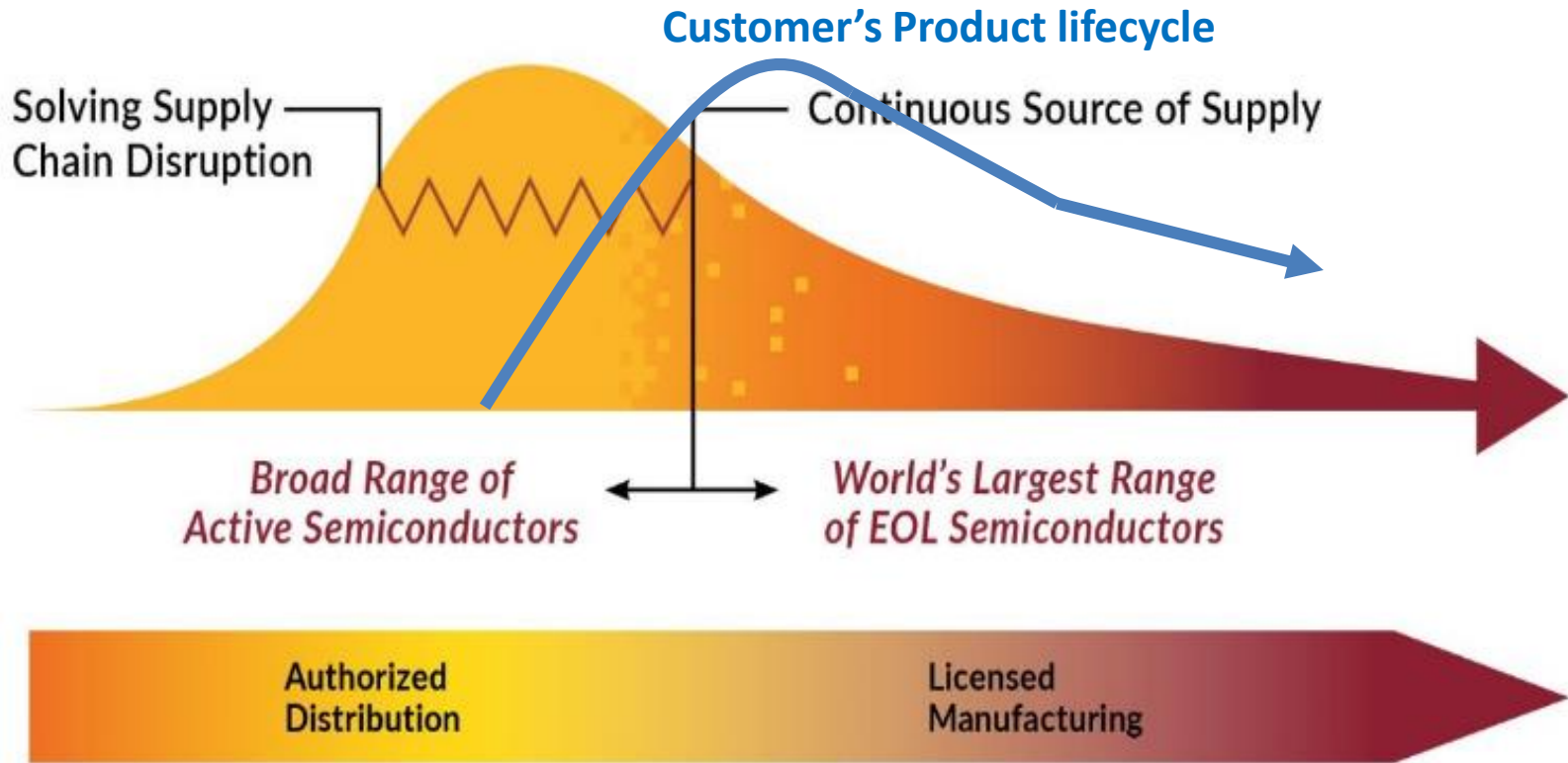


Typical Product Life Cycle

Product Life Cycle



Rochester's Semiconductor Lifecycle Solution



Why End of Life (EOL) Happens

Why suppliers need to make parts obsolete

- Economical
- Technological – new Fab process, focus on Innovation, new standards
- Government Legislations e.g. RoHs,
- Acquisitions & Mergers – portfolio consolidation
- Natural disasters

Challenges to supplier

- Portfolio management - Profitability, loss of revenue
- Customer relationship compromised
- Opens door to competition to get into design

