



# High Reliability Line Card

[www.ttiasia.com](http://www.ttiasia.com)



The Specialist in Electronic Component Distribution

## TTI's High Reliability business unit serves all customer needs providing:

- World leading authorised suppliers for:
  - Passives and Discretes
  - Connectors, Cable and Wire Management
  - Relays, Switches and Sensor products
- Circular connector assembly for fast delivery and low volume
- Specialist local technical team
- Engineering design-in support and technical seminars
- Engineering design and prototype quantity support from Mouser Electronics (a TTI Company)
- Wide range of COTS products for cost reduction requirements
- Safety and buffer stock inventory
- Advanced logistics solutions tailored to your requirements – direct line feed and consignment inventory
- One global system supporting your OEM and CEM supply chain internationally
- On-time delivery >98.5%, quality <1800ppm and we embrace the Total Quality Process
- ISO 9001:2008, IECQ-CECC, EN9120 & 9100 and SC21

## Why Buy from TTI?

### Product Knowledgeable Experts

TTI has a team of specialists with more product experience and knowledge than any other distributor. All TTI employees participate in company-wide training programs, plus every one of our sales branches has a team of product managers on-site to provide that extra support that customers need. Through the years these exceptional specialists have become, and remained, the most knowledgeable in the electronic component industry.

### Broader and Deeper Inventories

TTI maintains extensive inventories by stocking more than 500,000 parts with more than 80% available for immediate delivery. That's more interconnect, passive, electro-mechanical, and discrete parts than from any other source. We remain committed to breadth and depth of inventory, ensuring availability of C and D class parts as well as commodity parts.

### Leading Edge Technology Products

The manufacturers TTI partners with, are the companies that lead the industry into new component technologies. For customers, this means that TTI enlists the help of the manufacturers who can help solve any design challenge. Our product groups also focus on new product introductions to ensure we have the very latest and most technologically-advanced products readily available from stock.

### Value Added Logistic Services

From technical application advice to customized logistical solutions; TTI can add value throughout the supply chain by reducing acquisition costs, improving material flow through forecast analysis, provide safety stock and reduce receipt handling through consolidated shipments. These are just some areas that TTI can review with your company to streamline your internal supply chain and help reduce hidden material costs.

### Global Distribution Centers

TTI has more than 1.8 million square feet of automated warehousing in North America, Europe, and Asia. All are linked into a global warehouse management system that provides superior customer service and overall business efficiencies. Wherever you are in the world, TTI can support you.

### Quality and Reliability

TTI has a passion for excellence, and after 40 years experience our on-time delivery and quality levels are the best in class. TTI implemented Total Quality Management in 1989 and have been ISO9000 registered since 1993, we were the first distributor to have all of our global warehouse locations ISO registered and have since upgraded to ISO9001:2008. TTI has one global documentation system that ensures that every TTI branch and warehouse in the world follow the same processes. Year after year, customers rate our quality and management practices to be among the very best in the industry. This is especially important when the products are the typical high mix, low value parts on which we have built our reputation.

# THE SPECIALIST

Authorized Distributor of These Manufacturers and Their Brands



Amphenol

**API Delevan**



**BOURNS®**



**CDE** CORNELL  
DUBILIER  
Your Source for Capacitor Solutions

**DELPHI**  
Innovation for the Real World



*Glennair*  
Commital

**Honeywell**

Electronic Components  
**KEMET**  
CHARGED®



**Littelfuse®**  
Expertise Applied | Answers Delivered

**molex®**  
one company > a world of innovation

*muRata*  
INNOVATOR IN ELECTRONICS

**nichicon**



**Panasonic**



**SOURIAU**  
Esterline  
Connection Technologies



**TE**  
connectivity

**TT electronics**

**TT electronics**  
SEMELAB



**VPG**  
PERFORMANCE THROUGH PRECISION



**YAGEO**

# CONNECTORS

## Connectors

	3M	AMPHENOL	AVX	C&K	DELPHI	FCI	GLENAIR	MOLEX	PHOENIX CONTACT	SOURIAU	SPECTRUM CONTROL	TE CONNECTIVITY
<b>Connectors</b>												
COTS PLUS		•		•	•		•	•		•	•	•
Automotive Specifications		•	•		•	•		•		•		•
CECC		•								•		
DSCC Drawings		•			•		•	•		•		•
Mil-Spec/QPL		•	•	•	•		•	•		•		•
ESCC/EPPL/NASA		•		•			•			•		•
<b>Connectors for Military, Aerospace &amp; Space</b>												
Circular		•			•		•	•		•	•	•
Hi-Rel Backshells & Adaptors		•					•			•		•
TTI Assembled QPL Connectors		•								•		•
Audio		•			•	•	•	•			•	•
D-Subminiature		•		•		•	•	•		•	•	•
Micro Miniature/Nano		•		•			•	•		•	•	•
Filtered Hi-Rel Input/Output		•				•	•	•		•	•	•
Rack & Panel/ARINC/Rectangular		•	•		•		•	•		•	•	•
Fibre-Optic Connectors		•			•	•	•	•		•		•
Hermetic		•					•			•		•
Space Applications		•		•			•			•		•
Naval & Shipboard		•			•		•		•			•
<b>RF/Coaxial/Microwave</b>												
1.0/2.3, 1.6/5.6 & 7/16		•								•		•
BNC (50/75Ω/TNC)		•						•		•		•
MCX/MMCX		•						•		•		•
QMA		•						•				•
SMA, SMB, SMC, SSMA		•						•		•		•
Type F, G & N		•						•		•		•
<b>COTS Board-to-Board</b>												
1.25mm to 10.00mm pitch	•	•	•		•	•		•				•
Pin Headers & Sockets	•	•	•			•		•				•
High Speed Backplane	•	•	•			•		•				•
Mezzanine	•					•		•				•
<b>COTS Device-to-Board</b>												
IC & PLCC Sockets	•					•		•				•
Memory Card Connectors	•	•	•			•		•				•
Smart Card Connectors	•	•		•		•		•				•
<b>COTS Wire-to-Board/Wire-to-Wire</b>												
1.25mm to 10mm pitch	•	•	•			•		•				•
Discrete Wire	•	•	•			•		•	•			•
FFC/FPC	•	•	•			•		•				•
IDC/Mass Termination	•	•	•			•		•				•
Power	•	•	•			•		•	•			•
SCSI (I, II, III) SATA/SAS/mini SATA	•	•	•			•		•			•	•
<b>COTS Input/Output</b>												
Audio		•				•		•			•	•
Circular		•			•	•		•		•	•	•
D-Subminiature	•	•		•		•		•		•	•	•
DVI/HDMI		•				•		•				•
Micro D		•				•		•		•		•
Modular Plugs & Jacks		•				•		•		•	•	•
Power		•			•	•		•		•		•
SFP/XFP		•				•		•				•
RJ/Industrial Ethernet		•				•		•	•	•	•	•
USB/Mini USB/USB OTG		•	•			•		•				•
<b>Other</b>												
Battery Connectors		•	•			•		•				•
High Voltage Connectors		•			•	•	•	•	•	•		•
Contacts		•	•			•	•	•		•		•
<b>Terminal Blocks</b>												
PCB Mounted		•	•			•		•			•	•
DIN Rail Mounted		•						•				•
<b>Wire &amp; Cable</b>												
Cable Assemblies	•	•			•	•	•	•	•		•	•
Discrete Wire	•				•	•		•				•
Printed Wiring Flexible/Rigid Flex		•			•			•				•
FFC Jumpers		•						•				•
Flat Ribbon	•	•										•
<b>Cable &amp; Wire Management</b>												
Cable Management – Ties, Splices, Terminators	•											•
Backshells & Adaptors	•	•	•			•	•	•		•		•
Heat Shrink Moulded Parts & Tubing	•						•	•				•
Solderless Terminals Insulated/Non-Insulated	•							•				•
Labels, Cable Markers & Printers									•			•

# PASSIVES

Passives														
	API DELEVAN	AVX	BOURNS	KEMET	LITTELFUSE	OHMITE	SPECTRUM CONTROL	KNOWLES.DLL NOVACAP/SYSER, VOLTRONICS	TE CONNECTIVITY	TT ELECTRONICS	VISHAY	VISHAY PRECISION GROUP	WIMA	YAGEO/PHYCOMP
<b>Passives</b>														
COTS PLUS		•		•			•	•	•	•	•	•		
AEC-Q200	•	•	•	•	•			•	•	•	•	•		•
CECC		•		•				•		•	•	•		
DSCC Drawings		•		•			•	•		•	•	•		
Mil-Spec/QPL	•	•	•	•	•	•	•			•	•	•		
ESCC/EPPL/NASA		•		•				•			•	•		
<b>Resistors</b>														
Film			•			•			•	•	•			•
Foil			•			•				•		•		
Networks		•	•							•	•	•		•
Power/Wirewound			•			•			•	•	•			•
Carbon						•			•	•	•			•
Current Sense			•			•			•	•	•	•		•
<b>Potentiometers &amp; Trimmers</b>														
Precision/Panel Control			•			•			•	•	•			
Sensor/Encoder			•							•	•			
Trimmer			•					•	•	•	•	•		
<b>Capacitors</b>														
Wet Tantalum		•									•			
Solid Tantalum		•		•							•			
Ceramic		•		•			•	•			•			•
Aluminium Electrolytic				•							•		•	•
Film		•		•			•				•		•	
Silver Mica														
Polymer		•		•							•			
<b>Magnetics</b>														
Ferrite Beads	•		•	•					•	•	•			•
Ferrite Cores	•													
Chokes	•		•	•					•	•	•			•
Coils	•		•	•					•	•	•			•
Inductors	•	•	•	•					•	•	•			•
Transformers	•		•	•					•	•	•			•
<b>Filters/Antennas</b>														
EMI/RFI	•	•		•			•	•	•					
RF/Microwave	•	•					•	•						•
Antenna							•							•
<b>Circuit Protection</b>														
ESD Suppression	•	•	•		•				•					
Fuses		•	•		•				•		•			
Gas Discharge Tube (GDT)			•		•				•					
Resettable Fuses (PPTC)			•		•				•					
Thermistors (NTC)		•									•			
Thermistors (PTC)			•								•			
Thyristors			•		•				•					
Varistors		•	•		•			•	•		•			•
<b>Timing Devices</b>														
Resonators		•												
Crystals		•									•			
Oscillators		•									•			

