

# Market Insights

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#### Semiconductor Industry Market Growth

For Taiwan earthquake special report, please consult the attached document or reach out to your sales representative for a copy. Awaiting updates from Micron as they continue to review their facilities and supply chains.

- Global semiconductor sales saw a significant 15.2% year-to-year increase in January 2024, totaling \$47.6 billion according to the Semiconductor Industry Association (SIA). Despite this growth, there was a 2.1% decrease from December 2023. The SIA projects continued market growth throughout 2024, with double-digit annual sales forecasted compared to 2023, although month-to-month sales were down across all major markets.
- The semiconductor industry is experiencing robust growth, driven by increased demand in automotive, data centers, and high-performance computing sectors. Trends include advancements in co-packaged optics, chiplets, and high-bandwidth memory, as well as governments promoting local manufacturing. In 2024, the silicon wafer market is set to rebound, supporting applications like HPC, AI, and automotive tech. Semiconductor manufacturing equipment sales are also rebounding, led by China's surge, while the proliferation of Generative AI is fueling demand for specialized AI-chips, particularly GPUs, due to their parallel processing power and suitability for tasks like generating text, images, and code.
- According to IDC's latest research, the semiconductor industry is poised for significant growth in 2024 driven by global demand for artificial intelligence (AI), high-performance computing (HPC), and stabilized demand for smartphones, personal computers, infrastructure, and automotive sectors. One key trend that is anticipated is IC Design Inventory Depletion Ends: The Asia-Pacific market is expected to grow by 14% in 2024 as IC designers recover from inventory rationalization.
- Powering Portfolios: Top Semiconductor Stocks to Ride the 2024 Tech Wave, In a landscape dominated by surging
  semiconductor demand driven by technological innovation and global market growth, investors are eyeing opportunities in dynamic
  semiconductor stocks for 2024. With a projected industry CAGR of 12.2% reaching \$1.38 trillion by 2029 and significant advancements
  in AI, IoT, and 5G, companies like ROHM Co., Ltd., Trio-Tech International, Nikon Corporation, and Photronics, Inc., are positioned as
  top picks. Against a backdrop of positive industry trends and strong financial indicators, these stocks present compelling investment
  prospects, with Photronics, Inc. leading the pack as a Strong Buy based on its outstanding performance and optimistic fundamentals.
- Retail Investors Hold Majority Stake in Semiconductor Manufacturing International (HKG:981), Signaling Influence Over Governance, Semiconductor Manufacturing International Corporation (HKG:981) saw a 14% gain last week, benefiting both institutional and retail investors. However, with retail investors holding around 59% ownership compared to institutional ownership of 16%, they wield significant influence over management decisions. Despite institutional analysts favoring the stock, the top 25 shareholders collectively control less than half of the company's shares, indicating widely dispersed ownership. While considering ownership structure is important, other factors such as risks and future prospects should also be assessed for informed investment decisions.
- Semiconductor Market Resurgence: Al Drives Rebound Amidst Technological Shifts, As the global semiconductor market shows signs of revival, propelled by a surge in demand for Al technologies, the Semiconductor Industry Association reports a 5.3% rise in sales, reaching \$48 billion in November 2023. Notably, the current market shift is distinct, with Al concepts driving demand rather than tangible products, leading to accelerated growth projections for 2024. While challenges lie ahead in meeting the demands of the evolving Al sector, semiconductor manufacturers must navigate complexities, invest in R&D, and explore strategic alliances to capitalize on the opportunities presented by the growing market.
- Singapore's manufacturing sector anticipates a cautiously optimistic outlook for the first half of 2024, buoyed by the global semiconductor industry's resurgence despite ongoing geopolitical and economic challenges. According to a survey by the Singapore Economic Development Board (EDB), 21% of manufacturers foresee improvements, while 11% expect a weaker outlook, resulting in a net weighted 10% anticipating better conditions compared to the previous quarter. Optimism is prevalent across various segments, particularly in electronics driven by semiconductor demand, transport-engineering benefiting from robust orders in marine and offshore engineering, and precision engineering, spurred by semiconductor industry recovery expectations.
- The Vietnam semiconductor market is projected to grow at a CAGR of 10.20% during 2024-2032, driven by several factors such as Government Initiatives and investments attractions through favorable policies, tax breaks and Infrastructure development, Geographical location and enhanced connectivity through participation in free trade agreements (FTAs), and Investments in skilled workforce through collaborations with universities, research institutions and industry players.



#### Semiconductor Industry Market News

- Geopolitical Unrest: Israel-Hamas Conflict Ripples Through Global Semiconductor Industry, The ongoing conflict between Israel
  and Hamas is causing disruptions in the global semiconductor industry, impacting supply chains, logistics, and the availability of skilled
  labor. Israel, a significant hub for advanced chip production outside of East Asia, plays a crucial role in the semiconductor landscape. As
  the conflict complicates the chip supply chain, there is potential for India to emerge as an alternative destination for semiconductor
  manufacturing and research, with the Indian government's proactive measures, such as the Production-Linked Incentive (PLI) scheme,
  attracting investments from global technology giants. Despite geopolitical uncertainties, India's strategic positioning and policies may
  accelerate its journey to become a key semiconductor hub, presenting opportunities amid the industry's current challenges.
- S&P 500 Hits Two-Year High in Broad Stock Rally Fueled by Tech Surge, The S&P 500 achieved its first record close in over two
  years, reaching 4,839.80 on Friday, driven by a widespread rally that followed the chip stock surge. The Nasdaq Composite soared 1.7%
  to surpass 15,300 for the first time in two years, while the Dow Jones Industrial Average rose 1.1%, marking a second consecutive week
  of gains for all three indexes. The momentum in semiconductor stocks continued after Taiwan Semiconductor Manufacturing Co.'s
  positive earnings outlook, contributing to the overall market optimism.
- The U.S.-China Semiconductor Showdown: A Battle for Technological Dominance and National Security, The intensifying U.S.-China tech conflict over semiconductors underscores the pivotal role of the industry in shaping global power dynamics and national security. With both nations fiercely competing for dominance, companies face mounting pressure amidst geopolitical tensions. The U.S.'s stringent export controls aim to curtail China's technological advancement, sparking a retaliatory rhetoric while forcing companies to navigate uncertain terrain. Taiwan emerges as a key player, strategically aligning with the U.S. to fortify its semiconductor industry and serve as a buffer against potential Chinese aggression. Amidst revelations of U.S. venture capital ties to Chinese entities linked to human rights abuses, calls for investment controls echo the complex intersection of technology, geopolitics, and ethical considerations. As the battle for semiconductor supremacy unfolds, the world awaits the implications for global stability and the balance of power.
- US Sanctions List Includes Korean-Owned Ireland Semiconductor Firm, Ireland-based Cubit Semiconductor, led by Korean
  management, was reportedly sanctioned by the US Department of the Treasury's Office of Foreign Assets Control (OFAC) for allegedly
  supporting Russia's military-industrial base. Cubit's founder expressed unawareness of the sanction, claiming to trade only within the EU
  semiconductor industry. The US also added 93 entities, including Korean-based Daesung International Trade, for unauthorized support to
  Russia's industrial sector. Korean authorities pledge to investigate violations, while Cubit Semiconductor focuses on supplying
  semiconductor equipment to global clients like ABB and Infineon.
- Nvidia Identifies Huawei as Major Competitor in AI Chip Sector, Nvidia has recognized Huawei as a significant competitor, particularly in the production of processors crucial for artificial intelligence (AI) systems, according to its annual report. The Santa Clarabased company listed Huawei as a rival in several key areas of its business, including supplying software and hardware for graphic processing units (GPUs), widely used in generative AI. This acknowledgment comes amidst ongoing geopolitical tensions between the United States and China, with implications for Nvidia's business operations, particularly in China, where its data center revenue faced a significant decline following US government export control regulations imposed in October 2022. Despite strong overall earnings, Nvidia's China business was impacted, highlighting the complexities of navigating global chip markets amid political uncertainties.
- Arizona Invests \$13 Million in NAU for Semiconductor Training and Research, The Arizona Commerce Authority (ACA) has
  allocated \$13 million to Northern Arizona University (NAU) to enhance semiconductor training programs and research. With a focus on
  metrology, essential for semiconductor manufacturing, the investment aims to bridge the growing gap between demand and supply for
  metrology professionals in the semiconductor industry. This initiative aligns with Arizona's commitment to bolster its semiconductor
  ecosystem and address the workforce needs of its thriving semiconductor industry.
- Oregon's Semiconductor Industry Anticipates Federal Funding Boost for Expansion, Oregon's semiconductor sector is set to
  receive a significant financial boost as Microchip secures \$72 million in federal funding for chip manufacturing expansion in Gresham.
  Experts predict additional funds from the \$50 billion CHIPS Act, coupled with around \$200 million from Oregon, will support job growth
  and facilitate industry expansion. With a strong existing semiconductor presence, skilled workforce, and state support, Oregon is
  positioned to benefit from federal incentives, attracting companies for manufacturing and research, ultimately contributing to job creation
  and industry development.
- Water Scarcity Threatens Semiconductor Industry, Could Lead to Price Hikes, S&P Warns, S&P Global Ratings has highlighted the
  growing risk of water scarcity impacting semiconductor manufacturers like TSMC, particularly as chip technology advances. The chip
  industry, reliant on vast amounts of water for cooling and production processes, faces disruptions that could affect the global supply chain.
  TSMC's dominance in advanced chip manufacturing positions it to mitigate potential disruptions by adjusting prices and focusing on
  higher-margin products. However, the industry's increasing water consumption, exacerbated by climate change, underscores the
  importance of water security for semiconductor firms' credit profiles and operational stability.



#### Semiconductor Industry Market News

- Virginia Tech Launches \$30 Million Partnership to Boost Women in Semiconductor Industry, Virginia Tech faculty members are spearheading UPWARDS, an international initiative aimed at increasing female representation in the semiconductor workforce, backed by a \$30 million investment. The program, supported by Micron Technology, Tokyo Electronics, and the National Science Foundation, focuses on various areas including research collaboration, curriculum design, and experiential learning. Through efforts like the UPWARDS Women in Semiconductor Camp and research programs, Virginia Tech aims to advance education and innovation in the semiconductor field while promoting gender diversity.
- Michigan Initiates First-Ever Taiwan Office to Bolster Semiconductor and EV Sectors, Governor Gretchen Whitmer has unveiled plans to establish the Michigan Taiwan Office during a five-day investment mission, aimed at expanding the state's global presence and fostering connections with southeast Asia. Administered by the Michigan Economic Development Corporation, the office will prioritize investment promotion, particularly in the semiconductor and electric vehicle industries, fostering collaboration and boosting economic ties between Michigan and Taiwan. Governor Whitmer emphasized the importance of collective efforts to attract jobs, projects, and supply chains to Michigan, highlighting the state's commitment to innovation and comprehensive economic development.
- Texas Senator Cruz Advocates Streamlining Environmental Regulations for Semiconductor Plant Construction, U.S. Senator Ted Cruz, during a roundtable on the future of semiconductor plants in Central Texas, discussed the delays caused by environmental regulations in building semiconductor plants. With chips being crucial for various electronic devices and the shortage posing national security concerns, Cruz emphasized the urgency in streamlining the construction process. While the CHIPS for America Act allocated billions for chip manufacturing plants, Cruz co-authored a bill to expedite construction, highlighting the unique vulnerability in semiconductor production that requires swift bipartisan action.
- U.S. Plans \$162 Million Boost for Microchip Technology in Bid to Strengthen Semiconductor Independence, The U.S. Commerce Department is set to award Microchip Technology \$162 million in government grants to significantly enhance the production of semiconductors and microcontroller units (MCUs) vital to both consumer and defense industries. This funding, part of the "Chips for America" program, aims to triple the production of mature-node semiconductor chips and MCUs at Microchip's facilities in Colorado and Oregon, reducing reliance on foreign sources and contributing to national and economic security. This move aligns with the broader initiative to shift semiconductor production away from foreign suppliers, particularly China, and is the second award in the \$52.7 billion program.
- Pentagon Invests \$49 Million to Revitalize U.S. Semiconductor Packaging Capabilities, The Department of Defense has awarded contracts totaling \$49 million through the Industrial Base Analysis and Sustainment (IBAS) program to Micross Components and the government of Osceola County, Florida. These contracts aim to revitalize advanced packaging capabilities and capacity for semiconductors crucial in defense applications, focusing on low-volume/high-mix production of secure 2.5 and/or 3D advanced packaging solutions. The initiative, known as RESHAPE, supports the National Defense Industrial Strategy's priority of building resilient supply chains and aims to enhance the U.S. semiconductor advanced packaging manufacturing ecosystem.

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#### Semiconductor Industry Market News

#### INDIA

- India to Host Two Multi-Billion Dollar Semiconductor Plants, Tower Semiconductors and Tata Group Lead, India is set to establish
  two semiconductor fabrication plants, backed by Tower Semiconductors and the Tata Group, signaling a significant advancement in the
  country's semiconductor industry. Minister Rajeev Chandrasekhar emphasized the strategic importance of these projects, highlighting
  their role in India's semiconductor roadmap and efforts to transition towards export-led manufacturing. With exponential growth in the
  electronics manufacturing sector, India aims to become a trusted global partner in offering high-quality products to enterprises and
  consumers worldwide.
- Gujarat Aims to Become Semiconductor Hub: Engages with Asian and American Chipmakers for Investments, In an effort to
  position itself as a semiconductor powerhouse in India, the state of Gujarat is engaged in discussions with chipmakers in Japan, South
  Korea, and the United States. Gujarat's Chief Minister, Bhupendra Patel, revealed plans to attract investments during the 10th Vibrant
  Gujarat Global Summit, with a special focus on semiconductors and electronics. The move comes as India competes for global
  chipmaker investments following the central government's INR760 billion incentive scheme to foster a local semiconductor ecosystem
  and diversify global chip production.
- Indian Government Greenlights Semiconductor MoU with EU for Strengthening Global Chip Resilience, India's Union Cabinet, led by Prime Minister Modi, has granted approval to the Memorandum of Understanding (MoU) on semiconductors signed between India and the European Union that was first signed in November 2023. The agreement aims to fortify the semiconductor supply chain collaboration between the two regions, fostering technological advancements in the chip sector. As part of the MoU, India and the EU commit to sharing expertise, promoting collaborative research and innovation, developing semiconductor industry skills and workforce, and ensuring a level playing field in the sector, addressing the challenges posed by the evolving geopolitics of semiconductor supply chains.
- India's Semiconductor Ambitions: Challenges and Progress Two Years In, Two years into India's initiative to promote semiconductor manufacturing, progress is evident, with Micron's investment announcement and AMD's commitment. However, challenges persist in attracting major chip players, with only Tower Semiconductor reportedly filing a new application. India's semiconductor dream faces competition globally, with countries like the US, Europe, and others vying for chip production. Despite hurdles such as a talent crunch, technology transfer issues, and infrastructure costs, experts believe that once the ecosystem is established, India could become a semiconductor hub, leveraging its growing electronics manufacturing ecosystem and attracting established companies and conglomerates.
- Semiconductor Industry Report Advocates for India's Expanded Role in Global Semiconductor Value Chains, The Semiconductor Industry Association (SIA) and the India Electronics and Semiconductor Association (IESA) have released a report assessing India's readiness to assume a greater role in global semiconductor value chains. Titled "Assessing India's Readiness to Assume a Greater Role in Global Semiconductor Value Chains," the report suggests that India, with the right policies, can enhance its position in the semiconductor industry. It highlights India's potential as an investment destination for high-tech industries and recommends areas for improvement in policy, regulatory frameworks, and business environments to attract semiconductor companies. Recommendations include advancing cooperation between the U.S. and India, creating visa programs for skilled workers, implementing policy reforms to lower business costs, fostering partnerships with higher-education institutions, and ensuring ongoing consultation with industry stakeholders.
- India Commits \$15 Billion to Semiconductor Plants to Challenge Global Players, India has greenlit investments totaling \$15.2 billion for the construction of three new semiconductor plants, marking a significant move in its bid to compete with major players like China and Taiwan in the chip manufacturing race. The projects include the country's first semiconductor fab facility in Gujarat, aiming to produce 3 billion chips annually for various sectors such as high-power computing and electric vehicles. Additionally, investments will support a semiconductor assembly unit in Assam and a specialized chip facility in Gujarat, targeting niche sectors like defense and electric vehicles. India's long-term semiconductor program, backed by substantial incentives, aims to bolster the country's position as a key player in the global semiconductor industry.
- HCL and Foxconn Forge Joint Venture for Semiconductor Assembly and Testing Unit in India, HCL, a major Indian IT conglomerate, is teaming up with Taiwanese electronics manufacturing giant Foxconn to establish a semiconductor Outsourced Assembly and Testing (OSAT) unit in India. With Foxconn holding a 40% equity stake for \$37.2 million, the specific details about the OSAT facility are yet undisclosed. This collaboration signifies a strategic shift for HCL, moving from its hardware roots to a higher-value position in the semiconductor domain, primarily focusing on design services.





