



# IP&E News

1<sup>st</sup> Quarter 2022

**ARROW**

# Bourns' Annual Distributor Awards



Arrow Electronics has been recognized both for team and individual performances by Bourns in its annual distribution partner awards. The awards honor exceptional sales support provided by distributors that have contributed to Bourns' business growth in EMEA (Europe, Middle East and Africa).

In Arrow's Neu-Isenburg branch office at the end of September, Bourns named Arrow as the highest performing distributor, as volume partner EMEA, based on the company's overall performance. Arrow was particularly successful in the automotive sector and with products in the standard and custom magnetics, multifuse and fixed resistors categories.

Benjamin Hofmann, product group manager at Arrow, was named Most Valuable Person in recognition of his engagement both in business development and customer support activities, especially in the area of magnetics.

Photo caption (from left to right)

**Matthias Hutter**

*Vice President, Product Management & Supplier Marketing – EMEA, Arrow*

**Elisabetta Bianchi**

*Product Management Director EMEA, Arrow*

**Ferdinand Leicher**

*Vice President Sales EMEA, Bourns*

**Vera Steverding**

*Technology & Supplier Business Manager EMEA, Arrow*

**Torben Rix**

*Director Marketing Pemco EMEA, Arrow*

**Eszter Sipöcz**

*Key Account Manager for Arrow EMEA, Bourns*

# IP&E by Arrow

## Providing components for success

### Components – EMEA

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# Learn How to Comply with IEC 62368-1

Understanding the new IEC Standard 62368-1 for Electronic Equipment  
Applying the standard to universal power adapters



The regulation of power-based products and components is critical for design development and user safety. For decades, the International Electrotechnical Commission (IEC) has dictated how to design information technology equipment and audio/video products for safety. The IEC's traditional approach to equipment safety has been product-dependent and incident-based, making the previous standards, IEC 60950-1 (information and communication technology equipment) and IEC 60065 (audio and video equipment), more reactive and less adaptable to emerging technologies.

A new regulation, IEC 62368-1, became the single default standard on December 20, 2020. Thus, designers no

longer can choose to comply with either the information/communication technology standard or the audio/video equipment standard. As the boundaries between information/communications and audio/video technology have blurred, the IEC 62368-1 hazards-based safety engineering standard applies to a broad scope of applications. The new standard is less product-specific. It focuses on the energy within the equipment and the intended environments. This future-proof approach aims to encourage manufacturers to address known hazards in the design and intended use of the product, whether its application is for industrial or residential use.

62368-1*		
IEC 60950-1 <sup>†</sup> (Information and communication technology equipment)	IEC 60065 <sup>†</sup> (Audio/Video and similar electronic equipment)	Other equipment <sup>‡</sup>
<ul style="list-style-type: none"> <li>- Point of Sale equipment</li> <li>- Banking equipment</li> <li>- Office equipment</li> <li>- Telecommunication equipment</li> </ul>	<ul style="list-style-type: none"> <li>- Audio equipment</li> <li>- Video equipment</li> <li>- Musical instruments</li> </ul>	<ul style="list-style-type: none"> <li>- Smart IoT appliances</li> <li>- Battery powered electronic devices</li> </ul>
<small>* UL/EN/CSA have created versions of 62368-1 based on IEC 62368-1  <sup>†</sup> Standards replaced by IEC 62368-1 starting in December 2020. All products, sub-assemblies and components previously covered under these standards are covered under UL/IEC 62368-1  <sup>‡</sup> Other equipment comprises of two product types: ones not covered under any product safety standard such as smart IoT equipment and others covered under various standards such as battery powered consumer electronic devices</small>		

## Understanding the new IEC Standard 62368-1 for Electronic Equipment Applying the standard to universal power adapters



Littelfuse 215 Series  
Time-Lag Fuses



Littelfuse TMOV®  
Series Varistors



Littelfuse UltraMOV®  
Series Varistors



Littelfuse UltraMOV®  
Series Varistors

Universal power adapters, commonly used in IT equipment, accept a wide range of voltage inputs, such as 90 to 240 Volts AC. This voltage range allows the product to be used worldwide with a common set of electronics. Safety requirements dictated by IEC 62368-1 require both overcurrent and surge protection.

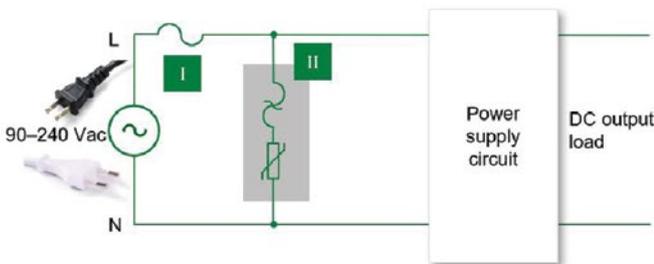
There are two recommended options for overload and surge protection of universal power adapters. Use a fuse and a varistor for differential mode protection for an unreliable ground connection. With a product connecting to a reliable ground, use the fuse-varistor series combination for differential mode line protection and a combination of two varistors with a gas discharge tube for common-mode.

While this is the most common surge protection solution for many electronic applications, designers can also consider other solutions.

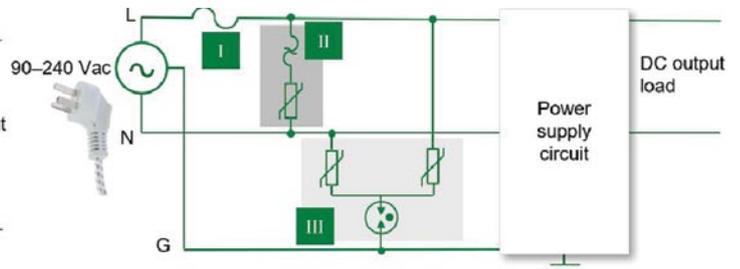
When comparing technologies, engineers should consider the component's:

- Clamping voltage, which shows how well the device can protect during a surge event, with lower being better
- Let-through energy during a surge event, again, lower is better
- Leakage current
- Lifetime after multiple surge events
- Size and cost

