

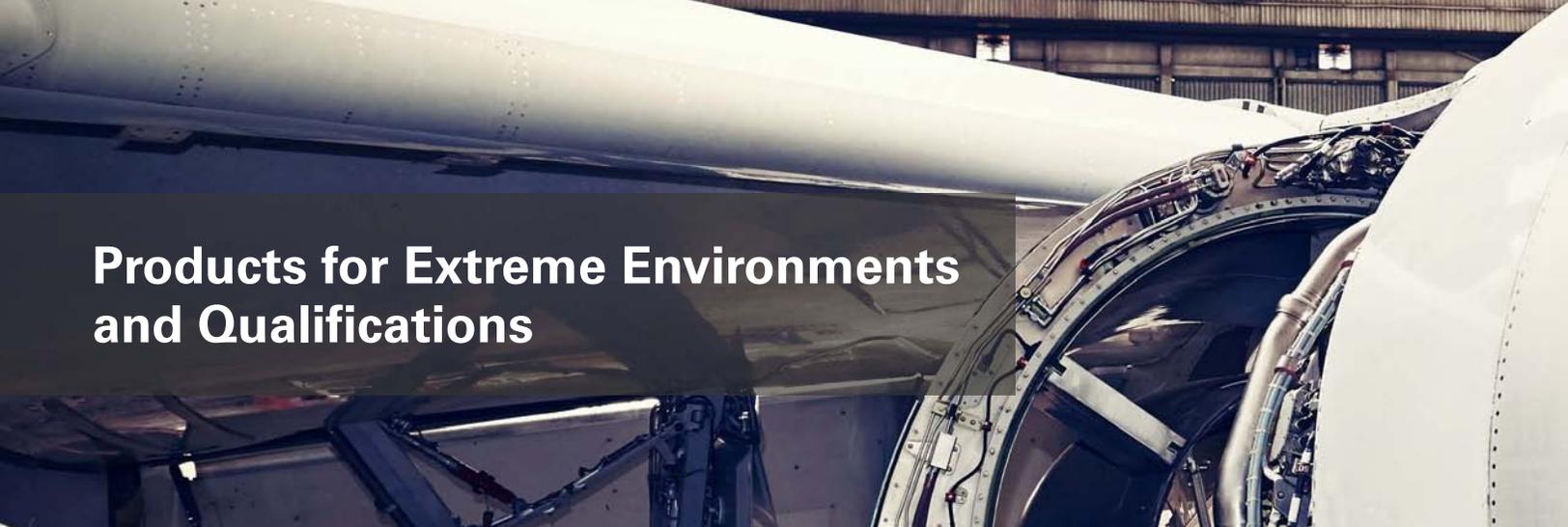


Aerospace

Application Guide



Solutions for aviation
and space applications



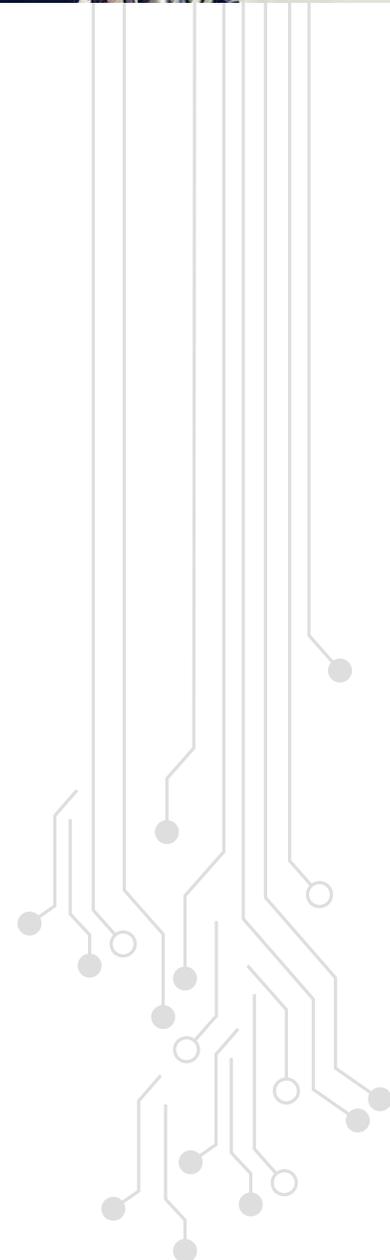
Products for Extreme Environments and Qualifications

About this guide

This guide provides an overview of the Littelfuse technologies used in various aviation and space applications. It is designed to help you quickly find design solutions appropriate to your application.

| Topic | Page |
|---|-------|
| Littelfuse: Everywhere, Every Day | 2 |
| Applications | 3 |
| Certifications | 4 |
| Customized Design | 5 |
| Aviation | 6–16 |
| Space | 17–22 |
| Defense | 23–24 |
| About C&K | 25 |
| Resources and Support | 26 |

The specifications, descriptions, and illustrative material in this literature are as accurate as known at the time of publication, but are subject to changes without notice. Visit [Littelfuse.com](https://www.littelfuse.com) for more information.





Littelfuse: Everywhere, Every Day

Founded in 1927, Littelfuse is a diversified industrial technology manufacturing company empowering a sustainable, connected, and safer world. Across more than 20 countries, and with approximately 18,000 global associates, we partner with customers to design and deliver innovative, reliable solutions.

Littelfuse offers an extensive technology portfolio—fuses, semiconductors, polymers, ceramics, relays, sensors, switches, and more. Serving over 100,000 end customers, our products are found in a variety of industrial, transportation, and electronics end markets—everywhere, every day.