#### Semiconductor Industry Market News

 Tower Semiconductor Proposes \$8 Billion Chip Plant in India Amid Government's Semiconductor Manufacturing Push, Tower Semiconductor, in alignment with Prime Minister Narendra Modi's semiconductor manufacturing agenda, seeks to establish an \$8 billion chip-making facility in India, targeting production of 65 and 40 nanometre chips. The move follows discussions between Minister of State for IT Rajeev Chandrasekhar and Tower Semiconductor CEO Russell C Ellwanger, highlighting potential partnership in the semiconductor sector. Tower Semiconductor's expertise in analog integrated circuits and its prior commitment to India's semiconductor ecosystem position it as a key player in the country's semiconductor manufacturing drive.

#### UK

- UK Establishes Critical Imports Council to Safeguard Supplies Amid Global Challenges, The UK government is creating a critical
  imports council to address potential supply chain restrictions for essential items such as medicine, minerals, food, and semiconductors,
  due to escalating geopolitical and climate threats. Comprising academics and businesses, the council will collaborate to forecast potential
  issues and recommend actions to secure supplies, including exploring alternative sources and potentially increasing domestic production.
  This strategy is part of an initiative to mitigate disruptions to global supply chains caused by factors like geopolitical tensions, extreme
  weather, and evolving technologies, involving input from over 100 UK firms.
- UK Clears Newport Wafer Fab Takeover Amid National Security Concerns, After years of uncertainty, the takeover of the Newport
  Wafer Fab factory has finally been approved by the UK government. The Dutch-based technology company Nexperia, a subsidiary of
  Wingtech, was forced to sell its 86% stake due to national security concerns over its links to China. US electronics giant Vishay has now
  acquired the plant, securing more than 400 jobs and promising to expand research and development in compound semiconductors. While
  the consent order paves the way for the new ownership, it comes with conditions to ensure tight control over intellectual property and
  sensitive information.
- UK Semiconductor Startups Advocate Five Government Demands Ahead of Budget Announcement, UK semiconductor startups are advocating for policy changes ahead of the country's budget announcement, aiming to level the playing field and boost investment in the sector. Techworks, representing 280 companies, has outlined five recommendations to support the success of UK startups amid growing competition from overseas. These include revising R&D tax credit rules to cover upgrades in production facilities, creating a public investment scheme to match lead investor contributions, incentivizing domestic procurement of British-made hardware, de-risking investments for private funds, and reforming the apprenticeship system to enhance the supply of engineers and technicians. These proposals come in response to US and EU initiatives offering substantial funding and subsidies to semiconductor companies, urging the UK government to take action to support its semiconductor industry's growth and competitiveness on a global scale.

#### ASIA

- Tower Semiconductor Assures Safety and Operational Stability Following Ishikawa Earthquake, In the aftermath of the recent earthquake in Ishikawa Prefecture, Japan, Tower Semiconductor, a leader in high-value analog semiconductor foundry solutions, provides a reassuring update. Thankfully, all employees are reported safe, with no impact on buildings and only minor damage to facilities. The company remains dedicated to the well-being of its team, ensuring safety during the recovery phase while actively working on tools requalification and minimizing potential disruptions to manufacturing and customer service.
- Singapore Launches Four A\*Star Initiatives to Boost R&D Commercialization, Singapore unveils initiatives by A\*Star to propel
  research and development (R&D) commercialization in semiconductors, nucleic acid therapeutics, robotics, and medtech. Key highlights
  include the S\$180 million National Semiconductor Translation and Innovation Centre to support semiconductor manufacturing and talent
  development. Additionally, RIE 2025 allocates S\$97 million to the Nucleic Acid Therapeutics Initiative, aiming to establish Singapore as a
  hub for RNA drugs and vaccines. The S\$38 million Medtech Catapult initiative and a new S\$60 million funding tranche for the National
  Robotics Programme further enhance Singapore's innovation ecosystem.



#### Semiconductor Industry Market News

JCET Group Ventures into Storage Market with CNY 4.5 Billion Investment in SanDisk Semiconductor Shanghai Co., Ltd., On March 4th, JCET Group announced its acquisition of an 80% equity stake in SanDisk Semiconductor Shanghai Co., Ltd. for USD 624 million, marking a strategic move to expand its presence in the storage market. The acquisition, facilitated through an "Equity Acquisition Agreement" with SANDISK CHINA LIMITED, aims to bolster JCET's market share in advanced NAND Flash memory products used across various sectors like mobile communications, automotive, and consumer electronics. This decision aligns with the company's forward-looking assessment of the global storage market, which is projected to reach USD 130 billion by 2024, with NAND flash chips constituting a significant portion of the market. Meanwhile, JCET's investment underscores the intensifying competition in the semiconductor packaging industry, with major players like ASE, Amkor, Powertech, and Huatian Technology also ramping up their efforts to enhance their competitive edge through expansions and acquisitions in advanced packaging technologies.

#### Philippines

- Philippine Semiconductor Manufacturers Seek Local Silicon Wafer Fabrication to Boost Industry Resilience, The Semiconductor and Electronics Industries in the Philippines Foundation Inc (SEIPI) reveals that Philippine semiconductor manufacturers are exploring the possibility of venturing into local silicon wafer fabrication. SEIPI President Danilo Lachica highlights the importance of developing wafer fabrication capabilities locally, addressing issues such as high costs, extended timelines, and potential intellectual property loss associated with relying on external sources like Taiwan for prototypes. Lachica urges government support through incentives rationalization and addressing operating costs to attract investors, emphasizing the need for new products and technologies to sustain the \$49 billion industry and support the 3 million direct and indirect workers. Despite expected industry contraction in 2023, SEIPI remains cautiously optimistic for 2024, projecting flat growth amid supply chain disruptions, geopolitical tensions, and high-interest rates.
- Philippines Included in US Semiconductor Funding Program, Enhancing Global Supply Chain Resilience, The Philippines is
  among seven countries selected by the United States to receive funding for bolstering its semiconductor supply chain, addressing global
  shortages caused by the pandemic and trade tensions. With the semiconductor industry thriving in the Philippines, the Biden
  administration aims to engage allies and partners in expanding its global semiconductor ecosystem. The US has allocated \$500 million to
  implement the CHIPS Act in the Philippines, promoting international capacity in assembly, testing, and packaging.
- Philippines Positioned as Semiconductor Investment Hub, The Philippines emerges as a key partner in the "CHIPS and Science Act," aimed at reshoring critical semiconductor manufacturing and reducing dependency on Chinese production. While this presents an opportunity to elevate the country's semiconductor industry, challenges such as infrastructure, talent, legislative adjustments, and cybersecurity must be addressed. As the Philippines navigates its role in the global semiconductor supply chain, preparations for techrelated investments are crucial amidst potential benefits and geopolitical considerations.
- Philippines Seeks US Semiconductor Firms' Expansion for Industry Growth, President Ferdinand R. Marcos, Jr. of the Philippines aims to attract US semiconductor companies to establish wafer fabrication facilities in the country, aligning with US efforts to strengthen national security and competitiveness. During a trade and investment mission led by Commerce Secretary Gina Raimondo, Marcos highlighted the Philippines' readiness to support high-tech industries and proposed plans to produce skilled professionals for semiconductor R&D. The initiative is part of the collaboration between the US and seven countries to diversify semiconductor supply chains under the CHIPS and Science Act, offering federal subsidies to incentivize chip manufacturing relocation. The meeting, attended by representatives from various industries, emphasized the potential for bilateral cooperation in advancing technology and economic growth.

#### JAPAN

Patent Dispute Emerges Over Chip Technology as Japan's JSR Faces Legal Challenge, A significant patent dispute has erupted in
the chipmaking industry, involving Japan's JSR and the State University of New York. The university alleges that Inpria, a US subsidiary
of JSR, has been selling chip materials based on technology invented by one of its professors, potentially seeking damages of up to \$4.3
billion. The legal battle coincides with JSR's impending buyout by a Japanese government-backed fund, raising questions about state
intervention to protect strategic technologies. The dispute revolves around metal-containing photoresists, crucial for advanced chip
production, and may impact JSR's ownership dynamics.



#### Semiconductor Industry Market News

- Japan to Back Development of Space-grade Semiconductors for Enhanced Space Exploration, The Japanese government is set to support the advancement of technology for manufacturing space-grade semiconductors developed by the Japan Aerospace Exploration Agency (JAXA) and startup NanoBridge Semiconductor, Inc. These semiconductors, designed to withstand intense radiation in space, offer increased resistance and reduced power consumption, contributing to downsizing space equipment. With a budget allocation of ¥750 million, the government aims to foster the development of manufacturing technology, anticipating a growing demand for highperformance space semiconductors in the expanding satellite market.
- Toyota Joins TSMC Arm Investment for Second Chip Plant in Japan, Toyota Motor Corporation has announced its investment in Taiwan Semiconductor Manufacturing Co.'s Japanese subsidiary to support the construction of a second chip plant in Japan's Kumamoto prefecture. Alongside existing investors Sony and Denso, Toyota's investment underscores the growing collaboration between automakers and semiconductor manufacturers to secure stable supplies of advanced chips, particularly for electric and autonomous vehicles. The second plant, expected to produce 6-nanometer chips, aligns with Japan's efforts to revitalize its chip industry with significant government support.
- TSMC Affirms Schedule for Kumamoto Fab Launch Amidst Reports of Early Production, Taiwan Semiconductor Manufacturing (TSMC) reaffirmed plans for its first wafer fab in Kumamoto, Japan, stating that commercial production is on track for the fourth quarter of this year, despite rumors of an earlier start. The joint venture, Japan Advanced Semiconductor Manufacturing (JASM), aims to achieve a monthly production capacity of 55,000 units of 12-inch wafers, utilizing various mature processes. TSMC's response follows reports suggesting pressure from Apple Inc., a major client of Sony, to accelerate chip production at the facility.
- Japan Invests \$4.8 Billion More in TSMC Plant for Cutting-Edge Chips, Japan announces an additional ¥732 billion subsidy for Taiwan Semiconductor Manufacturing Co. to expand its plant, emphasizing the critical importance of cutting-edge logic chips for Japan's industries. The investment aims to bolster Japan's digital transformation efforts and secure a stable supply of advanced chips for various sectors, including automotive and consumer electronics. This move reflects the global trend of governments competing to secure domestic chip supplies, highlighting the strategic significance of semiconductor technology in today's economy.
- Tower Semiconductor Assures Safety and Operational Stability Following Ishikawa Earthquake, In the aftermath of the recent earthquake in Ishikawa Prefecture, Japan, Tower Semiconductor, a leader in high-value analog semiconductor foundry solutions, provides a reassuring update. Thankfully, all employees are reported safe, with no impact on buildings and only minor damage to facilities. The company remains dedicated to the well-being of its team, ensuring safety during the recovery phase while actively working on tools requalification and minimizing potential disruptions to manufacturing and customer service.
- TSMC Announces Second Chip Factory in Japan, Raises Investment to \$20 Billion, Taiwan Semiconductor Manufacturing Co. (TSMC) reveals intentions to construct a second chip plant in Japan, set to commence operations by late 2027. With total investment surpassing \$20 billion, this move signals TSMC's commitment to bolstering its presence in Japan's semiconductor market and meeting rising customer demand. The expansion aligns with Japan's strategic efforts to revitalize its chip manufacturing sector and ensure chip supply stability amid global trade tensions.

#### SOUTH KOREA

- Korean Scientists Develop Breakthrough Sub-Nanometer Chip Technology, A team of scientists at the Korea Advanced Institute of Science and Technology (KAIST) has announced the successful development of technologies essential for sub-nanometer-scale semiconductors. Using a novel substance called ambipolar molybdenum disulfide (MoS2) instead of conventional silicon, the technology addresses challenges associated with short-channel effects in larger-scale integrated circuits. The breakthrough, which enables highperformance ambipolar MoS2 devices, is expected to contribute to the ongoing competition among chipmakers, including Samsung Electronics, Taiwan Semiconductor Manufacturing Co., and Intel, aiming for 1-nanometer and smaller chip nodes.
- Korean Exports Surge Driven by Semiconductor and Automobile Exports, South Korea's exports saw double-digit growth in January, reaching US\$54.69 billion, with semiconductor exports leading the surge, up 56 percent year on year for the third consecutive month. Automobile exports also hit a January record high, contributing to the fourth consecutive month of overall export growth. Notably, exports to China, the largest export market, experienced their first year-over-year increase in 20 months, signaling a positive trend in global trade.
- SK Hynix Invests Over \$1 Billion to Elevate Advanced Packaging, Bolstering HBM Chip Dominance, SK Hynix, the South Korean memory giant, is directing significant investment exceeding \$1 billion towards advanced chip packaging to cater to the growing demand for High Bandwidth Memory (HBM), crucial for the expanding AI market. Lee Kang-Wook, spearheading SK Hynix's packaging R&D, emphasized the pivotal role of back-end processes, foreseeing it as the future focus of the semiconductor industry. The investment aims to enhance performance, reduce power consumption, and fortify SK Hynix's leadership in the HBM market, aligning with recent market trends highlighting the importance of advanced packaging in meeting NVIDIA's rigorous testing standards and addressing the complexities of HBM chip production.