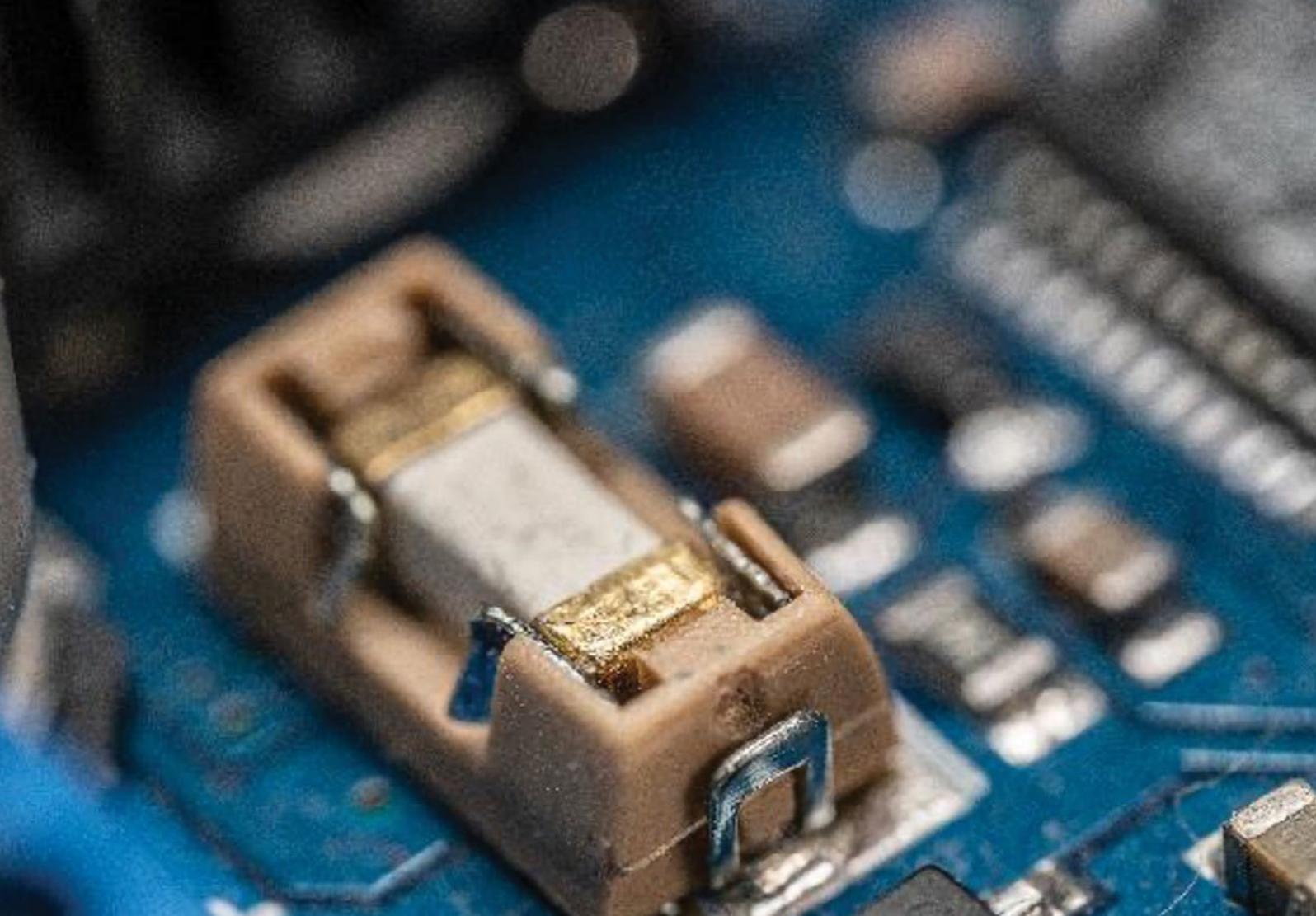
### Differential mode protection



### Differential & Common mode protection



Technology	Product series	Function in application	Benefits and considerations
I	Fuse	Protects the power stage from overcurrent events	Small, through-hole device with high breaking capacity and high surge withstand capability
			Multiple ampere ratings in compact design
II	TMOV	Protects the power supply unit from voltage transients and lightning. Meets minimum allowable MCOV (1.25 x 240 V). Exceeds minimum surge requirements of Overvoltage category II	Integrated thermal protection avoids overheating caused during abnormal voltage events; low energy let-through and clamping voltage
	MOV		Smallest form-factor, higher clamping voltage than other solutions
	SIDACtor® + MOV		Lowest leakage current (nA)
	TVS Diode		Best clamping and surge life
III	MOV + GDT	Protects the power supply unit from voltage transients and lightning. Meets requirements for common mode protection.	Only permitted solutions for common mode protection; lowest leakage current



# What's the story behind Circuit Protection?

Essentially, circuit protection covers the protection of electronic assemblies and devices against overvoltage, overcurrent and overtemperature. Circuit protection components do not usually have device functions. Ideally, they should not even influence them. The goal of a good circuit protection concept is to protect the assembly or device from as many influences as possible. The right choice of protection elements can create very effective and cost-efficient solutions, so the functional and normative requirements for the devices are fulfilled. *Author: Mathias Nitzsche, Technologie Field Application Engineer, FAE PEMCO, Arrow*

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You will find on the next pages the first part of the 3 topics of Circuit Protection. We start with overvoltage. Overcurrent and overtemperature will follow in the next two issues.

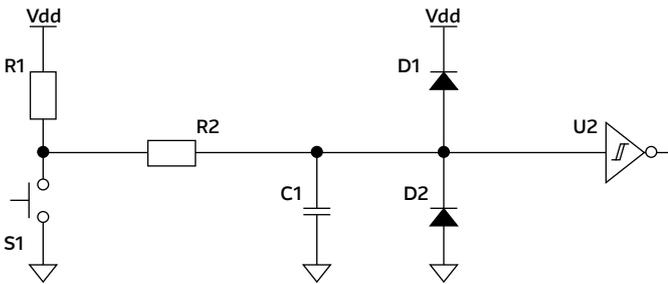
## Surge voltage protection

Surges can occur in various ways. Induction voltage and electrostatic discharge are particularly well known. Special care must be taken when selecting the protective components. Selecting the wrong components or the wrong concept can render the effectiveness of the protective measure invalid. In principle, overvoltage should always be counteracted as close as possible to the point of origin or entry. Surges can be diverted in the circuit or, better, converted directly. Diverting can be dangerous, so close attention must be paid to this.

### The following circuit shows a typical input protection circuit of digital inputs.

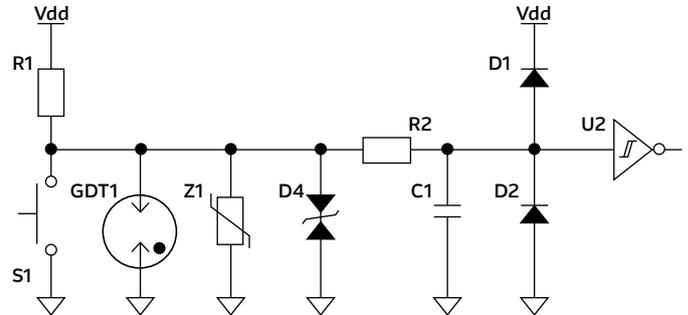
The aim is to divert the excessively high input voltage via diodes D1 or D2 into the supply line. However, this method can also involve dangers.

