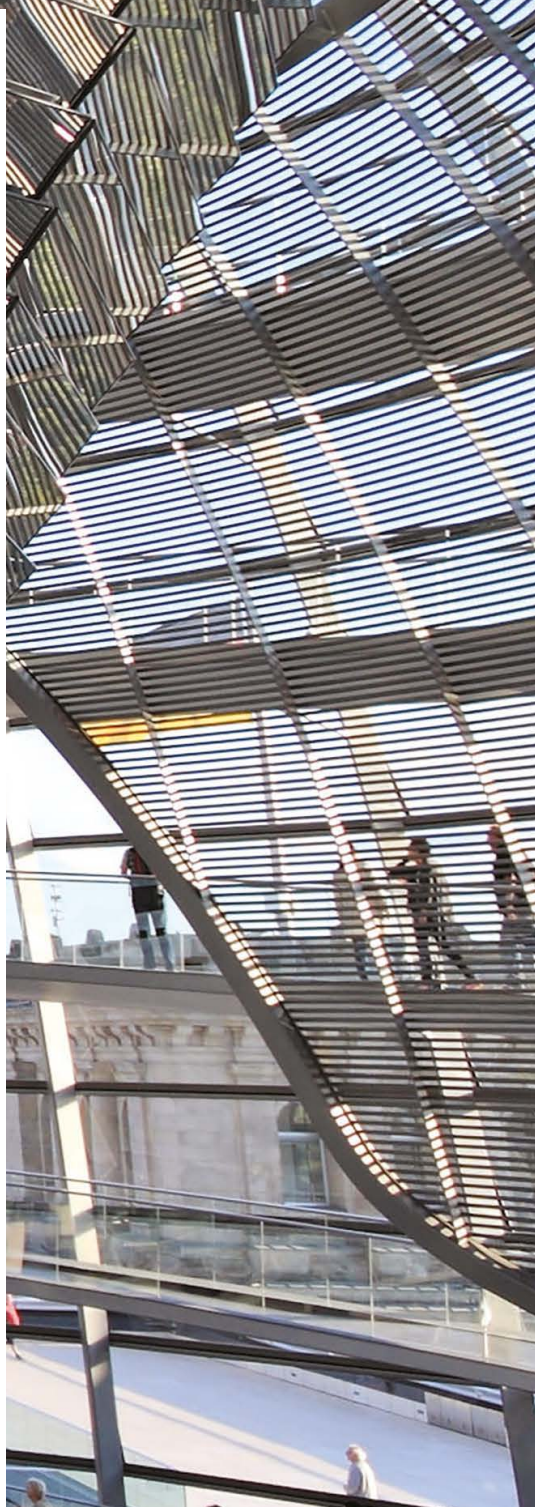
IP&E News

2nd Quarter 2023



We believe in helping the benefits of technology reach as many people as possible.

IP&E by Arrow
High voltage and small sizes

Components – EMEA

Content

One charger for all mobile applications:

USB-C

Choosing the right connector, implement the interface and protect it.

USB-C Connectors

The European Union has issued a new directive that will require all mobile devices sold in the EU after December 2024 to have a USB-C port. This decision has implications for companies in the industry, especially those responsible for the development of mobile devices.

Author: Jörn Herrmann, Technology Application Engineer, Arrow

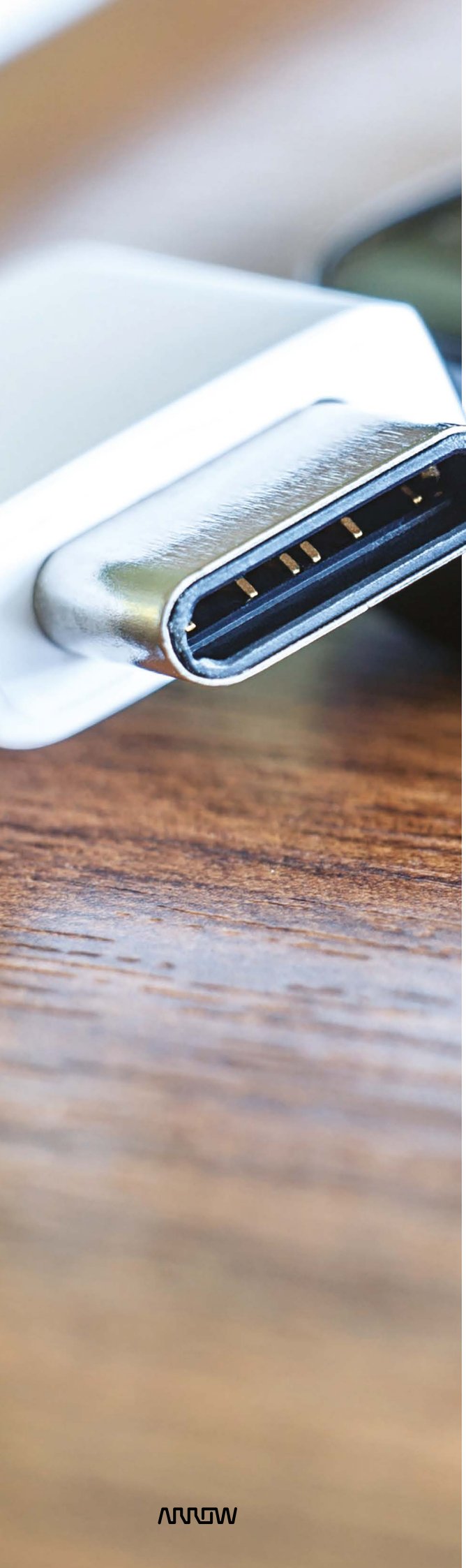
Arrow Electronics can help customers with all aspects of designing a USB-C interface, from selecting the right connector to implementing and protecting the interface. With years of experience and technical expertise, Arrow is able to provide customers with comprehensive advice to help them meet the requirements of the new EU directive.

The USB-C interface not only offers the benefits of faster data transfer and easier connectivity, but also the ability to deliver up to 240 watts of power via USB Power Delivery (USB-PD). Overall, the USB-C interface with USB-PD offers an interesting solution for a faster and more convenient power supply not only for mobile devices, but also for other electrical devices.

In addition to providing a more convenient and flexible way to power devices, it can also help reduce cable clutter and space requirements.