Our history of innovation, combined with our customer-first culture, drives us to collaborate with you to develop safe, reliable products that are energy efficient and compliant with global regulations. We will partner with you to solve complex problems wherever electrical energy is used, bringing design, engineering, and technical expertise to deliver business results.

Littelfuse, Inc. acquired C&K on July 19, 2022. C&K is one of the most recognizable and trusted names in the electromechanical switch industry. C&K's outstanding engineering expertise and high-performance products allow us to offer you a broader product portfolio, expanded footprint, and enhanced distribution channels.

Why Choose Us

Complementing our wide portfolio of products is a global network of design and technical support expertise. We offer decades of design experience to help you address application challenges and achieve regulatory compliance.

Your Single Source

Our extensive portfolio of high-quality, high-performance, and reliable aviation-specific switches and space-specific connectors is specifically made to withstand harsh aerospace environments.

Testing Support

Littelfuse can help ensure that your products withstand most common threats repeatedly and fail safely under extreme circumstances. We serve as an independent source of assistance as you design by offering lab testing capabilities. With more than 15 lab locations worldwide, Littelfuse labs are equipped to provide testing that includes overcurrent, overvoltage, ESD, temperature, failure analysis, material analysis, and application performance.

Application Knowledge

With over 90 years of experience, C&K has a deep understanding of the aerospace market. Engineers and circuit designers around the world have come to rely on Littelfuse products and application knowledge to support their designs.

Global Support

Littelfuse stays close to customers. With manufacturing, lab, and design facilities located around the globe, our application knowledge and technical support are locally available. We also offer a network of regional customer support offices and hundreds of independent authorized distributor contacts to assist you. Visit [Littelfuse.com/contact-us](https://www.littelfuse.com/contact-us) to find local support near you.

Standards Compliance Expertise

Most Littelfuse products comply with a wide range of applicable industry and government guidelines as well as our own rigorous quality and reliability criteria. We continually look forward and adapt to changing requirements so that our products will comply with industry-specific national and international standards and regulations.

Most of the products in this guide are ESA/ESCC and MIL qualified and available for a wide range of applications, from connectors and wiring harnesses for PCBs and antennas to satellites/launchers and space computer systems.

Operational Excellence

With our global manufacturing footprint, Littelfuse is firmly committed to creating quality products at a competitive price. We build quality into our products and services, striving for zero defects in everything we do—thereby reducing costs and increasing your total satisfaction. We strive to exceed your expectations every day.

C&K's AS9100 certification enables us to receive orders directly from around the globe. Product designers can either choose to take advantage of C&K's available portfolio of highly reliable components or benefit from our unmatched custom design capabilities, coordinated and optimized by our integrated engineering, laboratory, and manufacturing teams. Alternatively, customers can work alongside one of our preferred distribution partner to complete their aviation, defense, and space designs.

Quality Assurance

Our global manufacturing facilities abide by strict quality assurance requirements and hold industry specific quality management system registrations.

We've been certified by space agencies since 1981. With more than 3,000 cumulative years in space, we are present in more than 700 satellites spanning all application domains: Earth observation, government/civil communications, security, exploration, navigation, science satellites, launchers, and missions.

C&K Products Power Myriad Applications

- Satellites/launchers
- Space computer systems
- Payloads (board-to-board connection)
- Integrated interconnected systems
- Antenna connections and harnesses
- Test equipment applications
- Cabin, lighting, and lavatory interconnection systems
- Flight control units



Ariane 5
Launcher

- **Launch Year:** 1997
- **Orbit:** Various
- **Launch Location:** French Guiana
- **Launch Vehicle:** Ariane 5
- **Years of Service:** Ongoing

Photo: ESA



Meteosat Third Generation
Satellite System

- **Launch Year:** End of 2022
- **Orbit:** Geo Orbit (36,000 km)
- **Launch Location:** French Guiana
- **Launch Vehicle:** Ariane 5
- **Years of Service:** About 20

Photo: ESA



Galileo
European Global Satellite Navigation System

- **Launch Year:** 2011
- **Orbit:** Medium Earth Orbit (23,000 km)
- **Launch Vehicle:** Ariane 5/Soyuz
- **Years of Service:** 10

Photo: ESA



03b
Telecommunications Satellite Constellation

- **Launch Year:** 2013
- **Orbit:** 8,063 km
- **Launch Location:** French Guiana
- **Launch Vehicle:** Soyuz-2/Fregat-MT
- **Years of Service:** 6



Iridium
Satellite Constellation

- **Launch Year:** 2017
- **Orbit:** About 781 km
- **Launch Vehicle:** Delta II 7920-10C, Proton-K/17S40, Chang Zheng 2C-III/SD
- **Years of Service:** 2



Gaia
Space Observatory

- **Launch Year:** 2013
- **Orbit:** Lissajous orbit (707,000 km)
- **Launch Location:** French Guiana
- **Launch Vehicle:** Soyuz-2/Fregat-MT
- **Years of Service:** About 12

Photo: ESA

Certifications

General Certifications

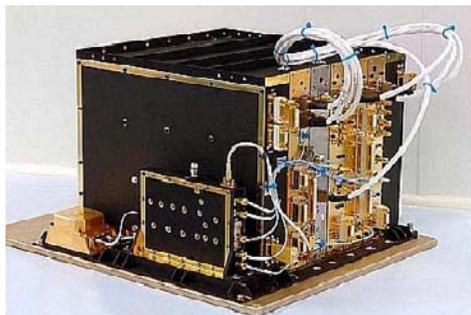
- ISO 9001
- ISO 14001
- ISO 50001

Aviation, Space, and Defense Certifications

- ESA: ESCC 3401
- CNES: ASF13-103 (EWIS)
- DLA: MIL M24308
- NASA: GSFC 311P
- AS 9100

Hi-REL TVS Diode Certification/Compliances

- RTCA/DO-160 Standard (Environmental Conditions and Test Procedures for Airborne Equipment)
- MILSTD-704
- MIL-PRF-19500
- AS9100



We have capabilities allowing for easy design-in that are in compliance with the RTCA/DO-160 Standard.

