



# IP&E News

4<sup>th</sup> Quarter 2021



# What's Next in the Automotive Industry?

Evolution has always come naturally to the automotive market, and the last decade has been no exception. The demand for interconnectivity has accelerated rapidly, with automotive mega trends such as autonomous driving, electrification, and safety features becoming more widespread.

*By Paul Keenan, Director of Sales – Distribution Europe*



Earlier this year Molex published the results of our 'Future of Automotive' survey, which revealed that 91% of the 230 automotive decisionmakers interviewed thought cars would be fully electric or hybrid in the future. In addition, 94% of respondents thought that future vehicles will include autonomous driving features, with wireless charging ranked one of the most popular features.

The results of this survey captured data on what industry professionals envision for the future of the automotive industry, but also reinforced the role that Molex plays in this market as we continue to innovate to address the demand for connectivity.

Molex has played a critical role in serving the automotive industry for decades, and with the pace of change accelerating at an unprecedented rate we are even more committed to working with Arrow to help our customers to stay ahead of the curve.

To learn more about our perspective on what's next in the automotive industry, visit [www.arrow.com/en/molex-connected-world](http://www.arrow.com/en/molex-connected-world) or continue reading to find our latest article 'The Future of Mobility: 3 Trends You Need to Understand'.

## Designing for the connected ecosystem: the digital change that's driving connected living

The internet has changed our lives forever, not just in the way that we connect with each other, but also in the way that our technology connects with other devices. This is the cornerstone of the internet of things (IoT), which allows machines to share information in new and exciting ways. The IoT is revolutionizing how we

live our lives as users and consumers, but it has far-reaching applications outside the home.



Click here or scan the QR code to learn more about how Molex is making a connected world possible.

# IP&E by Arrow

## Turn today's ideas into tomorrow's technology

### Components – EMEA

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# How a new automotive component is born

Technology distributors play a leading role in the current market scenario for electronic components and sub-systems, and act as a real hinge between producers and suppliers, proposing the most suitable solutions to meet specific requirements, and intervening in each phase of the product lifecycle. *By Andrea Cattania, freelance journalist*

The challenges facing the designers of systems and components for electric cars, and those intended for installation aboard the vehicle, present various difficulties. In the case that we will look at here, the main design requirement was the need to minimise the weight and size of a battery charger, even when exposed to high power levels, as well as the need to reduce installation times and costs. This condition required looking beyond the use of standard

components, which would have involved threaded or welded connections.

The project described here represents a perfect instance of enhancing the role of the technology distributor, which operated not only as a hinge between the design company and the supplier of specific components, but also as an active participant in the product approval phase.



Quality Detail of quality inspection



## The Meta System solution

This onboard battery charger was produced by Meta System, a company specialising in advanced electronic systems for the automotive sector. Established in Reggio Emilia in 1973, Meta System focuses on innovation, know-how differentiation and continuous technological progress. The company has more than 150 registered patents to its name and employs approximately three hundred employees in research and development activities, collaborating with the major car manufacturers worldwide.

In this case, the challenge for the designers comprised the size of the battery charger to be installed on the vehicle. Minimising this footprint was a strict design requirement, which eliminated any possibility of using standard connectors. One particularly important decision was therefore the selection of the supplier who best met this requirement.

The winning approach proved to be to collaborate with a technology distributor capable of combining technical and market expertise with wide-ranging knowledge of the world of manufacturers, an essential criterion for making the desired choice within a short period of time. Arrow Electronics is a leading global technology provider with a strong international presence in the automotive sector's supply chain. Against a background of an increasing trend toward a model in which electrification, digitalisation and autonomous

driving foreshadow the future of the automotive industry, Arrow operates as a reliable reference point capable of anticipating future requirements and of guiding customers through the complexity of rapidly evolving scenarios such as in the automotive sector. Arrow's unique ecosystem of manufacturers, developers and technologies offers the right conditions for creating complete, independent, and integrated technical solutions for the automotive sector.

As a Meta System technology distributor, Arrow Electronics realised from the very start that the stringent design constraints would require careful planning, not only of the electronics, but also of the mechanics and connections. Right from the start of the project, Arrow's specialists got in touch with the main suppliers of these components to ensure a careful assessment of their alignment with the needs of the design. Following a careful examination of the main manufacturers active in the market, the decision was made in favour of Amphenol. ►



The project with Meta System is significant in a wide variety of aspects. First, because it involves a product which started out as a custom item but is destined to become a standard component, as it meets a general need. In this instance, the case is interesting as an example of a situation where the starting constraint is its footprint, since the dimensions of the final product also affect the design of the electronics.

More importantly, however, the case also highlights the added value represented by a technology distributor that understands the needs of the manufacturer, relieving them of other tasks which might distract them from focusing on the product, and who collaborates in the setup of the project, coordinating its various phases.

Arrow's commitment is not limited to the role that it plays during the design phase. Product approval also requires intensive involvement, due to the strict protocols governing the automotive sector. The strategic positioning of a technology distributor allows them to rapidly establish the necessary contacts, which often represent a not-inconsiderable problem for a medium-sized company.

The development and implementation of this project, which translated into a successful product for a major automotive manufacturer, constituted a notable feather in the cap for Meta System and Arrow Electronics in view of the intensification of relationships with players in the sector and the improvement in their own positioning on the market.

## The added value of a technology distributor understanding the needs of the manufacturer

The main function of the On-board Battery Charger product is to convert the AC mains voltage into a DC voltage, which is then used to charge a high-voltage accumulator (in this instance, the vehicle's battery system). Designed for on-board installation, the unit can be used as a standalone charger or in combination with other units in parallel to reduce the charging time. A further reduction in charging time was achieved thanks to its high operating efficiency.

The converter can be connected to almost any kind of electrical network, as it is compliant with current standards in Europe, Asia, and the USA. It uses power line communication (PLC) to exchange information with the charging station as well as for the various functions for managing the charging process (Proxy, Pilot, LED control, plug locking, etc.). The topology of the product, which operates at high frequencies and uses silicon carbide MOSFETs, was carefully developed with a view to minimising cost, weight, and volume. These features, in combination with the reduction in assembly times and the increase in current capacity, were also taken into consideration in the various power connections that have been developed (single or multiple contacts, wire-to-board, board-to-board).