If we dimension R1 and R2 generously with 10 kΩ, the protection seems sufficient at first glance. However, the problem starts with an ESD impulse on the switch. This comes along with up to +-8 kV. The circuit designer must take special care in the design of the components and the layout. The supply voltage should be very low impedance.



Typical input protection circuit of digital inputs with series resistor and diodes bypass.

If the internal resistance of the power supply is 10 Ω, the supply voltage (Vdd) would increase from 5 V to 12 V. This is certainly not suitable for all components in the circuit nor in the system. If the power supplies are far away from the input elements, the impedance of the internal supply line worsens the effectiveness of this approach.



Input protection circuit of digital inputs with additional clamping devices.

The capacitor C1 adds some protection, but negatively affects functionality. Since the capacitor is a real component, its properties change with increasing frequency. An ESD pulse has an extremely short rise time of < 1 ns. Therefore, the capacitor must function in the frequency range from a few MHz to 1 GHz. In summary, this type of surge protection is not so easy to dimension and can lead to unpleasant surprises in the test laboratory or during operation. Reworking is then often difficult and time-consuming.

A better approach is to mitigate the overvoltage directly at the input using varistors, TVS diodes or GDTs. The energy introduced is converted directly in the protective element and the overvoltage is reduced to a controllable level.

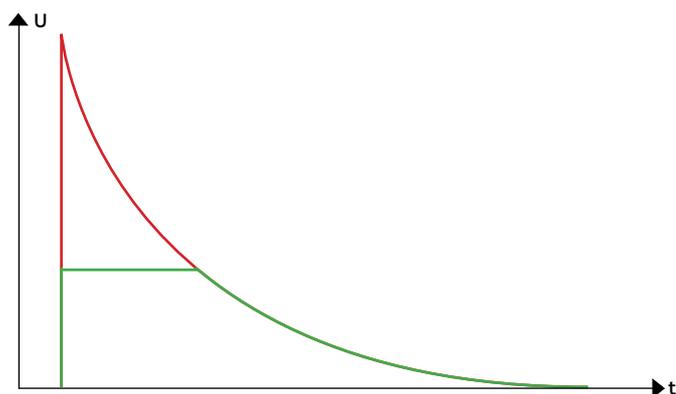
In general, the following properties can be assigned to the components:

	Advantages	Disadvantages
<b>Varistors</b>	<ul style="list-style-type: none"> <li>Offer very good dissipation of large amounts of energy</li> <li>Very robust component</li> <li>Low response time</li> </ul>	<ul style="list-style-type: none"> <li>Higher leakage currents than TVS diodes</li> <li>Higher capacities than TVS diodes</li> <li>Ageing effects</li> </ul>
<b>TVS diodes</b>	<ul style="list-style-type: none"> <li>Various versions possible (uni- and bipolar, arrays)</li> <li>Miniaturised designs</li> <li>Very low response times</li> </ul>	<ul style="list-style-type: none"> <li>Lower power than varistors</li> <li>Lower current carrying capacity</li> <li>lower dielectric strength</li> </ul>
<b>Gas Discharge Tube</b>	<ul style="list-style-type: none"> <li>Very low capacity</li> <li>Galvanic isolation, no leakage current</li> <li>Very low clamping voltage</li> </ul>	<ul style="list-style-type: none"> <li>Higher response times</li> <li>Extinguishing the arc at DC may be necessary.</li> <li>larger design</li> </ul>



Each of the components can protect the circuit on its own. In practice, however, combinations are often very useful. Unlike ESD pulses, larger amounts of energy can also be entered over a longer period of time, for example in the surge test or load dump. The combination then provides the maximum protection against harmful surges, regardless of their nature.

Furthermore, disadvantageous characteristics can be compensated. For example, when a varistor is connected in series with a gas discharge tube. In simple terms, varistors, TVS diodes and also GDTs limit the level of the input voltage by becoming low-impedance above a certain threshold and thus limiting the voltage. In the process, the excess energy is converted into heat and dissipated.



Typical transient voltage - green = clamped transient

The following circuit parts or assemblies are thus effectively and reliably protected against overvoltage. Each component has its own characteristics and special properties that need to be taken into account when selecting it.

#### Any questions?

Please contact our specialized engineers for additional information you need.

## Key Suppliers

At Arrow we focus on strong partnerships with our principals, and we want to introduce you to some of our key suppliers for the Circuit Protection product range. Arrow, together with its supplier network, can help you to identify the most suitable product for your application.



At Littelfuse, our mission is to develop innovative circuit protection, power control, and sensing solutions that meet our customers' unique needs. This customer-focused philosophy has helped us become the top circuit protection brand in the world.



TDK's comprehensive portfolio covers the whole range of voltage protection devices which are used to guard IC components and electronic circuits from electrostatic discharges (ESD) and voltage surges such as lightning surges.



Bourns is a global manufacturer with an expansive portfolio of Circuit Protection solutions. It covers technologies as PPTC and CPTCs, GDT, MOV, TBU®, TVS and PTVS diodes, one-time fuses, ESD and LED protectors, thermal cutoff and surge protective devices.



SCHURTER circuit protection includes fuses and circuit breakers in non-resettable and resettable versions. The products protect electric and electronic systems against overcurrent, undervoltage and overtemperature.



The DNA of tech™

Vishay circuit protection solutions include MOVaristors, Transient Voltage Suppressors, resettable CPTC thermistors, SMD- and Thermal-fuses. These products protect against overvoltage, overcurrent and overtemperature conditions in the most challenging environments and applications.



KYOCERA AVX offers wide range of multilayer varistors for highly reliable protection against voltage transients in general, industrial, professional and automotive (AEC-Q200) applications.

At Arrow, we understand what you're facing. In fact we're facing it with you. Partner with us, and you'll get access to proven, best-in-class technology that Satisfies your customers needs for efficient, affordable, future-proof solutions.

# Faster and Easier IDC-termination

Discover the Mini-Clamp, Link and Power Clamp Connectors from 3M™ for faster and easier IDC-termination



The 3M Mini-Clamp is a simple termination connector based on industry standards for industrial, sensor, LED, switch, and various small device connections.

Featuring Insulation Displacement Contact (IDC) technology, this connector can provide a timesaving, reliable and field-installable wiring solution.

Benefits of the Mini-Clamp products include a simple installation process that does not create material waste, a labor-saving IDC termination process relative to traditional interconnect alternatives ease of assembly for system building; and a design that provides for consistent quality and reliability without special tooling.