#### Semiconductor Industry Market News

Navigating Crossroads: South Korean Chipmakers Amid US-China Tech Rivalry, In the midst of the US-China tech rivalry, South Korean chipmakers, SK Hynix and Samsung, face critical decisions with far-reaching consequences. With a dominant 60% global memory chip share, their strategic position becomes evident as monthly exports to the US surpass China for the first time in two decades. Balancing economic ties, navigating US restrictions, and anticipating China's ascent, South Korean chipmakers find themselves at a pivotal juncture, requiring strategic adaptability in a rapidly evolving technological landscape.

#### TAIWAN

For Taiwan earthquake special report, please consult the attached document or reach out to your sales representative for a copy.

- Taiwan's President-Elect Lai Unveils Vision for Semiconductor Leadership in a Tech-Driven World, In a momentous address in Taipei, President-elect William Lai declared Taiwan's semiconductor industry as the 'world's common asset,' emphasizing its pivotal role in the global economy. Lai outlined a comprehensive plan to strengthen Taiwan's semiconductor ecosystem, encompassing materials, research, design, manufacturing, and testing. Despite geopolitical challenges and the complex tech war between the U.S. and China, Lai remains steadfast in positioning Taiwan as a leader in semiconductor innovation, ensuring both national prosperity and contributions to the stability of the global economy.
- Taiwan Launches Talent-Seeking Missions in Southeast Asia to Address Semiconductor Workforce Shortage, In response to a severe talent shortage in its semiconductor industry, Taiwan's Ministry of Economic Affairs (MOEA) is set to conduct talent-seeking missions in Southeast Asian countries. Delegations, comprising company representatives, will visit the Philippines, Malaysia, Indonesia, and Vietnam to recruit and groom professionals in IC design, assembly, and testing. Notably, Singapore is excluded from this year's mission due to workplace preferences of its professionals, while companies like ASE Technology Holding, Powertech Technology, TSMC, MediaTek, UMC, Phison Electronics, and Realtek Semiconductor have collectively recruited 316 individuals following similar efforts in 2023.
- Taiwan Envoy Accuses China of Attempts to 'Cheat' in Semiconductor Race, Foresees Increased Taiwanese Investment in US, Taiwan's representative to Washington, Alexander Yui, dismisses China's efforts to catch up in chip technology, accusing Chinese chipmakers of cheating and stealing technology. Yui casts doubt on reports of China's advancements in next-generation processors and refutes claims by Donald Trump regarding Taiwan taking American semiconductor jobs. Despite political tensions, Yui expresses hope for increased Taiwanese semiconductor investment in the US and emphasizes bipartisan support for Taiwan in Washington. Meanwhile, tensions between the US and China continue, with the US military seeking secure locations in the Pacific amid growing concerns over potential conflict with China.
- TSMC to Ramp Up Production Across Taiwan Amid Surging Demand for Al Chips, Responding to the heightened demand for Al chips, TSMC is embarking on a substantial expansion across northern, central, and southern Taiwan, focusing on the establishment of new facilities for 2-nanometer fabs and advanced packaging plants. Despite a slowdown in factory construction last year, driven by the semiconductor industry's downturn, TSMC's renewed expansion efforts underscore the industry's recovery and the pressing need for Al chip production. With plans for mass production of its 2-nanometer process by 2025, TSMC is also gearing up for the development of next-generation 1-nanometer fabrication plants, anticipating the necessity of eight to ten facilities in Taiwan to meet future demands.

#### CHINA

- China Procures Banned Nvidia Chips for Military and Al Despite U.S. Restrictions, Chinese military bodies, state-run Al research institutes, and universities have reportedly acquired Nvidia semiconductors banned by the U.S. in the past year, according to a Reuters review of tender documents. The purchases include Nvidia's A100 and H100 chips, banned for export to China in September 2022, as well as the later-developed A800 and H800 chips, banned in October 2023. The continued demand highlights challenges faced by Washington in restricting China's access to advanced U.S. chips, despite geopolitical tensions and export bans, and underscores the lack of viable alternatives for Chinese firms in the semiconductor market.
- Geopolitical Strain: ASML Faces Export Restrictions on Chip-making Machines to China, Dutch semiconductor giant ASML has revealed that its shipments of cutting-edge chip manufacturing machines to China have been blocked after the Dutch government revoked the necessary license. The move, reportedly influenced by US pressure, reflects the escalating geopolitical tensions surrounding semiconductor technology. As semiconductors become a geopolitical battleground, concerns grow over the impact on the global semiconductor industry layout and the security of international industrial and supply chains.



#### Semiconductor Industry Market News

- China Takes the Lead: 18 New Semiconductor Fabs Set to Boost Global Chipmaking Capacity in 2024, China is poised to lead the global expansion of the semiconductor industry, with 18 new fabs expected to begin production in 2024, according to the SEMI World Fab Forecast report. The report anticipates a 6.4% increase in global chipmaking capacity in 2024, reaching over 30 million wafer starts per month. Driven by government funding and incentives, China's semiconductor production is projected to accelerate, contributing to the diverse and dynamic growth of the global semiconductor industry.
- China Achieves Breakthrough in Semiconductor Imaging with Locally Developed Electron Microscope, A Guangzhou-based research institute, Bioland Laboratory, has unveiled China's first transmission electron microscope, the TH-F120, a pivotal achievement in the country's quest for self-reliance in semiconductor technology. With the capability to mass-produce these microscopes, China aims to reduce its dependence on imports for critical semiconductor manufacturing equipment. This breakthrough not only positions China as a major player in the semiconductor imaging race but also underscores the country's rapid progress in key technologies amid international competition and restrictions on access to advanced semiconductor tools.
- Semiconductor Startup Silicon Box Secures \$200 Million, Surpassing \$1 Billion Valuation, Semiconductor company Silicon Box has secured \$200 million in a Series B funding round, achieving a valuation exceeding \$1 billion less than three years after its founding. Investors in the round include Praesidium Capital, Maverick Capital, BRV Capital, Tata Electronics from India, and the venture arms of UMC in Taiwan, TDK in Japan, and Lam Research in the U.S. Silicon Box, founded in 2021 by the leaders of Nasdaq-listed chipmaker Marvell, focuses on chiplet technology, offering increased flexibility, performance, and efficiency by combining multiple smaller chips within a single package.

#### **INSIGHTS / SUSTAINABILITY**

- Game-Changer: Researchers Unveil World's First Functional Graphene Semiconductor, A collaborative effort between Chinese and U.S. researchers has resulted in the creation of the world's inaugural functional semiconductor made from graphene, heralding a new era of smaller, faster, and more efficient electronic products. The breakthrough involves growing graphene on silicon carbide wafers, producing epitaxial graphene with semiconducting properties when bonded properly with silicon carbide. This development addresses the long-standing challenge of graphene lacking a "band gap," opening up possibilities for transformative technologies and marking a significant leap beyond the physical limits of silicon-based semiconductors.
- Australian Researchers Unveil Revolutionary "LEGO-Like" Photonic Chip for Semiconductor Breakthroughs, Scientists at the University of Sydney Nano Institute have developed a groundbreaking semiconductor chip that combines electronic and photonic elements, significantly enhancing radio-frequency (RF) bandwidth and control capabilities. This compact chip, built using emerging silicon photonics technology, integrates diverse systems on semiconductors less than 5 millimeters wide, resembling a Lego-like assembly of components. With applications in advanced radar, satellite systems, wireless networks, and the rollout of 6G and 7G telecommunications, the chip's strategic importance could lead to advanced sovereign manufacturing in Australia.
- Chinese Scientists Develop Diamond-Based Microwave Chip for Advanced Warfare, Chinese scientists have achieved a
  groundbreaking feat by creating a diamond-based microwave chip, significantly enhancing electronic warfare capabilities. These fourthgeneration semiconductors, boasting a 30% higher power density, promise to revolutionize weapons, radar, and communication systems.
  Leveraging diamonds' exceptional properties, including high thermal conductivity, China aims to strengthen its position in advanced
  technology industries, potentially gaining a decisive edge in electronic warfare.

#### CHIPS and Science ACT of 2022

U.S. Plans \$162 Million Boost for Microchip Technology in Bid to Strengthen Semiconductor Independence, The U.S. Commerce
Department is set to award Microchip Technology \$162 million in government grants to significantly enhance the production of
semiconductors and microcontroller units (MCUs) vital to both consumer and defense industries. This funding, part of the "Chips for
America" program, aims to triple the production of mature-node semiconductor chips and MCUs at Microchip's facilities in Colorado and
Oregon, reducing reliance on foreign sources and contributing to national and economic security. This move aligns with the broader
initiative to shift semiconductor production away from foreign suppliers, particularly China, and is the second award in the \$52.7 billion
program.



#### Semiconductor Industry Market News

- Biden Administration Set to Unveil Billions in Subsidies for US Semiconductor Manufacturing, The Biden administration is reportedly planning to announce substantial subsidies, amounting to billions of dollars, for leading semiconductor companies such as Intel, Taiwan Semiconductor Manufacturing Company (TSMC), and others to facilitate the construction of new semiconductor factories in the United States. The move aims to jumpstart the production of advanced semiconductors crucial for smartphones, artificial intelligence, and defense systems. The subsidies are expected to be disclosed before President Joe Biden's State of the Union address on March 7, targeting projects in various states, including Intel's ventures in Arizona, Ohio, New Mexico, and Oregon, and TSMC's facilities near Phoenix, among others.
- White House Unveils \$11 Billion Semiconductor R&D Program, The White House announces a \$11 billion investment in semiconductor research and development, launching the \$5 billion National Semiconductor Technology Center under the Chips and Science Act approved by Congress in August 2022. U.S. officials emphasize a collaborative approach with industry, academia, and investors to bolster American competitiveness in semiconductor technology. Plans include funding chip manufacturing and supply chain investments to enhance production capacity and innovation.
- SIA Lauds Launch of \$5 Billion in CHIPS R&D Investments and Workforce Initiatives, The Semiconductor Industry Association (SIA) praises the administration's allocation of over \$5 billion for semiconductor R&D investments and workforce initiatives, including the National Semiconductor Technology Center (NSTC), established under the CHIPS and Science Act of 2022. SIA underscores the critical role of semiconductor R&D in bolstering America's economy, national security, and technological leadership, emphasizing the importance of government-industry collaboration in advancing innovation and workforce development. With substantial private investments totaling over \$220 billion and the creation of 40,000 jobs in the semiconductor ecosystem, the CHIPS Act's manufacturing incentives demonstrate a significant boost to the U.S. semiconductor industry.
- Biden's State of the Union Highlights Semiconductor Importance, CHIPS Act Progress Awaited, President Biden's State of the Union Address underscores America's rising position and emphasizes the importance of semiconductor supply chains amid global competition, particularly with China. While progress on the CHIPS Act is urged by the Semiconductor Industry Association (SIA), only a few companies have received subsidies from the promised \$39 billion for semiconductor manufacturing. Secretary of Commerce Gina Raimondo emphasizes prioritizing projects operational by 2030 to boost America's share of leading-edge logic chip production. Despite private sector investments, the semiconductor industry faces challenges in talent acquisition, prompting collaboration with universities to address workforce shortages.

### Challenges in Semiconductor Industry

The semiconductor industry faces a persistent challenge with talent acquisition, ranking as the primary concern for the third consecutive year based on the research done by KPMG for Global Semiconductor Industry Outlook conducted in the last quarter of 2023. This issue is exacerbated by the global trend of territorialism and nationalization, particularly evident in the US where it closely competes with talent risk. Despite plans for new chip manufacturing facilities worldwide, the industry grapples with a shortage of skilled workers, especially in technical, computer science, and engineering roles. Efforts are underway in regions like Europe to address this through initiatives such as the European Chips Skills 2030 Academy, aiming to meet manufacturing capability goals by securing a pipeline of microelectronics experts. Meanwhile, concerns over territorialism and nationalization have risen, reflecting the industry's response to geopolitical tensions and the need for more localized supply chains.

Biggest issues facing the semiconductor industry over the next 3 years according to KPMG survey:



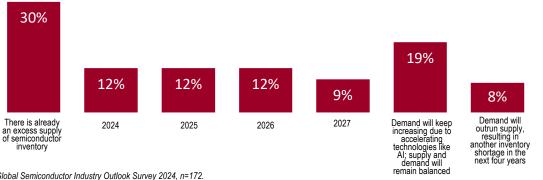
Source: Global Semiconductor Industry Outlook Survey 2024, n=172. Multiple responses allowed; percentage do not sum up to 100%



#### **Operational Expectation**

According to a KPMG survey, concerns over inventory shortages in the semiconductor industry have significantly diminished, with only 8 percent of leaders anticipating a shortage in the next four years. However, views on excess supply have grown, with 30 percent of respondents believing there is already excess inventory, and another 12 percent expecting it to occur later in 2024. Despite this, there is optimism regarding sustained chip demand driven by emerging technologies like Gen AI and electric vehicles, leading to projections of double-digit industry revenue growth in 2024.

#### When will the next excess supply of semiconductor inventory occur?



Source: Global Semiconductor Industry Outlook Survey 2024, n=172.



### **Analog Devices**

- Analog Devices' Sensinel CPM System, FDA-cleared, offers remote cardiopulmonary management for chronic diseases like heart failure, utilizing wearable technology and cardiologist-inspired algorithms, promising improved patient care and streamlined clinician workflows.
- Analog Devices (ADI) has expanded its partnership with TSMC, securing long-term wafer capacity through Japan Advanced Semiconductor Manufacturing (JASM), TSMC's subsidiary. This agreement strengthens ADI's hybrid manufacturing network, supporting critical platforms like wireless BMS and Gigabit Multimedia Serial Link applications, and enhancing resilience against external factors while enabling rapid response to customer needs and market changes.

### Broadcom

 Broadcom's Tanzu division, led by Purnima Padmanabhan, assures customers that its Tanzu application development toolkit remains a key part of the post-acquisition strategy, emphasizing a push for simplicity, integration with Al services, and commitment to multicloud capability, particularly with Cloud Foundry.

### Diodes Inc.

- Introducing the PI3CLS9606: A high-performance, ultra-low voltage level shifter designed for SMBus, I2C, and I3C applications in data center and AI server environments. This advanced device facilitates smooth communication and data integrity between disparate components with its wide voltage range and compact design.
- The AL1783Q is a three-channel linear LED driver featuring three independent PWM dimming controls, enabling precise and customizable illumination settings for various lighting applications.