## Meta System activity in the automotive sector

The success of projects and products like the one mentioned here is the result of the perfect teamwork between the main players, who are aligned along the same strategic vision focused on innovation, the driving force behind the activities of the companies involved. In Meta System, the fundamental factors in research and development are the high level of specialisation of the technicians, an excellent ERP system and the use of the latest technologies.

The use of electric propulsion is based on the technical characteristics defined for e-mobility. These technologies relate to hybrid, plug-in and fully electric vehicles, which are intended to reduce emissions levels, operating costs and fuel consumption. In the e-mobility market, Meta System offers global OEM manufacturers professional support, not only in terms of state-of-the-art products, but also in terms of hi-tech methodologies and advanced technologies.

## E-mobility is Meta System's flagship sector.

E-mobility is Meta System's flagship sector. Forecast turnover for 2020, updated based on the impact of the ongoing pandemic, is expected to reach approximately €194 million, of which €110M comes from this sector. The forecast shows constant growth over the coming years, reaching more than €500M in 2026. Meta System has completed projects for major global manufacturers in the sector.

In addition to "innovation", the key word for Meta System in this area is "safety". Safety and security products, such as the Park Assist parking assistance sensor range, Clima Fan Control climate control system electronic control module range, smart sirens and volumetric protection systems, can be adapted to the most complex automotive systems to create bespoke solutions.

One of Meta System's objectives is to make mobility safer and smarter for everyone, and the Telematics business unit, established in 2002, has since developed products, services and solutions for usage based insurance (UBI) and for the management of corporate fleets in line with automotive sector standards. Meta System is a market leader in telematics solutions for insurance companies, with more than ten million devices on the road. ►



Detail of Anechoic Chamber for EMC tests

## Design that looks to the future

Meta System designers operate based on structured analyses of requirements throughout a design cycle which covers the various phases from design through to the implementation, installation and integration of the devices. The Meta System project team has recently been expanded with a simulation group, which makes its skills available for the development of advanced, sustainable solutions.

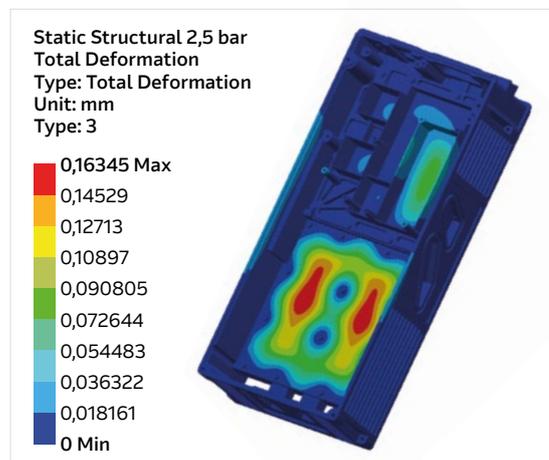
This integrated design activity is not limited to electronics alone, but extends to mechanics, with the ability to create complex structures to a high standard for integration into the target systems. The Simulation division creates and analyses digital prototypes of physical models, identifying their weaknesses to eliminate these from the start. The aim is to ensure the maximum efficiency of designs and products, which are intended to anticipate the future, thanks to their innovative features.

These simulations and analyses include the real-time assessment of design changes, structural checks of the mechanical parts, the fluid-dynamic optimisation of cooling circuits, predictions of the system's thermal performance, electromagnetic compatibility checks, the optimisation of the magnetic circuits of power components and EMI filters, and the development and validation of RF antennae.

The transition from design to large-scale production involves the use of the latest automation processes. Product reliability is guaranteed by an internal ISO 17025-certified

laboratory, which complies with the automotive standard requirements for the approval and qualification of products. In the Life Testing division, devices undergo rigorous thermal, mechanical, and environmental reliability tests, as part of which the behaviour of the products is examined across a wide range of conditions. A further factor which guarantees Meta System's market competitiveness is the presence of SMT assembly lines in clean room environments, which comply with Industry 4.0 requirements for process automation and quality. This picture is completed with smart logistics, which allow the effective management of materials using an ERP system that is connected 24 hours a day for complete traceability.

The entire process is governed by a certified quality system.



Example of FEM simulation for the structural analysis of mechanical parts.



SMT Department with high-flexibility production rate

# Extensive Portfolio of Cables

3M offers an extensive portfolio of cables built for reliability and convenience to offer the performance you need in a bright application field.

### Applications

- Industrial Electronics
- Medical
- Communication

### 3M cable attributes at-a-glance:

- Flat and round cable versions
- Shielded and none shielded solutions
- Ribbon and twisted pair cable
- Halogen free version
- High- and medium flex models
- Different pitches, conductor sizes, insulation materials, stranded or solid wires
- Jacketed or unjacketed solutions

Flat Cables	Round Cables	Halogen Free Cables
 High Flex Life Cable, 3250 Series	 Round, Shielded/Jacketed, Flat Cable, 3659 Series	 High Flex Life Cable, HF319 Series
 High Flex Life Cable, 3319 Series	 Round, Jacketed, Flat Cable, 3759 Series	 Round Conductor Flat, LSHF Cable, HF447 Series
 Round Conductor Flat Cable, 3365 Series	 Round, Shielded Jacketed, Disc. Wire Cable, 3600B Series	 Round Conductor Flat Cable, HF365 Series
 Twisted Pair Flat Cable, 1700 Series	 Round, Shielded/Jacketed, Disc. Wire Cable, 3750 Series	 Round, Shielded/Jacketed, Flat Cable, HF659 Series
 Color Coded Flat Cable, 3302 Series	 Round, Shielded/Jacketed, Disc. Wire Cable, 3644X Series	 Round, Jacketed, Flat Cable, HF759 Series
 Round Conductor Flat Cable, 3625 Series		
 Round Conductor Flat Cable, 3447 Series		
 Shielded/Jacketed, Flat Cable, 3517 Series		
 Round Conductor Flat Cable, 3749 Series		
 Round Conductor Flat Cable, 3801 Series		
 Round Conductor Flat Cable, 8125 Series		
 Round Conductor Flat, Controlled Impedance Cable, 7700 Series		



Click here or scan the QR-Code for specific questions.