Up-screening and Sorting Steps for High Reliability TVS Diodes Are Available.

- Visual monitor in process
- Single wafer lot source
- High temperature storage life
- AS9100 certified manufacturing site
- X-Ray inspection
- 3 Sigma & dynamic test
- Temperature cycle test
- Reflow (2X)
- Customized Vbr/Ir
- Additional sorting
- HTRB
- H3TRB
- Labeling



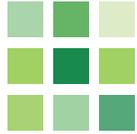
100% Screen Process

Figure 1. Screen Process

| Description | Standard |
|---|------------------------------------|
| 100% Vision Inspection | MIL-STD-750: Method 2074 |
| 100% High Temperature Storage Life (168 hrs) | MIL-STD-750: Method 1031 |
| 100% X-Ray inspection | MIL-STD-750: Method 2076 |
| 100% Temperature Cycle Test (-55 to 150° C, 20 cycles, dwell time 15 min) | MIL-STD-750: Method 1051 |
| 100% Reflow (2X) | JEDEC J-STD-020 |
| 100% Surge Test (2X) | MIL-STD-750: Method 4066 |
| 100% HTRB 150°C Bias= V_R (80% breakdown voltage, 96 hrs, and each direction at 96 hrs for Bi-directional products) | MIL-STD-750: Method 1038 |
| Final Electrical Test(100% 3 sigma limit, 100% dynamic test and PAT limit) | MIL-STD-750: Method 4016.4021.4011 |

| Screen | Method | Condition | Requirement |
|------------------|-------------------------------------|---|--|
| Surge test | 10x1000 μ S Peak Pulse Waveform | Maximum Clamping Voltage (V_C) @Peak Pulse Current (I_{PP}) | Sample Size 45, Perform 10x Accept 0 Failures |
| Burn-in (HTRB) | MIL-STD-750: Method 1038.5 | Applied Voltage 100% V_R @150° C | Sample Size 45, 340 hrs (680 hours for bi-directional products, each direction 340 hours). Accept 0 Failures |
| Electrical tests | - | I_R @ V_R $V_{(BR)}$ @ I_T | Sample Size 45, Accept 0 Failures |

Note: Please see our datasheets on website for more details.



PBA



Cable Harnesses

- Over 10,000 aircraft equipped with EIS/C&K Aerospace harnesses
- 15,000 km of harnesses delivered to customers

Aviation



Electrical Wiring Interconnection Systems for (EWISs) Safe Flights

Littelfuse provides value-added interconnectivity solutions for most commercial aircraft, such as the A320, A330, A340, A350, and A380.

Our cable harness products are deployed in these aircraft for a variety of different applications, including lavatories, overhead compartments, crew rest compartments, galleys, and so forth.

We support our customers by addressing their complex and unique wiring harness requirements (we are currently supplying thousands of different harness variants).

We also support manufacturers of aircraft for VVIPs around the world with our passenger convenient solutions and star light systems.

We have the capability to build sealed and shielded harnesses for different applications, including power, signal, and fiber optic communications.

Our expert engineering, laboratory, and manufacturing teams are available to support our customers with design, development, and integration activities, including on-site at the customer's facility.

The reasons Littelfuse has been identified as a strategic partner by our customers include proximity (due to our global manufacturing footprint), quality, and speed of execution and delivery.



Push Button Series



Scan or click for more information



PBA

This illuminated push button switch offers a solution for aviation applications. It has flexible LED colors and an indicator cap display.

Features

- Illuminated display
- Lightweight
- Short length
- Tactile feedback
- One or two indicator lines
- 3 sizes: 9.5 x 14 mm, 11.5 x 14 mm, and 14 x 14 mm

Micro-D Connector Series



Scan or click for more information



MDMB

This unique product in the micro-D connector series is designed with a removable crimp contact which makes it useful for harness manufacturers.

Features

- Unique design
- Removable crimp contact technology
- All sizes available from 9 to 51 contacts
- Nickel and gold finish
- Associated contacts available

AeroSplice Series



Scan or click for more information



One-Way

This is a unique patented product design with a one-way connector linking two wires with removable contacts. Replace the hand-splicing process using a standardized solution with D*MA contact technology.

Features

- Unique design
- Wire-to-wire connect solution
- Saves cost by replacing manual splices with a standard solution
- One-way connector with removable contacts
- Uses standard D*MA contacts

AeroSplice Series (continued)



Scan or click for
more information

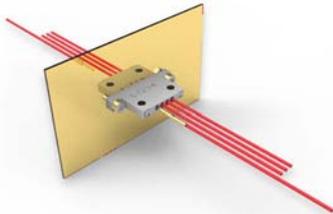


Four-Way Radial Fixing

This four-way connector links four pairs of wires with removable contacts. Replace the hand-splicing process by using a standardized solution with D*MA contact technology. It has a compact format and is designed to accept the most popular gauges (20 AWG to 30 AWG).

