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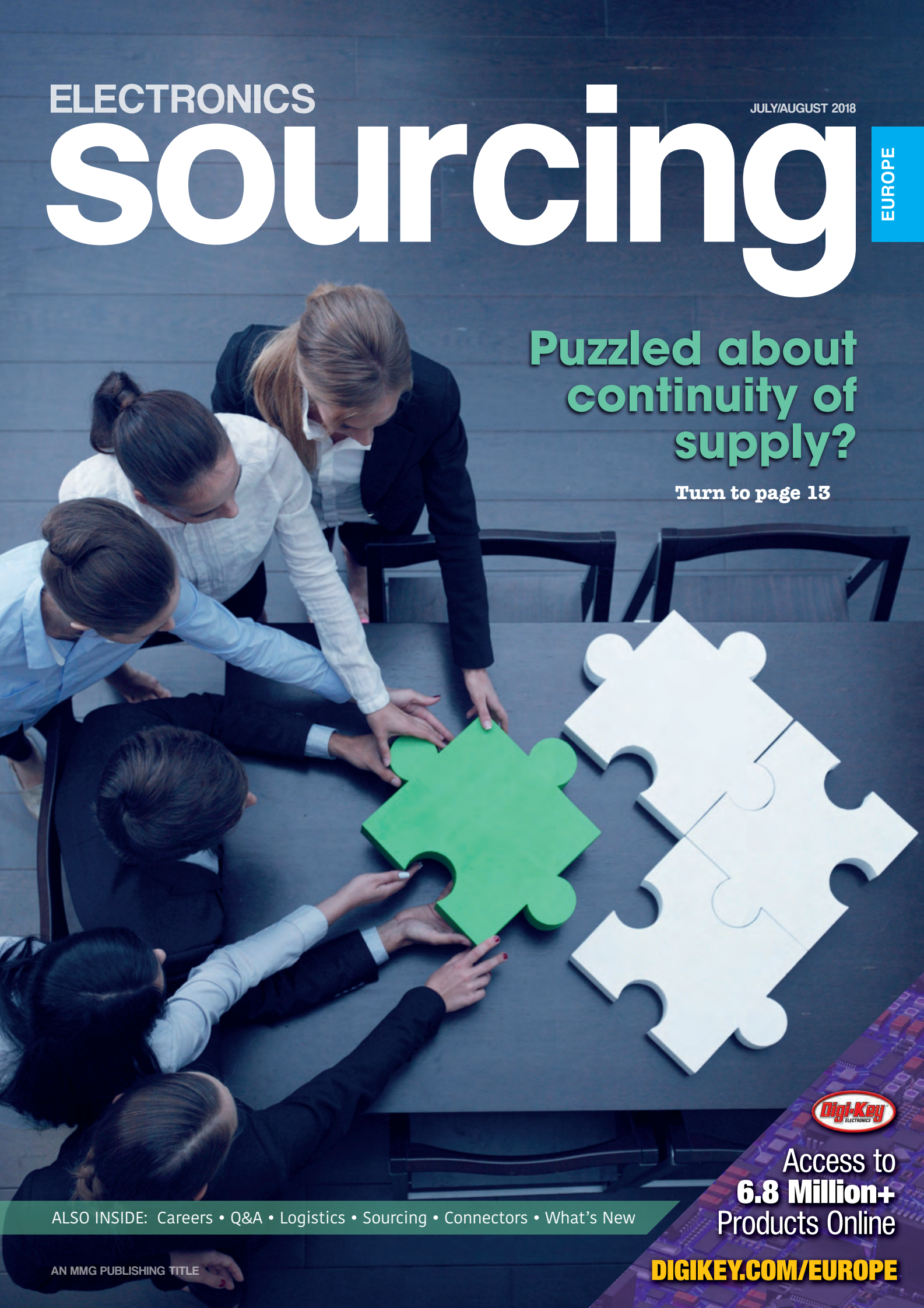

Puzzled about continuity of supply?

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Introducing Roborep

For the last 20-years I've worked with a media salesperson (no names mentioned) who has the nickname Roborep. It's a term of endearment for their love of the media sales process. Their focus, dedication and subject knowledge is almost machine-like.

Which is why I nearly fell off my seat while listening to a podcast of Google's latest Duplex demonstration. Duplex is described as an extension of Google Assistant that allows it to carry out natural conversations by mimicking human voice. During the demo the assistant helped a woman book a hair appointment and without forewarning I would not have been able to differentiate between the two voices.

It was like I was listening to Roborep V2 but this time it was more robot than human. If, at this stage, Duplex can help someone book a hair appointment why not in the future talk an electronics purchaser through the buying process or advise an engineer on component selection.

In all the discussions regarding future automation, the predicted job losses are not in blue collar manufacturing applications (the core of that process took place decades ago) but white collar managerial roles.

Robots are already writing articles (sports reports I'm told) so I guess my days are numbered. Am I worried? Not really, I'm happy to take the robot writers on. I'll secretly develop new robot-unfriendly editorial styles that are more interesting and useful, slip in under their radar, and create a new audience of people who like the nostalgia of reading human written words.

And the reps? I guess they will get new jobs selling the next generation of robots.

Jon Barrett

A Good Time *to be a* Buyer

Victoria Kickham is a freelance writer specializing in manufacturing, distribution and supply chain issues

Procurement and supply managers reap the benefits of a strong employment economy, but professional pressures mount in a tough sourcing environment

Careers • By Victoria Kickham

It continues to be an employee's market, and those in the supply chain profession are reaping the benefits of the trend in 2018. The economy remains on its upward trajectory worldwide, and U.S. unemployment levels were at historic lows heading into the summer months, as wages continued to increase across the board. For buyers and supply managers, the story is even better.

In early June, the Institute for Supply Management released its *Annual Salary Survey*, revealing higher than average salaries and wage increases for supply management professionals—those responsible for buying and managing a wide range of products and services for companies of all sizes—as compared to the larger professional workforce. On average, supply management salaries rose more than four percent last year, versus three percent for professionals generally, according to ISM, which represents 50,000 supply management professionals who manage about $1 trillion in corporate supply chain procurement annually. What's more, buyers and supply managers' average overall compensation was close to $120,000 last year, the ISM survey showed.

So what does this mean, aside from the liklihood that buyers are bringing home a bigger paycheck these days? ISM points to the value the profession brings to the table and companies' understanding of and willingness to pay for that value, especially in today's climate.

"In today's global economy, excellence in supply management improves both top- and bottom-line performance, and advances companies' leadership on the worldwide stage," Paul Lee, director of ISM Research & Publications said in a statement announcing the results this spring. "Supply management professionals' higher-than-average wage growth reflects the significant value they add every day."

Such value plays an increasingly important role in the electronic components supply channel, as companies and their purchasing departments face a tougher sourcing climate in 2018. Longer lead times and the threat of shortages are putting pressure on buyers to expand their sourcing networks while also managing the supply chain risks such practices often entail, including slower production lines due to delays and the danger of sourcing counterfeit parts. In short, supply chain risk is rising right alongside employment levels and wages. Another recent industry study shows that procurement leaders are prioritising risk management as one of their most strategic responsibilities in 2018, based on a host of factors affecting global supply chains. The study, *Managing Supply Risk: Are You Prepared for a Black Swan Event?* by consulting firm A.T. Kearney and research/analytics firm RapidRatings, also showed that most companies expect their procurement organisations to be given more responsibility for managing risk over the next two years.

Such challenges are here to stay, and will be exacerbated by other market factors. Employment growth is expected to continue, even as some industries find it challenging to fill both skilled and unskilled jobs. This remains a thorn in the side of many manufacturing and industrial firms, which is another factor threatening productivity. Although manufacturing employment levels saw 20 straight months of growth as of May 2018, procurement professionals at manufacturing firms said the labor market remains a constraint to their production and that of their suppliers, according to separate ISM data also released in early June.

The bottom line? Buyers and supply managers can count on both a rewarding and challenging work environment ahead.

NES News

Enhanced support for passives

Rutronik and TDK Europe have expanded their distribution agreement for the European market, meaning Rutronik now offers TDK's Epcos brand products in addition to the TDK-Micronas and TDK-Lambda brands. Under the Epcos brand, Rutronik will supply aluminium electrolytic and foil capacitors, transformers, varistors, thermistors, piezo components and actuators for haptic feedback.

Senior line manager at Rutronik, Gerd Fischer, said: "By expanding the range of TDK products we offer, we can more comprehensively support customers in the implementation of their projects, all from one source."

TDK vice president distribution, Dietmar Jäger, added: "Rutronik is an established distributor in Europe and, thanks to its infrastructure, logistics, and highly qualified team, is able to support customers with expertise and suitable components from the design stage all the way through to implementation."

www.rutronik.com

Partner backs IoT explosion

Acal BFi has been selected as the first technical partner to bring Airoha system-on-chip solutions to the internet of things sector in Europe. The agreement provides purchasers with access to Airoha's system on chip solutions, including Bluetooth low energy, Wi-Fi and location, with on-site design and integration support from Acal BFi's Airoha-trained field application engineers.

Connectivity solutions from Airoha are used in wireless-enabled products, including wearable and fitness accessories, home automation, connected appliances and asset tracking.

Business development director, Acal BFi, Diego Sala, commented: "Airoha's technology is driving an explosion of connected products. We look forward to helping customers create ground-breaking IoT solutions."

Senior vice president, Airoha, Yuchuan Yang, added: "Acal BFi is our major design partner in Europe, providing customers with complete, one-to-one support. This expertise and collaborative approach were key factors in our decision to partner with Acal BFi,and are essential for the IoT sector to benefit from our SoC technology."

www.acalbfi.com

Reach new highs in digital pressure

Mouser Electronics is now stocking the BMP388 digital barometric pressure sensor from Bosch. Featuring a temperature coefficient offset between 20 and 65°C, this low-power, low-noise sensor is designed to deliver accurate altitude measurement over a broad temperature range. This makes the BMP388 ideal for altitude stabilisation in consumer drones, internet of things applications, vertical velocity indication, weather forecasting, health care applications, augmented reality and virtual reality devices.