### 3M Mini-Clamp attributes at-a-glance:

- Standard connector for sensor, LED, switch, and other small device connections
- Easy, quick, and reliable IDC termination using a standard pliers

- Offers time and labor savings – 10 seconds to terminate 4 wires
- Enables easy field termination
- Compatible with wire from 20 to 28 AWG
- No need to strip wire insulation; saves time and helps prevent wire damage
- Mating latches provide a reliable interconnection in demanding applications
- High number of mating cycles
- Compact design saves space
- Semi-transparent color-coded covers for wire inspection and wire retention
- Reduces maintenance work by providing higher connection reliability
- Easy to apply for T-branching and splicing of sensor and field networks

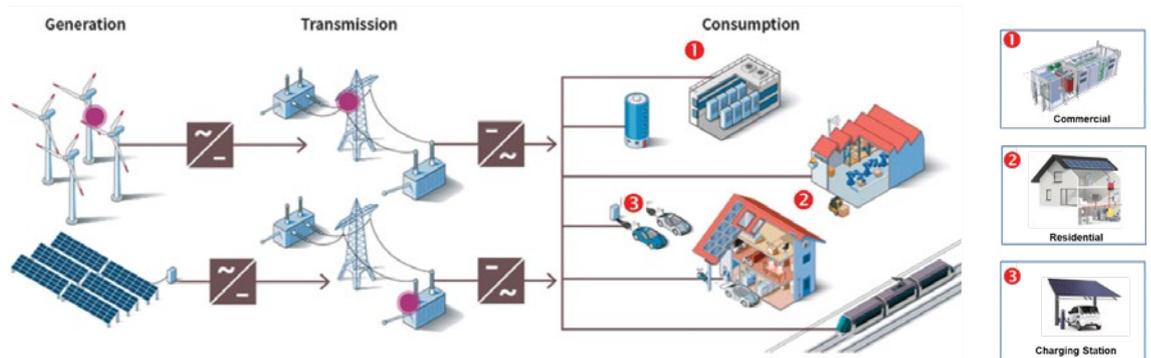
Applications: connector based on industry standards for industrial, sensor, LED, switch, and various small device connections.



Click here or scan the QR-Code for more information.

3M™ Mini-Clamp Connectors	3M™ Link Connectors	3M™ Power Clamp Connectors
Mini-Clamp Wiremount Plug, 371 Series 	Link Connector, 381 Series 	Power Clamp Wiremount Plug, 358 Series 
Mini-Clamp Wiremount Socket, 373 Series 	Link Connector, 382 Series 	Power Clamp Wiremount Socket, 355 Series 
Mini-Clamp Common Socket, 37C Series 	Branch Mini-Clamp Link Connector, 38A Series 	Power Clamp Header, 356 Series, Right-angle solder tails 
Water-Resistant Boot, IP67, 378 Series 	One Piece Branch Link Connector, 387 Series 	Power Clamp Header, 356 Series, Straight solder tails 
Mini-Clamp Socket, 372 Series, Right-angle, solder tails 	Splash-proof One Piece Branch Link Connector, 387 Series 	Power Clamp Branch Connector, 357 Series, Y-Type 
Mini-Clamp Socket, 372 Series, straight, solder tails 		Power Clamp Branch Connector, 357 Series, H-Type 

## Energy Storage System Solutions



Energy Storage Systems (ESS) store energy and stabilize electrical performance in large grid installations as well as medium commercial to residential establishments. Lithium-ion batteries are the basic building blocks of ESS and together with inverters or Power Conditioning Systems (PCS) help the ESS manage peak and off-peak power requirements of the locality or household. Residential ESS found in smart homes come with wall-mounted batteries or modules and are coupled with AC/DC Inverters. For commercial or industrial establishments, several of these modules stack up to form racks while multiple such racks are arranged within a container which works as the commercial ESS for large smart grids. The excess power produced by renewable energy resources like solar and wind power are captured by ESS, avoiding massive frequency fluctuations, thereby boosting the reliability and power quality of the grid.

Battery Storage forms the heart of an Energy Storage System (ESS). It is a collection of Lithium Ion battery cells designed to store excess energy from renewable installations and distribute it to the grid according to the requirements at hand. Every battery module includes a battery management system that manages and monitors the cells for risk of imbalance, optimizes the performance and preserves the life of the batteries.

Amphenol offers compact, flexible high performing connectors that support Battery Storage systems within an ESS.

### **ComboStak® and PowerStak® Board-to-Board Connectors**

ComboStak® is a compact, hybrid (signal and power) solution that combines existing, BergStak® 0.8 mm pitch signal pins with 2.00 mm pitch power blades. PowerStak® is the power only version. Both provide high signal and current density with a wide range of stack heights.



### **Minitek Microspace™ Crimp-to-Wire Connectors**

Unique design and performs at 1.8, 1.5 and 1.27 mm pitch, available in single and double row versions, with top and side latch configurations.



### **Conan® 1.00 mm Connectors**

Designed for industrial applications and rugged environments. Provides a mechanically secure, high-density electrical interface between parallel printed circuit boards.



### **Dubox® 2.54 mm Crimp-to-Wire Connectors**

Extensive range of through-hole and surface-mount options, including single or double-row in straight or right angle from 2 to 50 positions, with a current rating of 3 A (maximum) per contact.



# Kyocera AVX Circuit Protection Products

Kyocera-AVX has a long history in manufacturing ceramic capacitors which enables us to offer a wide range of automotive qualified ceramic capacitors while constantly bringing new innovative solutions to the market.

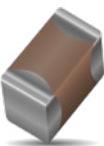
Ceramic capacitors are the basic building block for every electronic application. Kyocera-AVX offers a broad range of AEC Q200 Qualified MLCCs ranging from general purpose NP0, X7R dielectrics to high temperature 150 °C X8R and X8L devices and high voltage capacitors both in SMD and leaded form.

Kyocera-AVX has supported the Automotive Industry requirements for Multilayer Ceramic Capacitors consistently for more than 20 years. Products have been developed and tested specifically for automotive applications and all manufacturing facilities are QS9000 and VDA 6.4 approved.