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

# Industrial Ethernet Connectors

With the introduction of several new Ethernet standards, factory automation programs utilising Industrial Internet of Things (IIoT) connectivity now have expanded capabilities to communicate in the same language from sensors and input devices, all the way up to the cloud. Whether the requirement is for a single twisted pair up to 1 km away (10BASE-T1L), or a 10GBASE-T connection (Cat6A) carrying real time inspection data over a four pair connection, Amphenol has a full range of Industrial Ethernet connectors to reliably help carry the load. Amphenol offers a range of interconnect and cable assembly products which support Power over Ethernet (PoE) or Power over Data Line (PoDL), so remote devices can be powered through the same connection that carries the signals.

## Single Pair Ethernet (SPE) IP20 Connectors

Next generation IEC63171-6 compliant industrial Ethernet connectors

Single Pair Ethernet (SPE) connectors eliminates slow expensive and complex fieldbus protocols and connections by simplifying and standardizing existing and new industrial network systems. Robust right angle and vertical PCB mount SPE jacks mate to field terminable plugs, providing a complete shielded interface with metal latching features. Current handling up to 4 A supports PoDL (Power over Data Link) capability up to 1 km.

## ix Industrial™ IP20 Connectors

Next generation industrial IoT Connectivity

ix Industrial™ connectors are 10 mm pitch connectors featuring 2-point metal latches are just 25 % of the size of an RJ45 connector, and as such allow much greater port density and mating security. They are PoE capable, provide data performance to Cat6A level (10GBASE-T), and feature 360° shielding through the mated pair for superior EMI protection.



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

- Single Pair Ethernet
- ix Industrial

# Kyocera AVX Circuit Protection Products

## Multilayer Varistors

KYOCERA AVX multilayer varistors with unique high-energy multilayer construction represents state-of-the-art overvoltage circuit protection and provide protection from voltage transients caused by ESD (e.g. IEC 61000-4-2), lightning, inductive switching, automotive related transients such as load dump, jump start with and other automotive transients (e.g. ISO 7637, AEC-Q200-002, ISO 10605, ISO 16750, CI-220, CI-260) and more.



KYOCERA AVX varistors are ideal choice for circuit protection thanks to wide range of components covering applications from low capacitance parts for high speed data lines/ RF circuits up to high energy varistors for load dump and jump start requirements or combined solution with MLCC capacitor for transient protection and broad frequency filtering.

### Features

- Bi-directional transient voltage protection
- EMI/RFI filtering in the off state
- High reliability
- Multiple strikes capability
- Very fast response (<1 ns)
- Operating temperature 125/150/175 °C
- No derating over operating temperature

### Applications

- Automotive
- Consumer
- Home appliances
- Automation
- Lighting
- Industrial/Professional
- Medical
- Renewable/Smart Energy
- Defense



## GiGuard® TVS Diodes

GiGuard® diodes offer clamping voltages below 12 V and very low cap values from 0.3 pF. This combination

both protects sensitive ICs during ESD events and preserves the integrity of the protected high-speed signals. Fits perfectly onto the same PCB solder pads as standard EIA 0201/0402 components. GG series complies with IEC 61000-4-2, IEC 61000-4-4, very fast charged device model ESD and cable discharge event.

## NTC Thermistors

KYOCERA AVX offers reliable NTC thermistor solutions for a wide range of automotive, industrial and commercial applications. Available in SMT, leaded, or leadless form, NTC thermistors provide multiple stability options and a wide resistance range with the option to offer customized solutions.



### Features

- Resistance: 10 Ω – 1 MΩ
- Tolerance: from ±1 %
- Temperature range: -55 to +150 °C

### Applications

- Temperature sensing
- Temperature compensation
- Liquid level detection

## KYOCERA AVX SpiCat

Online Simulation Software is an online engineering simulation software that allows you to find many characteristics of the components that KYOCERA AVX manufacturers, including Multilayer Varistors and NTC Thermistors.

**SpiCAT**

<https://spicat.kyocera-avx.com>

# Building Automation Switch

## Reliable Ethernet Communication in Smart Buildings

New unmanaged switches offer electricians a reliable, cost-effective solution to meet the specific electrical installation requirements for commercial and non-residential smart buildings, as well as smart homes.

- Saves time and space during installation by fitting directly into standard electrical distribution enclosures
- Eliminates the need and cost for a separate power supply by embedding Power over Ethernet (PoE) functionality
- Provides fast, reliable Ethernet communication through up to 8 Gigabit speed ports

## Key Features

- Special form factor for easy installation
- Up to 8 ports (Fast Ethernet/Gigabit Ethernet variants)
- PoE enabled, with a total power budget of up to 110 W
- Ethernet speeds up to 1 Gigabit
- Integrated 110/230 V power supply, with optional 24 V for use in industrial automation applications
- Operating temperature range of -5 °C to +60 °C
- Meets electrical installation requirements in commercial/nonresidential buildings and smart homes

## Applications

As smart buildings enable more automation, there is a trend towards PoE-powered



controllers instead of separate power cables, introducing a need for a reliable and cost-effective switch. The Building Automation Switch provides reliable connection to end devices and can be installed directly in the electrical distribution board. The switch is also an ideal solution for door-entry systems and video surveillance where reliable Gigabit speeds are needed to transmit high-resolution video streams.

## Markets

The Building Automation Switch is ideal for smart building applications where IP-enabled controllers and sensors are being powered by PoE. This includes smart homes and buildings, casinos, hotels, and hospital systems. Additionally, the switch is suited for factory automation environments in which standard modular DIN-rail form factor is required.

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

- BAS20-8TX-HV
- BAS22-8TX-HV-110
- BAS22-8TX-HV-55



# Compliant Thick Film Chip Resistor Arrays

The AEC-Q200 compliant Model CATxxA series concave and CAYxxA series convex chip arrays are available in two different widths of 1 and 1.6 mm and contain two or four pieces of isolated thick film resistive elements printed onto a single ceramic substrate and is designed for general purpose applications.

The Model CAYxxA-AS series are the first chip arrays from Bourns that are both AEC-Q200 compliant and sulfur-resistant based on ASTM-B-809-95, and EIA-977 (test parameter B) standards and able to operate in certain harsh environments such as agricultural, gas, oil, rubber industry and telecommunication base stations.