# DISCRETES, ELECTROMECHANICAL

Discretes					
	BOURNS	HONEYWELL	LITTELFUSE	TT ELECTRONICS	VISHAY
<b>Discretes</b>					
COTS PLUS				●	●
AECQ101	●		●		●
CECC				●	
DSCC Drawings				●	
Mil-Spec/QPL					
ESCC/EPPL/NASA				●*	
<b>Diodes</b>					
Arrays	●		●	●	●
ESD Protection	●		●	●	●
Schottky	●			●	●
Switching	●			●	●
TVS	●		●	●	●
Zener	●			●	●
Hi-Rel Diodes				●	
<b>Rectifiers</b>					
Avalanche	●				●
Bridge	●				●
General Purpose	●			●	●
Standard Recovery	●			●	●
Fast Recovery	●				●
Ultrafast Recovery	●			●	●
Schottky	●			●	●
<b>Transistors</b>					
Bipolar/Small Signal	●			●	
FETs				●	●
MOSFETs				●	●
IGBTs				●	●
Hi-Rel Transistors				●	
RF Transistors				●	●
Diamond Performance FETS				●	
Radiation Tolerant MOSFETS				●	
<b>Thyristors</b>					
DIAC			●		
SCRs	●		●		●
SIDACs			●		
TRIAC	●		●		
<b>Optoelectronics</b>					
Couplers				●	●
LEDS				●	●
Infrared Emitters		●		●	●
Infrared Receivers		●		●	●
IRDA Transceivers		●		●	●
Optical Sensors		●		●	●
Photo Detectors		●		●	●
<b>Modules</b>					
Plastic Power Modules				●	●
Hermetic Power Modules				●	
IGBT Modules				●	●
Multi Chip Arrays (MCA)				●	
RF Modules				●	
<b>Others</b>					
Voltage Regulators				●	●
Hi-Rel Voltage Regulators				●	
Analog Switches					●
Motor Control ICs					●

\* Space level test procedures in accordance with MIL-PRF-19500 & ESCC5000

Electromechanical				
	BOURNS	C&K	HONEYWELL	TE CONNECTIVITY
<b>Electromechanical</b>				
COTS PLUS		●	●	●
CECC				
DSCC Drawings			●	
Mil-Spec/QPL		●	●	●
ESCC/EPPL/NASA				●
<b>Relays</b>				
Signal				●
Power				●
General Purpose				●
Solid State				●
High Frequency				●
Automotive				●
Reed				●
High Voltage				●
Sockets & Accessories				●
Sensors				●
<b>Switches</b>				
DIP/SIP		●	●	●
Slide		●		●
Pushbutton		●	●	●
Rocker/Paddle		●	●	●
Toggle		●	●	●
Thumb/Push Wheel		●	●	●
Tactile/Navigation	●	●	●	●
Limit/Detect/Snap Action		●	●	●
Switchlock/Key Operated		●	●	●
Rotary		●	●	●
Thermostatic			●	
Sealed		●	●	●
Explosion Proof/Hazardous			●	
<b>Sensors</b>				
Airflow, Force, Pressure			●	
Current			●	
Optical			●	
Speed			●	●
Position/Hall Effect			●	●
Thermal/Humidity			●	●

## MIL-DTL-38999 Series III/EN3645 (TV/CTV)



- Amphenol Tri-Start MIL-DTL-38999 Series III thread coupling connectors offer the highest performance capabilities for both general duty and severe environment applications
- Different versions are available: "TV" metal versions (aluminium, stainless steel or aluminium bronze) as well as "CTV" composite versions, which offer a lightweight, corrosion resistant connector

## PT451/VG95328



- PT451/VG95328 Series are robust subminiature cylindrical connectors ideally fitted to meet the most demanding requirements
- In accordance with the American MIL-DTL-26482 Series I standard, the PT/451 connectors can be delivered in crimp, solder, PCB versions, with different sealing levels which are well known in aeronautics, military and industrial applications
- Technical advantages: many versions available, sealed (IP67/68), hermetic, EMI shielded, resistant to many fluids, resistant to shocks and vibrations, operational from -55°C to +125°C, proven world standard
  - The PT/451/VG Series comprises a wide range of products: 9 shell sizes available, 35 insert arrangements and up to 61 contacts. Shell finishes: olive drab cadmium and nickel platings as standard
  - Plastic self closing caps are available for shell sized 8, 10, 12 and 18"

## 38999 Power Solutions



- These connectors derived from the MIL-DTL-38999 Series are equipped with ruggedised power inserts
- The power contacts are crimp contacts for 60A, 100A, 230A and 500A currents
- Available in different shell types:
  - MIL-DTL-38999 I (LJT)
  - MIL-DTL-38999 III (TV-CTV)
  - VG96912 (SJT)
  - RNJ
  - RNJLP
- The 4x60A and the 4x100A are HE308 qualified (bayonet and rackable versions)

## SC39



- The SC39 connectors offer a new connecting solution, particularly for applications which required a fast and easy connection/disconnection
- The innovation lays in the mating system
- It consists of a circular spring trapped in the receptacle which keeps the plug mated
- The SC39, without any rotating ring or moving part, insures a high reliability
- Receptacles with stand-off, integrated backshells and lanyard versions are available

## Amphenol RF



- Amphenol RF is a leader in the RF microwave industry. They design and manufacture RF connectors, cable assemblies and passive components. With over 40 years of proven performance, Amphenol manufactures one of the largest ranges of RF and microwave products available today. Their product range includes standard off-the-shelf catalogue items and custom designed products to meet specific customer requirements
- When it comes to the design and manufacture of special custom designed products, their SV Microwave division has set the standard in High Frequency and High Reliability RF and microwave connectors and components. Integrated state-of-the-art design and manufacturing resources and tools give it the capability of providing its customers with rapid turnaround, proven quality and a competitive price
- Precision N types capable of working up to 18GHz made from high strength stainless steel and standard SMAs feature heavily in the SV range along with the SVK which performs up to 46GHz
- Their RF and Microwave products are used in the military, satellite, aerospace and telecommunication and all other industries where performance, reliability, durability and competitive pricing matter

## RJField



- RJField allows you to use an ethernet class D/Cat. 5e connection for 10 BaseT, 100 BaseTX

## Rugged USB Keys



- Reinforced USB memory keys are available in several capacities up to 64GB
- They are sealed (IP68) and have a metallic shell with various plating
- Amphenol provide two versions:
  - USBFKey: 1/4 turn bayonet coupling, to be used with standard USB-A ports, non-protected connection (2 to 8GB)
  - USBFTVKey: based on MIL-DTL-38999 Series III shell, to be used with USBFTV receptacles, protected connection (2 to 64GB)

## USBField



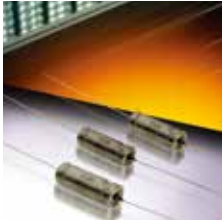
- USB Field allows to use a standard USB2.0 connection in harsh environments:
  - Sealed against fluids and dusts (IP68)
  - Shock
  - Vibration and traction resistant
  - No cabling operation in field and no tools required
  - Mechanical coding/polarisation (2 positions)
  - Improved EMI protection

AVX Corporation is a leading international supplier of advanced passive components and interconnect solutions, offering the world's broadest selection of passive electronic components and connectors. The company has over 30 years experience in producing industry-leading, high-reliability passive components, offering an expanding range of products including capacitors, filters, timing devices, connectors and circuit protection devices which have been designed to provide industry-leading performance and quality.

AVX currently has 11 factories in Europe and USA qualified to AS9100, IECQCECC, TS16949-2002 and ISO9001-2000 standards. The company also has a number of products qualified to COTS +, ESCC, SRC, MIL and DSCC drawings, as well as optional custom screening and test service capabilities.