Using USB-C as a universal interface for powering different devices can reduce the number of different adapters and chargers. This, in turn, can reduce the consumption of resources such as materials and energy, and thus have a positive impact on the environment.

In this issue of IP&E News, we look at the USB-C connector and its variants. In upcoming publications we will look at the interface components and the protection of the interface.



USB-C connectors – typical configurations

Right from the start: The full-featured 24-pin USB-C connector is the best choice in most cases, even for applications that only require power or battery charging of devices.

Powering USB-C is often complex issue. When considering the entire application, it is essential to follow the instructions in the relevant standards (USB-PD).

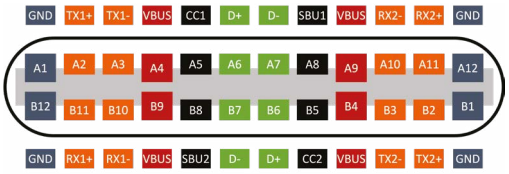
In some cases, however, a stripped-down version of the USB-C connector is desired. Such cases may include:

- Simpler PCB layout due to fewer pins
- Component cost reduction (often only achievable in high volumes)

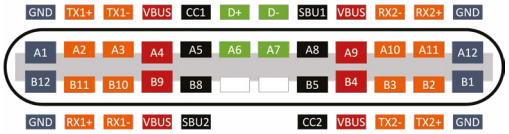
Especially for small and medium quantities, partially assembled connectors often do not offer a significant price advantage. It even limits the possibility to find alternative products in case of delivery problems.

Therefore, it is always a good idea to consider using the standard 24-pin USB-C connector for power supply applications.

24pin – fully equipped – full functionality
With a fully equipped 24pin USB-C you can cover all applications. From simple charging applications to data transfer at 40 Gbps and beyond. For high speed applications such as Thunderbolt and USB4, you will need to check the datasheets to see if the connectors are suitable for the required transfer rates.

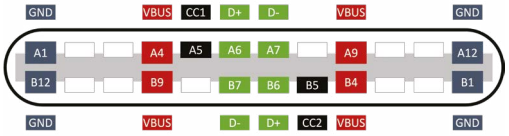


22pin – configuration only for plugs
The 22-pin configuration is only found in connectors such as cables and USB-C memory sticks. Why is this? The USB2.0 data lines (D+, D-) are (usually) always connected in the device jack. No matter how you insert the plug, the contacts are always connected correctly. Therefore, you can omit the two contacts in the plug.

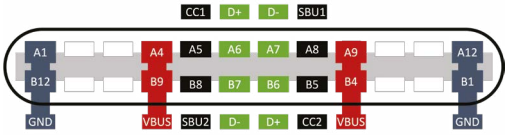


16pin – for USB2.0 data and charging
The 16pin USB-C is intended for applications that do not require data transfer at extremely high speeds. If the transfer rates of USB2.0 are high enough, the unnecessary pins can be omitted. This makes the PCB layout easier and the component may be cheaper.

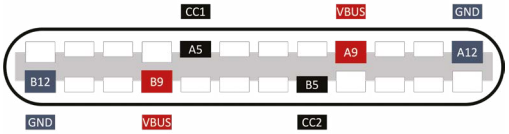
14pin – for USB2.0 data and charging
Like the 16-pin version, the 14-pin USB-C is intended for applications that do not require data transfer at extremely high speeds. In this configuration, the sideband pins (SBU) have been omitted, presumably to meet the cost-saving demands of very large end users.



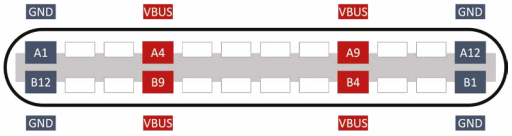
12pin – for USB2.0 data and charging
The 12-pin USB-C is even more simplified than the 14-pin version. The pins for ground and bus voltage are combined on the outside.



6pin – only for charging
No data lines are needed to power or charge devices. Therefore, all data pins are eliminated. The result is the 6-pin USB-C. This makes PCB layout easier.



8pin – only for charging (proprietary)
This is a very exotic configuration where the CC pins have been omitted.



General pin designations

GND – Ground
(ground terminals for power supply)

VBUS – Power Supply
(positive terminals for power supply)

D – Data standard speed
(Differential pair USB2.0 for standard speed data transmission)

RX, TX – High-Speed data
(Differential pairs for high-speed data transfer, often called “super-speed channel”)

CC, SBU – Configuration Signals
(terminals for system configuration, like initial interface negotiation (device roles) and power configurations (USB-PD)

AUTHORIZED DISTRIBUTOR

Miniaturization for Sustainability

50 % CO_2 savings with the industry's smallest automotive qualified crimped terminal, connector and header system

The Green Shift

With global concerns over the impacts of climate change, consumers and governments increasingly demand environmentally friendly and socially responsible practices. The transportation sector especially faces growing pressure to meet sustainability requirements. This has created a quickly expanding market for greener vehicles, greener components, and more sustainable manufacturing processes, leading the industry to prioritize the use of renewable resources, reduce waste, and minimize emissions.

In response to these demands, TE Connectivity (TE) is investing in research and development to find innovative ways to meet these sustainability requirements, and continuously pushing towards the forefront of the green shift.

Sustainability at TE Connectivity

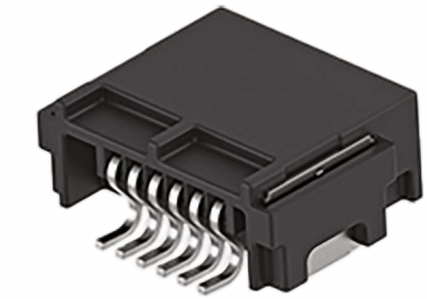
TE holistically approaches sustainability with connected and circular pillars, rather than isolated goals. For their automotive business in the EMEA region, they pursue key targets along the different lifecycle stages to ultimately achieve full circularity – from product design, on to production, transport, product use, and end of life.

Miniaturized Product Design

One example to demonstrate TE's sustainability approach is their PicoMQS miniaturized connector system. It is the industry's smallest automotive qualified crimped terminal, connector and header system, which delivers optimized performance, minimized packaging and ease of manufacturing.