The 24-bit device covers a measurement range of 300 to 1,250hPa while consuming just 3.4µA at 1Hz. For easy access to storage and data, the BMP388 sensor features a raw interrupt functionality, while a built-in infinite impulse response filter minimises short-term disturbances like those caused by slamming doors or windows.

www.mouser.com

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ES News

In Brief

Website simplifies search
CamdenBoss has launched a new website, making it easier to search the company's extensive product range. In addition to enhanced navigation and search functionality, the site also spotlights new products, such as CamCirc circular connectors. The website can be viewed across mobile and tablet devices, with full access to PDF datasheets, DWG drawings and product catalogues.
www.camdenboss.com

Expanded A-Series
Conrad Business Supplies has expanded its electromechanical portfolio for control cabinet design with the extended A range of Weidmüller's Klippon Connect terminal blocks. The A-Series now features push in connection technology in a universal format, which includes protective earth terminal blocks, fuse terminals, feed-through terminals, multi-level distribution terminal blocks, test series terminals and neutral terminal blocks.
conrad.com

Growth defies challenges
FBDi reveals that despite component shortages, the German component distribution market posted further growth during the first quarter of 2018, with distribution sales up seven percent compared with Q1 2017. There is, however, little prospect of lead-times easing for a variety of passive components and consequently, price increases and long delivery times will set the tone for 2018.
www.fbdi.de

Automotive audit passed
Rosenberger has been certified by DQS according to the new automotive standard IATF 16949:2016. This confirms that Rosenberger can manufacture and supply coaxial and high-voltage connectors in accordance with stringent automotive industry requirements. Other Rosenberger sites in Germany, Hungary and China and India will be audited according the new standard in due course.
www.rosenberger.com

Powerful info at your fingertips

Bicker Elektronik has published two new product catalogues: Power solutions for industrial and medical systems and Power and board solutions, which includes PSU and mainboard bundles, system components and industrial grade accessories for computer systems. The publications are aimed at purchasers in several fields such as industrial automation, industrial internet of things, medical and laboratory technology.

Purchasers will find several product categories in the power solutions catalogue including: industrial power supplies, medical grade power supplies, DC/DC converters and UPS systems. Various new products have been incorporated, particularly in the DC UPS area, which now includes battery technologies such as Supercaps and LiFePO4.

A variety of one-stop solutions are featured in the power and board catalogue with laboratory tested power and board bundles consisting of a power supply, industrial mainboard and industrial-grade accessories and processors. These preconfigured solutions are available for a variety of applications and can save time and money for system developers of IPC and embedded computer systems. Power and board specialists from Bicker Elektronik can provide advice and design-in support.
www.bicker.de

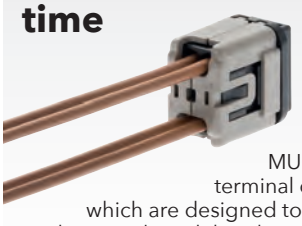
New plant expands SiC production capacity

Rohm has announced plans for a new production building at its Apollo plant in Chikugo, Japan. The expanded production capacity is intended to meet growing demand for silicon carbide power devices.

The properties of SiC promise advances in power electronics, with SiC-based voltage converters demonstrating less losses than conventional silicon-based converters. SiC also enables smaller modules, components and systems than silicon. Demand for energy-efficient devices is expected to increase the call for SiC components in the coming years.

In a bid to increase its market share for SiC wafers and components, Rohm is therefore increasing production capacity and efficiency using the latest equipment. The new three-storey building at Apollo, which will be complete by the end of 2020, will increase the production area by approximately 11,000m².
www.rohm.com

Reduce cable assembly time



RS Components has announced availability of the Molex MUO 2.5 series of terminal connectors, which are designed to replace closed-end terminals and thereby reduce harness-assembly lead times, as well as improving quality, reliability and processing.

MUO 2.5 connectors claim to simplify the termination process by eliminating tangled wires. Typical applications that could benefit include equipment such as air conditioners, fan heaters or floor-heating, as well as appliances such as refrigerators and washing machines.

As well as eliminating unstable crimped terminations, the MUO 2.5 termination process delivers manufacturing flexibility and, unlike closed-end terminations, can be set up at any stage of the production workflow.

Features of the MUO 2.5 connectors include two separated retainers to protect cables and secure the terminal position, preventing wire entanglement and eliminating electrical-shock hazards. The connectors also include a water-exhaust function designed to prevent water from permeating inside.
www.rs-online.com

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Rising demand from multiple segments drive analog IC market

Strong demand and mostly firm prices will result in steady revenue growth for analog ICs through 2021

James Carbone

The global analog integrated circuit market will grow 8 per cent in 2018 due to rising demand from automotive, cell phones and Internet of Things and other applications.

The market will increase from $53.1 billion in 2017 to $57.1 billion in 2018 as unit shipments rise 6.2 percent, according to Semico Research. Analog demand will continue to grow through 2021 when analog chip revenue reaches $62.8 billion for a compound annual growth rate of 4.3 per cent.

The good news for semiconductor buyers is despite growing demand for analog chips, the overall average selling price won't increase through 2021, although there could be selective price increases for some analog ICs.

"Fabs want to build products that generate the most return," said Brian Anderson, senior analyst, power management, technology, media, for market researcher IHS Markit. "Their ability to do that is bound by contractual agreements." Because demand for analog is strong, chipmakers are going to want to "maximise return so I expect there will be tougher negotiations this year than in the past" which could mean higher prices for some analog chips. At the very least, it will mean prices won't decline as they have in previous years.

Last year the average price for an analog IC was 34.6 cents and will rise to 35.1 cents in 2018 and remain steady until 2021 when the price will drop to 34.2 cents, according to Semico. However, in 2012 the average price was 43 cents and it then dropped to 38 cents in 2013 and fell each year steadily through 2017 when it was 34.6 cents.

One reason for the price decline is that in recent years more analog IC production has moved to 300mm production which has increased supply and reduced cost for some analog semiconductors. Analog chip manufacturers such as Texas Instruments, Infineon, STMicroelectronics and foundries including TSMC, UMC, Globalfoundries, TowerJazz and Powerchip have 300mm capabilities for analog, according to Semico. "In 2018, 45 per cent of the silicon processed for analog will be on 300mm wafers," said Jim Feldhan, Semico president.

TI, the world's largest analog IC manufacturer with $9.9 billion analog sales in 2017, has been steadily increasing production of analog ICs on 300mm wafers over the last six years. In 2017, About 40 per cent of its analog chips were produced at two 300mm fabs and the percentage will likely continue to rise over the next several years.

The cost of analog ICs produced on 300mm wafers is 40 per cent less than the cost of the same chip on 200mm wafers, according to TI. In addition, TI's gross margin on analog chips produced on 300mm wafers is about six percentage points more than ICs made on a 200mm wafer.

While more production is moving to 300mm production, many analog chips are still produced on 150/200mm wafers. Buyers could see some supply issues for those parts because demand for many analog ICs produced on 200mm

By the Numbers

Source: Semico Research

4.5%
The compound annual growth rate for analog ICs through 2021

$62.8 billion
The forecasted size of the analog semiconductor market in 2021

35.1 cents
The average selling price for an analog IC in 2018

6.2%
The percentage growth weight of analog chip unit shipments in 2018

45%
The percentage of analog ICs that will produced on 300 mm wafers in 2018

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wafers is running high across multiple segments including automotive, IoT, cell phones and industrial.

"The 200mm wafer market is at capacity," said Anderson. " New capacity is not coming out very quickly." Capacity expansion for 200mm production is a challenge because of tight supply of equipment needed to produce 200mm wafers, he said.

Driving growth

While supply is limited, demand continues to grow including from the automotive segment. "From a revenue standpoint, 29 per cent of all analog revenue is derived from the automotive market," said Feldhan. "It has been slowly increasing each year as more electronics are used in vehicles. You have more electrification in cars and it requires a substantial amount of analog," he said.

Even though the smart phone market is slowing, it is still helping drive analog chip demand. The low-end smart phone market is still growing at double- digit rates, about 16 per cent," said Feldhan. The high-end "flagship products" of cell phone manufacturers are growing about 2.4 per cent. Cell phones use application-specific and general-purpose analog ICs, including operational amplifiers, signal conditioning, interface circuits, A to D and D to A converters. linear regulators, switching regulators among others.

The continuing growth in the number of data centers used by Internet services providers (ISPs) and large companies is also having an impact on the analog IC market and may be contributing to tighter supply, according to Anderson. Data centers typically are equipped with hundreds or thousands of servers, mainframes and storage units.

"Right now, we are seeing some pretty good growth having to do with data centers. That's a huge growth area right now for the overall semiconductor market including analog ICs," said Anderson.

Recent semiconductor industry consolidation may also be playing a part in supply conditions for some analog ICs. In some cases, two chipmakers may produce a similar product. When those two companies merge, often one of the production lines of the chip that is made by both suppliers is shut down, decreasing supply of the part.

Anderson said there have been some fab closures as a result of mergers and acquisitions and some products have been discontinued. "But it's typically been older products" and newer versions of the discontinued products are available to OEMs, he said.

"From a supply standpoint I don't think consolidation has much impact," said Anderson.

He added consolidation made it a little easier for analog IC manufacturers to maintain pricing, but there are still a healthy number of suppliers and "more suppliers are coming on board in Asia."

More consolidation within the analog market is possible. "I think we will continue to see a bit more consolidation probably focusing on some of the smaller players," said Feldhan. Larger players may try to "solidify their offerings" by acquiring a smaller company that makes some analog chips that the larger acquiring company doesn't.

Analog ICs will prosper

Because of continuing strong growth for multiple customer segments, the analog IC market will thrive for years despite the trend toward more system on chip (SoC) products.

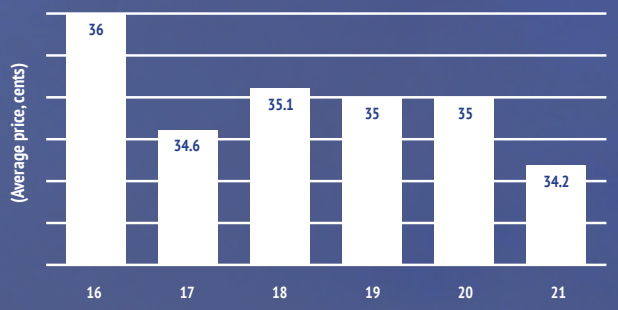
"Several years ago, the idea was to add more analog to SoCs and integrate everything into a massive chip," said Feldhan. "It seemed like a good idea when chips were made on 65nm process technology."

But now leading-edge chips use 10nm and 7nm technology and analog "does not scale well and it's getting more expensive to make SoCs," said Feldhan. As a result, the industry is looking at moving to advanced packaging and putting multiple chips such as an analog and memory IC in a stacked chip, and not including the functionality of the devices in an SoC, he said.

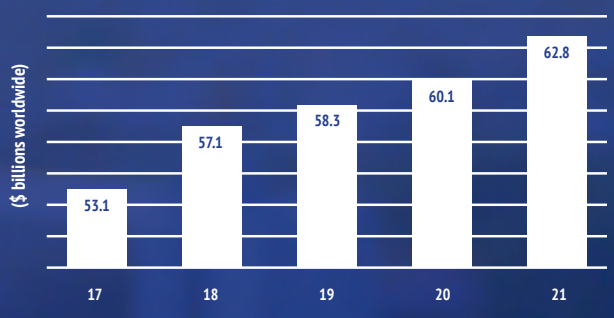
Analog chipmakers are also manufacturing analog ICs in smaller packages. For example, TI recently introduced what it says is the industry's smallest operational amplifier (op amp) and low-power comparators in a X2SON package, which measures just 0.8x 0.8mm. The amplifier is the first to use the tiny package and allows OEMs to reduce system size and cost. The devices will be used in a range of Internet of Things (IoT), personal electronics and industrial applications, including mobile phones, wearables, optical modules, motor drives, smart grid and battery-powered systems.