## Hermetically Sealed Caps

### TWA Series



#### Features & Benefits

- Wet electrolytic axial leaded tantalum capacitor
- Capable of higher voltage and higher capacitance (higher CV) than solid tantalum
- Only 20% derating required
- Hermetically sealed can, which provides long operating life
- Meets shock and vibration per Mil-Std-202, method 213 & 204
- Fully qualified to DSCC 93026 Rev. P

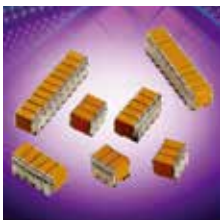
### TCH & THH Hermetic Series



#### Features & Benefits

- Hermetically sealed SMD tantalum capacitors
- TCH – Low ESR conductive polymer electrode
- THH – Rated temperature up to 230°C
- Stability under humidity and ambient atmosphere
- Large case sizes including CTC-21D provide high capacitance values
- Available in 2013

## TurboCap™



#### Features & Benefits

- Vertically stacked construction
- SMPS ceramic capacitor
- High CV values
- Offers ultra low ESR/ESL characteristics
- Very high current handling capability
- Wide operating temperature: -55°C – +125°C
- Automated lead frame attachment assembly process

## Tin/Pb Terminated Products

### LD Series



#### Features & Benefits

- Ceramic capacitor with termination consisting of 5% minimum lead
- Tin whisker protection
- Low temperature soldering profile
- Long time stability
- Wide range of dielectrics
- Low voltage and high voltage options
- Also available with Flexitem®

## High Temperature Products

### SMPS



#### Features & Benefits

- SMX-style, stacked SMPS capacitor utilising MLCC
- Ideally suited for hi-temp applications up to +200°C
- Much lower ESR and lower losses
- Excellent capacitance retention with frequency
- Excellent high frequency performance
- Low DC leakage current
- Much higher current handling capabilities

### THJ Series



#### Features & Benefits

- 1st SMD +175°C tantalum capacitor on the market
- 200°C option available as THJ+ Series
- SMD = small size, fast pick & place ready
- Negative temperature operation (unlike wet electrolytics)
- 3 x reflow +260°C and RoHS compliant
- Gold plated termination for hybrid assembly

## MH Series



#### Features & Benefits

- Lead free ceramic capacitor in moulded case
- Excellent ESR
- Voltage range: 25V – 100V
- Operating/storage temp: -55°C – +125°C
- Non-polar construction
- Excellent over voltage immunity
- Enhanced mechanical protection due to moulded case and lead frame

### ESCC Tantalum Capacitors



#### Features & Benefits

- SMD solid tantalum chip capacitors
- For use in ESCC space programs, according to ESCC generic specifications 3012
- TAJ – ESA ESCC 3012/001
- Low ESR and Hi-CV EPPL 3012/004
- Robust moulded construction and J lead terminations
- Advanced powder technology allows for higher CVs through all voltages
- Silicon barrier to protect capacitor from humidity



# Designing Technology into Solutions

C&K Components is a leader in interface and switch technology as well as smart card and high reliability connector products. C&K Components offers more than 40,000 unique part numbers that are built, priced and delivered as standard catalog items. C&K products include: low profile tactile switches, navigation switches, detect switches, pushbutton switches, rotary, switchlock and key switches, slide switches, toggle switches, DIP, illuminated switches, and sealed switches.

## Sealed Pushbutton – AP Series



### Features & Benefits

- IP67 sealed
- 1,000,000 life cycle
- Illumination/non-illumination
- Threaded or snap-in mounting
- SPST, normally open

## Sealed Pushbutton – NP Series



### Features & Benefits

- IP68 sealed
- 1,000,000 life cycle
- Multiple housing styles
- Capable of up to 5A resistive load

## Illuminated Pushbutton – PBA Series



### Features & Benefits

- Illuminated display
- Small size
- Cold lighting
- Tactile feedback

## Domes – ED/EDM Series



### Features & Benefits

- Short travel
- Good tactile feedback
- Self cleaning
- 3 actuation forces

## Keyswitch – K12 Series



### Features & Benefits

- Excellent tactile feel
- Wide choice of LED colors, travel and actuator forces
- High reliability/long life
- Sealed version available
- Designed for low-level switching
- Double stroke version available
- Detector version available

## Sealed Keyswitch – K12S Series



### Features & Benefits

- Harsh environment applications – IP67
- Illuminated
- Excellent tactile feel
- High reliability/long life
- DPST and detect versions available

## Microminiature Key Switches – DIGITAST Series



### Features & Benefits

- High reliability/long life
- Designed for low level switching
- Ready to implement on PCB
- Latching function available
- Several button options

## Toggle Switches



### Features & Benefits

- Qualified to MIL-S-83731
- Epoxy sealed terminals for process compatibility
- Rated for logic level to 5A resistive loads and 2A inductive loads
- Flame retardant housing material

## Tactile Switches – KSA/KSL Series



### Features & Benefits

- Highest tact switch sealing performance
- Improved sealing through a modification of the crimping technique and to a double overmoulding of the terminal
- Up to 1,000,000 operations

## Mains/Power Switch – NE 18 Series



### Features & Benefits

- Chassis or panel mount
- Several button options available
- Various contact configurations

Honeywell Sensing and Control manufactures one of the broadest switching and sensing product portfolios in the industry, including products from: Clarostat, Data Instruments, Electro, Elmwood, Fenwal, Hobbs, Hycal, Micro Switch™, NEI and Sensym. Honeywell offers a breadth of solutions from an array of technology platforms designed to specific and essential requirements, integrated into application-specific packaging.

Honeywell Sensing and Control is a global leader in cost-effective, problem-solving sensor and switch solutions. Honeywell serves thousands of customers in four core industry segments: Industrial, Medical, Transportation and Aerospace/Military.

## MICRO SWITCH™ Sealed Switches



Military performance standard and most global approvals. Environmental and hermetic sealing to resist many severe environment conditions, changes in atmospheric pressures/temperatures. Potential applications include aircraft landing gear and flap/stabiliser controls, de-icers, doors/slides, engine thrust reversers, space vehicles, armoured personnel carriers, weapon systems and wing fold actuators.

**MICRO SWITCH™ SE/XE**  
Watertight and military standard construction per MIL-PRF-8805; corrosion-resistant aluminium housing

**MICRO SWITCH™ HS**  
Hermetically sealed per MIL-S-8805; high temperature construction; reduced sensitivity to changes in altitude or pressure

**MICRO SWITCH™ HE**  
Features true hermetic sealing (metal to-metal, glass-to-metal construction); meets sand and dust, explosion, icing, minimum current, and moisture resistance requirements; top and roller plunger actuators have internal ice scraper ring

**MICRO SWITCH™ HR**  
Meets moisture resistance, explosion and salt spray requirements; top plunger actuator has internal ice scraper ring

**MICRO SWITCH™ HM**  
Hermetically sealed per MIL-S-8805; high temperature construction; reduced sensitivity to changes in altitude or pressure

**MICRO SWITCH™ EN**  
Top and roller plunger actuators have internal ice scraper ring

**E1-217 Series**  
Small size and lightweight, without sacrificing performance or electrical capacity

## MICRO SWITCH™ Toggle Switches



Hermetic and environmentally sealed toggle switches offer reliable operations with MICRO SWITCH™ technology. Often used in applications where a panel-mount switch with an environment-proof rating is needed, including military and commercial aviation and process control.

**Approvals**

- Qualified to MIL-S-8805/26/98UL
- Qualified to MIL-S-83781
- Qualified to MIL-S-5594 UL, CSA, CE
- Qualified to MIL-S-3950

**Features & Benefits**

- Choice of sealed bushing
- Short behind panel depth saves space and weight
- Sealed bushing versions holding coil replaces mechanical holding mechanisms to maintain toggle in operate environment-proof sealing
- Qualified to MIL-DTL-3950

## MICRO SWITCH™ Limit Switches



Available with a variety of actuators, electrical specifications, terminations, circuitries and sealing ratings, Honeywell's MICRO SWITCH™ limit switches offer superior flexibility and performance. These precision snap-action switches sealed in rugged housings are used to detect presence or absence in areas where physical contact is allowed.

**Series: 914CE**

- Rugged housing
- Miniature size
- Direct-acting contacts available
- Pre-leaded or various quick-connect terminations

**Series: LS**

- Housing type: compact/non-plug-in, plug-in
- Rugged housing
- Miniature size
- Direct-acting contacts available
- Pre-leaded or various quick-connect terminations

**Series: BZE6/V6**

- Housing type: split housing, side mount; split housing, flange mount
- Mode of operation is field adjustable
- Variety of operating characteristics rugged electrostatic
- Epoxy coated housing
- Booted versions sealed to IP66
- Unsealed actuators sealed to IP40
- Side or flange mount
- Low temperature options

**Series: GLA**

- Housing type: EN 50041
- Direct-acting NC contacts

**Series: HDLS**

- Housing type: plug in and non-plug-in
- Wide variety of actuators
- Circuitry options and connectivity

## “Mighty Mouse” Series 80 Connector

The Series 80 “Mighty Mouse” Connector offers virtually equal performance to MIL-DTL-38999 interconnects with up to 71% weight and 52% size savings for similar contact layouts. The Series 80 Connector was originally developed as a smaller and lighter alternative to D38999 connectors for aerospace applications such as Attack Helicopters and Unmanned Aerial Vehicles. Today, the Series 80 “Mighty Mouse” serves in thousands of safety-critical defence, medical, industrial and geo-physical applications.

