

ELECTRONICS

sourcing

JUNE 2023

NORTH AMERICA

AN MMG PUBLISHING TITLE

***EXPANDED
SOURCING
OPTIONS
FOR EOL
PRODUCTS***

page 10





myLists Quotes: **We're fast. You're faster.**

We love to help, but when you need to create a quote fast, and we mean **fast**, give it a shot yourself with myLists— it's easy, and your pricing is locked-in for 30 days.

Get started today at [digikey.com/mylists](https://www.digikey.com/mylists)



Digi-Key is an authorized distributor for all supplier partners. New products added daily. Digi-Key and Digi-Key Electronics are registered trademarks of Digi-Key Electronics in the U.S. and other countries.
© 2023 Digi-Key Electronics, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA

 **ECIA MEMBER**
Supporting The Authorized Channel



On the cover – June 2023

Expanded sourcing options for EOL products
page 10

Editor's Word



Retirement and rebirth

Readers of *Electronics Sourcing's* monthly leader column will be aware of my interest in demographics, particularly declining birth rates which began in the '70s and the unavoidable consequence of ageing and declining numbers of workers and consumers. This process has now started chipping away at the electronics industry.

Over the past two or three years I have witnessed an unexpected number of owners of small and medium sized electronics businesses announce their retirement. This caught me by surprise as it wasn't something I was used to. However, on investigation it's obvious.

The origins of many of today's electronics manufacturing and distribution industries can be traced back to the '70s. If early employees started in their 20s and worked their way to senior management and ownership, they will have recently started enjoying their retirement. This ties in with the number of small and medium sized businesses I've seen merge with larger organizations as part of the owner's succession plans.

If you look at the standard arc of any business there comes a point where it is either purchased, develops an innovative new product or fails. Luckily, most of what I have seen are mergers and innovations. In fact, mergers often drive innovations as the purchasing company is suddenly exposed to new technology, IP, skills, experience, customers and market sectors.

Electronics Sourcing regularly reports these mergers in its news pages, followed by subsequent innovations in the feature sections. So, please keep reading if you would like to vacuum up this information.

Jon Bakke

Contact

EDITORIAL
Managing Editor: Jon Barrett
jonb@electronics-sourcing.com
Contributing Editor: Amy Barker
amyb@electronics-sourcing.com

ADVERTISING
Director of Sales: Emma Evernden
emma.evernden@electronics-sourcing.com
Sales Executive: Alex Mosqueda
alex.mosqueda@mmgpublishing.com
Sales Executive: William Leary
william.leary@mmgpublishing.com

PRODUCTION & DESIGN
Production Manager: Jo McCarthy
jo.mccarthy@electronics-sourcing.com

Electronics Sourcing **mmg** **US LTD**
PUBLISHING

Design Manager: Josh Hilton
josh.hilton@electronics-sourcing.com

CIRCULATION
Data and Software Analyst: Thomas Smart
thomas.smart@electronics-sourcing.com
Circulation Account Manager: Liz Poole
liz.poole@electronics-sourcing.com

PUBLISHER
Mark Leary
mark.leary@electronics-sourcing.com
Director of Operations: Denise Pattenden
denise.pattenden@mmgpublishing.com

Issue 129, Vol.14 No.06

Published 12 times per year
by MMG Publishing US Ltd

MMG PUBLISHING US Ltd
Normandale Lake Center
8400 Normandale Lake Boulevard
Suite 920, Bloomington MN 55437
Tel: 866.364.0951
Fax: 952.378.2770
@Electrosourcing

Printed in the United States
ISSN 2835-0650
© 2023 MMG Publishing US Ltd



Electronics Sourcing
IS INDEPENDENTLY
ABC AUDITED
2005/2021



NEWS



New D-Sub manufacturing
capacity

04

OBSOLESCENCE



Expanded sourcing options
for EOL products

10

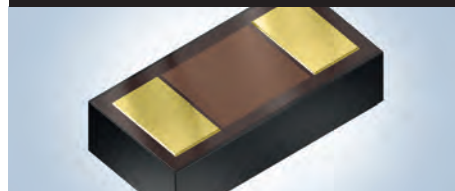
POWER



Li-ion battery storage
and shipping

20

WHAT'S NEW



Compact TVS diodes
protect USB-C

28

BUYERS GUIDE



All the facts and figures
to help you buy

31

Articles appearing in this magazine do not necessarily express the views of the Editor or the publishers. Every effort is made to ensure the accuracy of information published. No legal responsibility will be accepted by the publishers for loss arising from articles / information contained and published. All rights reserved. No part of this publication may be reproduced or stored in a retrieval system or transmitted in any form without the written consent of the publishers.



New D-Subminiature manufacturing capacity

PEI-Genesis has announced the opening of a new production site in Philadelphia, PA. This facility will support increasing demand for D-Subminiature connectors. It will supplement PEI's largest facility in South Bend, Indiana, enabling quick-turn, value-add D-Sub products to customers worldwide.

PEI-Genesis' chairman and CEO, Steven Fisher, said: "By localising PEI's manufacturing capabilities around the world, we can get closer to our customers, allowing us to support their needs more quickly than ever. This new facility in Philadelphia will aid the ever-growing demand for D-Subminiature connectors"

Director of global operations, Brad Thiel, added: "With four value-add production facilities worldwide, PEI can get products to customers within days. We will return to the 48-hour service model our customers have come to expect from us."

The 16,000ft² facility is connected directly to PEI-Genesis's headquarters and stocks roughly \$6 million worth of ITT Cannon connector components and finished goods.

www.peigenesis.com

Guaranteed cell retention

Keystone Electronics' 12mm Vibra-Fit is a button cell holder specifically designed for mounting CR1220 lithium button cells on PCBs. The robust holder is compatible with both vacuum and mechanical placement systems. Vibra-Fit is available in OEM packaging or on tape-and-reel.



The holder features gold-plated phosphor bronze double spring contacts and a glass-filled, high-temperature resistant thermoplastic (PPS) base. The holder is surface mountable, allowing quick and easy replacement or insertion of button cell batteries. Marked polarities make it additionally user-friendly.

Vibra-Fit is RoHS-compliant and is designed to provide a compact and flat solution. It weighs 0.7g. These features suit densely populated PCBs. In these applications, the holder guarantees reliable battery retention, especially in environments involving strong vibrations or shocks.

www.rutronik24.com



Direct access to mmWave expertise

Pharowtech, a specialist in wireless platforms that simplify and accelerate the adoption of millimeter-wave (mmWave) technology, is expanding into North America.

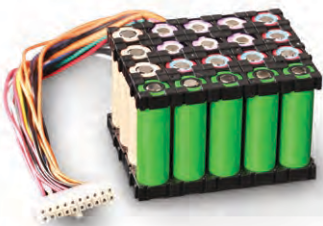
Pharowtech's CEO and co-founder, Wim Van Thillo, said: "We see the US as an ideal location for our next phase of growth thanks to its long history in wireless systems and silicon design and proximity to customers and partners. Wireless infrastructure, Wi-Fi, consumer electronics and smart city IoT applications are our primary target markets, and most of our existing customers are based in North America."

Pharowtech's general manager North America, Christian Plante, added: "With Pharowtech's unique expertise in mmWave silicon and antenna development and software solutions, a new class of high-bandwidth wireless application becomes possible. As the company's next expansion phase begins, I am delighted to be joining the team."

www.pharowtech.com



WITHOUT THE RIGHT **BATTERY SOLUTION**
IT MAY AS WELL BE A PAPER WEIGHT.



BATTERY SOLUTIONS

From standard batteries to custom battery packs and battery systems, Sager Electronics are experts in matching your power requirements with proven, ISO-certified, cost-effective solutions. We offer all battery chemistries including Lithium Ion, LiFePO4 (LFP), Lithium Primary, Nickel-based, Sealed Lead Acid (SLA) and Pure Lead. If your project goes beyond off-the-shelf, our engineering team will work with you to design and manufacture the perfect custom solution.



sager.com | **POWER YOUR WAY**



In Brief

LED innovations and upgrades

Cree LED's Summer 2023 Product & Application Guide showcases the latest innovations in performance, reliability and efficiency. Whether buyers are seeking high-brightness white LEDs, energy-efficient lighting solutions, captivating color LEDs or reliable options for projects, the catalog provides a comprehensive overview of the latest LED offerings.

www.cree-led.com

Buying into transformers

Inrcore has acquired Sentran, a manufacturer of instrument transformers and transducers supporting energy conservation, monitoring and control markets. Inrcore's CEO, Sarah Harris, said: "Sentran is a well-known name in the power and distribution market for its split core transformers. This addition will allow us to expand our offerings to existing customers and open up new opportunities."

www.inrcore.com

Newly added component capabilities

FDH Aero has acquired BJG Electronics, a provider of interconnect and electromechanical products for defense, commercial aerospace and space end-markets. FDH Aero's CEO, Scott Tucker, said: "With BJG, FDH Aero can provide an expanded product offering that improves supply chain efficiencies in a market that understands the strategic importance of supply availability and on-time performance."

www.fdh aero.com

Long-term power supply agreement

A long-term supply agreement will see Onsemi provide its EliteSiC silicon carbide power devices to increase the powertrain efficiency of Zeekr's EVs. Zeekr Intelligent Technology's CEO, Andy An, said: "With cutting-edge technologies such as advanced SiC, Zeekr will be able to offer electric vehicles with improved performance and even lower carbon emissions."

www.onsemi.com



Optimizing SoC lead times

Variscite has launched a new production line at its manufacturing facility, helping the company offer industry-leading delivery times and meet increasing customer demand. The line will also support expected demand for two new SoMs based on Texas Instruments' AM62x and NXP's iMX93.

Variscite's VP business development and sales, Ofer Austerlitz, said: "This additional production line not only increases our current production capacity, it also allows us to remain flexible and robust in an uncertain market environment with a mission to best support our customers."

Starting at \$33, the new VAR-SOM-AM62

(powered by TI's AM62x) suits cost-sensitive embedded products that require low power, high performance and a GPU. The new VAR-SOM-MX93 suits energy-efficient machine learning edge devices and includes a rich set of features for markets like industrial, IoT and smart devices. Prices start at \$39.

Both SoMs are compatible with the VAR-SOM Pin2Pin product family, letting Variscite's customers easily scale at any point of the product lifecycle while using the same carrier board for all platforms.

www.variscite.com



Partnership strengthens domestic lithium supply chain

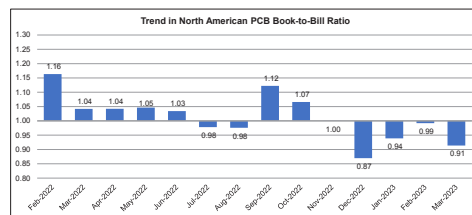
Dragonfly Energy and Loneer have announced a commercial offtake agreement which Dragonfly believes will strengthen US battery supply chains and invest in production and manufacturing of Nevada-sourced lithium.

Nevada Governor, Joe Lombardo, said: "This agreement between Dragonfly Energy and Loneer, and hopefully more like it in the future, are vital to our economy as we work to develop this new industry, secure Nevada's energy independence and close the lithium loop."