Analog prices will stabilise in 2018, but will decline again in 2019 and beyond
Source: Semico Research

Analog price erosion will resume



Analog chip market to rise steadily



The worldwide analog IC market will grow at a 4.5% annual rate through 2021 when analog revenue will reach $62.8 billion
Source: Semico Research

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Innovation without delay

Electronics Sourcing Europe asked Mouser's vice president of marketing, EMEA, Graham Maggs, about the complexities of supporting emerging technology trends in a market dominated by shrinking product lifecycles

How have purchasing trends shifted since you joined Mouser eight years ago?

A) There have been several interesting trends. New markets, which can all be described loosely as internet of things platforms, are not being driven by traditional electronics companies, so those involved need different levels of support. It's important to supply the whole ecosystem and Mouser has recognised that by stocking more devkits.

Having inventory available to sell is also vital. Other companies stock against the forecasts of their top customers, but Mouser is continually increasing the available stock we hold. Product lifecycles are reducing, so as one project moves from design to purchasing, another one is starting. This means that the stock we hold must be the latest technology and again, this is different to other distributors who can be slow to stock new technology parts because there is no order history.

When a new component is launched, who leads the marketing, Mouser or the principal manufacturer?

A) We work collaboratively with our franchised suppliers, discussing which new parts to stock and how to market them. Of course, large 'blue-chip' companies will have experience, but newer, smaller suppliers with a niche or even disruptive technology may need more guidance. That's why we employ a technical marketing team who can spot emerging markets and work with a range of suppliers to promote that application.

How is Mouser managing extending lead-times to ensure purchasers are not let down?

A) When you see lead-times extending beyond a year, it is time to admit that we are looking at an 'allocation' scenario, however, this is not how Mouser operates. Firstly, we hold a huge amount of stock: over 880,000 unique supplier part numbers. Secondly, that stock is freely available for anyone to purchase. Glenn Smith, our chief executive officer, was quick to foresee and react to the situation and we placed orders of more than double the normal quantity at the end of last year to ensure our customers are not disappointed.

When a new product is scheduled to launch, what happens to ensure stocks keep up with demand?

A) A lot of activity! Our supplier marketing teams work directly with the franchise to determine the stock profile and we do no promotion until we have stock on the shelves because we don't want customers to have the negative experience of waiting.

What impact do mergers and acquisitions have with overlapping product lines?

A) Some merger and acquisition activity has impacted product availability, however, Mouser represents almost all the first and second tier electronic component names, so we can offer alternatives and our website makes this easy. In the case of Analog Devices buying Linear Tech, for example, this was good for Mouser's customers, as we added Linear to our linecard.

What challenges do you envisage for the electronics supply chain in the future?

A) Predictions are always tricky, but it seems a safe bet that over the next 10 years we'll see at least one more cycle of shortages and lead-time extensions, possibly two. Experienced buyers should have tactics in place for those by now! Counterfeiting is always a problem, but if you buy from an authorised distributor, which only deals direct with component manufacturers, that issue goes away. Also, be aware that when electric and hybrid electric vehicles take off, that will suck up a huge number of components.

Finally, what advice would you give to readers sourcing components who are facing extended lead times?

A) Call Mouser!

www.mouser.com

> **New markets are not being driven by traditional electronics companies, so those involved need different levels of support**

Vice president marketing, EMEA, Mouser Electronics, Graham Maggs

> **Counterfeiting is always a problem, but if you buy from an authorised distributor, which only deals direct with component manufacturers, that issue goes away**

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TTI is extending its European headquarters in Maisach-Gernlinden

Facilitating the future

An emphasis on efficiency and flexibility ensure TTI's extended European headquarters are ready for future growth, thanks to investment in automation and Supply Chain 4.0 technology

TTI is readying its European headquarters in Maisach-Gernlinden for the future with new office buildings and an extension of its existing distribution centre. With the new facilities in place, TTI boasts more than 30,000m² of warehouse space, however, the challenge hasn't only been to extend the space available, but also to use it more effectively.

With a new storage concept in place and investment in innovative technology, TTI has been able to increase the volume of warehouse space used by a factor of three. To be fully prepared for the future, the new buildings have also been planned generously, so that initially, only 60 per cent of the available space will be used, with the remaining space available for use at a later stage.

Warehouse technology
Investment in the latest warehouse technology is budgeted at around 23 million Euros, a figure which includes the implementation of integrated Supply Chain 4.0 software. TTI already communicates with nearly all its suppliers via different electronic data interchange standards and more than 700 customers are also connected with TTI through sophisticated logistics solutions.

Now the supply chain will also be optimised for intralogistics, with an intelligent combination of efficient automation and highly flexible manual elements.

For example, the existing pallet racking will be extended in a format compatible with narrow forklift trucks and reaching to a height of 15 metres. In the first phase, this will offer 21,000 pallet bays, with a possible further extension to 32,000 bays.

In addition to conventional racking, the extension will also include an autostore-system with 110,000 containers, which can also be doubled in a further extension. In the first phase, the autostore-system will consist of 50 robots, powered by silent electric motors, which present goods automatically at the 24 picking stations.

Picking and packing
Order commissioning will continue to be paperless, just as it is today, and this will be supported at picking stations by a put-to-light system, designed to guarantee order accuracy.

From now on, the consolidation of orders during two-stage commissioning will be handled automatically. This will be managed via a shuttle system with a total of 8,000 container positions, which can be extended to 12,000 positions in the future. Compared to traditional solutions, the shuttle system is expected to offer high performance and optimal space usage with low service and maintenance costs.

Warehouse space now stands at more than 30,000m²

To further increase efficiency, and for optimal use of the transport vehicles in the shipping process, the system will employ automatic volume optimisation and parcel labelling. Not only will this help save shipping costs, it will also be more environmentally friendly.

Risk management
A final, but important, part of the project is an integrated risk management program consisting of failure modes and effects analysis and backup solutions to secure delivery capability at all times.

By planning the extension in two stages and combining different storage systems with a mix of manual operations and automisation, TTI expects to increase efficiency and flexibility when reacting to future market developments.

www.ttieurope.com

Second sourcing is the key to continuity

Ensuring second-source options early in the design process can help buyers to maintain continuity of supply throughout the extended lifetime of a military system, explains Debbie Rowland

If the recurrence of allocation on some passive components teaches us anything, it is that purchasing professionals need to be involved at the earliest stage of component selection. While buyers may not be able to influence the form, fit or function of a component, they certainly have an important role to play in how the part is documented. The way in which a part is entered on the drawings and the bill of materials can have a major impact on how easy it is to procure the part. In the long term, this could make the difference between continuity of supply and a line stop.

Single sourcing risks

When an engineer specifies a resistor or capacitor which is genuinely single-source they present additional challenges to their purchasing colleagues. If the lead-time slips, or there are quality issues, the buyer has no room for manoeuvre in sourcing an alternative device, and if a sole manufacturer makes a part obsolete, then there is no choice but to return to the drawing board for a re-design.

Single-source parts are also not subject to the same competitive pressures as multi-sourced devices. As component manufacturers constantly monitor the lead-time, price and minimum order quantity of competing devices, multi-sourced parts are subject to constant pressure to stabilise or improve both the price and availability.

Documentation differences

The recent approval of Exxelia wet tantalum capacitors to DSCC MIL 39006/22/25 is a good example of how availability can be affected by the way in which a part is documented.

Buyers may often find these wet tantalum capacitors specified under an Arcotronics part number. In this case, specifying the manufacturer's name would effectively make the device sole-source. It would also make it obsolete following the acquisition of Arcotronics in 2008.

A more flexible approach would be to specify the capacitor by its product description as an 82 microFarad, 125V, 20 per cent tolerance, wet tantalum capacitor, in a T4 (D) case to either CECC, DSCC MIL 39006/22 or MIL 39006/25. Although more complex than simply writing a manufacturer part number, this opens procurement to any manufacturer who produces the part to either the CECC or Mil specification now or in the future. So, a buyer faced with an obsolete Arcotronics part could now source these parts from Exxelia without having to go back to the engineering department to request a change to the BoM.

Distribution support

Of course, buyers cannot be expected to research multiple sources before an engineer documents the design and this is where distribution should help. Deep engagement with customers allows the distributor to be more than just an order-taker. It provides a partnership in which the distributor can highlight potential problems with a single-source device and recommend alternative devices. A proficient distributor can also suggest the most appropriate way to document the parts to ensure procurement flexibility for long-term continuity of supply.

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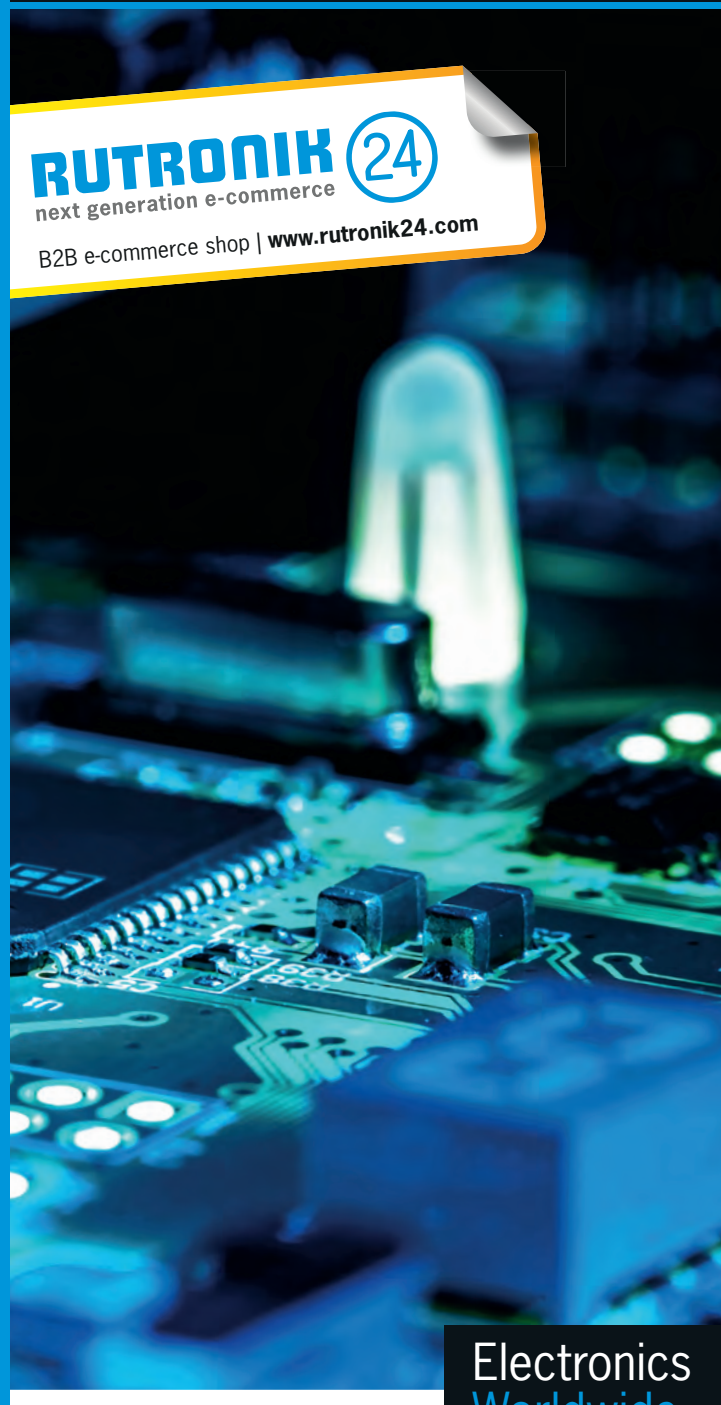

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Smart sourcing for industrial IoT

As the internet of things enters the industrial arena, connectivity requirements are increasingly compact and complex. Harting embraces this challenge with connectors that support both IoT and Integrated Industry

Han M23 Hybrid provides a compact interface for data, signal and power transmission

Miniaturisation

Thanks to the growth of IoT, complex industrial networks increasingly require compact connectivity solutions for both Ethernet and power. The Harting M8 provides a space-saving Ethernet solution, complete with sockets and overmoulded system cables. Despite being a third the size of a traditional M12 connector, the M8 still provides IP 65/67 protection and 100Mbits to Cat.5 fast Ethernet.