**The Series 80 “Mighty Mouse” Connector is supplied in six standard designs:**

- Series 800 Light Duty UN Thread
- Series 801 Heavy Duty Double-Start
- Series 802 “Aqua Mouse” Harsh Environmental
- Series 803 Bayonet
- Series 804 Quick-Disconnect
- Series 805 Triple-Start

**The Series 80 “Mighty Mouse” Key Features :**

- Rear-release crimp contacts, PC Tail or solder cup terminations
- In-line plugs, square flange, jam nut receptacle
- Integrated banding platforms for EMI shield termination or rear-end threads for backshell accessories
- Insert arrangements available: 1 – 130 contacts



### D38999 Series III Type Fibre Optics



**Features & Benefits**

- Ferrule design, critical to the performance of the termini, has traditionally relied on a machined stainless steel ferrule incorporating a precision micro-drilled hole
- Glenair’s fibre optic termini for D38999 Series III connectors are qualified to MIL-PRF-29504/4 and /5 requirements
- Unique precision ceramic ferrules, with concentricity and diametric tolerances controlled within a micron (.00004 of an inch), meet the needs of high bandwidth and low allowable insertion loss applications
- Glenair’s ferrules are approximately 10 times more accurate than alternative designs, and have reduced insertion loss values from 1.5dB to less than 5dB

### Micro-D and Nanominiature TwistPin Connectors



For applications where interconnect failure is simply not an option, the Glenair high-reliability Micro-D offers a wealth of performance benefits. If downtime is a critical concern, other connectors cannot match the long-term durability and performance advantages of the MIL-DTL-83513 Micro-D.

**Features & Benefits**

- Higher current ratings
- Lower circuit resistance
- Superior vibration and shock
- Optimised EMI/RFI shielding
- Broader operating temperature
- Better damage resistance
- Enhanced corrosion resistance
- Better contact retention
- Better environmental sealing

### Series 77 “Full Nelson” Environmental Shrink Boots



**Features & Benefits**

- These adhesive-lined shrink boots provide a dependable, leak-proof seal for interconnect cable assemblies
- Shrink boots provide mechanical and environmental protection to connector-to-cable transitions
- Specially formulated polymers are injection-moulded, then heated and expanded
- The shape-memory property of the material allows it to return to its original shape when heated with a hot air gun
- Optional adhesive coatings on the inside of the boot provide a watertight, high-strength bond to the cable jacket and the connector or adaptor

### AmberStrand® EMI/RFI Braided Shielding



**Features & Benefits**

- For many applications, the cable shield is the most important element in controlling EMI. Unfortunately, metal shielding can be extremely heavy
- AmberStrand® thermoplastic material combines the light weight, abrasion resistance and elasticity of fabric braid with the EMI protection of metal
- The Glenair AmberStrand® plated thermoplastic shielding offers all of the best performance characteristics of fabric and metal braid, but with only a fraction of the weight of metal

## Ceramics

### DLA (Formerly DSCC) High Reliability MLCCs

DLA 05006/7, 03028/9 and 91019

#### Features & Benefits

- 05006/7 available in BP, BR and BX dielectrics
- 03028/9 available in BR and BX dielectrics
- 9109 available in BR dielectric
- High capacitance
- Voltage range: 6.3VDC – 200VDC
- Non-polar device, minimising installation concerns
- EIA case sizes 0402, 0603, 0805, 1206 and 2220



### Space Grade MLCCs

GR900, MIL-PRF-123

#### Features & Benefits

- For use in applications where the chance of failure must be reduced to the lowest possible level
- BP, BR and BX dielectrics
- Voltage range: 16VDC – 200VDC
- Numerous end metallisation options available including 100% pure matte tin, SnPb plated (70/30), SnPb coated (60/40) and gold plated
- Receive special attention in all phases of manufacture including raw materials selection, clean room production, individual batch testing, C-SAM (when applicable), maintenance of singular batch identity and destructive physical analysis



### Multilayer Ceramic Stacked Capacitors

KPS MIL

#### Features & Benefits

- Reliable and robust termination system
- Higher capacitance in the same footprint
- Advanced protection against thermal and mechanical stress
- Reduces audible microphonic noise
- Extremely low ESR and ESL
- T-Level reliability available (Space Grade)



### High Voltage Large Case MLCCs for Higher Reliability Applications

KPS HV SM Series

#### Features & Benefits

- “J” & “L” lead configurations available
- Reliable and robust termination system
- Advanced protection against thermal and mechanical stress
- Improved flex performance
- Reduces audible, microphonic noise
- Non-polar device, minimising installation concerns
- Available with screening to MIL-PRF-4946, Group A & B
- Several end metallisation options available



## Tantalum Polymer COTS

### T540 and T541 Series

#### Features & Benefits

- Polymer cathode technology
- High frequency capacitance retention
- Benign failure mode
- Low ESR
- Surge current testing options
- High ripple current
- 10% derating for part types ≤10V
- 20% derating for part types >10V



## Polymer Hermetic Seal

### T550 Series

#### Features & Benefits

- Low and stable ESR across temperature range and frequency
- Stable capacitance across temperature range and frequency
- Non-catastrophic failure mode
- Mechanical robustness (shock and vibration)
- Lighter weight (~25%) and same case sizes as wet tantalum
- Patented polymer slurry technology
- 20% derating



## Space Grade MnO<sub>2</sub> Tantalum

### T493 COTS, T496 Fused, T497 High Grade COTS & T510 Multiple Anode Low ESR Series

#### Features & Benefits

- MIL-PRF-55365 and MIL-STD-1580
- Incorporates customisable intensive testing and screening protocol such as Weibull grading level (C = 0.01%/k hours), surge current level (10 cycles -55°C and +85°C before and/or after Weibull grading) and variety of additional performance testing level options
- Low and standard ESR options
- Variety of termination finishes
- Fused versions available for built-in circuit protection
- Multi-anode designs for very low ESR values



## High Volumetric Efficiency Facedown MnO<sub>2</sub>

### T428 Series

#### Features & Benefits

- Taped and reeled per EIA 481-1
- SnPb termination finish
- Laser-marked case
- 100% surge current test available
- Halogen-free epoxy
- Capacitance values: 15µF – 470µF
- Tolerances: ±5%, ±10% and ±20%
- Voltage rating: 4VDC – 50 VDC
- Extended range values
- Pick-and-place friendly
- RoHS Compliant and lead-free terminations available
- Operating temperature range: -55°C – +125°C



From its origin SOURIAU's strategy is based on innovative interconnect solutions. SOURIAU offers numerous product configurations designed for complex, integrated aerospace and defense systems, with the ability to provide customised solutions as required.

## Product Ranges

### EN3646/MIL-C26482 Series II – 852 Series



#### Features & Benefits

- High performance shielding
  - Metal housing
  - 360° teeth option
- High contact density – up to 61 contacts #20
- Quick mating – bayonet coupling
- Hermeticity – stainless steel hermetic version available

### EN2997/ESC Qualified – 853 Series



#### Features & Benefits

- High temperature firewall connector
  - 260°C operating temperature
  - 20 minutes fire resistance
- Excellent corrosion performance
  - up to 500h salt spray
- Upgraded vibration performance
  - high vibration performance available
- EMI and lightning resistance
  - 65dB
  - 40kA lightning indirect peak
- Integrated backshell version available

### 38999 Series I & VG96912 – 8LT & 8ST Series



#### Features & Benefits

- A large offer
  - 7 different shell types available
  - 8LT RoHS version available
- PCB contacts available – in standard or potted connector for high sealing level
- Rapid and secure – 1/3 turn mated and sealed

### 38999 Series II – 8T Series



#### Features & Benefits

- A wide range – 43 layouts available (from size 8 with 6 contacts up to size 24 with 128 contacts)
- Lower profile design
  - lightweight
  - space saving (30% shorter compared to 8LT)
- High reliability
  - EMI shielding
  - Excellent shock vibration and fluid resistance
- RoHS – cadmium-free alternative (QPL approved)

### 38999 Series III – 8D Series



#### Features & Benefits

- Metal contact retention clip – superior strength in vibration and high temperature
- Standardised insert for all series metal clip
  - better availability and flexibility
- Wide contact platform metal clip – a large array of different contact technologies available
- RoHS compliant finish – cadmium-free alternative (QPL approved)

### 38999 Miniaturised – micro38999 Series



#### Features & Benefits

- Smaller and more compact than D38999 – Superior strength in vibration and high temperature
- Flexible solutions – threaded (8DA), break away (8BA), bayonet (8LTA)
- RoHS and cadmium-free – available plating: Zn Ni (RoHS), nickel and olive drab cadmium
- Integrated backshell – cost and space saving

### ARINC 600 & DOD 700 – ARINC & EN Qualified



#### Features & Benefits

- Rackable solution – blind mate, low insertion force
- High contact density
  - Up to 800 #22 signal contacts
  - Up to 56 #8 quadrax contacts
- Configurable solution – wide range of insulators, shells and type of contacts
- Many options available
  - Cost saving option: harpooned contacts
  - Flex circuit integration and cabling EMI/RFI

### Micro Rectangular/Composite – microComp® Series



#### Features & Benefits

- Miniature design – ideal for tight space applications
- Full composite – lightweight
- Removable contacts – easy reconfiguration
- Quick latch version – easy to handle

### Electrical Distribution – 208, 209, 8559 Series



#### Features & Benefits

- Easy to install
  - Screw mounting
  - Rail profile support
- Flight proven – used on major Airbus and Boeing programs
- Standards qualified – NSA/NFL/EN/ASNE

### Backshells and Caps

Souriau offer a full range of aluminium backshells and caps. The best choice for a global solution provider



#### Features & Benefits

- Cost and time saving – one supplier for connector and accessories
- A wide range – available for 38999 Series
- A global RoHS solution – with Zn Ni accessories, Souriau offers a complete RoHS solution
- Caps – QPL approved

## Innovation & Technologies

### RoHS Black Zinc Nickel

#### The RoHS alternative to cadmium

Souriau Zinc Nickel – the best in terms of price and performance for aerospace and defence equipment.