### Infineon

- Infineon and HD Korea Shipbuilding & Offshore Engineering are partnering to develop ship electrification technology, aiming to enhance marine
  vessels' propulsion drive technology and contribute to environmental sustainability through the use of energy-efficient power semiconductor
  technology.
- Infineon Technologies and Green Hills Software have collaborated to launch an integrated microcontroller-based processing platform for safety-critical real-time automotive systems, combining Green Hills' safety-certified real-time operating system (RTOS) µ-velOSity with Infineon's new AURIX TC4x safety controllers, aimed at providing OEMs and Tier 1 suppliers with a reliable, safe, and secure platform for developing domain controllers, zonal controllers, and drivetrains for electric vehicles in next-generation software-defined vehicle architectures.
- ASE Technology Holding Co. Ltd. is set to acquire Infineon Technologies AG's manufacturing sites in the Philippines and South Korea, including the Cavite and Cheonan plants, through its subsidiaries ASE Inc. and ASE Korea Inc., respectively. Infineon will continue to receive manufacturing services under long-term supply agreements, ensuring continuity for its customers while enabling mutual synergy potentials and strengthening supply chain resilience. The transaction is expected to close towards the end of the second calendar quarter of 2024, when all pending closing conditions will have been fulfilled.

### Intel

- Intel Aims to Surpass TSMC with Advanced Chip Manufacturing, Intel unveils ambitious plans to reclaim semiconductor dominance from TSMC, introducing Intel 18A manufacturing technology and targeting the world's fastest chips by 2026. CEO Pat Gelsinger's vision includes leveraging partnerships, US government investments, and geographic diversity to revitalize Intel's competitiveness. While collaborations with Arm Holdings and top universities signal Intel's commitment to innovation, analysts caution patience amid turnaround efforts.
- US Government Set to Invest \$3.5 Billion in Intel for Military Chip Production, Intel is poised to receive a significant boost in its semiconductor
  production capacity for military and intelligence applications, with the US government planning a \$3.5 billion investment. This initiative, part of the
  RAMP-C program, aims to position Intel as a key provider in the defense market alongside companies like IBM, Microsoft, and NVIDIA. The funding,
  potentially sourced from the CHIPS and Science Act or the Secure Enclave program, underscores efforts to strengthen domestic semiconductor
  manufacturing capabilities, aligning with broader government initiatives like the Chip Act enacted in 2022.



### Kyocera

- Kyocera launches a \$40 million corporate venture capital fund, the "Kyocera Ventures Innovation Fund-I," on April 1, 2024, focusing on supporting startups primarily in Japan and Asia across various sectors such as environment, energy, healthcare, and technology, in collaboration with Global Brain Corporation.
- Kyocera introduces the "5814 Series," a 0.3mm pitch Board-to-Board connector designed for advanced consumer electronics, boasting compact dimensions and a unique metal fitting structure to prevent damage during mating operations, now available for general sale since February 5th, 2024, catering to the trend of miniaturization and expanding functionality in communication terminals and wearable devices.
- Kyocera unveils the new "KJ4B-EX1200-RC" inkjet printhead featuring ink recirculation technology at the nozzle, set to launch in April 2024, boasting
  industry-leading jetting performance and compatibility with various inks, catering to diverse printing applications like commercial and package
  printing.

### Lattice

- Lattice Semiconductor extends its ORAN solution stack with integrated 5G small cell bridging capabilities, introducing a PCIe® to JESD interface bridge for low power acceleration in 5G Datapath applications, aiming to enhance next-gen wireless infrastructure for various sectors such as smart factories, smart cities, and smart cars.
- Lattice Semiconductor earns multiple 2024 Globee Cybersecurity Awards, with its Sentry™ solution stack winning Gold in Embedded Security, SupplyGuard™ service securing Silver in Software Supply Chain Security, and its Security Seminar series receiving Bronze in Thought Leadership in Strengthening Cyber Resiliency, highlighting the company's dedication to providing advanced security solutions and resources in today's digital landscape.
- Lattice Semiconductor introduces an enhanced version of its Lattice Radiant® design software, incorporating expanded functional safety and reliability features by integrating the latest Synopsys Synplify® FPGA synthesis tool with Triple Modular Redundancy (TMR), providing advanced design automation flow for FPGA-based applications in Industrial, Automotive, and Avionics markets, ensuring robustness and compliance with industry standards such as DO-254, IEC 61508, and ISO 26262.

### Murata

- Murata Manufacturing Co., Ltd.'s subsidiary, Izumo Murata Manufacturing Co., Ltd., initiates construction of a new production building in March 2024 with completion slated for March 2026 in Izumo City, Shimane Prefecture, Japan, as part of its diversification strategy to meet the rising demand for multilayer ceramic capacitors.
- Murata introduces the Type 2FR IoT connectivity module, compliant with Matter standards, featuring Matter-enabled NXP RW612 wireless MCU with tri-radio capabilities, targeted at smart home, industrial automation, and smart city applications, offering seamless connectivity, high integration, and robust security with reduced size and development time.

### Nexpria

- Nexperia unveils a new series of 4- and 8-channel analog switches designed for monitoring and protecting 1.8 V electronic systems in automotive, consumer, and industrial applications, featuring independent control pins, fail-safe logic, and power-off protection to enhance system safety and simplify design, with integrated injection current control circuitry to eliminate the need for external components and reduce costs and board space.
- Nexperia expands its lineup of discrete FET solutions at APEC 2024 with new MOSFET offerings including 100 V application-specific MOSFETs (ASFETs) for Power over Ethernet (PoE) in space-saving DFN2020 packaging and 40 V NextPowerS3 MOSFETs with enhanced electromagnetic compatibility (EMC) performance, aimed at simplifying design challenges and providing efficient solutions across various applications, showcasing the company's commitment to innovation and customer support.
- Nexperia introduces new high-efficiency, dual-output LCD bias power supplies, the NEX10000 and NEX10001, designed to prolong the lifespan of TFT-LCD panels in smartphones, tablets, VR headsets, and LCD modules, featuring I<sup>2</sup>C programmable asymmetric voltage outputs, internally compensated design, and small form factor in a wafer level chip scale package (WLCSP), aiming to extend battery life and video display longevity while providing stable images.

### NVIDIA

- A 7.4-magnitude earthquake in Taiwan, impacting chipmaker TSMC, Nvidia's key supplier, may disrupt Nvidia's chip production, as TSMC temporarily halts operations; however, neither company has provided official statements on the potential impact.
- Nvidia plans to establish a \$200M AI center in Indonesia in collaboration with the government and Indosat, aiming to bolster the nation's AI capabilities amidst global competition, with construction set to begin in 2024.



### NXP

- NXP Semiconductors (NXPI) is aggressively pursuing growth opportunities in the software-defined vehicle (SDV) market, leveraging its S32 CoreRide platform, SAF86xx radar SoC, Trimension NCJ29D6 UWB family, and S32M2 motor control solution, expected to drive solid traction across automotive manufacturers and boost performance despite challenging macroeconomic conditions.
- SECO and NXP collaborate to integrate Clea, an AI as a Service (AlaaS) Platform, into industrial and IoT applications, leveraging NXP's hardware to
  optimize AI models deployment, aiming to simplify complexity for customers with ready-made development environments and reference
  implementations, empowering users to access Clea's functionalities efficiently and effectively, facilitating rapid product deployment and market entry.

### Onsemi

 At APEC 2024, Onsemi introduces its 7th generation IGBT-based Intelligent Power Modules, specifically the FS7 1200 V SPM31 product family, designed to enhance efficiency, power density, and thermal management in three-phase inverter drive applications, leveraging substrates like Direct Bonded Copper (DBC) and ceramics for superior thermal performance and effective heat dissipation, aiming to simplify design challenges and increase power density for engineers.

### Panasonic

- Toyota Motor (7203.T) has announced an agreement with Panasonic Holdings (6752.T) to acquire one of their joint ventures, Primearth EV Energy Co, making it a wholly-owned subsidiary of the automaker, with plans to expand production to include batteries for electric vehicles and plug-in hybrid vehicles alongside its existing manufacturing of batteries for gasoline hybrid vehicles, with the acquisition anticipated to be completed in late March.
- Panasonic and Indian Oil are considering establishing a joint venture in India to produce round cells for two- and three-wheeled electric vehicles and stationary energy storage systems, aiming to address environmental challenges and bolster India's position in the global energy landscape, with plans to finalize details by summer of 2024.
- Panasonic Holdings (6752.T) has announced the sale of its entire stake in Panasonic Automotive Systems (PAS) to funds managed by U.S. private equity firm Apollo Global Management, with Panasonic to acquire a 20% stake in Star Japan Holdings, the new parent company of PAS, maintaining a strategic relationship with the automotive business, while also revealing its unit Blue Yonder's acquisition of U.S. digital supply chain network supplier One Network Enterprises for \$839 million, anticipated to be completed in the July-September guarter of 2024.
- Panasonic Energy and Indian Oil are in discussions to establish a joint venture for manufacturing cylindrical lithium-ion batteries in India, targeting the demand from two- and three-wheel vehicles and energy storage systems in the Indian market, aiming to address environmental challenges and contribute to India's self-reliance in the energy landscape.

### Rapidus

- Japan has approved an additional ¥590 billion (\$3.9 billion) in subsidies for chip startup Rapidus to bolster its semiconductor manufacturing
  ambitions, aiming to strengthen its competitiveness against industry leaders like TSMC and Samsung, with the funds directed towards equipment
  procurement and advanced chipmaking processes development. The move aligns with Japan's broader strategy to revitalize its chipmaking industry,
  targeting a significant financial support to chipmakers, including private sector collaborations, to enhance domestic capabilities amid growing global
  geopolitical tensions over semiconductor supply chains.
- Japanese chip venture Rapidus Corp. and U.S. start-up Tenstorrent Holdings Inc. have announced a partnership to jointly produce next-generation
  artificial intelligence chips, focusing on central processing units and accelerator chips for various applications like robots and automobiles. They aim
  to mass produce their chips based on 2-nanometer process technology by 2028, emphasizing speed and development synergy, with Rapidus set to
  manufacture the chips and Tenstorrent providing the design expertise. This collaboration marks Rapidus' first production contract since its formation
  in 2022, backed by major Japanese companies like Toyota and Sony.

### Renesas

- Renesas Electronics Corp.'s new RA2A2 microcontroller, featuring a 24-bit Sigma-Delta analog-to-digital converter and dual-bank flash, enables seamless firmware over-the-air updates for IoT applications, offering low power consumption, AES hardware acceleration, and support for smart energy management and building automation.
- Renesas has unveiled its RA2A2 microcontrollers, featuring an Arm Cortex-M23 processor for low power consumption and robust analog-to-digital
  conversion capabilities, along with dual-bank flash memory to support firmware over-the-air updates for IoT applications like building automation and
  medical devices.
- Renesas Electronics announced its acquisition of electronics design firm Altium for \$5.9 billion, aiming to expand its offerings in digital device design to customers and bolster competitiveness in Japan's chip industry amidst government efforts to enhance supply chain resilience. Renesas plans to finance the purchase with cash on hand and bank loans, with Altium's board recommending the deal, subject to shareholder and regulatory approvals.



### Samsung

- Samsung Commences Trial Production of 2nd-Gen 3nm Chips (SF3) A Game-Changer in Semiconductor Technology, Samsung Foundry has
  initiated trial production of its second-generation 3nm-class process technology, SF3, a significant step in competing with TSMC for dominance in
  advanced process nodes. The SF3 process, building on Samsung's first-generation 3nm, is expected to revolutionize the semiconductor industry by
  enabling more efficient and powerful chips, particularly targeting Al applications. With expectations of over 60% yield rates within six months, the
  successful trial production sets the stage for Samsung's full-scale production, positioning the company to impact diverse sectors and solidify its
  position in the Al era.
- Samsung Electronics Expands HBM Focus with New Development Office Amid Al Surge, Samsung Electronics is intensifying its focus on High Bandwidth Memory (HBM) technology by establishing a dedicated development office, aiming to bolster its competitiveness in the burgeoning HBM market. With plans to enhance research and development capabilities for HBM3e, Samsung joins Micron Technology and SK Hynix in ramping up production to meet soaring demand driven by Al applications. Investment commitments from major players underscore the industry's bullish outlook, with HBM poised to play a pivotal role in next-generation Al servers.
- Samsung Electronics is reportedly aiming to fully automate its semiconductor factories by 2030, utilizing "smart sensors" to control the manufacturing
  process, as part of its initiative to create an "artificial intelligence fab" that operates without human labor. The project, aimed at optimizing IC design,
  materials development, production, yield improvement, and packaging, has already commenced, with defect identification during the production
  process highlighted as a top priority.

### Siemens

- Siemens AG pledged support for the Philippines' digital transformation, offering training for Filipino workers and businesses, leveraging the country's young and English-speaking workforce, as President Ferdinand R. Marcos Jr. emphasized the need for upskilling to navigate modern technologies.
- Iraq signed a memorandum of understanding with Siemens Energy and Schlumberger to address gas flaring and enhance power generation capacity by utilizing captured gas, with the aim of supporting power plants and the national grid. The collaboration is expected to lead to joint ventures and long-term cooperation, contributing to energy security, reduced imports, and environmental protection, according to officials from both sides.

### ST Microelectronics

- STMicroelectronics is adopting an 18-nm fully depleted silicon-on-insulator (FD-SOI) process technology with embedded phase-change memory (ePCM) for its next generation of STM32 microcontrollers, offering improved performance, power consumption, and larger memory sizes, with sampling to selected customers expected in the second half of 2024 and full production planned for the second half of 2025.
- STMicroelectronics CEO Jean-Marc Chery affirms China's significance as a growth market despite US-China semiconductor tensions, emphasizing the company's strategic investments in local production, including a joint venture with Sanan Optoelectronics, to ensure continued growth.
- ST Microelectronics introduces new direct time-of-flight (ToF) 3D lidar module VL53L9 with high resolution and an early design win for the VD55H1 ToF sensor, expanding its presence in 3D depth sensing applications, including mobile-robot deep-vision systems and VR headsets.

### Toshiba

- Toshiba's fab in Nomi City, Ishikawa Prefecture, temporarily shuts down for safety checks following Japan's earthquake, potentially affecting PC component supplies alongside other semiconductor manufacturers like Taiyo Yuden, Tower, Shin-Etsu, GlobalWafers, and TPSCo.
- Toshiba introduces the TS205 TV Mate Soundbar, a compact and affordable 2.0 channel soundbar with multiple connectivity options and three different sound modes, available for purchase at an asking price of RM399.
- Toshiba has commenced volume shipments of its SmartMCD<sup>™</sup> Series gate driver ICs with embedded microcontroller, starting with the TB9M003FG model, designed for sensorless control of three-phase brushless DC motors in automotive applications. This integration aims to reduce system sizes and component counts while enabling advanced motor control, with a reference design available on Toshiba's website to facilitate implementation in automotive body electronics.

### **Tower Semiconductor**

- Tower Semiconductor Assures Safety and Operational Stability Following Ishikawa Earthquake, In the aftermath of the recent earthquake in Ishikawa
  Prefecture, Japan, Tower Semiconductor, a leader in high-value analog semiconductor foundry solutions, provides a reassuring update. Thankfully,
  all employees are reported safe, with no impact on buildings and only minor damage to facilities. The company remains dedicated to the well-being of
  its team, ensuring safety during the recovery phase while actively working on tools requalification and minimizing potential disruptions to
  manufacturing and customer service.
- Tower Semiconductor proposes an \$8 billion fab in India, signaling significant progress in India's semiconductor manufacturing, pending government approval, amid previous failed attempts and uncertainties.
- Tower Semiconductor is reportedly halting operations for three weeks in Newport Beach, California, due to reduced orders amid an industry slowdown, affecting nearly 700 employees, while also planning further closures in July and October. Despite this, the company has listed job vacancies and aims to expand operations, including a proposed investment of \$9 billion to establish a facility in India.