As devices shrink in size, however, it doesn't necessarily follow that their energy demands do likewise. The traditional 7/8in interface is now too large for many applications so Harting has developed the M12 Power in L-coding as the new standard connector for a 63V/16A DC power supply. Standardised to IEC 61076-2-111, the new M12 can provide sufficient power for smaller applications in a more compact, high-performance design.

Integration

Data, signal and power are the three lifelines of an

industrial system. Designed to provide a compact interface for all three capabilities in a single connector, the Han M23 Hybrid combines an efficient, robust design with a range of housings.

The durable ComLock system ensures insertion is both fast and safe, while the closed housings achieve protection class IP 67/69K. With a voltage range up to 630V AC and up to 28A of current carrying capacity, the Han M23 Hybrid is said to transmit significant power, even when installed in a tight assembly space.

In addition, the system protects against vibration as per IEC 61373, can tolerate at least 1,000 mating cycles and can be opened and closed with a short rotational movement. For added security, an optical marking on the housing helps identify whether the connection is open or closed.

Modularisation

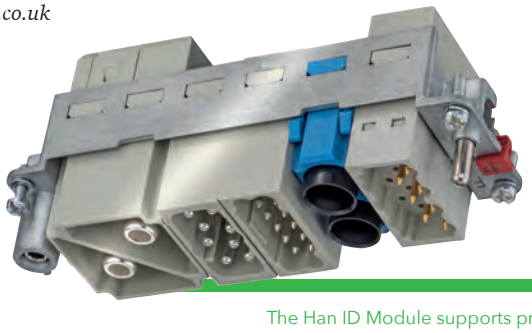
Finally, 'smart' connectors are increasingly being used in the field of predictive maintenance. To this end, the latest Han CAN ID Module can be integrated into power, data and signal interfaces. This allows the modules to determine if units are connected to the right slots, helping to avoid incorrect configuration.

Machine unit data such as last revision status can also be stored and used for predictive maintenance. This potentially delivers time savings, as drive data is available in the module, meaning revision status can be quickly queried, for example during servicing. Individual elements can then be identified and repaired quickly, without the need to start the entire machine.

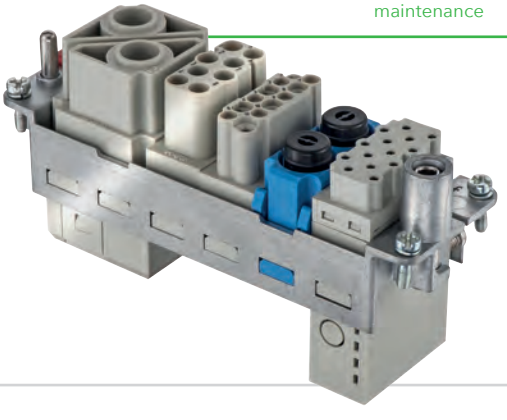
Furthermore, the CAN ID Module also enables the current drive configuration to be tested and the correct parameters to be transmitted to all other drives and the controller.

www.harting.co.uk

As devices shrink in size it doesn't necessarily follow that their energy demands do likewise



The Han ID Module supports predictive maintenance



Distributors' sales soar as component demand remains robust

Distributors say component supply could remain tight until 2019 and shortages could worsen as component manufacturers slowly add capacity

James Carbone

Some distributors say that shortages of passive components and discrete semiconductors that began last year should start to ease in the second half of this year, but others believe supply will remain tight until 2019.

Shortages that began last year because of strong demand from multiple customer segments continued into the first half of this year and will remain robust through 2018, according to distributors and component manufacturers.

Most distributors believe that supply constraints will ease, but there is a difference of opinion on when. Some expect tight supply of resistors, capacitors and discretes will loosen in the second half because component manufacturers are adding capacity. Others say enough capacity has yet to be added to significantly impact supply so component constraints will continue into 2019.

"Component shortages are going to get worse before they get better," said Michael Knight, president of TTI Semiconductor Group. "Demand is going to exceed capacity through next year," he said during a presentation to TTI suppliers at the annual Electronics Distribution Show. He noted there was double booking occurring and predicted that "customer line downs are going to escalate in the second half of the year." As a result of continuing strong demand, "2018 will be an amazing year," said Knight.

While economic growth is forecast to slow in 2019, underlying demand for components "is going to be just fine for some time," he said. "Regardless of what happens to the economy 2019, it will be a good year for us as well, and hold onto your seats, 2020 is going to take off."

Knight is not the only distribution executive who believes that demand will continue to be healthy if not stellar and supply will be tight for a while.

Underlying demand will continue to be strong even if new capacity is added and lead times for components shrink, according to Karim Yasmine, corporate vice president, strategic supplier development at Future Electronics, based in Montréal.

He said component demand was stellar in 2017 and continues to be strong this year. "We have been in an unbelievable environment for the last six quarters. Demand is coming from every market segment, every application space," he said. Growth is especially strong in automotive, industrial and Internet of Things applications, according to Yasmine.

"Component shortages are going to get worse before they get better and demand is going to exceed capacity through next year"

Michael Knight, president of TTI Semiconductor Group

With automotive, there is "phenomenal content growth" of electronic components because of proliferation of Advanced Driver Assistance Systems (ADAS) in vehicles and rising shipments of electronic vehicles and hybrids, which have more electronics than traditional vehicles.

IoT takes off

Another reason why supply will remain tight is IoT is starting to take off as more companies want to connect their products to the Internet, requiring them to be designed with sensing and wireless capabilities.

"IoT asset tracking, agricultural applications, wearables, smart factories, smart homes, smart appliances, require more sensing capability" to collect data and to analyse it, he said.

"IoT is a tremendous opportunity for the industry," said Yasmine.

While strong component demand is resulting in more business for larger broad line distributors such as Future, it is also helping drive business at small-volume catalog distributors that usually sell parts to engineers designing new products. However, because

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of allocations, many buyers have reached out to catalog distributors such as Mouser, Digi-Key, Newark and Allied.

"Our first quarter was up 46 per cent over Q1 last year," said Mark Burr-Lonnon, senior vice president global service EMEA, & APAC at Mouser Electronics. "It was 10-15 per cent over what we expected." Much of that growth was due to Mouser's core business of selling components to engineers designing products, but some of the sales growth was due to buyers looking for shortage components.

While Mouser and other distributors undoubtedly welcome the extra business caused by tight supply, if the current shortages continue it could result in declining sales of other components in the future.

"Up until now everyone has been euphoric about the market," said Burr-Lonnon. He said all the components that Mouser can get from manufacturers can easily be sold. However, supply constraints of multilayer ceramic capacitors (MLCCs), resistors and memory chips are severe.

At some point if an electronic systems manufacturer can't buy resistors, capacitors and memory, the company won't be able to manufacture its products, said Burr-Lonnon. If that happens there will be no need for them to buy other components.

Add capacity with caution

Component manufacturers are aware of this and report that they are adding capacity, although some distributors say they are being cautious about how quickly they bring capacity online.

"We are not seeing a lot of manufacturers adding a whole a lot of capacity," said Burr-Lonnon. "One manufacturer said their capacity was up 30 per cent this year and will go up another 16 per cent next year, but they're not suddenly laying in huge amounts of capacity." A lot of component manufacturers are adding capacity for parts and smaller packages such as 0201, he said. Shortages could continue for parts in larger packages.

Component manufacturers say they are being judicious about how much capacity they are adding. "We are adding capacity and so are our competitors and we are trying to do it in a responsible way," said Dave Valletta, executive vice president worldwide sales at Vishay Intertechnology, based in Malvern, Pa. "None of us want to get stuck with overcapacity. It doesn't do anyone any good."

He said MOSFETs "are a real problem but we have additional capacity coming and that should be on line in the second half." Resistor chips continue to be an issue, but supply is improving for them, said Valletta. "We are making meaningful increases in capacity."

The biggest supply issue is with multilayer ceramic capacitors. Valletta said Vishay is a "niche player" with MLCC and supplies some MLCCs to the auto industry. However, it is considering adding more MLCC capacity to serve automotive customers and other segments.

The amount of capacity being added varies by product. "In some cases, we're talking 10 per cent increases. With other products it's 30 per cent," said Valletta.

He noted that Vishay had a six-month backlog of orders. Increases in capacity will start to ease supply conditions in the second half of the year, according to Valletta. However, some component manufacturers say supply will remain tight longer.

Karim Yasmine, corporate vice president, strategic supplier development at Future Electronics, based in Montréal

"We have been in an unbelievable environment for the last six quarters. Demand is coming from every market segment, every application space"

Wait until 2019

"Constrained supply will not ease in 2018 and will probably remain constrained in the first half of 2019, according to Jeffrey Thomson, vice president global supply chain sales for ON Semiconductor in Phoenix. He said supply could remain constrained for components used in the "automotive and industrial space" even longer. "I'm not sure it's going to be truly back to what I would consider normal lead times of eight weeks over the next several years. There are a lot of new designs kicking in and a lot more content going into cars," he said.

ON is adding capacity, but at a lesser rate than demand, said Thomson. He said ON focuses on industrial, IoT and automotive and those markets "are incredibly strong. It is phenomenal how much they are growing."

ON's most constrained products are power products including intelligent power modules and MOSFETs, said Thomson.

Besides MOSFET, MLCCs and resistors, supply is also tight for connectors but supply conditions aren't as acute as with other components. "We do have allocations from time to time, but we're not seeing the type of allocations anywhere close to what's happening with semiconductors," said Brian Krauss, vice president marketing and communications for Molex, based in Lisle, Ill. "We are not seeing double ordering and cancellations," he said. Molex is adding capacity at its facilities in Mexico and China because it expects continued strong connector demand.