- Automotive-grade robustness with Class 2 vibration stability with maximum temperature of 130 °C (Sn) / 150 °C (Ag). 0.22 wire, continuous current capability up to 4A @80 °
- Best-in-class miniaturization/space reduction for space-constrained signal interfaces with 78 % reduced packaging space (compared to MQS), 1.27 mm pin pitch (30 % reduction), and 55 % reduction in crimp length with complete LV214 qualification
- Smallest LV214 qualified crimped connection with anti-scooping features, secondary locking system and Kojiri connector design
- Manufacturing ease, quality and cost efficiency with automated pin insertion and S-bending pin design for camera control for header and board connection with a reduced pin length by 4 mm (42 % shorter length)
- CO_2 savings in excess of 50 % compared to market standard MQS contact system

TE is continuously learning and improving in sustainability, so that an increasing number of products can be found in their green portfolio.



Orderable at arrow.com
- 1-2332184-1

3M Science. Applied to Life.™

USB3 Vision Ind. Camera Cable Assembly

With what scholars are calling the Fourth Industrial Revolution upon us, the manufacturing industry is steadily moving towards automation, incorporating artificial intelligence into production lines to improve efficiency and better leverage human skill. In this shifting landscape, machine vision has emerged as a key element in driving productivity over a variety of expanding applications.

Whether mounted on mobile or static platforms, machine vision can reduce operator intervention, obtain important quality metrics, identify defective product, scan inventory, identify emergency situations, and carry out many other tasks that promise to reduce downtime and waste while providing quality assurance.

But as need for real-time machine intervention increases, the equipment required demands an increase in signal speed and reach. Machine vision in factory automation is an emerging need to increase speed and reduce downtime.

Explore options for machine vision using USB3 Vision standard cables from 3M™

3M™ USB3 Vision Industrial Camera Cable Assembly products sidestep the obstacles of intensive industrial applications and provide sturdy reliable connections.

- This Series of products has higher functional cable length than any other known USB3 connector solution.
- Non-repetitive & repetitive motion application available
- Excellent transmission up to at least 7 m (1U30UA) and 5 m (1U30US)
- 2 million 10 >durability bending cycle with 1U30US
- Reliable connection with or without locking screws available on USB 3 and Micro B ends
- Micro-B connector available in straight, upward, downward, left-hand, and right-hand configurations
- RoHS2 compliant, CE confirmed
- USB3 Vision® compatible

3M™ offers 1U30A Series and 1U30S Series to give you more flexibility to build the configuration your application needs.

Scan QR-Code to read more and order

Amphenol
COMMUNICATIONS SOLUTIONS

D-Sub High Density Connectors

Amphenol's D-Subminiature high density product line offers a wide range of termination options for board and cable ends, bringing down the overall cost of cable assembly and connectors significantly. The terminations include Straight, Right Angle, SMT, Press Fit, and Slim Sunk for board side, and Solder Cup, Crimping, IDC Ribbon, Solderless Wire Wrap, and Screw Termination for cable side. Each termination variant has both socket and plug connectors.

Two footprint layout styles, European and Military, are available for right angle PCB terminations. The mating area contact finish is always gold with choice of three basic thicknesses: gold flash, 15µ", and 30µ", according to the adequate number of mating cycles desired. Contacts are either offered as precision-machined military-graded versions with current ratings up to 7.5 A for reliability or as more economical and commercially-available stamped versions with a 3 A rating.

Standard line is available in five basic shells sizes from A to E, and our hybrid connectors have up to 18 contact arrangements in signal, power, and coax. The stacked (dual port) D-Sub line is comprehensive in its range of offering. Our newly developed slim (or sunk, or short) series for PIP soldering has a proven success among our commercial customers. Furthermore, we provide accessories for all applications that include metal covers, plastic dust covers, hoods, mounting hardware, gender-change and other adapters.

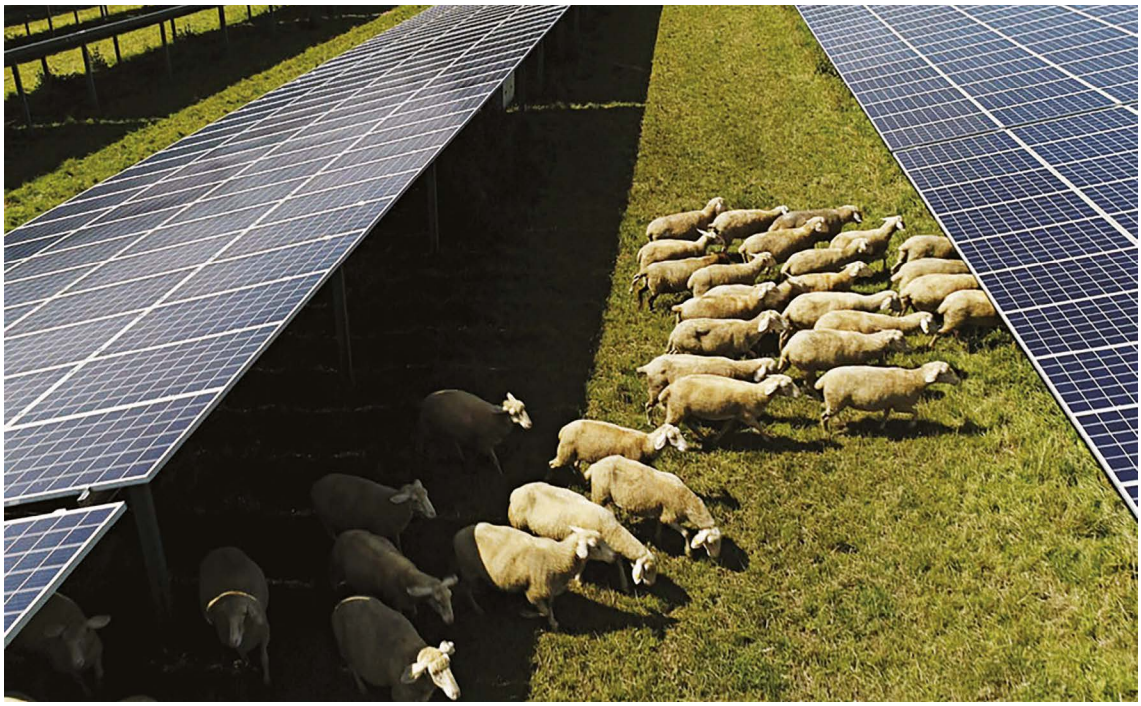
Orderable at arrow.com

– Amphenol Communications Solutions D-Subminiature Connectors

Features	Benefits
Standard D shape connectors	Ensures proper mating orientation
Metal shells for EMI	Suitable for high volume but low cost solutions
Grounding dimples for plug	UL #E232356 certified
Inserts are made of flame-retardant thermoplastic	Supports various customer needs
Commercial stamped contacts are used	Meets industry standards
Variants with a comprehensive range of terminations	Special series are available for Pin-in-Paste or reflow soldering
Both socket and plug are available for each termination variant	