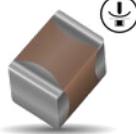


Scan or click QR-Code to find the products on [arrow.com](http://arrow.com)

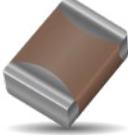
## TIN TERMINATION

	<p>Ceramic Capacitors exhibit low parasitics and excellent EMI filtering capabilities. Kyocera-AVX MLC Capacitors are available in wide range of values, styles, voltage ratings and dielectrics.</p> <p>NP0 for MHz range for stability. X7R for general kHz range. X8R/X8L for high temperature up to +150 °C.</p>	<ul style="list-style-type: none"> <li>- Excellent EMI filtering</li> <li>- Low ESR</li> <li>- Wide range of values</li> <li>- High Temp +150 °C series</li> <li>- High Voltage up to 3000 V</li> </ul>	<ul style="list-style-type: none"> <li>- ESP</li> <li>- Telematics</li> <li>- DC Motors</li> <li>- Pumps</li> <li>- Infotainment Hybrid and Electric</li> </ul>
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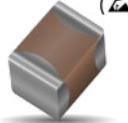
## FLEXITERM®

	<p>MLC Capacitors equipped with Kyocera-AVX flexible termination system - FLEXITERM®. Capacitors have superior resistance to both - mechanical stress (board flexure - 5 mm bend test guaranteed) and thermal stress (increased temperature cycling performance, 3000 cycles and beyond). (*Contact AVX for +150°C X7R option)</p>	<ul style="list-style-type: none"> <li>- Excellent EMI filtering</li> <li>- Low ESR</li> <li>- Combines Flexiterm™ with cascade design for safety critical applications</li> <li>- Excellent reliability</li> </ul>	<ul style="list-style-type: none"> <li>- ESP</li> <li>- Telematics</li> <li>- DC Motors</li> <li>- Pumps</li> <li>- Infotainment Hybrid and Electric</li> </ul>
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## FLEXISAFE

	<p>Designed with an industry leading set of safety features for safety critical applications. Combines FLEXITERM™ layer in conjunction with the cascade design.</p>	<ul style="list-style-type: none"> <li>- Excellent EMI filtering</li> <li>- Low ESR</li> <li>- Combines Flexiterm™ with cascade design for safety critical applications</li> <li>- Excellent reliability</li> </ul>	<ul style="list-style-type: none"> <li>- Airbag</li> <li>- Crash Avoidance</li> <li>- Power Steering</li> <li>- Transmission Control</li> <li>- Parking Assistant Hybrid and Electric</li> </ul>
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## ESDSAFE

	<p>Enhanced MLC capacitor designed specifically for general ESD protection.</p>	<ul style="list-style-type: none"> <li>- Excellent EMI filtering</li> <li>- Low ESR</li> <li>- ESD per HBM of AEC Q200-002</li> <li>- ISO 10605</li> <li>- ESD Rating 18-30 kV</li> </ul>	<ul style="list-style-type: none"> <li>- ESP</li> <li>- Transponders</li> <li>- Power Steering</li> <li>- Turbo Charger</li> <li>- Alarm Hybrid and Electric</li> </ul>
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# IP&E Linecard

- Connectors
- Passives
- Antennas, Batteries, Emech
- Power Supply



Take out the linecard or  
download here:  
[arrow.com/en/ipe/download-area/  
arrow-ipe-linecard](https://arrow.com/en/ipe/download-area/arrow-ipe-linecard)







# Cable tie mounts with fir tree foot parts



Fir tree cable tie mounts are an extremely versatile means of bundling and affixing cables wherever a round

hole is available. Because cable tie fasteners with fir trees are highly effective and simple to install by hand, they are widely used in everything from vehicles to washing machines.

Made from robust polyamide engineering plastic, the fir tree design makes it easy to push these parts into round panel holes (0.75 – 6.0 mm thickness) or into threaded or blind holes in deeper materials.

The lamellae hold the foot part firmly in the hole whilst allowing the tie to be rotated to the required bundling position. The disc on the top provides strain relief in all directions and prevents water and dirt getting into the hole. HellermannTyton supplies a variety of one-piece and two-piece fir tree mounts with inside serrated cable ties. Depending on the material (PA66, heat stabilised PA66HIRHS or PA46), operating temperatures range from -40 °C up to +85, +105 °C, +125 °C or +150 °C.

#### Orderable at arrow.com

- 111-85871
- 150-31090
- 150-55948
- 150-55610
- 150-55850
- 157-00296
- 157-00028



# High-Temperature Capable MEMS Resonator



Murata's MEMS resonators are piezoelectric elements that function as mechanical resonators to generate a precise frequency.

MEMS technology was used to realize the world's smallest size resonator with low ESR characteristics that is currently unachievable by quartz crystal resonators. Murata's MEMS resonators achieve excellent frequency accuracy and stable temperature characteristics without the use of active elements to correct the initial frequency and frequency shift by temperature. This helps customers reduce both power consumption and mounting space.

- World's smallest size 0.9x0.6 mm—75 % area saving compared with 1.6x1.0 mm sized turning fork crystal
- Built-in capacitance—Space saving by eliminate the external load capacitance for oscillation circuit
- Support high temperatures/High reliability—Available for use in high temperature applications because of non-organic material
- Low ESR—Realize 10 % lower power consumption compared with 1.6x1.0/2.0x1.2 mm sized turning fork crystal



Click here or scan the QR-Code to find the products on arrow.com

# Special Thick Film Resistors

## High Power Wide Terminal

High reliability and enhanced terminal strength are essential in all power applications. KOA's WK73/WU73-series has a 90° rotated design and this offers several advantages compared to standard resistor footprints. The 0612 chip size allows 6 x power rating compared to standard 1206 parts. This saves board space and is possible due to the improved heat dissipation via the solder joints. The large terminals also enhance terminal strength and the smaller distance between the terminals reduces expansion stress. Finally, the inner resistive pattern is designed to minimize hotspots.

These benefits combined, result in a superior reliability compared to standard flat chip resistors.

### Features and Benefits

- Excellent heat dissipation characteristics
- Superior temperature and power cycling performance
- Low thermal expansion stress
- Higher rated power – less board space than standard chips
- Standard sizes 0204 ... 1225



- High component and equipment reliability
- Resistance range 10 mΩ...1 MΩ
- Resistance tolerances ±0.5 %, ±1 %, ±5 %
- Operating temperatures of up to +155 °C
- AEC-Q200 tested
- Anti-sulfuration type also available

### Applications

- Automotive electronics e.g. ECU for engine bay
- Power supplies
- Motor control units
- Industrial power control
- Battery packs

### Orderable at arrow.com

- WK73 R
- WK73 S
- WG73
- WU73
- WK73 R/S\_RT

## Anti-Surge & Anti-Pulse

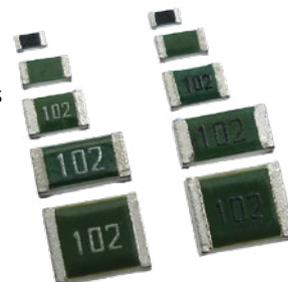
The KOA SG73-family offers several chip resistor solutions with high surge/pulse withstanding characteristics. The new SG73G-series has a T.C.R. of ±50 ppm/K as well as a tolerance of ±0.25 %, so it is ideal for precision designs such as high-accuracy sensing or voltage detection circuits in automotive and industrial applications. The special inner construction offers outstanding pulse load capability and higher rated power.