Dragonfly Energy's CEO, Dr Denis Phares, added: "Deploying our innovative dry powder coating cell manufacturing process is exciting. But ultimately, cell production is only made possible by access to lithium. This agreement gives us the opportunity to bring our entire manufacturing process not only to the US, but to Nevada, from mining to manufacturing to recycling."

Loneer's managing director and CEO, Bernard Rowe, commented: "As the world's demand for lithium in electric vehicle and energy storage increases, the need to secure a reliable and domestic source of lithium is critical."

www.dragonflyenergy.com



North American PCB sales up 11.6 per cent

IPC's March 2023 findings from its North American Printed Circuit Board Statistical Program show a book-to-bill ratio standing at 0.91. Total North American PCB shipments in March 2023 were up 11.6 per cent compared to the same month last year. Compared to the preceding month, March shipments were up 30.1 per cent.

PCB bookings in March were down 10.5 per cent compared to the same month last year. March bookings were up 2.3 per cent compared to the preceding month.

IPC chief economist, Shawn DuBravac, said: "The book-to-bill slipped this month, but this was driven in part by strong shipments. Order flow is holding steady, but at lower levels than a year ago."

www.ipc.org

It's The Human Component that sets TTI Apart

Sure, we warehouse more than 850,000 part numbers, but it's the Human Component that gives TTI an advantage others can't touch.

TTI Specialists add product knowledge, purchasing assistance, industry trends, design expertise, supply chain updates, the newest technology and more.

See what you'd look like as a human component at ttipartsportrait.com

The
HUMAN
COMPONENT

Max Lalor
Field Account
Representative



The Electronic Components Specialists

1.800.CALL.TTI | tti.com

A Berkshire Hathaway Company



Optimized for server, storage and networking

Bel Power Solutions' new TEC Series comprises power supplies offering Titanium level efficiency—up to 96 per cent—for server, storage and networking applications. Based on the Common Redundant Power Supplies (CRPS) standard, the first models available are AC versions rated at 2200, 2400 and 2600W output power. Future variants will include 800, 1300, 1600 and 2000W. All models offer overvoltage, overtemperature, overcurrent, overpower and short circuit protection. Standard or reverse airflow options are available.

The company states the high-power density helps improve system efficiency and enhance system reliability. TEC Series supplies' main output is 12VDC to support DC-DC converters in systems using distributed power architectures, together with a 12VDC always-on standby output for power management circuitry.

Parallel operation with active analog current sharing eliminates the need for additional components when multiple units are needed for high current applications. These hot-swappable power supplies support N+1 redundant architectures.

www.belfuse.com/power-solutions



Mosfets feature fast recovery body diodes

Magnachip has released a new family of 600V super junction metal oxide semiconductor field effect transistors consisting of nine products featuring proprietary design technology which provides specific on-resistance (RSP) reduction of about 10 per cent. The family is equipped with a fast recovery body diode which is designed to enhance system efficiency with reduced reverse recovery time and switching loss.

Applications include solar inverters, energy storage systems and uninterruptible power supply systems.

Magnachip's CEO, YJ Kim, said: "Now that we have introduced these 600V SJ Mosfet products, we are aiming to unveil new 650V and 700V SJ Mosfet products with fast recovery body diode in the second half of 2023. These new Mosfets represent a notable achievement for the company and we will build upon this success to deliver next-generation power solutions for rapidly changing market requirements and customer expectations."

www.magnachip.com



Gate driver reports telemetry data

Power Integrations has announced a new, single-channel, plug-and-play gate driver for 190 by 140mm IHM and IHV IGBT modules up to 3300V. The 1SP0635V2A0D combines Power Integrations' Scale-2 switching performance and protection features with a configurable isolated serial output interface, which augments driver programmability and provides telemetry reporting for an accurate lifetime estimation.

Multiple sensing circuits including thermal, device and bus condition information are incorporated, simplifying system design and enhancing observability, control and reliability. Application areas are rail traction inverters, power grid and medium-voltage drives.

Power Integrations' product marketing manager, Thorsten Schmidt, said: "The serial status output protocol incorporates critical real-time measurements, facilitating advanced operational verification and dramatically increasing overall visibility of the inverter's health, reliability and efficiency. Engineers may adapt monitoring and control systems to the PI standard plug-and-play protocol or request custom adjustments by PI engineers during their project's development phase."

www.power.com

Network access to power supply diagnostic

SolaHD has launched a next generation power solution that brings network connectivity to its SDN-D DC power supply, letting it serve as an IIoT-ready device providing condition monitoring, asset tracking and quick troubleshooting.

Connecting the module to the power supply lets plant operators continuously monitor its diagnostics over standard Ethernet/IP or HART 7 protocols and transmit this data to supervisory systems. Operators and service technicians can monitor the health of each power supply remotely. Key diagnostic information can be sent to a historian for predictive maintenance helping to ensure uptime and better utilize important resources.

SolaHD's product marketing manager-connected power, Jay Hendrix, said: "Rapid growth in the IIoT demands a new type of power supply with enterprise-grade connectivity combined with industrial features to meet compliance and use case requirements. That is what Emerson is bringing to the table with the SDN-D power supply and SCM module combination."

www.solahd.com





The Critical Link in Your Supply Chain

Fusion is your best source for quality electronic components.

Contact Us Today



Expanded sourcing options for EOL products

Resurgent Semiconductor's founder, Duker Dapper, explains how extended manufacturing bridges between a semiconductor's lifecycle and OEM's product lifecycle

The problem of obsolescence is common, unremitting and complex in the networking, industrial, and aerospace/defense industries. Original equipment manufacturers (OEMs) in these and other technology-intensive industries are committed to products that require considerable investment—time, money and resources—to produce and to change when components designed into them reach end of life (EOL). New products may take years to architect, verify and qualify. Similarly, these products' lifecycles can be a decade or more. Some will need specific semiconductors or other components well beyond their expected EOL date.

Despite knowing that components will reach EOL at some point, a scramble typically ensues when a semiconductor EOL is

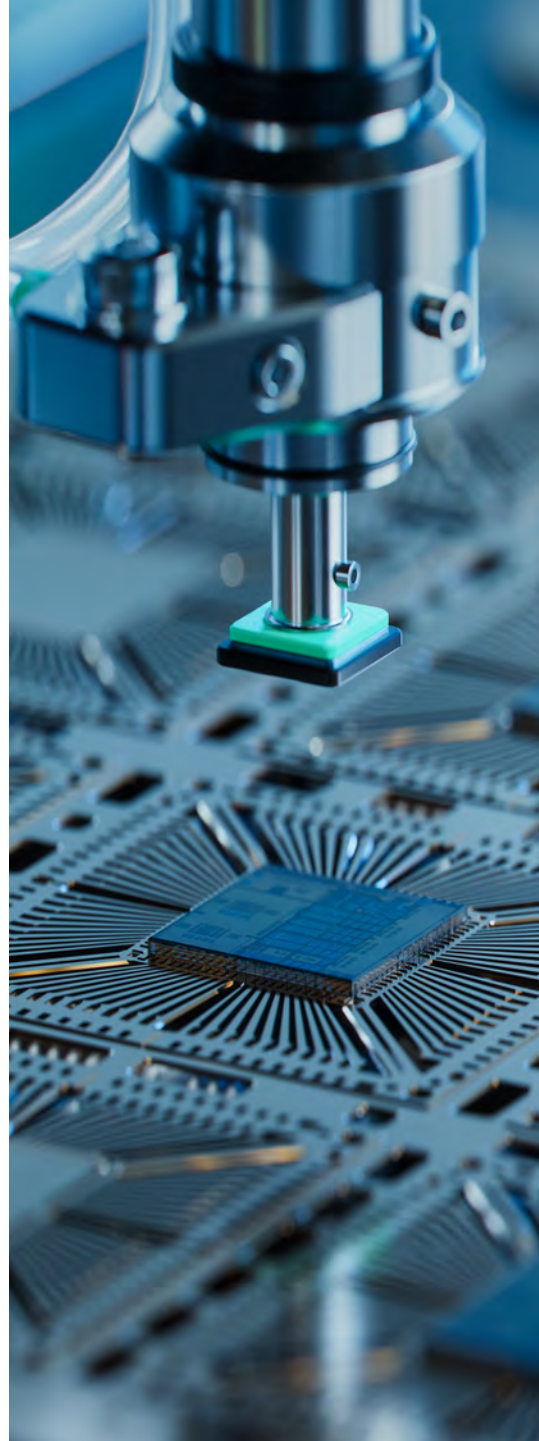
announced by its original component manufacturer (OCM). Product designers, engineers and manufacturers must either find a resource with sufficient inventory to provide a vital component that's soon to be off the market, or they need an alternative with the same specs and functionality. Can a new sourcing partner provide enough of the obsolete semiconductors to maintain production and, if they're in the equation, repair and refurbishment? Is there another semiconductor that might work, whether from that supplier or one of its competitors? Does the product need to be completely redesigned? Does it need to be requalified for a different component?

Although there is a clear need for components well beyond their EOL, OCMs may not be

able to make a compelling financial case for continued production as they weigh the cost of manufacturing vs demand for a particular chip. At that point, it's time for the OCM and OEM to think outside the box. To avoid obsolescence, extending the manufacturing of a particular component using a third party for a specific customer or set of customers may make sense. Increasingly, companies are establishing partnerships that deliver a three-way win between the OCM, OEM and an extended manufacturing partner (EMP) to reduce the financial and supply chain risks associated with component obsolescence.

As an EMP, Resurgent Semiconductor is always looking for a three-way win. These mutually beneficial relationships enable