#### Features & Benefits

- Souriau Black Zinc Nickel – a unique alternative plating process to cadmium
- RoHS compliant – a unique SOURIAU plating process compliant with RoHS regulations for cadmium and Cr6+
- The first QPL qualified – Souriau Zn Ni is the first product which has been qualified by US Defense standards organisation (DLA Land and Maritime)
- High corrosion resistance – 500h salt spray

### Composite Weight Saving

Souriau is a world leader in high performance 38999 Series III with composite shell, with in house mastery of plating adhesion for outstanding shielding effectiveness and lightning protection



#### Features & Benefits

- Lightweight – up to 25% weight saving compared to aluminium
- High performance
  - 2,000 hours salt spray
  - According to D38999 (QPL approved)
  - EN3645 Qualified
- Superior design – match the latest lightning strike and 230V requirements

### High Speed Networks

#### Quadrax contacts for full duplex ethernet link



#### Features & Benefits

- High speed
  - One Quadrax contact replaces two Twinax contacts
  - Data rate up to 1 Gbit/sec
- A wide range – compatible with all Souriau inserts with at least one #8 cavity
- A flexible range – available in 100Ω and 150Ω (grounded or not)
- A versatile technology – Quadrax layouts compatible with all #8 contacts type: power, coax, triax, fibre optic

### Box Solutions

#### Double flange solution for PCB mount

Specially designed for PCB applications in harsh environments, isolating vibration from the board



#### Features & Benefits

- Excellent mechanical performance
  - Standoffs integrated into the connector
  - No risk of breaking contacts and no risk of micro-cuts
- Design flexibility
  - Square flange or jam nut versions available
  - Versatile contact length options
- A wide range – available in aluminium with a range of layouts from shell size 9 to 25
- User friendly – Easy to assemble and time saving

### Miniature

#### A full offer dedicated for space and weight saving



#### Micro38999 Series

#### Features & Benefits

- Superior strength in vibration & high temperature
- Flexible solutions: Threaded, bayonet and break away
- Integrated backshell

### Power Transmissions

#### Power contacts. High current supply in harsh environments



#### Features & Benefits

- A unique contact design with a braid socket
  - allowing 20% more current
  - excellent vibration withstanding
- A versatile individual sealing on the cable
  - same connector can accommodate a wide range of cable diameters
- A contact technology integrated standard MilAero connectors
  - up to 260°C service temperature
  - up to 60G vibration withstanding

#### 38999 High Power (up to 850A)

Designed to meet the harshest military requirement where high power and shielding are needed.



#### Features & Benefits

- 3 aluminium shell sizes available – size 19 (450A max); size 23 (650A max); size 25 (850A max)
- Different finish – cadmium, zinc nickel, electroless nickel
- Threaded coupling
- Superior contact technology equipped with a silver plated braid
  - High contact endurance
  - Low contact resistance
  - No microcut under vibration
- Modular design for easy installation
  - Removable backshell: straight, right angle or bus bar
  - Backshell termination: for thread or shrink boot
  - Possible to crimp various cable

### Hermetic Technologies

#### Compact low profile connectors with high hermeticity performance Glass sealed connectors



#### Features & Benefits

- Perfect hermeticity – up to 100,000 times more hermetic than standard connectors
- Low profile – no rear accessory thread: 30% space saving
- Various ranges including EN2997, ESC10, MIL-DTL-38999, D Sub, EN3646, MIL26482 standards
- Large technology mix – 230V double voltage, fuel tank, filters, fibre optic, hermetic extensions

### ELIO® contact

#### Ruggedised and user friendly fibre optic technology. Easy mounting optical link for severe applications



#### Features & Benefits

- Flight proven – the only Airbus qualified fibre optic technology: ABS1379, ABS1213, ARINC 801 and EN4531 qualified
- Robust connection – withstanding the most severe vibrations with excellent optical performance (0.3 dB)
- User friendly contact
  - Easy cleaning: no part to remove
  - No tool needed for insertion/extraction of the contacts
- A wide range available – in all platforms with #8 cavities
- Up to 24 ELIO® contacts in 38999 size 25

#### Push Pull and Breakaway Connectors: JBX, JDX & JKX Series

#### Features & Benefits

- High reliability with quick connect/disconnect
- Ideal for limited space and where endurance is the priority

Syfer and its sister CMP companies are global leaders in mission-critical engineered electronic components and subsystems, providing program and design driven products to the Military, Aerospace, Space and other High reliability markets.

Comprising ten manufacturing locations globally, the full product range encompasses SMD and radial ceramic capacitors, EMI filters, power filters, microwave, thin film and RF filters, precision trimmers, switches, and a custom product capability.

- Product is available as COTS, COTS+, MIL Spec BP, BX, BZ classification, SCD, Tin-lead finish options or RoHS compliant, FlexiCap™
- Approvals include QPL, IECQ-CECC, MIL-PRF, AS9100B, DSCC, Space EPPL, IAW ESCC, AEC-Q200 and ISO9001

## ProtectiCap™ High Voltage MLCCs



### Features & Benefits

- High working voltage in small case sizes
- Minimises the risk of flashover
- No coating required
- Up to 3kV in 1206 size, 5kV in 2220
- For power supplies, inverters, general high voltage circuits

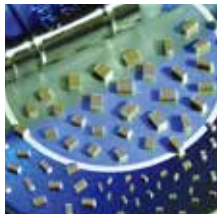
## 115V 400Hz MLCCs for Aerospace Applications



### Features & Benefits

- Ideal for aerospace power supply applications
- Meets voltage and frequency transients to MIL-STD-704
- Sizes 0805 to 2220
- Termination options include tin-lead and FlexiCap™
- Capacitance values up to 100nF

## High Voltage SMD and Radial Capacitors



### Features & Benefits

- SMD MLCCs up to 30kV
- Radial capacitors up to 10kV
- Available in C0G/NP0, X7R or X5R
- FlexiCap™ termination option
- Tin-lead terminations available, with or without FlexiCap™
- Highest voltage/capacitance combinations available in the world
- Approvals as listed above

## Speciality Capacitors



### Features & Benefits

- Custom capability across a range of products including:
- Detonator and pulse energy capacitors/pulse power capacitors. Offer exceptional discharge energy up to 7 joules/cc at elevated voltages
  - Stacked capacitors for switch mode power supplies
  - Thin film ceramic filters for GSM and KA band applications

## Hi Q MLC and Single Layer Capacitors



### Features & Benefits

- For high frequency RF, microwave and millimetre-wave applications including radar
- Ideal for comms, defence, aerospace and satellite markets up to 80GHz
- Sizes as small as 0101 in SLC and 0402 in MLC
- Low ESR, high Q performance

## High Temperature Capacitors



### Features & Benefits

- The broadest range of high temperature MLCCs available
- From X8R performance (150°C) up to 230°C
- For aerospace and other applications
- Products can be in SMD/radial forms or custom shaped

## Low Pass EMI Filters



### Features & Benefits

- Surface mount types include 3 terminal chips and X2Y filters, with AEC-Q200 and tin-lead options
- High current, high capacitance SMD pi-filters
- Panel mount filters for solder or screw mount, and for 115V 400Hz applications
- Highest capacitance/voltage combinations in the market

## Precision Trimmer (Variable) Capacitors



### Features & Benefits

- World leading precision trimmers capacitors
- Custom solutions available to meet specific tuning needs
- QPL products, approved for MIL-C-14409E
- Military applications include night vision goggles

## Capacitors for Space Applications



### Features & Benefits

- Track record in satellite and space station applications
- 0603 sized MLCCs now available as space grade
- EPPL listed company, offering testing in accordance with ESCC Generic Specification 3009
- Extensive and widely used range of space grade SLCs

## FlexiCap™ MLCCs



### Features & Benefits

- World's first flexible termination on MLCCs
- Proven technology reduces stress damage in MLCCs, caused during PCB assembly process, by shock or vibration, or by temperature cycling
- Available across almost all ranges of capacitors
- Also available with tin-lead finish



## Connectors

### CeeLok FAS-T Connectors

TE's CeeLok FAS-T connector is the most rugged, small form factor, 10 Gigabit Ethernet, field terminable I/O connector in the Aerospace, Defense and Marine marketplace. It has been designed to perform in some of the most extreme environments in the industry, while providing substantial size and weight savings via its small shell size 8 form factor.