HellermannTyton

Solar EdgeClips



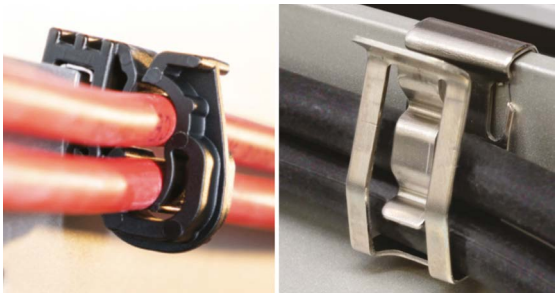
Securely fastening cables in solar parks can be a challenge. Specially developed EdgeClips provide a practical option for fast and reliable cable installation.

EdgeClips are tiny cable tie mounts held in place by spring steel claws. They provide practical anchor points on construction edges for securely fastening solar cables.

Utilising the module edge makes EdgeClips a flexible solution for engineers designing for efficient cable routing. They are simple to push on by hand and press in solar cables.

Single part EdgeClips, the EC1-3SPDHC6-7 (UV and heat stabilised) and MSC2 (stainless-steel), are designed for parallel routing of two cables on panel edges measuring 1.0 – 3.0 mm in width.

The EdgeClip range includes a variety of two-piece EdgeClips, including a cable tie. They cover edge thicknesses ranging from 0.5 – 2.5 mm up to 6.0 – 8.0 mm. Different EdgeClip geometries make it possible to align the cable tie vertically or horizontally on, along or across an edge.



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- 151-03846
- 151-04010
- 156-00570
- 156-00948
- 156-00661
- 156-00698
- 156-00843
- 151-00982

Ultra-Small Chip Antennas

KYOCERA AVX offers the smallest chip antennas in the market using in-house technology.

The ultra-small chip antennas using KYOCERA AVX technology offer a small keep-out area while maintaining the performance of the typical ceramic/LTCC antennas. These versatile antennas can be used for different applications depending on the PCB layout and matching components. The antennas are also available in the A-versions for automotive applications.

A-series: The Automotive Version
The A-versions of the ultra-small chip antennas are AEC-Q200 qualified and therefore meet the automotive standard. PPAP and IMDS are also available for these antennas.

- Size: 1.00 mm x 0.55 mm x 0.40 mm
- Frequency range: 1176 – 1610 MHz or 2.4 / 5 GHz or 6 – 8.5 GHz
- Impedance: 50 Ohms
- Assembly: SMD

Features and Benefits

- Support different technologies (BLE, UWB, GNSS, Wi-Fi, L1/L2/L5/L6 bands)
- High Efficiency in ultra-small size (1 x 0.55 mm)
- SMD
- AEC-Q200 versions available

Typical Applications

- IoT
- Consumer
- Home Appliances
- Industrial
- Medical
- Wearable Devices
- Automotive

Orderable at arrow.com
Antenna PN 9001978
EVB PN:

- 9001978-01 for BLE
- 9001978-03 for Wi-Fi Dual Band
- 9001978-04 for UWB

Antenna PN 9002137
EVB PN:

- 9002137-05 for GNSS L1
- 9002137-06 for GPS L1/L2/L5/L6

Low Ohm Shunt 0805 – 1 W – up to 22 A

Metal Plate Technology – TLR2A / TLRH2A-Series

Low Inductance, Metal Plate Shunt with 'no hotspot' design
KOA's TLR-series uses a special trimming method which not only offers resistance tolerances to 1 % but also very high reliability. Special trimming results in low inductance, a smooth current flow as well as a 'no hotspot' even temperature distribution. The very low inductance values are down to 0.01 nH (dependent of size and r-value). The TLR series has excellent pulse resistance and high-frequency characteristics and is also suitable for high reliability automotive applications.

The **TLR2A** is the 0805inch version of this series and allows power ratings up to 1 W at +105 °C terminal temperature.
0805 inch, 1 W, ±100 ppm/K, 2 mΩ...10 mΩ, ±1 %

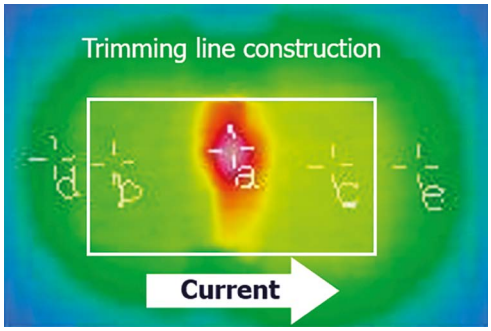
The **TLRH2A** is also size 0805 inch for slightly higher resistance values. It allows power ratings up to 0.5 W at +105 °C terminal temperature.
0805 inch, 0.25~0.5 W, ±75 ppm/K,
12 mΩ...100 mΩ, ±1 %

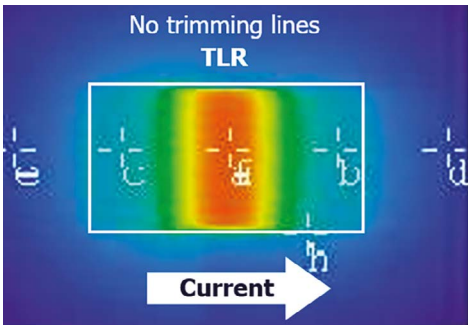
Features and Benefits
- TLR2A: 2 mΩ to 10 mΩ (±1 %)
- TLRH2A: 12 mΩ to 100 mΩ (±1 %)
- Current ratings up to 22.4 A in size 0805
- T.C.R.: ±75 / ±100 ppm/K
- 0.25... 0.3 mm low profile height
- Special no 'hotspot' trimming for higher reliability
- Low parasitic inductance
- Filletless product (soldering area is only the bottom electrode)
- Operating temperatures to +155 °C
- EU-RoHS compliant, AEC-Q200 tested

Applications
- Automotive electronics
- Motor control units
- Power supplies
- Industrial electronics
- AC / DC-DC converter
- Measuring instruments
- Metering
- CPU current sensing
- Mobile device charge controller
- etc.