Continues on page 12 >



ALLIED IS NOW RS

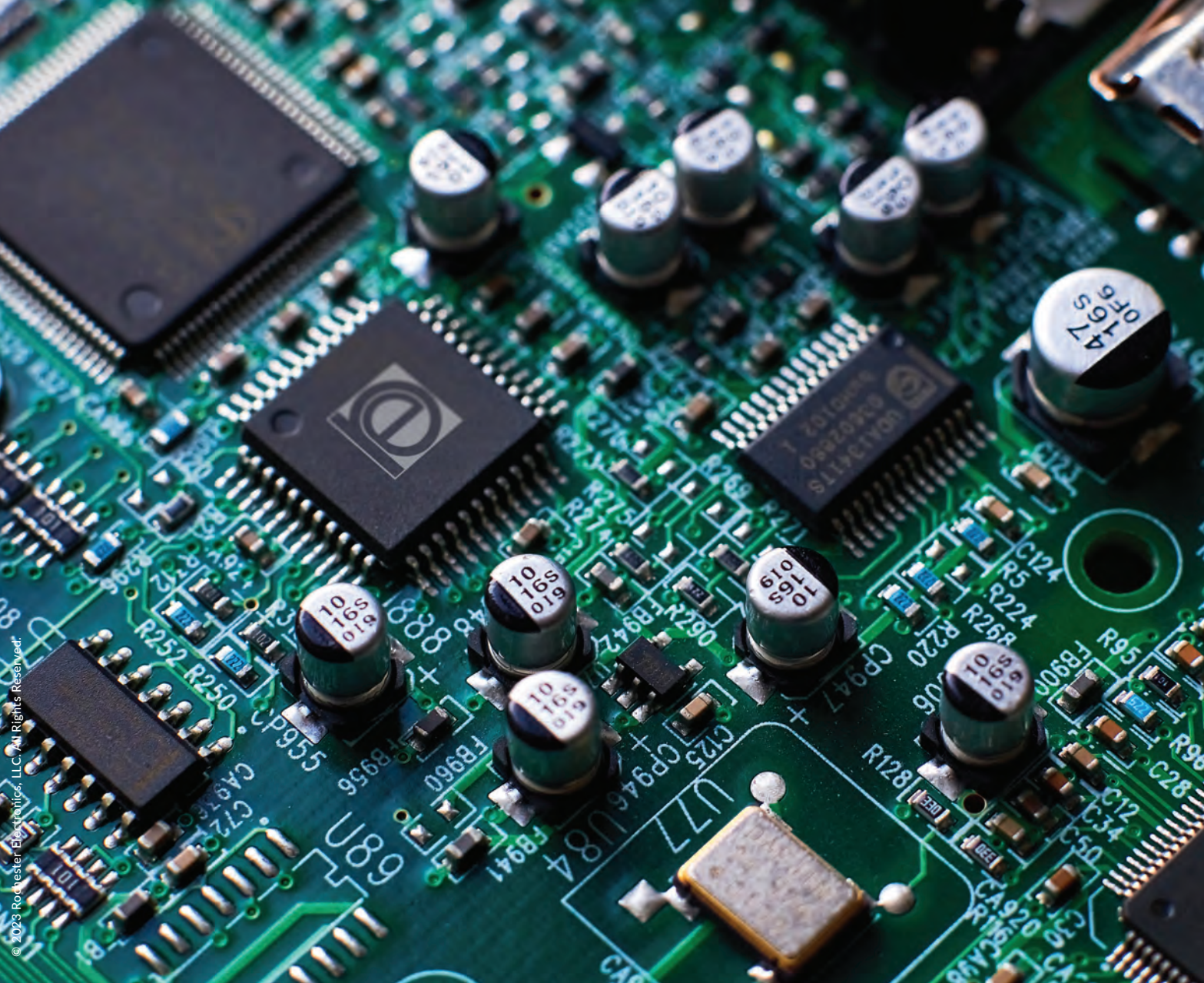
Our new brand means a world of opportunity for you.
Learn more at us.rs-online.com



IMAGINE THAT.
WE CAN.



© RS Americas, Inc., 2023



WE KEEP THE SUPPLY CHAIN MOVING.

As an authorized distributor, Rochester Electronics provides the world's most extensive range of end-of-life (EOL) and broadest range of active semiconductors to keep industries moving worldwide.



 **Rochester
Electronics®**
www.rocelec.com

Authorized Distribution | Licensed Manufacturing | Manufacturing Services

semiconductor manufacturers to focus on new product development without abandoning customers that do not need more advanced technologies. They give OEMs an affordable source of reliable, high-quality products that match the form, fit and function of the original for as long as they are needed. And of course, the EMP closes the gap between demand and supply in a way that makes financial sense for all parties.

EMPs embrace a variety of business models to accommodate the needs of their customers. We may partner with another supplier to build a discontinued substrate, then do the product requalification ourselves. We may replace a discontinued automated test platform with something current. No two business cases are alike, so there's no one-size fits all approach. Every solution

is measured against a number of variables.

For example, an EMP may not make financial sense for commodities such as memory and standard logic. However, extended manufacturing may be just the thing for customers that need several dozen high-value products in a scenario where demand exceeds hundreds of thousands of components annually.

The ideal component for an EMP relationship is one with a unique pin-out that precludes a pin-compatible drop-in replacement, with a demand horizon that extends for several years.

Extended manufacturing is often dismissed based on a couple of misconceptions:

Myth: Lower product quality.

Reality: Resurgent uses the same manufacturing flow—foundry and mask set, OSAT, test hardware and software—that the

OCM uses. As a result, every electrical and physical parameter complies with the OCM's data sheet. The parts manufactured by Resurgent are identical to OCM originals electrically and physically. This is a unique feature of Resurgent's business model.

Myth: Extended manufacturing won't make financial sense for the OEM.

Reality: Even if unit pricing is a bit higher, there are OEM savings to be had. For example, there's no need for the OEM to redesign the product or requalify a new part, and the risk and cost of supply chain disruptions are taken on by the EMP.

Myth: Extended manufacturing places too large a burden on the OCM to complete a manufacturing transfer or the manufacturing process is too complex for a third party to manage.

Reality: Put Resurgent to the test. We will

demonstrate how efficient and painless a manufacturing transfer is. We've executed multiple manufacturing transfers producing over one million parts per year and we have the expertise to execute a transfer quickly, with minimal OCM resources. Resurgent's recent merger with Flip Electronics brings financial resources to the table to allow for a profitable transaction for the OCM.

When EOL is imminent, organizations may not think past traditional sourcing options—but they should. EMPs solve a non-trivial problem that has plagued the electronics industry for decades. Strategically leveraging extended manufacturing bridges the gap between the semiconductor lifecycle and the OEM's product lifecycle, producing a win-win-win for all involved.

www.flipselectronics.com



The (lowest) Loss Leaders



XGL Family power inductors feature the industry's lowest DC resistance and extremely low AC losses for a wide range of DC-DC converters

Coilcraft's XGL Family of molded power inductors is available in a wide range of inductance values (from 82 nH to 56 μ H) and current ratings up to 117 Amps. With up to 60% lower DCR than previous-generation products, they are the most efficient power inductors available today!

Their ultra-low DCR and higher I_{rms} also allow XGL Family inductors to operate much

cooler than other components.

All XGL Family inductors are qualified to AEC-Q200 Grade 1 standards (with a maximum part temperature of 165°C) and have no thermal aging issues, making them ideal for automotive and other harsh environment applications.

Download the datasheets and request free samples at www.coilcraft.com/XGL.



WWW.COILCRAFT.COM

Accurate product information equals confident purchasing

As Mouser explains, one of the most effective solutions to component obsolescence is to ensure purchasing teams avoid components not recommended for new designs

Today's world is powered in large part by semiconductors and electronic components. On top of recent shortages, few things are more frustrating to buyers and engineers than a delay caused by using obsolete components or components not recommended for new designs (NRND).

Identifying product lifecycle and NRND products are just two examples of value-added services from high service distributors like Mouser that go beyond simple component supply. Mouser offers suggestions for component alternatives, along with the risk level assessment for those potential replacements.

Having the most advanced technology to develop cost-efficient prototypes limits costly redesigns, manufacturing delays or even project termination. It also offers a design edge in delivering more product features and capabilities, plus longer lifecycles. As an authorized global distributor, Mouser works with its 1,200-plus manufacturer partners to provide fast, easy access to the newest components.

Mouser's customers can subscribe to receive product notifications online. The company offers real-time product availability through its website and customer service representatives,

providing accurate product information to make confident buying decisions.

In addition, Mouser delivers easy access for buyers to technical data and application resources with its Purchasing Resource Library. This online library features dozens of articles and videos that empower buyers with the insights needed to make informed purchasing decisions.

The Purchasing Resource Library contains instructional videos, developed in partnership with leading manufacturers, dedicated to some of the most important components in electronics design. The library also

features articles that address trending topics, such as vehicle charging infrastructure, chip shortages and supply chain challenges. It can help buyers choose the most suitable products for their needs.

The site also offers convenient links to the distributor's services and tools, including the FORTE intelligent BOM tool, Price and Availability Assistant and API hub.

resources.mouser.com/purchasing-resource-library

Customers can be confident that they are receiving genuine, authorized products



DON'T LET OBSOLESCENCE KEEP YOU GROUNDED



COUNTERFEIT AVOIDANCE | AUTHORIZED DISTRIBUTION | COMPONENT MANUFACTURING





Supply chain wrestles with the 'trust' deficit

Distributors are searching for the antidote to the lack of trust, visibility and transparency in the supply chain

Trust is a scarce commodity in the electronics supply chain. Everyone wants it but few are willing to be fully transparent with partners. Analysts and observers say the negative effects of the industry's cycles are often worsened by the cautiousness with which executives handle sales projections and other forecasts shared with them by customers, suppliers and other supply chain partners. The unexpectedly high inventory levels that companies are reporting in first quarter financial results announced so far confirm the industry's huge trust deficit and the need to tackle this problem, distribution executives said.

A recent survey conducted by the Electronic Components Industry Association (ECIA) confirmed the depth of the problem. Asked to name their wish list for managing their businesses efficiently, distribution executives overwhelmingly picked visibility, transparency and the opportunity for full collaboration with partners. These three factors hinge on trust and are important to distribution executives because they remain intransigent problems that show up during each downcycle, wreaking havoc on enterprise financial performance, they noted.

"The biggest concerns change quite quickly amongst distributors. Covid went from the top of the list to literally the bottom of the list. It is never a stable situation," said Dale Ford, chief analyst at the ECIA, in a podcast. "Players in the supply chain continually must stay on top of

a very dynamic environment. The greatest concern that they have now is 'how do we manage this process to avoid this inventory overhang?' It came down to visibility, transparency and collaboration. That is what they kept coming back to."

Distributors will not say to customers that their forecast numbers are not reliable. They just know the figures must be checked and constantly revalidated due to changing market conditions and possible errors in the data collection process. But they were not the first to institute this trust-but-verify mechanism. Having been repeatedly burned by erroneous customer forecasts and orders, semiconductor suppliers have long learned to doublecheck forecasts provided during market upturns. Desperate to secure parts during periods of shortages, OEMs and contract manufacturers would place orders for the same parts with different suppliers, jacking up backlogs at vendors and increasing the opacity of demand-supply conditions. Cleaning up the financial mess that results from the double-ordering was often left to suppliers.

The solution suppliers developed was to more tightly manage component orders and shipments to OEMs and distributors alike. The financial risks to distributors were limited, though. They enjoyed the right to return most unsold parts to suppliers and, in many cases, had non-cancellable agreements with OEM customers. That shield has its weak points, though. The financial seesaw

"The evolving macroeconomic backdrop has resulted in further demand deterioration, particularly in handsets, at a magnitude greater than we previously forecasted"



Cristiano Renno Amon,
president and CEO,
Qualcomm

and lack of visibility into actual market demands made it difficult for even distributors to properly plan their capital allocations, analysts said. Plus, whatever ails their suppliers would eventually result in weak sales at distributors too. As a result, distributors now closely monitor OEM forecasts, orders and inventories. Market leader Arrow Electronics Inc., for example, said it kept verifying orders during the first quarter to ensure they were in line with actual customer requirements.

"We spend as much time as we can to help our customers deliver on their production schedules even as they change. And as you might imagine, there's a fair bit of change in this environment," said Sean Kerins, Arrow's CEO, during a conference call with analysts

in May. "Our backlog is down from its all-time high, but it's still well beyond historical levels. Our teams do a good and active job throughout the world to continue to validate that backlog. And we believe the majority of it is still firm compared to forecast. And that work yields or has yielded certainly more reschedules and pushouts than cancellations. So, we feel pretty good about the backlog."