AEC-Q200				
Series	Termination	Body Width	Number of resistors	Features
CAY10A	convex	1 mm	2/4	AEC-Q200 compliant
CAY16A		1.6 mm	4	
CAT10A	concave	1 mm	2/4	
CAT16A		1.6 mm	4	
CAY10A-AS	convex	1 mm	4	AEC-Q200 compliant and sulfur-resistant
CAY16A-AS		1.6 mm	2/4	

## AEC-Q200 Compliant Thick Film Chip Resistors

CR-A series AEC-Q200 compliant chip resistors are available in eight different footprints from small 0201 (0603 metric) up to 2512 (6431 metric) and offers rated power from 0.05 to 1 watt. The Model CRxxxxA series has a wide resistance range from 1 ohm to 20 megohms and is designed for general purpose applications.



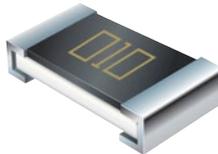
## AEC-Q200 Compliant High Power Anti-Surge Thick Film Chip Resistors

CMP series anti-surge thick film resistors are available in five different footprints from small 0603 (1608 metric) to 2512 (6431 metric). This series has a wide resistance range from 10 ohms to 1 megohm, high rated power up to 1.5 watts and superior pulse load capability.



## AEC-Q200 Compliant Metal Foil Chip Resistors

CFN-A series metal foil chip resistors are produced by using a metal foil resistive element mounted on a ceramic substrate with excellent heat conductivity. The CFN-A series is available in four different footprints: 0402 (1005 metric), 0603 (1608 metric), 0805 (2012 metric) and 1206 (3216 metric). The metal foil resistive element of these chip resistors provides very low inductance, low noise, excellent reliability and very low resistance values down to five milliohms. The low resistance value makes them ideal for current sensing in consumer and telecommunication electronics and industrial automation applications.



CMP-A series chip resistors are AEC-Q200 and sulfur-resistant, an attribute increasing in demand for customers using thick film technology products in a challenging environment.

Target applications for models CMP and CMP-A are power supplies, digital meters, consumer electronics, LED lighting and industry control boards.

### Orderable at arrow.com

- CATxxA
- CAYxxA
- CAYxxA-AS
- CR-A
- CMP
- CMP-A
- CFN-A

# EVO Series Cable Tie Tools



## Precise tensioning and cutting of plastic ties

Designed for operator comfort and repeatable quality, the EVO7 is ideal for manually applying plastic cable ties up to a strap width of 4.8 mm.



Whereas other cable tie guns tighten and cut the strap in one step, the mechanism in the EVO7 locks the strap before it is cut off flush behind the head.

The results are elimination of jarring recoil that can lead to repetitive stress injuries (RSI), no stretching of the tie, and excellent blade life >1 million cuts!

Overtightening of cable ties can result in unnecessary damage to sensitive bundles. That's why the EVO7 is factory calibrated between 20 N and 165 N – other cable tie guns start at 50 N.

## Safe removal of ties on critical harnesses

There is also an inherent risk of damage to cable insulation when cable ties are removed using side cutters or knives to remove cable ties.



The unique EVO cut tool helps ensure the integrity of electrical and data wiring in critical systems whenever cable ties need to be removed during maintenance, repair or modification.

The lightweight hand tool is suitable for removing inside and outside serrated plastic cable ties of different sizes on both flexible and rigid bundles.

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

- EVO7SP-MET/PL-BK
- EVO7-MET/PL-BK
- SP EVO7 Blade Kit-ST-MIX
- EVOcut-BK

# Flexible Piezoelectric Haptic Modules



## Revolutionary High Definition Haptic

KEMET film actuators add haptic skin to any device embedded in product surface to create:

- Localized, independent sensations anywhere on the surface (flat, curved or flexible)
- Natural, organic, authentic touch sensations

## Typical Applications

Interaction with hands:

- Smart capacitive button: home speakers, trackpads etc.
- Gaming and VR controllers including gloves, buttons, and joysticks



Interaction with lips:

- Medical devices
- Musical instruments

## Key Product Highlights

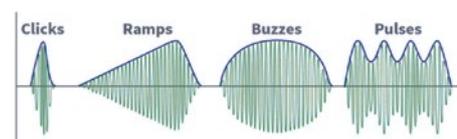
- Thin 150  $\mu\text{m}$
- Flexible and comformable
- High displacement: 250  $\mu\text{m}$

## FFAA Product Specifications

- Size 14.1 x 18.5 mm
- Thickness 0.6 mm
- Weight 56 mg
- Operative Voltage 212@ 150 Hz Vpp
- Frequency range 10–500 Hz
- Out of plane displacement  $\approx$  200  $\mu\text{m}$



## Effect Design



- Library of haptic effects
- Software tools to enable simple effect designs



Click here or scan the QR-Code for Film Haptic Actuator Demo Kits, available via Arrow Test Drive.

## Orderable at arrow.com

- Demo KIT - FFAA000021274X
- Film Flex Assembled Actuator – FFAA141921201L

# Space Saving Anti-Pulse Thick Film Chip Resistors

KOA's SG73P-series thick-film chip resistors has approx. 7 times pulse handling capability compared to standard flat chip resistors. Due to the special resistance trimming it also allows a higher continuous power rating. This means that existing designs can be 'powered up': An SG73P device can be dropped onto the pads of a similar sized conventional part, thus increasing the power capability without changing the PCB layout.

The **SG73P1EW** is the latest addition to the popular SG73P pulse stable series. This version of the 0402-size part has an improved power rating of 0.25 W compared to the standard 0402 device. By this high power rating, downsizing of standard flatchip resistors from size 1206 or 0805 to the new SG73P1EW (0402inch) is possible. Additionally, the new SG73P1EW is using a special resistive paste to reach an even better T.C.R. of  $\pm 100$  ppm/K.