### **Texas Instruments**

- Texas Instruments Faces Semiconductor Demand Slump as Industrial and Automotive Weakness Persists, Texas Instruments Inc. experienced a
  more than 2% decline in its stock as fourth-quarter earnings fell short of analyst expectations, with a 30% YoY drop in net income and a 13% decline
  in revenue, mainly attributed to soft demand from industrial and automotive clients. The company, heavily reliant on these sectors, anticipates
  continued weakness in the upcoming quarter, forecasting a significant drop in revenue and earnings per share. In contrast, competitors like ASML
  Holding NV report a surge in demand for chipmaking equipment, driven by the AI arms race and increased investment in advanced semiconductors.
- Texas Instruments reports disappointing guidance, reflecting industry weakness, with declining sales and net income, especially in industrial and automotive segments, while R&D expenses increase, and capital expenditure rises slightly.
- Texas Instruments plans to transition GaN chip production from 6-inch to 8-inch wafers, aiming for increased productivity and lower costs, with new
  fabs planned in Dallas and Aizu, Japan.

### Vishay

- Vishay Intertechnology has acquired the Newport Wafer Fab from Nexperia for \$177 million in cash, following the UK government's blocking of Nexperia's sale; Newport Wafer Fab is the largest semiconductor manufacturing site in the UK, primarily supplying automotive markets.
- Vishay has released the R3T2FPHM3, an industry-first standard rectifier and transient voltage suppressor (TVS) two-in-one device designed for automotive applications, featuring a 3 A, 600 V standard rectifier and a 200 W TRANSZORB TVS in a compact FlatPAK 5 x 6 package.
- Vishay has acquired Newport Wafer Fab for \$177 million in cash, securing its ownership after discussions with Nexperia, owned by Chinese company Wingtech. Vishay plans to establish a SiC line to produce Trench MOSFETs and diodes at Newport Wafer Fab.



	ANALOG	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
	Amplifiers & Comparators	$\rightarrow$	$\rightarrow$	18+
lard	Analog Interface	$\rightarrow$	$\rightarrow$	18+
Standard	Power Management	$\rightarrow$	$\rightarrow$	18+
	Converters	$\rightarrow$	$\rightarrow$	18+
Standa	ard Analog Total	$\rightarrow$	→	18+
Advan	ced	$\rightarrow$	$\rightarrow$	18+

	MOSI	VICR	OLOGIC	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
MPU				$\rightarrow$	$\rightarrow$	18+
		٢	8 Bit & Lower	$\rightarrow$	$\checkmark$	12-18
	Mau		16 Bit	$\rightarrow$	$\rightarrow$	18+
		L	32 Bit & Higher	$\rightarrow$	$\checkmark$	12-18
MCU T	otal			$\rightarrow$	$\rightarrow$	18+
Autom	otive M	CU		$\rightarrow$	$\rightarrow$	28+
DSP				$\rightarrow$	$\rightarrow$	28+

PROGRAMMABLE LOGIC	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
	<b>→</b>	$\rightarrow$	18+

STAND	ARD LOGIC	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
Timing Products		$\rightarrow$	$\rightarrow$	28+
Interface		$\rightarrow$	$\rightarrow$	28+
Connectivity		$\rightarrow$	$\rightarrow$	28+
Standard Logic		<b>→</b>	<b>→</b>	12-18

	POWER	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
FET		<b>→</b>	$\rightarrow$	18+
IGBT		<b>→</b>	$\rightarrow$	28+
Rectifier		<b>→</b>	$\rightarrow$	12-18
Other Powe	r	$\rightarrow$	$\rightarrow$	12-18



MEMORY	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
Flash	NOR →	$\rightarrow$	12-18
E L	NAND 1	Ť	18+
eMMC	Ť	Ť	12-18
EEPROM	$\rightarrow$	$\rightarrow$	28+
DRAM	Ť	Ť	18+
SRAM	$\rightarrow$	$\rightarrow$	4-10
Solid State Drives	1	<b>↑</b>	28+

SENSORS	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
	$\rightarrow$	<b>→</b>	28+

ОРТО	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
LEDs (Low Power)	$\rightarrow$	$\checkmark$	4-10
LEDs (Mid Power)	$\rightarrow$	$\checkmark$	4-10
LEDs (High Power)	$\rightarrow$	$\checkmark$	12-18
Couplers	$\rightarrow$	$\rightarrow$	18+
Fibre-Optic	$\rightarrow$	$\rightarrow$	18+
Infrared	$\rightarrow$	$\rightarrow$	18+
Other Opto	$\rightarrow$	$\rightarrow$	18+

DISCRETE	PRICING TREND	LEAD TIME TREND	LEAD TIME (WEEKS)
Small Signal	$\checkmark$	$\rightarrow$	4-10
RF	$\rightarrow$	$\rightarrow$	12-18

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41 offices in 27 countries, with dedicated purchasing hubs in Asia, Europe & the Middle East.



$\leftrightarrow$	Stable	Click on a category below:		
	Increasing	Analog	<u>High - End</u>	
	<b>.</b> .	Battery	Interconnect	
Ľ	Decreasing	<b>Connectivity</b>	<u>Opto / Lighting</u>	
SMA	Selective Market Adjustment	Discrete	Memory	
EOL	End-of-Life	<u>Electromechanical</u>	Passives	

## Analog

MANUFACTURER	PRODUCT	LEAD TIME (WEEKS)	TREND	PRICING	COMMENTS
ams	Sensors	10-26	$\leftrightarrow$	SMA	
Bosch Sensortec	Sensors	8-14	$\leftrightarrow$	$\leftrightarrow$	
Diodes Incorporated	Multi- Source Analog/Power	12-22	$\leftrightarrow$	$\leftrightarrow$	
	Switching Regulators	14-26	$\leftrightarrow$	$\leftrightarrow$	
FTDI Chip	Interface	16-22	Ľ	$\leftrightarrow$	
	Sensors	6-28	$\leftrightarrow$	$\leftrightarrow$	
Infineon	Switching Regulators	<b>16-32</b>	$\leftrightarrow$	$\leftrightarrow$	
	Analog and Power for Automotive (CAN/LIN/Smart FET)	38-48	Ľ	$\leftrightarrow$	
Maxlinear	Interface	12-22	Ľ	$\leftrightarrow$	
Melexis	Sensors	14-62	$\leftrightarrow$	$\leftrightarrow$	
	Signal Chain (Amplifiers and Data Converters)	6-12	$\leftrightarrow$	$\leftrightarrow$	
Microchip	Timing	10-14	Ľ	$\leftrightarrow$	
	Switching Regulators	10-22	$\leftrightarrow$	$\leftrightarrow$	
Monolithic Power Systems	Switching Regulators	14-26	$\leftrightarrow$	$\leftrightarrow$	
	Sensors	18-54	$\leftrightarrow$	$\leftrightarrow$	
NXP	Interface	18-26	Ľ	$\leftrightarrow$	
	Analog and Power for Automotive (CAN/LIN/Smart FET)	22-32	Ľ	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WEEKS)	TREND	PRICING	COMMENTS
	Sensors	20-54	$\leftrightarrow$	SMA	
	Signal Chain (Amplifiers and Data Converters)	12-22	$\leftrightarrow$	$\leftrightarrow$	
Onsemi	Timing	22-44	$\leftrightarrow$	$\leftrightarrow$	
	Multi- Source Analog/Power	12-30	$\leftrightarrow$	$\leftrightarrow$	
	Switching Regulators	12-28	$\leftrightarrow$	$\leftrightarrow$	
Panasonic	Sensors	18-28	7	$\leftrightarrow$	
Pericom Saronix-eCera	Timing	22-28	$\leftrightarrow$	$\leftrightarrow$	
Power Integrations	Switching Regulators	18-20	$\leftrightarrow$	$\leftrightarrow$	
	Signal Chain (Amplifiers and Data Converters)	26-38	$\leftrightarrow$	$\leftrightarrow$	
Renesas	Timing	52	$\leftrightarrow$	$\leftrightarrow$	
	Interface	22-32	$\leftrightarrow$	$\leftrightarrow$	
	Switching Regulators	14-24	$\leftrightarrow$	$\leftrightarrow$	
ROHM	Sensors	26-54	7	7	
	Switching Regulators	14-28	$\leftrightarrow$	$\leftrightarrow$	
	Sensors	14-22	$\leftrightarrow$	$\leftrightarrow$	
	Signal Chain (Amplifiers and Data Converters)	12-22	$\leftrightarrow$	$\leftrightarrow$	
ST Microelectronics	Multi- Source Analog/Power	12-22	$\leftrightarrow$	$\leftrightarrow$	
	Switching Regulators	12-22	$\leftrightarrow$	$\leftrightarrow$	
	Analog and Power for Automotive (CAN/LIN/Smart FET)	32-42	Ľ	$\leftrightarrow$	
TE Sensor Solutions	Sensors	18-54	$\leftrightarrow$	SMA	
vishay	Sensors	26-54	7	$\leftrightarrow$	



## **Batteries**

MANUFACTUREF	R PRODUCT	LEAD TIME (WEEKS)	TREND	PRICING	COMMENTS
Alium Batteries	Lithium Ion	22-24	$\leftrightarrow$	$\leftrightarrow$	
	Alkaline	12-14	$\leftrightarrow$	$\Leftrightarrow$	
Energizer	Lithium Metal	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Silver Oxide	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Alkaline	16-18	$\leftrightarrow$	$\Leftrightarrow$	
	Lithium Metal	20-22	$\leftrightarrow$	$\leftrightarrow$	
GP Batteries	Lithium Ion	18-20	$\leftrightarrow$	$\leftrightarrow$	
	Nickle Metal Hydride	12-14	$\leftrightarrow$	$\leftrightarrow$	
	Lead Acid	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Carbon Zinc	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Alkaline	12-14	$\leftrightarrow$	$\leftrightarrow$	
Panasonic	Lithium Metal	18-20	$\leftrightarrow$	$\leftrightarrow$	
	Nickle Metal Hydride	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Carbon Zinc	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Alkaline	12-14	$\leftrightarrow$	$\leftrightarrow$	
Rayovac	Lithium Metal	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Nickle Metal Hydride	10-12	$\leftrightarrow$	7	
	Carbon Zinc	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Lithium Metal	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Lithium Ion	22-24	$\leftrightarrow$	$\leftrightarrow$	
Renata Batteries	Nickle Metal Hydride	12-14	$\leftrightarrow$	7	
	Silver Oxide	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Carbon Zinc	10-12	$\leftrightarrow$	$\leftrightarrow$	



## Batteries

MANUFACTURER	PRODUCT	LEAD TIME (WEEKS)	TREND	PRICING	COMMENTS
	Lithium Metal	14-16	$\leftrightarrow$	$\leftrightarrow$	
Tadiran Batteries	Alkaline	12-14	$\leftrightarrow$	$\leftrightarrow$	
	Lithium Metal	20-26	$\leftrightarrow$	$\leftrightarrow$	
VARTA	Lithium Ion	34-40	$\leftrightarrow$	$\leftrightarrow$	
	Nickle Metal Hydride	12-14	$\leftrightarrow$	7	

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# When Quality is Key - Choose Rebound.

Maintaining the integrty of the supply chain is paramount to us. We back this up with industry-leading quality control and certification.

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AS9120 Rev B



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## **Enhanced Inspection**

In-house enhanced inspection including Creative Electron Truview prime X-Ray system with reel-to-reel capability, Abi Sentry Counterfeit IC detector as well as Keyence VHX-5000 Series microscope and RKD – Chemical Decapsulation.



## Connectivity

MANUFACTURER	PRODUCT	LEAD TIME (WEEKS)	TREND	PRICING	COMMENTS
AMS	RFID	22	7	$\leftrightarrow$	
	802.15.4/Zigbee Modules	28-34	$\leftrightarrow$	$\leftrightarrow$	
CEL	Small Signal, Schottky Diodes, PIN Diodes, Bipolar Transistors, FETs/PHEMTs, Amplifiers, Mixers & Modulators, VCOs, SS Bipolar Transistors, Wideband Transistors	32	$\leftrightarrow$	$\leftrightarrow$	
	Bluetooth Modules	<b>18-26</b>	Ľ	$\leftrightarrow$	
Infineon + Cypress	Small Signal, Schottky Diodes, PIN Diodes, Bipolar Transistors, FETs/PHEMTs, Amplifiers, Mixers and Modulators, VCOs, SS Bipolar Transistors, Wideband Transistors	14-18	$\leftrightarrow$	$\leftrightarrow$	Cypress is now Infineon
Fibocom	Cellular Modules	18-22	$\leftrightarrow$	$\leftrightarrow$	
Kyocera AVX	Antennas	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Wi-Fi Modules	18-38	$\leftrightarrow$	$\leftrightarrow$	
Laird Connectivity	Antennas	14-18	7	$\leftrightarrow$	
	LoRa	~32-54	7	$\leftrightarrow$	
	Cellular Modules	8-12	$\leftrightarrow$	$\leftrightarrow$	
Linx Technologies	Antennas	12-14	7	$\leftrightarrow$	
	Transceivers/Receivers	12-14	7	$\leftrightarrow$	
Melexis	Transceivers/Receivers	18	$\leftrightarrow$	$\leftrightarrow$	
	RFID	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Wi-Fi Modules	14 -22	$\leftrightarrow$	$\leftrightarrow$	
Microchip	Bluetooth Modules	14-22	$\leftrightarrow$	$\leftrightarrow$	
	Transceivers/Receivers	14-22	$\leftrightarrow$	$\leftrightarrow$	
	LoRa	18	$\leftrightarrow$	$\leftrightarrow$	
MultiTech	Cellular Modules LoRa	18-22 ~22	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
	Wi-Fi Modules	28-52	$\leftrightarrow$	$\leftrightarrow$	
	Bluetooth Modules	28-52	$\leftrightarrow$	$\leftrightarrow$	
Murata	Small Signal, Schottky Diodes, PIN Diodes, Bipolar Transistors, FETs/PHEMTs, Amplifiers, Mixers and Modulators, VCOs, SS Bipolar Transistors, Wideband Transistors	14-22	$\leftrightarrow$	$\leftrightarrow$	
	LoRa	32-42	$\leftrightarrow$	$\leftrightarrow$	
Nearson	Antennas	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Multi-Protocol/Chip Solutions	28-38	$\leftrightarrow$	7	
	Transceivers/Receivers	26	$\leftrightarrow$	$\leftrightarrow$	
NXP	RFID	16	$\leftrightarrow$	$\leftrightarrow$	Parts on allocation
	High Power IC's Small Signal, Schottky Diodes,	14-18	$\leftrightarrow$	$\leftrightarrow$	
	PIN Diodes, Bipolar Transistors, FETs/PHEMTs, Amplifiers, Mixers and Modulators, VCOs, SS Bipolar Transistors, Wideband Transistors	14-18	$\leftrightarrow$	$\leftrightarrow$	
Onsemi	Bluetooth Modules	18-32	$\leftrightarrow$	$\leftrightarrow$	
Panasonic	Bluetooth Modules RFID	18-28 16-18	$\leftrightarrow \leftrightarrow$	$ \stackrel{\leftrightarrow}{\leftrightarrow} $	
Pulse Electronics	Antennas	10-12	$\leftrightarrow$	$\leftrightarrow$	
Semtech	Transceivers/Receivers	12-14	7	$\leftrightarrow$	
Senteen	LoRa	12-18	$\leftrightarrow$	$\leftrightarrow$	
Sierra Wireless	Multi-Protocol/Chip Solutions	42-48	$\leftrightarrow$	$\leftrightarrow$	
	Cellular Modules	32-42	$\leftrightarrow$	$\leftrightarrow$	Intel based radios are at 52 weeks
Silex Technology	Wi-Fi Modules	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Bluetooth Modules	12-14	$\leftrightarrow$	$\leftrightarrow$	
	Transceivers/Receivers	14	$\leftrightarrow$	$\leftrightarrow$	Capacity constraints on Spirit Radio
ST Microelectronics	RFID	22	$\leftrightarrow$	$\leftrightarrow$	ST25R39xx on allocation
	GPS	14	$\leftrightarrow$	$\leftrightarrow$	
	High Power IC's	22-32	$\leftrightarrow$	$\leftrightarrow$	
	LoRa	12-14	$\leftrightarrow$	$\leftrightarrow$	