Inventory debacle

Arrow may have a good handle on its backlog, but the industry is today undoubtedly awash in parts that OEMs stacked up during the scramble to secure supplies only a few months ago. Inventories at OEMs, suppliers and distributors alike have shot up year-over-year across the



industry although executives say the bulk of the increase was due to the higher pricing environment. At Apple Inc., for example, first quarter inventories rose to \$7.5 billion from \$5.5 billion in the comparable quarter of 2022. Sales during the same period dipped, however, to \$94.8 billion from \$92.3 billion, indicating softening demand. One could argue, therefore, that the higher inventory could not be solely due to the higher cost of components. As has happened during previous periods of intense growth, many companies appear to have increased their purchase of components in anticipation of higher sales, which did not materialize.

Semiconductor companies are reporting higher inventories, too, even as revenue growth has slowed dramatically. Nvidia offers an example of this trend. The company's revenue fell in the three months ended January 31, to \$6.1 billion, from \$8.3 billion, in the comparable year-ago quarter. Inventories continue to grow, though, rising during the same period to \$5.2 billion, up 63 percent, from \$3.2 billion, in the year-ago quarter. The company splurged on inventories during the recent shortages and was not able to reduce stocks as it had committed itself to purchasing the components from its contract semiconductor manufacturer. Collete Kress, CFO at Nvidia attributed the

revenue decline to the "impact of channel inventory correction, which is largely behind us."

Nvidia is not alone. NXP, Qualcomm and many other chipmakers are in the same muddle. These companies all spent a boatload of money on inventories over the last two years, believing that the upturn would last longer than it did. The opposite happened and the suppliers are now left with too much inventory at their suppliers and distributors. The revenue drop at Qualcomm was staggering. The company's sales fell in the first quarter to \$9.3 billion, dropping 16.9 percent, from \$11.2 billion, in the first quarter of 2022. Inventories kept growing, though. The company closed the first quarter with inventories valued at \$6.9 billion, a 50 percent increase, from the \$4.6 billion in parts it reported one year ago.

"The evolving macroeconomic backdrop has resulted in further demand deterioration, particularly in handsets, at a magnitude greater than we previously forecasted," said Cristiano Renno Amon, president and CEO of Qualcomm, in a discussion with analysts. "As a result, we're operating under the assumption that inventory drawdown dynamics remain a significant factor for at least the next couple of quarters. Additionally, while expectations are for a

rebound in China demand in the second half of the calendar year, we have not seen evidence of meaningful recovery and are not incorporating improvements into our planning assumptions. While the challenges we are facing are impacting the semiconductor industry, we remain focused on managing what is within our control and will continue to execute on our diversification strategy and leading technology and product roadmap."

Companies are now moving to shave down their component stocks, according to analysts. This is typically the first step on the road to recovery, said Malcolm Penn, founder of semiconductor market consulting firm Future Horizons. The industry must whittle down its excess inventory before getting clearer visibility into actual current demand levels, Penn noted. That process may last several quarters and could reach into next year, depending upon the amount of stocks and strength of a market recovery. Semiconductor shipments have already slowed as manufacturers move to reduce inventories in the channels. Future Horizons said weekly unit shipments have fallen 24 percent, to 6.2 billion, from 8.2 billion during the recent bout of shortages. Shipments are trailing market consumption by as much as 15 percent, with the trendline continuing now for about 4 months, according to Penn who adds that "the inventory burn is in progress."

For distribution, what the lower shipment means is sluggish performance over the next several quarters. As customers work on cutting down inventories, they will demand less from distributors, observers noted. Even so, distribution executives largely say they are comfortable with the size of inventories on their balance sheets. Most of the parts are being held for OEMs that have committed to purchasing them during the period of shortages, they said. "The sequential increase is not something we're at all concerned with," noted Arrow's Kerins. "We feel good about the quality of the inventory we've got on hand. I'm very confident

in our ability to sell it. And I think the most important point is, if you look at our turns in the core global component business at Q1 exit, we were right on or slightly above our historical targets and expectations, both for semiconductor and IP&E."

The optimism does not negate the fact that orders may come under pressure throughout the industry, however. Only a few companies—STMicroelectronics, for example—are showing year-over-year growth. Europe-based ST reported sales rose to \$4.3 billion in the 2023 first quarter, up from \$3.6 billion, in the first quarter of 2022. Most of ST's rivals in the semiconductor market are reporting double-digit sales declines, which confirms cutbacks in orders from OEMs and contract manufacturers. This will eventually flow through to the distribution market, observers said.

This is why distributors say they are reviewing current backlogs to ensure these are viable orders. Clarity about the market conditions may not be easily achieved, though, according to the ECIA's Ford. It will require that distributors, suppliers and OEMs work more closely with each other, collaborating on production output, lead-times, customer demand and insights into economic conditions. Unfortunately, the industry is not noted for such extensive collaboration or trust, Ford observed, adding that changes may be slowly taking place, however.

"We're seeing the downturn, in terms of demand in the marketplace, but also in unwinding the inventories," Ford said. "Two things are lacking in the supply chain. One is visibility. The other is collaboration. Machine learning certainly provides the basis to make things more visible and transparent, but at the same time, it won't work without collaboration among companies who are participating in providing data. That's going to be up to the supply chain people."



"The biggest concerns change quite quickly amongst distributors. Covid went from the top of the list to literally the bottom of the list. It is never a stable situation"

Dale Ford, chief analyst, ECIA



Order with Confidence.



Exclusively sponsored by



Digital Supply Chains Enhance Procurement

by Arkadiusz Rataj, supply chain solutions director, EMEA, Digi-Key



The digital supply chain aggregates data picked up from different parts of the supply chain, like procurement, manufacturing and distribution, to help sourcing professionals improve logistics. By providing all these analytics, a digital supply chain can offer users nearly immediate cost savings and long-term strategic insights.

The pandemic accelerated the move to digital solutions for many companies around the globe and it's important to keep that momentum going. While Digi-Key offers some of the most advanced API options in the industry for those that are ready – including product availability, quoting, scheduled shipments, and Supply Chain API to manage reservations – it also has tools for companies that are just beginning their digital journey.

Improving the role of a procurement buyer

One of the biggest misconceptions about digital supply chains is that they eliminate the role of a procurement buyer, but this

is simply not true. Embracing digital solutions for procurement elevates your role – making it more strategic by reducing time spent on tedious tasks.

For example, tools like Digi-Key's myLists, our parts management list system, let's sourcing professionals work smarter, not harder, by using quoting functionality to keep everything in one convenient location, create multiple quotes from one list of parts and easily convert quotes to online orders. This digital solution is just one of the many ways Digi-Key is offering customers roadmaps to find their optimal path to a completely digitized supply chain.

In addition, by making the effort to start the digitalizing processes within your organization, the overall industry and channel encounter less disruption, along with sustainability benefits.

Data & Analytics

A key to supply chain success is not only having data but understanding and using it. Unless data is translated into

actionable decisions, it's truly useless in the supply chain. Big data and analytics are the technology duo that can help procurement professionals cut through massive amounts of data to optimize their jobs.

Even if you're not ready to make the jump to a fully digital supply chain, one of the easiest ways to get started with digital solutions that makes the most of your current data and analytics technology is by setting up a quoting process. A quoting process alone represents a major timesaver for whoever handles your organization's quotes. Establishing a quoting process will also show you the power and speed of digital solutions. In addition to efficiency, procurement professionals can easily validate the ROI that accompanies digital solutions like these.

Innovations in Digi-Key's Supply Chain

Digi-Key is investing in supply chain innovations that will serve our customers for years to come. From opening our 2.2 million

square foot/204,400 square meter Product Distribution Center expansion (PDCe) to keep pace with growing demand, to the establishment of the largest Foreign Trade Zone (FTZ) in the United States, the team is examining every angle to ensure that their supply chain is dynamic now and during any challenges that come up in the future.

For more information on the Digi-Key's supply chain solutions & services portfolio visit www.digikey.com/supply-chain-transformed





We verify distributors are authorized.

- ✓ Proof of authorization required for each region
- ✓ Regular audits to verify authorization status



100% AUTHORIZED SOURCES

Search authorized distributors at  **TrustedParts.com**

Li-ion battery storage and shipping

Sager Electronics' director supplier marketing and product management—power and battery, Paul Kopp, discusses storage and shipping restrictions for Li-ion batteries

Best practices for storing Li-ion batteries include: avoiding extreme temperatures; keeping them in a dry environment; storing them at a partial state of charge (SoC); and separating batteries by chemistry type. By following these best practices, OEMs can ensure the longevity and safety of their Li-ion batteries, resulting in better performance and reduced risk of safety hazards.

Several types of lithium-ion chemistries are commonly used in electronic devices, each with unique properties and characteristics. Prevalent types include lithium cobalt oxide (LiCoO_2), lithium iron phosphate (LiFePO_4), lithium manganese oxide (LiMn_2O_4) and lithium nickel manganese cobalt oxide (LiNiMnCoO_2 or NMC).

LiFePO_4 is a safe and stable chemistry used in electric vehicles, power tools, consumer devices and renewable energy storage. It has a longer lifespan and is less prone to thermal

runaway. Although it has a lower energy density than LiCoO_2 , it is still attractive due to its enhanced safety features.

LiCoO_2 is a commonly used chemistry in consumer electronics (laptops and smartphones) due to its high energy density, lightweight and low self-discharge rate. However, it is also known to be unstable and can be a safety hazard, especially in high-temperature environments.

LiMn_2O_4 is commonly used in power tools, medical devices and hybrid electric vehicles. It has a lower energy density than LiCoO_2 but is a safer option due to its increased thermal stability.

LiNiMnCoO_2 is a relatively new chemistry used in EVs, drones and power tools. It has a higher energy density than LiFePO_4 , making it a better

choice for devices that require high power output. However, it is also prone to thermal runaway, making proper handling and storage crucial.

Shipping Li-ion batteries requires strict adherence to regulations to ensure safe transportation. The UN, DOT, IATA and IMDG Code establish strict labeling requirements for Li-ion batteries being shipped and compliance with these regulations is essential to avoid safety hazards during shipping. There are also restrictions on lithium-ion batteries based on their watt-hour (Wh) rating. Batteries with a watt-hour rating of less than 100Wh can typically be shipped on commercial and cargo airlines provided they are shipped at a state of charge not exceeding 30 per cent of their rated design capacity.

With battery experts on staff, Sager Electronics can help identify the most suitable battery for an application and provide custom battery pack design and manufacturing services. Additionally, the company can provide access to the latest and most reliable battery technologies, giving customers the confidence to make informed decisions about their lithium-ion battery needs.

www.sager.com



Sager Electronics' director supplier marketing and product management—power and battery, **Paul Kopp**



LiMn_2O_4 is commonly used in power tools, medical devices and hybrid electric vehicles



DENNA

DESIGNING ELECTRONICS NORTH AMERICA

EVERYTHING **YOU** NEED ON THE LATEST
ELECTRONIC DESIGN IN NORTH AMERICA



TO SUBSCRIBE, VISIT:

WWW.DESIGNING-ELECTRONICS.COM/REGISTER

Coming challenge of sustainability reporting



John Denslinger is a former executive VP Murata, president SyChip Wireless, and president/CEO ECIA, the industry's trade association. His career spans 40 years in electronics

In this article, John Denslinger argues that businesses have a vested interest in environmental stewardship and then takes a closer look at reporting processes

Let's start with some background. Shortly after the 2008/2009 global financial crisis, G20 members endorsed the creation of an international body chartered with monitoring and reforming international financial regulations. The Financial Stability Board (FSB) was born. Members sought a robust, stable global financial system. Over subsequent years, the scope of FSB expanded to include standards setting and, in a major move in 2015, FSB established a Taskforce on Climate-related Financial Disclosures (TCFD). TCFD tracks and advises updates as US, EU and Asia reporting regulations change and remains the model for voluntary climate disclosures today.