The newest updated datasheets of these low ohm shunt resistors can always be found on the supplier website of KOA Corporation.

Orderable at arrow.com
- TLR2A: Metal Plate shunt resistors (2 mΩ to 10 mΩ)
- TLRH2A: Metal Plate shunt resistors (12 mΩ to 100 mΩ)





Littelfuse

Expanding eFuse Protection ICs Series

The latest eFuse Protection ICs utilize an innovative design ideal for a wide range of power inputs (3.3 V to 28 V) with highly integrated protection. These semiconductor-based electronic fuses provide robust overvoltage, overcurrent, short circuit, and inrush current protection.

Additional features include reverse current blocking, under voltage lockout (UVLO), soft start, and overtemperature protection with real-time diagnostics – all in one compact chip.

Scan QR-Code to view the video

The latest eFuse Protection ICs are ideal for use in a wide range of electronics designs, including:

5 V Applications
- Portable electronics
- Bluetooth devices
- Wearables
- Smartphones
- USB-C cables
- Internet of Things (IoT)

12 V Applications
- SSD/HDD
- Switch routers
- Enterprise servers
- Telecom
- Appliances
- Fan systems

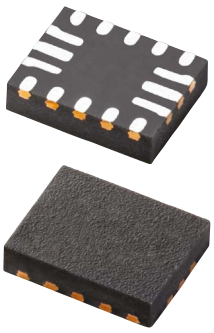
24 V – 28 V Applications
- USB-C PD
- Power tools
- Industry
- POS
- PLC

Orderable at arrow.com

LS0504EDD12

LS2405IDD23

LS12052BD33



LS24062RQ23

molex

Making the Connection for the Smart Factory

Many of us are already familiar with the IoT, using smartphones to control everything from the lights and doors in our homes to the appliances and temperature systems. However, the true potential for the Internet of Things can be found in the industrial environment. The Industrial Internet of Things (IIoT) is transforming the factory.

The Smart Factory

The purpose of the IIoT is to bring every element of the manufacturing process together so that it works as a single entity known as the smart factory. In the traditional factory, each part of the manufacturing process was separate – from the receipt of raw materials through production and finally to the dispatch of completed goods. Each machine on the production line was independent, and the process was managed from a high level. The factory was organized to be very efficient at one task, but not flexible enough to accommodate changes easily.

The smart factory provides the flexibility that traditional factories cannot. The IIoT allows each machine to collect data about its own function and status, which is then shared with the entire network. Not only does this sharing of information allow the efficient operation of the factory, but it also allows any potential problems to be identified so that action can be taken to minimize disruption.

With the advent of the IIoT, all the machines in the factory are connected, sharing data both with each other and with the wider network. Information has become a critical raw material within the smart factory.

The Importance of Connectors

Data connectors must be able to interface with existing computer networks using familiar methods such as RJ45 and USB. The volume of connections required for the magnitude of sensors, drives and controls in the smart factory means that connectors should also be small and compact.

The IIoT offers a huge opportunity for manufacturers to adapt to new ways of working. The smart factory market is growing, with Reuters predicting a acceleration of 10 % per annum for the foreseeable future. Alongside new smart factories, existing users will upgrade their facilities to take advantage of the latest IIoT solutions. Connectors will form an important part of this revolution.

Scan the QR-Code to read how Arrow and Molex collaborate to deliver connectors that are ready for the challenge of the new industrial environment.

Panasonic
INDUSTRY

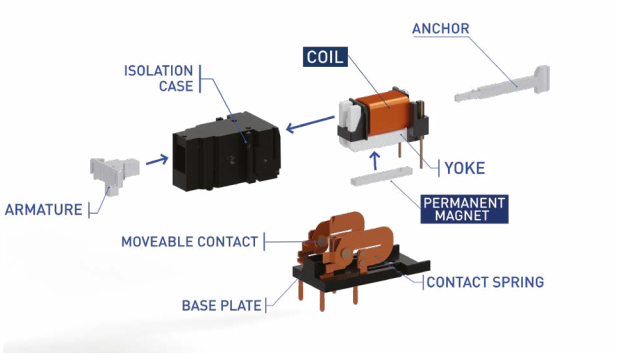
Energy efficiency with polarized power relays

When looking at the design of a typical circuit board in a, let's say, conventional washing machine, there is an obvious potential for saving energy: A whole five to eleven relays can be found on these types of circuit boards -and those are mostly non-polarized types with inevitable power losses due to their coils.

Specifically, each of these relays typically consumes at least 360 mW of power, which means a power loss of altogether 4 W even eleven relays. That may not appear much for one washing machine alone – but considering with millions and millions of households, operating those devices on a daily base, the picture is a very different one.

So let's have a look what polarized power relays have here: Compared to their non-polarized counterparts the main benefit would be the lower power that is required in the for the control circuit of the relay. Resulting from a permanent magnet, which is included into the design. This permanent magnet takes over part of the magnetic force that has to be generated on the drive side to switch the relay.

Moreover: the polarized power relays hardly dissipate any power, especially if they are bi-stable. This means that additional cooling becomes redundant which in turn saves valuable resources and installation space. This is a fundamental advantage in the light of ever smaller and ever more powerful products and applications.



How do polarized power relays compare in terms of cost, when you draw a comprehensive picture from unit costs to potential savings? Assuming the 2021 electricity price level as a basis - and a usage period of twelve hours per day: Compared to a non-polarized relay, a bistable polarized relay achieves a payback, i.e. compensates the slightly higher unit costs already after less than two years! (Employing a monostable polarized relay will pay off in less than five years under these preconditions). Given all this, it makes perfect sense for OEMs to use and promote this energy-efficient relay technology.