### Features and Benefits

- Outstanding pulse performance
- Excellent in ESD characteristics (SG73, SG73S)
- High component and equipment reliability
- Available in sizes 0402...2512
- Resistance range 1 Ω...10 MΩ
- Resistance tolerances ±0.25 % ... ±20 %
- Operating temperatures of up to +155 °C
- AEC-Q200 tested
- Anti-sulfuration type also available

### Applications

- Automotive electronics e.g. ECU for engine bay
- Power supplies
- Industrial electronics
- Measuring instruments
- Motor control units
- Smart meter
- Power conditioner/inverter



### Orderable at arrow.com

- SG73
- SG73 P
- SG73 S
- SG73 P/S\_RT
- SG73 G

# RF Microwave Absorbers & Dielectric Materials



Design delays caused by excessive waste energy can prove costly.

Laird Performance Materials' leading line of RF/microwave absorbers and dielectric materials for free space, cavity resonance, and near field applications help you go to market faster. We speed you along with our know-how, rapid prototyping, and modeling capabilities, working closely with our partner Arrow.

Laird offers multiple form factor solutions designed for the MHz > 100 GHz frequency band. Selections range from microwave absorber and mm wave absorber products for free space to cavity resonance through near field applications as well as low loss dielectric materials. Custom molded elastomeric and thermoplastic, reticulated foam, along with dispensables, compounds, textiles, and custom composite products are available immediately. Ask Arrow about Laird's full line and obtaining samples.

## Low Loss Dielectrics

High-quality, high performance, low loss dielectric materials ranging from 1.05-30 dielectric constant come in various formats from rigid to flexible, compact to foam as well as thermoplastic.

## Microwave Absorbing Elastomers and Films

Achieve effective EMI shielding from low to high frequencies and solve issues like internal cavity resonances up to the mm wave range. Suppress noise in the near field range.



## Microwave Absorbing Foams

Low end cut-off RF absorbers made of impregnated polyurethane foam are the standard solution to solve reflectivity issues.

## Microwave Absorbing Gap Fillers

Lowering EMI noise and opening a thermal path, Laird's hybrid gel-type absorbers in interface configurations deliver answers to compliance issues at minimum deflection force.

## Ruggedized Specialty and Military Microwave and Custom Magnetic Absorbers

Rugged offerings reduce free space reflectivity and cavity resonance. Some are qualified for military use because they resist salt water, corrosive fuels, heat, and cold.

## Injection Molded, Machined, Cast Liquids and Microwave Absorbing Thermoplastic

Pre-cut materials won't work? Use our epoxy, silicone-based and thermoplastic for casting and customized injection molding of complex 3D parts.

Laird offers significant electromagnetic modeling and product design skills, pre-loaded parameters in modeling software, custom formulations, testing, measurement, and verification capabilities along with integrated multifunctional absorptive solutions.



## Orderable at [arrow.com](http://arrow.com)

- 21100106      - NS1010CA
- A1830          - NS1010FA
- A18307-04    - NS1010HA
- A18181-040

# New Littelfuse Xtreme Varistor Series

Littelfuse Xtreme Varistor Series is specifically designed for applications requiring high surge energy/current absorption and multiple surge pulse withstanding capability. Xtreme Varistor Series is available in six nominal disc sizes: 5 mm, 7 mm, 10 mm, 11 mm, 14 mm, and 20 mm. Constructed with a proprietary powder formulation developed by Littelfuse, these new, smaller varistors achieve robust surge performance that helps prevent damage, fire hazards, and catastrophic failure even under extreme circumstances.



The Xtreme Varistors are specifically designed for use in the following markets and applications:

- Home and building automation
- Large and small appliances
- Outdoor LED lighting
- Smoke detectors and fire alarms
- Smart meters
- GFCI, AFCI, and USB outlets

**The Xtreme Varistor series offer these key benefits:**

- Small disc sizes (from 5 mm to 20 mm) reduces both the component footprint and the printed circuit board space required for circuit protection.
- Suitable for products with high operating temperature ranges up to 125 °C.
- High surge energy and current absorption withstanding capability extend product reliability and lifespan.
- Meets the UL-94 Flammability Rating V-0 which ensures burning stops within 10 seconds.

The Xtreme Varistor series is available in bulk, and tape & reel packaging.

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**Orderable at [arrow.com](http://arrow.com)**

- V05X150E      - V11X320E
- V07X320E      - V14X320E
- V10X320E      - V20X320E

# IloT and the growth of the smart factory

For the first time, the Internet of Things (IoT) is creating a network of machine-to-machine communication, and the industrial world has been quick to take advantage of this technology. The use of IoT in the industrial marketplace has led to the birth of the smart factory. IloT allows each machine to collect data about its own operation and status and then share this information with the entire network. The data creates a real-time picture that shows all aspects of the smart factory.

## **The Smart Factory**

The IloT, with its collection and sharing of data, allows the smart factory to operate as a single entity. Changes in performance or unexpected shifts in demand can be handled centrally, making the factory highly flexible and responsive. Additionally, the collection of data from each machine provides advance warning of maintenance and shortage issues, allowing potential problems to be identified early on so that action can be taken to minimize disruption.

## **The New Raw Material**

The IloT connects all these machines at the device layer, sharing data both with each other and with the upper layers of the business. In this way, information has become critical to the operation of the smart factory, alongside other raw materials, such as steel and plastic. The machines of the device layer are evolving too. The growth in the use of robotics on the factory floor is another reason for the increased digitization of the manufacturing space. This has led to another innovation of the smart factory in the guise of edge computing.

## **Connectivity in Harsh Conditions**

The growth of edge computing devices suggests that sophisticated electronics are finding their way onto the factory floor. The industrial environment is a harsh place, home to hazardous



atmospheres, abrasive chemicals and harmful waste products. Even industries that depend upon sterile environments, such as the food preparation and pharmaceutical sectors, use machines that create heat and vibration while they are working. It is important that designers are aware of these conditions when selecting components.

IloT delivers new methods of working for manufacturers. Choosing to work with Arrow and Molex for electronic components will ensure that you are at the forefront of this new industrial revolution. [Click here](#) or scan the QR code to read the full article and learn more about the growth of the smart factory.