"In meeting with our distributors, no one is talking bloom and doom," said Krauss. "No one is talking about this thing coming to an end. Everyone is saying that business continues to grow," he said.

Krauss said the connector industry is growing about 4 per cent per year, although Molex's growth rate is "more than 2X the market."

Strong demand will continue. "We feel that the global economy is continuing to go up and to the right and we don't over the next year see any reason that we would take a step backwards," he said.

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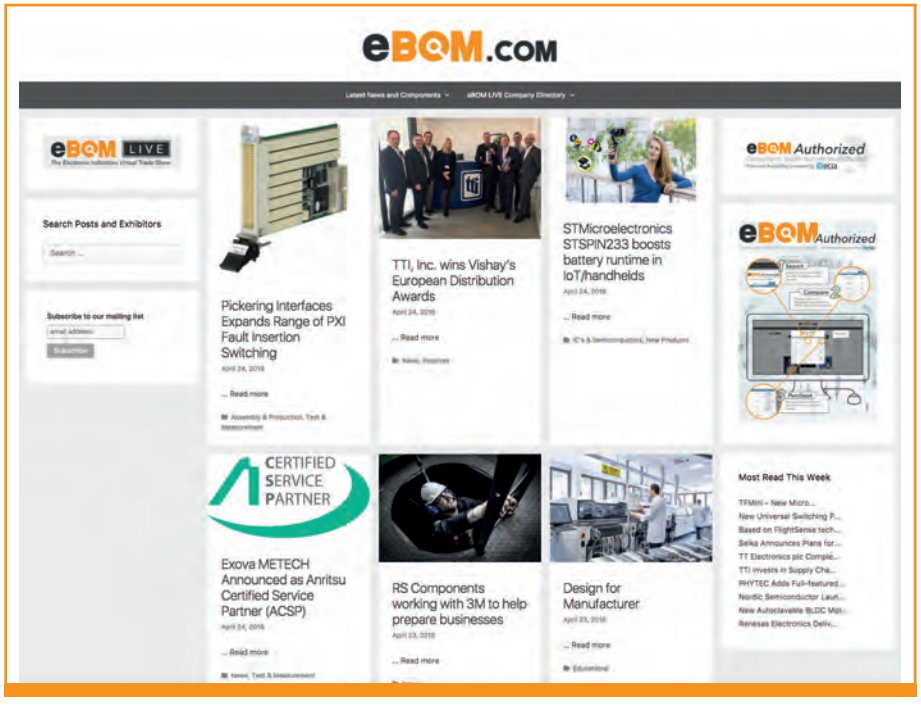

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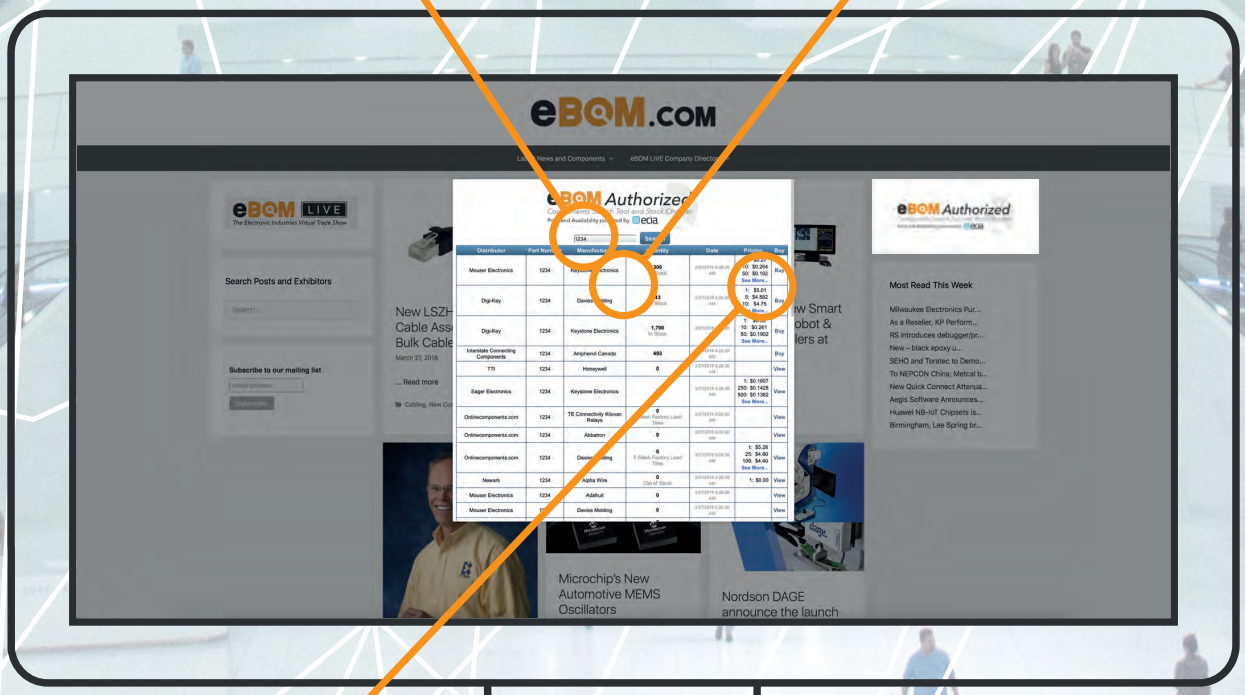

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LeCroy (Teledyne LeCroy)
LED Engin
LEDdynamics, Inc.
LEDiL
LEM USA, Inc.
LEMO
Lighting Science
Lime Microsystems
Linear Technology / Analog Devices
Link Labs
Linx Technologies
Lite-On, Inc.
Littelfuse
LMB Heeger, Inc.
LOCTITE / Henkel
Logic PD, Inc.
Logical Systems
LTW (Amphenol LTW)
LulzBot
Lumberg Automation
Lumex, Inc.
Lumileds
Luminary Micro / Texas Instruments
Luminus Devices
Luna Optoelectronics
Luxo
MACOM Technology Solutions
Macraigor Systems LLC
Macronix
Maestro Wireless Solutions
Mag-LED Solutions
Magnasphere Corp.
Makeblock
Mallory Sonalert Products
Marktech Optoelectronics
Marlow Industries, Inc.