Scan QR-Code to view the Video

Orderable at arrow.com

– Series DSP, DK, DW, DE, DJ-H

	DSP		DK		DE		DW		DJ-H
Contact configuration	1A	1A1B, 2A	1A	1A1B, 2A	1A	1A1B, 2A	1A	1A	1A
Single side stable | 1 coil latching | 2 coil latching	•|•|•		•|•|•		•|•|•		•|•|•		•|•|•
AC Voltage	250 V	250 V	250 V	250 V	250 V	250 V	250 V	277 V	277 V
AC Current	8 A	5 A	10 A	8 A	10 A	8 A	8 A	16 A	50 A
DC Voltage	30 V	30 V	30 V	30 V	30 V	30 V			
DC Current	5 A	5 A	10 A	8 A	10 A	8A			
Length x with x height	20x11x10 mm		20x12.5x10 mm		25x12x12.5 mm		24x10x 18.8 mm	24x10x 15,8 mm	39x15x 30.2mm

PANDUIT®

Highly Efficient Solar Solutions

UV Resistent Acetal Solution
Our solution is designed specifically for solar panel installations, offering a quick and easy installation process with no need for cable ties or other additional materials. This saves the installer up to 60 % time. With our clip installers can be confident in a secure and safe installation. Our solution can accommodate a range of solar panel sizes of 1.2 – 2 mm and 6 mm – 1 mm.

Features

- Fast and easy installation with clips
- No need for cable ties
- Lightweight material
- Cost-effective solution
- 20-year lifespan
- Scratch-free surface during installation

Orderable at arrow.com
HCME06A12-M130, HCME04Y09-M130

Adjustable Edge Clip
The adjustable edge clip is developed with the idea to allow a flexible installation . The attachment to the edge of the panel is made possible by a rail system, which allows for easy adjustment and positioning. Thanks to its design it wont scratch or damage the surface of your panels during installation . The bundle diameter can be up to 7.5 mm with an edge size of 20 mm to 35 mm.

Features

- UV resistant Acetal material
- Panel thickness range of 1 – 3 mm
- Edge surface range of 20 – 35 mm
- Bundle diameter of 7.5 mm
- No need for cable ties & 20-year lifespan
- No surface scratches during installation

Orderable at arrow.com
UCCCUL-X130, UCCCDL-X130, UCCAD-C130, UCCPD-C130, UCCPU-C130

Nylon 612 Cable Ties
Panduit always strives to provide innovative solutions and Nylon 612 is no exception. We are confident that with we have launched a game-changer with our exclusive and unique solution. Nylon 612 cable ties provide resistance to UV rays and chemical attacks when exposed to various concentrations of salts, hydrocarbons, chlorinated hydrocarbons, bases, and acid rain. With its long durability of 20 years, we offer a cost-effective innovation that allows our customers 3x lower maintenance costs compared to ordinary cable ties.

Features

- Long lifespan of 20 years
- Excellent chemical resistance
- 3x lower maintenance costs compared to Nylon 6.6 cable ties
- High availability

Orderable at arrow.com
PLT1M-M6120, PLT1.5I-M6120, PLT2S-M6120, PLT2.5S-M6120, PLT3S-M6120, PLT4S-M6120, PLT4H-TL6120, PLT7LH-C6120, PLT8LH-C6120

PANDUIT®

Edge Clip
The Nylon 6.6 Heat Stabilzed Weather Resistant Edge Clip has a strong holding power thanks to its metal locking mechanism. Our solution offers fast and easy installation with pre-mounted cable ties. The Edge Clips are available in various designs suchs as side assembly or top assembly and the tie can optionally come with a steel nose.

Features
- Nylon 6.6, heat-stabilized, weather-resistant
- Panel thickness: 0.7 – 3 mm and 3 – 7 mm
- Flexible bundling diameter with cable ties
- Quick installation with pre-mounted cable ties
- Lifespan: 7-9 years
- Strong holding power

Orderable at arrow.com
CMEA12-2S-D300, CMSA12-2S-D300, CMEA24-2S-D300, CMSA24-2S-D300

Cable Tie Installation Tool
The Cable Tie Installation Tool is designed to simplify the installation process of cable ties, making it faster and easier. Its ergonomic design features an easy-to-grip handle that reduces intaller fatigue and makes the process comfortable and allows clean and flush cut to prevent sharp edges.

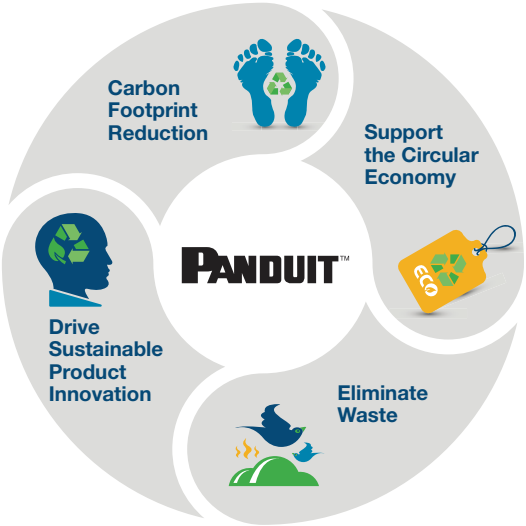
Features
- Ergonomic design reduces installer fatigue
- Clean and flush cut to prevent sharp edges
- No recoil to further protect the installer
- Low maintenance
- Adjustable tightening force for consistent
- attachment

Orderable at arrow.com
GTS-E, GS2B-E, GTH-E, GS4H-E, GS4MT-E

Solar Metal Edge Clip
The clips feature a flat design that saves space and rounded edges that provide added safety. With their simple clip mechanism, installation is quick and easy - no cable tie is needed. This makes the installation process faster and more efficient. Plus, the clip design allows for a secure and tight grip on your solar panels, ensuring that they stay in place even in harsh weather conditions.