Features

- Unique design
- Wires-to-wires connection
- Four-way connectors with removable D*MA contacts
- Stackable
- Can float or fix the insulator using the two holes provided



Scan or click for
more information



Four-Way Axial Fixing

This four-way connector links four pairs of wires with removable contacts. Replace the hand-splicing process by using a standardized solution with D*MA contact technology. This product has a compact format and is designed to accept the most popular gauges (20 AWG to 30 AWG).

Features

- Unique design
- Wires-to-wires connection
- Four-way connectors with removable D*MA contacts
- Used to pass through panels





Avionic Applications and the High Reliability TVS Diodes

We offer a wide portfolio of discrete TVS Diode devices ranging from 200 watt to 30 kW including ultra high power AK families up to 15 kA. Our dedicated design team with AS9100 certified facility provides specialized up-screening services based upon Specification MIL-PRF-19500 for robust Hi-Rel TVS Diodes that are suitable selection for applications require higher reliability performance under harsh conditions.

Aviation Applications

- Aviation computing protection
- Engine control unit protection (DO-160 L3/L4)
- Power train/power distribution unit (DO-160 L4/L5)



Figure 2. High Reliability TVS Diodes products

Table 2. Screen Process Description

| Series | 100% Screen Test Sorting | Group B Test Sorting | PeakPulse Power Rating | Reverse Stand Off Voltage (V _R) | Minimum Breakdown Voltage (V _{BR}) | SMD/ Axial Lead | Package | Compliance and Protection | |
|---------------------------|--------------------------|----------------------|------------------------|---|--|-----------------|----------|---------------------------|-------------|
| | | | (W) | (V) | (V) | | | DO-160 / DC Protection | MIL-STD-704 |
| SMAJ-HR | Yes | Yes | 400 | 6.0-45.0 | 6.67-50 | SMD | DO-214AC | Yes | - |
| SMAJ-HRA | Yes | - | 400 | 6.0-45.0 | 6.67-50 | SMD | DO-214AC | Yes | - |
| SMBJ-HR | Yes | Yes | 600 | 5.0-170 | 6.4-189 | SMD | DO-214AA | Yes | - |
| SMBJ-HRA | Yes | - | 600 | 5.0-170 | 6.4-189 | SMD | DO-214AA | Yes | - |
| SMBLCE-HR | Yes | Yes | 600 | 6.5-70.0 | 7.22-77.8 | SMD | DO-214AA | Yes | - |
| SMBLCE-HRA | Yes | - | 600 | 6.5-70.0 | 7.22-77.8 | SMD | DO-214AA | Yes | - |
| SMCG-HR | Yes | Yes | 1500 | 5.0-120 | 6.4-133 | SMD | DO-215AB | Yes | - |
| SMCG-HRA | Yes | - | 1500 | 5.0-130 | 6.4-144 | SMD | DO-215AB | Yes | - |
| SMCJ-HR | Yes | Yes | 1500 | 5.0-170 | 6.4-189 | SMD | DO-214AB | Yes | - |
| SMCJ-HRA | Yes | - | 1500 | 5.0-170 | 6.4-189 | SMD | DO-214AB | Yes | - |
| SMDJ-HR | Yes | Yes | 3000 | 5.0-170 | 6.4-189 | SMD | DO-214AB | Yes | - |
| SMDJ-HRA | Yes | - | 3000 | 5.0-170 | 6.4-189 | SMD | DO-214AB | Yes | - |
| 5.0SMDJxxS-HRA | Yes | - | 5000 | 6.0-60.0 | 6.67-66.7 | SMD | DO-214AB | Yes | - |
| TLP | Yes | Yes | 5000 | 10.0-40.0 | 11.8-44.4 | Axial Leaded | P600 | Yes | Yes |
| TLPA | Yes | - | 5000 | 10.0-40.0 | 11.8-44.4 | Axial Leaded | P600 | Yes | Yes |
| 5KP-HR | Yes | Yes | 5000 | 5.0-220 | 6.4-244 | Axial Leaded | P600 | Yes | - |
| 5KP-HRA | Yes | - | 5000 | 5.0-220 | 6.4-244 | Axial Leaded | P600 | Yes | - |
| 15KPA-HR | Yes | Yes | 15000 | 17.0-280 | 18.99-312.8 | Axial Leaded | P600 | Yes | - |
| 15KPA-HRA | Yes | - | 15000 | 17.0-280 | 18.99-312.8 | Axial Leaded | P600 | Yes | - |
| 30KPA-HR | Yes | Yes | 30000 | 28.0-345 | 31.28-384 | Axial Leaded | P600 | Yes | - |
| 30KPA-HRA | Yes | - | 30000 | 28.0-345 | 31.28-384 | Axial Leaded | P600 | Yes | - |

Note: Hi-REL Series are also available for 3 kA/ 6 kA/10 kA/15 kA in AK packages, please contact Littelfuse sales for more details.

High Reliability TVS Diodes



Scan or click for more information



5KP-HR Series

The 5KP-HR High Reliability Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 5 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection



Scan or click for more information



5KP-HRA Series

The 5KP-HRA High Reliability Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 5 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection



Scan or click for more information



TLP Series

The TLP Series is packaged in a highly reliable industry standard P600 axial leaded package and is designed to provide precision overvoltage protection for sensitive electronics.