#### Features & Benefits

- 1 Gbit-Ethernet and 10Gbit-Ethernet when used with Cat 5e, Cat 6A or Cat 7 cables
- Crimp snap, 39029-style contacts for easy termination and field repairability
- Backshell integrated in plug body provides low profile, low cost, low weight strain relief and EMI protection
- T-shaped pin pattern improves SI through uniform crosstalk cancellation
- Compatible with multiple braid terminations, adaptor styles and seal boots
- Scoop-proof design
- Insert assembly mechanically retained for  $\leq 25$ lb. retention force
- Robust coupling ring mechanism
- Size 8 shell saves weight and space

#### Applications

##### Military

- Rotary and Fixed Wing
- Space
- Ground Vehicles
- Shipboard
- Soldier Systems
- C4I

##### Missiles and Smart Munitions

- Commercial and Civilian Aircraft
- In Flight Entertainment & Connectivity
- Avionics
- Production Breaks



### AMPLIMITE – Subminiature D Connectors



#### Features & Benefits

- Military qualified connectors conform to MIL-DTL-24308
- Non-magnetic variants available per NASA specification
- Ultra-lite AMPLIMITE save 15-20% weight and improve EMI shielding
- Choice of sizes for Series 109 for standard and Series 90 for high density

#### Applications

- Designed for environments having wide ranges of temperature, pressure and humidity ranges
- Used in airframes, avionics boxes, test equipment, computers & communications equipment
- Ruggedised I/O interconnect

### Mezalok Connectors



#### Features & Benefits

- 60 and 114 positions
- Mini-Box contact system provides 4 points of contact for ultra reliability
- LCP plastic housings offer superior thermal stability and are low-outgassing
- Compliant BGA board attach supports standard surface mount processing and excellent thermal stability
- 114 position footprint compatible to XMC footprint and all dimensional constraints

#### Applications

- Stacking or mezzanine applications
- 114 position is designed to support VITA 61 XMC architecture as rugged alternative to VITA 42 XMC
- 60 position designed for custom architecture stacking applications

### MULTIGIG RT Connector System

Rugged "pin-less" backplane connector

#### Features & Benefits

- For use with VITA 41 and 46 standards
- Extreme flexibility available in modular or mono-block style
- MULTIGIG RT 2 connector supports data rates of 3.125Gb/s – 6.4+Gb/s and has been demonstrated to support 10Gb/s

#### Applications

- Aerospace and defense
- Telecommunications equipment
- Midrange servers
- High end servers
- High-speed custom platforms
- Mass data storage
- Rugged, mission-critical applications
- Switches
- Servers/Blade Servers
- Routers
- Storage

### BOX & Mini-BOX – PCB Connectors

#### Features & Benefits

- Two-piece receptacle and pin headers for board-to-board applications
- Wire-to-board and wire-to-wire capability with crimp contacts
- Centerline spacing selections of .050, .075 and .100 with contacts duplex plated military gold over nickel
- Housing made of high temperature thermoplastic material

### Fortis Zd Connectors



#### Features & Benefits

- Allows 10Gb/s+ data rates
- Extreme mechanical and electrical performance for the most demanding applications
- Modular design allows for user configurability and modular evolution
- M55302 Mini-Box separable interface provides 4 points of contact on all sides of the pin
- Three shell varieties including plastic, shielded and machined metal shell
- 3-Pair and 2-Pair versions available to accommodate multiple slot pitches
- Proven compliant pin board attach facilitates manufacturing efficiency, repairability, and superior electrical performance
- Staggered daughtercard pin field supports 2 level maintenance
- Protected pin field on backplane for reliability and durability
- Durability: 500 mating cycles
- Operating temperature: -55 – +125°C

AMPLIMITE, CeeLok FAS-T, Fortis Zd, Mezalok, MULTIGIG RT, TE Connectivity and TE Connectivity (logo) are trademarks.

## Relays

### CII: High Performance Signal Level and Mid-Range Relays

#### Features & Benefits

- Hermetically-sealed Mil-Spec and COTS versions are available
- Many optional terminals and mounting styles, including surface mount
- Electromechanical models ranging from microwave-switching TO-5 types to multipole, 25A models
- Solid state relays including versions with built-in circuit protection and other intelligent functions
- Time delay relays offering various timing functions and delay times

#### Applications

- Aircraft
- Missiles
- Power Distribution
- Fuel Pumps
- Avionics Main Power Feed
- Weapons Systems
- Ground Support Equipment



### HARTMAN: Aerospace Power Relays & Contactors



#### Features & Benefits

- Lightweight 28VDC contactors to 1,000A
- Available with a variety of auxiliary contact arrangements
- Hermetically or gasket sealed models in conventional or bus bar mounting
- AC models also available

#### Applications

- Aerospace and defence
- High current
- environmental control systems
- hydraulic pumps
- ground power
- main power
- cargo systems

### KILOVAC: Rugged, Small, Lightweight Relays & Contactors



#### Features & Benefits

- Small size and weight for given power rating
- Low and stable contact resistance over relay life
- Ability to interrupt DC loads
- High resistance to shock, vibration and temperature extremes
- Fast operating times
- "Bounceless" operation in many applications
- Usable in RF devices

#### Applications

- Electric Vehicles
- Aerospace and defence
- Hybrid Vehicles
- Fork Lifts
- Recreation Vehicles
- Winches on trucks, vehicles
- Maritime, Boats
- Electric Buses
- Electric Generators

## Cable & Wire Management

### Adaptors

TE Connectivity's range of adaptors are a metallic component designed to 'adapt' a connector overall shielding braid and, if necessary, anchor a heat-shrinkable boot for sealing and strain-relieving. Connector interfaces are available for most circular connectors for unscreened and screened termination systems. The choice is largely dependent upon the screening level required and the braid termination method.

#### Spin Lock Adaptors



#### Features & Benefits

- Style: Raychem Spin Lock Variable Angle Backshells
- Angle: 45°, 90°, Straight
- Finish: Cadmium over Nickel
- Material: Aluminum



#### 2XX Cable Termination Adaptors

##### Features & Benefits

- Style: Solid (Fixed), Spin-Coupling or Shielded
- Material: Aluminium Alloy
- Finish: Cadmium or Unplated (Shotblast)

#### TXR Cable Termination Adaptors

##### Features & Benefits

- Style: Tinel-Lock
- Material: Aluminium Alloy
- Finish: Cadmium

CII, HARTMAN, KILOVAC, Tinel-Lock, TE Connectivity and TE Connectivity (logo) are trademarks.

## Devices: Solder Sleeve & Crimp Product

Designed to ease termination of wire or cable to connect, insulate and shield using a single device adding the benefits of added strain relief, high resistance to vibration, low profile and lower installation costs. These products are ideal for harsh environment applications.

### Cold Applied Splices

The cold applied splice product line is designed as a single component in-line splice to provide high environmental protection to seal the termination from moisture and provide electrical isolation. If moisture is present, it can lead to insulation failure and breakdown of the electrical connection. In this product, sealing is achieved by replacing traditional methods, such as grommets, greases and tapes with a novel TE gel technology. The electrical isolation is provided by a polymer outer layer.

#### Features & Benefits

- One-step termination and environmental protection
- No heating required for installation — safe for use on fueled aircraft
- Reliable in a wide variety of environmental conditions
- Achieve environmental performance while maintaining:
  - Small profile
  - Electrical performance
- Easy installation and application flexibility
- Prevents water ingress under permanent pressure/weight

#### Applications

- Ideal for aerospace and defense application where performance and reliability is essential



## Heat Shrink Tubing & Moulded Parts

Heat shrink tubing and moulded parts from TE Connectivity offer superior abrasion and crush resistance, sealing and strain relief, and excellent performance at high and low temperatures. Our moulded parts include boots, cable breakouts, transitions, caps and feed-throughs, available in a variety of configurations and materials.

#### Key Features

- Lipped moulded shapes available in straight and right angles
- -25°C fluid resistant elastic material
- Bottle shape provides straight relief mechanical protection and insulation
- Pre-coated adhesive option available
- Tubing-single or dual wall with 2:1, 3:1 and 4:1 shrink ratio available



### High Temperature Sealing Sleeves



High temperature fluoropolymer sealing sleeve provides a robust, lightweight cover which shrinks to environmentally seal in-line compression joints and terminal lugs.

#### Features & Benefits

- Sealing material is pre-installed in high temperature heat shrink sleeve
- No oven curing equipment needed
- Available in four product sizes in two different lengths
- Labor saving preinstall sealing sleeves
- Temperature and fluid resistant fluoropolymer tubing rated to 200°C continuous with excursions to 260°C
- Thin, tough and lightweight with robust fluid resistance

#### Applications

- High temperature circuit lug and splice covers
- Aerospace
- Ground Vehicles
- Commercial Aviation

### C-Wrap Side Repair Sleeve



TE Connectivity's C-Wrap side repair sleeve consists of two pieces; the outer tubing and an adhesive inner layer. It is a side-entry sleeve designed to repair and seal a damaged wire jacket that is either chafed or has a radial crack or cut on the insulation.

#### Features & Benefits

- 150°C rated
- Easy to install: saves time, man power and cost
- Color-coded to ensure proper sizing for each application
- Long term performance provides a permanent repair
- Low profile (small diameter and short length)
- Side Entry for easy access to damaged wire
- Wrap-around design eliminates de-pinning of connector for repair

#### Applications

- Used as a side-entry repair kit
- Repair of nicks, chafed and radial cracks on the wire in most Aerospace, Defense and Marine applications
- Prevents galvanic corrosion on center conductor

C-Wrap, TE Connectivity and TE Connectivity (logo) are trademarks.

# Silicon Carbide Diodes (up to 230°C)

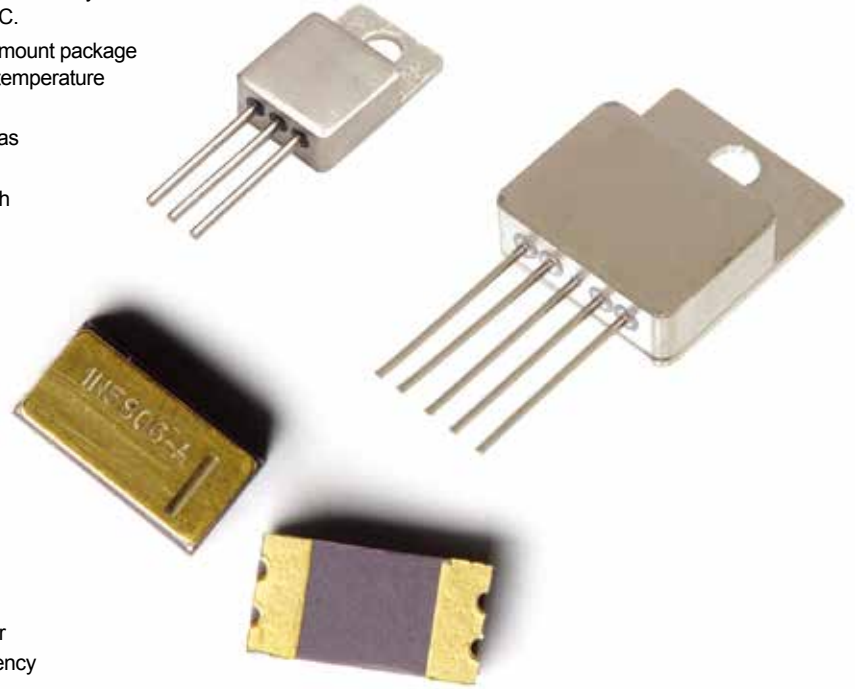
TT electronics Semelab present a range of power diodes for high reliability, high temperature applications rated for operation at up to +230°C.