Features
- Maximum durability & high quality
- Rounded edges for added safety
- No cable tie needed
- Secure and tight grip on solar panels
- Compatible with panel thicknesses of 1.3 mm to 6.4 mm
- Holds 1 to 4 wires per 4 – 6 mm²

Orderable at arrow.com
MEC100-PV-C, MEC100-2PV-C, MEC125-4PV-C
MEC100-90-PV-C, MEC100-90-2PV-C



“Unlock the Full Potential of Your Solar Installation with PANDUIT® Solutions”

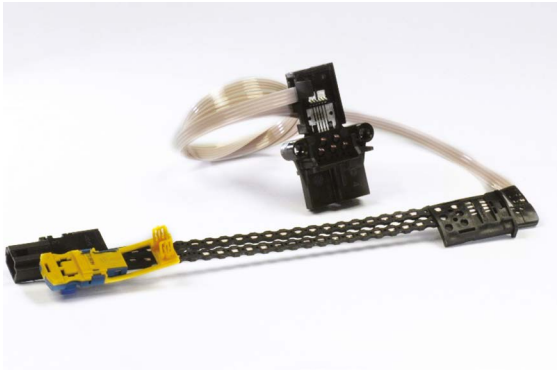
Cables for high durability applications

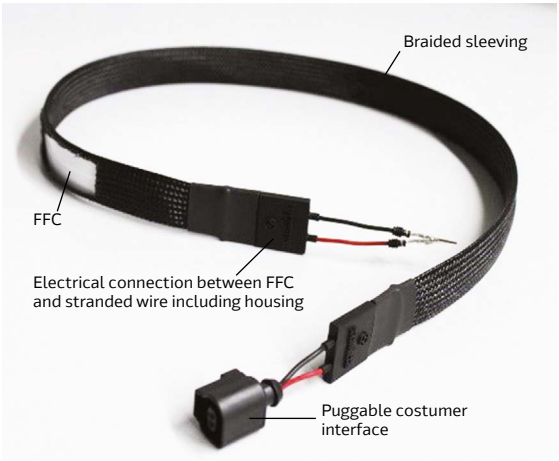
The central element of our cables for high durability bending assemblies is one or more flexible flat cables (FFC). Ideally the FFC could be directly connected with the devices. This is packaging- and costwise the best solution.

In case the OEMs defines a pluggable interface with a transition from FFC to conventional stranded wire required – especially, this is the case when there is a requirement for IP protection classes.

Housing manufactured in different process between FFC (flexible flat cable) and stranded wire leads to mechanical protection against environmental conditions and can be added with various clip elements.

The braided sleeving provides additional mechanical protection of the FFC under dynamic load and fulfils additional requirements in terms of appearance and acoustics (noise damping). The customer has the choice of the stranded wire cross-section depending on the required current carrying capacity or the connection plug.





Facts
- High durability bending
- IP protection classes tested (IPX 4,5,7)
- Variability in the customer interface
- Suitable for signal and power transmission
- Operating temperature -40 °C to +105 °C (+125 °C on request)
- Optional direct connection from FFC to customer interface
- Integration of clipping elements

Areas of application
- Automatic door systems
- Sliding roof
- Tailgate
- Trailing cables (cable trolleys or trailing systems)
- Trailing cable for printer systems

Orderable at arrow.com

TVS diodes for USB Type-C® connectors

The USB Type-C® connector is the most common interface for computers, tablets and smartphones. It supports high-speed data transfer and fast charging of peripheral devices. Like other interfaces, USB Type-C® connectors are frequently exposed to Electrostatic Discharges (ESD), which may cause damage to the sensitive electronics of the connected devices. Therefore, connector pins must be properly protected against ESD.

TDK offers TVS diodes, which are specifically designed to protect USB Type-C® connectors. The portfolio provides the ideal solutions for the high-speed data pins up to 40 Gbps using the fast USB™ 4 40G protocol, as well as the Thunderbolt™ protocol and supports fast device charging via power delivery protocol.

The USB Type-C® connector is flippable with no up or down orientation, achieved by mirroring the pins on both sides of the connector. Figure 1 shows all 24 pins densely arranged without leaving much space for protection diodes. Best practice for ESD protection is to place an ESD component as close as possible to the connector pin. Due to the miniaturized size of TDK TVS diodes, they perfectly fit and offer robust protection with the IEC 61000-4-2 system-level ESD standard.

ESD protection is needed on 20 pins except for the four GND (ground) pins. By connecting the TVS diodes from the pin to GND, a transient current will be redirected to GND at an ESD event. TDK TVS diodes are designed with a snap-back feature with extremely low clamping voltage characteristics due to their “thyristor structure”. This feature guarantees a reliable limitation of over-voltage.

For super-speed Tx/Rx high data-rate pins, TDK offers ULC TVS diodes with low reverse working voltage (±3.3 V) and ultra-low capacitance. ULC TVS diodes are certified for applications with USB™ 4 40 Gbps and Thunderbolt™ signals. Test results show that TDK TVS protection diodes do not impair the communication signal on the lines.

For the protection the differential signal D+/D- pins, TDK offers TVS diodes with a working voltage of ±5.5 V, perfectly suited to USB™ 2 signal levels.

For VBUS power pins and neighboring CC (Configuration Channel) and SBU (Sideband Use) pins, TDK TVS diodes support reverse working voltages up to ±20 V and fast charging functionality with a USB PD (USB Power Delivery) of up to 100 W with 5 A / 20 V.

Orderable at arrow.com

- B74111U0033M060
- B74121U0033M060
- B74111U0055M060
- B74121U0055M060
- B74121G0160M060
- B74121G0200M060

TDK PN	B74121 U0033M060	B74111 U0033M060	B74121 U0055M060	B74111 U0055M060	B74121 G0160M060	B74121 G0200M060
Package	WLCSP 0201	WLCSP 01005	WLCSP 0201	WLCSP 01005	WLCSP 0201	WLCSP 0201
Footprint						
Thickness	150 µm	100 µm	150 µm	100 µm	150 µm	150 µm
Working Voltage	3.3 V	3.3 V	5.5 V	5.5 V	16 V	20 V
Clamping Voltage I_{TLP} = 8 A	3.9 V	3.8 V	4.0 V	3.9 V	22 V	26 V
Capacitance 1 MHz	0.65 pF	0.48 pF	0.55 pF	0.43 pF	6 pF	5 pF
ESD level contact discharge	15 kV	15 kV	15 kV	15 kV	15 kV	>8 kV
PIN to protect	Tx/Rx	Tx/Rx	D+/D- (Tx/Rx)	D+/D- (Tx/Rx)	V_{BUS} (CC/SBU)	V_{BUS} (CC/SBU)