Features

- 5 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection
- Designed to protect sensitive electronics from 50ms Square Test Waveform
- MIL-STD-704

High Reliability TVS Diodes (continued)



Scan or click for
more information



TPLA Series

The TPLA Series is packaged in a highly reliable industry standard P600 axial leaded package and is designed to provide precision overvoltage protection for sensitive electronics.

Features

- 5 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection
- Designed to protect sensitive electronics from 50ms Square Test Waveform
- MIL-STD-704



Scan or click for
more information



15KPA-HR Series

The 15KPA-HR High Reliability Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 15 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection



Scan or click for
more information



15KPA-HRA Series

The 15KPA-HRA High Reliability Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 15 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection

High Reliability TVS Diodes (continued)



Scan or click for more information



30KPA-HR Series

The 30KPA-HR High Reliability Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 30 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection



Scan or click for more information



30KPA-HRA Series

The 30KPA-HRA High Reliability Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 30 kW peak pulse capability at 10/1000 μ s waveform
- P600 package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection



Scan or click for more information



5.0SMDJxxS-HRA Series

The 5.0SMDJxxS-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upsampling options for enhanced reliability.

Features

- 5 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AB package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC protection

High Reliability TVS Diodes (continued)



Scan or click for more information



SMAJ-HR Series

The SMAJ-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 400W peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AC package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC Protection



Scan or click for more information



SMAJ-HRA Series

The SMAJ-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 400W peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AC package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC Protection



Scan or click for more information



SMBJ-HR Series

The SMBJ-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 600W peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AA package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160/DC Protection

High Reliability TVS Diodes (continued)



Scan or click for more information



SMBJ-HRA Series

The SMBJ-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 1600 W peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AA package
- 100% pscreen process
- High reliability devices with fabrication and assembly lots traceability
- DO-160 / DC Protection



Scan or click for more information



SMBLCE-HR Series

The SMBLCE-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 600 W peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AA package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- Unidirectional
- DO-160



Scan or click for more information



SMBLCE-HRA Series

The SMBLCE-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 600 W peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AA package
- 100% screen process
- High reliability devices with fabrication and assembly lots traceability
- Unidirectional
- DO-160

High Reliability TVS Diodes (continued)



Scan or click for more information



SMCG-HR Series

The SMCG-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 1.5 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-215AB package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- L bend lead forming gives best solderability for Hi reliability application
- DO-160/DC Protection



Scan or click for more information



SMCG-HRA Series

The SMCG-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 1.5 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AB package
- 100% pscreen process
- High reliability devices with fabrication and assembly lots traceability
- L bend lead forming gives best solderability for Hi reliability application
- DO-160/DC Protection



Scan or click for more information



SMCJ-HR Series

The SMCJ-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 1.5 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AB package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160/DC Protection

High Reliability TVS Diodes (continued)



Scan or click for more information

SMCJ-HRA Series

The SMCJ-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 1.5 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AB package
- 100% Screen Process
- High reliability devices with fabrication and assembly lots traceability
- DO-160/DC Protection



Scan or click for more information

SMDJ-HR Series

The SMDJ-HR High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 3 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AB package
- 100% screen process and Group B test
- High reliability devices with fabrication and assembly lots traceability
- DO-160/DC Protection



Scan or click for more information

SMDJ-HRA Series

The SMDJ-HRA High Reliability series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. These are available with a variety of upscreening options for enhanced reliability.

Features

- 3 kW peak pulse capability at 10/1000 μ s waveform
- Surface mount DO-214AB package
- 100% Screen Process
- High reliability devices with fabrication and assembly lots traceability
- DO-160/DC Protection

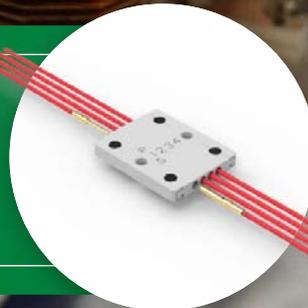


MDMA Series

Space is an extremely challenging environment for electronic systems and components.

Ultra-high reliability is the top priority. This is why space agencies around the world use connectors from C&K for demanding applications in satellites, launchers, telescopes, and other spacecraft.

The MDMA series of micro-D connectors have a unique design with removable crimp contacts that give great flexibility in creating an interconnected electrical wiring system.



SpaceSplice Connector

This product provides a highly reliable yet compact and easy-to-use alternative to manual splicing. The space splice replaces the traditional splicing process with a standardized solution based on D*MA contact technology.

Space



Harnesses for Most Demanding Environments

The interconnection systems used in space applications are different to other applications.

The challenging environment in space requires high quality, light weight, low outgassing interconnection systems that can support long and arduous mission lifetimes.

We have been supporting our customers' space applications—including launchers, computers, satellites, space probes, and other payloads—for decades. Our wiring harness solutions are complemented by our connector offerings and supported by our global footprint.

All wiring harnesses intended for space applications are created in an ISO8 clean room and manufactured on a mock-up table with component dummies/brackets.

Our proven tradition of delivering the highest quality products for 40+ years speaks volumes with respect to the trust our customers place in us.

D-Sub Connector Series



Scan or click for more information



D*M

This is the largest standard used in rectangular connectors. It's mainly employed in equipment used for data transfers. The robustness of the design and its maturity make it a reference in the space field.

Features

- All standard and high-density sizes
- Solder cup, straight, and 90° bent terminations (US and EU footprints)
- Brackets and fixing options



Scan or click for more information



D*MA

Our D-sub connector is designed with a removable crimp contact, making it useful for harness manufacturers. This gives great flexibility in creating an interconnected electrical wiring system.