The DLCC (Diode Leadless Chip Carrier) is a ceramic, surface mount package designed specifically for high reliability applications where high temperature and high reliability are of paramount importance.

A new 600V, 10A, 5-lead package has been developed for use as a Power Schottky Full Bridge Rectifier.

And there are several TO257 hermetic parts offering superb high temperature operation, ultra efficiency and extreme reliability.

All parts are available fully screened in accordance with international standards.



## Applications

- High reliability defence programmes
- Space exploration and satellite missions
- Aerospace engines, systems and nacelles
- Downhole drilling

## Features & Benefits

- Light weight packages for reduced weight
- High temperature operation to +230°C
- High performance design for smaller systems with more power
- Improved switching and high frequency die for improved efficiency
- Fully screened parts available

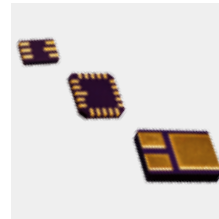
## Power Modules



### Features & Benefits

- Extended reliability
- Improved thermal performance
- Lighter weight
- Higher power density (smaller)
- Harsh environment capability
- High reliability screening
- Long term supply
- Hermetic or Plastic Hi-Rel

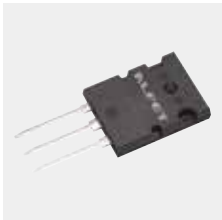
## Aerospace Discretes



### Features & Benefits

- More than 10,000 device types
- Wide range of modern and traditional packages
- Screening to international standards
- Custom designs – MCAs and Modules
- Assembly, test and qualification
- Parts can be screened in accordance to MIL-PRF-19,500 flows
- Long term supply policy

## ALFET Lateral MOSFETs for Audio



### Features & Benefits

- Specifically designed for audio amplifier power output stages
- Excellent sound quality
- Complementary N&P parts in wide range of packages
- Double-Die devices, replaces two standard parts

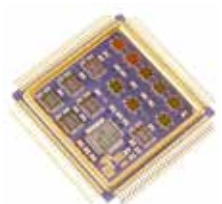
## RF VDMOS



### Features & Benefits

- Ultra wide band: 1MHz – 1GHz
- Gain of 20dB VHF, 16dB UHF
- Wide power range: 750mW – 400W
- Very low Rds (ON)
- High efficiency >50% broadband
- Low feedback capacitance
- Excellent thermal stability
- Diamond enhanced performance
- 12.5V devices in ranges to 500MHz and 1GHz
- 28V devices for frequencies to 1GHz
- 50V devices optimised for broadcast applications

## Multi Chip Module



### Features & Benefits

- High temperature to-fired ceramic (HTCC)
- High density – reduced size and weight
- Hermetically sealed
- Qualified temperature: -55°C – +150°C
- Extended high temperature approval testing: -55°C – +205°C

## Software Controlled Fuse



### Features & Benefits

- Automatic activation of fuse if fault condition detected by control software
- Low weight, robust and reliable
- Consistent fusing at high altitude and at -40°C – +115°C

# Vishay Draloric Beyschlag Qualified Products

In 2002 the competitors Draloric and Beyschlag were merged into a new division of the globally operating Vishay Intertechnology, Inc. This step combined many decades of expert knowledge and wide experience. Draloric, having emerged from a former Rosenthal industrial ceramics activity established in 1900, enjoys the recognition as an approved manufacturer of various types of resistors within the CECC Quality Assessment System since 1974. Since 1994, thin film resistors qualified to high reliability specifications have been provided to the European space industry, leading to the 1999 qualification of the MS1 MINI-MELF resistor by the European Space Agency. Beyschlag was founded 1931 in Berlin to meet the growing needs of the new and upcoming radio industry. Also in 1974, Beyschlag had achieved the recognition "Approval of Manufacturer" within the CECC Quality Assessment System for their production of film resistors. In 1996 the next level of quality management has been attained by achieving the "Technology Approval", which is superior to the variety of individual "Qualification Approvals" to the individual detail specifications. Vishay Draloric Beyschlag has established an outstanding reputation for their products being used in demanding applications, under harsh environmental conditions, and where functional reliability is required for a long operating life.

## Thin Film Chip Resistors



### Features and Benefits

- Advanced thin film technology
- Excellent overall stability
- Superior moisture resistivity

### Draloric Brand TNPS Series

- **TNPS0603 ESCC; TNPS0805 ESCC; TNPS1206 ESCC**  
ESA approval to ESCC 4001/029, SnPb termination plating

### Beyschlag Brand MC\_Series

- **MCS 0402; MCT 0603; MCU 0805; MCA 1206**  
Industrial level IECQ-CECC approval to EN 140401-801, professional and precision specification, RoHS compliant
- **MCS 0402 AT; MCT 0603 AT; MCU 0805 AT; MCA 1206 AT**  
Industrial level IECQ-CECC approval to EN 140401-801, automotive grade, professional and precision specification, RoHS compliant
- **MCS 0402 VG01; MCT 0603 VG01; MCU 0805 VG01; MCA 1206 VG01**  
Military level IECQ-CECC approval to EN 140401-801 with established reliability, failure rate level E6, RoHS compliant

## Thick Film Chip Resistors



### Features and Benefits

- Metal glaze film
- High quality ceramic substrates
- Protective overglaze

### Draloric Brand CRCW Series

- **CRCW0805 EN802 E0; CRCW1206 EN802 E0**  
Industrial level IECQ-CECC approval to EN 140401-802, RoHS compliant
- **CRCW0805 EN802 E6; CRCW1206 EN802 E6**  
Military level IECQ-CECC approval to EN 140401-802 with established reliability, failure rate level E6, RoHS compliant

### Beyschlag Brand D Series

- **D12 EN802 E0 (Size 0805); D25 EN802 E0 (Size 1206)**  
Industrial level IECQ-CECC approval to EN 140401-802, SnPb termination plating
- **D12 EN802 E6 (Size 0805); D25 EN802 E6 0 (Size 1206)**  
Military level IECQ-CECC approval to EN 140401-802 with established reliability, failure rate level E6, SnPb termination plating

## Leaded Wirewound Resistors



### Features and Benefits

- All welded construction
- Vitreous coating
- Enhanced humidity protection

### Draloric Brand G200 Series

- **FDG (G202); FDK (G204); FDK (G206)**  
Industrial level IECQ-CECC approval to CECC 40201-801, RoHS compliant

## Thin Film MELF Resistors



### Features and Benefits

- Excellent overall stability
- Outstanding environmental robustness
- Superior pulse load capability

### Draloric Brand SMM0204

- **SMM0204 EN803 E0**  
Industrial level IECQ-CECC approval to EN 140401-803, automotive grade, RoHS compliant
- **SMM0204 EN803 E8**  
Military level IECQ-CECC approval to EN 140401-803 with established reliability, failure rate level E8, RoHS compliant

### Draloric Brand MS1

- **MS1 EN803 E8 (Size 0204, MINI-MELF)**  
Military level IECQ-CECC approval to EN 140401-803 with established reliability, failure rate level E8, SnPb termination plating
- **MS1 ESCC (Size 0204, MINI-MELF)**  
ESA approval to ESCC 4001/022, SnPb termination plating

### Beyschlag Brand MM\_Series

- **MMU 0102; MMA 0204; MMB 0207**  
Industrial level IECQ-CECC approval to EN 140401-803, automotive grade, professional and precision specification, RoHS compliant
- **MMA 0204 HT**  
Industrial level IECQ-CECC approval to EN 140401-803, high temperature, automotive grade, RoHS compliant
- **UMA 0204**  
Industrial level IECQ-CECC approval to EN 140401-803, high precision, RoHS compliant
- **MMU 0102 VG03; MMA 0204 VG03; MMB 0207 VG03**  
Military level IECQ-CECC approval to EN 140401-803 with established reliability, failure rate level E6, RoHS compliant

## Leaded Metal Film Resistors



### Features and Benefits

- Advanced thin film technology
- Excellent overall stability
- Controlled low TCR and tolerances

### Beyschlag brand MB\_/SMA Series

- **MBA/SMA 0204; MBB/SMA 0207; MBE/SMA 0414**  
Industrial level IECQ-CECC approval to EN 140401-803, professional and precision specification, RoHS compliant
- **MBA/SMA 0204 VG06; MBB/SMA 0207 VG06; MBE/SMA 0414 VG06**  
Military level IECQ-CECC approval to EN 140401-803 with established reliability, failure rate level E7, RoHS compliant