## Features and Benefits

- Outstanding pulse performance, high power
- Allows e.g. 500 W for 10  $\mu$ s in size 1210
- High component and equipment reliability
- 1  $\Omega$ ...10 M $\Omega$ ,  $\pm 0.5$ ...  $\pm 5$  % T.C.R.:  $\pm 100$ ...  $\pm 200$  ppm/K
- 5 sizes from 0402 ... 1210 inch
- Operating temperatures up to +155  $^{\circ}$ C
- EU-RoHS compliant, AEC-Q200 tested
- Anti-Sulfuration type also available



## Applications

- Automotive electronics
- Power supplies
- Measuring instruments
- Motor control units
- Industrial electronics
- Smart meter
- Power conditioner/inverter

## Orderable at arrow.com

- SG73P
- SG73P\_RT

# Anti Sulfuration Thick Film Chip Resistors

KOA's anti-sulfuration resistors are designed to be used in harsh environments where high levels of sulfur contamination gases are present. Sulfuration-proof materials are used in the construction of the part which means that KOA's  $x_{RT}$  are able to achieve an extremely high level of sulfuration-proof performance, which in turn means that equipment failure rate, when used in high sulfur environments, is reduced.

## Features and Benefits

- Excellent anti-sulfuration characteristic due to using high-sulfuration-proof inner top electrode material
- Available for most KOA thick film resistor ranges
- Ideal for use in harsh environments
- AEC-Q200 tested

## Applications

- Industrial control systems
- Automotive electronics
- Medical equipment
- Electrical instrumentation
- Power meter/conditioner
- Solar/wind inverter circuits
- Avionics



Resistor failure due to the effects of sulfuration. Picture shows silver sulfide ( $Ag_2S$ ) needle crystal growth.

## Orderable at arrow.com

- RK73B/H\_RT
- RK73Z\_RT
- RK73G\_RT
- RS73\_RT
- SG73(S/P)\_RT
- WK73(S/R)\_RT
- SR73\_RT
- HV73(V)\_RT

# Fast, Low-Height, Superior Shielding

## Board Level Shielding

Look to Laird Performance Materials. You'll quickly see why. Our surface mount PCB shields provide superior protection at the component level. They're the choice for countless devices globally.

Laird can design shielding often in hours. Advanced laser welding? Adhesive metal-joining technologies? Laird innovates. How?

- Many standard board-level shields meet off-the-shelf application requirements
- Laird shields are thinner, lighter, save space, and enable zero air gap
- Coplanarity of 0.05 mm (depending on part size) allows less use of solder; coplanarity 100 % inspection system
- Rigid corners on shields, removable pick bridges (where replaceable covers enable repairs), and ultra-low height (<1.0 mm designs)

## Standard Surface Mount Shields

Economical one-piece shields offer six sides of EMI protection, with the sixth side being the board itself. There's no tooling cost.

Two-piece shields (or our new two-piece low height shields) enable component inspection or repair without risking board damage. Covers snap on and off with ease, making component repairs quicker and easier. Again, no tooling costs.

## Custom Surface Mount Shields

Laird uses Pro-Engineering/AutoCAD systems to create custom part designs. We look at the entire application, not merely the component,

creating best-value finished products which deliver long-term customer satisfaction.

## Fast Turnaround on Prototypes

Laird responds within days with a prototyped shield well within tolerances. Design modifications don't extend delivery dates. All are 100 percent inspected on critical dimensions. Parts designed in pre-production can be supplied while progressive die tools are being produced.

## Laird Virtual Design Centre

Use it to to locate, configure, and download 2D and 3D parts, assemblies, and library features

## Custom Product Development

You achieve rapid prototyping, design freedom, and virtual prototype capabilities through Laird's PTC Creo, AutoCAD, and Solidworks platforms.

## Modeling

Our predictive performance tools precisely forecast potential issues of concern, guiding needed modifications. Laird know-how gives you:

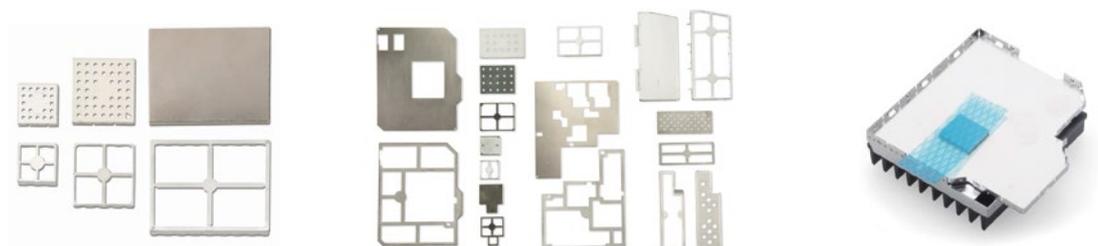
- Rapid modeling concepts
- 2D/3DRF simulation (HFSS, CST)
- Program control
- Precise forecasting of issues for peace of mind

Speedy, superior prototyping. Superb board-level shielding. They're Laird specialties. Contact Arrow today.

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- BMI-S



# 3 Trends – For the Future of Mobility

The automotive industry is undergoing major changes. Often seen as a highly innovative market, it is currently experiencing three major advances that will dictate the future of mobility for the next decade. These innovations will not just affect the vehicle manufacturers themselves – they will also create ripples throughout the industry. It is vital that designers and engineers become familiar with how these developments will impact their role in the industry.



## The Move to Electric

The promise of the electric vehicle is not new. In fact, the development of electric vehicles has paralleled the growth of the internal combustion engine during the early years of the automotive industry. However, the compactness of the gasoline engine, combined with the relatively crude battery technology available at the time, led to electric vehicles becoming a small niche in the automotive industry as we now know it.

## Vehicle Communications

More than any other single element, our lives over the next decade will be guided by data. The widespread adoption of 5G connectivity around the globe has led to a huge constellation of connected devices, and the car will form a key part of this network. High-speed communications will enable V2V (vehicle-to-vehicle) communications, allowing vehicles to share information about road conditions, potential dangers and even their relative positions. The ability to connect remotely to the manufacturer will also make possible the update of vehicle software remotely, allowing cars to use the latest technology without having to be taken to a service center.

## Driverless Vehicles

Self-driving or autonomous vehicles have caught the public imagination. The technology to achieve this level of driving capabilities will require a complex combination of sensors and computational power. To achieve widespread acceptance, self-driving cars will need to be able to detect all potential hazards, understand how to avoid them and then take the necessary action, all within a very short period of time.

## Your Partner for Future Mobility

Molex has a proven track record of creating robust, high-performance solutions for connectivity in tough conditions. Scan the QR code to read more about each future mobility trend and learn how Molex solutions combine the reliability of the automotive industry and the high performance of the latest wireless communication systems.