Martel Electronics
Marutsuelec
Master Appliance Corp.
Matrix Orbital
MaxBotix Inc.
Maxim Integrated
MaxStream (Digi International)
Maxwell Technologies, Inc.
MCB Industrie / Vishay
McGraw-Hill Education
MEAN WELL
Measurement Specialties / TE Connectivity
MEC switches
Mechatronics
MegaChips
Melexis
Memory Protection Devices
MEMSIC
Menda/EasyBraid
Mentor Graphics
Metelics (MACOM Technology Solutions)
METZ CONNECT
MG Chemicals
Micrel / Microchip Technology
Micrium
Micro Commercial Components (MCC)
Microchip Technology
microEngineering Labs Inc.
Micro-Measurements (VPG Micro-Measurements)
Micron Technology
Micronas / TDK
Microsemi
Microwave Technology
Midcom / Wurth Electronics
Mide Technology
Midwest Microwave / Cinch Connectivity Solutions
MikroElektronika
Mill-Max
Mills / Vishay
Milwaukee / Vishay
MMB Networks
Molex
Molex Affinity Medical Technologies
Molex Beau Interconnect
Molex Brad Harrison
Molex FCT Electronics
Molex Flamar
Molex GWConnect
Molex Interconnect Systems
Molex NuCurrent
Molex Oplink Communications, LLC.
Molex Phillips-Medisize
Molex PolyMicro Technologies
Molex Temp-Flex
Molex Woodhead
Monnit
Monolithic Power Systems
MPD (Memory Protection Devices)
MPS (Monolithic Power Systems)
Mueller Electric Co.
Multicore / Henkel
Multi-Tech Systems, Inc.
Murata Electronics
Murata Power Solutions
Nakagawa Manufacturing USA, Inc.
National Semiconductor / Texas Instruments
Navman Wireless (Telit)
NDK
Nearson
Neohm Resistors / TE Connectivity
Neonode
Nesscap Co., Ltd
NetBurner, Inc.
Newava Technology
Newhaven Display, Intl.
Nexperia
Nichicon
Nidec Copal Electronics
NimbeLink
Nippon Chemi-Con
NJR Corporation / NJRC
NKK Switches
NMB Technologies Corp.
NorComp
Nordic Semiconductor
NOVACAP
NovaSensor / GE Measurement & Control
NuCurrent - a Molex company
Nuvoton Technology Corporation America
NVE Corporation
nVent Birtcher
nVent Calmark
nVent Hoffman
nVent Schroff
NXP Semiconductors / Freescale
O.C. White Co.
Octavo Systems
ODU
OEG Relays / TE Connectivity
Ohmite
OK Industries (Jonard Tools)
Olimex
Omron Automation & Safety
Omron Electronic Components
ON Semiconductor
On-Shore Technology, Inc.
Oplink, a Molex company
Optek Technology / TT Electronics
Option NV
Opto Diode Corporation
Opulent Americas
O'Reilly Media, Inc.
Orion Fans
OSRAM Opto Semiconductors, Inc.
Packet Digital LLC
Paladin Tools (Greenlee Communications)
Panasonic
PanaVise
Panduit
Parallax, Inc.
Parlex Corp.
Particle
Patco Electronics
Patco Services
PCD / Amphenol
Peerless by Tymphany
Peregrine Semiconductor (pSemi)
Pericom Semiconductor Corp. (Diodes Incorporated)
Pervasive Displays
PHIHONG USA
Phillips-Medisize - a Molex company
Phoenix Contact
Phoenix Mecano
Phoenix Passive Components / Vishay
Phyton, Inc.
Pi Supply
Pimoroni
PolyMicro Technologies - a Molex company
Polytech / Vishay
Pomona Electronics
Pontiac Coil, Inc.
Portescap
Potter & Brumfield Relays / TE Connectivity
Power Integrations
Powerex, Inc.
Power-One (Bel Power Solutions)
PowerStor (Eaton)
PRD Plastics
Preci-Dip
Precision Design Associates, Inc.
Precision Electronic Components Ltd.
Precision Technology, Inc.
ProAnt
Products Unlimited Transformers & Relays / TE Connectivity
Protektive Pak
pSemi
PUI Audio, Inc.
PULS
Pulse Electronics Corporation
PulseCore Semiconductor / ON Semiconductor
PulseLarsen Antennas
Pycom
Q-Cee's / TE Connectivity
Qoitech
QT Brightek
Quadcept
Qualcomm
Qualcomm (RF360 - A Qualcomm & TDK Joint Venture)
Qualtek Electronics Corp.
Quatech / B+B SmartWorx
Rabbit Semiconductor (Digi International)
Radial Magnet, Inc.
Radiocrafts
RAF
RAFI
Ramtron (Cypress Semiconductor)
Raspberry Pi
Raychem Cable Protection / TE Connectivity
RayVio
RECOM Power
Red Lion Controls
REDEL / LEMO
Renesas Electronics America
RF Digital
RF Solutions
RF360 - A Qualcomm-TDK joint venture
Richco, Inc. (Essentra Components)
Richtek
Riedon
Rigado
Roederstein / Vishay
ROHM Semiconductor
Rose Bopla
Rose Enclosures
Rose+Krieger
Rosenberger
Roving Networks / Microchip Technology
RPM Systems
Rubycon
RushUp
Sagrad
Samsung ARTIK
Samsung Electro-Mechanics
Samsung Semiconductor
Samtec, Inc.
Sanken Electric Co., Ltd.
Sanyo Denki
Sanyo Semiconductor / ON Semiconductor
Schaffner EMC, Inc.
Schrack Relays / TE Connectivity
Schroff / nVent
Schurter
SCS
Seeed
Segger Microcontroller Systems
Seiko Instruments, Inc.
Semflex / Cinch Connectivity Solutions
Semtech
Sensata Sensors Thermal Sensors and Switches
Sensata Technologies
Sensata Technologies – Airpax
Sensata Technologies – BEI Sensors
Sensata Technologies – Crydom
Sensata Technologies – Kavlico Pressure Sensors
Sensirion
Sensitron Semiconductor / SMC Diode Solutions
Seoul Semiconductor
Serious Integrated
Serpac Electronic Enclosures
SGX Sensortech
Sharp Microelectronics
Sierra Wireless
Sigfox
Sigma Designs
Sigma Inductors / TE Connectivity
Signal Transformer
Silego Technology
Silicon Labs
SINE Systems / Amphenol
Siretta
SiTime
SkyeTek
Skyworks Solutions, Inc.
SL Power Electronics - Manufacturer of Condor / Ault Brands
SMC Diode Solutions
Soberton, Inc.
SOC Technologies (System-On-Chip Technologies)
Socle Technology Corporation
SolidRun
Souriau Connection Technology
Spansion (Cypress Semiconductor)
SparkFun
Spec Sensors
Spectra Symbol
Spectra-Strip (Amphenol Spectra-Strip)
Sprague Goodman
SSI Technologies, Inc.
SST Sensing
Stackpole Electronics, Inc.
Staco Energy Products Co.
Standex-Meder Electronics
Stanley Electric
Steinel
steute Wireless
Stewart Connector
STMicroelectronics
Storm Interface
Sullins Connector Solutions
Sumida Corporation
SunLED
Sunon
Susumu
SV Microwave (Amphenol SV Microwave)
Swanstrom Tools
Swissbit
Switchcraft / Conxall
Syfer
Synapse Wireless
System-On-Chip Technologies
Tag-Connect
Taica Corporation
Taitien
Taiwan Semiconductor
Taiyo Yuden
Talema
Tallysman Wireless
Talon Communications, Inc.
Tamura
Taoglas
TAOS / ams
TDK Corporation
TDK InvenSense
TDK Micronas
TDK RF360
TDK Tronics (Tronics)
TDK-Lambda Americas, Inc.
TE Connectivity
TE Connectivity Aerospace Defense and Marine
TE Connectivity ALCOSWITCH Switches
TE Connectivity AMP Connectors
TE Connectivity Corcom Filters
TE Connectivity DEUTSCH Connectors
TE Connectivity DEUTSCH INDUSTRIAL & COMMERCIAL TRANSPORTATION
TE Connectivity Measurement Specialties
TE Connectivity Potter & Brumfield Relays
TE Connectivity Raychem Cable Protection
TE Connectivity Raychem Circuit Protection / Littelfuse
TE Connectivity's Agastat Relays
TE Connectivity's Axicom Relays
TE Connectivity's Buchanan Terminal Blocks
TE Connectivity's CGS Resistors
TE Connectivity's CII
TE Connectivity's Elcon Connectors
TE Connectivity's Holsworthy Resistors
TE Connectivity's Kilovac Relays
TE Connectivity's Neohm Resistors
TE Connectivity's OEG Relays
TE Connectivity's Products Unlimited Transformers & Relays
TE Connectivity's Q-Cee's
TE Connectivity's Schrack Relays
TE Connectivity's Sigma Inductors
Teccor / Littelfuse
Techflex
TechNexion
Techno / Vishay
Techspray
TechTools
Telcodium
Teledyne LeCroy
Telit
Temp-Flex - a Molex company
Tensility International Corporation
Terasic Technologies
Test Products International (TPI)
TEWA Sensors LLC
Texas Instruments
t-Global Technology
Thales Visionix, Inc.
Thermometrics / GE Measurement & Control
ThingMagic
Thinxtra Solutions Limited
Thomas Research Products
TinyCircuits
TOKO / Murata
Torex Semiconductor Ltd.
Toshiba Memory America, Inc.
Toshiba Semiconductor and Storage
Touchstone Semiconductor
TPI (Test Products International)
TPK America LLC
Transphorm
Trenz Electronic
Triad Magnetics
TRINAMIC Motion Control GmbH
Tripp Lite
Trompeter / Cinch Connectivity Solutions
Tronics
TRP Connector
TSC (Taiwan Semiconductor)
TT Electronics
TT Electronics / BI Technologies
TT Electronics / IRC
TT Electronics / Optek Technology
TT Electronics / Welwyn
Tuchel / Amphenol
Twin Industries
TXC Corporation
Tyco Electronics
Tymphany (Peerless by Tymphany)
U.S. Sensor/Littelfuse
UDOO
Ultra Librarian®
Ungar / Weller
United Chemi-Con
US-Lasers, Inc.
Varitronix International Ltd.
VCC (Visual Communications Company)
VEAM
Vector Electronics & Technology, Inc.
Verivolt
VersaLogic Corporation
VersaSense
Vicor
Vicotee
Vifa (Peerless by Tymphany)
Viking Technology
Virtium Technology Inc.
Vishay
Vishay / BCcomponents
Vishay / Beyschlag
Vishay / Cera-Mite
Vishay / Dale
Vishay / Huntington Electric, Inc.
Vishay / Semiconductor - Diodes Division
Vishay / Semiconductor - Opto Division
Vishay / Sfernice
Vishay / Siliconix
Vishay / Spectrol
Vishay / Sprague
Vishay / Thin Film
Vishay / Vitramon
Visual Communications Company, LLC
Vitelec / Cinch Connectivity Solutions
Volgen (Kaga Electronics USA)
Voltronics (Knowles)
VPG Foil
VPG Micro-Measurements
VPG Sensors
Wakefield-Vette
Walsin Technology
Wandboard
WeEn Semiconductors Co., Ltd
Weidmuller
Weller
Welwyn / TT Electronics
Wickmann / Littelfuse
Wiha
Winbond Electronics Corporation
Winchester Electronics
Wintec Industries
Wiss
WIZnet
Wolfspeed - a Cree company
Woodhead - a Molex company
Wurth Electronics
Wurth Electronics iBE
Wurth Electronics Midcom
Xcelite
Xeltek
Xilinx
XMOS
XP Power
Xsens
Yageo
Zentri (Silicon Labs)
Zetex Semiconductors (Diodes Incorporated)
ZF Electronics
Zilog

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Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Location	Franchised Distributor	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	Buffer Stock Facility
CABLE ASSEMBLY												
FTDI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €		50	1,500+	Y
Molex	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	97%	50	1,500+	Y
CIRCUIT PROTECTION												
Bourns	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,000	N/A	0 €	58%	50	1,500+	Y
EPCOS/TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,000	N/A	0 €	58%	50	1,500+	Y
Littelfuse	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	35,000	N/A	0 €	67%	50	1,500+	Y
ELECTROMECHANICAL												
ALPHA WIRE	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	26,919	N/A	0 €	97.04%	150	3500+	Y
CINCH CONNECTIVITY/Bel	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	31,120	N/A	0 €	78.21%	150	3500+	Y
CUI INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	17,410	N/A	0 €	92.21%	150	3500+	Y
DELTA PRODUCT GROUPS	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	3,215	N/A	0 €	99.95%	150	3500+	Y
KEYSTONE ELECTRONICS	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	6,315	N/A	0 €	95.17%	150	3500+	Y
Laird	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	15,187	N/A	0 €	97.20%	150	3500+	Y
Murata	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	66,179	N/A	0 €	99.79%	150	3500+	Y
OMRON ELECTRONICS INC-EMC DIV	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	74,369	N/A	0 €	95.47%	150	3500+	Y
Panasonic	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	154,777	N/A	0 €	94.42%	150	3500+	Y
TDK	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	60,769	N/A	0 €	99.20%	150	3500+	Y
TE	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	338,106	N/A	0 €	79.40%	150	3500+	Y
ENCLOSURES												
Bud	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,500	N/A	0 €	80%	50	1,500+	Y
Hammond	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	12,500	N/A	0 €	100%	50	1,500+	Y
Metcase Enclosures	OKW Enclosures	+44 (0) 1489 583858	www.metcase.com	EU	N/A	288	£40K	0 €	100%	5	22	Y
FREQUENCY												
ABRACON	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,000	N/A	0 €	91%	50	1,500+	Y
ECS	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	500	N/A	0 €	99%	50	1,500+	Y
Epson	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	500	N/A	0 €	59%	50	1,500+	Y
HEAT SINKS												
Aavid	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	67%	50	1,500+	Y
ICs & SEMICONDUCTORS												
ALLEGRO MICROSYSTEMS, LLC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	3,090	N/A	0 €	87.22%	150	3500+	Y
Altera	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,600	N/A	0 €	60%	50	1,500+	Y
ALTERA	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	10,901	N/A	0 €	84.86%	150	3500+	Y
ANALOG DEVICES INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	52,308	N/A	0 €	73.79%	150	3500+	Y
Analog Devices Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	9,500	N/A	0 €	83%	50	1,500+	Y
Atmel	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,700	N/A	0 €	58%	50	1,500+	Y
Avago Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	400	N/A	0 €	84%	50	1,500+	Y
AVAGO TECHNOLOGIES US INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	16,512	N/A	0 €	91.38%	150	3500+	Y
Broadcom	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	69%	50	1,500+	Y
Central Semiconductor Corp.	Future Electronics	0049 40 547 277 000	www.futureelectronics.com	EU, UK	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y
Cirrus Logic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	80%	50	1,500+	Y
Cypress Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,400	N/A	0 €	63%	50	1,500+	Y
CYPRESS SEMICONDUCTOR CORP	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	27,423	N/A	0 €	92.54%	150	3500+	Y
DIGI INTERNATIONAL	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	4,355	N/A	0 €	95.30%	150	3500+	Y
Diodes Incorporated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,600	N/A	0 €	98%	50	1,500+	Y
DIODES INCORPORATED	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	38,292	N/A	0 €	90.02%	150	3500+	Y
Exar	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,100	N/A	0 €	95%	50	1,500+	Y