Features

- All standard and high-density sizes
- With or without contacts
- Standard, large, and reduced crimp contact sizes
- Fixing options



Scan or click for more information



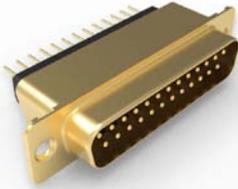
Combo

The combo connector has the same shape and dimensions of a standard D-sub connector and has the combination layout which accommodates power and RF contacts. A wide range of combinations is available with removable 8 AWG contacts.

Features

- D-sub connector with a combination of signal, power, and coax contacts
- Solder cup, straight, 90° bent, and crimp terminations

D-Sub Connector Series (continued)



D*J

This D-sub connector with a ceramic capacitor allows signals to be filtered with a technology suitable for space applications.

Features

- Filter connectors under the CSFR165 specification (according to European Space Components Coordination 3405)
- Capacitance at 1k Hz is 4,000 to 12,000 pF
- Operates in medium frequency
- 50 dB min. attenuation at 100 MHz



Scan or click for more information



Savers

Connector savers are the solution for preventing contact damage. They protect connectors that are mated and unmated frequently during all phases of tests and programs.

Features

- All sizes for standard, high-density, and combo connectors
- With or without contacts



Scan or click for more information



Accessories

Connectors must be used with accessories that guarantee good assembly, secure fixing, and protection of terminations. We offer a large range of accessories that support the safe use of our connectors.

Features

- Jackposts and jackscrews for connectors and savers
- Lightweight backshells, each with a nickel and gold finish
- Several outlets: straight, 45°, 90°, cylindrical, and elliptical
- Dust caps
- Extraction tools, crimp tools, locators, retention tools, and more



Scan or click for more information

Micro-D Connector Series



Scan or click for more information



MDM

This is a solution for applications that require small and high-density contacts (the pitch is half the size of a D-sub connector). These Micro-D connectors are manufactured with lightweight aluminum shells.

Features

- All sizes available from 9 to 51 contacts
- Terminations: solder cup, straight, narrow profile, 90° PCB bent, and wired
- Brackets and fixing options
- Nickel and gold finish



Scan or click for more information



MDMA

This unique product in the micro-D connector series is designed with removable crimp contacts. This is useful for harness manufacturers; it gives them great flexibility when creating an interconnected electrical wiring system.

Features

- Unique design
- Removable crimp contact technology
- All sizes available from 9 to 51 contacts
- Nickel and gold finish
- Associated contacts available



Scan or click for more information



Savers

Connector savers are the solution for preventing contact damage. They protect connectors that are mated and unmated frequently during all phases of tests and programs.

Features

- All sizes available from 9 to 51 contacts
- Fixed contacts
- Nickel finish only

Micro-D Connectors Series (continued)



Accessories

Connectors are recommended to be used with accessories that guarantee good assembly, secure fixing, and the protection of terminations. We offer a large range of accessories for the safe use of our connectors.

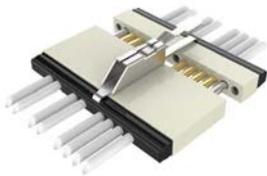
Features

- Jackposts and jackscrews for connectors and savers
- Lightweight backshells, each with a nickel and gold finish
- Several outlets: straight, 45°, cylindrical, and elliptical
- Dust caps
- Extraction tools, crimp tools, locators, retention tools, and more



Scan or click for more information

MTB Connector Series



MTB1

This in-line contact connector without a protective shell uses micro-D contact technology. It's useful in the computer testing process.

Features

- From 2 to 51 in-line contacts
- Solder cup, straight, 90° PCB bent, and wired terminations
- Polarization, latching, and guide post options



Scan or click for more information

SpaceSplice Series



One-Way

This unique, patented product design is a one-way connector linking two wires with removable contacts. Replace the hand-splicing process using a standardized solution with D*MA contact technology.

Features

- Unique design
- Wire-to-wire connection
- Saves cost by replacing manual splices with a standard solution
- One way connector with removable contacts
- Uses standard D*MA contacts



Scan or click for more information

SpaceSplice Series (continued)



Scan or click for more information

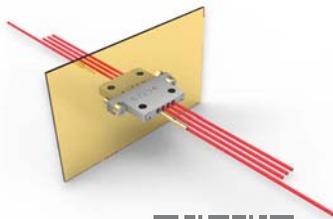


Four-Way Radial Fixing

This four-way connector links two wires with removable contacts. Replace the hand-splicing process by using a standardized solution with D*MA contact technology. This SpaceSplice has a compact format and accepts the most popular gauges (20 AWG to 30 AWG).

Features

- Unique design
- Wires-to-wires connection
- Saves cost by replacing manual splices with a standard solution
- Four-way connector with removable contacts
- Uses standard D*MA contacts



Scan or click for more information



Four-Way Axial Fixing

This is a four-way connector that links two wires with removable contacts. Replace the hand-splicing process by using a standardized solution with D*MA contact technology—one that has a compact format and accepts the most popular gauges (20 AWG to 30 AWG).

Features

- Unique design
- Wires-to-wires connection
- Four-way connectors with removable D*MA contacts
- Uses to pass through panels



Scan or click for more information



Interposer

The interposer provides a board-to-board connection with a custom solderless solution. It ensures reliability and performance, and it has the flexibility to incorporate specific application features. It also has a stable contact resistance; the electrical contact function is decoupled from the pressure applied by a spring.