Click here or scan the QR-code to learn more about each of these automotive trends.

# New AC-DC Converters for Medical Applications

ORING isolation is not required to achieve sharing of current between paralleled power supplies. In applications where reliability is critical it may be desired to protect against the unlikely event of a power module fault that would compromise the common bus.

For the lower current auxiliary (V2) output, ORING is most easily implemented with diodes rated to tolerate the reverse voltage, leakage current and the forward current. The Aux (V2) outputs can be tied together for redundancy but total combined output power (at initial power up) must not exceed 2.5 W; external ORing devices are recommended to preserve redundancy.

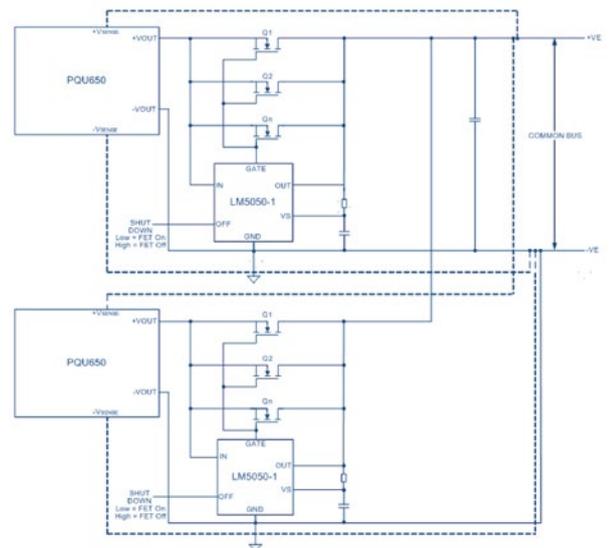
It is not recommended that the 12 V Fan (V3) outputs are connected in parallel since these outputs are only semi regulated.

NB: Optional remote sense connections are not mandatory for parallel operation.

Applications include hospital beds, diagnosis equipment, ventilators, process control, broadcast, Power over Ethernet (PoE), lighting, security, and audio visual (AV).



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



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– PQU650M

# G7EB PCB Power Relay

The OMRON G7EB has a switching capacity up to 100 A at 800 VAC, as well as 100 A at 60 VDC. Its ultra-low 5 milliohm contact resistance greatly reduces heat generation within the component and minimizes energy waste. As a result, the G7EB experiences a temperature rise to about +40 °C with a 100 A carry current. This 40.5 x 50.5 x 37 mm relay helps reduce overall system size, while its reduced requirement for heat sinks, as a result of its cool operation, yields further space savings for the system designers.

The G7EB is aimed at distribution power conditioning systems (PCS), as well as test equipment such as semiconductor testers. It is available with both industry standard and OMRON proprietary pin layouts.




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Orderable at [arrow.com](https://www.arrow.com)  
 – G7EB

# G6J-Y PCB Signal Relay

The OMRON G6J-Y is a surface-mounting, ultra compact and slim DPDT relay. Its double-pole, double-throw configuration enables multiple simultaneous switching. The relay has a dielectric strength of 1,500 VAC and an impulse withstand voltage of 2,500 V for 2x10 μs. With the size of 5.7 x 10.6 x 9 mm it requires an exceptionally small mounting area, making it suitable for high-density mounting. Single-winding latching models, which enable energy saving, are also available. The G6J-Y conforms to UL/C-UL standards.

Applications include communication equipment, test and measurement equipment, building automation and factory automation.




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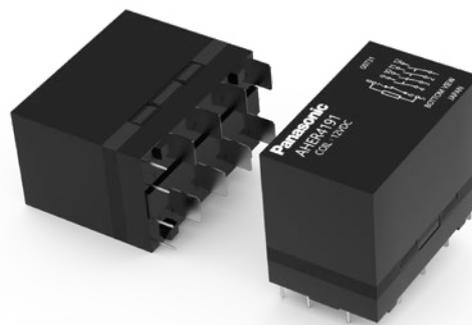
Orderable at [arrow.com](https://www.arrow.com)  
 – G6J-Y

# A small box for the wall box: New HE-R Relay

Quad power – one eighth power loss: Panasonic Industry releases 40 A printed HE-R relay for 3 phase systems with feedback contact. The perfect option for demanding inverter and wallbox designs.

EV charging station infrastructure and the spread of efficient domestic wall boxes are more than ever decisive factors for the resounding success of electromobility. Correspondingly, the demand for compact, robust and efficient components is high. When it comes to switching, there is good news from Panasonic Industry, as the new HE-R relay is the world's first PCB based relay that can be used as the main switching element in 3 phase systems. Being remarkably compact, it contributes to considerable space and cost savings. Each of the 4 NO contacts is able to switch 40 A up to an ambient temperature of +85 °C - also a result of the sophisticated thermal design and an unique low coil holding power. An optional NC contact as feedback contact can handle low level loads down to 10 mA / 5 VDC.

“Because of its outstanding ratio of size, power and robustness, the IEC62955 compliant HE-R relay is the perfect choice for contemporary and demanding AC/DC wall box designs”, claims Bernd Jaschinski from Panasonic Industry Europe. “The advanced technology inside the HE-R enables our customers now to control 3 phase systems directly on the PCB – that might not only be highly interesting for domestic wall boxes, but also for AC or DC charging stations and other fields of application, such as industrial automation or energy harvesting.”



## Key features

- Unique contact arrangement of 4a or 4a1b
- Compact size : W (35 mm) x L (58 mm) x H (47 mm)
- Short circuit capability VDE-certified according to IEC 62955,  $I_n \leq 32$  A
- Clearance & creepage distance > 8.0 mm
- Coil holding power : 490 mW
- Mirror contact structure according to IEC 60947-4-1
- Contact gap min. 3.6 mm
- UL/C-UL, VDE certified

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- AHER\*19\*

# SAW Filter Highlights

for sub-1 GHz, 2.4 GHz, GNSS connections

## Qualcomm Technologies acquired the SAW filter business from EPCOS/TDK

In 2016 EPCOS/TDK carved-out the SAW business unit and formed a joint venture with Qualcomm Technologies, Inc. (QTI), called RF360 Holdings Singapore Pte. Ltd. Target was the value creation for customers in the complex RF environment by offering the entire RF component chain from the antenna to the transceiver. In 2018 QTI took over TDK's share and is holding 100 % of RF360 Holdings.