Businesses have a vested interest in environmental stewardship. The inclusion of environmental, social and governance issues, whether material or immaterial to financial performance, is a worthwhile disclosure. In the EU, ESG reporting is a regulatory requirement. In the US, it's not mandatory but widely viewed as an opportunity to communicate company ESG initiatives and results.

The global movement to capture sustainability information from publicly traded businesses is well-underway led by the EU's European Financial Reporting Advisory Group (EFRAG). In the US, it's the Security Exchange Commission (SEC). Elsewhere, the International Sustainability Standards Board (ISSB) drives that initiative. By far, the EU disclosure rules will be the most demanding of the three and for multi-national companies, the reporting challenges will not be insignificant. According to Refinitiv, a global provider of financial market data, more than 10,000 foreign companies will be subject to the forthcoming EU rules. Of that figure, 31 per cent are US based and 13 per cent Canadian.

What will US and Canadian companies need to disclose? A KPMG assessment from November 2022 describes it best as a 3D matrix: four reporting areas x three reporting layers x three distinct topics.

- Reporting areas: Applies to all companies and includes: governance/strategy/impact, risk, opportunity management/metrics and targets

- Reporting layers: Varies by sector with one or more applying: sector-agnostic disclosures apply to all companies/sector-specific disclosures apply where relevant/company-specific disclosures apply to situations not covered by standards
- Topics: Applies to all companies and includes: environmental/social/governance

Of the 82 EU sustainability draft standards published in November 2022, 80 per cent are environmental and social topics. The 20 per cent balance covers general and governance issues. Adherence to the new reporting rules begins as early as 2025 while some have until 2029 to comply.

As for the US side, the SEC is not yet aligned with the rapid developments in Europe. That is not to say the SEC is content with voluntary ESG disclosures. Quite the contrary, the SEC has proposed making ESG reporting mandatory using the TCFD framework for public company reporting. The SEC is also endorsing the Greenhouse Gas (GHG) Protocol as the accounting standard. In the SEC's current draft, companies will need to report their own GHG emissions and that attributable to their suppliers and customers. This could be incredibly burdensome particularly for manufacturers of goods.

Perhaps the WSJ said it best: "Multi-national businesses could face a patchwork of requirements, if the mandatory climate reporting standards vary significantly between standard setters."

Avoiding duplicity and contradictory disclosures will be tricky. At the very least, new compliance systems and potentially third-party auditing will be needed. Since the data captured from disclosures will be massive, is the next step thresholds, conformance timelines and penalties? Speculation.... pure speculation on my part and that may be the coming challenge of sustainability reporting.

Lighting up LED options for heavy and off-road vehicles

TTI's optoelectronics technical marketing manager, Roland Chapa, explains trends and innovations in visibility, efficiency, durability, safety and customization

Advances in LED lighting and associated component capabilities are delivering higher quality, greater reliability and more versatile performance due to enhancements in brightness, beam pattern, construction, color temperature and mounting hardware. These new solutions are redefining what can be done and how it's done as the future priority in lighting won't just be what people can see but also how effectively they can work.

Visibility: LED lighting options are outdistancing their halogen and HID counterparts

in brightness, clarity and depth of field, significantly improving night vision and capability in adverse weather. Customization in intensity, size, mounting options, beam patterns and peripheral lights is allowing drivers to avoid blind spots and expand what is seen all around them.

Efficiency: One of the leading benefits of LED technology is its efficiency and longevity, which result in more uptime, longer life and lower costs. LED lights also use less energy, run cooler and reduce temperature stress. And with

sensors providing real-time performance data, maintaining optimal productivity is getting much easier.

Durability: Beyond these advances comes the concern of dependability: will these lights work in rugged environments during extreme weather? The answer is yes because today's lighter and more durable components resist intense vibration, shock and temperatures while protecting electronics from chemical/liquid egress and electrical interference.



TTI's optoelectronics technical marketing manager, Roland Chapa



Safety: With heavy-duty vehicles performing heavy-duty tasks, a concern has always been safety for personnel and equipment. LED lighting, with its enhanced visibility, increased clarity and wider lighting range, is keeping workers and work sites safer. Special color temperature adjustability can improve contrast in the work area or on off-road trails. Innovations in drowsy operator detection, backup cameras, crash avoidance and other safety enhancements are designed to minimize accidents.

Customization: Traditional lighting for heavy and off-road vehicles has long been a take-what-you-can-get scenario. That's a thing of the past because customization is the new reality. Expanded options in lighting color, size, intensity, beam pattern, mounting locations and more are enabling operators to obtain the unique lighting they need for their application or work site.

The good news is that technology is becoming more advanced and versatile. The challenging news is that technology is more advanced and versatile. That's why a trusted distributor who can provide quality components with proven expertise on what to purchase and how to coordinate them with other components is essential when shopping for heavy and off-road vehicle lighting. The optimal combination of LED, sensor and accompanying components can make the difference between a job well done and a disaster.

TTI partners with premium suppliers and technology to provide an LED lighting resource of choice, providing deep and wide inventory of quality, authentic electronic components and experienced specialists.

www.tti.com

Mitigate “Wrinkles” in Your Obsolescence Plan

Sourceability has the dedicated team and digital tools to proactively address electronic component obsolescence issues.

With real-time data and comprehensive market intelligence, our digital tools provide you with valuable insights to stay ahead of your aging issues.



SOURCEABILITY™
[SOURCEABILITY.COM/OBSOLESCENCE](https://sourceability.com/obsolescence)





The foundry era is only just beginning

Foundries were beginning to dominate the semiconductor manufacturing landscape before the recent supply shortages. Will they resume their march now that supplies have increased?

Berkshire Hathaway chairman Warren Buffet likes the No. 1 contract supplier of wafers to the global semiconductor industry so much that he gave a shoutout to Taiwan Semiconductor Manufacturing Co. Ltd. in his annual address to his company's shareholders. Buffet had just sold most of Berkshire Hathaway's interest in the foundry, but he still admitted thinking highly of TSMC, noting that the semiconductor manufacturer was battling through strong geopolitical headwinds and economic factors over which it has limited or no control.

"Taiwan Semiconductor is one of the best-managed companies and important companies in the world," Buffet told the investor audience. "I don't like its location and reevaluated that, ... [but] there's no one in the chip industry that's in their league, at least in my view."

The world's most-renowned investor is not the only one keenly interested in the world of foundries nowadays. The contract manufacturing of semiconductor wafers for fabless chipmakers is a large and growing business. Analysts estimate the foundry business generated revenue of \$101.6 billion in 2022. They project foundry sales will jump by 2030 to \$182.9 billion, growing at a compounded annual rate of 6.5% and making it one of the more viable segments of the global electronics supply chain.

Foundries have become so central to the semiconductor industry that governments and legislators worldwide now keep a close watch on them and their investment actions. Political players especially in China, the European Union and in the US have in recent years

taken steps to either protect or limit the ability of foundries to influence national and regional economies as semiconductors continue to infiltrate all segments of society, according to observers.

"One of the major factors driving the market growth is the increasing demand for integrated circuits (ICs) for use in cars, consumer electronics, medical devices, military equipment, and smart home appliances," said analysts at Verified Market Research, in a report. "The increasing global adoption of Internet of Things (IoT)-enabled devices is driving up demand for integrated circuits (ICs). In addition, the government funding for the advancement of semiconductor technology from a number of countries is propelling the industry forward and driving the growth of semiconductor foundry market."

The patronage of foundries by fabless semiconductor suppliers has surged across the industry over the last couple of decades. One factor behind this was the high cost of establishing new semiconductor fabrication facilities (put variously today at between \$10 billion and \$20 billion) and the efficiencies that companies expect to gain from outsourcing production to enterprises like TSMC, Globalfoundries, Semiconductor Manufacturing International Company (SMIC) and United Microelectronics Corp. By specializing solely in the production of integrated circuits designed by others and eschewing competition with customers, foundries have become the new darlings of the technology world, analysts said.

"The cost of building state-of-the-art chip foundries has increased exponentially, which puts pressure on the industry," said analysts at Global Information, in a report. "Moreover, governments in countries, such as the United States, South Korea, Taiwan, and other major hubs for foundries, are also increasingly investing and incentivizing to expand the industry presence of their respective countries. For instance, the South Korean government recently announced that it plans to invest about \$451 billion in tax benefits to boost chipmakers' competitiveness amid a critical global shortage of key components. Such trends are expected to propel the respective countries' position in the worldwide market."

A majority of the world's biggest semiconductor companies began turning towards the fabless model more than a decade ago as they tried to improve their productivity and margins. Shorn of elevated capital expenditure, R&D and packaging costs required to maintain a position, companies like Advanced Micro Devices, NXP, Nvidia, and Qualcomm have seen their competitive positions improve dramatically over the last years. Many integrated device manufacturers (IDMs) that used to compete on manufacturing excellence have pulled back, turning over more and more of their production activities to foundries like TSMC.

As a result, TSMC's sales have surged over the past decade, turning it into one of the world's biggest and most valuable semiconductor companies. In 2022, the company recorded revenue of \$75.9 billion, an increase of

43 percent from the prior year. Net income for the year rose to \$34.1 billion, up 70 percent year-over-year and making the company one of the most profitable semiconductor vendors in the industry. The company's net revenue in Taiwan dollars has nearly quadrupled since 2015 and it has grown since then to become the dominant player in the foundry market with a market share of approximately 60 percent.

"Concluding 2022, the semiconductor industry growth excluding memory, was about 10%, while foundry increased about 27% year-over-year. TSMC's revenue grew 33.5% year-over-year in U.S. dollar terms," said C.C. Wei, TSMC's CEO, during a presentation of the calendar year results to analysts. "TSMC's mission is to be the trusted technology and capacity provider for the global logic IC industry for years to come. Our job is to provide the optimal solutions for our customers to enable their success. This includes technology leadership, manufacturing, cost, trust and recently also geographic manufacturing flexibility."

Supply squeeze

Foundries were hurtling towards what could have been a complete dominance of the semiconductor manufacturing business until recently when a supply chain crisis starting with the outbreak of Covid-19 pandemic forced companies and governments to begin questioning the wisdom of concentrating so much production in a few hands or regions. Supply constraints grew over the last couple of years, pushing up prices and lead times. Although the market has since weakened, automotive manufacturers



are still being squeezed due to the demand-supply imbalance that started when chipmakers slowed production after the Covid-19 outbreak.