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MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Synapse Wireless	802.15.4/Zigbee Modules	20-22	$\leftrightarrow$	$\leftrightarrow$	
Taoglas	Antennas	22-24	7	$\leftrightarrow$	
ТДК	Small Signal, Schottky Diodes, PIN Diodes, Bipolar Transistors, FETs/PHEMTs, Amplifiers, Mixers and Modulators, VCOs, SS Bipolar Transistors, Wideband Transistors	14-22	$\leftrightarrow$	$\leftrightarrow$	
Thales	Cellular Modules	14-22	$\leftrightarrow$	$\leftrightarrow$	
	Bluetooth Modules	14-28	$\leftrightarrow$	$\leftrightarrow$	
U-Blox	Cellular Modules	14-28	$\leftrightarrow$	$\leftrightarrow$	Parts are on allocation, lead time is 26+
	GPS	14-28	$\leftrightarrow$	$\leftrightarrow$	Parts are on allocation and increasing in cost
	WiFi Modules	14-28	$\leftrightarrow$	$\leftrightarrow$	

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Preventing problems in your supply chain.

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## Discrete

IGBTs       42-54       +       +         Bridge Rectifiers       50-52       +       +         Rectifiers       18-52       -       SMA         Optocoupler Components       18-22       +       +         Low Voltage MOSFETS       12-38       -       SMA         High Voltage MOSFETS       12-34       -       +         IGBTs       16-54       -       -	MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Brige Rectifiers     10.18 $\leftrightarrow$ $\leftrightarrow$ Shotty Diodes     10.4 $\varkappa$ $\leftrightarrow$ Rectifiers     10.66 $\leftrightarrow$ $\leftrightarrow$ Shotty Diodes     10.14 $\leftrightarrow$ $\leftrightarrow$ Shotty Diodes     10.14 $\checkmark$ $\leftrightarrow$ Diode Transistors     10.14 $\checkmark$ $\leftrightarrow$ Diotal Transistors     10.14 $\checkmark$ $\leftrightarrow$ Diotal Transistors     10.14 $\checkmark$ $\leftrightarrow$ Atom     10.14 $\checkmark$ $\leftrightarrow$ Atom     10.14 $\checkmark$ $\leftrightarrow$ Diotal Transistors     10.14 $\checkmark$ $\leftrightarrow$ Atom		Low Voltage MOSFETS	10-18	Ľ	SMA	
Shouts, Diale       10.14       K         Shouts, Diale       10.16       S         Becifiers       10.16       S         Swiding Dioles       10.14       K         Swiding Dioles       10.14       K         Swiding Dioles       10.14       K         Swiding Dioles       10.14       K         Biolar Transistors       10.14       K         Digital Transistors       10.14       K         Ogeneral Pupose Transistors       10.14       K         Digital Transistors       10.14       K         Ogeneral Pupose Transistors       10.14       K         Topic       10.14       K         Arton       SD       SD         Arton       SD<		TVSDiodes	8-14	Ľ	$\leftrightarrow$	
Rectifiers       10-16       ↔         Switching Diodes       10-14       ↔         Smild grad MOSFETS       10-14       ↓         Ippolar Transistors       10-14       ↓         Diodes       10-14       ↓         Ippolar Transistors       10-14       ↓         Diodes       10-14       ↓         Ippolar Transistors       10-14       ↓         Diodes       10-14       ↓         Ippolar Transistors       10-14       ↓         Ippolar Transistors       10-14       ↓         Ippolar Transistors       10-14       ↓         Ippolar Transistors       10-14       ↓         Ippolar       Ippolar       Ippolar		Bridge Rectifiers	10-18	$\leftrightarrow$	$\leftrightarrow$	
biologs Inc. biologs Inc. bi		Schottky Diodes	10-14	Ľ	$\leftrightarrow$	
Diodes Inc.       Small signal MOSFETS       10.4       L       C         Small signal MOSFETS       10.4       L       C         Biolar Transistors       10.4       L       C         Digital Transistors       10.4       L       C         Digital Transistors       10.4       L       C         Digital Transistors       10.4       L       C         Ceneral Purpose Transistors       10.4       L       C         Logic       10.4       C       C         ATON       EsD       16-22       C       C         ATON       Espand Holders       14-18       C       C         Atom conceptor Components       14-18       C       C         Atom conceptor Components       14-26       C       C         Atom conceptor Components       18-22       C       C		Rectifiers	10-16	$\leftrightarrow$	$\leftrightarrow$	
Snal Sgrad MOSFETS     10-14     L     H       Zare Diodes     10-14     L     H       Bipolar Transistors     10-14     L     H       Digital Transistors     10-14     L     H       Cereal Pupose Transistors     10-14     L     H       Cereal Pupose Transistors     10-14     L     H       Cereal Pupose Transistors     10-14     H     H       Cereal Pupose Transistors     10-14     H     H       ATON     Esp     16-22     H     H       Coperad Holders     14-18     H     H       Verlight     Optocoupler Components     12-26     H       Copocoupler Components     18-22     H     H       Copocoupler Components     12-34     L     H       Copocoupler Components     12-	Diadaa ka	Switching Diodes	10-14	$\leftrightarrow$	$\leftrightarrow$	
Bipolar Transistors       10-14       L       Image: Comparison of the compariso	Diodes Inc.	Small Signal MOSFETS	10-14	Ľ	$\leftrightarrow$	
Index       Indition       In		Zener Diodes	10-14	Ľ	$\leftrightarrow$	
Image: Construction       Image: Construction         General Puppose Transistors       10.14       Label         Logic       10.14       Label         Logic       10.14       Label         ESD       18.22       Label         Fuses       16.22       SMA         Opticoupler Components       14.18       Label         Verlight       Opticoupler Components       24.26       Label         IGBTs       18.22       Label       Label         Moteoupler Components       18.52       Label       Label         IGBTs       18.52       Label       Label       Label         Introductory       Indegree Actifiers       18.52       Label       SMA         Introductory       Indegree Actifiers       18.52       Label       Label         Introductory       Indegree Actifiers       18.32       Label       Label         Introductory       Indegree Actifiers       18.32<		Bipolar Transistors	10-14	Ľ	$\leftrightarrow$	
Infineon Automation and a serie of the serie		Digital Transistors	10-14	Ľ	$\leftrightarrow$	
ATON FUSES		General Purpose Transistors	10-14	Ľ	$\leftrightarrow$	
ATON Fuse function of the func		Logic	10-14	$\leftrightarrow$	$\leftrightarrow$	
Index       16-22       Image: Sint A         Cips and Holders       14-18       Image: Sint A         Severlight       Optocoupler Components       24-26       Image: Cip A         IGBTs       22-54       Image: Cip A       Image: Cip A         IGBTS       Sol-52       Image: Cip A       Image: Cip A         Bridge Rectifiers       Sol-52       Image: Cip A       Image: Cip A         Rectifiers       Sol-52       Image: Cip A       Image: Cip A         Optocoupler Components       18-52       Image: Cip A       Image: Cip A         Iow Voltage MOSFETS       12-38       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A       Image: Cip A       Image: Cip A         Infineon       Image: Cip A <t< td=""><td></td><td>ESD</td><td>18-22</td><td><math>\leftrightarrow</math></td><td><math>\leftrightarrow</math></td><td></td></t<>		ESD	18-22	$\leftrightarrow$	$\leftrightarrow$	
Everlight       Optocoupler Components       24-26       L'	ATON	Fuses	16-22	$\leftrightarrow$	SMA	
IGBTs IGBTs S0-52 $\leftrightarrow$ $\leftrightarrow$ Rectifiers S0-52 $\leftrightarrow$ $\leftrightarrow$ Rectifiers 18-52 $\checkmark$ SMA Optocoupler Components 18-22 $\leftrightarrow$ $\leftrightarrow$ ILOW Voltage MOSFETS 12-38 $\checkmark$ SMA High Voltage MOSFETS 12-34 $\checkmark$ $\leftrightarrow$ IGBTs IGBTs 16-54 $\checkmark$ $\leftrightarrow$ IGBTs 16-54 $\checkmark$ $\leftrightarrow$		Clips and Holders	14-18	$\leftrightarrow$	$\leftrightarrow$	
airchild (ON Semiconductor)       Bridge Rectifiers       SO-52 $\leftrightarrow$ $\leftrightarrow$ Rectifiers       18-52 $\checkmark$ SMA         Optocoupler Components       18-22 $\leftrightarrow$ $\leftrightarrow$ Iww Voltage MOSFETS       12-38 $\checkmark$ $\leftrightarrow$ IgBTs       12-34 $\checkmark$ $\leftrightarrow$ IgBTs       16-54 $\checkmark$ $\leftrightarrow$ Digital Transistors       8-52 $\checkmark$ $\leftrightarrow$ General Purpose Transistors       8-52 $\leftrightarrow$ $\leftrightarrow$	Everlight	Optocoupler Components	24-26	Ľ	$\leftrightarrow$	
Rectifiers       18-52       L       SMA         Optocoupler Components       18-22 $\leftrightarrow$ Low Voltage MOSFETS       12-38       L'       SMA         High Voltage MOSFETS       12-34       L' $\leftrightarrow$ IGBTs       16-54       L' $\leftrightarrow$ Digital Transistors       8-52       L' $\leftrightarrow$ General Purpose Transistors       8-52 $\leftrightarrow$ $\leftrightarrow$		IGBTs	42-54	$\leftrightarrow$	$\leftrightarrow$	
Rectifiers       18-52       Low A         Optocoupler Components       18-22	airchild (ON Semiconductor)	Bridge Rectifiers	50-52	$\leftrightarrow$	$\leftrightarrow$	
Low Voltage MOSFETS       12-38       ビ       SMA         High Voltage MOSFETS       12-34       ビ       ↔         IGBTs       16-54       ビ       ↔         Mide Bandgap Mosfets       20-42       ↔       ↔         Digital Transistors       8-52       ビ       ↔         General Purpose Transistors       8-52       ↔       ↔	,	Rectifiers	18-52	⊻	SMA	
High Voltage MOSFETS       12-34       L' $\leftrightarrow$ IGBTs       16-54       L' $\leftrightarrow$ Wide Bandgap Mosfets       20-42 $\leftrightarrow$ $\leftrightarrow$ Digital Transistors       8-52       L' $\leftrightarrow$ General Purpose Transistors       8-52 $\leftrightarrow$ $\leftrightarrow$		Optocoupler Components	18-22	$\leftrightarrow$	$\leftrightarrow$	
Infineon Mide Bandgap Mosfets Digital Transistors General Purpose Transistors 16-54 20-42 20-42 Control		Low Voltage MOSFETS	12-38	⊻	SMA	
nfineon Wide Bandgap Mosfets Digital Transistors General Purpose Transistors 8-52 4 5 5 5 5 5 5 5 5 5 5 5 5 5		High Voltage MOSFETS	12-34	Ľ	$\leftrightarrow$	
Wide Bandgap Mosfets     20-42 <h></h>		IGBTs	16-54	Ľ	$\leftrightarrow$	
General Purpose Transistors 8-52 $\leftrightarrow$ $\leftrightarrow$	Infineon	Wide Bandgap Mosfets	20-42	$\leftrightarrow$	$\leftrightarrow$	
		Digital Transistors	8-52	Ľ	$\leftrightarrow$	
Mil-Aero Transistors 22-42 $\leftrightarrow$		General Purpose Transistors	8-52	$\leftrightarrow$	$\leftrightarrow$	
		Mil-Aero Transistors	22-42	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Isocom Components	Optocoupler Components	4-6	$\leftrightarrow$	$\leftrightarrow$	
IXYS	High Voltage MOSFETS	52-56	$\leftrightarrow$	$\leftrightarrow$	
	IGBTs	52-56	$\leftrightarrow$	$\leftrightarrow$	
Keystone	Clips and Holders	12-18	$\leftrightarrow$	SMA	
Kyocera	Varistors	16-20	$\leftrightarrow$	$\leftrightarrow$	
Lite-On	Optocoupler Components	18-22	$\leftrightarrow$	$\leftrightarrow$	
	ESD	42-62	$\leftrightarrow$	$\leftrightarrow$	
	Diode Arrays	42-62	$\leftrightarrow$	SMA	
	Varistors	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Wide Bandgap Mosfets	14-16	$\leftrightarrow$	$\leftrightarrow$	
Littelfuse	Fuses	10-14	$\leftrightarrow$	SMA	
	PTC Fuses	10-14	$\leftrightarrow$	$\leftrightarrow$	
	Clips and Holders	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Thyristors/Triacs	18-24	$\leftrightarrow$	$\leftrightarrow$	
	TVS Diodes	8-14	Ľ	SMA	
	Sensors	18-32	$\leftrightarrow$	SMA	
	Low Voltage MOSFETS	12-22	Ľ	$\leftrightarrow$	
	High Voltage MOSFETS	16-30	$\leftrightarrow$	$\leftrightarrow$	
	ESD	14-18	$\leftrightarrow$	$\leftrightarrow$	
	TVS Diodes	8-10	$\leftrightarrow$	$\leftrightarrow$	
Micro Commercial Components	Schottky Diodes	12-16	$\leftrightarrow$	$\leftrightarrow$	
	Switching Diodes	12-16	$\leftrightarrow$	$\leftrightarrow$	
	Small Signal Mosfets	12-16	$\leftrightarrow$	$\leftrightarrow$	
	Zener Diodes	12-16	$\leftrightarrow$	$\leftrightarrow$	
	Bipolar Transistors	10-16	$\leftrightarrow$	$\leftrightarrow$	
	General Purpose Transistors	10-16	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMM
icrochip	High Voltage Mosfets	24-52	Ľ	$\leftrightarrow$	
	Wide BandGap Mosfets	26-38	$\leftrightarrow$	$\leftrightarrow$	
	High Voltage MOSFETS	44-54	$\leftrightarrow$	$\leftrightarrow$	
crosemi	IGBTs Mil-Aero Diodes	44-54 28-54	$\leftrightarrow \leftrightarrow$	$\leftrightarrow$	
		34-62	$\leftrightarrow$	$\leftrightarrow$	
	Mil-Aero Transistors		Ľ		
	Low Voltage MOSFETS	8-22		SMA	
	ESD	8-20	$\leftrightarrow$	$\leftrightarrow$	
	Schottky Diodes	6-10	Ľ	$\leftrightarrow$	
	Switching Diodes	6-10	Ľ	$\leftrightarrow$	
eria	Small Signal MOSFETS	8-10	Ľ	$\leftrightarrow$	
pend	Zener Diodes	6-10	Ľ	$\leftrightarrow$	
	Bipolar Transistors	6-10	Ľ	$\leftrightarrow$	
	Digital Transistors	6-10	Ľ	$\leftrightarrow$	
	General Purpose Transistors	6-10	Ľ	$\leftrightarrow$	
	Logic	6-12	$\leftrightarrow$	$\leftrightarrow$	
	Low Voltage MOSFETS		Ľ	SMA	
		14-42			
	High Voltage MOSFETS	14-42	Ľ	$\leftrightarrow$	
	ESD	14-54	Ľ	$\leftrightarrow$	
	Wide Bandgap Mosfets	16-42	$\leftrightarrow$	$\leftrightarrow$	
	Schottky Diodes	12-42	$\leftrightarrow$	$\leftrightarrow$	
	Rectifiers	18-52	Ľ	SMA	
niconductor	Switching Diodes	12-42	Ľ	SMA	
	Small Signal MOSFETS	14-48	Ľ	SMA	
	Zener Diodes	12-42	$\leftrightarrow$	SMA	
	Bipolar Transistors	12-42	Ľ	SMA	
	Digital Transistors	12-42	Ľ	SMA	
	General Purpose Transistors	12-42	$\leftrightarrow$	SMA	
	Logic	15-22	Ľ	$\leftrightarrow$	
ek Devices	Diode Arrays	16-20	7	Я	
esas	Optocoupler Components	54	$\leftrightarrow$	SMA	
	High Voltage MOSFETS	18-22	Ľ	$\leftrightarrow$	
	Wide Bandgap Mosfets	22-34	$\leftrightarrow$	$\leftrightarrow$	
	Schottky Diodes	14-22	$\leftrightarrow$	$\leftrightarrow$	
IM	Switching Diodes				
		14-22	$\leftrightarrow$	$\leftrightarrow$	
	Digital Transistors	14-22	Ľ	$\leftrightarrow$	
	General Purpose Transistors	14-22	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Schurter	Fuses	22-42	$\leftrightarrow$	7	
	Clips and Holders	22-32	7	7	
Semtech	Diode Arrays	10-14	$\leftrightarrow$	$\leftrightarrow$	
	Low Voltage MOSFETS	52-56	Ľ	$\leftrightarrow$	
	High Voltage MOSFETS	16-42	Ľ	$\leftrightarrow$	
	IGBTs	14-54	Ľ	$\leftrightarrow$	
	ESD	24-34	Ľ	$\leftrightarrow$	
ST Microelectronics	Wide Bandgap Mosfets	44-54	$\leftrightarrow$	$\leftrightarrow$	
	Thyristors/Triacs	18-20	$\leftrightarrow$	$\leftrightarrow$	
	TVS Diodes	28-32	$\leftrightarrow$	$\leftrightarrow$	
	Rectifiers	16-18	$\leftrightarrow$	SMA	
	Bipolar Transistors	42-54	$\leftrightarrow$	$\leftrightarrow$	
TDK EPCOS	Varistors	16-28	$\leftrightarrow$	$\leftrightarrow$	
TE Connectivity	PTC Fuses	10-14	$\leftrightarrow$	$\leftrightarrow$	
	Low Voltage MOSFETS	18-54	Ľ	$\leftrightarrow$	
	High Voltage MOSFETS	12-28	Ľ	$\leftrightarrow$	
	TVS Diodes	10-16	Ľ	$\leftrightarrow$	
Vishay	Bridge Rectifiers	10-36	Ľ	SMA	
	Rectifiers	14-18	$\leftrightarrow$	SMA	
	Zener Diodes	14-22	Ľ	$\leftrightarrow$	
	Optocoupler Components	12-20	Ľ	$\leftrightarrow$	