## Qualcomm Technologies – a leader in SAW filters

Here we present SAW filter highlights for sub 1 GHz, 2.4 GHz and GNSS based wireless connected devices operating with various standards and protocols.

## Sub-1-GHz standards:

Lora®, Sigfox, Z-Wave, Zigbee, Halow, OMS®

## 2.4 GHz standards:

Wifi, Bluetooth, Zigbee

## GNSS standards:

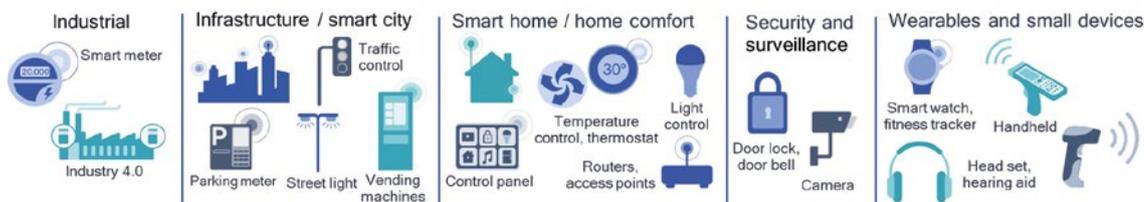
L1 (1.6 GHz), L2, L5 (1.2 GHz)

The usage of our filters is independent of the wireless standard, the frequency band is the deciding criteria.

## Reference designs

You find our filters in many of our and other IC makers transceiver/receiver reference designs.

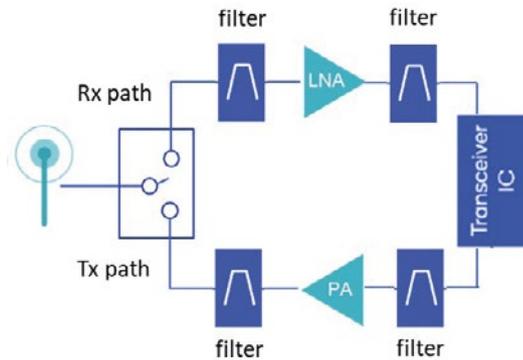
## Application examples



## Filters for sub 1-GHz

Part number	Package size (mm)	fc (MHz)	BW (MHz)	IL, typ (dB)	Highlight
B39431B3710U410	3.0 x 3.0	433.92	1.7	2.0	Top, max = 125 °C
B39871B4377P810	1.4 x 1.1	866.50	7.0	2.3	Top, max = 125 °C
B39871B2674P810	1.4 x 1.1	869.00	2.0	1.8	optimized for low IL and high out-of band attenuation
B39871B2636P810	1.4 x 1.1	869.00	2.0	2.7	optimized for best performance at 25 °C (attenuation at 862 MHz (B20 Tx) and at B8 Tx and out-of band attenuation); Top, max = 125 °C
B39871B4365P810	1.4 x 1.1	869.00	2.0	2.5	combines high attenuation at 862 MHz (B20 Tx) and B8 Tx with low IL @ -40 to +85 °C
B39921B2625P810	1.4 x 1.1	915.00	26.0	1.7	Top, max = 125 °C; optimized for high out-of-band attenuation
B39921B2672P810	1.4 x 1.1	915.00	26.0	1.1	optimized for low IL
B39921B9972P810	1.5 x 1.1	866.50 915.00	7.0 26	2.6 1.9	diplexer, covers all typical sub-1 GHz frequencies, 2 output lines can be combined into 1 output line

## IoT front end design (example):



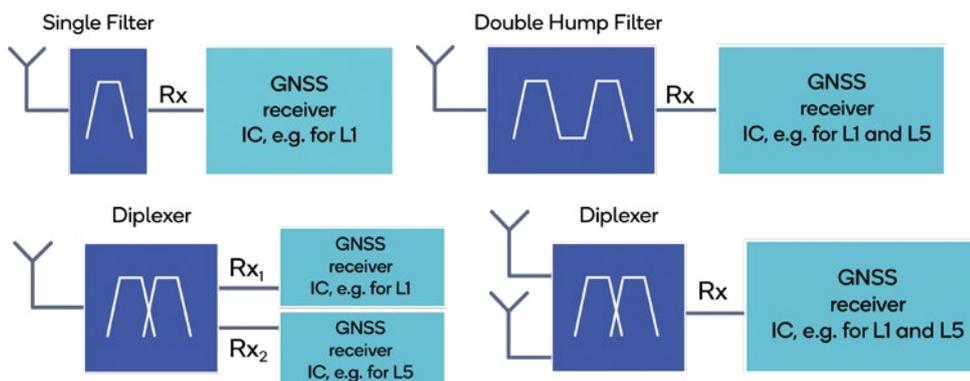
Click here or scan the QR-code for more information.

### Filters for GNSS

Part number	Package size (mm)	fc (MHz)	BW (MHz)	IL, typ (dB)	Features and GNSS bands
B39162B7504L210	0.9 x 0.7	1583	47	0.9-1.2	L1
B39162B8813P810	1.1 x 0.9	1583	47	0.8-1.3	L1
B39162B88313P810	1.4 x 1.1	1583	47	0.85-1.2	L1
B39122B7505L210	0.9 x 0.7	1176	20	0.9	L5, E5a
B39122B8884P810	1.1 x 0.9	1176	20	1.0	L5, E5a
B39122B8889P810	1.1 x 0.9	1197	62	0.9-1.4	L5, E5a, G3, B2-1, L2
B39122B2642P810	1.4 x 1.1	1225	118	1.1-2-2	L5, E5a, E5b, G3, B2-1, L2, G2, B3-1, E6
B39162B1267L210	1.5 x 1.1	1176	20	1.2	diplexer; L5, E5a and L1
		1583	47	1.2-1.5	
B39162B9973P810	1.5 x 1.1	1197	62	1.2-1.7	diplexer; L5, E5a, G3, B2-1, L2 and L1
		1583	47	1.2-1.5	
B39162B3503U410	3.0 x 3.0	1176	20	1.6	double hump filter; L5, E5a and L1
		1583	47	1.9	