The pandemic made even IDMs that were considering cutting internal production and increasing the use of foundry partners to reconsider this strategy. Companies like STMicroelectronics raised their capex to meet surging demand and others followed. Capital expenditure across the industry surged to a record \$181.7 billion in 2022 from \$153.1 billion in 2021.

The increased spending was not just at foundries like TSMC, which launched a fab building spree and said it would spend \$100 billion on capex in 3 years. IDMs like Infineon, Intel, Micron, Texas Instruments and STMicroelectronics jumped on the fab construction bandwagon. It suddenly looked like the burgeoning foundry era was about to end even before it began taking hold. Government subsidies and financing support further reinforced this perception. The American government passed the Chips Act legislation with

the objective of sparking a renaissance in local semiconductor production.

Similar initiatives have since been launched in Europe, Japan and South Korea. Governments in these countries and regions were concerned that the concentration of semiconductor production in certain geo-economic regions – mainly Taiwan – was fraught with risks and began taking steps to encourage enterprises located in their geographic zones to increase local production. The efforts have been largely successful. Companies like Intel rolled out plans to build new fabs in North America, the first in nearly 20 years. In Europe, Infineon Technology and STMicroelectronics have announced fab construction activities amounting to billions of dollars. Worried about supply constraints, even automotive companies have taken steps to set up internal chip design units and began engaging directly with semiconductor vendors to plan their short- and long-term supply needs. In specialized market segments serving the auto industry, chipmakers like WolfSpeed are racing to add new fabs that would supply silicon carbide to



customers, consolidating their grip on the market segment.

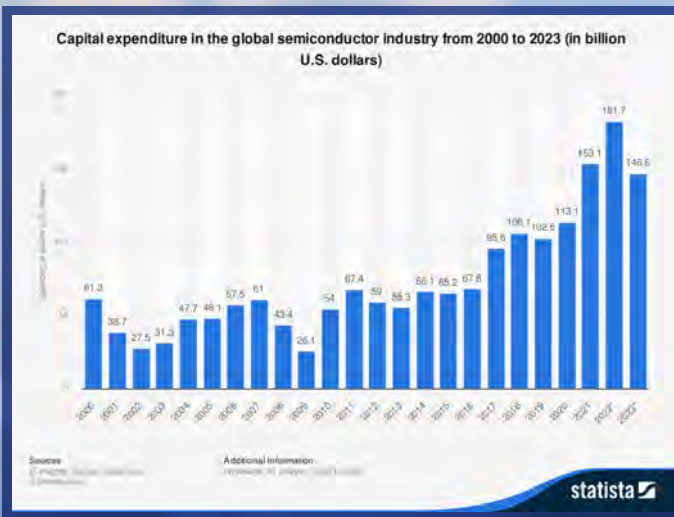
Even TSMC joined the throng. The foundry market leader, which had always insisted that manufacturing in Taiwan was more efficient than in North America or in Europe, has increased funding for new fabs in the United States. It is adding new fabs in Arizona and reviewing opportunities elsewhere globally. "Based on customers' requests, we are increasing our capacity outside of Taiwan to continue to provide our customers with the optimal solution they need to be successful," said CEO Wei, during presentations to analysts. "TSMC's decisions are based on our customers' needs and the necessary level of government support. Our decisions are also based on the talent pool, land, electricity and water needs for TSMC's long-term growth. In the U.S., we are in the process of building 2 advanced semiconductor fabs in Arizona. Our U.S. customers welcome us to build capacity in the U.S. to support their need and have pledged their strong commitment and support."

Wei detailed other actions that TSMC is taking elsewhere, adding: "We will also consider building additional mature node capacity outside of Taiwan. In Japan, we are building a specialty technology fab, which will utilize 12- and 16-nanometer, and 22/28 process technologies. We are also considering building a second fab in Japan, as long as the demand from customers and the level of government

support makes sense. In Europe, we're engaging with customers and partners to evaluate the possibility of building a specialty fab, focusing on automotive-specific technologies, based on the demand from customers and level of government support. In China, we expand 28-nanometer in Nanjing as planned to support local customers, and we continue to follow all the rules and regulation fully. At the same time, we continue to invest in Taiwan and expand our capacity to support our customers' growth."

But it was the increased production promised by IDMs like Intel, Micron, ST and TI that highlighted the depth and speed of the changes going on in the semiconductor supply chain. Having experienced the disruption caused by the recent demand-supply imbalance, political leaders, OEM executives and semiconductor manufacturers agreed about the need to change the dynamics of the IC market. The huge capex investments announced recently by companies like Infineon, Intel, Micron and others have reignited interest in the IDM model. But even these will not dampen the growth of the foundry market, observers said.

"We do not see any slowdown in our customer's [desire] to adopt TSMC's leading-edge technology," said TSMC's Wei. "They might have a different kind of product schedule. They might have a different kind of product plan. But the technology adoption, did not slow down."



Authorized distributor



Compact TVS diodes protect USB-C

TDK's new compact TVS diodes feature parameters matched to USB-C ports and other high-speed interfaces. The B74111U0033M060 and B74121U0033M060 devices offer capacitance values of 0.48 and 0.65pF at 1MHz, respectively, which means signal integrity is not compromised. The clamping voltages are 3.8 or 3.9V with an ITLP of 8A.

The devices are designed for ESD discharge voltages of up to 15kV. The diodes are manufactured in WLCSP 01005 and WLCSP 0201 packages with heights of 100 and 150µm respectively. This means the diodes can also be integrated into USB-C SIP modules.

The B74111U0055M060 and B74121U0055M060 types, with maximum DC voltages up to 5.5V, suit conventional USB2.0 data bus of USB-C (D+/D-). Clamping voltages are 3.9 and 4.0V with an ITLP of 8A. They are also designed for a high ESD discharge voltage up to 15kV.

www.tdk-electronics.tdk.com



Easy arm config

Rolec has added more components to its taraSMART (IP54) range of modular suspension arms. Users can now configure support arms from a choice of 22 different components.

Described as tough and stylish, the arms support displays, panel PCs and HMI enclosures weighing up to 100lbs. Applications include smart factory automation, modern machine control systems, robotics, process automation, medical/laboratory technology and information stations.

Users can configure arms quickly, easily and cost-effectively thanks to their simple design. There is a choice of either round (48 and 70mm dia) or rectangular (40 by 60mm) profiles. Both offer space for cables and HDMI, DVI and USB connectors.

The range features: four couplings and two adapters (VESA and Siemens); five joints, two elbows and a base; and eight support profiles in lengths of 250, 500, 750 and 1,000mm (four round and four rectangular cross section). The round profiles suit enclosures from Siemens, Beckhoff and B&R. Set screws enable adjustment.

www.rolec-usa.com



WINSOURCE
ELECTRONICS

WIN-SOURCE.NET

Easy to Find Obsolete & EOL & Hard-to-Find Electronic Components

from
**The Largest Electronic Parts
Online Store from Asia.**

Semiconductor | Integrated circuits | Discrete semiconductors
Sensor | Passive components Power products | Connectors



24 Hours Delivery

Parts in stock are available for immediate delivery. At any given time, more than 1 million+ products are in stock and ready to be shipped.



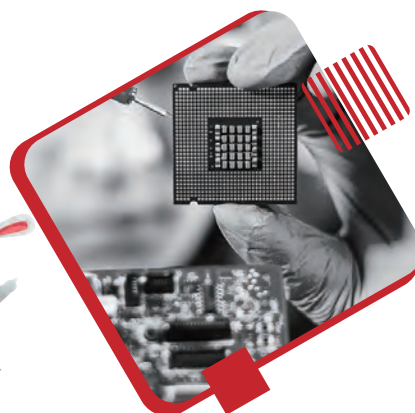
365 Days Warranty

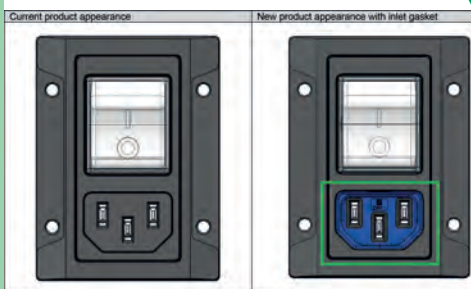
The electronic components you purchase include 365 Days Warranty. We guarantee product quality.



23 Years Supply Chain Experience

WIN SOURCE are always consistent since 1999.





Schurter has updated the design of its series DG11 and DG12 power entry modules with mains filter. The company states the update builds on

Ingress protection when connected

the success of the 6080 appliance inlet, which features a first-of-its-kind ingress protection solution between the connector and mating V-Lock power cord.

The blue colored latch of the V-Lock power cord and blue inlay of the appliance inlet indicate the two have been equipped to provide an IP54 rating under load. The unit is rated IP67 between the power entry module and panel.

The modules are designed to combine up to five functions in a single component

including: C14 or C18 appliance inlet; circuit breaker that provides overcurrent protection and/or a recessed 2-pole on/off switch; and a mains filter (DG12). The circuit breaker switch is available lighted or unlighted with a selection of colors and on/off printing/embossing. Rated up to 10A at 250VAC according to IEC and 15A at 250VAC according to UL/CSA.

www.schurter.com



Image sensor makes cars safer

Onsemi has launched its Hyperlux automotive image sensor family. With a 2.1µm pixel size, 150dB ultra high dynamic range (HDR) and LED flicker mitigation (LFM) across the full automotive temperature range, the family is designed to provide high performance, speed and advanced features for next generation Advanced Driver Assistance Systems (ADAS).

The Hyperlux family spans products with resolutions from three to eight megapixel and higher, catering to both sensing and viewing camera applications. With an HDR of 150dB, it captures high quality images under the most extreme lighting conditions without sacrificing lowlight sensitivity. The LFM capability of the platform ensures that pulsed light sources do not appear to flicker and thereby avoids flicker-induced machine vision issues.

Desay SV's deputy general manager of the Intelligent Driving Sensor Business Unit, Huohong Jiang, said: "With the new Hyperlux technology, automotive OEMs and tier ones can expect proven high performance in all operating conditions to accelerate more advanced safety and convenience features."

www.onsemi.com



SLIM-CASE



BODY-CASE



CONNECT



STYLE-CASE



HANDHELD ENCLOSURES

Take a look at our all new handheld and wearable cases for today's personal electronics, instrumentation and medical equipment. They are molded in UV-stable FR (V-0) plastic, and sealed up to IP 65 for indoor and outdoor applications.

Request a free sample today!



OKW ENCLOSURES, INC.

800 965-9872 | www.okwenclosures.com

OKW

Chip shortages and their ongoing impact

For this article, ByteSnap Design spoke with an industry insider to gain insight into the current state of the market and future trends

Many businesses are looking to restructure their supply chains to reduce risk and improve resilience. One approach gaining traction is reshoring production to the US and Europe. This is driven by several factors including: rising labour costs in Asia; changing trade policies; and the increasing need for greater supply chain transparency and control.

Reshoring also reduces transportation costs and lead times, letting companies respond more quickly to changing market conditions. Reshoring production can also help companies better protect their intellectual property and ensure compliance with regulatory requirements.