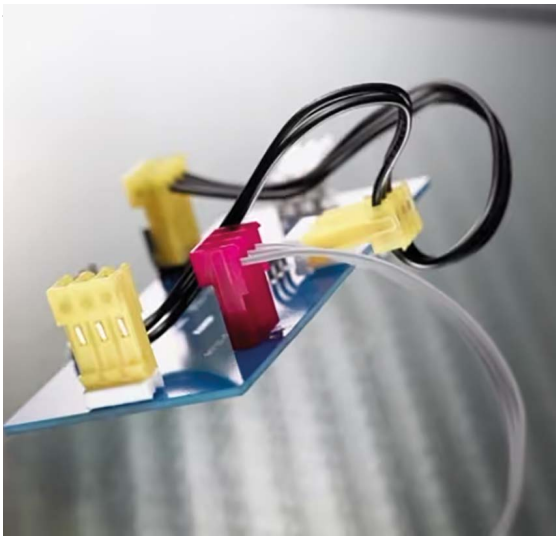
IDC Connectors Lower Assembly Cost

TE's MTA connector system can help you to reduce labor, lower costs, and simplify assembly processes. The MTA connectors support the mass termination of wires, which reduces the need for manual labor and lowers the overall cost of assembly.

These connectors are wire-to-board and wire-to-wire and can be stacked. They use insulation displacement contacts (IDC) that allow for easy wire termination without the need for stripping or crimping. Additionally, they have wire feed-through capability for daisy-chain applications and can terminate ribbon cable when the appropriate receptacle assembly and strain relief cover are used.

Board mount headers are available in various orientations and configurations such as right-angle, vertical, through-hole, and surface mount. MTA connectors are widely used in appliances, lighting, and industrial controls.

MTA Connector Specifications
(MTA 100 / MTA 156 Connectors)
- Centerline (mm): 2.54 / 3.96
- Maximum Current Rating (A): 5 / 7
- Voltage Rating (VAC): 250 / 600
- Operating Temperature (oC): -55 to +105
- Wire Size (AWG): 28 – 22 / 26 – 18
- Positions Available: 2 – 28 / 2 – 24
- UL94 Rating Available: V-0 & V-2
- Agency Approvals: UL, CSA



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- 640445-4

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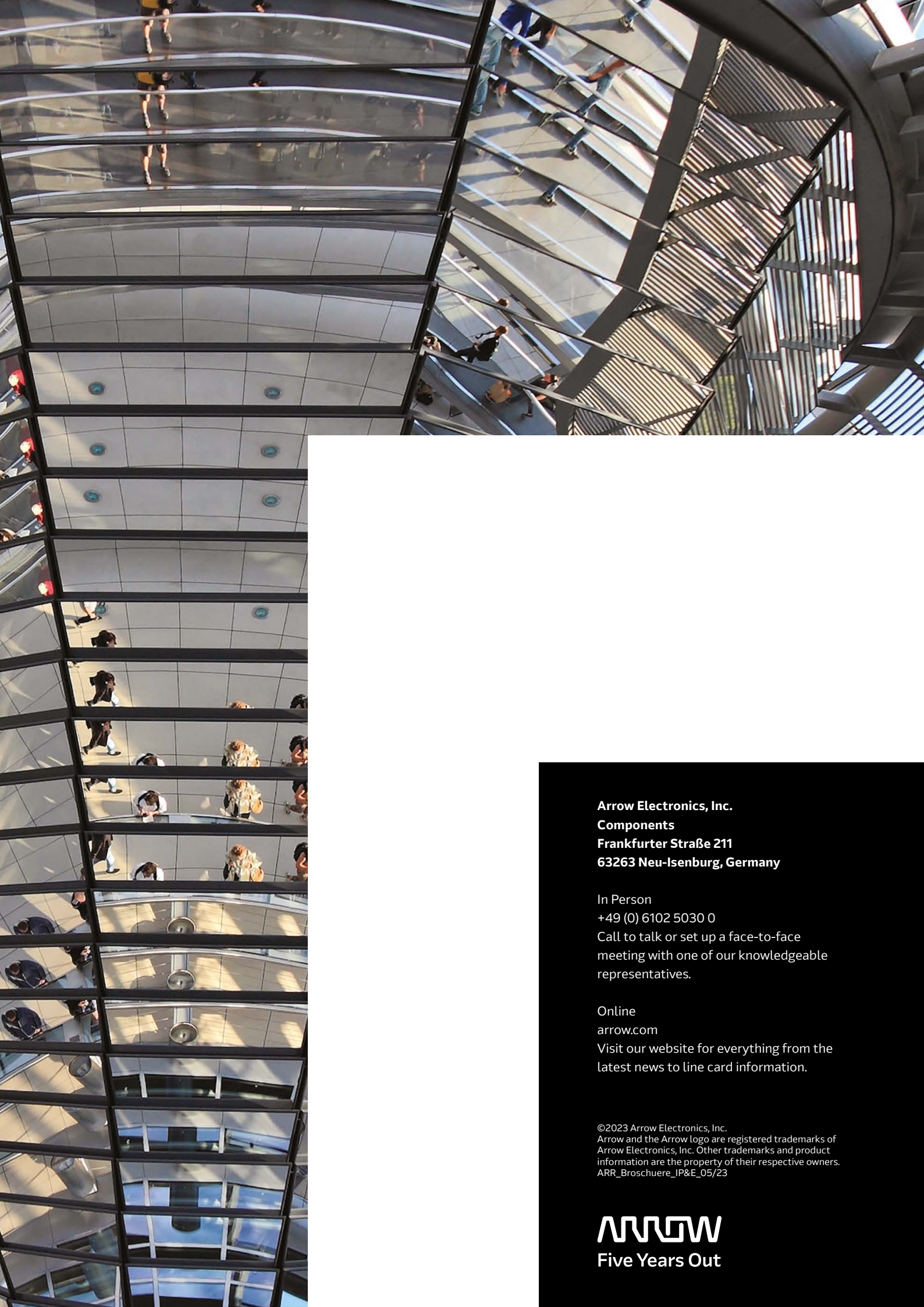

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