# Vishay Sfernice ESCC Space Qualified Range

Vishay Sfernice has been involved in space programs for more than 30 years. It is one of the last European manufacturers to be space qualified. The strategy of Vishay Sfernice Thin Film Division is to offer a wide range of qualified resistive products, chip resistors and chip arrays from 0Ω to 3 MΩ. Vishay Sfernice thin film is the first passive manufacturer to hold the ESCC/QMML Technology Flow Qualification. This qualification opens the door to a new concept at ESA: The failure rate option similar to the one offered in the MIL system. The former level C (enhanced performances) will still remain available and level B suppressed from the ESA specifications. New specifications describing this new concept have been released by the ESA: 2544001: Requirements for the Technology Flow Qualification of Film Resistors; 26000: Failure Rate Level Sampling Plans and Procedures; 21300: Terms, Definitions, Abbreviations, Symbols and Units; 21700: General Requirements for the Marking of the ESCC Components; 4001: Generic Specification Resistors Fixed Film; 4001023: Resistors, Fixed, Chip, Thin Film, Type PHR

## Thin Film SMT Chips ESCC4001/023

Space Qualified (ESA) PHR



### Features and Benefits

- 0402 to 2010
- Ohmic range: 10Ω – 6 MΩ
- Qualified ohmic range: 10Ω – 3 MΩ
- Tolerance down to 0.01%
- TCR down to 5ppm/°C (-55°C; +155°C)
- Operating temperature range: -65°C +155°C



Established reliability "R" failure Rate (ESA) PFRR



### Features and Benefits

- 0402 to 2010
- Ohmic range: 10Ω – 6MΩ
- Qualified ohmic range: 100Ω – 3 MΩ
- Tolerance down to 0.05%
- TCR down to 10ppm/°C (-55°C – +155°C)
- Operating temperature range: -65°C – +155°C

## Thick Film SMT Chips ESCC4001/026

Space Qualified (ESA) CHPHR



### Features and Benefits

- 0603 to 2512
- Ohmic range: 0.1Ω – 100MΩ
- Qualified ohmic range: 1Ω – 10MΩ
- Tolerance down to 1%
- TCR down to 100 ppm/°C (-55°C – +155°C)
- Operating temperature range: -65°C – +155°C



## Thin Film Chips CECC 40401-010

CECC Qualified: RV



### Features and Benefits

- 0505 to 1206
- Conform to EN 140401-804
- Qualified ohmic range: 100Ω – 1MΩ
- Tolerance down to 0.1%
- TCR down to 10ppm/°C (-55°C – +155°C)
- Operating temperature range: -55°C – +155°C



## Thin Film SMT Chips Arrays ESCC4001/025

Space Qualified (ESA) PRAHR/CNWHR



### Features and Benefits

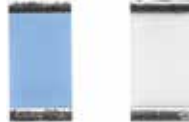
- 3 sizes (PRAHR100, PRAHR135 or PRAHR150)
- Ohmic range: 10Ω – 3MΩ
- Qualified ohmic range: 100Ω – 1MΩ
- Tolerance ratio down to 0.05%
- TCR ratio down to 3ppm/°C (-55°C – +155°C)
- Operating temperature range: -65°C – +155°C
- 2 to 8 resistors in same network
- Same (PRAHR) or different ohmic value (CNWHR) in same network



## Qualification Ongoing

### Thin Film Low Value SMT Chips ESCC4001/xxx

Space Level (ESA) LHR



### Features and Benefits

- 0603 to 2512
- Ohmic range: 0.1Ω – 9.99Ω
- Future qualified ohmic range: 0.25Ω – 9.99Ω
- Tolerance down to 1%
- TCR down to 100ppm/°C (-55°C – +155°C)
- Operating temperature range: -65°C – +155°C

### Thin Film 0Ω Jumper SMT Chips ESCC4001/xxx

Space Level (ESA) PZHR

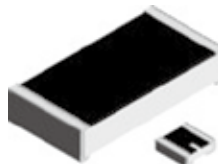


### Features and Benefits

- 0402 to 2512
- Operating temperature range: -65°C – +155°C
- Available now with option 0057 on PZR: PZRxxxx0057

# Vishay Dale Qualified Products

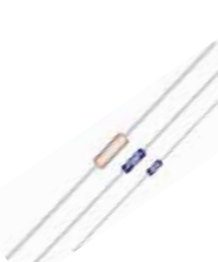
## Established Reliability Military Chip Resistors



### Features and Benefits

- QPL MIL-PRF-55342 qualified Thick and Thin film resistors
- Pre-tinned Nickel Barrier Wraparound termination
- Established reliability, "R" failure rate level standard
- Laser-trimmed tolerances down to ±1% at Thick film, down to ±0.1% at Thin film technology
- Complete MIL-testing available in house

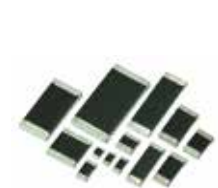
## Established Reliability Metal Film Military Resistors



### Features and Benefits

- "S" Failure rate standard for most sizes
- MIL-PRF-39017, type RLR
- Available in MIL sheet sizes 05, 07, 20 & 32
- DSCC drawing (Non-QPL) available on multiple sizes to extended resistance ranges
- MIL-PRF-55182, type RNC, RNR/RNN
- Available in various MIL sheet sizes
- Characteristics J, H & K (Non-Hermetically-Sealed)
- Characteristics C & E (Hermetically-Sealed)

## Military/Established Thick Film Chip Resistors, 0Ω Jumper



### Features and Benefits

- New MIL-PRF-32159 replaces several MIL-drawings
- Reliability MIL-PRF-32159 qualified, type RCZ
- Pre-tinned Nickel Barrier Wraparound termination
- Established reliability, "M" failure rate level standard
- 100% group A screening per MIL-PRF-32159

# Wet Tantalum Capacitors

## SuperTan® Extended Capacitors, Wet Tantalum with Hermetic Seal STE/DSCC 10004

### Features and Benefits

- Temperature range: -55°C – +85°C, to +125°C with voltage derating
- Maximum ESR: 0.25Ω – 1.5Ω at 120Hz
- Capacitance range: 180μF – 10 000μF
- Capacitance tolerance of ±20 % standard at 120 Hz and +25°C, tolerance of ±10% available



### Applications

- Low/voltage filtering and energy storage applications
- High/stress military and aerospace systems including: Weapon systems, Radars, Transponders, Power supplies

## Wet Tantalum High-Energy Capacitor HE3/DSCC 10011

### Features and Benefits

- Capacitance range: 1,100μF – 72,000μF
- Low ESR: 0.035Ω
- Ripple current capability: up to 16A
- Utilises proven SuperTan® hybrid technology
- Withstands high stress and hazardous environments



### Applications

- Airborne radar
- Military
- Weapons systems
- Pulse power devices

## Wet Tantalum, Axial Leaded, Tantalum Case, Extended Capacitance, Enhanced Performance – T16

### Features and Benefits

- Higher capacitance
- Greater reverse voltage capability
- Extended thermal shock capability
- Greater vibration capability
- Temperature range: -55°C – +85°C, to +125°C with voltage derating
- Low ESR down to 0.70Ω at 120Hz and +25°C

### Applications

- Power supplies for space and avionics applications
- Timing
- Filtering
- Energy hold-up
- Pulse power



# Vishay Semiconductors

## N-Channel MOSFETs

DSCC NUMBER	SILICONIX PART NUMBER	DESCRIPTION
JAN2N6660	2N6660JAN02	N-Channel MOSFET, 60V, 3Ω
JANTX2N6660	2N6660JTX02	N-Channel MOSFET, 60V, 3Ω
JANTXV2N6660	2N6660JTXV02	N-Channel MOSFET, 60V, 3Ω
JAN2N6661	2N6661JAN02	N-Channel MOSFET, 90V, 4Ω
JANTX2N6661	2N6661JTX02	N-Channel MOSFET, 90V, 4Ω
JANTXV2N6661	2N6661JTXV02	N-Channel MOSFET, 90V, 4Ω



## Analog Multiplexers

DSCC NUMBER	SILICONIX PART NUMBER	DESCRIPTION
5962-9204201MEA	9204201EA	DG408, 8-Ch High-Performance CMOS
5962-9204201M2A	92042012A	DG408, 8-Ch High-Performance CMOS
5962-9204201MXA	9204201XA	DG408, 8-Ch High-Performance CMOS
5962-9204201MXC	9204201XC	DG408, 8-Ch High-Performance CMOS
5962-9204202MEA	9204202EA	DG409, Dual 4-Ch High-Performance CMOS
5962-9204202MEC	9204202EC	DG409, Dual 4-Ch High-Performance CMOS
5962-9204202M2A	92042022A	DG409, Dual 4-Ch High-Performance CMOS
5962-9204202M2C	92042022C	DG409, Dual 4-Ch High-Performance CMOS
5962-9204202MXA	9204202XA	DG409, Dual 4-Ch High-Performance CMOS
5962-9204202MXC	9204202XC	DG409, Dual 4-Ch High-Performance CMOS



## Analog Switches

DSCC NUMBER	SILICONIX PART NUMBER	DESCRIPTION
5962-9073704MPA	9073704PA	DG417B, Precision Monolithic SPST (NC) CMOS
5962-9073705MPA	9073705PA	DG418B, Precision Monolithic SPST (NO) CMOS
5962-9073706MPA	9073706PA	DG419B, Precision Monolithic SPDT (NO/NC) CMOS





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