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## Electromechanical

MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Abracon	Timing	14-54+	Ľ	SMA	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
ADDA	Fans	22-26	$\leftrightarrow$	$\leftrightarrow$	
Alps Electric	Switches	26-34	7	$\leftrightarrow$	
American Zettler	Relays	18-54+	$\leftrightarrow$	$\leftrightarrow$	
Bivar	Hardware	12-18	$\leftrightarrow$	$\leftrightarrow$	
Boyd	Fans	14-16	ק	Я	
	Heatsinks	18-26	$\leftrightarrow$	7	
С&К	Switches	14-32	$\leftrightarrow$	$\leftrightarrow$	
Churod Electronics	Relays	10-32	$\leftrightarrow$	$\leftrightarrow$	
Citizen Finedevice	Timing	14-54	$\leftrightarrow$	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
COSEL	Power Supplies (AC/DC)	50	$\leftrightarrow$	$\leftrightarrow$	
	Power Supplies (DC/DC)	50	$\leftrightarrow$	$\leftrightarrow$	
CTS	Switches	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Timing	14-54	Ľ	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
	Power Supplies (AC/DC)	26-54+	$\leftrightarrow$	$\leftrightarrow$	
CUI Inc	Power Supplies (DC/DC)	14-38	Ľ	$\leftrightarrow$	
	Heatsinks	12-14	$\leftrightarrow$	$\leftrightarrow$	
Delta	Fans	42-54	л	7	
Diodes Inc	Timing	10-14	$\leftrightarrow$	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
E-Switch	Switches	14-16	$\leftrightarrow$	$\leftrightarrow$	
ECS Inc.	Timing	14-42	Ľ	SMA	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
EPSON Electronics America	Timing	14-42	Ľ	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
Essentra Components	Hardware	14-16	7	7	
Fox	Timing	12-42+	$\leftrightarrow$	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
Grayhill	Switches	18-26	$\leftrightarrow$	$\leftrightarrow$	
Неусо	Hardware	12-14	$\leftrightarrow$	$\leftrightarrow$	
Hongfa	Relays	18-54+	$\leftrightarrow$	SMA	
Infineon	Relays	42-54	$\leftrightarrow$	7	
IXYS	Relays	12-32	$\leftrightarrow$	$\leftrightarrow$	
Keystone	Hardware	14-16	$\leftrightarrow$	$\leftrightarrow$	
Kyocera International	Timing	18-30	Ľ	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
MEAN WELL	Power Supplies (AC/DC)	16-20	Ľ	Я	
Microchip	Timing	14-28	$\leftrightarrow$	я	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
Murata	Timing	10-12	$\leftrightarrow$	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
Murata Power Solutions	Power Supplies (AC/DC)	28-54	$\leftrightarrow$	7	
	Power Supplies (DC/DC)	22-42 22-42	$\leftrightarrow \leftrightarrow$	<b>7</b>	

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MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
NKK Switches	Switches	12-20	$\leftrightarrow$	$\leftrightarrow$	
NMB	Fans	28-42	$\leftrightarrow$	$\leftrightarrow$	
Ohmite	Fans	12-14	л	7	
Orion Fans	Fans	18-20	$\leftrightarrow$	$\leftrightarrow$	
Panasonic	Relays	16-32	$\leftrightarrow$	$\leftrightarrow$	
	Switches	12-14	$\leftrightarrow$	$\leftrightarrow$	
Qualtek	Fans	22-26	$\leftrightarrow$	$\leftrightarrow$	
Raltron	Timing	12-42	$\leftrightarrow$	$\leftrightarrow$	Tuning Fortks-32.7668KHZ and 40-52+ weeks, TCXO's are on allocation due to AKM fire
RECOM	Power Supplies (AC/DC) Power Supplies (DC/DC)	18-42 16-38	$\leftrightarrow \leftrightarrow$	$\leftrightarrow \leftrightarrow$	
Rosenberg	Fans	18-20	$\leftrightarrow$	$\leftrightarrow$	
Schneider Electric	Relays	18-20	$\leftrightarrow$	$\leftrightarrow$	
Song Chuan	Relays	26-38	$\leftrightarrow$	$\leftrightarrow$	
SUNON	Fans	32-44	$\leftrightarrow$	$\leftrightarrow$	
TE Connectivity Sensors	Relays Switches	14-16 12-14	$\underset{\leftrightarrow}{\leftrightarrow}$	$    \leftrightarrow \\     \leftrightarrow$	All stable except the IM ready Series- allocation 52+ weeks
Vicor	Power Supplies (AC/DC)	28-54	7	7	
	Power Supplies (DC/DC)	28-54	7	7	
Wakefield Thermal	Heatsinks	12-14	$\leftrightarrow$	$\leftrightarrow$	
Wall Industries	Power Supplies (AC/DC)	10-12	$\leftrightarrow$	$\leftrightarrow$	
ZF Electronics	Power Supplies (DC/DC) Switches	10-12 20-22	$\leftrightarrow$	↔ ↗	

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Competitve Price Vs. Tier 1 Manufacturers



## High - End

MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
AZ Displays	LCD's	18-20	Ľ	$\leftrightarrow$	
Compulab	SOM	18-26	Ľ	Ľ	
	8 bit MCU	12-18	Ľ	$\leftrightarrow$	
Cypress	32 bit MCU	12-54	Ľ	$\leftrightarrow$	
	USB Automotive	44-54 34-48	⊻ ↔	$\leftrightarrow$	
Formerica	Fibre Optic Transceivers	14-18	Ľ	$\leftrightarrow$	
Infineon	Automotive	Allocation	$\leftrightarrow$	$\leftrightarrow$	
iWave Systems	SOM	28-32	$\leftrightarrow$	$\leftrightarrow$	
Lattice Semiconductor	FPGA	18-26	Ľ	Ľ	
	8 bit MCU	6-14	Ľ	$\leftrightarrow$	
	32 bit MCU	6-20	Ľ	$\leftrightarrow$	
Microchip	PHY/ Ethernet	6-16	$\leftrightarrow$	Ľ	
	USB	6-16	Ľ	$\leftrightarrow$	
	32 bit MPU	6-22	$\leftrightarrow$	$\leftrightarrow$	
Microsemi	FPGA	10-44	Ľ	$\leftrightarrow$	
	8 bit MCU	15-42	Ľ	$\leftrightarrow$	
	32 bit MCU	15-42	Ľ	$\leftrightarrow$	
NXP	Automotive	20-54	Ľ	$\leftrightarrow$	
	32 bit MPU	20-54	Ľ	$\leftrightarrow$	
	Network Processors	20-44	Ľ	$\leftrightarrow$	
Renesas RA	32 bit MCU	20	Ľ	$\leftrightarrow$	
	8 bit MCU	14-20	Ľ	$\leftrightarrow$	
Renesas	32 bit MCU	20	۲ د	$\leftrightarrow$	
	Automotive 32 bit MPU	48 20-28	$\leftrightarrow \leftrightarrow$	$\leftrightarrow$	
Sharp	LCDs	30-32	Ľ	$\leftrightarrow$	
	8 bit MCU	12-26	Ľ	$\leftrightarrow$	
	Automotive	42-54	$\leftrightarrow$	$\leftrightarrow$	
	32 bit MPU	18-22	Ľ	$\leftrightarrow$	
	STM32F0- 32 bit MCU	12-14	Ľ	$\leftrightarrow$	
ST Microelectronics	STM32F1- 32 bit MCU	18-22	Ľ	$\leftrightarrow$	
	STM32L- 32 bit MCU	18-22	Ľ	$\leftrightarrow$	
	Balance 32 bit MCU	12-14	Ľ	$\leftrightarrow$	
	STM32F2/F4/F7/H7	12-22	Ľ	$\leftrightarrow$	
Zilog	8 bit MCU	26-42	$\leftrightarrow$	$\leftrightarrow$	



## Interconnect

MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Adam Tech	I/O Connectors	18-20	$\leftrightarrow$	$\leftrightarrow$	
	PCB Connectors	18-20	$\leftrightarrow$	$\leftrightarrow$	
Altech Corp.	Terminal Blocks & Crimps	14	$\leftrightarrow$	$\leftrightarrow$	
	D-Sub Connectors	10-12	$\leftrightarrow$	$\leftrightarrow$	
Amphenol Communications Solutions	Data & Telecom	10-12	$\leftrightarrow$	$\leftrightarrow$	
	PCB Connectors	10-12	$\leftrightarrow$	$\leftrightarrow$	
	FFC/FPC	10-12	$\leftrightarrow$	$\leftrightarrow$	
Amphenol Sine System	Circular Connectors	10-22	Ľ	$\leftrightarrow$	
	Data & Telecom	22	$\leftrightarrow$	$\leftrightarrow$	
ASSMAN WSW Components	PCB Connectors	22	$\leftrightarrow$	$\leftrightarrow$	
	IC Sockets	22	$\leftrightarrow$	$\leftrightarrow$	
Bulgin	Circular Connectors	18-20	$\leftrightarrow$	7	
EDAC	PCB Connectors	16-24	$\leftrightarrow$	$\leftrightarrow$	
Global Connector Technology	PCB Connectors	10-12	$\leftrightarrow$	$\leftrightarrow$	
competer (complete)	FFC/FPC	10-12	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
HALO Electronics	Data & Telecom	14-20	Ľ	$\leftrightarrow$	
HARTING	PCB Connectors	12-14	$\leftrightarrow$	R	
	PCB Connectors	10-18	Ľ	$\leftrightarrow$	
Hirose Electric	RF Connectors	10-18	Ľ	$\leftrightarrow$	
	FFC/FPC	10-18	Ľ	$\leftrightarrow$	
JST	PCB Connectors	18	$\leftrightarrow$	$\leftrightarrow$	
Mil-Max	PCB Connectors	6-8	$\leftrightarrow$	7	
	IC Sockets	6-8	$\leftrightarrow$	7	
Ouipiin	PCB Connectors	16-22	Ľ	$\leftrightarrow$	
Sullins	PCB Connectors	8-10	$\leftrightarrow$	$\leftrightarrow$	
	Automotive Connectors	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Circular Connectors	14-18	$\leftrightarrow$	*	
	Relays	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Data & Telecom	14-18	$\leftrightarrow$	$\leftrightarrow$	
TE Connectivity	PCB Connectors	14-18	$\leftrightarrow$	$\leftrightarrow$	
	RF Connectors	14-18	$\leftrightarrow$	$\leftrightarrow$	
	IC Sockets	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Terminal Blocks & Crimps	14-18	Ľ	$\leftrightarrow$	
	Lighting Connectors	14-18	$\leftrightarrow$	$\leftrightarrow$	
WAGO	Terminal Blocks & Crimps	16	$\leftrightarrow$	$\leftrightarrow$	
	Lighting Connectors	16	$\leftrightarrow$	$\leftrightarrow$	
WECO	Terminal Blocks & Crimps	22	$\leftrightarrow$	$\leftrightarrow$	