Challenges to the customer

- Frustration & uncertainty - impact on their end customers
- High costs – may need to redesign, re-qualify, re-certify design
- Need to manage last-time-buy & risks
 - find alternate sources (brokers?)
 - find alternative parts (competition)



\$ and time will be spent managing

Core Market Segments



- Key long-term market requirements
 - Sometimes 20-30 years
- Importance of quality solution
- Often safety critical
- Re-design is complex
- Certification/Approvals barrier

Life Cycle Management

EOL Notification:

- Typically 1 to 1.5 years advance notification (last order date, last ship date)

Which Options do Customers have:

- Select suppliers and product lines which offer long Product Longevity
- Request Supplier to provide extension
- Long term Storage agreements
- Check via authorised channels to see if any remaining sources
- Customers may be forced to look on grey market or buy via Brokers (high risk!!!)

Navigating the pitfalls of a semiconductor device's end-of-life.

After an end-of-life event, OEMs need to procure hard-to-find or obsolete critical devices without encountering two pitfalls:

- *Obtaining substandard or counterfeit components during an “emergency buy” on the grey market*
- *Embarking on lengthy and costly system re-designs.*

EETimes



Wege zur Vermeidung von gefälschten und minderwertigen Halbleitern:

- Kaufen Sie Produkte nur von autorisierten Händlern oder lizenzierten Herstellern.
- Kaufen Sie bei einem Anbieter, der eine volle Garantie für Leistung, Qualität und Zuverlässigkeit bietet.
- Stellen Sie sicher, dass der Anbieter über Qualitätszertifikate verfügt, die für den Verkauf des Endprodukts bedeutend sind.

Authorized Distribution

Original manufacturer stocking distributor

Finished Goods

- Over 8 billion finished devices in stock
- Over >3 billion active devices in stock
 - *Manufacturer overstock, ODC, distribution rotations*
- Over **200k** different products
- Over 1 billion new devices per year

Wafer & Die

- Over 11 billion in stock
- 2" through 12" wafers
- Environmental Controlled
 - Facilities Monitored for Purge Gas, Temperature, Humidity



All parts are 100% Authorized, traceable, certified and guaranteed!

Rochester Test & Component Engineering

- **Modern 30,000 square foot test, program & burn-in facility**
 - 22 Major ATE platforms
 - 40 testers available
 - 41 component handlers available
 - BP Microsystems, Xeltek & Data I/O programmers
- **Capability include:**
 - Digital, Analog, RF, Memory, ECL, Mixed Signal, Gate Arrays, ASIC's, PLD's, FPGA's
 - ≈150 custom test programs developed per year (No OEM IP provided)
 - Tri-temp automation for package & wafer test



- **In-house CAD capability**

- Electrical
- Mechanical
- Design / Layout

- **In-house PCB board repair**

- ATE Board Repair & Support
- Handler Repair & Support

Case Study - Rail Infrastructure

Application: Rail Signalling.

Main Device: Intel 196KC Processor.

Situation: Product Life Extension needed.

Rochester Solution: Re-build Intel product. Full Fit-Form-Function guaranteed including errata/software compatibility.

“Extension-of-Life” Solution: 10 year scheduled delivery commitment.

Key Value Attributes:

Zero Risk'. No re-design and/or re-qualification.

True long-term availability offered.

No backward compatibility issues; No need to replace entire systems.

Many Other Rail System developments:

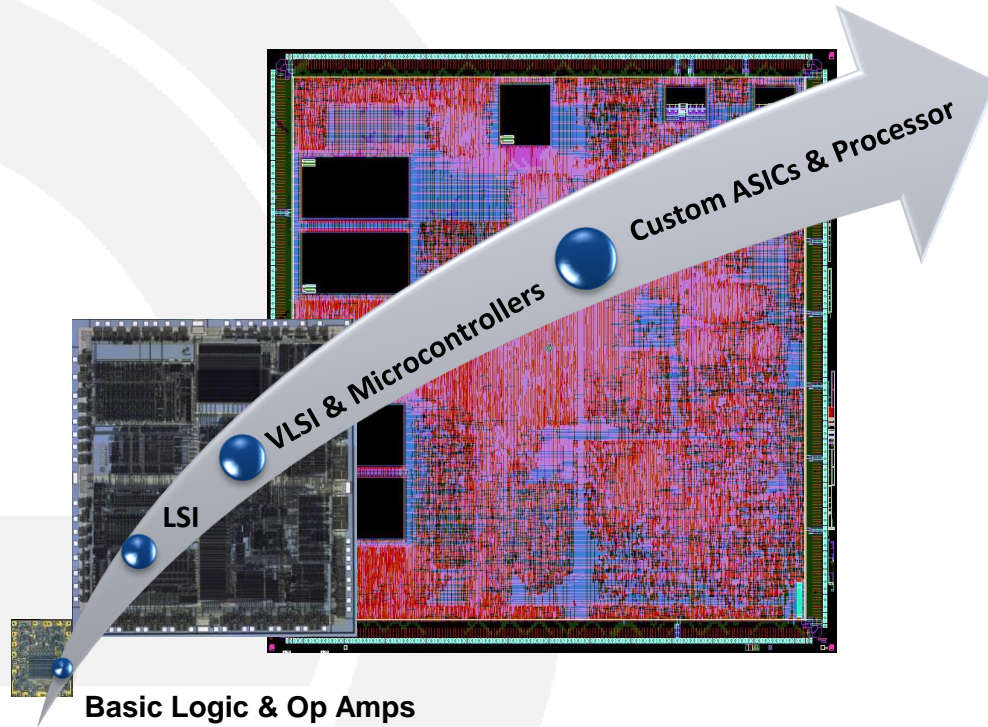
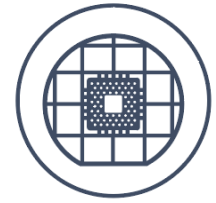
Motorola/Thomson MCU's MC6802/09/21/40 re-creations.

Intel D2716/32/64 UVROM – ongoing long-term build from Intel wafer.

Altera EP610/910/1810 EPLD – ongoing build from ALT wafer.

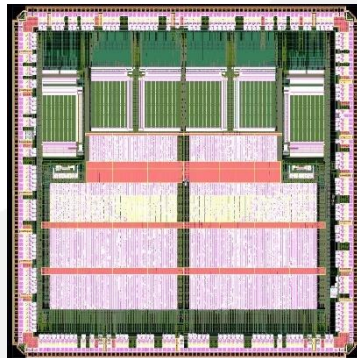


Successful Re-Created/Ported Products

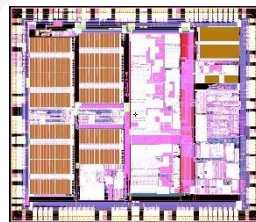


Basic Logic & Op Amps

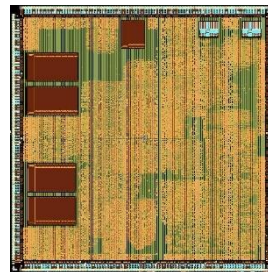
Intel IXF1002 Network Processor (1.4M transistors)



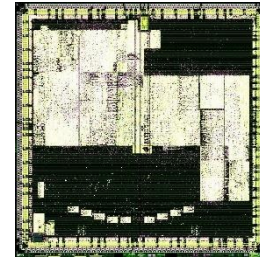
XPC509 Processor (2.4M transistors)



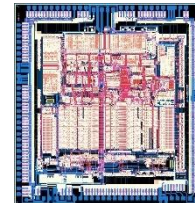
17mm x 17mm
.6um CMOS ASIC (1.1M transistors)



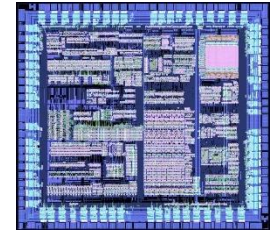
.35um CMOS ASIC (2.2M transistors)



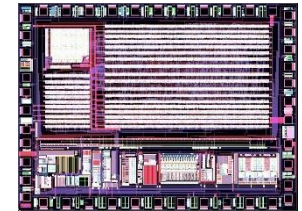
MC68020 (190K transistors)



Intel 80C186EA/XL (100K transistors)



.8um CMOS mix-signal ASIC (37K transistors)



Rochester's Extension-of-Life[®] Solution: Die Bank Storage

Rochester maintains the largest die bank in the world.

Over 12 Billion die in storage:

Nitrogen-purged dry boxes and temperature & humidity control

Wafer/Die sources:

- Inventory from the original manufacturer
- Inventory manufactured by Rochester
- Inventory supplied by customer



Unlimited storage life & build capabilities

Why Suppliers Partner with Rochester for EOL

- ✓ Give customers a soft landing
- ✓ Give controlled, authorised channel of supply even after EOL
- ✓ Avoid counterfeit & “grey market” product
- ✓ Reliable quality service & warranty on original products
- ✓ Bridge the gap from EOL to New Product Introduction

Summary Distribution & Manufacturing

Authorized original manufacturer stocking distributor

- Over **15 billion** finished devices in stock
- Over **5 billion** active devices in stock
- Over **1 billion** new devices per year
- Over **200,000** part numbers in stock