Features

- Custom solderless solution
- Spring-probe contact technology
- No soldering process
- Easy-build interposer technology

Custom Design

C&K's expertise and capabilities allow for the design and manufacturing of custom products and solutions that match the specific requirements of our customers. C&K's custom products and solutions cover terminations, cable harnesses, rear potting, hardware, and backshells.

We design, manufacture, integrate, and repair wire harness systems for our defense customers. The brand name E.I.S. Electronics stands for flexibility, expertise, quality, and competitiveness. Lean organization and fast decision-making processes are our advantages.



Our Electrical Wiring Interconnection System

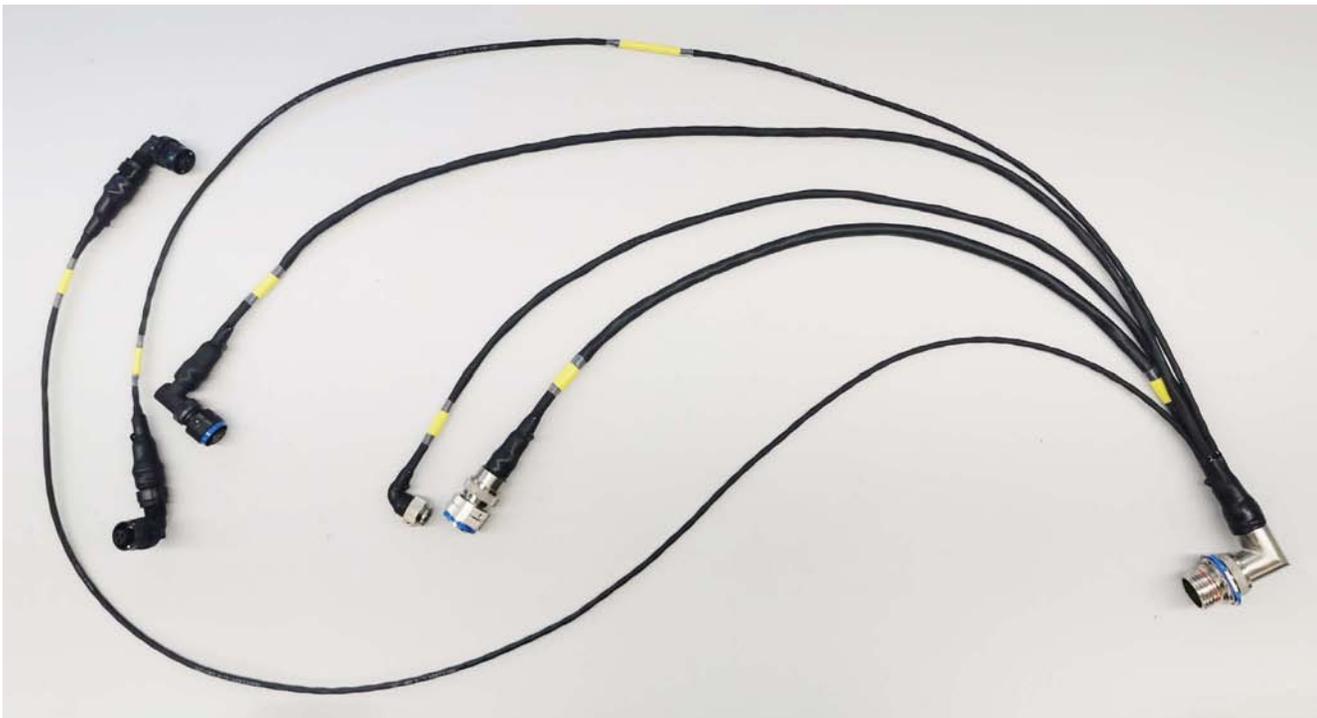
meets the ruggedization and high reliability requirements of a wide variety of defense applications.

The cable harnesses used in defense applications require sealing and shielding to protect them against EMI/EMC interference and allow them to be deployed in harsh environments.

Our proven engineering and manufacturing competencies and expertise in building these harnesses means our customers rely on us for applications where failure is not an option.

We have partnered with defense OEMs around the globe on many prestigious programs, including ground defense and weapon systems.

Our industry-specific management certifications—including EN9100, ISO14001 and VG—provide yet one more reason for potential customers to consider us as a future partner for their interconnectivity needs.



On July 19, 2022, Littelfuse, Inc. acquired C&K, which has provided innovative customer solutions for over 90 years. With worldwide manufacturing, engineering, and sales support, C&K is focused on delivering customer satisfaction with superior products, processes, and services. Through close partnerships with our customers, we continue to expand our offering to fully integrate our core switch products into customer-specific interface solutions.

Satellites, launchers, and any other systems for space applications require high-reliability products as operating conditions can be extreme. C&K offers a large range of ESA- and defense-qualified products to cope with vibration, radiation, magnetism, and corrosion issues and provides the high-quality and reliable solutions demanded by harsh environmental conditions. We also offer custom designed solutions, coordinated and optimized by our integrated engineering, laboratory, and manufacturing groups.

E.I.S. Electronics is now also part of Littelfuse and has long-standing experience in Electrical Wiring Interconnection tasks in many demanding systems.

Supporting customers:

With our **standard** products.

By **customizing** existing products.

By **co-developing** new products.



Additional Resources



Scan or click to download

High Reliability TVS Diodes Technology Brief

This brief provides an overview of Hi-Reliability TVS Diodes that are suitable for applications requiring higher reliability performance under harsh conditions.



Scan or click for download

Circuit Protection Products Selection Guide

This guide provides a summary of key circuit protection consideration factors, descriptions of the technologies Littelfuse offers, and product selection tables. It is designed to help you quickly find a protection solution appropriate to your application.