## Lighting Solutions & Opto

MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Bridgelux	Chip On Board (CoB)	8-10	$\leftrightarrow$	$\leftrightarrow$	
Dialight	Indication LEDs 6V (LED Optics)	12-18 12-18		⊼ ↔	
	Automotive LEDs (AEC-Q101 Certified)	10-12	$\leftrightarrow$	$\leftrightarrow$	
Everlight	Infrared Components/ LED	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Indication LEDs	16-18	$\leftrightarrow$	$\leftrightarrow$	
	UV LEDs	10-12	$\leftrightarrow$	$\leftrightarrow$	
Excellence Optoelectronics Inc.	Automotive LEDs (AEC-Q101 Certified)	10-12	$\leftrightarrow$	$\leftrightarrow$	
General Luminaire	Standard Light Engines (Level 2 Boards)	16-18	$\leftrightarrow$	$\leftrightarrow$	
Inolux	Indication LEDs	8-10	$\leftrightarrow$	$\leftrightarrow$	
Kingbright	LED Displays	12-14	$\leftrightarrow$	$\leftrightarrow$	
	Indication LEDs	10-12	$\leftrightarrow$	SMA	
	Infrared Components/ LED	16-18	$\leftrightarrow$	$\leftrightarrow$	
Lite-On	LED Displays	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Indication LEDs	18-22	$\leftrightarrow$	$\leftrightarrow$	
Lumex	LED Displays	18	$\leftrightarrow$	$\leftrightarrow$	
	Indication LEDs	10-16	$\leftrightarrow$	$\leftrightarrow$	
	Illumination High Power LEDs (White)	10-14	$\leftrightarrow$	SMA	
	Illumination High Power LEDs (Colors)	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Illumination High Power LEDs (White & Colors)	10-12	$\leftrightarrow$	SMA	
	Horitcultural Mid Power LEDs (White & Colors)	10-12	$\leftrightarrow$	$\leftrightarrow$	
Lumileds	Automotive LEDs (AEC-Q101 Certified)	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Chip On Board (CoB)	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Standard Light Engines (Level 2 Boards)	20-28	$\leftrightarrow$	$\leftrightarrow$	
	Infrared Components/ LED	28	$\leftrightarrow$	$\leftrightarrow$	
	UV LEDs	14-18	$\leftrightarrow$	$\leftrightarrow$	
Meanwell	LED Drivers	12-22	$\leftrightarrow$	$\leftrightarrow$	
Murata	Lighting Controls	28-32	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
	Illumination High Power LEDs (White)	8-12	$\leftrightarrow$	$\leftrightarrow$	
	Illumination High Power LEDs (Colors)	8-12	$\leftrightarrow$	$\leftrightarrow$	
Nichia	Illumination High Power LEDs (White & Colors)	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Horitcultural Mid Power LEDs (White & Colors)	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Chip On Board (CoB)	14-16	$\leftrightarrow$	$\leftrightarrow$	
ROHM	Infrared Components/ LED Indication LEDs	8-10 12-14	$\leftrightarrow \leftrightarrow$	$\leftrightarrow \\ \leftrightarrow$	
	Illumination High Power LEDs (White)	8-10	$\leftrightarrow$	SMA	
	Illumination High Power LEDs (White & Colors)	10-12	$\leftrightarrow$	$\leftrightarrow$	
Samsung LED	Horitcultural Mid Power LEDs (White & Colors)	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Chip On Board (CoB)	8-10	$\leftrightarrow$	$\leftrightarrow$	
	Standard Light Engines (Level 2 Boards)	8-10	$\leftrightarrow$	SMA	
	Illumination High Power LEDs (White)	8-10	$\leftrightarrow$	$\leftrightarrow$	
	Illumination High Power LEDs (White & Colors)	8-10	$\leftrightarrow$	$\leftrightarrow$	
Seoul Semiconductor	Horitcultural Mid Power LEDs (White & Colors)	8-10	$\leftrightarrow$	SMA	
	Chip On Board (CoB)	10-12	$\leftrightarrow$	$\leftrightarrow$	
	Standard Light Engines (Level 2 Boards)	12-14	$\leftrightarrow$	$\leftrightarrow$	
Seoul Viosys	UV LEDs	10-12	$\leftrightarrow$	$\leftrightarrow$	
Stanley Electric	LED Displays Indication LEDs	14 12-14	$\leftrightarrow \leftrightarrow$	$\leftrightarrow$	
TE Connectivity	6A (Heat Sinks, LED Holders)	22-52	$\leftrightarrow$	$\leftrightarrow$	
TT Electronics- Optek Technology	Infrared Components/ LED	28-46	$\leftrightarrow$	7	
VCC	Indication LEDs	14	$\leftrightarrow$	7	
	Infrared Components/ LED	10-22	Ľ	$\leftrightarrow$	
Vishay	Indication LEDs	10-32	$\leftrightarrow$	7	
	UV LEDs	16-18	$\leftrightarrow$	$\leftrightarrow$	

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## Memory

MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
	Memory Modules	8-10	$\leftrightarrow$	7	
ADATA	eMMC	8-10	7	7	
	Memory Cards	10-12	$\leftrightarrow$	7	
	Solid State Drives (SSD)	10-14	7	7	
	PC (Commodity) DRAM	4-22	$\leftrightarrow$	7	
	Mobile RAM	14-18	$\leftrightarrow$	7	
Alliance Memory	SRAM NOR Flash	10-32	Ľ	7	
		14-22	$\leftrightarrow$	7	
	NAND Flash	10-26	Ľ	7	
	eMMC	10-14	$\leftrightarrow$	7	
	SRAM	14-54	Ľ	$\leftrightarrow$	
Cypress	NOR Flash	14-28	Ľ	$\leftrightarrow$	
	FRAM & NVSRAM	14-28	Ľ	$\leftrightarrow$	
Everspin Technologies	MRAM	14-30	$\leftrightarrow$	$\leftrightarrow$	
	NOR Flash	10-18	$\leftrightarrow$	$\leftrightarrow$	
Greenliant	eMMC	14-20	7	7	
	Memory Cards	10-18	$\leftrightarrow$	7	
	Solid State Drives (SSD)	10-18	7	7	
	PC (Commodity) DRAM	4-6	$\leftrightarrow$	7	
	Memory Modules	4-8	$\leftrightarrow$	7	
Kingston	eMMC	4-8	7	7	
	Memory Cards	4-12	$\leftrightarrow$	7	
	Solid State Drives (SSD)	6-10	7	7	
	NOR Flash	10-14	$\leftrightarrow$	SMA	
Macronix	NAND Flash	10-14	$\leftrightarrow$	SMA	
	eMMC	20-28	$\leftrightarrow$		rts on allocation, MXIC is not quoting and not king new orders for the time being



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
	SRAM	6-14	Ľ	$\leftrightarrow$	
Microchip	NOR Flash	6-54	Ľ	$\Leftrightarrow$	
	EEPROM	6-54	Ľ	$\leftrightarrow$	
	EPROM	14-28	$\leftrightarrow$	7	
	SRAM	22-42	$\leftrightarrow$	$\leftrightarrow$	
Onsemi	EEPROM	22-32	$\leftrightarrow$	$\leftrightarrow$	
	SRAM	20-24	Ľ	$\leftrightarrow$	
Renesas	NOR FLASH	20-24	Ľ	$\leftrightarrow$	
	DATA FLASH	30-32	$\leftrightarrow$	$\leftrightarrow$	
	PC (Commodity) DRAM	54-56	$\leftrightarrow$	$\leftrightarrow$	
Samsung LED	Memory Modules	54-56	$\leftrightarrow$	$\leftrightarrow$	Parts on allocation, Samsung is not quoting and not
5000500 B 225	eMMC	54-56	$\leftrightarrow$	$\leftrightarrow$	taking new orders for the time being
	Solid State Drives (SSD)	54-56	$\leftrightarrow$	$\leftrightarrow$	
SkyHigh Memory	SLC NAND Flash	8-12	Ľ	SMA	
Skyrligit Methol y	еММС	10-14	$\leftrightarrow$	$\leftrightarrow$	
STMicroelectronics	EEPROM	14-28	$\leftrightarrow$	$\leftrightarrow$	Now on allocation





## Passives

MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Apl Delevan	Inductors	16-18	Ľ	$\leftrightarrow$	
Cornell Dubilier Electronics	Electrolytic	24-48	$\leftrightarrow$	7	
	Capacitor	28-42	Ľ	7	
CTS	Resistor Networks	18-42	$\leftrightarrow$	$\leftrightarrow$	
Eaton	Capacitors - Supercapacitors	12-22	Ľ	$\leftrightarrow$	
	Inductors	22-32	Ľ	$\leftrightarrow$	
ELNA	Capacitors - Supercapacitors	32-54+	$\leftrightarrow$	$\leftrightarrow$	
HALO Electronics	Inductors	16-18	Ľ	$\leftrightarrow$	
	Filters	14-18	$\leftrightarrow$	$\leftrightarrow$	
	Inductor / Transformers	14-22	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors- Ceramic (Less than 1 uf)	12-16	$\leftrightarrow$	$\leftrightarrow$	
Murata	Surface Mount General Capacitors- Ceramic (Greater than 1 uf)	12-14	$\leftrightarrow$	$\leftrightarrow$	
	Leaded Capacitors- Ceramic	18-20	$\leftrightarrow$	$\leftrightarrow$	
	Specialty Capacitors	18	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Electrolytic	24-32	Ľ	$\leftrightarrow$	
	Filters	16-22	$\leftrightarrow$	$\leftrightarrow$	
	Inductors	16-22	$\leftrightarrow$	$\leftrightarrow$	
NIC Components	Fixed Resistors	14-20	$\leftrightarrow$	$\leftrightarrow$	
		20-22	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors - Ceramic (Greater than 1 uf)	16	$\leftrightarrow$	$\leftrightarrow$	
	Leaded Capacitors - Ceramic	28-30	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
Nichicon	Electrolytic	20-32	Ľ	$\leftrightarrow$	
	Electrolytic	20-32	Ľ	$\leftrightarrow$	
	Capacitors- Polymer Tantalum	12-14	Ľ	$\leftrightarrow$	
Panasonic	Inductors / Transformers	20-24	$\leftrightarrow$	$\leftrightarrow$	
	Fixed Resistors	20-32	Ľ	$\leftrightarrow$	
	Resistor Networks	20-30	$\leftrightarrow$	$\leftrightarrow$	
Paktron Capacitors	Capactors- Film	14-18	$\leftrightarrow$	7	
	Fixed Resistors	46-48	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors- Ceramic (Less than 1 uf)	14-16	Ľ	$\leftrightarrow$	
Samsung Electro-Mechanics	Surface Mount General Capacitors – Ceramic (Great than 1 uf)	14-16	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors-Ceramic *Automotive Upgrade	14-16	Ľ	$\leftrightarrow$	
Stackploe Electronics	Fixed Resistors	20-32	$\leftrightarrow$	$\leftrightarrow$	
Sumida	Inductors	22-26	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors- Ceramic (Less than 1 uf ) Surface Mount General Capacitors- Ceramic (Greater	20-22 22-24	$\leftrightarrow$	$\leftrightarrow$	
Taiyo Yuden	than 1 uf ) Surface Mount General Capacitors-Ceramic	22-24	$\leftrightarrow$	$\leftrightarrow$	
	*Automotive Upgrade Filters	14-18	7	7	
	Surface Mount General Capacitors- Ceramic ( Less than 1 uf )	22-26	$\leftrightarrow$	$\leftrightarrow$	
тдк	Surface Mount General Capacitors- Ceramic ( Greater than 1 uf )	26-32	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors-Ceramic *Automotive Upgrade	26-32	Ľ	$\leftrightarrow$	
	Capacitors- Film	26-54+	$\leftrightarrow$	$\leftrightarrow$	
TDK EPCOS	Filters	14-18	7	$\leftrightarrow$	
	Inductors / Transformers	18-22	$\leftrightarrow$	$\leftrightarrow$	



MANUFACTURER	PRODUCT	LEAD TIME (WKS)	TREND	PRICING	COMMENTS
TT Electronics- BI Technologies	Trimmers & Pots	42-54	$\leftrightarrow$	$\leftrightarrow$	
TT Electronics- IRC	Fixed Resistors	22-54	7	7	
United Chemi-Con	Electrolytic	24-36	Ľ	$\leftrightarrow$	
Viking	Surface Mount General Capacitors- Ceramic (Less than 1 uf) Surface Mount General Capacitors- Ceramic (Greater than 1 uf)	18-20 16-18	$\leftrightarrow \leftrightarrow$	$\leftrightarrow \leftrightarrow$	
	Trimmers & Pots	12-22	$\leftrightarrow$	7	
	Capacitors- Film	14-22	Ľ	7	
	Capacitors- Supercapacitors	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Capacitors- Tantalum Molded	12-14	Ľ	$\leftrightarrow$	
	Capacitors- Tantalum Conformals	20-22	$\leftrightarrow$	$\leftrightarrow$	
Vishay	Capacitors- Polymer Tantalum	14-16	Ľ	$\leftrightarrow$	
	Inductors / Transformers	14-16	Ľ	$\leftrightarrow$	
	Fixed Resistors	20	Ľ	$\leftrightarrow$	
	Surface Mount General Capacitors - Ceramic (Less than 1 uf)	16-18	Ľ	$\leftrightarrow$	
	Leaded Capacitors - Ceramic	20-26	Ľ	$\leftrightarrow$	
	Specialty Capacitors	28-36	Ľ	$\leftrightarrow$	
WIMA	Capacitors- Film	14-18	Ľ	$\leftrightarrow$	
Wurth Elektronik	Inductors / Transformers	20-22	$\leftrightarrow$	$\leftrightarrow$	
	Fixed Resistors	20-22	$\leftrightarrow$	$\leftrightarrow$	
	Resistor Networks	22-26	$\leftrightarrow$	$\leftrightarrow$	
,	Surface Mount General Capacitors - Ceramic (Less than 1 uf)	16-18	$\leftrightarrow$	$\leftrightarrow$	
/ageo	Surface Mount General Capacitors - Ceramic (Greater than 1 uf)	16-18	$\leftrightarrow$	$\leftrightarrow$	
	Surface Mount General Capacitors- Ceramic *Automotive Upgrade	16-18	$\leftrightarrow$	$\leftrightarrow$	

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