While there are challenges to reshoring, including higher upfront costs and the need for specialised skills and equipment, many businesses consider it a necessary step in securing their long-term competitiveness.

Security of intellectual property

Intellectual property security is a major concern for companies

operating in Asia. In recent years, there have been many cases of intellectual property infringement, with counterfeit products and copies flooding the market. As the insider noted: "It's always a risk, but it's one you can manage."

To mitigate risk, companies can partner with local firms with good reputations and understanding of the local market. Such partnerships can help companies to better protect their intellectual property by providing access to local knowledge, expertise and resources. Additionally, setting up their own production facilities can provide companies with greater supply chain control and reduce the risk of intellectual property infringement.

Despite the risks, companies cannot ignore the opportunities the Asian manufacturing hub offers. Instead, they must balance risks against benefits.

Quality issues in different regions

Regarding quality, tier one contract electronics manufacturers are particularly

adept at standardising processes and delivering successful outcomes in low-cost regions. However, smaller players may find it challenging to achieve the same success. Companies should consider the quality capabilities of their chosen manufacturing location.

Quality can be controlled through regular communication and on-site factory visits. This helps identify and address potential issues quickly, which can prevent delays and production setbacks. Also, quality control can be implemented throughout the supply chain, from component selection to final product testing.

Freight costs and environmental impact

In addition to rising sea freight costs, other challenges when shipping products include the long transit time, which can leave finished goods in transit for several weeks. This can be particularly challenging for companies relying on JIT delivery to meet customer demand. Furthermore, the pandemic

has caused port congestion and shipping delays.

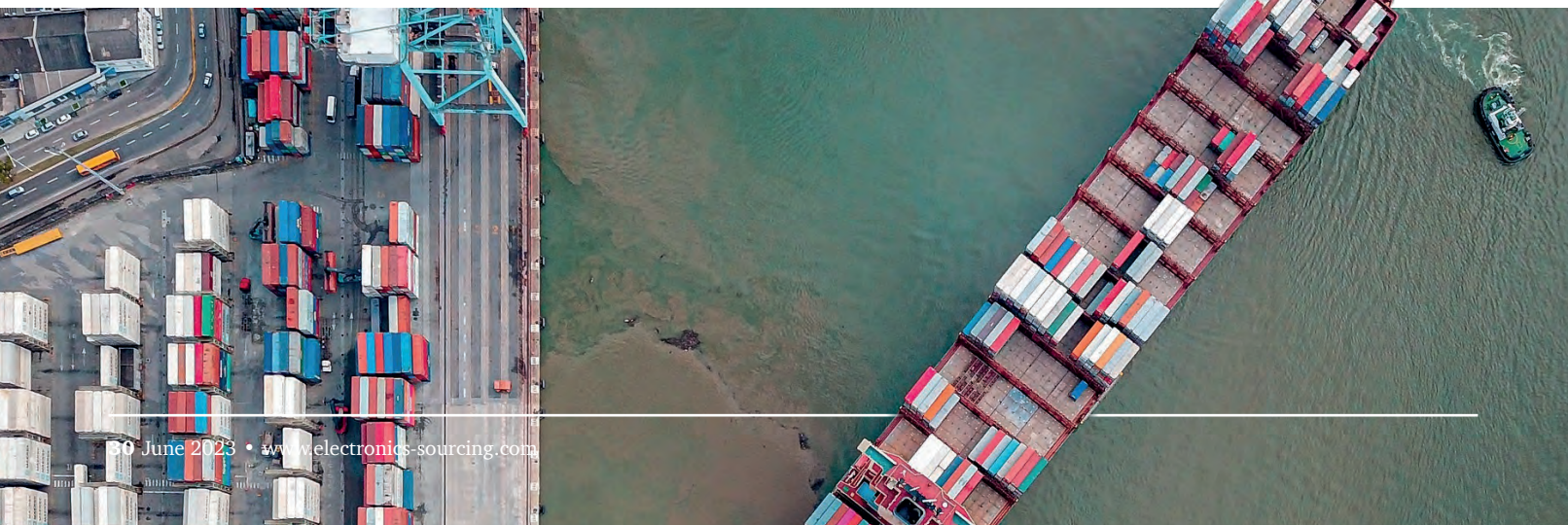
Air freight is faster but more expensive, while rail freight offers a balance between speed and cost. However, rail freight is limited by availability of infrastructure and can be subject to border controls and customs clearance.

Companies can also consider rethinking their supply chain strategy by reshoring production or sourcing components from local suppliers. This could also help reduce the environmental impact of shipping and improve supply chain resilience.

Supply chain flexibility and hedging variations

The insider emphasised the importance of supply chain flexibility. Staying in contact with factories and spending time onsite ensures quality and timely delivery. Dealing with the hedging of variations with the US Dollar and the Euro is simpler and more stable than dealing with other currencies, making it an attractive option.

www.bytesnap.com



Manufacturer	Distributor	Telephone	Website	Franchised Distributor (Y/N/A)	No. of Lines for Principle	Stock Value for Principle	Minimum Order Value	% Lead Free for Principle Range	No. of Technical Support Staff	Total No. of Staff	Pack and Hold
CABLE & WIRING											
3M	Mouser Electronics	800-346-6873	www.mouser.com	Y	23,235	N/A	\$0	0.46	50	1,000+	Y
Alpha Wire	Mouser Electronics	800-346-6873	www.mouser.com	Y	8,106	N/A	\$0	93%	50	1,000+	Y
Belden Wire & Cable	Mouser Electronics	800-346-6874	www.mouser.com	Y	5,863	N/A	\$0	97%	50	1,000+	Y
Molex	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Molex	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
TE Connectivity	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
CIRCUIT PROTECTION											
Bel Fuse		+1 201 432 0463	belfuse.com/circuit-protection	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bourns	Mouser Electronics	800-346-6873	www.mouser.com	Y	4,462	N/A	\$0	68%	50	1,000+	Y
Eaton	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
EPCOS	Mouser Electronics	800-346-6873	www.mouser.com	Y	3,487	N/A	\$0	100%	50	1,000+	Y
KYOCERA AVX	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
KYOCERA AVX	Digi-Key	800-344-4539	www.digikey.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
Littelfuse	Mouser Electronics	800-346-6873	www.mouser.com	Y	28,790	N/A	\$0	67%	50	1,000+	Y
Schurter	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Vishay	Mouser Electronics	800-346-6873	www.mouser.com	Y	31,445	N/A	\$0	68%	50	1,000+	Y
DISPLAYS & LEDs											
BIVAR	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Broadcom	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Cree LED	Mouser Electronics	800-346-6873	www.mouser.com	Y	12,390	N/A	\$0	99%	50	1,000+	Y
Dialight	Mouser Electronics	800-346-6873	www.mouser.com	Y	6,179	N/A	\$0	84%	50	1,000+	Y
Displaytech	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Hantronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Kingbright Company, LLC	Mouser Electronics	800-346-6873	www.mouser.com	Y	301	N/A	\$0	100%	50	1,000+	Y
Lumileds	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Luminus	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Newhaven Display	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ams OSRAM	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,690	N/A	\$0	100%	50	1,000+	Y
Tianma	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ELECTROMECHANICAL											
ALPS	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Apem, Inc.	Mouser Electronics	800-346-6873	www.mouser.com	Y	4,326	N/A	\$0	83%	50	1,000+	Y
E-Switch	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Grayhill	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Honeywell	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Keystone Electronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Littelfuse	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Nidec	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
NKK Switches	Mouser Electronics	800-346-6873	www.mouser.com	Y	13,976	N/A	\$0	86%	50	1,000+	Y
Omron	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y

Advert Index

Advert	Page	Advert	Page
Coilcraft	13	Rochester	11
Designing Electronics North America (DENA)	21	RS	10
Digi-Key	IFC	Sager Electronics	05
eBOM.com	IBC	Sourceability	25
Flip Electronics	15	Trusted Parts (ECIA)	19
Fusion Worldwide	09	TTI Inc	07
Mouser Electronics	16, 17, 26, 27 & BC	Winsource Electronics	28
OKW Enclosures, Inc	29		