**Click here or scan the QR-Code to read the full story and to find the related products.**

What's next for industrial IoT? The growth of the smart factory | [Arrow.com](http://Arrow.com)

# High-power Photovoltaic MOSFET drivers

Modern industrial automation solutions, energy systems and professional equipment are often extremely specialized devices that require high safety and design flexibility for switching elements like semiconductor relays. A photovoltaic driver for galvanic separation in combination with a distinct MOSFET power switch leaves nothing to be desired. The new APV models of Panasonic Industry's Photovoltaic MOSFET drivers can control MOSFETs in a new range by offering high-output voltage or high-output current.

The Photovoltaic MOSFET drivers come in a miniaturized SSOP housing and provide a galvanic separation of 1,500 V between the control circuit and the power output circuit.

#### Choose the force you need:

The new high-power type APV3111GVY directly switches Power MOSFETs for high-load currents, thanks to a generated output voltage of 18V used for controlling the MOSFETs Gates, a feature that reduces the number of amplifier parts on the PCB.

APV1111GVY comes into play in the context of high-speed switching with high-current requirements - and stands out with a remarkable



output current of 45  $\mu$ A for fast MOSFET Gate charging.

It is a straightforward driver principle, one that is ready for efficient and miniaturized next-gen high-power applications in a wide range of temperatures, including power supply devices, measuring equipment, energy storage systems and much more.

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#### Orderable at [arrow.com](https://www.arrow.com)

- APV3111GVY
- APV1111GVY

# Edge Clips - On the edge, get set, go



**Edge Clip Cable Tie Mounts - On the edge**

Panduit's new Edge Clips are versatile, quick, and secure to attach directly to panel and frame edges. This allows cables or wires to be routed along or perpendicular to the edge in a user-friendly manner. To do this, simply press the clip directly onto the respective edge and use the matching cable tie for bundling. Drilling into the existing structure is unnecessary, components remain intact to resist corrosion

and overall installation efficiency is increased. The high-performance clips offer high tensile strength thanks to the specially developed metal lips and can still be attached by hand without tools. The combination of innovative Edge Clips, robust cable ties and cable tie bases from Panduit find their professional use in the cabling of motor vehicles, rail vehicles, heavy-duty machinery, trucks, all the way to solar parks for cable routing underneath panels.

**Versatile Mounting**

Allows cables or wires to be routed along or perpendicular to the edge.

**Close Fit**

The cable tie mount saddle provides close fit for small diameter bundles.

**Storage Reduction**

Versatile mounting reduces the space of storage required and gives you much more flexibility when mounting on site.



**Expanded Range**

The Edge Clip has an extended range from .7 – 3 mm edge thicknesses as well as a larger clip offering for 3 – 6 mm edge thicknesses.

**High Performance**

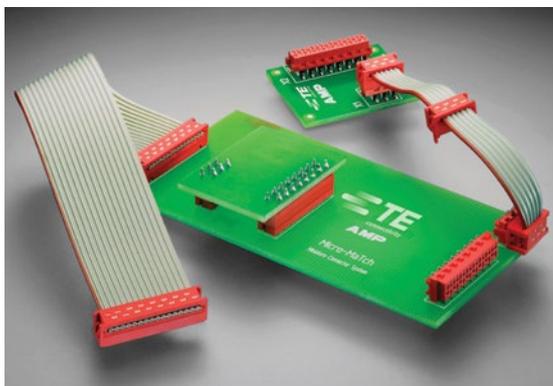
The high-performance metal clip delivers high pull off force yet still allows for easy hand installation without tools.

**Orderable at arrow.com**

- CME12-M300
- CME24-M300
- CMS12-M300
- CMS24-M300
- CMEA12-2S-D300\*
- CMEA24-2S-D300\*
- CMSA12-2S-D300\*
- CMSA24-2S-D300\*
- CMEB12-2S-D300\*
- CMEB24-2S-D300\*
- CMSB12-2S-D300\*
- CMSB24-2S-D300\*
- CMEA12-B2S-D300
- CMEA24-B2S-D300
- CMSA12-B2S-D300
- CMSA24-B2S-D300
- CMEB12-B2S-D300
- CMEB24-B2S-D300
- CMSB12-B2S-D300
- CMSB24-B2S-D300

# Board Signal Connector Solutions

TE's Board Signal connectors reliably & economically meet the requirements of today's miniature, sophisticated electronics.



Micro-MaTch

## Features

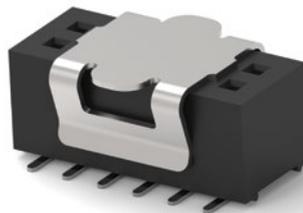
- Fine pitch centerlines
- Dual-beam receptacle contact
- Multiple solder tail lengths for various PCB thicknesses
- High temperature plastic (LCP) housing
- Up to 25 positions per row, single and dual row offering
- Wire termination: crimp and IDC
- Wire size:
  - Crimp contacts: AWG 30-24
  - IDC: AWG 30-26

## Benefits

- Occupies less space on PCB's
- Two-point electrical stability
- Micro-Match: resistant to fretting corrosion
- Automated surface-mounting and through-hole reflow manufacturing
- Inter-mateable with other major brand connectors
- Various crimp terminal options
- Fast termination/installation
- IDC and crimp receptacles mate with the same headers
- Easy replacement of damaged/faulty contacts

## Applications

- Industrial automation controls & devices
- Building, home, and factory automation devices
- Telecommunications equipment
- Instrumentation & test equipment
- Material handling equipment
- Passenger vehicle infotainment systems



AMPMODU

## Orderable at arrow.com

- |              |             |
|--------------|-------------|
| Micro-MaTch: | AMPMODU:    |
| - 8-188275-0 | - 2842126-3 |
| - 7-188275-6 | - 2842128-3 |
| - 7-188275-4 | - 2842102-6 |
| - 7-188275-8 |             |
| - 8-188275-4 |             |



AUTHORIZED DISTRIBUTOR

# DDR4 SO DIMM Sockets

## Key Benefits

- Provide about 30 % better performance than previous DDR3 SO DIMM memory sockets
- Consume about 70 % less power than DDR3 SO DIMM memory sockets
- Adds 20 % PCB space savings over DDR3 SO DIMM memory sockets
- Offer up to 10 % connector height reduction
- System operating costs can be lowered due to higher performance and less power consumption per socket
- Higher chip density and pin count provides larger DIMM capabilities than DDR3 SO DIMM memory sockets – transmitting more signal at one time
- One of the largest product portfolios in the market with a variety of heights and gold plating options

## Applications

- Routers
- Switches
- Base Stations
- Servers
- Work Stations
- Desktop PCs
- Notebook PCs
- Industrial
- Instrumentation

## Target Markets

- Data Communications
- Consumer Devices
- Industrial



2309412-4



2309413-1



2309414-5

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## Orderable at [arrow.com](http://arrow.com)

- 2309413-1
- 2309412-4
- 2309414-5

# TDK Ferrites with Distributed Air Gaps

All types of power supplies require ferrites, which in turn, in a wide variety of core designs, are the basis of inductors for energy storage and of transformers for power transmission and galvanic isolation. Although efficiencies above the 98 per cent mark are already being achieved today, developers are fighting for every tenth of a per cent to further increase efficiency, especially in high-performance power supplies.