Scan or click for download

Sensing Products Selection Guide

This guide provides an overview of magnetic and temperature sensing technologies, key consideration factors, descriptions of technologies Littelfuse offers, and product selection tables to help you quickly find the sensing solution appropriate for your application.



Scan or click for download

Power Semiconductor Catalog

This catalog represents the powerful combination of IXYS: A Littelfuse Technology. It offers a comprehensive portfolio of advanced power semiconductor technologies, including silicon and wide bandgap solutions in discrete and module packages.

An Extension of Your Team

Our engineers are available to help identify potential issues and provide product recommendations to solve problems.

For aviation, defense, or space support, email:
aerospacesupport@littelfuse.com

Application and Field Support

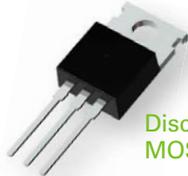
Our experienced product and application engineers work step by step with customers from design to installation to determine the best solution. Contact us today:

[Littelfuse.com/contactus.aspx](https://www.littelfuse.com/contactus.aspx)

©2023 Littelfuse, Inc. Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <https://www.littelfuse.com/legal/disclaimers/product-disclaimer.aspx>



Polymeric Positive Temperature Coefficient



Discrete MOSFETs



SCR Thyristors



Reed Switches



TVS Diodes



Discrete IGBTs



Protection Relays

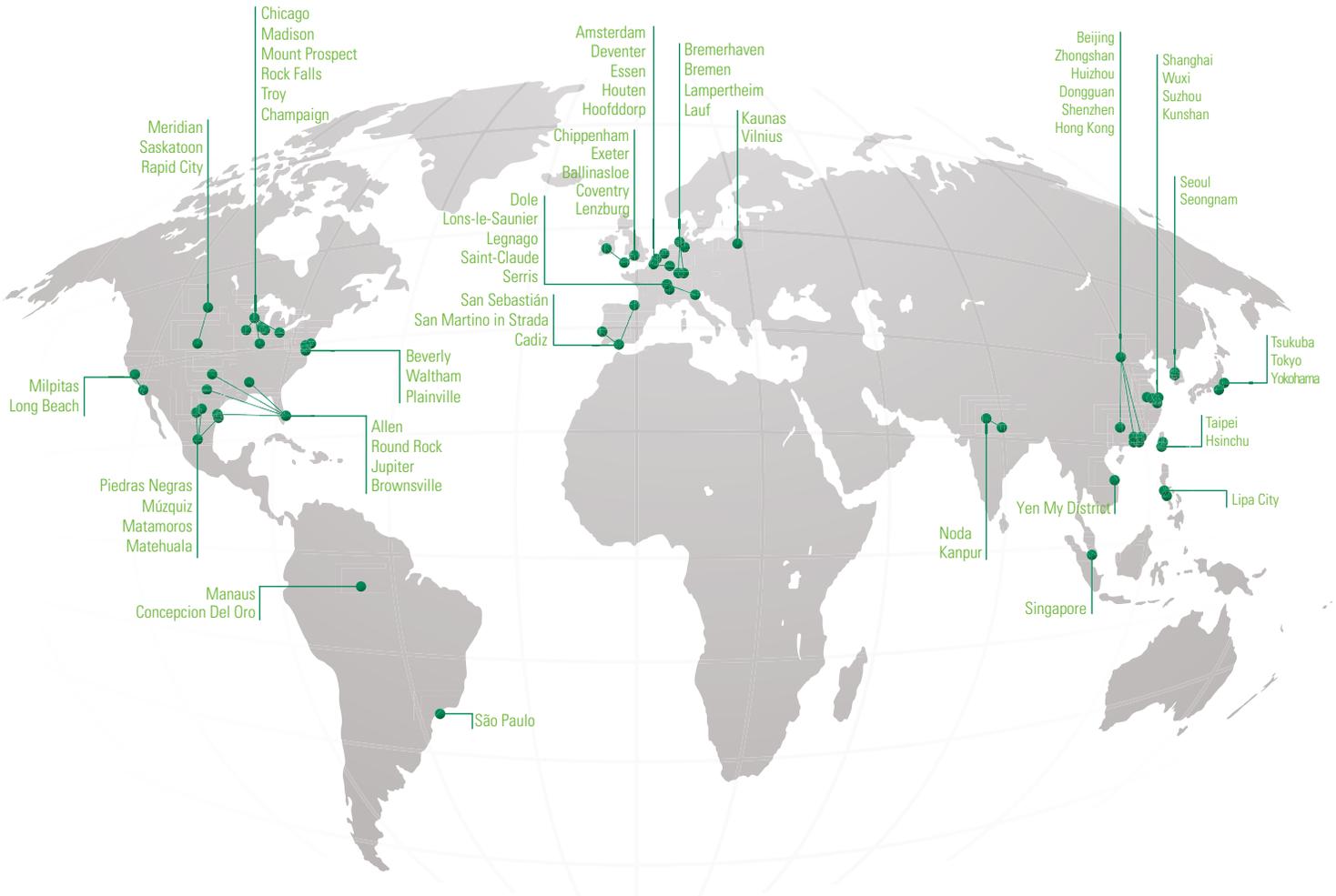


TRIACs



IGBT Modules

LOCAL RESOURCES FOR A GLOBAL MARKET



Disclaimer notice: The information furnished here is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read the complete disclaimer notice at www.littelfuse.com/product-disclaimer.