Manufacturer	Distributor	Telephone	Website	Franchised Distributor (Y/N/M)	No. of Lines for Principle	Stock Value for Principle	Minimum Order Value	% Lead Free for Principle Range	No. of Technical Support Staff	Total No. of Staff	Pack and Hold
Panasonic	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Phoenix Contact	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
PUI Audio	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Schneider Electric	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Sensata	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
TE Connectivity	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Teledyne Relays	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ENCLOSURES											
Bud	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bud Industries	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,325	N/A	\$0	80%	50	1,000+	Y
Hammond Manufacturing	Mouser Electronics	800-346-6873	www.mouser.com	Y	2,839	N/A	\$0	82%	50	1,000+	Y
METCASE Enclosures	OKW Enclosures, Inc.	(800) 965-9872	www.metcaseusa.com		322	N/A	\$0	N/A	10	20	Y
New Age Enclosures	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
OKW Gehäusesysteme GmbH	OKW Enclosures, Inc.	(800) 965-9872	www.okwenclosures.com		2,450	N/A	\$0	N/A	10	20	Y
ROLEC Gehäuse-Systeme GmbH	ROLEC Enclosures Inc	(888) 658-5774	www.rolec-usa.com		1,960	N/A	\$0	N/A	4	6	Y
FREQUENCY MANAGEMENT											
Abrakon Corporation	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,780	N/A	\$0	100%	50	1,000+	Y
CTS Electronic Components	Mouser Electronics	800-346-6873	www.mouser.com	Y	3,889	N/A	\$0	100%	50	1,000+	Y
ECS Inc	Mouser Electronics	800-346-6873	www.mouser.com	Y	2,070	N/A	\$0	100%	50	1,000+	Y
Epson Toyocom	Mouser Electronics	800-346-6873	www.mouser.com	Y	178	N/A	\$0	100%	50	1,000+	Y
IQD Frequency Products	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
KYOCERA AVX	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
KYOCERA AVX	Digi-Key	800-344-4539	www.digikey.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
SiTime	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ICs & SEMICONDUCTORS											
Analog Devices, Inc	Mouser Electronics	800-346-6873	www.mouser.com	Y	18,749	N/A	\$0	95%	50	1,000+	Y
Broadcom Limited	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Central Semiconductor	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Central Semiconductor Corp.	Future Electronics	(800) 675-1619	www.futureelectronics.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y
Digi International	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Diodes Incorporated	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
FTDI Chip	Mouser Electronics	800-346-6873	www.mouser.com	Y	94	N/A	\$0	100%	50	1,000+	Y
Infineon	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,580	N/A	\$0	63%	50	1,000+	Y
Intel	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ISSI	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Lattice	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Littelfuse	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
MACOM	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Maxim Integrated	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Microchip	Mouser Electronics	800-346-6873	www.mouser.com	Y	5,800	N/A	\$0	100%	50	1,000+	Y
Monolithic Power Systems (MPS)	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Nexperia	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
onsemi	Mouser Electronics	800-346-6873	www.mouser.com	Y	7,205	N/A	\$0	100%	50	1,000+	Y
onsemi	Mouser Electronics	800-346-6873	www.mouser.com	Y	7,486	N/A	\$0	96%	50	1,000+	Y
Power Integrations	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Qorvo	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Renesas Electronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ROHM Semiconductor	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Silicon Laboratories Inc	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,141	N/A	\$0	100%	50	1,000+	Y
Skyworks	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ST Microelectronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	8,145	N/A	\$0	96%	50	1,000+	Y
Swissbit	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Texas Instruments	Mouser Electronics	800-346-6873	www.mouser.com	Y	29,676	N/A	\$0	94%	50	1,000+	Y
Toshiba	Mouser Electronics	800-346-6873	www.mouser.com	Y	800	N/A	N/A	N/A	N/A	N/A	Y
Vishay	Mouser Electronics	800-346-6873	www.mouser.com	Y	53,781	N/A	\$0	77%	50	1,000+	Y
Wolfspeed	Mouser Electronics	800-346-6873	www.mouser.com	Y	53,781	N/A	\$0	77%	50	1,000+	Y
INTERCONNECTION											
Bel		+1 858 676 9650	belfuse.com/magnetic-solutions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3M	Mouser Electronics	800-346-6873	www.mouser.com	Y	23,235	N/A	\$0	46%	50	1,000+	Y
Aero Conesys	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Amphenol	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Amphenol	Mouser Electronics	800-346-6873	www.mouser.com	Y	165,853	N/A	\$0	31%	50	1,000+	Y
Anderson Power Products	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Active (Delphi)	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Bel Magnetic Solutions		+1 858 676 9650	belfuse.com/magnetic-solutions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Manufacturer	Distributor	Telephone	Website	Franchised Distributor (Y/N/A)	No. of Lines for Principle	Stock Value for Principle	Minimum Order Value	% Lead Free for Principle Range	No. of Technical Support Staff	Total No. of Staff	Pack and Hold
Cinch	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cinch Connectivity/Bel	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Cinch Connectivity Solutions		+1 507 833 8822	belfuse.com/cinch	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eaton	Mouser Electronics	800-346-6873	www.mouser.com	Y	10,744	N/A	\$0	27%	50	1,000+	Y
ERNI Electronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Glenair	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Harting	Mouser Electronics	800-346-6873	www.mouser.com	Y	2,160	N/A	\$0	51%	50	1,000+	Y
Harwin	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Hirose Electric	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ITT Cannon	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ITT Cannon	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
JAE Electronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	6,02	N/A	\$0	100%	N/A	N/A	Y
JST	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
KYOCERAAVX	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
KYOCERAAVX	Digi-Key	800-344-4539	www.digikey.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
LEMO	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Mill-Max	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Molex	Mouser Electronics	800-346-6873	www.mouser.com	Y	85,634	N/A	\$0	89%	50	1,000+	Y
Neutrik	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,563	N/A	\$0	100%	50	1,000+	Y
NorComp	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Phoenix Contact	Mouser Electronics	800-346-6873	www.mouser.com	Y	30,044	N/A	\$0	77%	50	1,000+	Y
Radiall	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Samtec	Mouser Electronics	800-346-6873	www.mouser.com	Y	123,613	N/A	\$0	69%	50	1,000+	Y
Stewart Connector		+ 1 717 235 7512	belfuse.com/stewart-connector	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Switchcraft Corporation	Mouser Electronics	800-346-6873	www.mouser.com	Y	300	N/A	\$0	55%	50	1,000+	Y
TE Connectivity	Mouser Electronics	800-346-6873	www.mouser.com	Y	123,613	N/A	\$0	69%	50	1,000+	Y

OBSOLESCENCE / HARD TO FIND

OBSCURENESS / HARD TO FIND										
Lansdale	602-438-0123	lansdale.com	Y							
Lantek Corp.	973-579-8100	www.lantekcorp.com	M	186,000	\$22M	\$0	75.00%	5	62	Y
Rochester Electronics	978-462-9332	www.rocelec.com	Y		N/A	\$250		10	400+	Y

OPTO ELECTRONICS

Broadcom	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Cree LED	Mouser Electronics	800-346-6873	www.mouser.com	Y	582	N/A	\$0	99%	50	1,000+	Y
Finisar	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
ams OSRAM	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,927	N/A	\$0	99%	50	1,000+	Y
ROHM Semiconductor	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Vishay	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y

PASSIVES

ABRACON	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Bourns	Mouser Electronics	800-346-6873	www.mouser.com	Y	38	N/A	\$0	78%	50	1,000+	Y
Cornell Dubilier	Mouser Electronics	800-346-6873	www.mouser.com	Y	24,145	N/A	\$0	71%	50	1,000+	Y
Coilcraft	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
EPCOS	Mouser Electronics	800-346-6873	www.mouser.com	Y	26,533	N/A	\$0	98%	50	1,000+	Y
Fair-Rite	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
KEMET	Mouser Electronics	800-346-6873	www.mouser.com	Y	77,568	N/A	\$0	66%	50	1,000+	Y
KOA Speer	Mouser Electronics	800-346-6873	www.mouser.com	Y	34,078	N/A	\$0	58%	50	1,000+	Y
KYOCERAAVX	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
KYOCERAAVX	Digi-Key	800-344-4539	www.digikey.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
Murata	Mouser Electronics	800-346-6873	www.mouser.com	Y	33,780	N/A	\$0	99%	50	1,000+	Y
Nichicon	Mouser Electronics	800-346-6873	www.mouser.com	Y	20,389	N/A	\$0	84%	50	1,000+	Y
Ohmite	Mouser Electronics	800-346-6873	www.mouser.com	Y	14,293	N/A	\$0	55%	50	1,000+	Y
Panasonic Electronic Components	Mouser Electronics	800-346-6873	www.mouser.com	Y	14,948	N/A	\$0	100%	50	1,000+	Y
Signal Transformer		+1 516 239 5777	belfuse.com/signal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Taiyo Yuden	Mouser Electronics	800-346-6873	www.mouser.com	Y	4,620	N/A	\$0	98%	50	1,000+	Y
TE Connectivity	Mouser Electronics	800-346-6873	www.mouser.com	Y	6,663	N/A	\$0	100%	50	1,000+	Y
TDK	Mouser Electronics	800-346-6873	www.mouser.com	Y	6,663	N/A	\$0	100%	50	1,000+	Y
TT Electronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
United Chemi-Con (UCC)	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Vishay	Mouser Electronics	800-346-6873	www.mouser.com	Y	102,917	N/A	\$0	64%	50	1,000+	Y
Würth	Mouser Electronics	800-346-6873	www.mouser.com	Y	934	N/A	\$0	99%	50	1,000+	Y
Yageo Corporation	Mouser Electronics	800-346-6873	www.mouser.com	Y	18,246	N/A	\$0	100%	50	1,000+	Y

POWER & BATTERIES

Artesyn Embedded Technologies	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
B&K Precision	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Bel Power Solutions		+1 866 513 2839	belfuse.com/power-solutions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor (Y/N/A)	No. of Lines for Principle	Stock Value for Principle	Minimum Order Value	% Lead Free for Principle Range	No. of Technical Support Staff	Total No. of Staff	Pack and Hold
Cincon	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Cosel	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
CUI Inc.	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Delta Electronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
MEAN WELL	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Murata	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Phihong	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Phoenix Contact	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
RECOM	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Schaffner	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
SL Power	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Texas Instruments	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
TDK Lambda	Mouser Electronics	800-346-6873	www.mouser.com	Y	405	N/A	\$0	80%	N/A	N/A	Y
TRACO Power	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Vicor	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
XP Power	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y

SENSORS											
ams OSRAM	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Amphenol	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Analog Devices Inc.	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Bosch	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Honeywell	Mouser Electronics	800-346-6873	www.mouser.com	Y	12,059	N/A	\$0	64%	50	1,000+	Y
KYOCERA AVX	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
KYOCERA AVX	Digi-Key	800-344-4539	www.digikey.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
Littelfuse	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Melexis	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Microchip	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
NXP	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
onsemi	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Omron	Mouser Electronics	800-346-6873	www.mouser.com	Y	4,915	N/A	\$0	59%	50	1,000+	Y
Renesas	Mouser Electronics	800-346-6873	www.mouser.com	Y	4,915	N/A	\$0	59%	50	1,000+	Y
Sensirion	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
STMicroelectronics	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
TDK	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
TE Connectivity	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Texas Instruments	Mouser Electronics	800-346-6873	www.mouser.com	Y	914	N/A	\$0	65%	50	1,000+	Y
Vishay	Mouser Electronics	800-346-6873	www.mouser.com	Y	914	N/A	\$0	65%	50	1,000+	Y

SWITCHES & KEYBOARDS											
OTTO	ECCO	773-767-2200	www.eccoconnectors.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	N/A

TEST & MEASUREMENT											
B&K Precision	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Fluke	Mouser Electronics	800-346-6873	www.mouser.com	Y	1,008	N/A	\$0	94%	50	1,000+	Y
Keysight	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Lascar Electronics		814-835-0621	www.lascarelectronics.com	Y	130	\$602,000	\$0	100%	10	175	Y
Tektronix	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50	1,000+	Y
Teledyne LeCroy	Mouser Electronics	800-346-6873	www.mouser.com	Y	194	N/A	\$0	96%	50	1,000+	Y

THERMAL MANAGEMENT											
Materials Direct	Materials Direct	01908 222 211	www.materials-direct.com	N/A	N/A	£1,000,000	£0	N/A	5	55	Y
ebm-papst	Mouser Electronics	800-346-6873	www.mouser.com	Y	194	N/A	\$0	96%	50	1,000+	Y
Sanyo Denki	Mouser Electronics	800-346-6873	www.mouser.com	Y	194	N/A	\$0	96%	50	1,000+	Y
CUI Devices	Mouser Electronics	800-346-6873	www.mouser.com	Y	194	N/A	\$0	96%	50	1,000+	Y
Universal Science	Universal Science	01908 222 211	www.universal-science.com	N/A	N/A	£1,000,000	£0	N/A	5	55	Y

WIRELESS SOLUTIONS											
KYOCERA AVX	Mouser Electronics	800-346-6873	www.mouser.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y
KYOCERA AVX	Digi-Key	800-344-4539	www.digikey.com	Y	N/A	N/A	\$0	N/A	50+	1,000+	Y

Contract Manufacturers Buyers' Guide

Manufacturer	Telephone	Website	Turnover	Location	Employees	Number of Surface Mount Lines	Approvals	BGA Capacity	Lead Free Manufacturer	Prototyping	Design Capability	Full Turnkey	Cables and Harnessing
Alan Anderson Manufacturing Ltd	+44 (0) 333 322 7222	www.aa-manufacturing.co.uk	£21m	Hertfordshire UK	40	2	ISO9001:2015, IPC-A-610	Y	Y	Y	Y	Y	Y
Pektron	1-248-677-4838	www.pektron.com	\$66m	Michigan & UK	350	8	ISO9001, ISO14001, TS16949, BEAB, VCA, TUV, UL	Y	Y	Y	Y	Y	Y

eBOM.com

The **GAME CHANGING** site
for the electronics industry

**DISCOVER | SOURCE |
COMPARE | BUY**



powered by

 **TrustedParts.com**

One source for your entire BOM



Widest selection of the
newest products™