Grinding individual air gaps into ferrite cores is a common state-of-the-art to delay core saturation and thus increase performance. However, these individuals, relatively large air gaps result in a higher stray magnetic field, which leads to additional copper losses, especially at high-frequencies. TDK offers an elegant solution with new geometries and the core manufacturing technique of distributed air gaps to reduce the stray magnetic field and thus reduce heating (Figure 1). The magnetic field emission to the surrounding environment is effectively prevented by arranging the air gaps in the center slug.



Click here or scan the QR-Code to find the products on [arrow.com](https://arrow.com)

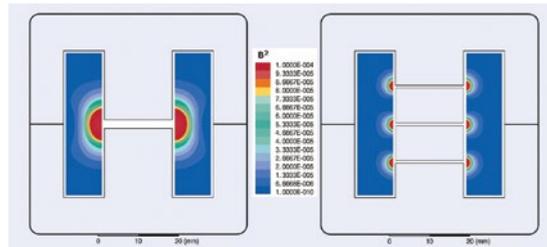


Figure 1: The uniform distribution of the air gaps (right) can significantly reduce the stray magnetic flux (red areas) compared to the conventional solution with only one air gap (left). Solutions with three air gaps offer the best price/performance ratio when used in applications with high frequencies and reduce copper losses by up to 70 %.

Core designs with distributed air gaps are available in the E, EQ, ER, ETD, PM, and PQ designs, each in different sizes and all EPCOS power materials.

Ferrite cores with distributed air gaps are used in a wide range of automotive and industrial applications, such as EV charging stations, on-board chargers, DC-DC converters, solar inverters, uninterruptible power supplies (UPS), industrial switch-mode power supplies, and switch-mode power supplies for telecommunications and server applications.



Figure 2: ETD core with three air gaps. The second and third gaps are formed by the symmetrical counterpart.

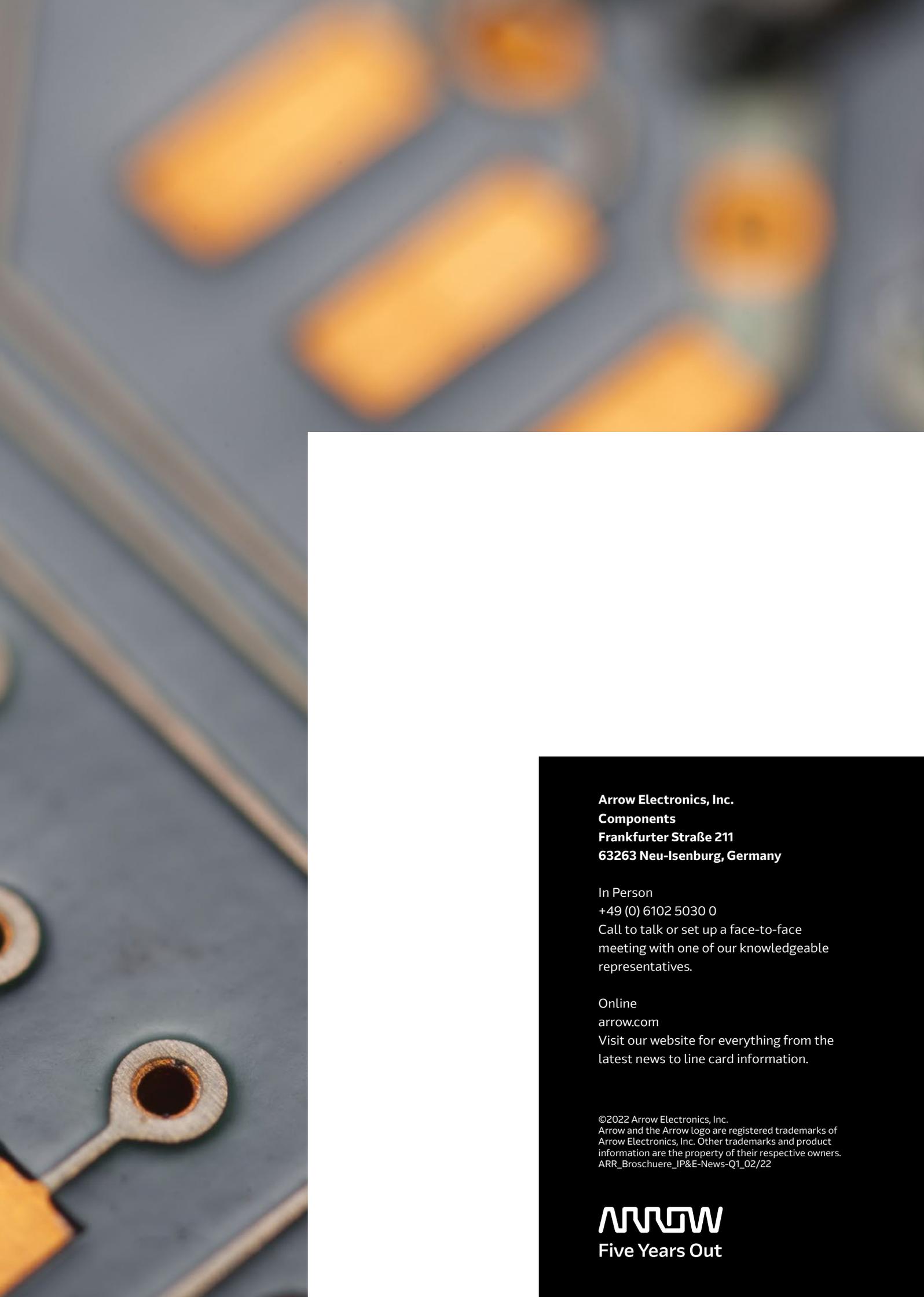
We help people connect with the tangible future.

One where new technologies, new materials, new ideas and new electronics make life not only different, but better. Not just faster, but smarter. Not just easier, but more inspired.

Where the benefits of these technologies are accessible to the many, not just the few. Customers. Corporations. Communities. Individuals. The people who need them most.

We do this by thinking and acting five years out – far ahead enough to shape the future, but close enough to make it a reality.

We're a team of builders, designers, engineers and imaginers, all bridging the gap between what's possible and the practical technologies to make it happen.



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