Licensed manufacturer of semiconductor devices

- Over **12 billion** die in stock
- Over **20,000** device types manufactured
- Capability to manufacture over **70,000** device types
- Supplier product line transfers
- Manufactured stocked product
- Manufacture build to order product



Quality: Certifications and Affiliations



- ISO9001:2015 registered and certified TUV USA.
- AS9120B
- QML MIL-PRF-38535, MIL-STD-883 for Class Q and V
- TAPA FSR 2017
- Certified as a QML (Qualified Manufacturer Listing) manufacturer and test lab by DLA Land and Maritime, a U.S. government organization. This certification includes all testing including Group D Test Methods for reliability, burn-in, life, and electrical testing.
- Member: JEDEC JP-13
- Member: Semiconductor Industry Association.
- Member: National Electronic Distributors Association (NEDA)
- Approved by the Chinese Government's Reliable Electronic Component Supplier (RECS) program



Quality

Certifications

- MIL-38535 Class Q & V Certified
- ISO 9001 Certification
- AS 9120 Certification

Quality Programs

- MFG Flows: Commercial / Industrial / Military / Space / SCD Custom
MIL STD 883 TM 5004 (screening) and 5005 (QCI)
Group A – 100% Electrical Test (Tri Temp Testing)
Group B – Resistance to Solvents / Solderability / Bond Strength / Die Shear
Group C – 1000 Hour Life Test / End Point Electrical Testing
Group D – Physical dimensions / Lead/terminal integrity / Thermal Sequence / Mechanical Sequence / Salt atmosphere / Internal water vapor test / Adhesion of lead finish / Lid torque / Soldering heat.

Rochester's Quality Policy:

Rochester Electronics is committed to supplying products and services that satisfy customer expectations for quality and service and are equal to those supplied by Industry Leaders. Objectives defined by Management are measured and continuous improvement is practiced.



Vor- und Nachteile des autorisierten Nachbaus

Vorteile

- Größte Die Bank der Welt mit 12 Milliarden Die
- Exakter Nachbau, Test eines Halbleiterproduktes
 - Gleiche Die-Größe, Ätzrate, Spannung, Gehäuse
- Programmqualifizierungen, wenn überhaupt, nur in sehr geringem Umfang erforderlich (DO-254/DO-178)
- Zusammenarbeit mit den Originalherstellern OCM während des gesamten Prozesses
- FPGA to ASIC 3.3V to 5V
- Langzeitverfügbarkeit durch Rochester

Nachteile

- Scheinbar höhere Kosten wegen geringerer Stückzahlen und Lizenzgebühren
- Nicht alle Produkte/Technologien nachproduzierbar - 5um NMOS to .6um Bipolar to .18um CMOS
- BTO (Build-to-Order) Lieferzeiten 16 - 52 Wochen
- Watch the VIDEO at Link: https://p.widencdn.net/mxbftf/Rochester_Recreation_DE_V1_31072018

Die Halbleiterlebenszyklus-Lösung

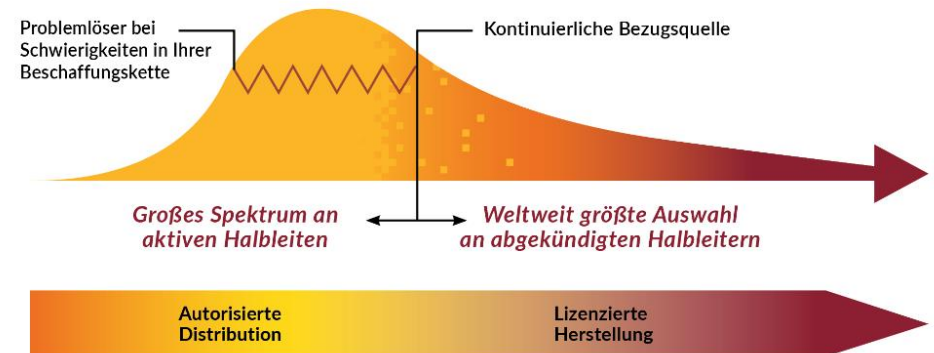
Die weltweit größte Quelle von Halbleiterprodukten und – Lösungen. Ihr Ansprechpartner, wenn es um das Thema Obsoleszenz geht.



Rochester Electronics ist von über 70 führenden Halbleiterherstellern zu 100 % autorisiert!



Die Vorteile von Rochester Electronics



www.rocelec.com

Contact direct: emeasales@rocelec.com

Thank you and Questions.