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Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Location	Franchised Distributor	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	Buffer Stock Facility
Fairchild Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,500	N/A	0 €	90%	50	1,500+	Y
Freescale Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,500	N/A	0 €	42%	50	1,500+	Y
FTDI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	97%	50	1,500+	Y
FTDI	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	569	N/A	0 €	100.00%	150	3500+	Y
IDT (Integrated Device Technology)	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,100	N/A	0 €	97%	50	1,500+	Y
Infineon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	800	N/A	0 €	66%	50	1,500+	Y
INFINEON TECHNOLOGIES	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	28,850	N/A	0 €	93.70%	150	3500+	Y
Intel	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	500	N/A	0 €	78%	50	1,500+	Y
International Rectifier	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	600	N/A	0 €	87%	50	1,500+	Y
Intersil	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,900	N/A	0 €	50%	50	1,500+	Y
ISSI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	98%	50	1,500+	Y
Laird	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	15,187	N/A	0 €	97.20%	150	3500+	Y
Lattice	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	69%	50	1,500+	Y
LINEAR TECHNOLOGY	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	37,479	N/A	0 €	77.62%	150	3500+	Y
Maxim Integrated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	11,200	N/A	0 €	67%	50	1,500+	Y
MAXIM INTEGRATED	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	68,021	N/A	0 €	78.22%	150	3500+	Y
Microchip	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	12,600	N/A	0 €	91%	50	1,500+	Y
MICROCHIP TECHNOLOGY	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	86,517	N/A	0 €	86.12%	150	3500+	Y
Microsemi	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	400	N/A	0 €	90%	50	1,500+	Y
Monolithic Power Systems (MPS)	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	600	N/A	0 €	40%	50	1,500+	Y
NEXPERIA USA INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	23,513	N/A	0 €	99.29%	150	3500+	Y
NXP	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,900	N/A	0 €	91%	50	1,500+	Y
NXP USA INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	36,258	N/A	0 €	93.55%	150	3500+	Y
ON Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,100	N/A	0 €	87%	50	1,500+	Y
ON SEMICONDUCTOR	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	87,298	N/A	0 €	85.61%	150	3500+	Y
Power Integrations	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	600	N/A	0 €	59%	50	1,500+	Y
Qorvo	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	90%	50	1,500+	Y
Rohm	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	55,139	N/A	0 €	99.85%	150	3500+	Y
ROHM Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,400	N/A	0 €	55%	50	1,500+	Y
Samsung	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	37,336	N/A	0 €	100.00%	150	3500+	Y
Silicon Laboratories	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,500	N/A	0 €	96%	50	1,500+	Y
SILICON LABORATORIES INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	19,667	N/A	0 €	96.54%	150	3500+	Y
Skyworks	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	91%	50	1,500+	Y
Spansion Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	600	N/A	0 €	93%	50	1,500+	Y
STMicroelectronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,500	N/A	0 €	99%	50	1,500+	Y
STMICROELECTRONICS	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	39,201	N/A	0 €	97.79%	150	3500+	Y
TDK	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	60,769	N/A	0 €	99.20%	150	3500+	Y
Texas Instruments	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	36,900	N/A	0 €	41%	50	1,500+	Y
TEXAS INSTRUMENTS	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	180,012	N/A	0 €	91.94%	150	3500+	Y
Toshiba	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	500	N/A	0 €	100%	50	1,500+	Y
Vishay	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	581,798	N/A	0 €	87.71%	150	3500+	Y
XILINX INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	8,213	N/A	0 €	51.46%	150	3500+	Y
INTERCONNECTION												
3M	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,100	N/A	0 €	16%	50	1,500+	Y
3M	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	62,421	N/A	0 €	93.42%	150	3500+	Y
Amphenol	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	25,600	N/A	0 €	53%	50	1,500+	Y
Amphenol	PEI Genesis	+44 8716060	www.peigenesis.com	EU	Y	N/A	£1.3m	10 €	N/A	N/A	85	Y
AMPHENOL RF DIVISION	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	443,368	N/A	0 €	75.92%	150	3500+	Y
Anderson Power Products	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	800	N/A	0 €	50%	50	1,500+	Y
Cinch Connectivity Solutions	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,900	N/A	0 €	82%	50	1,500+	Y
CINCH CONNECTIVITY/Bel	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	31,120	N/A	0 €	78.21%	150	3500+	Y
Delphi Connection Systems	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,300	N/A	0 €	67%	50	1,500+	Y

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FCI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,300	N/A	0 €	94%	50	1,500+	Y
Glenair	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,900	N/A	0 €	76%	50	1,500+	Y
HARTING	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,700	N/A	0 €	31%	50	1,500+	Y
Harwin	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	79%	50	1,500+	Y
Hirose Electric	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	6,100	N/A	0 €	99%	50	1,500+	Y
HIROSE ELECTRIC CO LTD	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	37,215	N/A	0 €	90.98%	150	3500+	Y
Hirose Electric Europe B.V		0031-(0)2 655 7460	www.hirose.com/eu	EU	Y	50,000	N/A	0 €	N/A	N/A	4,190	Y
ITT Cannon	PEI Genesis	+44 8716060	www.peigenesis.com	EU	Y	N/A	£1.3m	10 €	N/A	N/A	85	Y
JAE Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,200	N/A	0 €	32%	50	1,500+	Y
JST SALES AMERICA INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	5,109	N/A	0 €	84.32%	150	3500+	Y
Kycon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	99%	50	1,500+	Y
LEMO	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,900	N/A	0 €	65%	50	1,500+	Y
Molex	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	16,900	N/A	0 €	75%	50	1,500+	Y
MOLEX, LLC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	120,034	N/A	0 €	97.98%	150	3500+	Y
Neutrik	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,000	N/A	0 €	86%	50	1,500+	
ODU		+49 8631 6156-0	www.odu.de	EU, USA, ASIA			N/A	0 €	N/A	50	1,650	
Phoenix Contact	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	12,000	N/A	0 €	99%	50	1,500+	Y
PHOENIX CONTACT	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	54,845	N/A	0 €	99.99%	150	3500+	Y
SAMTEC INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	427,448	N/A	0 €	99.99%	150	3500+	Y
Switchcraft	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	69%	50	1,500+	Y
TE	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	338,106	N/A	0 €	79.40%	150	3500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	30,900	N/A	0 €	40%	50	1,500+	Y
OBSOLESCENCE / HARD TO FIND												
	America II Electronics	01462 707070	www.americaii.com	EU, G, UK	N	1,900	$1B	0 €	75%	59	550+	Y
OPTO ELECTRONICS												
Avago Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	8,200	N/A	0 €	89%	50	1,500+	Y
Cree, Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	22,500	N/A	0 €	74%	50	1,500+	Y
Dialight	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	9,800	N/A	0 €	99%	50	1,500+	Y
Kingbright	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,100	N/A	0 €	100%	50	1,500+	Y
Lumileds	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,100	N/A	0 €	99%	50	1,500+	Y
Newhaven Display	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	65%	50	1,500+	Y
Osram Opto Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,800	N/A	0 €	99%	50	1,500+	Y
VCC	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,000	N/A	0 €	92%	50	1,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,100	N/A	0 €	99%	50	1,500+	Y
PASSIVES												
ABRACON LLC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	41,991	N/A	0 €	100.00%	150	3500+	Y
AVX	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	70,700	N/A	0 €	58.00%	50	1,500+	Y
AVX CORPORATION	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	70,131	N/A	0 €	89.28%	150	3500+	Y
Bourns	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	49,500	N/A	0 €	98%	50	1,500+	Y
BOURNS INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	59,314	N/A	0 €	82.47%	150	3500+	Y
CINCH CONNECTIVITY/Bel	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	31,120	N/A	0 €	78.21%	150	3500+	Y
Coilcraft	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	10,400	N/A	0 €	98%	50	1,500+	Y
Cornell Dubilier	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	33,000	N/A	0 €	65.00%	50	1,500+	Y
EPCOS / TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	31,000	N/A	0 €	74%	50	1,500+	Y
Fair-Rite	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,000	N/A	0 €	94%	50	1,500+	Y
HONEYWELL MICROELECTRONICS & PRECISION SENSORS	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	28,560	N/A	0 €	89.87%	150	3500+	Y
Kemet	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	135,800	N/A	0 €	93%	50	1,500+	Y
Kemet	RS Components	08457 201201	www.rs-components.com	EU	Y	N/A	£161m	0 €	N/A	50+	2,500	Y
KEMET	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	101,257	N/A	0 €	91.57%	150	3500+	Y
KOA Speer	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	107,900	N/A	0 €	82%	50	1,500+	Y

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Laird	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	15,187	N/A	0 €	97.20%	150	3500+	Y
Laird Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,800	N/A	0 €	50%	50	1,500+	Y
LITTELFUSE INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	59,517	N/A	0 €	91.54%	150	3500+	Y
Murata	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	66,179	N/A	0 €	99.79%	150	3500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	67,300	N/A	0 €	99%	50	1,500+	Y
Nichicon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	21,600	N/A	0 €	47%	50	1,500+	Y
NICHICON	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	39,747	N/A	0 €	96.70%	150	3500+	Y
Ohmite	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	17,300	N/A	0 €	99%	50	1,500+	Y
Panasonic	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	154,777	N/A	0 €	94.42%	150	3500+	Y
Panasonic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	67,900	N/A	0 €	69%	50	1,500+	Y
Rohm	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	55,139	N/A	0 €	99.85%	150	3500+	Y
Samsung	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	37,336	N/A	0 €	100.00%	150	3500+	Y
Taiyo Yuden	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	6,400	N/A	0 €	82%	50	1,500+	Y
TAIYO YUDEN	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	21,540	N/A	0 €	99.97%	150	3500+	Y
TDK	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	60,769	N/A	0 €	99.20%	150	3500+	Y
TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	25,300	N/A	0 €	85%	50	1,500+	Y
TE	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	338,106	N/A	0 €	79.40%	150	3500+	Y
TT Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	32,800	N/A	0 €	55%	50	1,500+	Y
United Chemi-Con (UCC)	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	13,900	N/A	0 €	99.00%	50	1,500+	Y
Vishay	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	581,798	N/A	0 €	87.71%	150	3500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	119,800	N/A	0 €	76%	50	1,500+	Y
Wurth Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,500	N/A	0 €	63%	50	1,500+	Y
WURTH ELECTRONICS INC	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	23,733	N/A	0 €	100.00%	150	3500+	Y
Würth Elektronik	Würth Elektronik	+49 (0) 7942 945 0	www.we-online.com	EU	Y	N/A	N/A	0 €	100%	250	4,000	Y
Yageo	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	45,300	N/A	0 €	99.00%	50	1,500+	Y
YAGEO	Digi-Key Electronics	+31 (0)53 484 9584	www.digikey.com/europe	EU	Y	147,833	N/A	0 €	84.31%	150	3500+	Y
POWER & BATTERIES												
Bel Power Solutions	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,400	N/A	0 €	94%	50	1,500+	Y
Cincon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,500	N/A	0 €	60%	50	1,500+	Y
Cosel	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	11,800	N/A	0 €	99%	50	1,500+	Y
CUI Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,900	N/A	0 €	100%	50	1,500+	Y
Mean Well	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,500	N/A	0 €	75%	50	1,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,200	N/A	0 €	93%	50	1,500+	Y
RECOM	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	23,300	N/A	0 €	92%	50	1,500+	Y
Sanyo Electronic Industries Co., Ltd.	Sanyo Electronic Industries Co., Ltd.	+81 36699 8080	www.eta.co.jp	JP	N	1,000	€3000k	20 €	90%	10	100	Y
Schaffner	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	900	N/A	0 €	98%	50	1,500+	Y
SL Power	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,100	N/A	0 €	87%	50	1,500+	Y
TDK-Lambda	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,600	N/A	0 €	99%	50	1,500+	Y
TRACO Power	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,400	N/A	0 €	95%	50	1,500+	Y
SENSORS												
All Sensors	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,300	N/A	0 €	70%	50	1,500+	Y
ams	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	400	N/A	0 €	77%	50	1,500+	Y
Analog Devices Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	500	N/A	0 €	78%	50	1,500+	Y
Bosch	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	94%	50	1,500+	Y
Freescale Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,000	N/A	0 €	66%	50	1,500+	Y
Honeywell	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	15,500	N/A	0 €	80%	50	1,500+	Y
Maxim Integrated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	900	N/A	0 €		50	1,500+	Y
Melexis	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €		50	1,500+	Y
Omron	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,700	N/A	0 €		50	1,500+	Y
Sensirion	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €		50	1,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,100	N/A	0 €		50	1,500+	Y