### Filters for 2.4 GHz

Part number	Package size (mm)	fc (MHz)	BW (MHz)	IL, typ (dB)	Highlight
B39242B7544L210	0.9 x 0.7	2442.0	77.8	1.0-1.4	B7/B40/B41 coexistence, very low insertion loss
B39242B7530L210	0.9 x 0.7	2442.0	77.8	0.6-1.0	superior B7/B40/B41 coexistence
B39242B7520P810	1.1 x 0.9	2442.0	77.8	0.9-1.4	B7/B40/B41 coexistence, very low insertion loss
B39242B7509L210	1.1 x 0.9	2442.0	77.8	1.1-1.7	superior B7/B40/B41 coexistence
B39242B7506P810	1.1 x 0.9	2442.0	77.8	1.0-1.4	very low insertion loss
B39242B2653P810	1.1 x 0.9	2450.0	100.0	0.9	ultra low insertion loss



Technical data subject to change. Filter specification must be taken from the data sheet.

# Ceramic Antennas

## for Multi-Band GNSS

### Key Benefits

- Reliable and precise tracking performance enhanced by integration of antenna as part of the device
- Increased accuracy at the decimeter (dm) and centimeter (cm) level instead of meter (m) level
- Antennas for GPS, GLONASS, BeiDou and Galileo can provide global access to multiple satellites and frequency bands
- Stacked ceramic patch (active) antennas can integrate multiple bands to increase the number of received satellites in challenging environments
- Reduced antenna size enabling significant space savings for multi GNSS bands
- Stacked patch design options can enable smaller footprint
- Quick time-to-market and miniaturization enabled by TE's implementation support
- Support antenna implementation for optimized efficiency and isolation between multiple antennas and final throughput

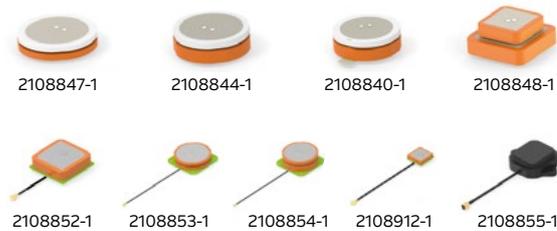
### Target Markets

- Smart transportation
- Smart agriculture

### Applications

- Fleet telematics
- Stolen vehicle tracking
- Livestock tracking
- Field condition tracking
- Drones
- Robots

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# USB Type-C receptacle connectors

### Key Benefits

- Excellent signal integrity (SI) performance in harsh environments (from low to high frequency)
- Transfers data up to 40 Gbps
- Excellent structure strength for a more robust connector shell
- Manufactured with an advanced insert molding process that helps avoid pin warping issues
- Supports resistance to damage and connection integrity during the customer assembly process
- Backward-compatible with Thunderbolt 3, USB 3.x and USB 2.0 connectors

### Target Markets

- Consumer Devices
- Artificial Intelligence (AI)
- Internet of Things (IoT)

### Applications

- Mobile phones, Notebooks, Tablets
- Peripherals
- Gaming or home entertainment
- Computing, PC or SOC design

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# Vishay's IHLP Power Inductors

## Discover How Vishay's IHLP Power Inductors Enhance Commercial and Industrial Applications

Vishay offers the widest variety of composite inductors in the market, with nine different core materials available to meet your specifications. Vishay is a reliable partner offering superior technical support and improved lead times.



### Industrial Applications

- Laser equipment
- Solar inverters
- High end embedded / industrial computing
- Industrial control units
- Construction vehicles
- E-bikes

### Key Product Features

- Current ratings up to 100 A
- Soft saturation independent from temperature rise
- High reliability with no significant aging effect

### Additional Benefits

Vishay's invention of the composite inductor created a fundamental component that designers rely on to drive innovation in electronics. Continuous product advancements have brought the benefits of Vishay's shielded inductors to nearly every application for commercial and industrial electronics.

### Orderable at arrow.com

- IHLP Series

# Therma Wick THJP from Thin Film Dale

Vishay thin film has launched a new product that provides a thermal transfer mechanism for an electrically isolated component to a chassis - ground plane or heatsink. The ThermaWick™ thermal jumper can increase the power handling capability of connected components, or extend their life under existing conditions, while maintaining a neutral potential to the heatsink or chassis.



### Available are

- THJP0603A?ZZ THJP 0603 30 mil
- THJP0612A?ZZ THJP 0612 30 mil
- THJP0805A?ZZ THJP 0805 30 mil
- THJP1206A?ZZ THJP 1206 30 mil
- THJP1225A?ZZ THJP 1225 30 mil
- THJP2512A?ZZ THJP 2512 30 mil



Here is the link to Vishay youtube video presence:  
<https://youtu.be/8gWlnIJrNOW>

### Orderable at arrow.com

- THJP Series

# Tube Liquid Sensor

## for Medical Applications

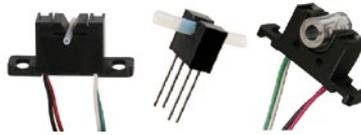
The OPB350 series liquid sensor is designed to work with 1/16" [1.6 mm] 1/8" [3.2 mm], 3/16" [4.8 mm] and 1/4" [6.3 mm] outside diameter clear tubes. When output reference circuitry is added, multiple output states such as "fluid present," "no fluid present" and "no tube present" can be recognized.

### Features

- Can identify if liquid is present in clear tubes that have an outside diameter of 1/16" [1.6 mm], 1/8" [3.2 mm], 3/16" [4.8 mm] or 1/4" [6.3 mm]
- Opaque plastic housing enhances ambient light rejection
- Printed circuit board mounting or 24" (610 mm) 26 AWG wires

### Applications

- Non-contact fluid sensing
- IV fluid
- Oils and other petroleum products
- Colored fluids
- Toner fluids
- Water



### Orderable at arrow.com

- OPB350
- OPB350W Series
- OPB350L Series

# 16 mm Panel Potentiometer

### Features

- 16 mm
- Conductive plastic element
- 100,000 cycle life
- Metal shaft/bushing
- Multi-ganged available
- RoHS compliant

### Applications

- Electric guitars
- Amplifiers
- Foot pedals
- Pro Audio



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- P160KN-0FC20B

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