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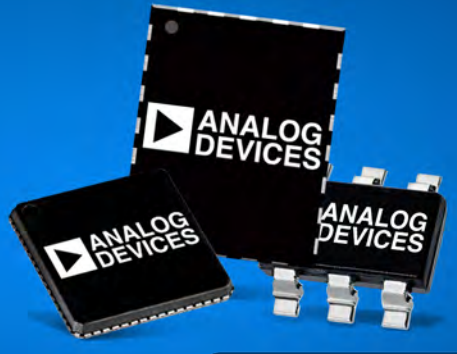

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SWITCHES & KEYBOARDS												
ALPS	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	400	N/A	0 €	70%	50	1,500+	Y
Apem	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	96%	50	1,500+	Y
C&K Components	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,500	N/A	0 €	84%	50	1,500+	Y
Carling Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	87%	50	1,500+	Y
CHERRY	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	200	N/A	0 €	77%	50	1,500+	Y
CHERRY	RS Components	08457 201201	www.rs-components.com	EU	Y	600	N/A	0 €	N/A	50+	3,500+	Y
E-Switch	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	94%	50	1,500+	Y
Grayhill	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	400	N/A	0 €	84%	50	1,500+	Y
Honeywell	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	98%	50	1,500+	Y
NKK Switches	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,100	N/A	0 €	94%	50	1,500+	Y
Omron	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	900	N/A	0 €	68%	50	1,500+	Y
Rubbertech 2000	Rubbertech 2000	+44 1594 826019	www.rubbertech2000.co.uk	EU	N/A	N/A	£40k	100 €	N/A	N/A	25	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	400	N/A	0 €	98%	50	1,500+	Y
THERMAL MANAGEMENT												
ADDA	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	800	N/A	0 €	59%	50	1,500+	Y
Delta Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	500	N/A	0 €	28%	50	1,500+	Y
ebm-papst	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	99%	50	1,500+	Y
Sanyo Denki	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,900	N/A	0 €		50	1,500+	Y
WIRELESS												
Anaren	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	86%	50	1,500+	Y
B&B Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	87%	50	1,500+	Y
Bluegiga Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	93%	50	1,500+	Y
Digi International	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	200	N/A	0 €	92%	50	1,500+	Y
Laird Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	76%	50	1,500+	Y
Linx Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	99%	50	1,500+	Y
Microchip	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	85%	50	1,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	100%	50	1,500+	Y
Panasonic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	91%	50	1,500+	Y
Redpine Signals	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	94%	50	1,500+	Y
RF Digital	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	100%	50	1,500+	Y
Texas Instruments	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	75%	50	1,500+	Y
Wi2Wi	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	36%	50	1,500+	Y

PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (i.e Broker, Manufacture &/or Repair)	Location	Approvals	Volume - Small, Medium, Large	Double-sided	Multi-layer 4-10/10-20-30	Metal PCBs	Flexi / Flexi-Rigid	Obsolescence Solutions	Modifications	Prototyping
Elvia PCB Group	+33 233 763 200	www.gepcb.com	M/B	France, Tunisia, China	AS9100, PRI-NADCAP, ISO-TS16949, ESA, UL, ISO9001, ISO14001	S/M/L	Y	1-30	Y	F, F/R	Y	Y	Y
Graphic Plc	00441363 774874	www.graphic.plc.uk	M	UK/China	AS9100,NADCAP,ISO 9001,AISO14001,OHSAS 18001, Mil 31032, Mil 55110, Mil 50884	S/M/L	N	4-10	Y	Y	N	Y	Y

Contract Manufacturers Buyers' Guide

Manufacturer	Telephone	Website	Turnover	Location	Approvals	Employees	Number of Surface Mount Lines	BGA Capacity	Lead Free Manufacturer	Prototyping	Design Capability	Full Turnkey	Cables and Harnessing
AWS Electronics Group	+44 (0)1782 753200	wwwawselectronicsgroup.com	£40m	UK & Slovakia	AS9100,ISO9001,13485,14001,TS16949,IPC-A-610 Class 3,NADCAP	430	11	Y	Y	Y	Y	Y	Y

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PEI-Genesis 14
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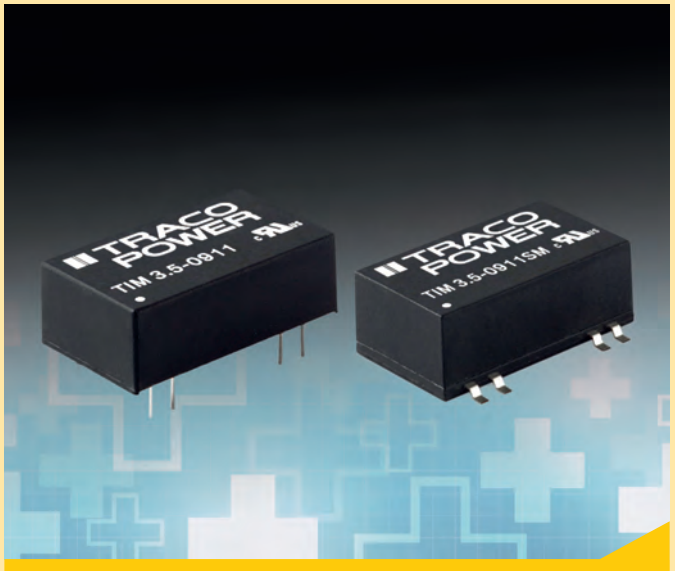


Compact converters meet medical needs

Traco Power has released its TIM 3.5 and TIM 3.5SM medical 3.5W DC/DC converters in a DIP 16 or SMD 16 package measuring 0.95 by 0.57 by 0.40in. The converters are ideal for healthcare products where small size and patient-applied parts are required.

The two families each consist of 28 models offering inputs of 4.5 to 12, 9 to 18, 18 to 36 or 36 to 75V in and outputs of 3.3, 5, 9, 12, 15, 24, ±12 or ±15V out. The converters provide reinforced insulation with isolation of 5,000V AC rms and leakage of less than 2µA.

All models are certified to IEC/EN/ES 60601-1 third edition for two times MOPP compliance and are suitable for body and body floating rated equipment.

www.tracopower.com

Rail connectors offer commanding benefits

TE Connectivity's MU27P connectors are designed to ensure reliable control and communication connections between railway locomotives and vehicles. The 27-point plugs and receptacles allow a single point in the train to issue up to 27 commands to all, or some, of the vehicles simultaneously.

The new connectors convey signals such as door controls and indications, public address, brake applied or released indications, as well as audio and other passenger rail functions. They are designed to accept three 10 AWG leads, with all the other leads being 12 or 14 AWG. This ensures the connectors are interchangeable with other brands adhering to the Association of American Railroads standard AAR-S-512 specification.

Global product manager for rail terminals and connectors at TE Connectivity, Dyon Bogaarts, said: "The connectors comply with the American Public Transport Association's PR-E-RP-019-99 standard, as well as the AAR standard AAR-S-512, with additional European Rail connector verification against a selection of tests based on NF F 61-030."

www.te.com

D-Sub connectors suit vacuum applications

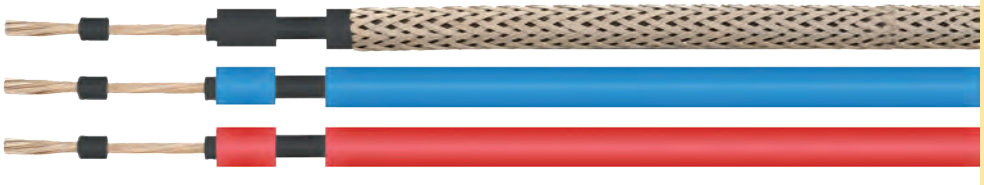
Provertha has designed a new range of D-Sub crimp connectors for use in vacuum technology applications. Featuring stainless steel housings and plastic insulators, the connectors can be used on the vacuum side and meet demanding low outgassing requirements. The crimp connection is said to ensure a mechanically stable, gas-tight connection with low electrical resistance.

Thanks to this design the connectors are ideal for industrial production environments subject to vacuum or cleanroom requirements where electrical vacuum feedthroughs for D-Sub connectors are used to transfer signals in a range of vacuum applications.

Typical applications for these easy-to-clean D-Sub connectors include vacuum and ultra-high vacuum technology, measurement and control technology, cleanroom and laboratory technology, the pharmaceutical industry, medical and safety technology. Accordingly, the connectors also offer complete hermetic and pressure-tight protection.

www.provertha.com

Protect PV cables from nibbling rodents



Conrad Business Supplies has introduced a new range of cables from Helukabel designed specifically for wiring solar modules and available with optional rodent protection.

Solarflex-X H1Z2Z2-K photovoltaic single-core cables are available with cross sections from 2.5 to 10mm, a nominal voltage of 1,500V, and are tested with 6,500V. The tinned copper wire of the conductor is in accordance with DIN VDE 0295 class 5, fine-wire, IEC 60228 class 5 and the insulation is made of copolymer. All versions are flame-retardant, halogen-free and UV-resistant. They are also double-insulated and meet protection class II and are compliant with the new European standard EN 50618.

Thanks to an operating temperature range from -40 to 90°C, Solarflex-X cables are suitable for use in all weather conditions. Cables are also available with optional rodent protection, making them particularly suitable for PV systems on agricultural holdings.

conrad.com

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